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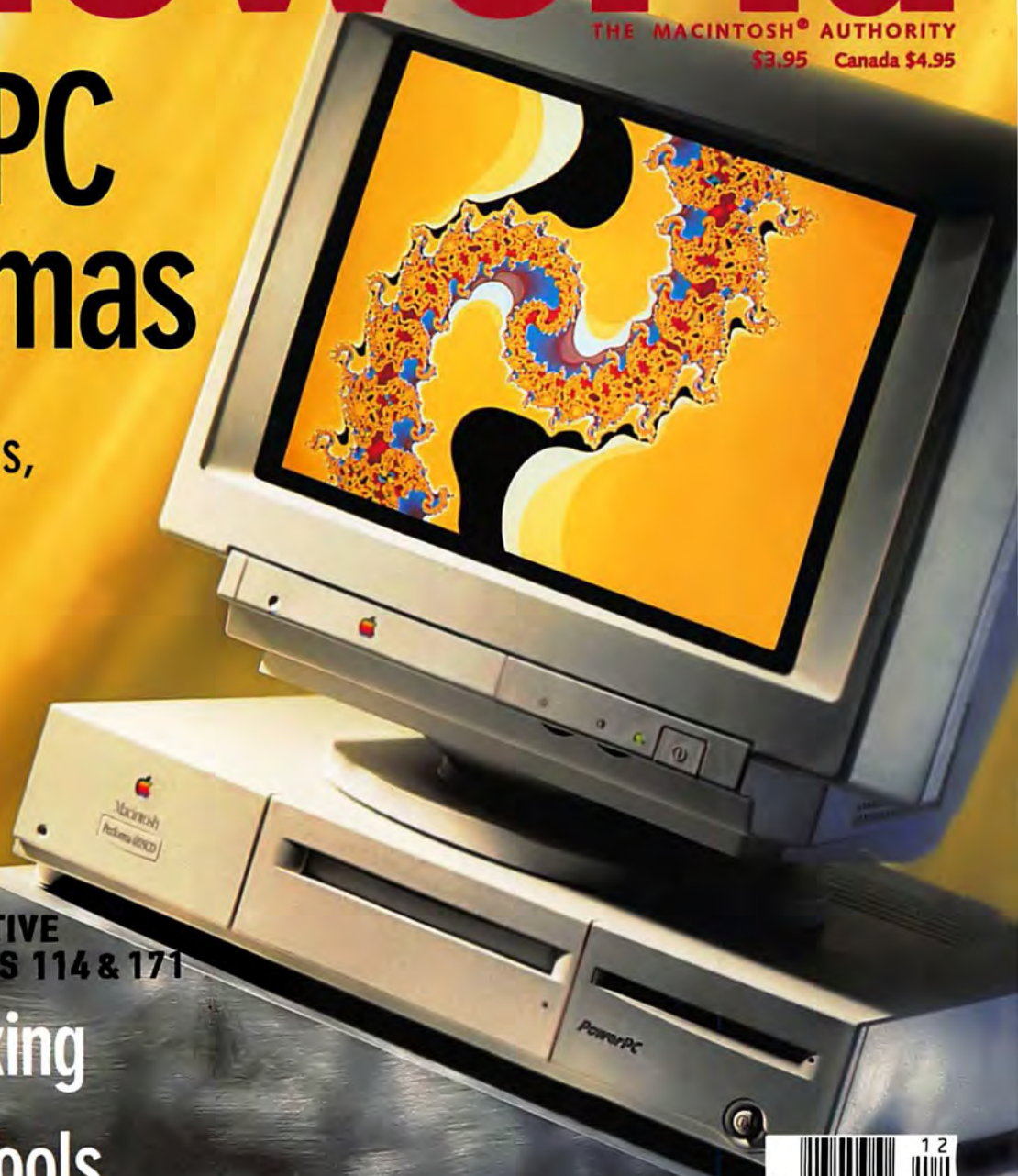

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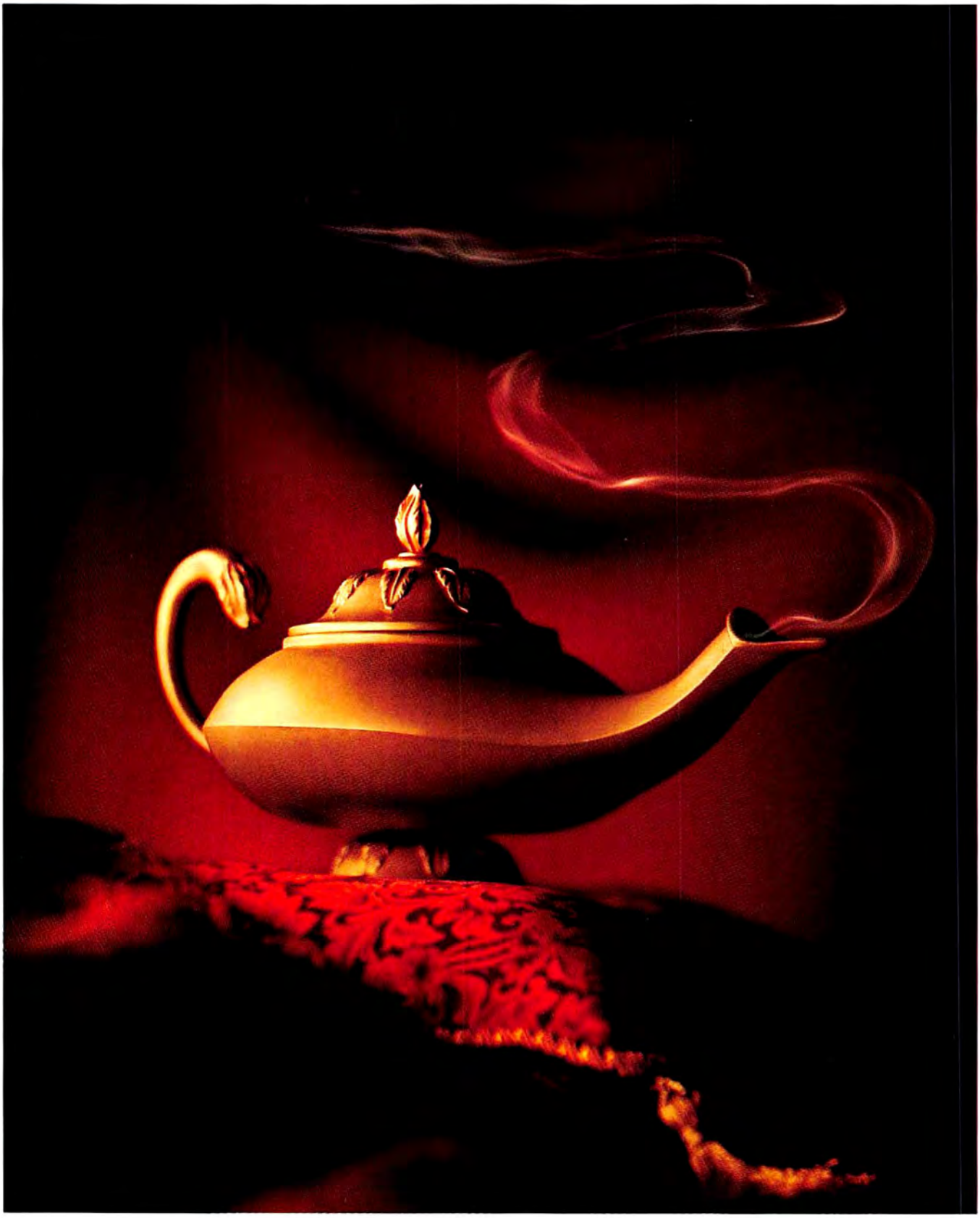

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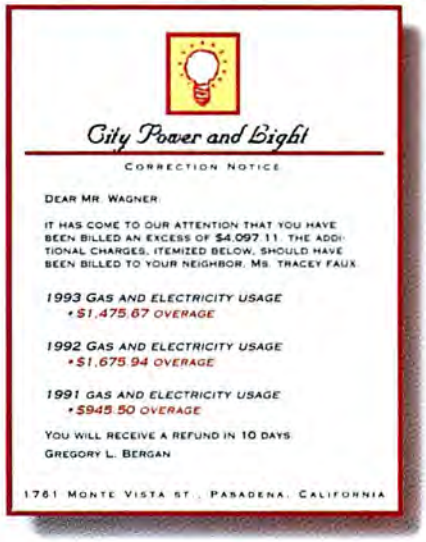

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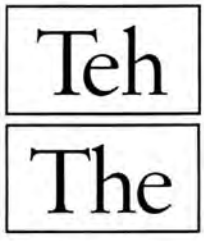

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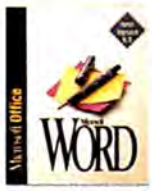

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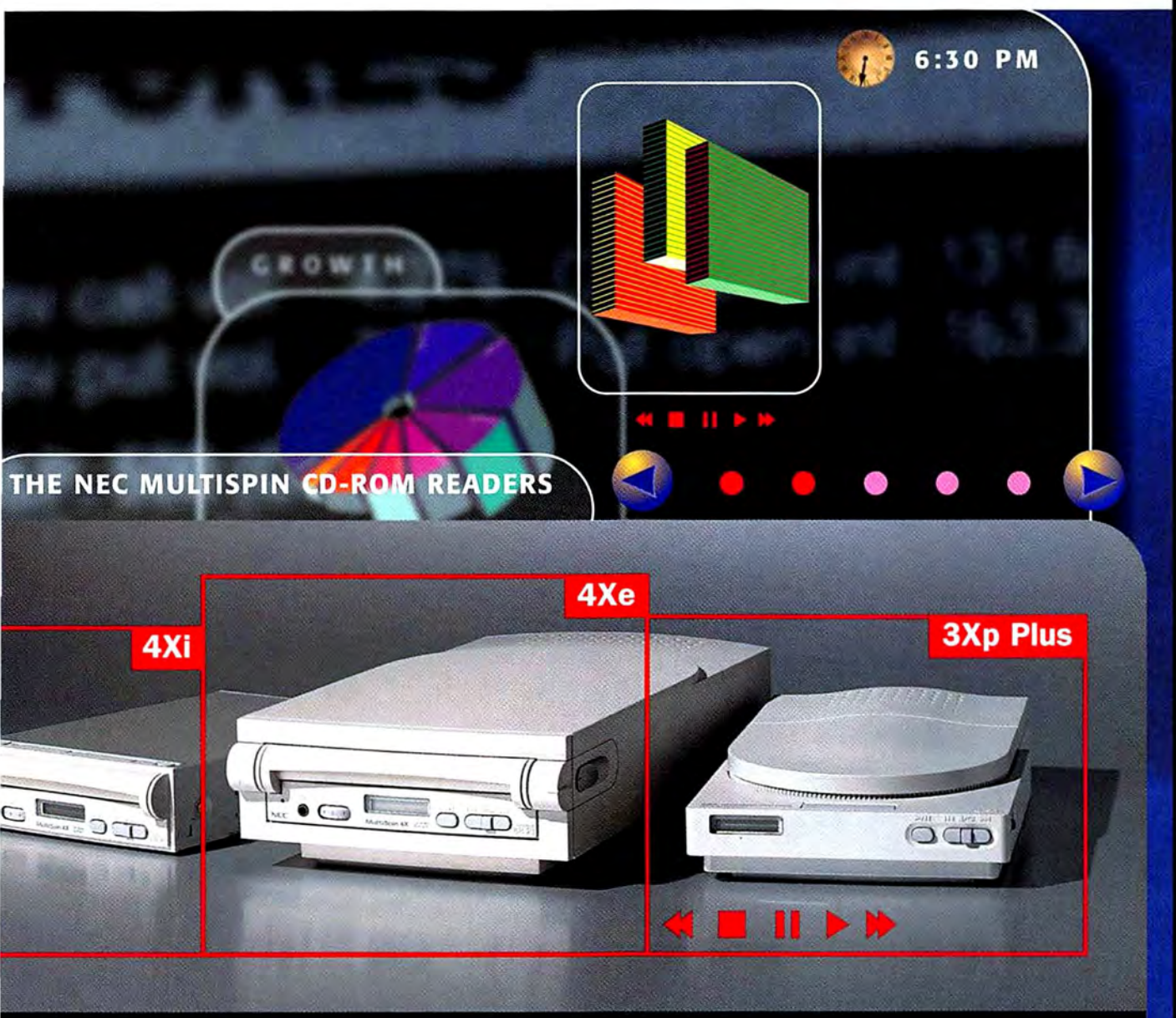

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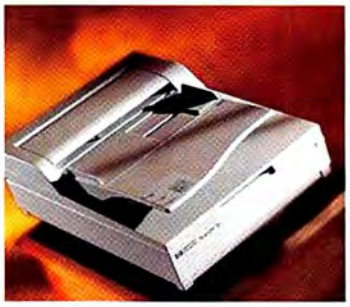

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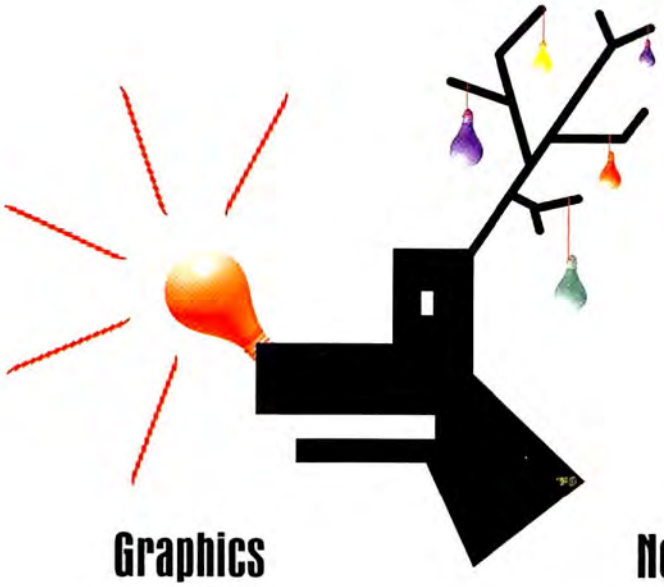

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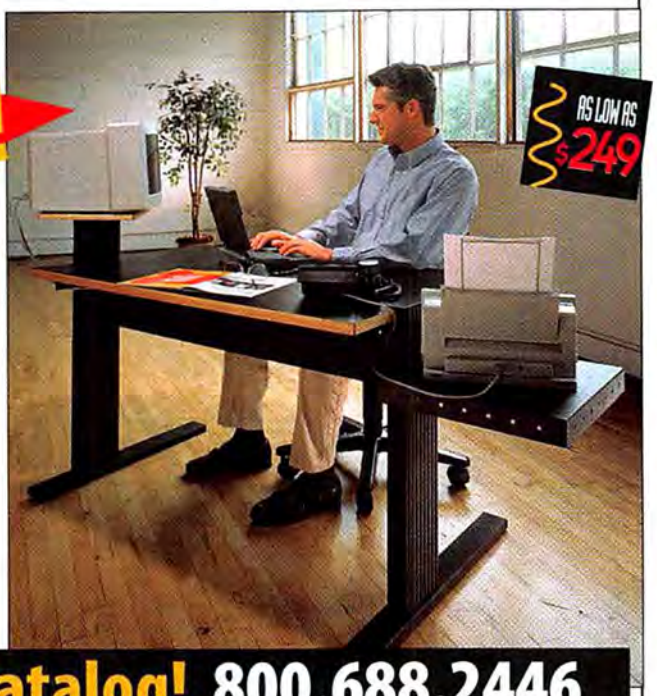

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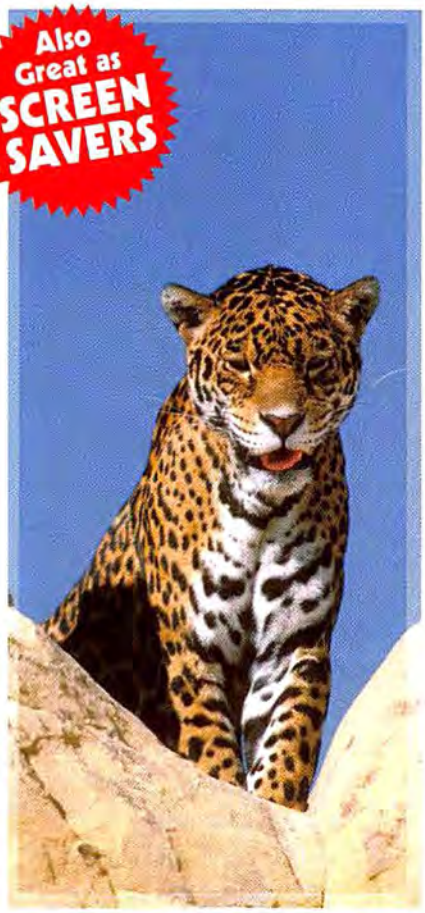

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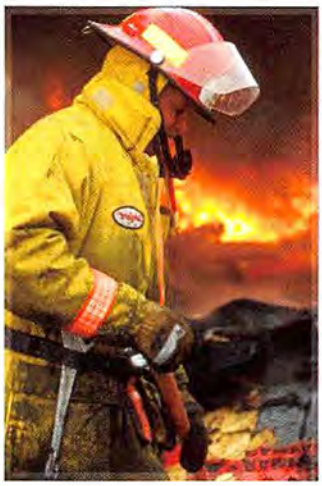

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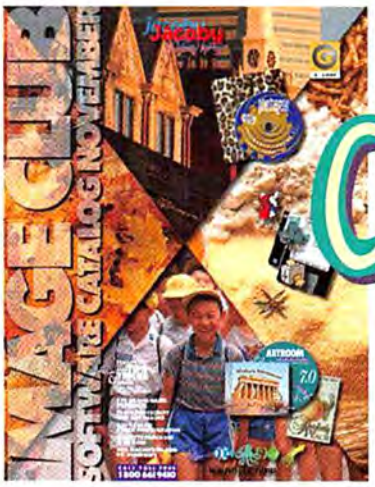

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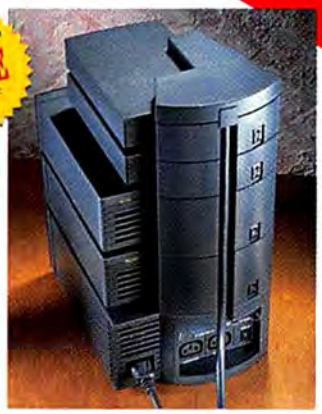

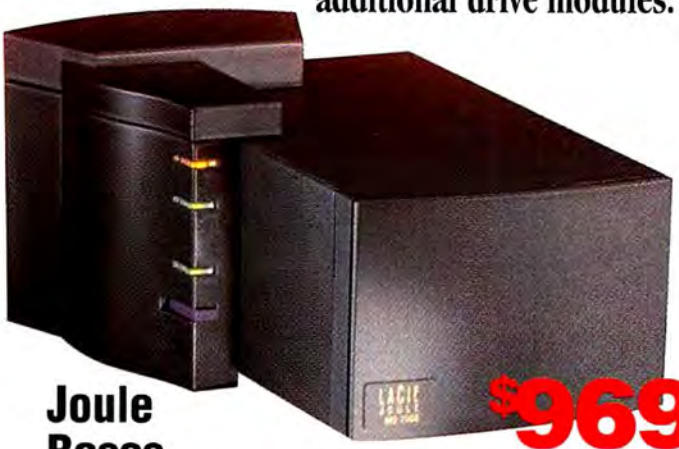

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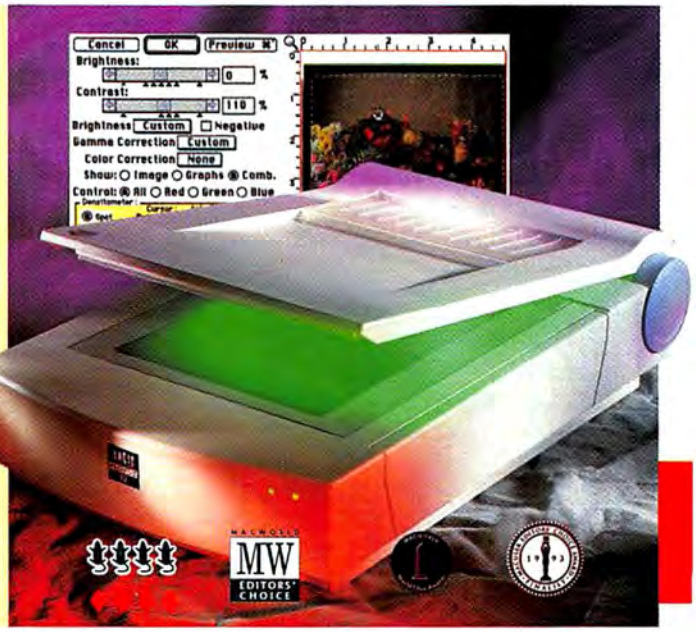

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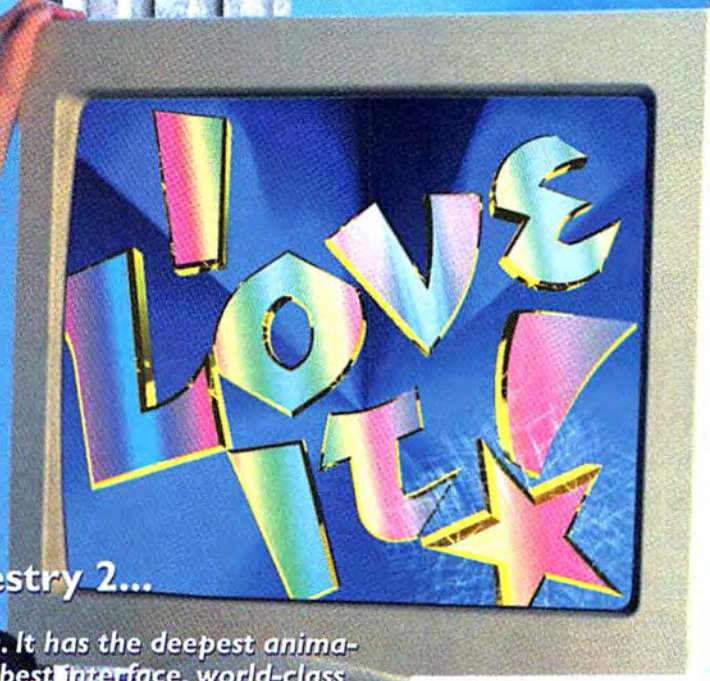

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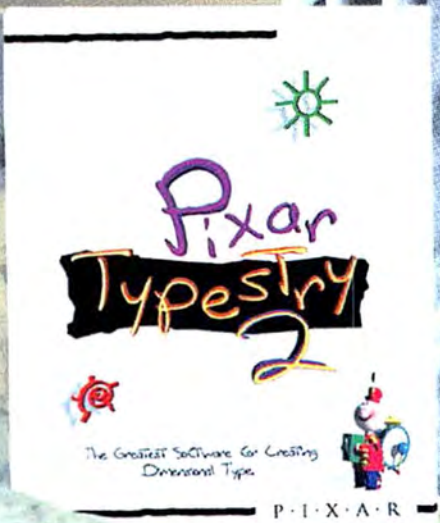

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BY ADRIAN MELLO

Suite Smell of Success

Can anyone challenge Microsoft's dominance?

BUNDLING IS A BIG DEAL ON the PC side of things. The most important bundles are called suites—collections of several complementary packages. The best-selling PC suites are collections of business-productivity programs offered by Microsoft, Lotus, and WordPerfect. These suites typically include a spreadsheet and a word processor as the foundation. Depending on the suite, you also get some other applications, such as a database manager, an E-mail license, a presentation package, or an organizer.

But suites aren't much of a factor on the Mac. Microsoft Office is the only Mac suite that's as important as the ones you see in the PC market. Office is a pretty good deal. For under $500 you get Word, Excel, PowerPoint, and a workstation license for Microsoft Mail.

The unchallenged position of Office is the best symbol of Microsoft's domination of the productivity market on the Mac. It's obvious that Microsoft competes extremely successfully as an applications vendor on the Mac platform, and it does so without control of the system software. The biggest question is whether Microsoft will build a yet more dominating position in the Mac applications market or whether it has reached its zenith.

Office and OLE

Beyond its dominance, the most interesting thing about Office is its relationship to OLE (Object Linking and Embedding)—Microsoft's method of linking applications together. OLE lets you update and work on portions of documents, such as spreadsheets and charts, directly in your word processing document without leaving the word processing document for another application. (See the feature article "OpenDoc and OLE 2.0," *Macworld*, November 1994.)

Microsoft is using a certification program to push OLE developers to use the Office interface on their applications. Applications that meet the Office interface guidelines get to have a sticker on the box that shows they comply with Microsoft's requirements.

What would happen if OLE succeeded and third-party developers felt compelled to conform to the Office interface guidelines? Microsoft would be more likely to determine the way all sorts of applications look and behave. Also, developers might have less room to differentiate their own products, and that could reduce the survival rate of innovative non-Microsoft applications. Preventing a Microsoft monopoly is undoubtedly one part of the motivation behind OpenDoc—a linking technology that competes with OLE and is supported by a consortium called CILabs.

If you combine the possible implications of OLE's and Office's becoming unofficial Mac interface standards with the effects of bundling, you may wonder what the future holds for application developers other than Microsoft. Where they now compete to offer the best-selling spreadsheet or database-management program, developers' only option might be to create niche products in the space left unoccupied by the big suites. And if Office succeeds enough to alter the Mac interface standard at the application level, Office will further consolidate its position as the leading suite and thus crowd out other applications.

Microsoft as Brando?

Strangely enough, Microsoft's applications, so noteworthy for their stellar success, are now taking on a Brandoesque character. Microsoft has achieved such a massive stature that it approaches the market with no sense of urgency whatsoever; note the company's nonchalance in delivering its Power Mac applications. Also, many customers are balking at the memory and storage requirements of the latest versions of Excel and Word that are just now shipping. These programs have become shamelessly ponderous, and unfortunately, they are good examples of what happens to software design when it's driven by the marketing urge toward endless additional features. Initial reports on Word 6.0 are that it lumbers through operations more slowly than Don Corleone talks. At this writing, it's not clear if Excel is substantially slower, but it doesn't appear to be as fast as the previous version.

For these reasons, competitors have an opportunity to challenge Microsoft's seeming invincibility. ClarisWorks is proof that you can beat Microsoft at its own game. The new Word's slow speed and large size appear to leave an opening for the competition. But it will take a concerted effort to make headway against Word's tremendous momentum. Perhaps the best way for other companies to challenge Microsoft's application hegemony would be to offer strong suites.

The Competition

Are there any challengers to Office in the Mac market? Possibly the strongest one to Microsoft Word is WordPerfect, with its rich feature set and loyal cross-platform following. WordPerfect was quick to debut innovative Mac technologies like QuickTime and was available in a native version when the Power Macs were intro-

continues

GLENN MITSUI/STUDIO MD

duced. And despite Word's dominance, WordPerfect continues to develop and promote its main product and appears to be slowly increasing its market share. In terms of a suite, the company offers Quattro Pro on the PC side, and it could possibly offer a Mac version (though it has made no announcement to this effect). The company also has a mail package and an integrated software package.

If not WordPerfect, what about Lotus? Lotus 1-2-3 was a nice spreadsheet on the Mac, and Lotus could always combine it with more serviceable Macintosh versions of Notes and cc:Mail. Lotus would also have to port the well-regarded AmiPro word processor. This would be a big investment and would require real commitment.

A few months ago Lotus damaged its credibility with Macintosh users by announcing that it will not support the Power Macintosh. Ironically, Lotus has yet to show that it can create a successful Macintosh product, despite several attempts. Lotus 1-2-3 was good but seemed to receive halfhearted parental support. Lotus seems to wilt in the presence of competition from a market leader. Hopefully, Lotus will develop a long-term strategy that will permit it to maintain a serious presence in the Mac market.

Claris has a full house of programs out of which to make an impressive suite including a word processor, spreadsheet, database manager, and personal organizer. And Claris has a unique advantage because it could upgrade its ClarisWorks users to a suite (if it had one). MacWrite Pro would have to challenge Word's feature set without losing its own performance edge and superior interface. FileMaker Pro is the leading flat-file database manager with no obvious challengers in sight. Like other spreadsheets, Claris's Resolve gave up the ghost in the face of Excel's inexorable domination of the Mac market. Claris could round out its suite with a choice or two from its outstanding collection of graphics packages, such as ClarisDraw and ClarisImpact.

Claris has another ace in the hole. It is owned by Apple Computer. A few years ago any visible coordination of efforts between Apple and Claris would have been extremely controversial among Apple's developers, but nobody much worries about this anymore. If Apple wanted to be really aggressive, it could put the suite on Macintosh hard drives and use that to sell Mac hardware-software packages.

OpenDoc

It's more than an interesting coincidence that Apple, Lotus, and WordPerfect are all part of the OpenDoc consortium. Maybe they could work together and build a couple of OpenDoc-compliant suites that would help them sell individual products and demonstrate the superiority of OpenDoc technology. What about a WordPerfect, 1-2-3, FileMaker bundle? ClarisWorks customers might like a discounted upgrade to this bundle once they outgrow their integrated package.

The next version of Windows (at press time referred to as Windows95) is the equivalent of a software aircraft carrier, with built-in word processing and mail applications that are like cruise missiles aimed at the key assets of WordPerfect and Lotus. In the long run, some sort of cooperation will be necessary to challenge Microsoft's domination of the software market, and OpenDoc seems the perfect means to do that. A suite would be a great way to showcase OpenDoc, provide a strong launch for this technology, and make it immediately meaningful. m

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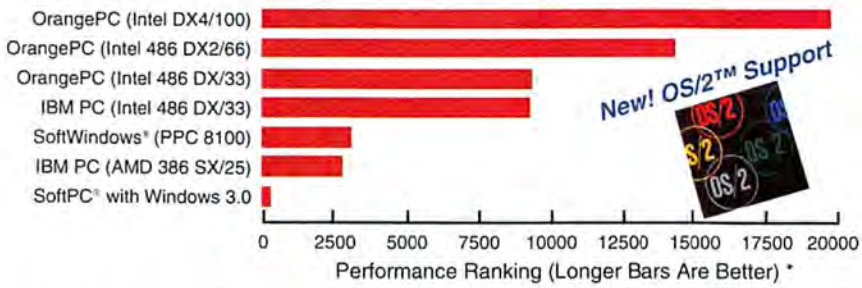

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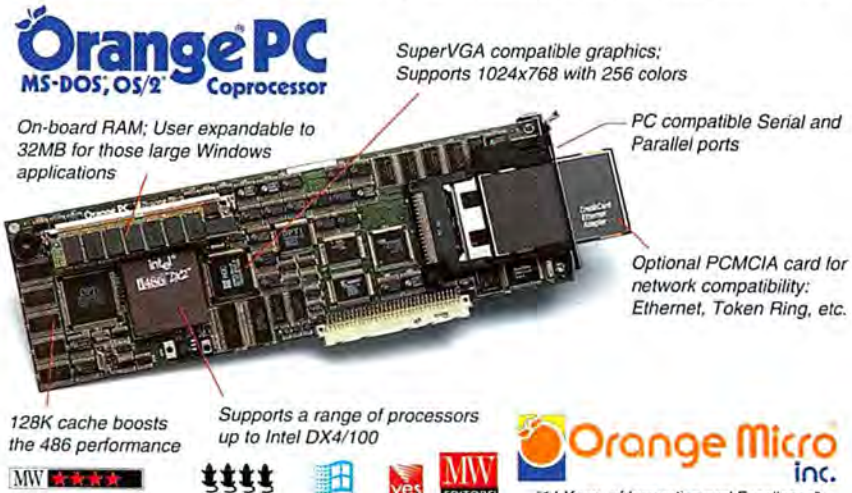
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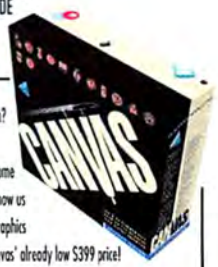

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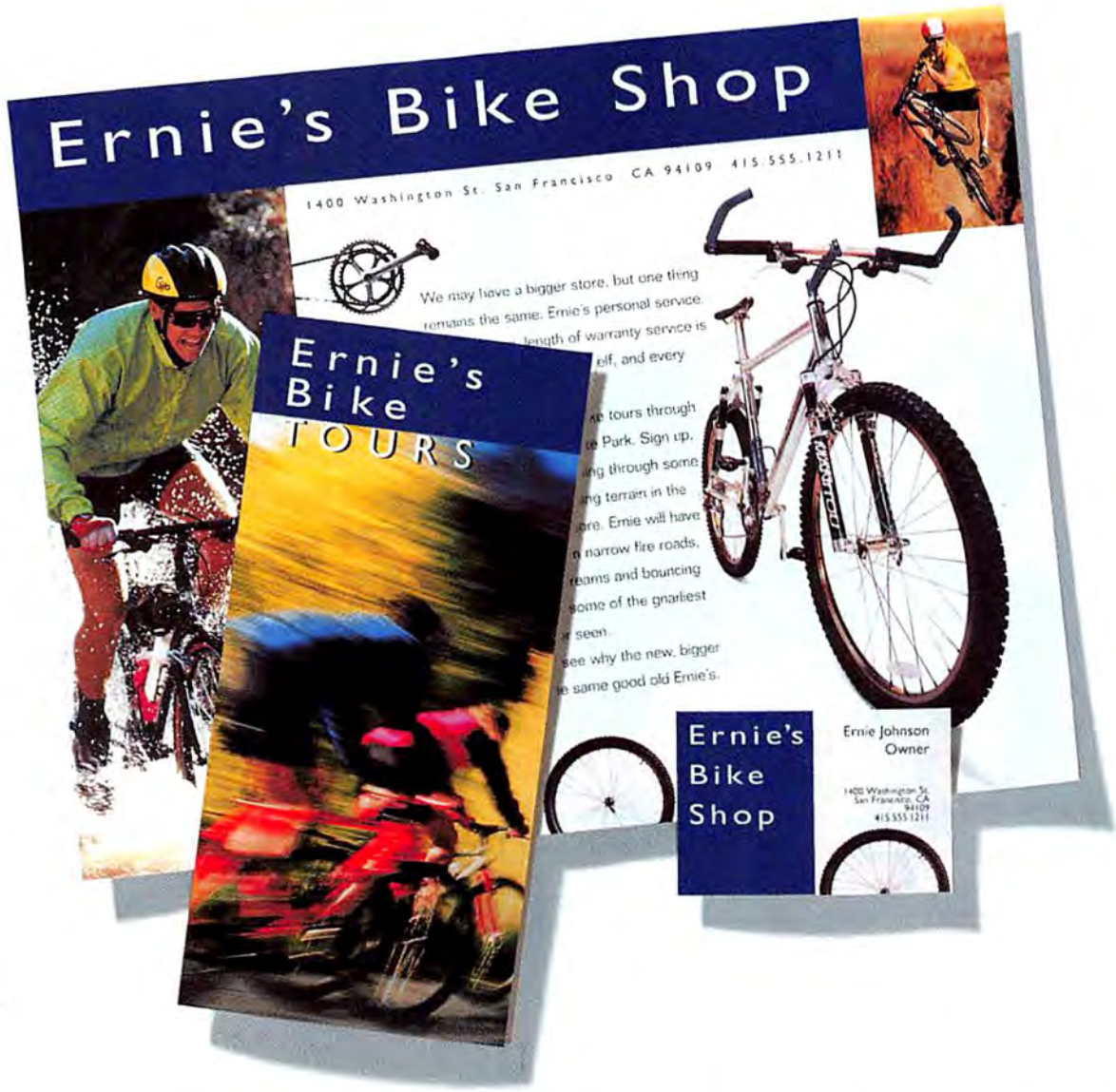

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Letters

System 7.5: Mixed Blessings

WHY, JUDGING FROM LON POOLE'S article, System 7.5 isn't for me ("System 7.5," September 1994).

1. It appears to offer me nothing I need that the terrific System 7.1 combined with Now Utilities doesn't already provide. If I wanted (and I don't), I could download WindowShade. I've got drag-and-drop editing within Microsoft Word, and that's plenty. I've got only one printer, and ⌘-P gets me to it just fine.

2. I've gotta ask: Has everyone who is capable of writing plain, direct English left Apple? The wording in the Extensions Manager's setup window could and should be reduced to "Use this control panel to turn off conflicting extensions." Period.

3. One of the special delights of using the Mac is the way it (and the companies that write the best Mac software) respect my intelligence. My response to the Huh? button in the Macintosh Guide Answer window is, "Huh?"

Michael Bradley
Palo Alto, California

THANKS FOR AN EXCELLENT FEATURE on System 7.5. I had been anxiously waiting for System 7.5's arrival, but your article now gives me pause: how in the world can it take up so much RAM? Specifically, I was intending to upgrade my 660AV to a Power Mac. I have 16MB of RAM on my machine, and consider that barely adequate for my current needs. With a Power Mac, would I need to start with 24MB simply to maintain current capability? Yikes.

Lane Millet
via America Online

All RISC code takes more RAM than CISC code. RISC processors such as the PowerPC process instructions more efficiently, but they need more scratch space (RAM) to handle the greater number of instructions. CISC processors can execute multiple steps from a single instruction, which means they're slower but need less scratch space. *Macworld* is currently investigating the real-world RAM requirements of System 7.5 and Power Macs; we'll have more information in January's *Quick Tips* column.—Ed.

WARD SCHUMAKER

This Is Your Text on QuickDraw GX

READING YOUR NEWS ITEM "THE Wait for QuickDraw GX Is Over—Sort Of" (*Graphics* news, September 1994), I got the impression that developers like Aldus, Adobe, and Quark are reluctant to implement portions of QuickDraw GX because there is no equivalent technology for Windows. That's comical. I get a little short of breath thinking that with QuickDraw GX I could have access to 65,000 characters in a single font, as well as built-in ligatures, tracking, kerning, and optical scaling. That's great stuff!

With QuickDraw GX, the Macintosh will do something that Windows doesn't. Back in the days when Aldus, Adobe, and Quark were Macintosh developers, the Mac routinely did things that Windows didn't do. But now it seems that these same companies have become primarily Windows developers, and more interested in Windows than in providing Macintosh users added functionality. As a user, I'll be looking into programs that provide that functionality.

This is a terrific opportunity for smaller developers. Anyone who implements QuickDraw GX and does it well could leap past developers who are more interested in supporting commonality than excellence.

Timothy Rogers
Costa Mesa, California

THANKS FOR THE VERY POSITIVE article on QuickDraw GX fonts ("Inside QuickDraw GX Fonts," October 1994). I have a couple of comments on the article. In the "GX Fonts at a Glance" sidebar the author stated, "The word *Plus* after a font name indicates it is a GX font." While one font vendor has chosen this convention, others have not. None of the new TrueType GX fonts Apple includes with the package (Apple Chancery, Hoefler, and Skia) use the word *Plus* to indicate GX-richness.

The author quite correctly stresses the need for GX-savvy applications in order to give users the benefits of the new type features. A little-known fact, however, is that SimpleText (Apple's replacement for TeachText that ships with every copy of System 7.5) can actually take advantage of some GX typographic features when printing. To see this, create a new SimpleText document. Set the font to, say, Apple Chancery at 30 points, type some text, and then print the document. Any of the QuickDraw GX typographic features the font designates as "default" features will show themselves on the printout, so you'll see automatic ligatures, kerning, some contextual swashes, old-style numerals, and so on. Check it out!

Dave Opstad
GX Line Layout Engineer
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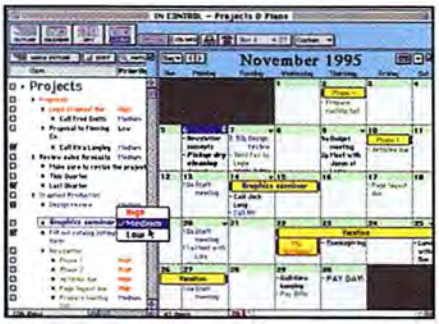

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CORRECTIONS

- *The letter about the Blacksburg Electronic Village project that appeared in the October 1994* Letters *section was not written by Gordon G. Miller III. The identity of the person who placed the letter on the online service where* Macworld *received it is currently unknown.* Macworld *apologizes for the error.*
- *Our October review of the PowerBook 540c oversimplified the work required to upgrade the machine's memory, modem, and hard drive. Also, since the review was printed, Apple has changed its policy, saying that only dealers should install internal upgrades.*

Axion Woes

IT NEEDS TO BE SAID (IN LIGHT OF Larry Woodard's letter in the August issue of *Macworld*) that Axion appears to be anything but solvent. In early 1994 I bought an Axion serial switch, but the product was incompatible with my hardware configuration. I called Axion, they gave me an RMA number, and I sent the switch back for a refund. After about two months, I called and was told that the company had reorganized and was just getting back on its feet—and that I should have my refund in about four weeks. After another month and a half, I called again and left a message, but received no call in return. The next week (we're up to June 3 by this time) I called Axion again and was promised that my refund would be expedited, and told that I should have it within a week.

A full month later, I called Axion again. This time I got a person who called himself the manager of customer support, who told me my account had somehow been credited instead of my money refunded. After I had faxed him a copy of my packing slip, the manager of customer support said he would expedite my refund check, and I should have it in two weeks. Five and a half weeks and two phone calls later (August 8), I called the manager of customer support and told him that it was time to go over his head to maybe get something done. He said the only thing he could do was give me the number of his accounting firm. But for all practical appearances, their accountant doesn't take phone calls.

Please advise all potential Axion customers that the company does not stand behind its product or its warranty and all would be better off looking for hardware elsewhere. In fact, Axion has probably accumulated nearly as much in phone bills from me calling its toll-free number as it would have spent if Axion had simply sent me my $88.52 and moved on.

Marc Williams
Yucaipa, California

After two weeks of repeated phone calls, *Macworld* obtained the following response: "Axion values its customers very much. [We] have spoken to Mr. Williams, apologized for the delay in taking care of the matter, and mailed him a refund check for $88.52. Axion has sold several thousand serial switches and Mr. Williams' case is an isolated one. He is entitled to his own opinion, but Axion has treated all its customers fairly, and the company stands behind its product 100%."

Macworld has confirmed that Marc Williams has received a check and an apology.—Ed.

Lighten Up on the 540c!

WAS GALEN GRUMAN HAVING A BAD day when he reviewed the PowerBook 540c (*Reviews*, October 1994)? I can't think of many other reasons for all the supposed cons he thought up.

Perhaps he just didn't spend enough time with the computer, which would explain why he thought the whirring noise it produces comes from a fan, rather than from the hard disk. Perhaps he is a PC user at heart, which would explain why he was surprised to find the start-up key placed on the keyboard in the standard Mac location. Maybe his repetitive strain injury was acting up, which is why he thought you'd have to like a trackball to like the (amazing) trackpad. Mr. Gruman calls the 540c's Ethernet port nonstandard, but it works fine with the same connectors as our office's Quadras and Power Macs.

Like most PowerBook owners I've heard from, I run out of superlatives when talking about my computer (a 520c), and I was surprised to read such a negative review. I hope Mr. Gruman is having a better day today.

Steven Haddock
Santa Barbara, California

The noise coming from the 540c was indeed the hard drive. There is no fan in the PowerBook—it just sounds like there is. I was wrong to say that Apple changed the standard for the Ethernet connector on the PowerBook 500 series, but I was not wrong that older AAUI connectors are incompatible. The Ethernet port on the 500 series is recessed, while on desktop Macs the port actually extends out a bit from the back of the case (something you wouldn't want on a portable). Some vendors have been shipping Ethernet cables with an extra lip around the connectors. These fit in the desktop Macs' Ethernet ports, but they don't fit in the PowerBook 500 series' port.

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Circle 8 on reader service card

Apple's own connectors work fine on both the 500 series and desktop Macs.—Galen Gruman

The Stars Control Our Destiny?

I HAD TO CHECK THE COVER OF THE September issue of *Macworld* to see that I wasn't reading your April Fool's issue. But there it was: David Pogue measures the accuracy of astrological programs, and with a fairly straight face (*The Desktop Critic*).

Does Pogue know that no scientific investigation of astrology has ever shown it to have any validity? Nowhere in his article does he explain the mechanism that supposedly relates planetary positions to our psyches. There's a pretty big leap that he just assumes to be true. Pogue's own attempt at statistical comparison is extremely flawed. I hope he finds some time to look at the night sky and see through the layers of superstitious myth (and New York smog) to the real and logical beauty of the stars.

Doug Wink
Midland Park, New Jersey

David Pogue has measured many things with a straight face but, by his own account, astrology software has not been one of them. *Macworld* leaves the question of faith in prophetic software up to the individual reader.—Ed.

Online Shopping

IN THE AUGUST 1994 ISSUE STEVEN Levy reviewed some online shopping services and came to the conclusion that Compact Disc Connection was a hands-down winner (*The Iconoclast*). Although I have no experience with the other services that he reviewed, I was amazed by what I saw when I accessed CD Connection through its Internet address (cdconnection.com).

This kind of raw data makes online shopping services worthwhile.

Rob Breitkreuz
Winnipeg, Manitoba, Canada

Letters should be sent to *Letters, Macworld,* 501 Second St., San Francisco, CA 94107; via fax, 415/442-0766; or electronically to CompuServe (70370,702), MCI Mail (294-8078), America Online (Macworld), eWorld (Macworld), Applelink (Macworld1), or via Internet (letters@macworld.com). Include return address and daytime phone number. Due to the high volume of mail received, we can't respond personally to each letter. We reserve the right to edit all letters. All published letters become the property of *Macworld*. m

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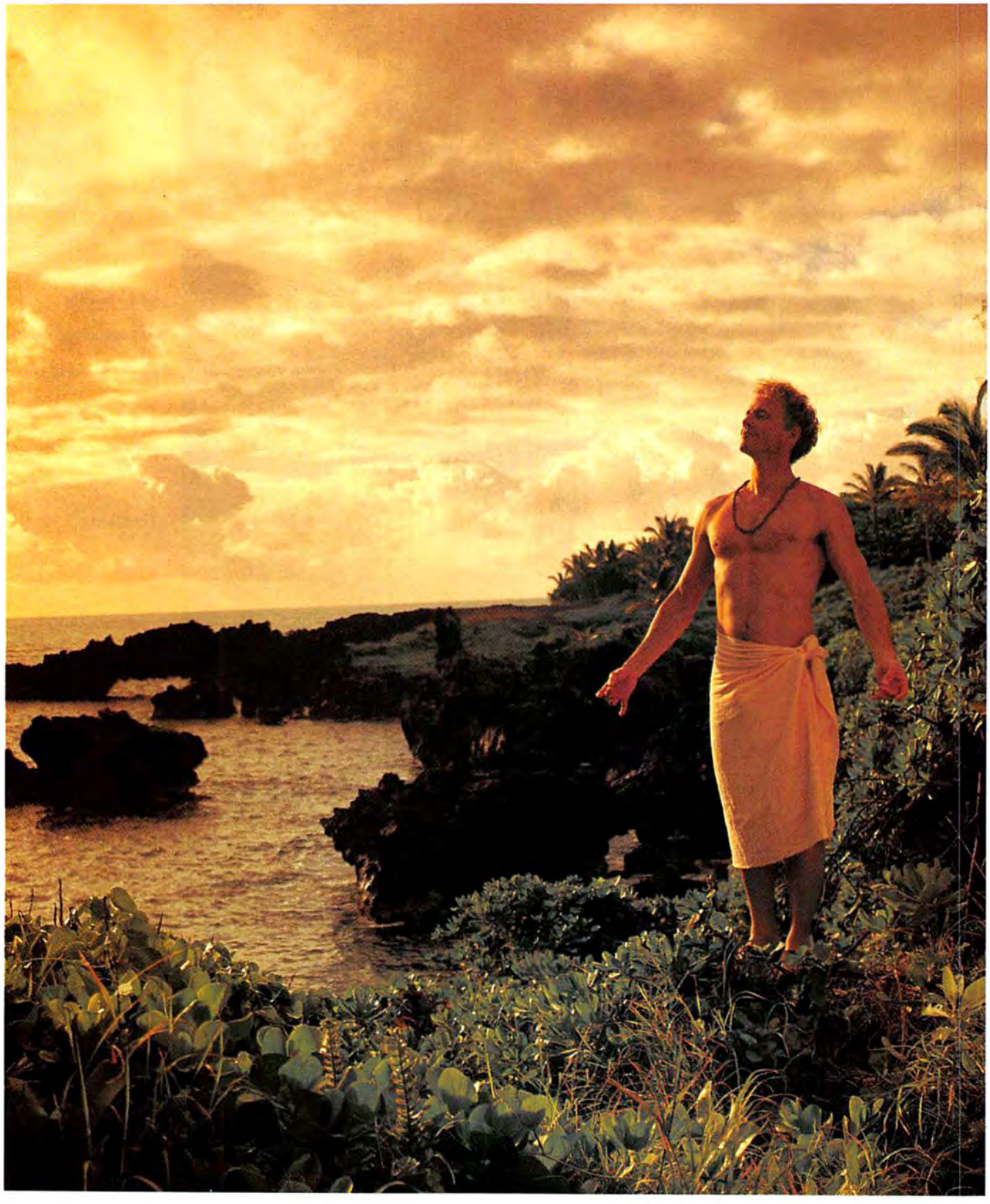

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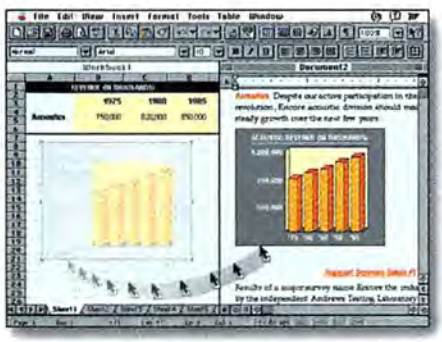

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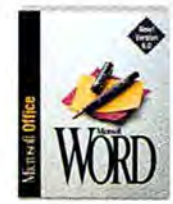

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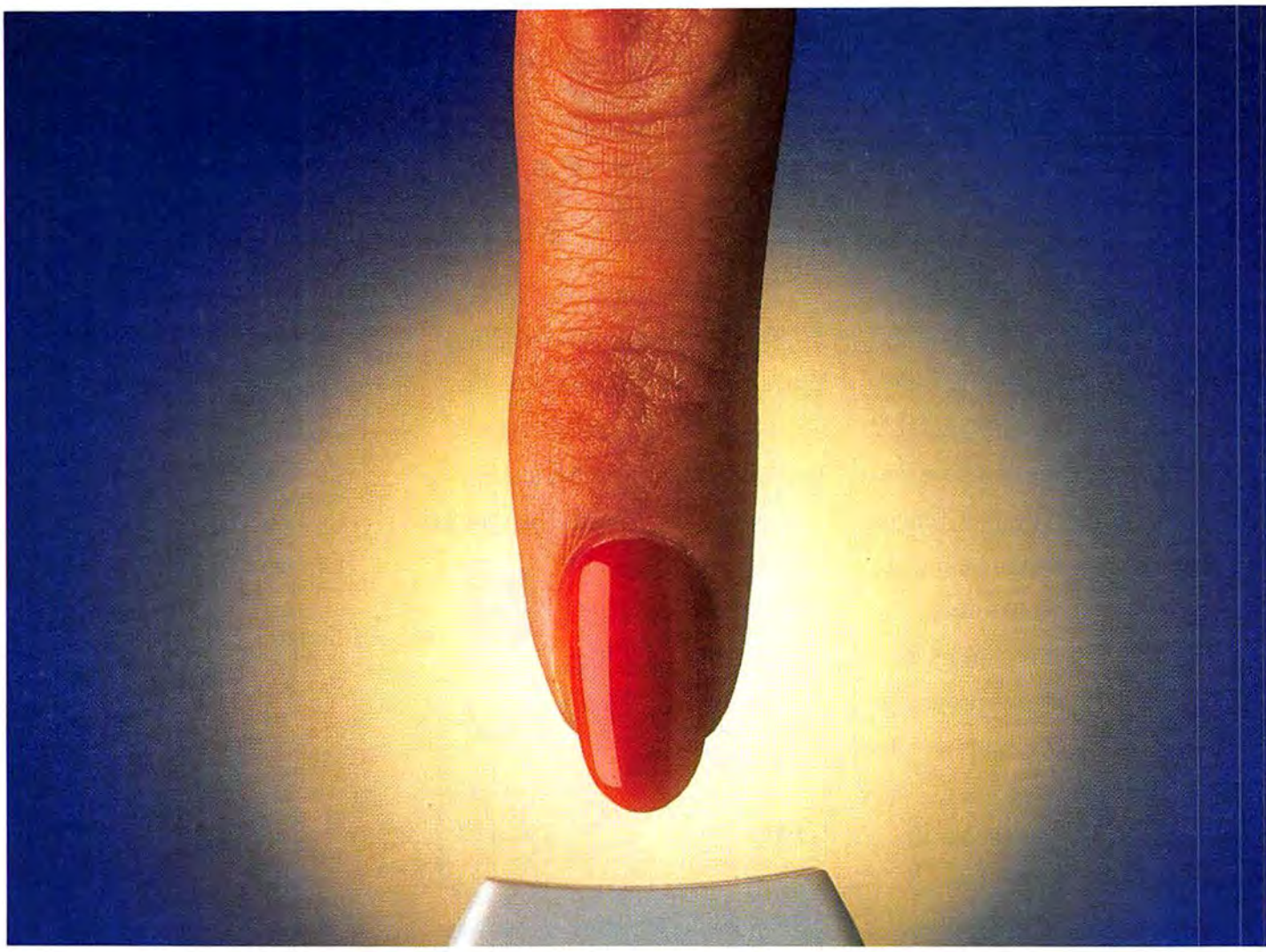

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Circle 158 on reader service card

LATE-BREAKING NEWS

MacBulletin

Apple, IBM Working on New Standard Platform Apple and IBM have confirmed that due to technical incompatibilities the Mac OS will not be ported to PREP, the standard developed by IBM to run multiple operating systems on PowerPC machines. Apple and IBM have agreed to cooperate on a new standard PowerPC architecture that could run a variety of operating systems, including the Mac OS. The two companies said that their engineers have begun work on the standard, and IBM said the project is progressing.

Potential Data Loss Symantec is once again warning owners of Norton Utilities for the Mac 3.0 (NUM) about a potential data-loss problem when using the SpeedDisk module, this time with older versions of FWB's Hard Disk Toolkit. When hard drive optimizers such as SpeedDisk move data in large blocks (on systems with more than 32MB of RAM), a bug in Toolkit can cause data loss. This is not related to a previous data-loss problem with SpeedDisk 3.0 that the company resolved with its update to NUM 3.1 (see *News*, "In Brief," in this issue). FWB is offering a free upgrade to Toolkit 1.6 for users running version 1.3.1 or older who have systems with 32MB or more. FWB, 415/474-8055.

Faster PowerPC 601 IBM Microelectronics began production on October 10 of a 100MHz PowerPC 601, the fastest version of this CPU yet. Apple has shown prototype Power Macs using experimental versions of this CPU running at 120MHz, but has not yet announced any Macs with the 100MHz CPU.

First Silicon of PowerPC 620 Motorola and IBM Microelectronics say they have achieved first silicon of the PowerPC 620 chip, which offers dramatically higher performance than the fastest current PowerPCs. The first 64-bit processor in the PowerPC line, the 620 should appear as the heart of file servers, computation servers, and very-high-end personal computers or engineering workstations. It is designed so that several 620s can work together in a single system, using a method called symmetric multiprocessing. Volume production should begin in the second half of 1995.

Adobe Joins OpenDoc Consortium Adding to the momentum of OpenDoc, Adobe Systems has joined CI Labs, the consortium responsible for popularizing the component-software technology, and will develop components to work with Illustrator, Photoshop, and Premiere. Adobe joins other sponsors Apple, IBM, and WordPerfect; recent recruit Lotus Development is a member but not a full sponsor.

Better Values from Apple Citing a drop in hard drive prices, Apple has increased the drive size on many Power Macintosh configurations while either keeping the price the same or reducing the price by as much as $300. The minimum Power Mac drive size is now 250MB (a 6100/60 with 8MB of RAM and a 250MB hard drive for $1819), and 8100/80 configurations top out at 1GB (an 8100/80 with 16MB of RAM, a 1GB hard drive, and a CD-ROM drive for $5379).

Photoshop's New Year's Surprise Thanks to a time bomb Adobe inadvertently left on Photoshop 3.0, that recently released version will shut down for good on January 1, 1995, unless you roll back your system clock to 1994. Fortunately, a remedied 3.0.1 is shipping. A free patch is also available online and will be sent via disk to registered users. 415/961-4400.

230MB Bernoulli Drive The Bernoulli 230 Transportable is Iomega's latest, a removable-cartridge drive that stores up to 230MB. Expected to ship early in the fourth quarter of 1994, the drive will list for $582, including one 230MB cartridge ($99 list, separately) and a five-year warranty. 801/778-1000. m

News

EDITED BY TOM MORAN

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Power Macs Join Performa Family

In another milestone for PowerPC-based Macs, Apple is rolling out the Performa 6100 series, which offers unprecedented performance in systems intended for the home. The five systems in the series are the first Performas to incorporate PowerPC processors. The basic systems are identical to the highly regarded Power Mac 6100/60 (see *Reviews*, *Macworld*, June 1994), but they come with an Apple Multiple Scan 15" Display and an Apple Design Keyboard. The five new Performas differ from each other only in their hard drive capacity and their bundled software.

All five systems come with a 60MHz PowerPC 601 microprocessor, 8MB of RAM, a double-speed CD-ROM drive, a 14.4-Kbps send/receive fax modem from Global Village, and System 7.5. All ship with a truly formidable assortment of applications installed on the hard drive or on CD-ROMs. The following applications are installed on the hard drives of all five systems (native Power Mac versions are in boldface type): **MacLinkPlus Easy Open Translators 7.52**, Quicken 4.0r6, eWorld 1.0, American Heritage Dictionary 3rd Edition 3.0, Spin Doctor Challenger 1.1, and Spectre Challenger 1.0.1c. The CD-ROMs common to all five new Performas are Grolier's Multimedia Encyclopedia, Time Warner's 1994 Time Almanac, **Electronic Arts' 3D World Atlas, Creative Multimedia's Family Doctor, Electronic Arts Kids' Around the World in 80 Days,** and KidSoft's KidSoft CD.

PAUL FRANZ-MOORE/SCREEN IMAGE, TONY STONE WORLDWIDE

Based on the Power Mac 6100/60, the Performa 6115CD is one of five PowerPC Performas introduced by Apple.

As for differences, the Performa 6110CD comes with a 250MB hard drive, and the Performa 6115 includes a 350MB drive. Both of these systems have the following additional software on their hard drive: **ClarisWorks 2.1v3,** ClarisWorks 2.1v3

Education Sample Files, MacGallery Clip Art Treasure Pak, ClickArt Performa Collection 2.0, **Now Up-to-Date 2.1.1,** and Now Contact 1.1. Street prices should range between $2599 and $2649 for the Performa 6110CD and between $2699 and $2749 for the Performa 6115CD.

The Performa 6117CD has a 350MB hard drive, and the Performa 6118CD sports a 500MB drive. These two offer all the same additional software as the 6110 and 6115 (see above), but both also include Kid Works 2 version 1.2.2, Thinkin' Things, The Writing Center 1.03, and **Spaceway 2000** on their hard drives; and San Diego Zoo Presents Animals and Wacky Jack's CD Gameshow on CD-ROMs. Street prices should run between $2699 and $2749 for the Performa 6117CD and between $2849 and $2899 for the Performa 6118CD. At press time, all prices were preliminary.

Confused yet? Well, we're in the home stretch with the Performa 6112CD, the oddball of the group. This model comes with a 250MB hard drive and the same core software (that of the first list only) plus Microsoft Works 4.0a, Mavis Beacon Teaches Typing 2.0.1, Kid Works 2.1.1, Thinkin' Things, The Writing Center 1.03, **Fractal Dabbler 1.0, Spaceway 2000,** and SuperMunchers 1.0 on the hard drive; and the San Diego Zoo Presents Animals and Wacky Jack's CD Gameshow on CDs. The street price of the 6112-CD should run between $2599 and $2649.

An Apple representative said the systems should all begin shipping on October 3, and should filter into various retail chains and consumer electronics stores by the end of October.—T.M.

NEWS FLASH

PCI Power Mac Preview

SPEEDS PAST NUBUS

The newest Power Macs represent the end of the line for NuBus-based Power Macs. In May or June, according to several developers who have current prototypes, Apple will deliver as many as five new Power Macs and perhaps one 680X0 Mac that will use the Peripheral Component Interconnect (PCI) bus that has become increasingly popular on PCs. PCI offers the Macintosh high-speed, high-bandwidth data transfer, which is a must for Apple's plans to put AV technology on all Macs by 1997 (see "PCI to Boost Data

continues on page 36

Color Ink-Jet for the Desktop

COLOR STYLEWRITER 2400

Apple's latest ink-jet printer comes with a high-speed (885-Kbps) serial connector and ink cartridges for both black and color printing. The Color StyleWriter 2400, which will sell for less than $525, prints 3 pages per minute in black ink. A color page at 360 by 360 dpi takes about three minutes to print.

KEVIN CANDLAND

The Apple Color StyleWriter 2400 prints 3 black-and-white pages per minute or a color page in about three minutes.

The 2400 handles plain paper, glossy stock, transparencies, back-print film, and envelopes. It comes with ColorSync, ColorShare, and QuickDraw GX software.

Apple plans to ship the StyleWriter 2400 in early October, but the LocalTalk option (under $125) isn't slated to ship until January 1995. Apple Computer, 408/996-1010.—NANCY E. DUNN

PowerBook PCMCIA

APPLE SHIPS EXPANSION MODULE

Delivering on the promise made with the PowerBook 500 series, Apple is shipping its PCMCIA Expansion Module. The module, or cage, as Apple calls it, slips into the left battery compartment of a 500-series PowerBook, plugging into the Processor Direct Slot interface within, thereby providing a PCMCIA interface. The module accepts two Type I or II cards, or one Type III card. The cards are hot-pluggable, meaning that users can slip them in and out without restarting; the ejection mechanism is activated through the Control Strip utility.

Currently the Expansion Module works with several PC-modem, cellular-modem, and storage cards; users should call Apple for a list of compatible vendors. Apple is working on making it possible for card manufacturers to write system-level drivers for other types of cards, including networking and data-acquisition cards. The PCMCIA Expansion Module is shipping at press time; the street price should be around $219. Apple Computer, 408/996-1010.

—CAMERON CROTTY

In Brief

Serious Bug in NUM 3.0

Norton Utilities for Macintosh 3.0 shipped with a serious bug in the Speed Disk module that at best requires a System reinstall and at worst causes data loss. Symantec mailed a new version, 3.1, to all registered users; a free patch is also available on America Online, CompuServe, AppleLink, and the company's BBS (503/484-6669, 9600 bps), or by calling Symantec at 503/334-6054 or 800/441-7234.

Support for Orphaned Accelerators

Extreme Systems is offering technical support and hardware repair for all SE and LC accelerators formerly sold by Total Systems, now defunct. Extreme, the original manufacturer of these products, also extends a $50 discount toward the purchase of new Extreme accelerators with the trade-in of any SE or LC accelerator. 206/575-2334.

Central Point Unbundles Tech Support

Central Point Software, which previously offered free tech support for the current versions of its Mac products, has begun charging for live tech support over the phone. Live support now costs $25 per incident (at 800/491-2764) or $2 per minute (at 900/555-7700). The company is also offering free tech support forums on CompuServe, America Online, and its own BBS. Information on the various options is available at 503/690-8090.

New Batteries for Old

Users of Battery Technology's SlimPack external battery packs for Apple PowerBooks can now turn in their drained battery cells and receive new cells for $85. The new SlipPack batteries normally list for $169.95. 213/728-7874.

"NEWS FLASH" *continued*

Speed," *Power Mac News*, in this issue.)

Apple has previously told *Macworld* that at least some of these new PCI Macs will combine PCI with Apple's own Digital Audio Video (DAV) bus, which will let video data move directly to the Power Mac's CPU, rather than compete with other peripheral cards' data on the PCI bus.

According to sources who have seen prototypes, one new PCI Power Mac will have just one PCI slot and be similar in design to today's Power Mac 6100. There will also be an all-in-one Performa model that will have the same features as the 6100-like machine. Two of the Power Macs will each have three PCI slots and will otherwise resemble today's Power Mac 7100. A fifth model will have six PCI slots and fit into a taller version of a Power Mac 8100 case, the sources said. The sixth model is a PCI version of the Quadra 630, the only PCI Mac expected to use a 680X0 chip.

The six-slot Power Mac does not have its own video card—at least not in the early prototypes—according to one developer. It's not clear whether Apple will bundle a third-party PCI video card (as most PCI PC vendors do), include one of its own, or let dealers and buyers choose the video card. The six-slot prototype also has the CPU and system oscillator on a separate card, which may mean that Apple will support performance upgrades by letting users replace their CPU while keeping the rest of the system. Current Macs require you to buy a third-party accelerator, replace the motherboard (for a few models), or buy a new system to increase performance.

Other sources say that Apple will begin selling components such as video cards separately from the CPU for at least some PCI Power Mac models, both to lower the list price and to create brand awareness for its peripherals. The reason, one source says, is to make Apple peripherals the no-brainer choice for Mac clones, which Apple has begun authorizing and which may ship in late 1995.

The PCI Power Macs will not support NuBus cards, although Apple has told *Macworld* that it is working with Second Wave, a manufacturer of NuBus expansion chassis, to develop a PCI-to-NuBus expansion chassis. Such a chassis would let owners of expensive NuBus cards—such as the multicard video-editing products from companies like Avid and Data Translation—keep their NuBus peripherals while reaping the benefits of PCI for other peripherals.

One unknown is the PCI Power Macs' RAM requirements. One source says that these new Macs will use a much faster bus than today's Power Macs, and that may require faster SIMMs than current Power Macs use. Another source says that the prototype six-slot machine uses 64-bit Dual Inline Memory Modules (DIMMs) in edge-connector-style mounts instead of the SIMM chips in clip mounts found in most Macs and PCs. This new design would boost the total RAM capacity of the six-slot machine to 1.5GB, but users upgrading even from first-generation Power Macs may have to buy all new memory. Apple says it has not yet determined what speed RAM will be required and would not commit to compatibility with today's SIMMs. One source said that current plans at Apple would make at least some models compatible with 60ns SIMMs—the kind the Quadra 840AV requires—but that faster SIMMs (probably 40ns or 50ns) would likely be needed on the fastest PCI Power Macs. Faster SIMMs are not available today but are under development by memory makers, the source said. Apple had no comment on system details beyond the DAV bus. Apple frequently changes its product plans, so the models introduced in the spring may differ from the current prototypes.—GALEN GRUMAN

ScanJet 3p: Faster, Cheaper

300-DPI GRAY-SCALE SCANNER

Hewlett-Packard is replacing its ScanJet IIp scanner with a faster, lower-cost model. The ScanJet 3p is a gray-scale (256 levels), 300-dpi true-resolution, flatbed scanner. It can handle documents up to 8.5 inches by 11.7 inches and can scan a single sheet of text in as little as ten seconds (real-world scan speeds depend on the speed of the CPU and the scanning software).

ROBERT PERRY

The HP ScanJet 3p provides 256 levels of gray at true 300-dpi resolution.

The ScanJet 3p supports the TWAIN scanning protocol, enabling such TWAIN-compatible applications as WordPerfect, Aldus PageMaker, and Adobe Photoshop to talk directly to the scanner. The ScanJet 3p connects to the Macintosh via an included SCSI connector. The scanner ships with HP's PictureScan scanning software and PicturePlace image-management and image-editing software. The ScanJet 3p also comes with Calera's WordScan 1.2 for the Macintosh, as well as an HP-designed utility called HP Copier that turns the scanner into a copy machine, sending a scanned image directly to a printer with a single button-click. The ScanJet 3p is currently available from Hewlett-Packard for a list price of $599; a 20-page automatic document-feeder attachment is available separately at a list price of $239. Hewlett-Packard, 208/323-2551.—CAMERON CROTTY

NEC Spins Again

QUAD-SPEED CD-ROM DRIVES

NEC has announced a slew of new drives for the fall. The MultiSpin 4Xe ($515 estimated street price)

THE AMCOEX INDEX OF USED MAC PRICES

Machine/RAM/Hard Drive	Average Sale Price	Monthly Change
PowerBook 100/4MB/20MB	$575	–$25
PowerBook 140/4MB/40MB	$775	–$50
PowerBook 180/4MB/80MB	$1550	–$100
PowerBook Duo 230/4MB/80MB	$875	–$100
Mac Classic/2MB/40MB	$350	–$25
Mac SE/30/2MB/40MB	$550	–$50
Mac LC II/4MB/40MB	$500	–$25
Mac IIsi/3MB/40MB	$550	–$25
Mac IIci/4MB/80MB	$800	–$100
Mac IIfx/4MB/80MB	$850	–$200
Centris 650/8MB/230MB	$1250	+$50
Quadra 900/8MB/160MB	$2000	–$100

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

TOM GIBSON

NEC's quad-speed MultiSpin 4X CD-ROM drive (left) and the company's portable MultiSpin 3Xp Plus CD-ROM drive.

and MultiSpin 4Xi ($415 estimated street price) are, respectively, the external and internal incarnations of NEC's new quad-speed (600-KBps) mechanism. The two drives feature an average access time of 220ms. NEC is also offering the 3Xp Plus, a portable drive with an average access time of 240ms, a sustained data-transfer rate of 500 KBps, and an estimated street price of $415.

For those with less stringent speed requirements, NEC has announced the MultiSpin 2V Mac, an external, tray-loading, double-speed (300-KBps) drive with an average access time of 320ms and an estimated selling price of $259. All drives are expected to be available in October. NEC, 708/860-9500.

—CAMERON CROTTY

Workgroup Printers from Apple and HP

LASERJETS VERSUS LASERWRITERS

For workgroups that include more than one type of computer, Apple Computer and Hewlett-Packard have each introduced a 600-dpi PostScript laser printer that simultaneously handles input from networked DOS/Windows PCs, Macs, and Unix systems. Although the printers are based on different RISC processors, the HP LaserJet 4MV ($3549) and Apple's LaserWriter 16/600 PS (about $2300) have many features in common.

These two competing printers have network connectors for Ethernet and LocalTalk, plus a bidirectional parallel port. Both printers can handle up to 850 pages in three bins, if you buy an optional 500-sheet tray ($449 for HP's; about $299 for Apple's). Both printers can hold an optional user-installable internal hard disk—HP's disk has a capacity of 42MB ($499); Apple's disk holds 245MB and has an estimated price of $399.

The HP LaserJet 4MV comes with 12MB of RAM, with room for up to 44MB. The LaserWriter 16/600 comes with 8MB of RAM, with a maximum capacity of 32MB. Both printers render halftones with screens as fine as 106 lines. (Although Apple's printer supports 600-dpi PhotoGrade, you really need 12MB of RAM to take advantage of it.)

Hewlett-Packard sets its LaserJet 4MV apart in a couple of important ways. HP's laser printer supports the company's proprietary page-description language, PCL 5, in addition to its built-in PostScript Level 2. The LaserJet 4MV also has a larger maximum paper size than Apple's printer. The 4MV accepts not only 11-by-17-inch stock but also custom 11.7-by-17.7-inch paper that permits 11-by-17-inch designs with bleeds on all sides. HP's 4MV also handles postcard stock. Apple's printer handles letter, legal, A4, A5, and B4 sizes.

Although it can't handle large-format printing, Apple's LaserWriter 16/600 does offer another wrinkle of flexibility: with the addition of a user-installable network fax card (about $300) the printer can act as a Group III and PostScript fax machine for all users on the network.

Apple Computer, 408/996-1010; Hewlett-Packard, 800/752-0900 in the U.S., 800/387-3867 in Canada.

—NANCY E. DUNN

SCOTT PETERSON

The Apple LaserWriter 16/600 PS will compete with HP's LaserJet 4MV (not shown) in the 600-dpi PostScript arena.

Color Printing on the Road

HP DESKWRITER 320

With a PowerBook and Hewlett-Packard's portable ink-jet DeskWriter 320 printer, you can redo report or presentation pages while on the road—in color. The HP DeskWriter 320 offers the same speed and 600-by-300-dpi resolution as the deskbound HP DeskWriter 540, but it is compact, weighs only 4 pounds without its paper feeder, and works from a rechargeable battery if AC power isn't accessible. It prints on letter-, legal-, and A4-size plain and glossy paper; and transparencies, labels, and some special stocks.

The DeskWriter 320 replaces the DeskWriter 310 at the same cost: $379 list. You can buy an optional 60-page sheet feeder ($99) and leave it at your desk, or you can carry it along; otherwise you feed the sheets one at a time by hand.

continues

In Brief

MicroNet's Raven Professional Array

MicroNet expects to ship in October its Raven Professional series of arrays for video, prepress, and graphics applications or file servers. The company is offering Raven ProNuBus, which requires a Quadra, Centris, or Power Mac with a full-length NuBus slot, and Raven ProPDS, which requires a Quadra or Centris with an 040 PDS slot. The company claims sustained writes up to 17.2MB per second. Users can configure the drives as RAID 0 or RAID 1 arrays. Base systems run from 3.6GB to 17.3GB, with prices from $8595 to $13,750. 714/453-6000.

2GB Optical Drive

Hitachi says it is shipping the OD152, a 2GB 5 ¼-inch erasable optical drive that's the first at that capacity. The OD152 has an average access time of 50ms, a SCSI-2 interface, and a sustained data-transfer rate ranging up to 3MB per second. Hitachi estimates that street prices will run around $2000. Macintosh drivers are available from MacPeak software at 512/327-3211. Hitachi America, 800/448-2244.

100MB Floppies on the Way?

Fuji Photo Film Company says it has created a high-density recording media for use in floppy disks with capacities of more than 100MB and data-transfer rates of more than 2MB per second. Although Fuji has declined to comment on possible prices or to say who would make drives that would use the new media, the company says that it expects such drives to ship by the end of 1994. Fuji also said that potential manufacturers of the 100MB floppy disk drives could make them capable of reading from and writing to existing lower-capacity floppy disks.

KEVIN CANDLAND

The HP DeskWriter 320 weighs about four pounds when detached from its paper feeder (shown assembled).

Black-and-white pages print at a rate of more than 3 pages per minute. Color pages, which require an optional color kit ($49), take about four minutes per page to print. HP replacement color cartridges list for $34.95; black cartridges go for $21.95.

The 320 works with software written for System 6.0.7 or later; for color matching, you need System 7.0.1 and Apple's ColorSync. Hewlett-Packard, 800/752-0900 in the U.S., 800/387-3867 in Canada.—NANCY E. DUNN

QuickDex Adds Fields

BECOMES INFOGENIE

QuickDex II, the light, quick database from the folks at Casady & Greene, has a new lease on life and a new name, InfoGenie. Users can now create two kinds of files: a free-form, QuickDex II–style database, or a database with fields for formatted, structured information. Both file types can be searched with some Boolean operations; accessed by multiple users over a network; and displayed in list view, record view, envelope view, or label view. The product is Power Mac–native; and data-import and -export, envelope-printing, and other features that existed as separate utilities for QuickDex are all integrated into InfoGenie. InfoGenie is expected to be available in November for $75.95. Casady & Greene, 408/484-9228.
—CAMERON CROTTY

InfoGenie can create a database with or without fields, though field-based and fieldless records can't coexist in the same file.

NEC Replaces FG Monitors

XP SERIES LINKS TO MACS AND PCS

NEC Technologies has released its new MultiSync XP series of monitors, which replaces the FG series. Available in 15-, 17-, and 21-inch sizes, the new monitors distinguish themselves from other companies' monitors by including a connector that lets a Mac or PC communicate directly with the monitor to control resolution, color temperature, and other characteristics. The NEC monitors use an Access.bus port, a new standard designed as a platform-independent equivalent of the Mac's ADB bus. Access.bus peripherals such as monitors, scanners, and input devices can be daisy-chained together, with as many as 128 devices on one chain. NEC plans to release an Access.bus device for Macs that connects to the Mac via NuBus; NEC is negotiating with Apple and PC vendors to include the bus in at least some PCs and peripherals. Developed by Digital Equipment Corporation and Philips, Access.bus is now an independent standard endorsed by 55 companies.

Other features include software controls over pixel resolution, color synchronization (using Eastman Kodak's CMS color model, which will be bundled with the next version of Windows and is now available for the Mac), color depth, screen geometry, and color temperature, plus the use of a nonreflective antiglare coating. An antiglare lens will continue to be available as an option for use in high-luminance settings, such as in a windowed office.

NEC estimates street prices of $2580 for the 21-inch model, $1295 for the 17-inch model, and $735 for the 15-inch model. NEC will also offer the MultiSync XE series of monitors, which won't have Access.bus or high-end color controls (although the color-control software in the XP series will be available as an option to XE owners). For the XE series, the estimated prices are $2095 for the 21-inch model, $1120 for the 17-inch model, and $575 for the 15-inch model. Separately, the company will release stereo speakers for use with the XE and XP monitors. NEC, 708/860-9500.
—GALEN GRUMAN

BUGS & TURKEYS

In theory, Apple's new PowerBook 150 was designed to support most third-party 100-series fax modems. In practice, using an internal modem in a 150 can crash the computer, cause excessive battery drain while the PowerBook sleeps, and with System 7.5, disable any communications software that uses the Apple Communications Toolbox. Apple is working on an extension to fix these problems. It should be available online and by calling Apple (800/767-2775) by the time you read this. Global Village (415/390-8200) has a software patch for their own modems that fixes the problem.

Apple Remote Access 2.0 crawls and crashes on the Power Macintosh 6100/60. Apple says that ARA 2.0.1 fixes the problem. The upgrade is available for a small fee from Apple (800/767-2775, ext. 7851).

Don't expect even margins when printing a full-page graphic to the Apple Color StyleWriter Pro. The top and left margins are ⅛ inch, the right margin is ⅛ inch, and the bottom margin is ½ inch. Additionally, it won't print at all if you have more than 32MB of RAM on your Mac. Apple says a forthcoming upgrade will fix these problems.

Those database report forms you laboriously created in Microsoft Works 3.0 are toast if you upgrade to 4.0. Microsoft says that the old forms creator was awkward and just not worth keeping. Microsoft also says that the new forms are much more usable and, since no data is lost, no fix is planned.

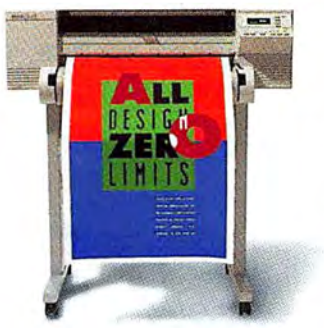
Aldus Datebook 4.0's alarms don't ring when scheduled. Aldus says a free fix will be sent to registered users and posted online by the time you read this.

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*.

Introducing a printer for those who have ideas bigger than this page.

The HP DesignJet 650C/PS printer. Large-format at a small price.

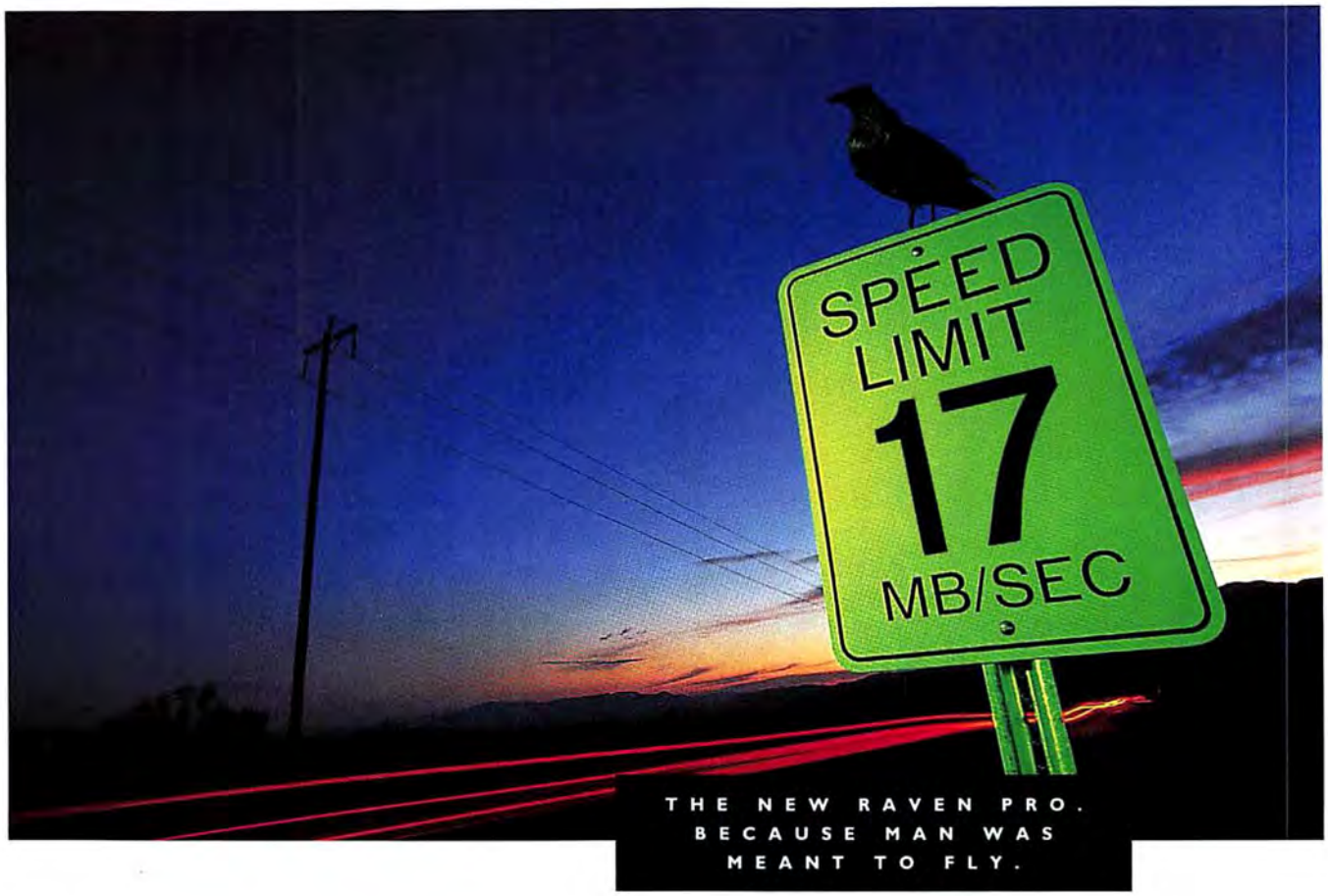
$8,995*



Go on. Give yourself room to think. With the HP DesignJet 650C/PS, you can now print in sizes up to 2′ by 9′ (up to 3′ by 9′ with our larger model**). Right in your office. Right away. No tiling. No hang-ups. No problem. Just clean, inkjet output with PANTONE®'-licensed colors. Adobe™ PostScript™ Level 2 software and a built-in RIP are included. For an output sample, call **1-800-354-7622, Ext. 8277.**

HEWLETT® PACKARD

*Suggested U.S. list price. **Larger model lists at $10,595. ®Pantone, Inc.'s check-standard trademark for color. Adobe and PostScript are registered of Adobe System Inc. which may be registered in certain jurisdictions. ©1994 Hewlett-Packard Company PE12410



When it comes to performance, the sky should be the limit—not your equipment. Introducing the Raven Pro disk array, our next-generation flying machine. Now you can open a 480 MB Photoshop file with lightning speed. Transfer dailies without losing a single frame. Gain access to mirrored business-critical data in less than 8 ms or mix and match RAID levels and partitions to meet your specific needs. With 17.2 MB/sec throughput and up to 52 GB on-line capacity, they're four times faster and have 104 times the capacity of the native 500 MB drive you're probably using now. To find out what Raven Pro can do for your company's throughput, call 1-800-800-DISK. Then let your imagination and productivity take flight.

Raven Pro

Raven's flexible utility program allows you to optimize drive caching and each partition's parameters, including location on disk and block size for maximum application performance.

Raven Pro disk arrays offer a flexible upgrade path for all high-powered Macintosh systems via PDS, NuBus or software. PDS and NuBus versions provide a 32-bit data path via Fast/Wide SCSI-2.

MicroNet's Raven Pro is the newest addition to our family of award winning storage solutions. Based on proven Raven technology, it takes the science of disk array engineering to an unprecedented level.

MicroNet

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Circle 139 on reader service card

Power Mac News

PCI to Boost Data Speed

BUT PCI-BASED PCS WILL STILL BE FASTER

Peripheral Component Interconnect (PCI) expansion boards for the next generation of Power Macs will provide up to double the data throughput of NuBus boards, according to Apple (see "PCI Power Mac Preview," *News*, in this issue). A *Macworld* survey of 20 video, storage, and networking card developers reveals that graphics and video professionals who grapple with huge image files will be the first to benefit.

The PCI bus runs at 33MHz, while NuBus runs at 10MHz. Current Pentium-based PCI computers can push data through their bus at 50MB to 60MB per second (MBps). Current NuBus Macs run at about 16 MBps, although some are as slow as 10 MBps. Apple won't release performance figures for its implementation of PCI yet, but one source said Apple is aiming for 40 MBps—a rate that developers welcome for high-end use like video editing and disk arrays. The same source said Apple is likely to achieve a rate of about 20 MBps—significantly faster than NuBus Macs but not comparable to what PCs can offer. The reason for the slower Mac PCI performance is the overhead imposed by the Mac OS. And according to one source, the forthcoming new version of Windows should reduce the PC's overhead even further. Apple's next version of the System, code-named Copland and due in early 1996, is being developed to reduce the Mac overhead, several developers said.

Regardless of the ultimate PCI performance on Macs, vendors hope to ship PCI SCSI and video accelerators within weeks of the PCI-based Power Mac's spring debut.

For digital-video professionals, PCI's increased throughput won't just speed up their work. Avid and Data Translation said they'd each like to build editing subsystems that can both capture images with little or no compression and process multiple streams of real-time video data. PCI can handle the required 9MB-to-20MB-per-stream rate. NuBus can't.

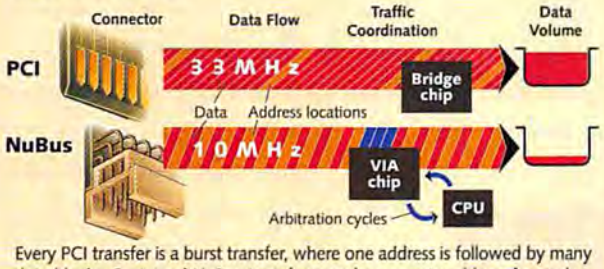
For users who don't yet have such data-intensive demands, Mac vendors say the reduced cost of the chips required to build PCI rather than NuBus cards may result in cheaper cards.

Apple hopes developers of PCI cards for PCs will make inexpensive PCI boards available for Power Macintoshes. But while each of the six leading PC board developers *Macworld* contacted expressed interest in Apple's plans, not one was willing to announce definite support for the Power Mac. Several Macintosh developers said they expect PC vendors to offer Macintosh PCI cards in late 1995, but they don't expect to see anyone offer a video card that works in both PCs and Macintoshes. It does not make sense, they said, for a vendor to add VGA and QuickDraw circuitry to every board. Instead, PCI vendors are likely to design a board with about 90 percent of the components compatible with both PC and Macintosh PCI and then add the platform-specific circuitry and connectors for each market's product lines.

—JIM FEELEY

Why PCI Is Faster Than NuBus

PCI runs both faster and more efficiently than NuBus. PCI's 33MHz speed yields a theoretical maximum throughput of 132MB per second. NuBus's limit is 40 MBps. But the Mac's operating system and the nature of the buses themselves limit the data-transfer rate to less than the maximum. Likely top data-transfer rates are 40 MBps for the first PCI Macs and 16 MBps for NuBus Macs.



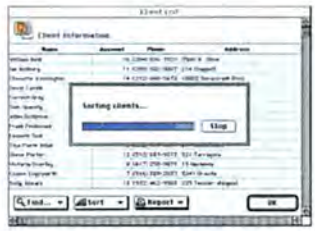
Every PCI transfer is a burst transfer, where one address is followed by many data blocks. Sustained NuBus transfers need a separate address for each data block. This added overhead slows the effective transfer rate. Between data transfers, NuBus and the Mac's CPU must stop the flow of data to arbitrate the next transfer. PCI doesn't interrupt data flow because it sets up the next data transfer while the current transfer is still running.

Power Watch

THE LATEST ON PRODUCTS FOR THE POWER MAC

An increasing number of companies have released native Power Mac versions of existing 680X0 software, including the following products. All these programs have both 680X0 and Power Mac versions in the same package.

- 4D First, $295; 4D Server, prices vary; 4th Dimension, $895; upgrades free. (Databases.) ACI US, 408/252-4444.



ACI US's 4D database gets a Power Mac boost this fall.

- APL Level II 3.0; $900, upgrade $450. (Compiler.) MicroAPL, 44 (71) 922-8866.
- Blueprint 5; $295, upgrade $99. (CAD.) Graphsoft, 410/290-5114.
- DeBabelizer 1.6; $399, upgrade $49. (Graphics translation.) Equilibrium, 415/332-4343.
- Multiframe 4D version 1.0; $1995, upgrade $795. Multiframe 3D version 2.0; $1495, upgrade $150. (Structure analysis.) Graphic Magic, 408/464-1949.
- Omnis 7½; prices vary. (Database.) Blyth Software, 415/571-0222.
- ultraShield 2.5; $149, upgrade $29. (Security.) usr-EZ Software, 714/756 5140.

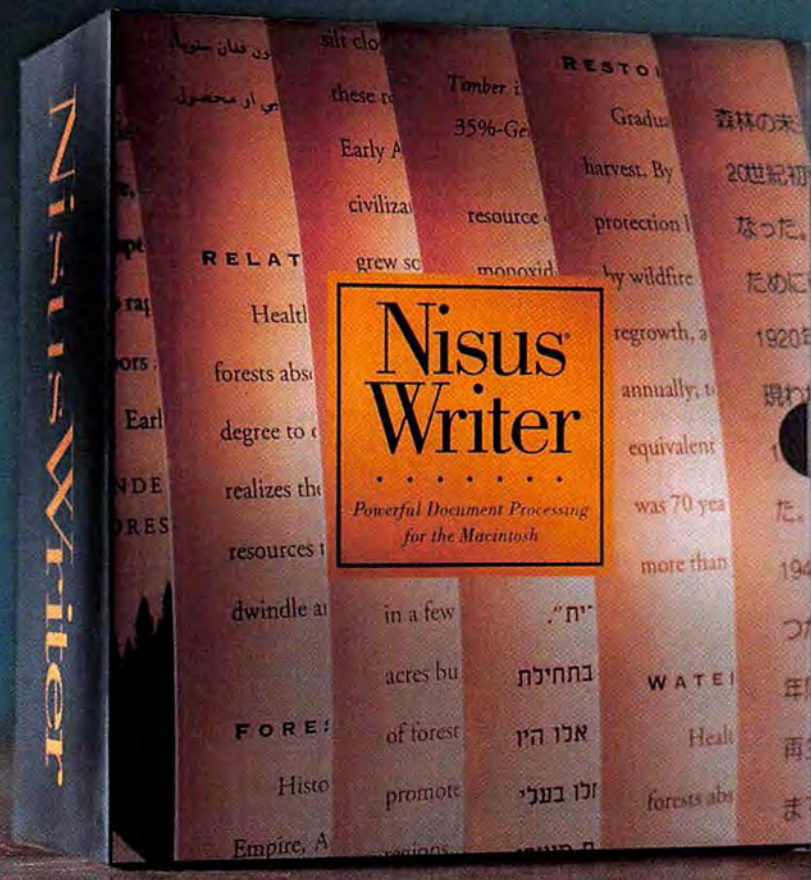
—GALEN GRUMAN

~ UNLIMITED UNDOS AND REDOS ~ APPEND TO TEN EDITABLE CLIPBOARDS ~ NONCONTIGUOUS AND RECTANGULAR SELECTION ~ DOCUMENT LINKING ~

~ AUTOMATIC SAVE AND BACKUP ~ DRAG AND DROP ~ STYLE SHEETS ~ OPEN SEVERAL FILES SIMULTANEOUSLY ~ GLOSSARY ~ ONLINE AND BALLOON HELP ~

~ TABLES ~ EQUATIONS ~ SEARCH IN UNOPENED FILES ~ DESKTOP PUBLISHING LAYOUT ~ TEXT WRAP AROUND GRAPHICS ~ FOOTNOTES AND ENDNOTES ~

Think Of It As Microsoft Word In About 10 Years.



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Sure, Word's impressive. But it's no Nisus® Writer. By giving you the power to manipulate text in multimedia presentations, edit lengthy books, and create foreign language documents, Nisus Writer starts where ordinary Mac word processors stop. Of course, just because it's big on features doesn't mean it's big on memory requirements. At just 2 MB of RAM, Nisus Writer lets you spend less time waiting and more time writing. No wonder why critics are calling Nisus Writer the ultimate document processor. And why a lot of people are calling those other word processors yesterday's news.

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Circle 123 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. A ◆ SIGNIFIES THAT A NATIVE POWER MAC VERSION OF THE PRODUCT IS AVAILABLE. 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

Accel-a-Writer 8200

This 16-ppm, PostScript Level 2 laser printer can print full bleed on pages up to 11 by 17 inches and can handle pages up to 11¾ by 25 inches. Shipping in a base configuration of 600 by 600 dpi (upgradable to 800 by 800 dpi or 1200 by 1200 dpi), the 8200 comes with 12MB of RAM; a SCSI port; and simultaneously active serial, parallel, and AppleTalk interfaces. An Ethernet card that supports EtherTalk and TCP/IP is optionally available. $4495; Ethernet card $395. Xante Corp., 205/476-8189, 800/926-8839; fax 205/476-9421.

Accel-a-Writer 8200

Audio 15

With desk space at a premium, you'll appreciate the stereo speakers built into this 15-inch, multiresolution color monitor. The Audio 15 has a 0.28mm dot pitch, a maximum resolution of 1280 by 1024 pixels, and a vertical refresh rate of 72Hz to 75Hz at most common Macintosh resolutions. The price includes a required Mac adapter. $515. Tatung Company of America, 310/637-2105, 800/829-2850; fax 310/637-8484.

ClearVueColor 20T Enhanced

Defining white points isn't for everyone, but sometimes an artist's gotta do what an artist's gotta do. Users of this multiresolution color monitor can define and store custom white points, or just switch between the predefined 9300-degree and 5000-degree presets. The Trinitron tube features a 0.31mm aperture grille, and the monitor automatically synchronizes to Macintosh resolutions up to 1280 by 1024 pixels at a 74Hz vertical refresh rate. The monitor also has digital controls with 10 preset combinations and room to store 13 user-defined settings. The 20T Enhanced is Energy Star–compliant. $2349. RasterOps, 408/562-4200, 800/729-2656; fax 408/562-4033.

CM-20MKR

CM-17MKR and CM-20MKR

These multiresolution color monitors measure 17 inches and 20 inches, respectively, and have a vertical-refresh rate of 76Hz. The CM-17MKR features a dot pitch of 0.26mm and a maximum resolution of 1280 by 1024 pixels; the CM-20MKR features a 0.31mm dot pitch and a maximum resolution of 1600 by 1280 pixels. Both monitors come with a required Mac adapter. CM-17MKR $1011; CM-20MKR $1815. Tatung Company of America, 310/637-2105, 800/829-2850; fax 310/637-8484.

DesignXpress Series

This is a line of PostScript Level 2 monochrome laser printers; the DesignXpress 6 prints 600 by 600 dpi, while the DesignXpress 12 prints 1200 by 1200 dpi. Each model is available in two configurations: the standard size can print images up to 11¾ by 18 inches on paper up to 11¾ by 20 inches. The oversize models can print images up to 12 by 20 inches on paper up to 12 by 25 inches. The DesignXpress printers come with simultaneously active AppleTalk, serial, and parallel ports, and an Ethernet card is available. DesignXpress 6 $4395, oversize $4895; DesignXpress 12 $6495, oversize $7295; Ethernet option $399. NewGen Systems Corp., 714/641-8600, 800/756-0556; fax 714/641-2800.

Grand Vision Pro

Grand Vision Pro

Connect your PowerBook or desktop Mac to nearly any television or projection system. The Grand Vision Pro accepts input from any Mac that can generate a VGA signal (most Macs produced after the Mac LC, and some PowerBooks); the unit sends out simultaneous VGA, RGB, and NTSC composite-video signals. The Grand Vision Pro package also includes a lavaliere microphone for adding narration to presentations—audio can be passed through to a television or VCR, or users can plug in a set of powered speakers for immediate amplification. $349. Dobbs-Stanford, 214/350-4222; fax 214/358-0180.

Mac65

Connect your Mac to the real world: this SCSI box provides ports for four digital sensors (sampled at 10,000 times per second) and three analog sensors (sampled at 100,000 times per second). The company's Science Workshop software is included; it displays, graphs, and performs simple statistical calculations on gathered data. Digital and analog sensors sold separately. $249. Pasco Scientific, 916/786-3800, 800/772-8700; fax 916/786-8905.

Magic 230 IBM

Fitting 230MB onto a 3½-inch optical cartridge, this half-height removable-media drive features an average access time of 40ms and a data-transfer rate of 5 MBps. The Magic 230 can also read and write 128MB cartridges. Internal $799; external $899. MacProducts USA, 512/892-4070, 800/622-3475; fax 512/892-4455.

Magic Alleycat

IBM still has a smoking-hot R&D team, but little did you know that the product-naming division is also funky fresh. This 2GB Fast and Wide SCSI-2 hard drive is based on the 3½-inch half-height IBM Alleycat mechanism, and provides 9.5ms average access times and data-transfer rates of up to 20 MBps. The drive ships with CharisMac's Anubis formatting software. External $1249; internal $1149. MacProducts USA, 512/892-4070, 800/622-3475; fax 512/892-4455.

Magic NEC 1.3GB Optical Drive

A half-height, removable-media optical drive that fits up to 1.3GB of data on a 5.25-inch cartridge. The drive features an average access time of 63ms and sustained data-transfer rates of 1.3 MBps, and ships with CharisMac's TurboMO formatting and speed-enhancement software. $1999. MacProducts USA, 512/892-4070, 800/622-3475; fax 512/892-4455.

MagniView 850 and 864

Eliminate the need for a two-piece projection system with these overhead projectors that have color LCD projection panels built right in. Both the Model 850 and the Model 864 feature 640-by-480-pixel active matrix color LCD displays that can show up to 2 million colors simultaneously. The Model 864 also supports composite NTSC, PAL, and SECAM video-in; and it has a lamp-life meter and a brighter lamp than the Model 850. Model 850 $5995; Model 864 $8495. Dukane Corp., 708/584-2300; fax 708/584-5156.

MicroTower

MicroTower

Four double-speed (300-KBps data-transfer rate) Toshiba CD-ROM drives power this SCSI tower. The drives are tray-loading models, and they are multisession Photo CD–compliant. Each drive in the MicroTower takes up a SCSI ID

continues

THE BEST OF BOTH WORLDS

NEW! PowerCard 601 Power Mac performance for the Macintosh LC and Performa 470, 570, 630 series and Quadra 605 and 630.

Processor upgrades from DayStar

Currently, there are two worlds out there. Macintosh and Power Macintosh. Only DayStar makes a family of processor upgrade cards that give you the best of both. DayStar upgrades save you time and money compared to purchasing a new Power Macintosh.

Universal Turbo 040® and PowerCache™

68K upgrades for the Macintosh Classic, LC, Performa, Centris and II series

DayStar processor upgrades have launched over 100,000 people into a higher orbit. These two low cost upgrades are the only *no-risk* option available because they make your Mac at least 2 to 3 times faster while maintaining 100% compatibility with the software you already own. And they let you upgrade to PowerPC later, so you can go faster now!

PowerPro™ 601 and PowerCard™ 601 – *NEW!*

PowerPC upgrades for the Quadra, LC, Performa and Centris series

The promise of PowerPC has finally arrived, and there are hundreds of native PowerPC applications available. DayStar and Apple designed the PowerPro 601 and the new PowerCard 601 to give you all the speed and the same compatibility as Apple's Power Macintosh computers. The PowerPro 601 even gives you up to 128 MB of optional memory. And, unlike a new Power Macintosh, DayStar's upgrade cards offer the best of both worlds because they let you run your Macintosh either as a PowerPC or 68K based Macintosh.

Call 800-962-2077 for your DayStar Reseller

DAYSTAR DIGITAL

5556 Atlanta Highway, Flowery Branch, GA, USA 30542
(404) 967-2077, Fax: (404) 967-3018, FaxBack (800) 438-0370

Circle 7 on reader service card

number, and all four volumes can appear on the desktop at the same time. $1995. Tac Systems, 205/721-1976; fax 205/721-0242.

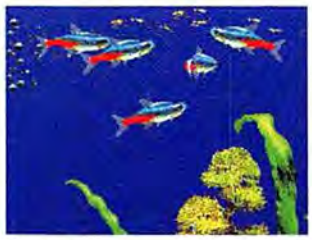
Top Hat

You won't need tails and a cane to accompany this product—it's an expansion kit for Macintosh LCs and Performas that adds space for four PDS cards, in addition to space and power for four internal drives (up to three hard drives plus the floppy drive). The kit box is composed of sheet metal and is strong enough to support a monitor. $149. MicroQue, 801/263-1883; fax 801/263-2886.

SOFTWARE

Aquazone

So you had a fish tank when you were seven, but all your guppies died? Here's your second chance at aquatic stewardship: Aquazone simulates life in a freshwater aquarium, complete with fish, gravel, food, accessories, filter, water

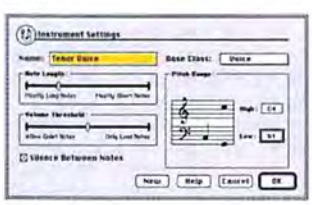


Aquazone

conditioners, and diseases. The base package comes with two fish types (neon tetra and catfish), and add-on disks are available with other species, including angelfish, dwarf pencilfish, and rummy-nose and red phantom tetras. 2.5MB min. memory; requires 8-bit color. $79; species disks $19.95. Lits Compute, 714/955-4968; fax 714/955-4963.

Autoscore

If you don't have an instrument that lends itself to pitch-to-MIDI hardware, this software could help. Autoscore works with compatible sequencers and music-notation programs to convert into MIDI data notes that are sung or played into the Macintosh microphone. The software can handle pitch bends and volume tracking, and it comes with filters that are tailored for the acoustic qualities of different instruments. Autoscore is compatible with Coda's Nightingale, Finale, and Allegro; ARS Nova's Practica Musica and Songworks; Opcode's Musicshop; and other sequencing and notation software. Requires Mac II with sound-input capability. $150. Wildcat Canyon Software, 510/527-5155; no fax.



Autoscore

DragStrip

Another weapon in the war against desktop disorganization, DragStrip provides you with any number of strips of buttons that can hold files, applications, volumes, or folders. Clicking once on a button launches or opens its contents; clicking and holding down on a button pops up a list of documents recently opened with that application, or a hierarchical menu of the contents of a volume or folder. DragStrip also features Additions, which are mini plug-in applications that perform common actions such as changing your bit depth or sound volume. Requires Macintosh II, System 7, and Drag Manager (included). $59.95. Natural Intelligence, 617/876-4876, 800/999-4649; fax 617/492-7425.

Esperanto

Like the language after which it is named, this software is designed to make communication easier. Esperanto (the software package) is a graphical front-end client to DEC's All-in-1 and VMS Mail hosts (support for IBM PROFS and Unix mail is in the works). The Esperanto client is designed to be used either on a desktop or remotely: connections are required only to deliver messages to the host and download unread mail. Users can connect serially; via modem; over the RAM Mobile Data Network (wireless); or over a network using Windows Sockets, LAT, or CTERM. Up to 10 clients $212 per user; 250 clients $112 per user; 500 clients $92 per user. Square One, 908/602-9100; fax 908/636-8886.

Layer It

With this QuarkXPress XTension, users can sort the elements of their documents into layers, organizing objects into logical groups. When working on a specific layer, users can hide other layers, speeding screen redraw and reducing screen clutter. Requires QuarkXPress. $89. Vision's Edge, 408/748-8411, 800/800-8476; fax 408/748-9584.

Links Pro Macintosh

Links Pro Macintosh

Tee it high and let it fly. To develop this golf software, Access starts with digitized photographs of the actual buildings, grounds, greens, fairways, trees, and traps of some of the world's most famous courses. While playing, you have complete control over your shot: you can adjust your stance, choose your club, and even take practice swings. If you're on an AppleTalk network, you can play head-to-head against as many as seven other players. Links Pro ships with the Harbour Town course in South Carolina, and other courses are available. 4MB min. memory. $69.95; additional cours-

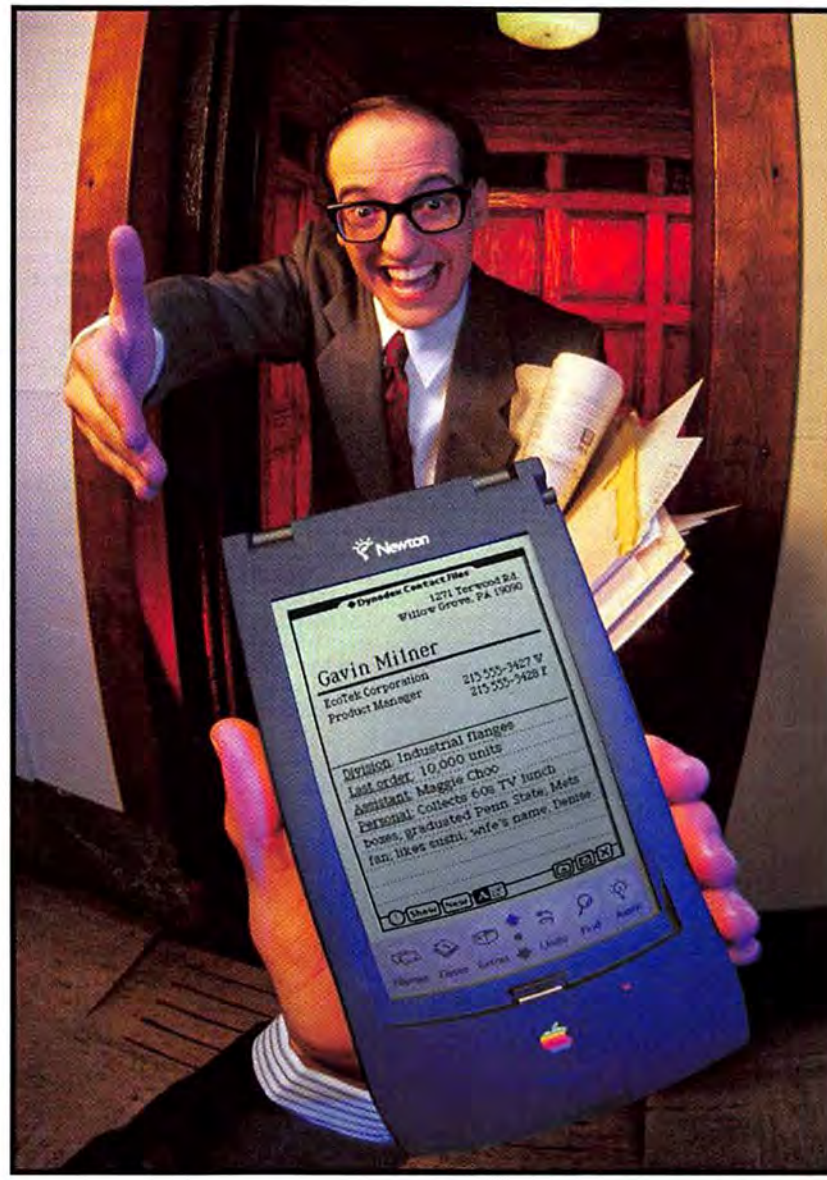
continues

Newton connects. When you carry a MessagePad™ 110, the new Newton® communications assistant from Apple, you carry the power that comes from having information at your fingertips. Which means no matter where you go, you always have access to the facts you need, at the moment you need them.

With the Newton Connection Kit 2.0 for Macintosh,* you can exchange information with your Macintosh, as well as with a range of popular Mac® software, such as ACT! contact manager, Lotus 1-2-3, Excel and Microsoft Works.*

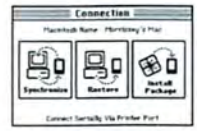
So now you can do things like reference sales leads from Dynodex and work with data created in Microsoft Word, all from the palm of your hand. And if you're working on a PC running Windows, the Newton Connection Kit 2.0 for Windows will allow you to easily do the same with all your current Windows applications.**

To find out more, call 800-365-3690, ext. 100, for the Newton dealer near you. Or check out an on-line service for the interactive demo found on the Newton forum.† Either way, you'll find that instead of giving you more technology, Newton gives you something you can really use: help.



Newton. It's there when you need it.

Newton connects to Windows.
With the Newton Connection Kit for Windows, you can easily exchange information with your Windows-equipped PC.



Downloading, updating and backing up information between your Newton and your computer is as easy as plugging in.

Newton connects to Macintosh.
The Newton Connection Kit lets you work with your Macintosh via serial connection or your AppleTalk® network.

*MacLinkPlus Library, a product of DataViz, Inc. **Available summer 1994. ConversionsPlus Library, a product of DataViz, Inc. †Look for the on-line Newton demonstration on the following services: AppleLink® America Online, CompuServe and the Internet. In Canada, call 800-665-2775, ext. 900, for information. ©1994 Apple Computer, Inc. All rights reserved. Apple, the Apple logo, AppleLink, AppleTalk, Mac, Macintosh and Newton are registered trademarks of Apple Computer, Inc. The lightbulb logo and MessagePad are trademarks of Apple Computer, Inc. ACT! is a registered trademark of Symantec Corporation. Dynodex is a registered trademark of Portfolio Software, Inc. Lotus and 1-2-3 are registered trademarks of Lotus Development Corporation. Microsoft is a registered trademark of Microsoft Corporation.*

es $29.95 each. Access Software, 801/359-2900, 800/800-4880; fax 801/359-2968.

MarkzTools

Don't let multiple versions of QuarkXPress get you down. This XTension converts 3.3 documents back to 3.2 or 3.11 format. Moreover, MarkzTools alerts users when a document is about to be converted and saved as a higher version. The user can choose to save QuarkXPress documents in a compressed format; MarkzTools automatically decompresses a document when opening it. $69. Markzware Software, 714/645-0881, 800/300-3532; fax 714/241-3874.

Menu Master Mac Lite

Tired of younger guest users leaving your Macintosh a mess—files missing, applications in the wrong places, control-panel settings scrambled? This software creates a Finder-like interface that limits users to programs, documents, and DAs that an administrator makes available. Guest users can be restricted to Open and Save operations on a floppy disk or specific folders on the hard drive. If desired, Menu Master Mac Lite will also protect your hard drive even when someone boots your Mac from a floppy disk. $49. Electronic Learning Systems, 904/375-0558, 800/443-7971; fax 904/375-5679.

PageNow

Carrying around an alphanumeric pager is a handy way to stay in touch, but the

PageNow

240-character message limit can get in the way. PageNow automatically breaks up longer missives and transmits them sequentially via modem to a paging service. The software includes a preview window so you can see what your data will look like when it's received. $79.95. Mark/Space Softworks, 408/293-7299, 800/799-1718; fax 408/293-7298.

Remind Me

Tying string around your fingers is one way to remember stuff, but it's hard to type with fluff-wrapped digits. When a Remind Me reminder is triggered, a Looney Tunes character pops up, complete with sound and animation, and lets you know what you should be doing. Even better, if you have PowerTalk, you can send a reminder over the network to someone else running the software—imagine having the Tasmanian Devil announce your next meeting. 4MB min. memory; requires System 7, PowerTalk for network use. $49.95. Velocity Development, 415/274-8840, 800/856-2489; fax 415/982-3299.

SCSI-Share

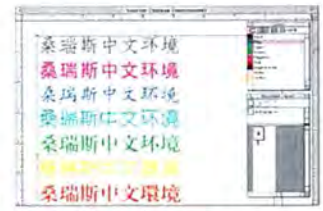
Didn't your mother teach you to share? With this control panel, you can share any SCSI device (except a mounted volume where System 7 file sharing should be used) over any AppleTalk network, including EtherTalk and TokenTalk. The software arbitrates concurrent device requests, indicates network activity, and provides password protection. $89. Stalker Software, 415/927-1026, 800/262-4722; fax 415/927-1026.

Smart1/2Tones

You might not need a whiter shade of pale, just the right shade of gray. This halftoning software converts gray-scale images to screened images using a stochastic algorithm that suppresses moiré patterns, preserves 256 levels of gray at all resolution combinations, and prevents text from breaking up into halftone dots. Smart1/2Tones can produce screen frequencies of 85, 106, and 141 lpi for 600-dpi printers, and of 71 and 106 lpi for 300-dpi printers. $295. Xyptx Corp., 201/263-4628; no fax.

Sunrise Chinese Environment

Sure, you can do Chinese DTP using Apple's Chinese Language Kit or ChineseTalk operating system, but you have to wait for all your software to be localized. The Sunrise Chinese Environment (SCE) provides for text handling, page design, and PostScript output, all within currently existing English-language applications. The heart of SCE is a Quark XTension that handles Chinese text input and font management: The package ships with two Chinese typefaces, which customers select from a list of 14. Requires QuarkXPress 3.0. $2695. Sunrise Hitek Service, 312/777-8708; fax 312/777-9247.



Sunrise Chinese Environment

VoiceAccess

Voice mail and E-mail keep growing closer and closer together. This telephone tool runs in the background and acts as a voice-mail system, depositing recorded messages (roughly 220K for a 30-second recording) in an Incoming Messages basket on the desktop. If PowerTalk is installed, VoiceAccess automatically places the messages in the Incoming Mail tray. Users can log in from a remote phone and listen to their messages, and the product can distinguish between voice and fax calls, routing each to the appropriate software. Requires Power Mac, System 7.1.2, GeoPort telecom adapter. $129. STF Technologies, 816/463-7972; fax 816/463-2179.

XFlow

By creating a document template in QuarkXPress you can save yourself a lot

continues

Even though PowerBooks are portable, they aren't always convenient. Batteries die, data gets lost or stolen, and controlling the cursor is, well, a curse.

Connectix PowerBook Utilities™ (CPU) solves these problems and makes your PowerBook a real pleasure to use.

A PowerBook with CPU installed:
- Extends your battery life
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- Saves your LCD screen when inactive
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CPU is the award-winning, number one selling PowerBook utility. And now CPU works with all the new '040 PowerBooks.

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CPU
CONNECTIX POWERBOOK UTILITIES

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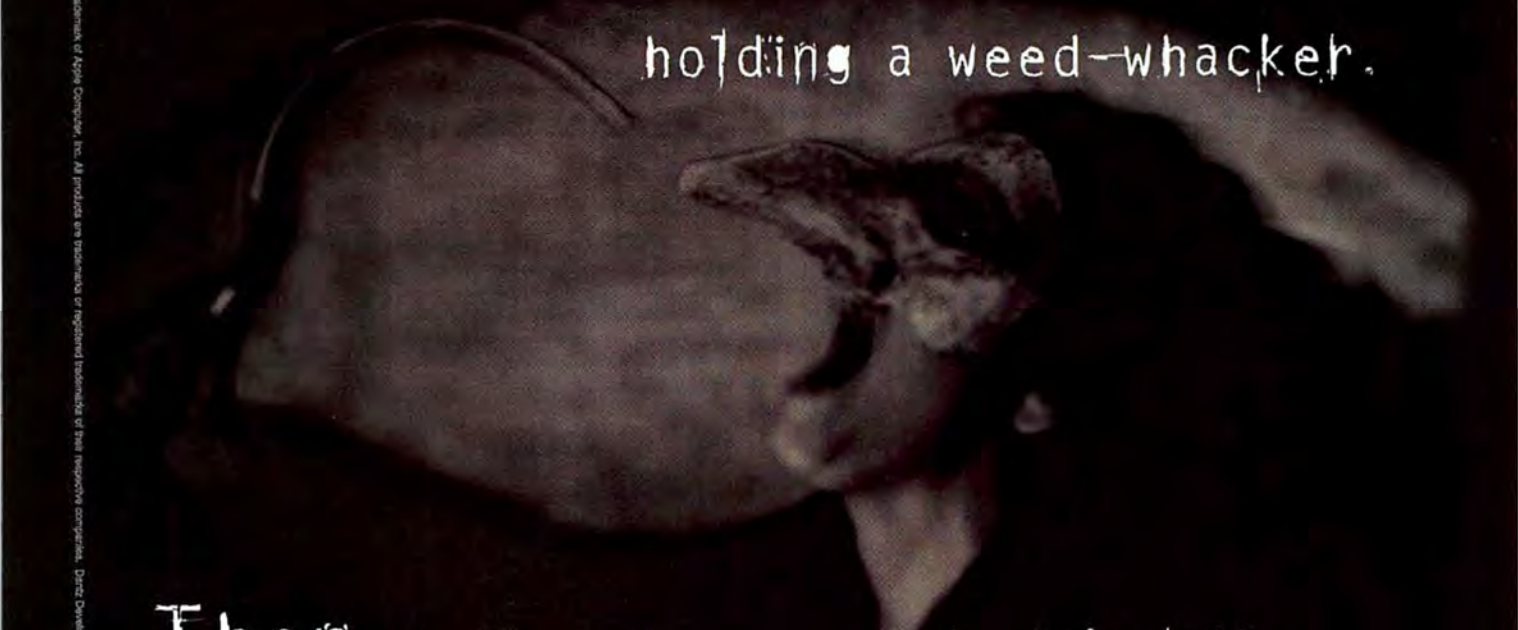
There's the one where your ex-girlfriend turns into a rabid dingo and chases you and you keep getting your feet stuck in some weird mucky stuff until finally you reach a cliff above a river and as you jump you see her mother waiting for you below.

holding a weed-whacker.



Then there's the one where it's 4:30 the day before your vacation and you accidently hit the delete button as you attempt to print the 46-page update you were supposed to show your boss at 5:00.

Not all dreams should come true. Check out Retrospect. It automatically backs up all the files on your Macintosh. (Or use Retrospect Remote-the network version.) Be it power loss, theft, fire or spilled cappuccino, it'll save you hours of therapy and recreating. Restores are quick and complete. It backs up data to any storage device whether tape, cartridge or disk. And has simplified scripting and incremental backups. Sleep better.

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A-MVMW1294

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of time in the design phase, but you are still going to have to import text and graphics files one by one. With this XTension, you can assign names to the graphic and text boxes in your template. When you invoke XFlow, it goes out and searches for files that match the names you've given your element boxes, reporting back any errors it had in locating or importing the files. Requires QuarkXPress. $149. Vision's Edge, 408/748-8411, 800/800-8476; fax 408/748-9584.

CD-ROMS

The 11th Hour

Sequel to The 7th Guest, this game chronicles the adventures of reporter Carl Denning, Jr., as he searches for his colleague and lover, Robin Morales. Robin has mysteriously disappeared while investigating a string of murders in the hometown of demented toy-maker Henry Stauf. The 11th Hour tells its story with a cast of 18 characters in over 60 minutes of live-action video combined with rendered 3-D graphics. $79.95. Virgin Interactive Entertainment, 714/833-8710; fax 714/833-8717.

A.D.A.M. The Inside Story

Take a tour of the body with Adam and Eve, the animated protagonists of this anatomy reference CD-ROM. Both male and female anatomy are presented, with over 3600 body parts. The 12 major body systems are identified, and these systems' functions are described with stories, video, and animations. 8MB min. memory; requires Mac IIci, 8-bit color, System 7.1, double-speed CD-ROM drive. $69.95. A.D.A.M. Software, 404/980-0888, 800/755-2326; fax 404/955-3088.

Design Elements—A Digital Reference

An electronic library of symbols, icons, and dingbats, this collection contains 3200 images, including chess pieces, postage motifs, trees, Spencerian flourishes and accents, arrows, pointers, gears, and pinwheels. The elements are in Adobe Illustrator format, and each element has an EPS preview that is organized in an Adobe Acrobat file. With the Acrobat software, users can browse the images or search them by keywords. $499.99. Ultimate Symbol, 914/942-0003, 800/870-7940; fax 914/942-0004.

Italian Fine Art, Prints and Historical Photographs

Italian Fine Art, Prints and Historical Photographs

These two discs are just chock-full of artistic works from the fourteenth through the twentieth century, including paintings, antique maps, heraldic imagery, and historical photographs. All 236 images are RGB TIFFs that have been color-corrected, dusted, and cropped, and come in two resolutions: 1MB to 2MB, 72-dpi files for browsing and composition; and 300-dpi, 24-bit color files for design and full-page output (compressed to fit on the discs using a JPEG algorithm). $299. PhotoDisc, 206/441-9355, 800/528-3472; fax 206/441-9379.

Rebel Assault

The rebellion is looking for a few good pilots—do you qualify? If so, then strap yourself in for this ride through the *Star Wars* universe. From rookie training in Beggars Canyon through the climactic trench run on the Death Star, Rebel Assault features both cinematic and interactive elements. The game incorporates both animation and digitized video, music from the original score as performed by the London Symphony Orchestra, and sound effects from Lucas Digital's Skywalker Sound. 4MB min. memory; requires Mac LC III, System 7, 8-bit color. $63.95 estimated selling price. LucasArts Entertainment, 415/721-3300, 800/782-7927; fax 415/721-3342.

Rebel Assault

Skull Cracker

"Helping the dead stay dead." That's the motto of Mortality Enforcement, Inc., and that is what you will be doing with big, ugly weapons in this arcade action game. You'll run up against ghouls, beasts, and zombies, not to mention carnivorous cockroaches and murderous skate punks in shopping malls, sewers, catacombs, and cathedrals. 4MB min. memory; requires Mac II, 8-bit color. $69.95. CyberFlix, 615/546-1157; fax 615/546-0866.

ACCESSORIES

Composite Sync Adapter

In one hand you are holding a new Macintosh; in the other you've got an old monitor that uses the unofficial sync-on-green Apple standard. With the Composite Sync Adapter, you can use that old monitor with the Quadra 605 and 610, LC models, PowerBooks, AV models, and Power Macs. $40. Griffin Technologies, 615/259-2095; fax 615/259-0090.

Phoenix

If you want to use this joystick, you're going to have to grab hold with both paws. There's a pivoting control provided for your off hand, and the Phoenix sports 24 buttons, each of which users can individually program

with (included) software to execute multiple mouse-button or keystroke commands. $149.95. Advanced Gravis, 604/431-5020, 800/663-8558; fax 604/431-5155.

Portable Laptop Workcenter
You probably wouldn't want to hold this PowerBook carrying case up in a firefight, but it's made of the same ballistic nylon that's used to make bulletproof vests. The Portable Laptop Workcenter is designed so that you can just open it and work, without removing the PowerBook. The case has pockets for cards, pens, tickets, and peripherals; you can also leave some peripherals in their storage pockets while you use them, as there are holes and channels to manage the wiring. $129. Brookstone, 314/581-7113; 800/343-9855, ext. 099; no fax.

PowerDoor

PowerDoor
Have you ever busted one of those little plastic doors on the rear of a PowerBook? You were probably just flipping it open to turn on the power or to plug in a phone line. This replacement door for 100-series PowerBooks (except the PowerBook 100) has strategically placed holes for the modem and power switch. A version is also available for the PowerBook 500 series. $19.99; volume pricing available. The AVO Company, 408/286-5720, 800/286-4558; fax 408/286-8253.

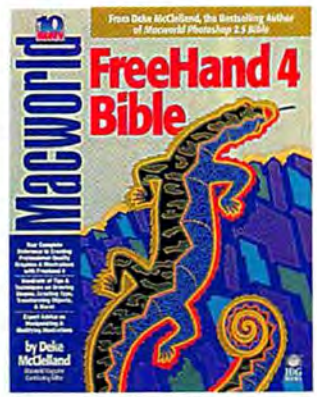
Remote Point
There's no longer any need to stay trapped behind your Macintosh when you give a presentation. This cordless infrared mouse has a 40-foot range, and to conserve battery power, automatically goes to sleep when not in use (remote requires two AAA batteries). You operate the mouse by pressing gently with your thumb on a button on top of the Remote Point—the cursor moves in the direction that you press. A trigger button under your index finger acts as a mouse button. The receiver plugs into the ADB port. $199. Interlink Electronics, 805/484-8855; fax 805/484-8989.

Remote Point

BOOKS

Digital Imaging for Visual Artists
You are a visual artist and think you want to start creating on the computer, but you don't have the first idea about where to start? *Digital Imaging for Visual Artists* starts out with a discussion of the pros and cons of a career in digital imaging (including copyright and creative issues); then the book moves through a tutorial on imaging hardware and software, from scanners to masking and digital filters. Written by Sally Wiener Grotta and Daniel Grotta. 616 pages. $49.95. Windcrest/McGraw-Hill, 717/794-2191, 800/ 822-8158; fax 717/794-2080.

Macworld FreeHand 4 Bible
Macworld's very own contributing editor Deke McClelland leads beginners and experts alike on a tour through the latest version of Aldus FreeHand. *Macworld FreeHand 4 Bible* covers creating and editing your own typefaces; importing and exporting graphics; working with graphic objects; and using FreeHand in combination with painting programs, word processors, and other software. 736 pages. $29.95. IDG Books Worldwide, 415/358-1250, 800/762-2974; fax 415/358-1260.



Macworld FreeHand 4 Bible

Photoshop Filter Finesse
You may think that you already know Photoshop filters, but author Bill Niffenegger bets that he can still teach you a few tricks. *Photoshop Filter Finesse* contains descriptions and instructions on how to use hundreds of commercially available effects filters, plus step-by-step recipes for creating special effects. Photoshop Filter Finesse ships with a CD-ROM with Aldus Gallery Effects, Kai's Power Tools 1.0, and scores of backgrounds and textures. 357 pages. $45. Random House Electronic Publishing, 212/572-2600, 800/733-3000; fax 212/572-4997. 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.

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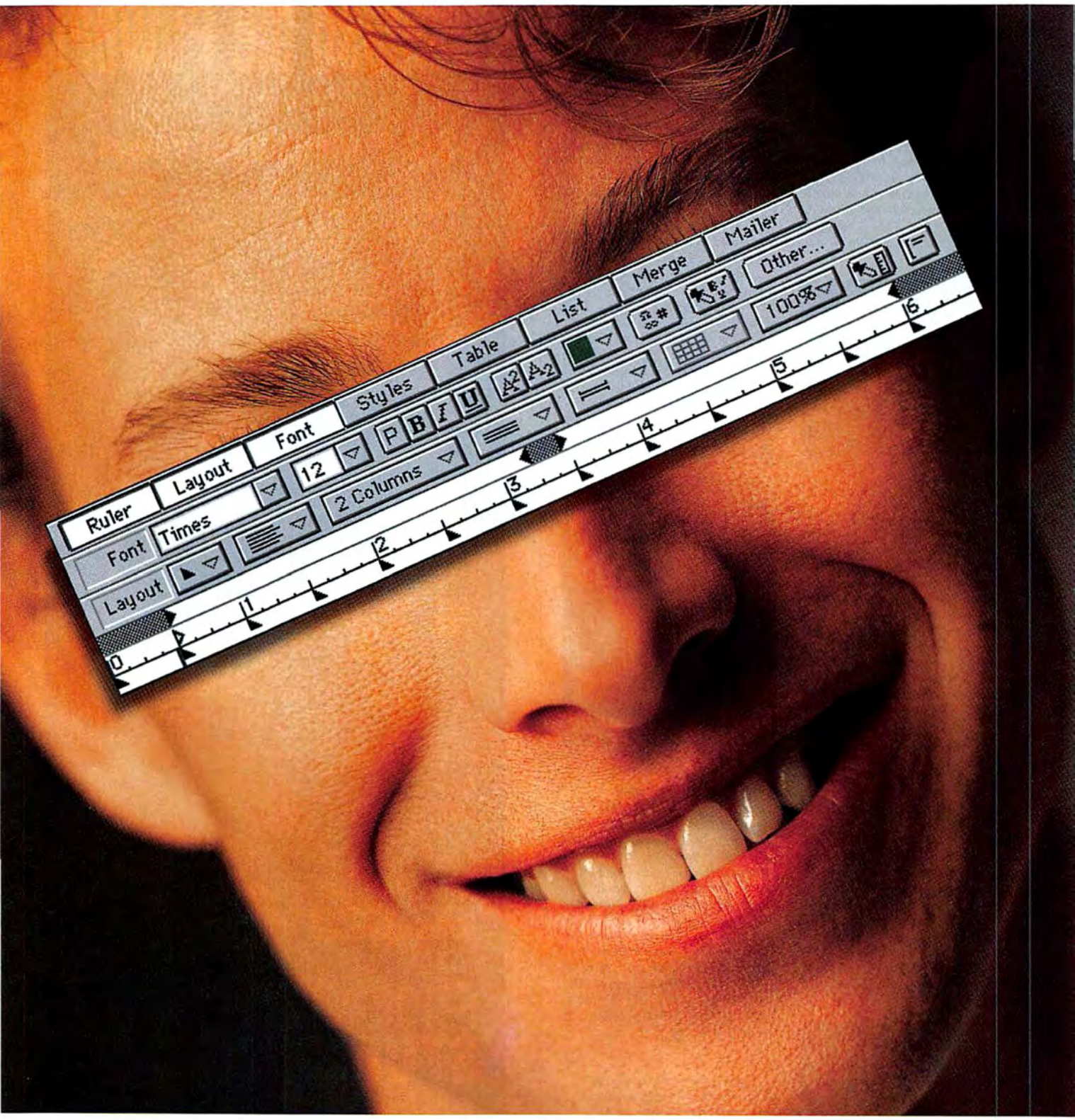

*Suggested retail price. Reseller prices may vary. You must own a competing word processor with a suggested retail price of $249 or more.
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Reviews

Live Picture 1.5.5

Image Editor

PROS: IVUE format speeds up editing operations; resolution-independent edits; no image degradation; can erase brushstroke effects. **CONS:** Overly expensive; can edit only the topmost visible layer; single-level undo command; badly implemented automatic masking function; can't cancel operations; rudimentary gradient tool; PPC version incompatible with ATM 3.8. **COMPANY:** HSC Software (805/566-6200). **LIST PRICE:** $3995.

MW ★★★

DIANE FENSTER

THERE'S NO DISPUTING THE POWER of FITS (functional interpolating transformational system) technology. It enables you to load and edit very large images quickly and apply your changes all at once so as to avoid the continual image degradation you get with Adobe Photoshop. On the other hand, the first U.S. incarnation of Live Picture, which incorporates FITS technology, is less impressive. Despite the hype and steep price, Live Picture is surprisingly limited and even clumsy at times. It provides fewer functions than you might expect—several times fewer than those available in the image-editing standard, Photoshop—and it fails to fully exploit some of the inherent advantages of FITS. While Live Picture will intrigue professional image editors, who routinely composite 40MB and larger images, most folks can count this application among the $4000 programs they can safely live without.

The Paroxysms of FITS

To understand the purpose and potential of Live Picture, you need to understand how FITS allows the program to break with tradition. Conventional image editors—Photoshop and Fractal Design Painter among them—work by applying operations to every pixel in an image. When you drag with a paintbrush tool, for example, the program applies color to every pixel in the path of the brush. Barring the occasional Undo or Revert command, the pixels are permanently changed, much as a canvas is permanently stained when you apply paint to it.

There are two problems with this approach. First, the program has to load every single pixel into memory (whether RAM or virtual memory) and apply your changes one at a time to every pixel, a tremendous chore when working on large images. Minor operations, like panning and retouching, as well as major ones, like filtering and compositing, are slowed down in direct proportion to the file size. And unless the image fits (no pun intended) on your screen, you can never see the full measure of any alteration.

Second, the image degrades as you work on it. For example, if you resample an image to 50 percent, you permanently sacrifice data. If you later scale the image up to, say, 150 percent, you don't regain that data but rather force the program to interpolate new data, which results in fuzzy details or outright jags. Even seemingly harmless adjustments like focus filters and color corrections sacrifice colors you never regain.

Armed with FITS, Live Picture successfully overcomes both these problems. The program converts all images into a Photo CD–like format called IVUE, which allows Live Picture to access specific portions of an image at various zoom sizes quickly, rather than reinterpolating every pixel. (Like Kodak's Photo CD, the IVUE format saves an image at full resolution, ¼ resolution, 1/16 resolution, and on down, resulting in an image that is

about ⅓ larger on disk than when saved in a flat-file format.) As you edit the image, Live Picture doesn't change so much as a single pixel in the original IVUE file. Instead, it stores your edits as mathematical paths and computations in a separate FITS file.

Because no real pixels are being changed—just screen pixels—most operations occur in real time. Generally speaking, you have to wait only when scrolling, zooming, or accessing a file on disk. Each time you change the view, the program reapplies your edits to the new chunk of the IVUE image on screen. In Macworld Lab's unofficial tests performed on a Quadra 800 with 72MB of RAM, Photoshop was sometimes faster than Live Picture at zooming and opening images—and always faster at scrolling—but Live Picture was much faster at applying edits. The Power Mac–native version of Live Picture, which arrived at press time, was even faster, applying most edits almost instantaneously.

Live Picture is not only fast, it's also flexible. Because the program saves all edits as mathematical objects, they have no inherent resolution. You can zoom in on a brushstroke, for example, to any extent you like and never see it degenerate into a bunch of enormous squares. (The imported images themselves have fixed resolutions, of course, but the edits are object-oriented, much as in Adobe Illustrator or Aldus FreeHand.)

When you are satisfied with your composition, you rasterize the final composition to an image file at any desired size and resolution. So you might resolve a small, 72-dpi image to show to a client, and then render the approved image overnight to a poster-size 300-dpi megafile. Because your edits are implemented only once—when you rasterize the composition—the edits are cumulative. Therefore, if you scale an image by 50 percent and then by 150 percent, Live Picture merely scales it by 75 percent (the product of 50 percent and 150 percent) when rendering. If you render to a higher image resolution, you may actually resolve the image up and not down.

Layers upon Layers

What I've described so far is equally applicable to any potential program that implements FITS or a similar technology. In fact, Live Picture's biggest advantage is that it's the first FITS program on the block. Judged on its own merits, however, the application doesn't measure up nearly so well. Take, for example, layers, Live Picture's most important and most befuddling feature. You create a composition by importing images onto different layers, much as in Specular Collage, Painter X2, and Photoshop 3.0. But in Live Picture, you use layers not only to hold images, but also to apply effects. For instance, if you want to sharpen the focus of an image, you overlay a special Sharpen/Blur layer and then paint on it with the paintbrush set to the Sharpen mode.

Though it's hard to learn, this system has advantages. You can edit various effects independently of each other. For example, you might adjust sharpening on one layer, adjust color correction on another, and then come back and tweak the sharpening. Also, layers let you undo operations incrementally. At any time you can return to the Sharpen/Blur layer and erase a sharpening effect by dragging with the eraser tool.

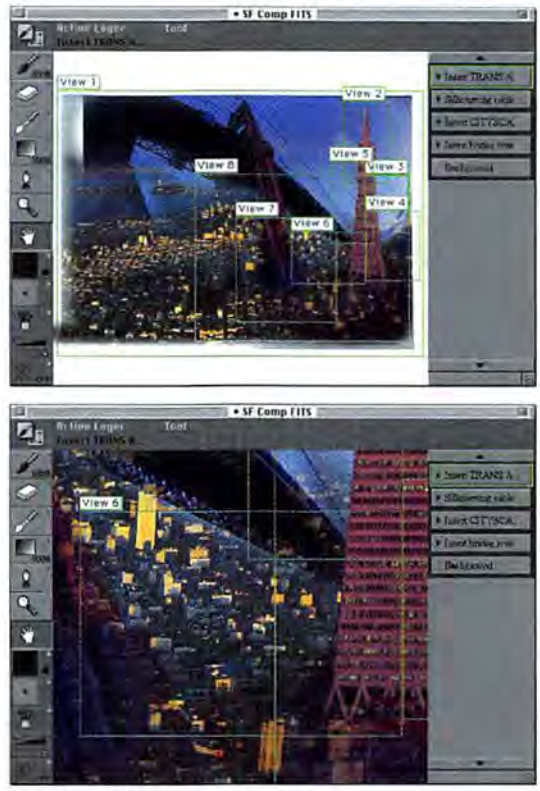
But layers are a disappointment. Never mind that they are largely nonintuitive and badly explained in the manual; Live Picture does not implement them with nearly the care you see in less expensive programs. For starters, you can edit only the topmost visible layer, an arbitrary constraint that prevents experienced users from freely exploring a composition from multiple perspectives. The workaround is to hide all layers above the one you want to edit, but this prevents you from seeing key portions of a composition as you make changes to others.

Undoing is another problem. Although you can erase effects, Live Picture provides only a single-level Undo command. So if one brushstroke overlaps another and you want to undo just one of them, you're out of luck. Furthermore, even though Live Picture records all brushstrokes as paths, it provides no means for you to edit them as such. (The path tool provided with the program applies only to masks and stencils.)

The tool-based Sharpen/Blur layer offers its own problems. Simply put, scrubbing an image with a paintbrush or filling masked areas hardly qualify as powerful or precise methods of fine-tuning the focus of an image. You have no means to numerically adjust, say, the strength or radius of the focus corrections, as you do in Photoshop. In fact, by HSC's admission, Live Picture's sharpening capability works like Photoshop's Unsharp Mask set to a maximum of 100 percent, with a fixed radius and no threshold. In its attempt to make the program easy to use, HSC has made Live Picture less versatile and more static.

Sometimes Live Picture ties your hands. The program provides a Silhouette feature that ostensibly makes it easier to mask away a uniformly colored background. But in practice, the feature is about as capable as Photoshop's magic wand, and less flexible, to boot. First of all, you can't simply apply the automatic mask to an image that's already inside your composition; you have to silhouette the image as you import it. You paint and erase to add to the masked or unmasked areas, then you click on a scissors icon when you're finished. Once you accept a surprisingly complicated dialog box of options—HSC thinks Unsharp Mask is too complicated, yet it offers options with names like Computing Mode and Maximum Transition Edge—the program generates the mask. Though the process takes as much as a minute or more, you're not allowed to switch applications. And when you finish, guess what? You can't

continues



Oodles of Views Since Live Picture lacks such conventional and doubtless passé navigation controls as scroll bars, it's helpful that it allows you to set up custom views by drawing and manipulating rectangular outlines around areas in your image. Here, for example, artist John Lund has set up a series of views in his photographic montage (shown by the green outlines). Zooming from View 1 at the top to View 6 at the bottom is as simple as choosing a command. Unfortunately, you have to set up all views manually; there is no default fit-in-window or actual-size view.

go back and take advantage of automated adjustments. You have to reimport the image and start again.

There are numerous other problems. You can't open multiple compositions at the same time, and the standard Mac Clipboard functions are permanently dimmed. Although you can interrupt a screen redraw and even switch applications while Live Picture redraws in the background, you can't cancel an operation. So if you import an image and then change your mind, you have to wait a minute or more until the introductory redraw cycle completes, and then delete the new layer. You can't change the size of the composition window when positioning an imported image, which limits your ability to place and scale the image in relation to the overall composition.

Live Picture lets you define custom views, but there are no default views, such as Fit in Window or Actual Size. (Granted, this program constitutes a resolution-independent environment, but every imported image has a fixed resolution, and I'd sometimes like to see it.) You can apply linear gradients only to rectangles, and then the gradients must be either horizontal or vertical. HSC gave us the amazing Gradient Designer plug-in module for Photoshop, so this is a particular disappointment.

You can't access individual color channels, and there are no mathematical overlay modes such as Multiply and Screen—both cardinal sins in a program geared toward a professional market. And if you want a bug, try shift-dragging a corner handle with the scale tool. Of course, you don't need to press the shift key when scaling, but the program shouldn't punish you with an eternal loop you can escape only by pressing ⌘-option-esc. Another way to crash is to use the native Power Mac version of Live Picture with the native Power Mac version of ATM (3.8). They are completely incompatible.

The Last Word

The amount of hyperbole surrounding Live Picture would make P. T. Barnum blush. One HSC employee told me, "You can't think about Live Picture like any other piece of software you've ever used before. It's a total paradigm shift." I'm not sure any program could live up to that description, and Live Picture clearly doesn't. At its core, it's a promising program rather rudely assembled atop some marvelous technology and burdened by an extremely high price tag. Though fast and blessed with all the benefits of a proxy-based system, Live Picture's day-to-day functions leave plenty of room for improvement.—DEKE McCLELLAND

Adobe Premiere 4.0

Video-Editing Software

PROS: Improved trimming; ability to create custom filters and transitions; NTSC-standard capabilities; improved support for edit-decision lists; Power Mac native. **CONS:** Needs more audio tools. **COMPANY:** Adobe Systems (415/961-4100). **LIST PRICE:** $795.

MW ★★★★

REMEMBER THE FIRST TIME you heard about using your Macintosh to digitize and edit video? Although it represented an exciting prospect, the technology needed to evolve. Yet, while desktop video technology improved, many users were still not satisfied. Desktop video editing wasn't practical, powerful, or just real enough for many. The new evolution of Adobe Premiere, version 4.0, just might come closer to satisfying those users.

Premiere 4.0 remains as solid and reliable as previous versions, and advances far and above its competitors with new and improved professional-level features.

Good video editing lies in the details: the frames that lead into and out of each clip. Since 99 percent of video edits are straight cuts from one clip to the next, the skill in selecting which frames to cut between is the core of good editing technique. Editors spend the majority of their time adjusting these edit points, adding a frame here, taking out a few frames there, all to present a project that plays smoothly and delivers its message effectively. Regrettably, desktop editing software hasn't been able to provide the proper tool for this top-priority job—that is, until now.

The Trimming window in Premiere 4.0 allows you to use both ripple and rolling edits to fine-tune cuts between clips. The window shows two frame views: the current out point for the outgoing clip and the in point for the incoming clip. Eight trim buttons surround the frame views for trimming or adding to either side of the cut. You can trim or add from one to a user-defined number of frames at a time. Each trim button has a corresponding frame view that previews the frame you'll have if you trim or add.

Even handier is the rolling-trim feature, which lets you quickly adjust a cut on the fly. You place the cursor between the out and in frames (indicated by *A* and *B* tracks on screen) and drag in either direction. We prefer to make a rolling trim first and then fine-tune the cut with a few clicks on the ripple-trim buttons. This way you can make audio and video edits quickly and precisely.

One challenge for video-editing software is to provide easy access to all functions and tools while keeping the interface simple and uncluttered. Premiere 4.0 accomplishes this in two ways: by consolidating many functions in a few new windows and by allowing you to define the main Construction window. By selecting options from the Windows menu, you can set icon size, track format, and track display. You can also snap the window edges together to create a console-style interface, and you can save your window design for future use.

The new Commands palette is a floating window for easy access and contains only those commands you use most frequently. Both the size and selection of this palette are completely user-definable. You select and add commands from a pop-up menu inside the palette window or from the Preferences option under the File menu. You can even adjust the number of columns in the window to make the palette fit better on your screen.

Trimming Window The eight buttons surrounding the two frame views are trim buttons for trimming or adding to either side of the cut.

Premiere 4.0 also improves the file management of its Project window. A new hierarchy of folders and subfolders, all user-definable, enhances the organization of your clips and minimizes clutter. For replacing low-resolution work clips with higher-res real clips, Premiere offers the Project Trimmer. This tool recaptures the original clip at a higher res but only

the portions of each clip you need for your project, to save hard disk space.

The Tool pop-up menu is an important enhancement to the Construction window. Rather than having to remember or look up keyboard shortcuts, you can choose all of Premiere's tools in one pop-up menu in the lower-left corner of the Construction window.

The range select tool, which eliminates the tedious repetition of executing the same command on a sequence of clips one clip at a time, has become one of our favorite tools. Range select lets you select a sequence of clips and work with them as a group. If you select a sequence and move it, the entire sequence moves as a unit, each cut intact; or you can select a sequence of clips and apply the same filter to all of them at once.

Anyone who uses Premiere for graphic design or special-effects work will be thrilled with 4.0's new filter capabilities. In addition to the filters provided in previous versions of Premiere—antialias, backward, camera blur—you can now apply Adobe Photoshop filters that ship with the software—such as emboss, solarize, and zigzag—to your video clips for unique impact. Once you select the clip you want to filter, Premiere displays a window in which you set the parameters of each filter. If you later forget just what filters you have applied to a clip, option-click on the clip and Premiere reminds you with a pop-up list. Audio filters include boost, fill left/right, and echo.

Still not enough filters for you? Try using the Filter Factory to create your own. From the Filters dialog box, select Filter Factory and click on Add. A Filter Factory Settings box appears, with a preview window and zoom and grabber tools. Once you have designed the filter you want by inputting mathematical equations and programming values, click on OK and it's yours. Or click on Build and save the filter for later use.

Likewise, Premiere includes both a wide variety of transitions and a new Transition Factory. Transitions range from a standard additive dissolve to the more spectacular gradient wipe. And the

Overall Work Space The screen shows an A and B track with Transitions chosen from the Transition palette shown in the upper left corner. The Customizable Command palette is shown in the lower left corner of the screen.

Transition Factory lets you design your own unique effects. These factories advance Premiere's effects capabilities beyond those of other desktop editing applications and challenge many big-money professional-level editing systems.

Which brings us to another new feature: uncompiled, or dynamic, previewing. In previous versions of Premiere, you could not preview your project or any segment of it without compiling the transitions and effects. Now you can preview without compiling by using either the Construction window, the Trimming window, or the new Controller window. You can also preview and print to video at the same time, with no delay, regardless of the size of your project.

And as for creating a professional-level project, Premiere 4.0 boasts support for true broadcast-quality video. To be considered broadcast quality, video must meet the NTSC standard of 29.97 frames per second. With the appropriate video hardware, Premiere 4.0 can capture video at this rate. You can now work in the Construction and Clip windows at 29.97 fps and output to tape at broadcast quality—again, with no delay.

Premiere 4.0 has several other new features. Stop-motion capture control lets you build an animated sequence a frame at a time. You can use the Show Previous command to *onionskin*—that is, to view the current and previous frames to assist setting the position and motion of the figure you're animating. Video makers who need to *online* (finish a project in a broadcast-quality format) can output a second edit-decision list (EDL) for the B-roll (usually used for dissolves) to eliminate conflicts with the A-roll. Finally, for clips containing window-burn time code, Premiere 4.0 can use OCR (optical character recognition) technology to convert it into an EDL, although OCR is still not totally dependable in any application.

Other features from 3.0 have been greatly improved: The EDLs now support four audio channels, and blue and green chromakeys now reduce the fringing effect of the background in a keyed composite image. Plus, the whole application is Power Mac–native, letting you take advantage of speedy filter rendering and smooth, 30-fps playback instantly.

The Last Word

While Premiere 4.0 is extremely powerful software on its own, professional-level digital video "for the rest of us" is still not a reality. Unless you have a workhorse CPU, lots of RAM, and very expensive disk arrays, you sacrifice video resolution, frame rate, or frame size. (We tested Premiere on a Quadra 950 with 20MB of RAM and a Radius VideoVision Studio 1.7, and also on a Power Mac 8100/80AV with 40MB of RAM.) The good news is that if you own the right hardware, you won't regret investing in Premiere.

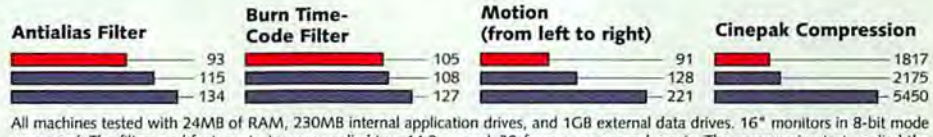
The most remarkable thing about Premiere 4.0 is the battery of exclusive features and functions that place it in its own class. The significantly simplified interface gives you greater accessibility to commands and functions. The Trimming window is a necessity long overdue, providing simple and precise tools for fine-tuning edits. The Filter and Transition factories give you full reign to design and store truly one-of-a-kind effects. And with the right hardware, Premiere can give the desktop video editor a broadcast-quality product with a minimum of compromises. Premiere 4.0 is not only a huge advance in desktop video software, it's the new standard.

—ROB BRAKEY AND LAWRENCE JORDAN

MW LAB

Adobe Premiere 4.0 (680X0 versus native)

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



BEHIND OUR TESTS

All machines tested with 24MB of RAM, 230MB internal application drives, and 1GB external data drives. 16" monitors in 8-bit mode were used. The filters and features tests were applied to a 14.2-second, 30-frames-per-second movie. The compression test applied the Cinepak compression scheme to a 53-second video clip captured at 30 fps.—**Macworld Lab testing supervised by Danny Lee**

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PowerBook 150

Macintosh Computer

PROS: Lightweight; decent speed. **CONS:** Not enough ports for an all-in-one computer; not a great value. **COMPANY:** Apple Computer (408/996-1010). **COMPANY'S ESTIMATED PRICE:** $1449.

MW ★★

APPLE'S POWERBOOK 150 IS A MIX-and-match collection of features from the 100-series PowerBooks fused into a single, fast machine that shouldn't cost much to make. It's as if the 150's designers raided the leftovers shelf at the PowerBook warehouse and chose some components that are no longer state of the art but work just fine.

The 150 sports the same case as the 100-series models, complete with trackball. Inside is a 33MHz 68030 processor with no FPU, so the 150 is pretty fast compared with the 100-series PowerBooks it's replacing. That speed is augmented by the 150's Duo-style RAM, which lets you expand the standard 4MB up to a whopping 40MB. It also weighs a few pounds less than the older all-in-ones, thanks to a lighter screen, fewer components, and a simpler Duo-like interior architecture. At 5½ pounds, the 150 is the lightest all-in-one PowerBook.

The 150 includes a lightweight, manual-insertion SuperDrive floppy drive, a backlit passive matrix LCD screen, and an IDE (Integrated Drive Electronics) hard drive. The display measures 9½ inches diagonally and offers 640-by-480-dot resolution, which is good for a passive matrix screen but doesn't compare in quality with an active matrix unit. Without a video-out port, this is the 150's only display option, and the passive matrix screen can really take a toll on your eyes.

Another way Apple kept the 150's weight (and, presumably, cost) down was to eliminate a whole slew of accessory ports. Hence, the 150 has no Ethernet, video-out, or ADB ports, and no microphone. The flip-down back panel is gone, and what's left is a single printer/modem serial port, a sound jack, a SCSI port, and space for an internal modem. The 150 is minimalist in the extreme.

Apple claims that all accessories for the original all-in-one PowerBooks, (including NiCad batteries) will work for the 150, despite some lingering internal-modem power problems; Apple is working to fix them by the time you read this.

The 150 comes bundled with ClarisWorks to create almost any type of document you could want, PC Exchange and MacLink Plus for exchanging files with the DOS world, Apple Remote Access client software and access to eWorld for telecommunications, and Apple's PowerStrip for easy access to PowerBook utilities. It is a nice starter bundle that makes the 150 useful right out of the box.

Once again, Apple has left out the system disks, packing only a single utilities/emergency–start-up disk with the 150. The company expects you to provide the nine disks it takes to make a backup of your hard drive as soon as you get the PowerBook home (an included backup utility performs this task).

It's worth noting that the 150 comes with an IDE hard drive. IDE drives, available in DOS and Windows machines for years, are cheaper than standard SCSI drives. If you want to reformat the 150's hard drive, you'll need to use the included formatting tools since most Mac hard disk formatters are SCSI specific. Other hard drive utilities and optimizers should work fine on the IDE drive for all but the lowest-level file-recovery and disk-optimization tasks. The 150 does include an HDI-30 SCSI port for attaching peripherals to the 150.

KEVIN CANDLAND

The Last Word

Apple could have made the 150 the Volkswagen of PowerBooks: just the basics, nothing fancy. For a decent bargain, some users would forgo the luxury of color, lose a few ports, and accept a less-than-top-of-the-line machine—no problem. Unfortunately, after all the sacrifice, you still get sticker shock when you pick up the 150. PC notebooks in the same price range offer PCMCIA expansion slots, larger hard drives, and up to three times the 150's battery life. For budget-conscious shoppers, buying a used or reconditioned 100-series PowerBook might be better than buying a 150, especially as dealers clear the older machines from their shelves. Or, if you have an extra $700, consider the more expandable, PowerPC-upgradable PowerBook 520. While the 150 is a solid machine, it isn't worth the premium price for a repackaging of older technology.

—MATTHEW HAWN

MW LAB

How Fast Is the PowerBook 150?

CORE-PERFORMANCE INDEX

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

Use these standard ratings of overall performance to compare systems across classes.

NOTEBOOK-SYSTEM PERFORMANCE TIMES

Times are in seconds. Shorter bars are better.

Use these results to compare the performance of systems using a range of common Macintosh business, graphics, and page-layout applications.

Best result in test. Products are listed in decreasing order of overall performance.

	Common	Scientific	Processor	Drive Access	Video Display	Floating Point
	Typical business tasks in Microsoft Excel and Word that use the Mac's processor, drives, and video display.	We added to the common tasks several scientific calculations (which use floating-point math).	Indicates raw processing power, which affects almost all aspects of performance.	Indicates performance for tasks that rely heavily on the hard drive.	Indicates performance for tasks that depend heavily on screen-redraw speed.	Indicates performance for tasks that heavily use a math coprocessor.
PowerBook 520	8.8	9.1	20.3	33.1	74.6	101.3
PowerBook 180	5.7	11.2	34.2	55.1	85.1	42.1
PowerBook 150	5.5	5.6	36.2	44.1	65.0	204.9
PowerBook 145B	4.0	4.1	49.8	63.8	96.4	279.5
PowerBook 160	3.7	3.8	51.7	69.7	108.3	282.7

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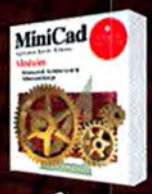

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ElectricImage Animation System 2.0

Animation Program

PROS: Exceptional animation controls; speedy production rendering. **CONS:** Compact-car price; hardware protection key. **COMPANY:** Electric Image (818/577-1627). **LIST PRICE:** $7495.

MW ★★★★

AT $7500, ELECTRICIMAGE ANIMATION System (EI) can hardly be called an impulse buy. But EI is aimed at professional animators. In demanding cinematic-production environments, where animation workstations can cost many thousands more, ElectricImage, with extraordinary animation and image-rendering capabilities, is a bargain. And as its extensive list of credits (including sequences in *Terminator 2*, *Jurassic Park*, and *The Mask*) attests, EI is every bit the equal of workstation-based programs in image quality. So although EI is not a program for dabblers, professional users get great value for their bucks.

ElectricImage 2.0 is better integrated than its predecessors, incorporating the old Mr. Font module into the main program. Now you can build and bevel text objects from PostScript Type 1 fonts right in the 3-D work space (TrueType fonts are not supported).

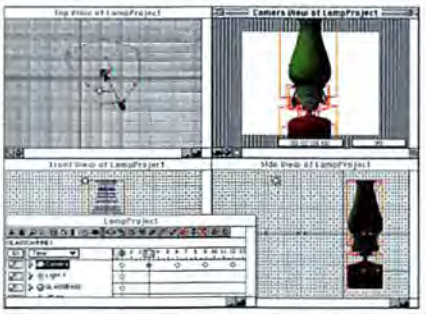
Gone also is the Translator module. With 2.0, you can import 3-D models without an intervening step. EI can read more than two dozen file formats, making it compatible with virtually every modeler in use today. Plus, it can write many of these formats, so it can translate files from one modeler to another.

Although ElectricImage still lacks a built-in modeler, version 2.0 includes plug-ins for constructing primitive shapes such as cones, cubes, and spheres, and for generating mesh-surface objects. Undoubtedly, more plug-in tools will be forthcoming, but you'll still need a separate program to build models.

Once you import a model, EI provides unbelievably comprehensive control over every facet of the animation process. You can link objects hierarchically using a variety of pivots for defining and constraining motion. EI 2.0 offers tools that deform objects to produce twisting, shearing, tapering, and even rippling effects. And you can manipulate objects using Bézier controls to produce organically flowing movements.

ElectricImage 2.0 also includes new plug-in animation routines. Mr. Nitro explodes objects into user-definable pieces, letting you edit variables such as air resistance, turbulence, and blast time. The Particle Generator creates a stream of fragments that you can edit for variables such as flow, lifetime, and bounce, simplifying hard-to-produce effects like flying sparks, and jets of water.

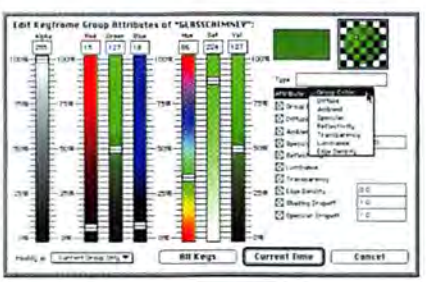
ElectricImage 2.0 is similarly exhaustive in controlling textures, letting you precisely adjust surface attributes such as specularity, reflectivity, and transparency. Also, EI 2.0 can enhance images with adaptive antialiasing to sharpen high-contrast edges and with Summation filtering to alleviate the unwanted moiré effects produced by some surface maps. And EI 2.0 can render images using various user-definable, motion-blur techniques that produce the effect of faster-than-camera-shutter motion.



Animation Prowess ElectricImage's clean and logical work environment gives little clue to the animation power that lies beneath, but it's there.

Beyond standard lighting (point, spot, ambient), EI gives you the option of tube lights that mimic neon fixtures and laser beams. All lights are infinitely adjustable, allowing for wonderfully subtle glows. In addition, a new plug-in produces lens flares simulating two photographic lenses.

The Project window lets you coordinate the animation on a time line displaying each channel; the window can also display spreadsheetlike grids in which you can edit animation values for specific frames. Also, you can import multiple sound files, which are displayed as waveforms in the Project window. EI automatically parses the sound track and assigns segments to every frame. Sound-synchronized animations can be previewed in real time and saved in QuickTime format.



Exquisite Control ElectricImage provides extensive controls over every element in the scene. The pop-up menu selects surface attributes for editing.

ElectricImage's separate Camera module has a well-earned reputation as a speedy production renderer. Much of that speed is derived from using Gouraud and Phong shading techniques with reflection mapping, instead of tracing every ray of light in the scene. The result is faster rendering with little, if any, compromise in image quality.

With EI's Projector module you can view the completed animation. Projector uses a proprietary playback routine that yields smooth performance even at a 640-by-480-pixel image size. In addition, Projector lets you edit animation sequences and manages the transfer of finished productions to an assortment of professional video devices.

Befitting a program this complex, EI's documentation is extensive. These manuals are comprehensive, well organized, and readable, making the learning curve more manageable. Less convivial, however, is EI's use of an ADB copy-protection key. Pros who already use several programs with ADB keys should be wary. String a few keys together, along with a normal complement of input devices, and you can overload the ADB.

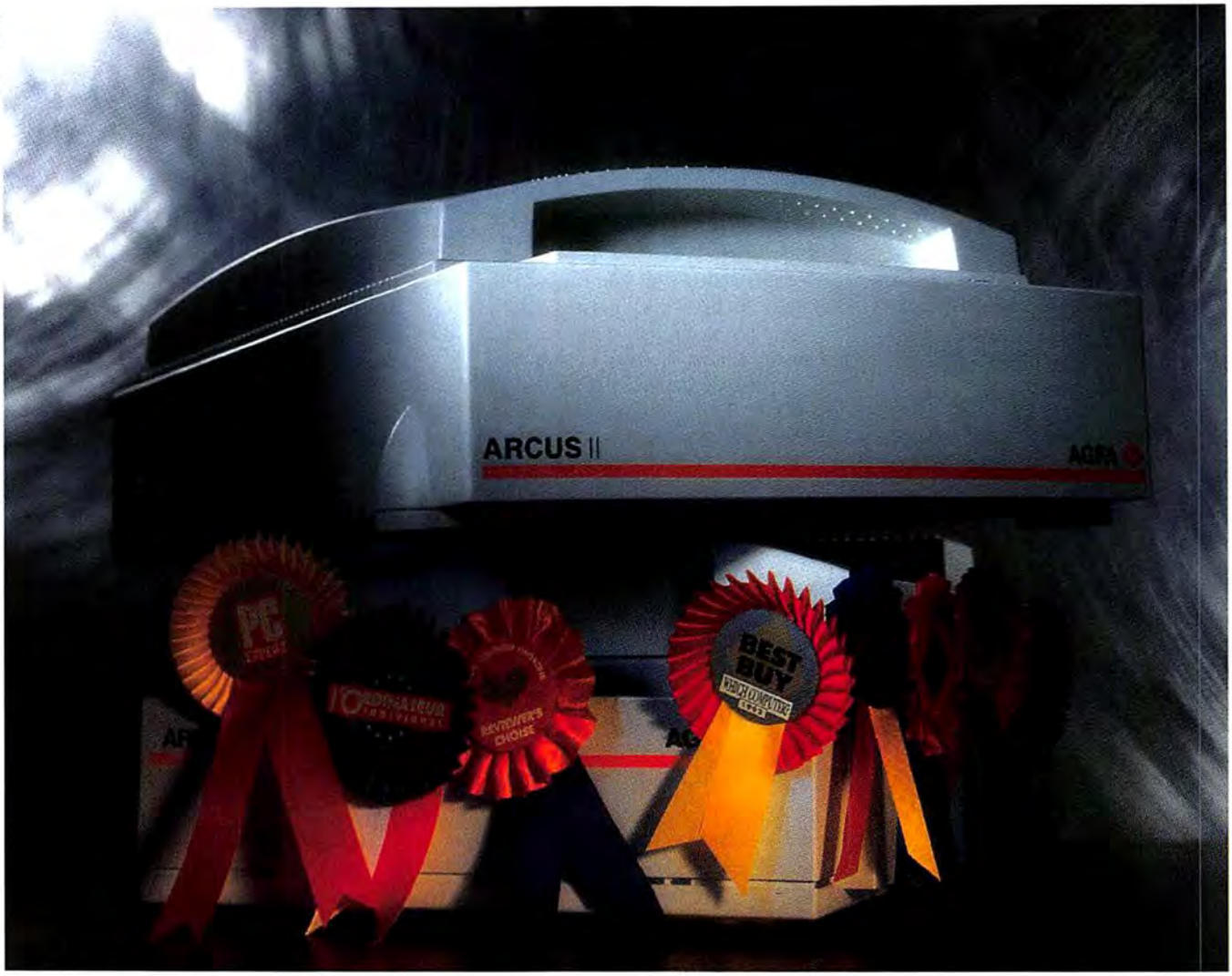
If you haven't guessed by now, EI's hardware requirements are steep. You'll need a large monitor to keep EI's multiple scene views, Project window, and assorted tool palettes at hand. Recommended RAM dosages range from 24MB to 256MB, depending on the complexity of your productions. And of course, get the fastest Mac you can afford. These days, think Power Mac—EI should be native by the time you read this. Yes, workstation systems still outperform Mac-based ElectricImage, but the Power Mac–native EI should change that, while maintaining a significant cost advantage.

The Last Word

Depending on your perspective, ElectricImage 2.0 is either incredibly overpriced or a terrific bargain. In the end, there's no denying that ElectricImage is worth every penny, but you have to be a *successful* professional to afford it.

—CARLOS DOMINGO MARTINEZ

Anderson & Lembke, Inc.



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Three Internet Packages

Internet Books and Software

The Internet Companion

PROS: Fun tidbits. **CONS:** Software hard to use; book outdated. **COMPANY:** The Voyager Company (914/591-5500). **LIST PRICE:** $29.95.

MW ★★

Internet Explorer Kit and Internet Starter Kit

PROS: Well-written books and useful software. **CONS:** None. **COMPANY:** Hayden Books (317/581-3500). **LIST PRICE:** $29.95 each.

MW ★★★★

Internet Membership Kit

PROS: Easy to set up; nice Internet-access offer. **CONS:** One included book, *The Mac Internet Tour Guide,* is not that useful. **COMPANY:** Ventana Media (919/942-0220). **LIST PRICE:** $69.95.

MW ★★★★

IT'S THE HOT, OVERHYPED TOPIC OF 1994: the Internet. Members of online services are able to explore some Internet functions, but how do you really get *on* the Internet? These three book-and-software combinations aim to help users navigate the infobahn.

The Internet Companion

Voyager's package contains The Internet Companion, a HyperCard-based book written by Tracy LaQuey (Addison-Wesley, 1992). LaQuey's book is well written but offers much less information than do the others reviewed here. It lacks the long lists of FTP sites and newsgroups that other Internet references contain, and its information isn't completely current. For example, a search on the word *Mosaic* yielded nothing.

This electronic book is surprisingly easy to browse; you can search the text and earmark references. But The Internet Companion suffers from the drawbacks of all electronic books: you need a power source, and you can't use a highlighter pen. Also, you can print only one computer screen of text on an 8½-by-11-inch sheet of paper, leaving half the page blank.

The Voyager package comes with MacIntercomm Lite, telecommunications software from New World Computing (818/999-0607). You use the book stack's Connect button to launch the telecom software and connect to CERFnet's Internet center, where you can find Internet addresses as well as search Gopher and WAIS, and Telnet. (For $49.95 you can upgrade to the full version of MacIntercomm, which gives you scripting and more transfer protocols.)

While The Internet Companion provides Internet access, you really get just a terminal-emulation screen; you can't use any of the graphical Internet clients—like TurboGopher or Fetch—that come with other packages. Plus you're subjected to the on-screen garbage that's typical of Unix, as well as the hard-to-decipher buttons for controlling access.

Voyager's Gopher With Internet Companion's access offer, you can retrieve files by using telecommunications software.

Internet Explorer Kit and Internet Starter Kit

Internet Explorer Kit (Hayden Books, 1994) is a companion book to Adam Engst's *Internet Starter Kit for Macintosh* (Hayden Books, 1993). The Explorer Kit package contains exactly the same software as Ventana's Internet Membership Kit does.

Starter Kit is one of the best introductions to the Internet I've seen for Macintosh users. It clearly explains basic terms and contains excellent resources for newsgroups, file-transfer servers, and mailing lists, all categorized by topic.

Explorer Kit tells you where to go once you're on the Internet. The book demonstrates ways to use the Internet and contains lots of quotes from online conversations.

Starter Kit comes with MacTCP, InterSLIP, Eudora, Fetch, TurboGopher, and StuffIt Expander. These pieces of software are the greatest hits of Internet shareware; with just these six, you can connect to your account, send mail, retrieve files, and decompress those files. (For more about navigating the Internet and using Mosaic, see "Taming the Internet," in this issue, and "How to Ride the Internet," *Macworld,* August 1994.)

Explorer Kit includes several lesser-known Internet tools, along with the University of Minnesota's elegant and popular gopher client TurboGopher. Peter Lewis's Anarchie (pronounced *anarchy*) helps users browse and retrieve files from Archie servers, which provide lists of which files are available on which FTP servers. Finger, also written by Lewis, lets you find information about people online. MacWAIS is a client that lets you search Wide Area Information Servers. MacWeather tells you the temperature in major cities around the world.

The software is easy to use, with familiar Macintosh commands and file names, and in most cases, simple dialog boxes. Once you get the hang of using these products, accessing the Internet is almost easy.

If you decide to buy one of these sets, choose Starter Kit unless you're an experienced Nethead. With Starter Kit's included software, you can find the software that

continues

Fetching Poetry With the Hayden and Ventana packages, you can view FTP sites as disks and save files to your hard drive.

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– *Forbes* (6/20/94)

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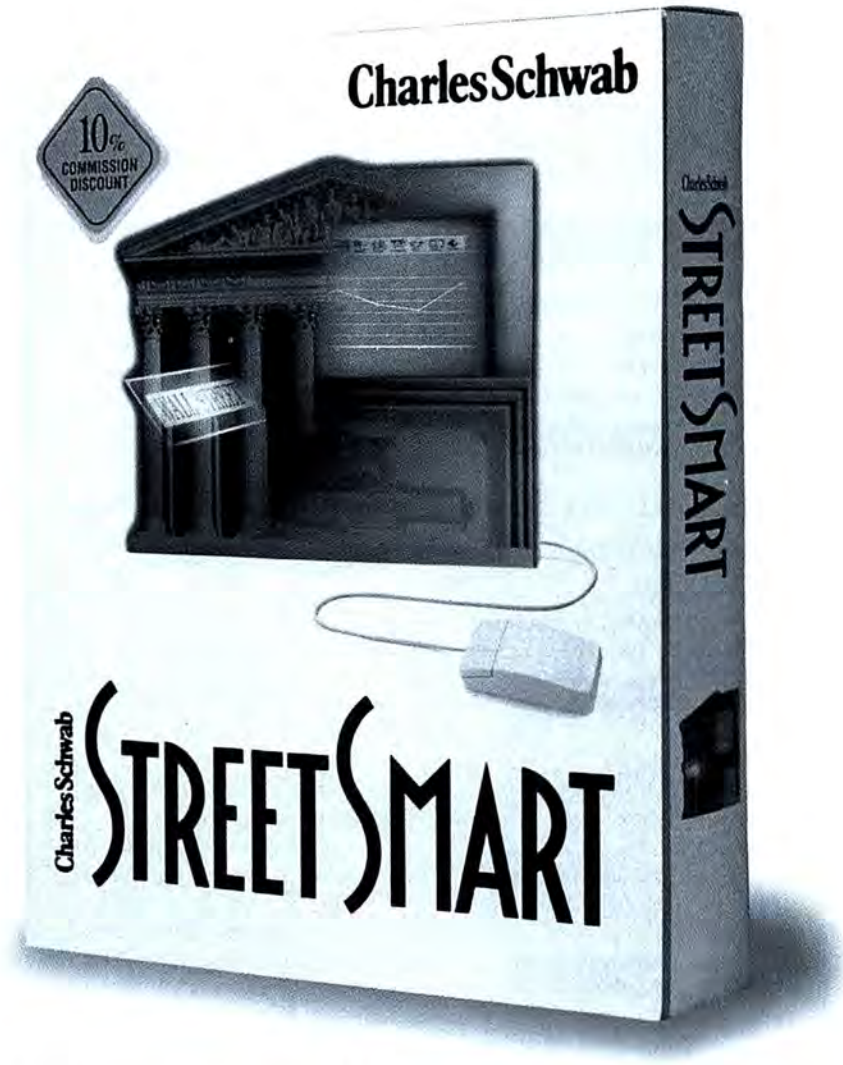

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comes with Explorer Kit out on the Net. Note that the package does not cover the shareware fees of the included software; so be a good citizen and pay the fees ($25 for the Starter Kit's shareware and an additional $65 for all the Explorer Kit's shareware).

Internet Membership Kit

Internet Membership Kit by Ventana Media contains two books—Michael Fraase's *The Mac Internet Tour Guide* (Ventana Press, 1993) and Harley Hahn and Rick Stout's *The Internet Yellow Pages* (Osborne/McGraw-Hill, 1994)—as well as Michael Fraase's booklet *A Brief Guide to Mosaic*, and all the software included with Adam Engst's Internet Starter Kit. Fraase's Internet book isn't nearly as helpful, well written, or organized as Engst's. *Yellow Pages*, on the other hand, is clearly organized, useful, and funny; the only thing missing is a pad of Post-it notes to help you mark your favorite Internet sites.

Both the Voyager and Ventana products offer free access to CERFnet for a limited time, but the Ventana product gives more online time. The best part of the Ventana product is its inclusion of preconfigured software. SLIP novices usually have to configure their own TCP software, which can be confusing even for experienced computer users. Ventana's combination lets you skip the exciting task of entering arcane information about your domain name server and IP address, making connection to the Internet a whole lot easier.

The Last Word

Virtually all the software included in these packages is readily available from user groups, online services, and the Internet, so these packages' true value is their convenience. And surprisingly, none of them come with Mosaic, though you can get it online fairly easily, by anonymous FTP from ftp.ncsa.uiuc.edu (141.142.20.50) as NCSAMosaicMac.10.sit.hqx. in the directory /Mac/Mosaic.

If you don't need an Internet access offer, Hayden's Starter Kit is an excellent resource. If you do need access, I recommend the Ventana kit. I recommend the Voyager package only if you want an electronic book or text-based Internet access. Of course, once you're on the Internet, you'll find that the other million people who just discovered its utility are clogging popular servers and causing general gridlock. Be aware that while you're using a friendly Macintosh, it's talking to a grouchy Unix box. Getting on the Internet is not going to be as easy or intuitive as you'd like.—JOANNA PEARLSTEIN

KPT Bryce 1.0

3-D Landscape–Rendering Program

PROS: Creates great graphics; presets give beginners a good jumping-off place. **CONS:** Noneuphonious appellation; innovative interface can be puzzling at times; occasional artifacts in rendering. **COMPANY:** HSC Software (805/566-6200). **LIST PRICE:** $199.

MW ★★★★

IF YOU BUY KPT BRYCE, YOU CAN KISS your spare time good-bye. You'll find yourself at it for hours, adjusting a fog bank here and a rock texture there, until your 3-D scene has just the look you want. But consider the bright side: while you're waiting for your scene to render—which can take hours for an intricate landscape—you can catch up on the chores you've been neglecting.

The manual encourages you to dive in and experiment with lighting, camera angles, and textures, creating realistic or fanciful scenes: an iceberg lit by starlight, mist rising from a tropical island, sandstone buttes at sunset, a domed city on an alien world, you name it.

KPT Bryce renders by means of ray tracing: virtual beams of light bounce throughout a scene to create impressively realistic textures, lighting, and effects. As a result, elements in a scene interact with one another—a star on the horizon reflects in the ocean, for example.

Cloudscape 4 KPT Bryce uses ray tracing to create detailed 3-D scenes. Shown here is a landscape by Eric Wenger, codeveloper of the program.

Bryce consists of five main components, or palettes. With the Master Palette, you adjust the position of a virtual camera to select a viewpoint for the landscape-to-be. The Create Palette lets you build the basics of a scene beginning with a chunk of terrain and various 3-D wire-frame shapes such as spheres, cubes, and cones. The Edit Palette allows you to modify the terrain: make a slope steep or gentle, add erosion, invert a ridge to create a valley, and so on. This palette provides many preset materials, or textures—including rock, ice, water, clouds, and vegetation—which can be applied to terrain or objects. The Edit Palette also offers control over lighting, letting you select the color and intensity of diffuse and specular light (matte surfaces and reflections). Ambient sun or moon lighting is set in the Sky & Fog Palette, which also lets you control the type of clouds and amount of cloud cover, including fog or haze (a touch of haze on the horizon can convey an amazing degree of realism).

The fun begins with the Render Palette: press the Render button and your landscape begins to materialize, accruing detail with seven successive rendering passes. If you can't wait that long to see how things will look, you can isolate and render just a piece of the scene. (The manual wisely suggests that when you render complex scenes, you put your Mac to work while you sleep.)

Bryce is designed to let beginners jump right in and create scenes—many preset components are included—while providing deeper layers that let experts customize scene components. Advanced users can build 3-D terrain from a scanned image, create custom textures, or add PICT images using an alpha channel.

In general, Bryce's interface is a work of art. Move the cursor from right to left on the Haze control in the Sky & Fog Palette, for example, and you'll see a postage-stamp–size scene get hazier and hazier, until the tiny landscape nearly disappears when the haze level reaches 100. Click on a small preview window to see how the haze will affect the color and visibility of objects in your landscape.

The novel, graphics-heavy interface can be confusing at first—for example, icons are used to indicate standard actions such as Cancel and OK—but the manual does a good job of explaining the sometimes eccentric controls. My major interface complaint: if you're rendering a scene and quit the program or open a new file, Bryce doesn't ask if you want to save changes, and wipes out all rendering performed since the last save (the scene can be rerendered, but that takes time—and woe to any spouse who accidentally wipes out several hours' worth of rendering). But back to raving about the program.

The Last Word

For less than $200, you get a remarkable graphics application, a CD-ROM full of images (you're welcome to dissect the images or add pieces to your landscapes), a slide-show utility, and even some screen-saver modules. I can enthusiastically recommend KPT Bryce to anyone looking for an artistic outlet, good stress relief, or just a great toy.—ERFERT FENTON

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Square One 2.0

File-Launching Utility

PROS: Elegant, flexible design; automatically lists recently opened documents; available from within any application; pop-up menus allow access to folders and disks placed on palettes. **CONS:** Requires at least 400K of additional RAM to run in background at all times. **COMPANY:** Binary Software (310/449-1481). **LIST PRICE:** $74.

MW ★★★★

SQUARE ONE CERTAINLY ISN'T THE only file-launching utility, but it's definitely one of the best. Square One provides easy access to every file on your Mac by displaying applications, folders, and documents as tiles on a resizable floating palette—the program's primary interface. To launch an item (or switch between running applications), you simply double-click on the appropriate tile.

Unlike some utilities, Square One doesn't limit you to a single palette. For example, you might create a Desktop Publishing palette loaded with your word processing, page-layout, and graphics applications, and a separate Games palette for entertainment programs. With each palette, you decide which file icons to include and in what order you want them arranged. You can fill the palettes with either large or small icons, displayed with or without file names.

Connected to each palette is a Document List window, which automatically lists up to ten recently opened files. (Displaying this window is optional.) When you click on an application icon, only those documents opened with the selected program appear in the list. Square One automatically assigns a ⌘-*key* shortcut to each document appearing in the list—⌘-1, ⌘-2, and so on—for quick keyboard-based launching. You have the option of making any of the listed documents permanent, so they always appear as choices in the Document List.

Square One also displays a separate Active Applications palette with tiles showing only those applications currently active on your Mac. A single click on any of the tiles jumps you to that application. Like Square One's main palettes, the Active Applications palette can display icons in two different sizes and with or without file names. You can also have it display memory usage for each of your active applications. Likewise, several other Finder-like commands and features have been added to Square One, so you can now use Get Info on a file, put a PowerBook to sleep, or shut down and restart your Mac without having to return to the Finder.

Another brilliant feature, new in version 2.0: clicking and holding down the mouse on a palette tile now produces a pop-up menu that allows you to launch the selected program or any of its recently opened files. If the tile contains a folder or disk, the pop-up menu displays the contents of the folder or disk with hierarchical submenus four levels deep.

In all this, Square One's hallmark is flexibility. For example, you can instantly access your palettes from within any application in five different ways—by clicking on a palette visible in the background; by pressing a definable hot key that jumps you directly into Square One; by pressing option-tab to cycle through all your active programs; by using the always-available Square One menu (which the program installs on your menu bar); or by simply moving the pointer to a hot spot on the screen.

Of course, for Square One to be most useful, you must have it running at all times. That means sacrificing some of your available RAM, but not much: the program requires only 400K, which shouldn't be a serious problem for most users. If you're really strapped for memory and have to quit the program, Square One's program-switching shortcuts remain fully functional, and you can relaunch the utility from within any application by using the Square One menu on the menu bar. (If memory is really tight, Square One also lets you quit the Finder to regain another 300K or so of RAM.)

The Last Word

Other comparable file-launching programs are out there, but none does the job as elegantly as Square One. Its slick design, flexibility, and straightforward interface make it a pleasure to use.

—JOSEPH SCHORR

Fair and Square Square One's palettes provide ready access to programs, folders, disks, and documents. The Active Applications palette (bottom) displays memory usage and provides one-click program-switching.

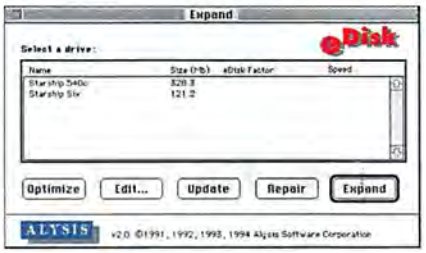
eDisk 2.0

File-Compression Utility

PROS: Reasonably transparent operation; decent performance; easily copes with disk-full situations. **CONS:** Both installation and removal erase hard drive; does not support some hard disk formatters; does not support driver-level security software. **COMPANY:** Alysis Software Corporation (415/928-2895). **LIST PRICE:** $149.95.

MW ★★★

EDISK FROM ALYSIS SOFTWARE TAKES a driver-level approach to file compression. Rather than compress files individually or in groups, it compresses an entire drive. eDisk compresses data read to the disk on the fly, and automatically



Making a Disk Bigger In eDisk's main application window, you select the disk option you want to perform.

expands data read from the disk. The advantage is transparency—once you install eDisk, you don't have to choose files to compress.

If you copy a file to another drive, eDisk expands it automatically, unless the second drive is also compressed. If you want to send compressed files via modem or copy them to a floppy disk, consider a file-level compression program, too.

eDisk comes on a single 800K startup disk containing System 7.1. If your Mac requires a System Enabler file or a later system version, you need to back up the System Folder (using the Disk Tools or Utilities disks that ship with your system software) and transfer it and the eDisk application to another floppy.

eDisk supports a number of hard disk formatters. I tried to install eDisk on a Maxtor 127MB drive formatted with Casa Blanca Works' Drive7 3.0B. Although Drive7 is on eDisk's list of compatible formatting software, I got a warning that eDisk doesn't support it. Rather than take any chances, I formatted the drive with FWB Hard Disk ToolKit 1.6 and proceeded without further incident. Installing (and removing) eDisk erases all the

continues

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data on the hard drive, so you must back up and restore your data for either operation. eDisk took about 25 minutes to prepare (or "expand," in the company's terminology) the Maxtor drive; a larger drive would take proportionately longer.

eDisk offers a handful of configuration options. You can set aside a disk cache (using your Mac's RAM) to speed up drive performance, choose to see a more or less accurate indication of disk usage, and have eDisk optimize the disk when the Mac is not in use (which is supposed to increase compression ratios).

My first encounter with Alysis Software's eDisk was not a happy one (see *Reviews*, October 1993). At the time, I had inconsistent results installing the program and experienced severe data-corruption problems. Happily, both problems have been resolved in version 2.0. Alysis claims a 40 percent performance boost for version 2.0, and it does perform noticeably faster than the previous release.

Once installed, eDisk doesn't draw attention to itself in any significant way. I observed a 20 to 25 percent slowdown in reading and writing data to the compressed drive and in launching most applications when eDisk was installed on the 127MB drive (admittedly a slow mechanism), which was hooked up to a PowerBook 540c. This slowdown is not severe enough to be terribly obvious unless you are copying a lot of data. And don't expect any speedup on a Power Mac, since eDisk runs in 680X0 emulation mode.

The weakness of driver-level compression until now has been its inability to handle disk-full situations, but eDisk 2.0 coped well. I couldn't quite achieve the promised 2:1 compression ratio on a mixture of application and document files, however. The best I could manage was 1.45:1.

eDisk 2.0 also adds support for Connectix RAM Doubler (a utility that effectively doubles the amount of RAM available). In my brief tests, I found that the combo worked, but applications took noticeably longer to open.

The Last Word

eDisk 2.0 is a tremendous improvement over the original release. During my testing, the program worked as advertised (except for the amount of disk compression achieved), with no significant problems. But using driver-level compression software has trade-offs, both in terms of disk performance and because you'll still need a file-level compression solution if you want to back up your data to a noncompressed disk. Within those limitations, eDisk is definitely worth further consideration.—GENE STEINBERG

PageTools 1.0

Publishing Utility

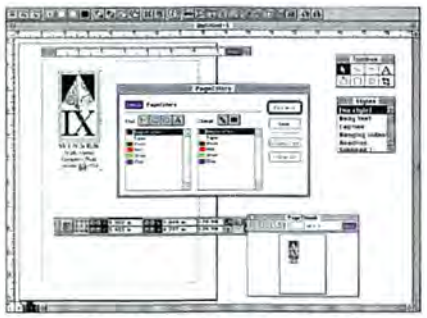
PROS: Several laborsaving functions for PageMaker users. **CONS:** Dialog boxes can be hard to read. **COMPANY:** Extensis Corporation (503/274-2020). **LIST PRICE:** $129.

MW ★★★★

OVER A YEAR AGO, ALDUS ADDED Additions to PageMaker 5.0, promising the kind of program extensibility that QuarkXPress owners have long had with XTensions. PageTools shows the real potential of Additions.

PageTools is a collection of several utilities. These tools were designed to work together, and that's one of the prime benefits PageTools offers.

PageTools installs a button bar at the top of your screen that is decidedly un-PageMaker-like. PageTools gives PageMaker the feel of Microsoft Word. It took me a while to figure out PageTools' icon scheme; if the name of the tool would pop up whenever you passed the mouse over the icon, as in Word 6.0, you wouldn't have to memorize the icons' meanings.



Powered-Up PageMaker PageTools offers several compelling add-ons to PageMaker, including floating rulers, a page-preview palette, and a utility to search and replace colors.

The series of icons at the left (plus, strangely, two at the far right) of the button bar take existing PageMaker features (line weight, fill type, stacking order, grouping, item guides, page insertion, and text sizing) and provide button-bar access. The series at the right all have a blue rectangle to identify them as PageTools features. The ten icons correspond to the ten features PageTools offers. (You can also access the Additions via the Aldus Additions submenu of the Utilities menu.)

My favorites are PagePrinter, PagePreview, PageColors, PageRulers, PageThumb, PageGuides, PageAlign, PageMover, and PageBar Editor. That's nine of the ten—a high hit ratio.

PagePrinter lets you control printing even more than PageMaker's superb print dialog boxes do: you can print all changed pages in a document. What a great idea!

PagePreview adds to the Open dialog box, so you can preview a PageMaker document before you open it. QuarkXPress has had this for about a year, but PagePreview lets you preview any page of a document, not just the first page.

PageColors lets you search and replace objects' colors. Now you can change all boxes with a red border to azure blue.

PageRulers creates floating rulers (you can fill your screen with them if you're not careful), which greatly aid the positioning and layout of elements.

PageThumb lets you see any page in a preview window. QuarkXPress's Thumbnail view is always a favorite option of mine because I can quickly see what is on any page before moving to it. Now PageMaker offers the same function.

PageGuides lets you put guidelines with elements, so you can align elements with, say, a graphic's corner or a center point. The Addition gives you full control over where you want guides to appear.

PageAlign lets you select objects and align them against each other or evenly distribute them over a certain area of the page. This old-time QuarkXPress feature should have been in PageMaker years ago.

PageMover moves selected elements to other pages (including master pages) or the pasteboard. It's a deceptively powerful Addition, since you can move objects without leaving your current page.

PageZoom—which lets you zoom in on an area of your page—is clunky to use and not much of an improvement over just changing your page view.

Overall, I have only a few quibbles. It's easy to add buttons via the PageBar Editor—perhaps too easy. You can unwittingly create a blank button that does nothing. I'd also prefer being able to choose the order of buttons in the button bar so I could, for example, group the guide-oriented ones together. I also wish the dialog boxes used a larger, bolder typeface. They're hard to read on my 16-inch monitor. These are minor complaints, and the paucity of them shows just how well designed PageTools is.

The Last Word

As with any utility package, the real value depends on whether your work benefits from what the utilities offer. PageTools offers several utilities that will benefit many people. PageAlign, PagePrinter, and PageRulers alone are worth the price; the others are frosting on the cake. PageTools is packed with utility.
—GALEN GRUMAN

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ErgoKnowledge 1.0

Ergonomics Training

PROS: Covers basic computer ergonomics; self-test questions reinforce learning. **CONS:** Doesn't cover pointing devices; would benefit from live-video examples. **COMPANY:** Visionary Software (503/246-6200). **LIST PRICE:** $395.

MW ★★★

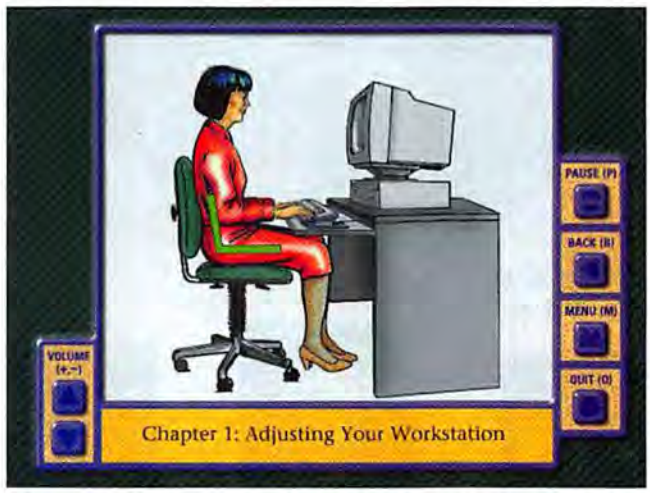
ERGOKNOWLEDGE IS A CONVENIENT way for managers to acquaint office workers with the principles and practice of computer ergonomics. (If you're wondering why this is so important, see "Safer Computing," elsewhere in this issue.) Developed by Dr. David Rempel, who heads the Ergonomics Laboratory at the University of California, Berkeley, the ErgoKnowledge CD-ROM covers the basics in an interactive presentation that took me about 45 minutes to complete.

The first and longest chapter tells you how to set up your keyboard, chair, and monitor; reviews ways to reduce eyestrain; and goes over the proper use of telephone headsets and document holders. (Alas, in-depth coverage of mice and other pointing devices is lacking.) The next section, "Moving Your Body," tells you how to take periodic breaks to work out kinks in your body. The last chapter takes a look at the medical management and reporting of repetitive strain injuries (RSIs) and other work-related illnesses. A short appendix on risk assessment and injury prevention rounds out the presentation.

ErgoKnowledge takes an informal approach, with a lot of graphics and just the right amount of text. Most of the important material is presented by two off-screen narrators, who provide a running commentary on animations that illustrate what to do and what to avoid (see "Ergonomically Correct"). Although the animations are well done, video clips of real people would be even more effective. ErgoKnowledge does include a few QuickTime movies featuring Dr. Rempel and the two narrators, but these clips add very little to the learning experience.

Each section includes a short multiple-choice test that drives home the basic concepts; a summary quiz at the end covers the entire presentation. Respond incorrectly and the program sends you back to review the relevant section. (Don't let the tests scare you—if anything, the questions are *too* easy, and the results aren't recorded.) My only complaint is that the CD-ROM's slow response makes the quizzes seem longer than they really are. I also got tired of hearing encouraging comments like "Good job!" when I answered the questions correctly.

ErgoKnowledge comes with an installer program that lets you run a specified number of training sessions; you can buy additional sessions directly from Visionary Software and install them by entering a code. A password-protected administrator's menu also lets you customize the program to some degree. For example, you can turn off the display of QuickTime movies if you're running ErgoKnowledge on a slow Macintosh, and you can enter reference text that describes available resources in your office or organization.



Ergonomically Correct ErgoKnowledge's first chapter shows you how to arrange and use your workstation. Buttons on the right let you jump to other topics or review previous sections.

The Last Word

Despite a few shortcomings, ErgoKnowledge offers a good, basic review of office-computer ergonomics. For a subject that has been neglected for far too long, that says a lot.

—FRANKLIN N. TESSLER, M.D.

AirNote 1.0

Remote-Messaging Service

PROS: Easy setup and operation; supports multiple users and groups; includes Internet mail address; DOS and Windows versions bundled; free headline-news service. **CONS:** Message log does not archive; no indication of message truncation; no cost-accounting capability. **COMPANY:** Notable Technologies (510/208-4400). **LIST PRICE:** $349.

MW ★★★★

ALPHANUMERIC PAGERS ARE wonderful things: by displaying full-text messages rather than simple phone numbers, they let you stay in touch with colleagues and clients without constantly running to a telephone. Many paging services, however, route messages through a live attendant, charging a per-message fee for that service. AirNote, from Notable Technologies, lets you originate alpha paging messages from your own computer, eliminating both dictation charges and errors in transcription.

The AirNote package includes a 4-line–by–20-character alphanumeric pager, SendNote software, a well-written and clear instructional pamphlet, and literature on SkyTel's digital paging service. You simply call an 800 number to activate the service using a credit card. Service plan prices range from $40 to $200 per month, depending on the options you choose and your anticipated message volume. (Messages are counted in 40-character increments, so for billing purposes a long message counts as several paging messages, even though a single page can deliver up to 240 characters.) Messages beyond the contracted volume cost 75 cents each; dictated messages cost an additional 50 cents each.

The minimum service allows 50 free 40-character messages per month and includes SkyTel's headline news service, which broadcasts news updates several times daily. You can expand the basic service to increase message volume; reserve a custom 800 number; add voice mail; or subscribe to additional news services for finance, business, sports, and entertainment. SkyTel's message service lets you phone in for missed messages.

To send messages from your computer, you use the SendNote software and a modem (2400 bps or faster). The bundle includes software for Mac, DOS, and Windows, and you can install the programs on as many machines as you want

continues

Data Storage Media

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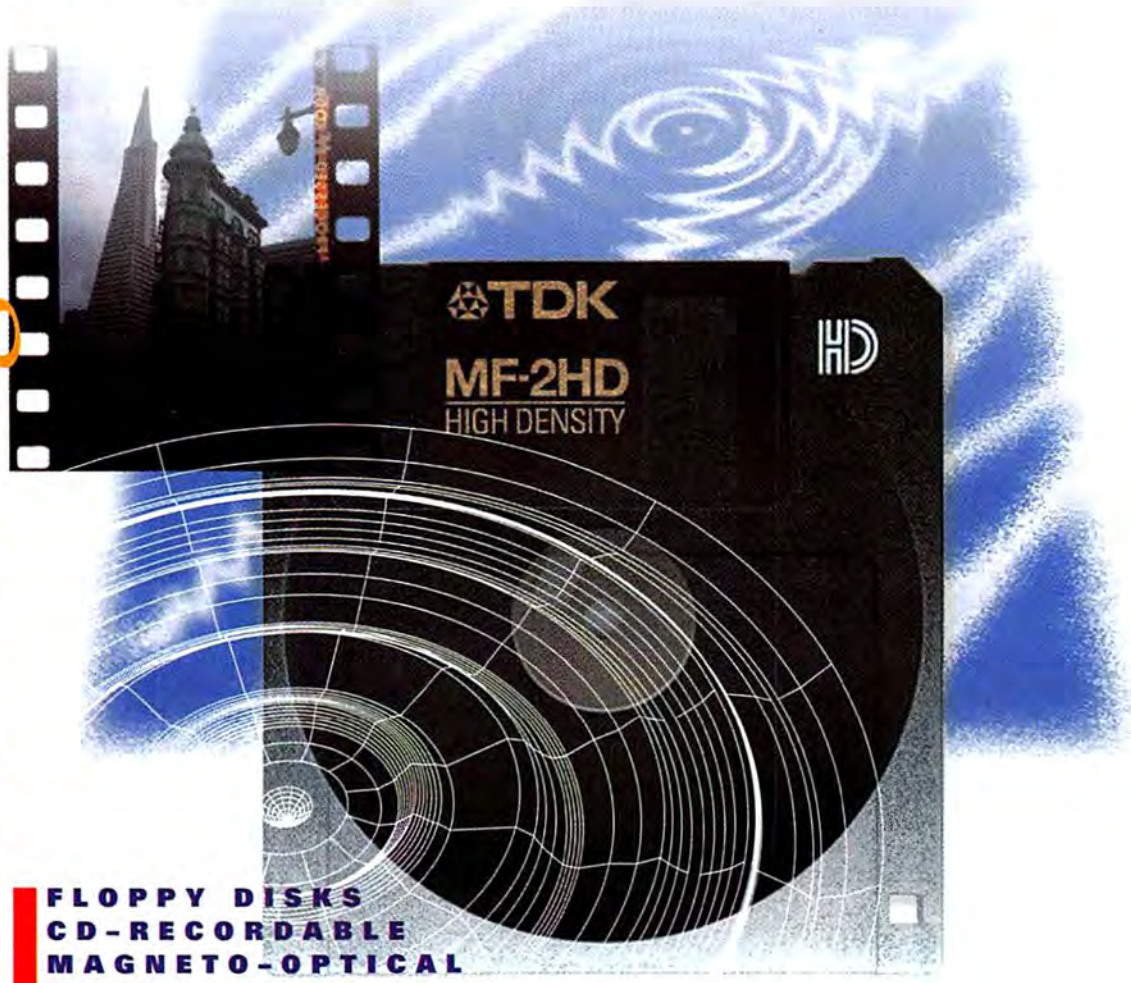

FLOPPY DISKS
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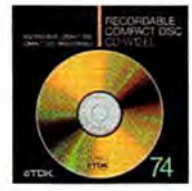

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TDK

Circle 129 on reader service card

for convenient organizationwide access to paging. Installing the software is simple: you enter a name and PIN number for each SkyTel subscriber you want to page. Type the message text, select your recipients, and press the Send button.

You can define paging groups for broadcasting messages to several people simultaneously, and you can set up any number of stock messages to make routine paging more convenient. The software automatically queues multiple messages and makes up to four attempts to dial into SkyTel. All messages are logged, noting date, time, and success or failure of transmission. A character counter in the message window helps you keep track of the size of each message. AirNote automatically breaks up long messages into several paging messages as required.

AirNote can also route Internet messages to you. Each AirNote pager has a unique Internet address, and any E-mail sent to that address goes automatically to the pager. This opens up all kinds of possibilities, including automatic notification of network problems, forwarding of local company E-mail, and even real-time monitoring of important Internet mailing lists. Beware, though—only the first 240 characters of an Internet message are transmitted, with the header stripped down to sender's name and subject.

Sending Notes AirNote's SendNote software lets you send messages to any SkyTel subscriber. You can set up recipient groups and standard message texts for easy routine paging.

The Last Word

The AirNote bundle has some minor flaws. While SendNote lets you print the message log, there is no convenient way to clear the log or archive logged messages to a file, nor does the software record the number of messages or 40-character message segments sent—information necessary for tracking costs. The pager doesn't identify Internet messages specifically and doesn't tell you that the message was truncated. But these nits notwithstanding, AirNote is a very handy way to get into alphanumeric paging.

—MEL BECKMAN

Cooperative Adapter

Infrared Network Interface

PROS: Easy to set up; no cables to string.
CONS: Expensive compared with wired alternatives; runs at LocalTalk speeds only.
COMPANY: Photonics Corporation (408/955-7930). **LIST PRICE:** $349.

MW ★★

WIRELESS NETWORKS ARE A HOT item these days. Photonics' Cooperative Adapter is a LocalTalk-only network interface that uses diffuse infrared (IR) instead of cables to connect Macintoshes, Newtons, and laser printers together. The system has two components: a network adapter and an optional base unit called an Access Point ($129). The adapter is small, about 2½ by 3 inches in width and less than an inch high. A single cable is attached to it with two connectors: one is the standard serial connector typically plugged into the printer port of a Macintosh. The other connector goes into an ADB port to draw power for the adapter. It has a pass-through port that allows its use on Macs that have only one ADB port.

If you're using a device with no ADB port (such as a Duo, Newton, or laser printer), the base unit provides power via either an AC adapter or three AA batteries. It also provides a pass-through LocalTalk connection for hooking up to an existing wired LocalTalk network. The base unit is about the same size as the network adapter, and the two attach together to form a single unit.

Installation is fairly easy. I attached one adapter to a PowerBook 140 with no difficulty, then I hooked another adapter to a Quadra 840AV—a little tougher because I keep the Quadra on the floor under my desk. The cable attached to the Cooperative Adapter was just a little too short to let me place the unit on top of the desk, so I ended up putting it on the floor. While the manual does not recommend this, it worked out fine.

Photonics claims that the range of the Cooperative Adapter is about 25 feet. This means that in order to cover a room larger than 25 feet, you must set up a wired LocalTalk network and then connect Access Point units to the network; the Access Points must be a maximum of 25 feet apart so that any receiver falls within the 25 feet. Otherwise, the adapters must all be in the same area—a room no larger than about 25 feet on a side, with a ceiling at least 8 feet but no more than 10 feet high. In other words, a typical classroom or office conference room is OK, but a warehouse or auditorium is out.

The range constraints are due to the Cooperative Adapter's use of diffuse IR technology. Each adapter is both a transmitter and receiver. The transmitter portion floods the room with IR signals that bounce off the ceiling, walls, and furniture. The receiver does not need a direct line-of-sight connection with any transmitter, and someone moving about the room won't break the connection. Since

TOM GIBSON

most of the IR light transmitted never reaches a receiver, diffuse IR is clearly not power-efficient. It's fine as long as you're running off AC power, but a set of batteries is good for only about 24 hours of operation.

Diffuse IR networks are inherently secure. The signal doesn't penetrate walls, quickly drops off in strength, and is not subject to electrical interference. It is, however, susceptible to "jamming" by bright sunlight, strong incandescent lights, and other IR sources. I ran a simple test using an IR remote control for a VCR. During a file transfer I pressed a button on the remote control. The watch cursor hands on the computer screen immediately stopped moving. As soon as I released the button, the transfer resumed. In addition, room windows reflect IR, so a room with more windows than walls might pose a problem for a Cooperative Adapter network.

The Last Word

I can imagine only a few scenarios where I might prefer to use a Cooperative Adapter network rather than a wired one. Setting up a class in a conference room or other area where stringing cable would be inconvenient or dangerous comes to mind. The high cost of each unit, the limitations and restrictions inherent in diffuse IR, and the extremely low cost of traditional LocalTalk adapters and cabling make the Cooperative Adapter an expensive niche product.—MATTHEW LEEDS

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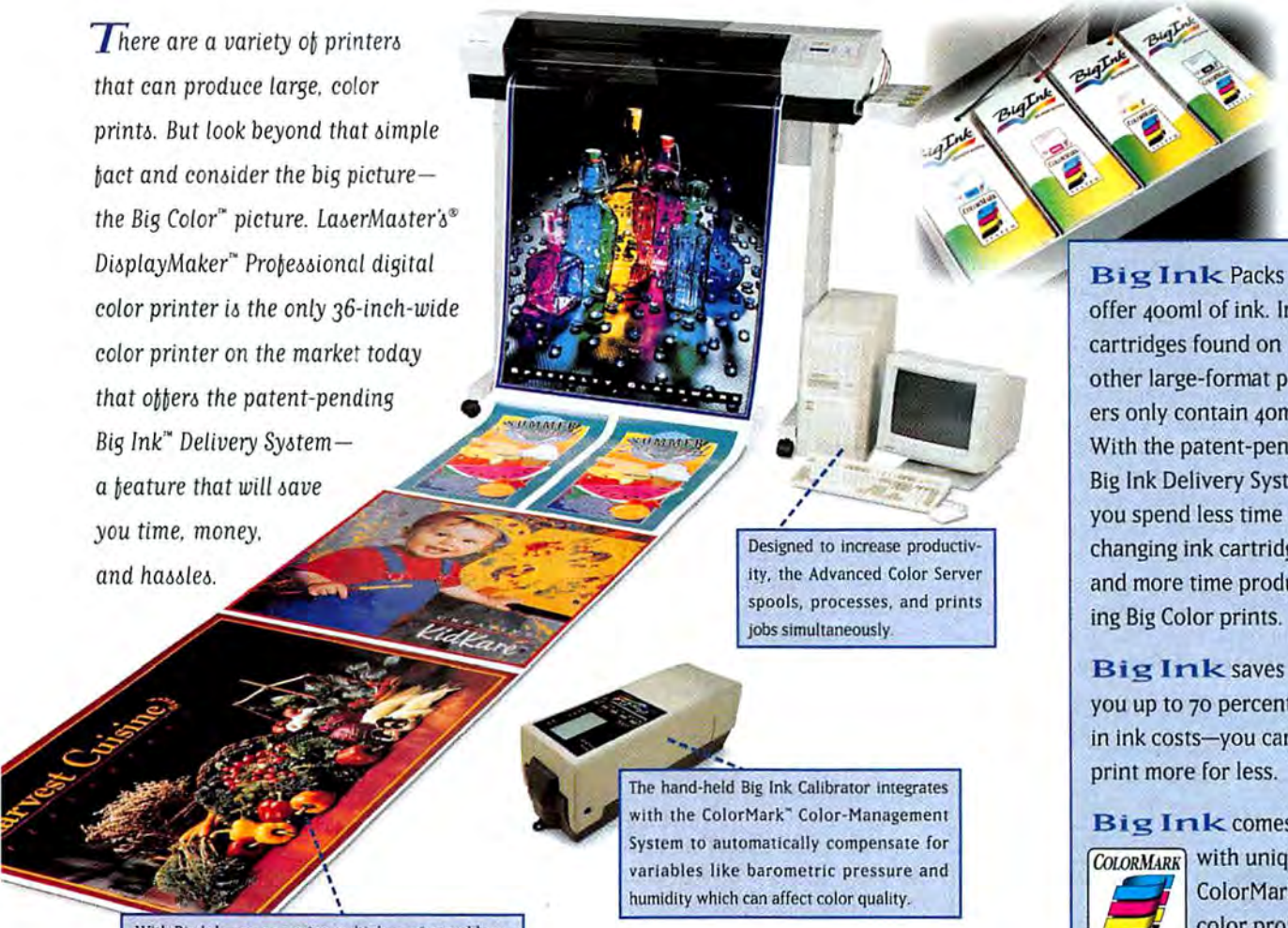

With Big Ink, you can print multiple copies and long banners without running out of ink in the middle of the job. For instance, you can print about 89 photo-realistic 36"x 45" prints with full-ink coverage. Ink cartridges found on other large-format printers will be dry after printing just seven or eight.

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Circle 103 on reader service card

SoundEdit 16

Digital Audio Software

PROS: Supports CD-quality audio; straightforward interface; good documentation. **CONS:** No record-level controls; editing QuickTime movie sound tracks is slow; some file-import glitches; slow audio processing. **COMPANY:** Macromedia (415/252-2000). **LIST PRICE:** $379.

MW ★★★

IN 1988, WHEN FARALLON COMPUTing released its MacRecorder hardware and SoundEdit software, multimedia pioneers and fans of silly error beeps could record and edit sounds. The product was later acquired by Macromedia, which did a good job of keeping the SoundEdit software compatible with new Macs such as the AV machines, but didn't add much in the way of features.

That's changed. SoundEdit 16, like the name says, supports 16-bit sound; the higher resolution allows for a wider dynamic range and better-sounding audio. The new version also supports higher sampling rates—up to the 48KHz rate used by digital audiotape recorders. In English: SoundEdit 16 lets you record and play compact disc–quality sound.

SoundEdit 16 also supports QuickTime movies. You can open a QuickTime movie and edit its sound track—you can fix audio glitches, rearrange words, and so on—and you can mix in sound tracks, such as a musical score. This isn't the only program that lets you do sound-track postproduction, and it has some surprising limitations, but by and large it is a solid upgrade.

You'll encounter one of the program's most serious limitations, however, when you go to record and realize that SoundEdit 16 doesn't allow you to adjust the recording level. There's no way to turn down the volume to compensate for a loud original or turn it up to make up for a soft one. You can boost soft sound levels after recording, but through a digital processing procedure that can introduce undesirable noise. Adjusting recording levels is important; the inability to do so hampers SoundEdit's usefulness as a professional audio tool.

SoundEdit 16 makes it easy to cut and paste sounds and apply a variety of effects, such as echo and reverb. Unlike audio programs such as Alaska Software's DigiTrax, SoundEdit 16 doesn't take advantage of the digital signal processor (DSP) chip built into AV Macs or of the speed of the Power Macs to enable you to listen to various effects in real time. You must choose a processing command, wait, audition the results, and then undo and repeat if you don't like them.

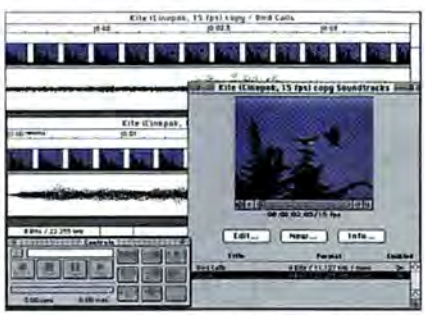
Adding and tweaking QuickTime sound tracks is easy—but often slow. SoundEdit 16 displays a small thumbnail view of the frames in a QuickTime movie above the waveform of the movie's sound track. Because SoundEdit must scale each frame before displaying it, tasks like scrolling and selecting can be painfully slow. You can hide the thumbnails to boost performance, but then you can't see the frames. I'd like to see a happy medium, such as showing only the frames that occur at cue points, which are electronic bookmarks you can create.

SoundEdit 16 can import and export a larger variety of sound formats than could earlier versions. The program can open and save WAV-format audio, a popular format in the Windows world. I encountered some import glitches, however. If you open an AIFF-format sound when the Open dialog box's file-format pop-up menu is set to QuickTime Movies, you get a startling screech of a sound I guarantee will wake you up.

How does SoundEdit 16 compare to DigiTrax or OSC's Deck II? These two programs are faster and better suited to mixing and recording audio (heck, you can adjust the recording level). But adding sound tracks to movies is easier in SoundEdit 16. More significant, SoundEdit 16 lets you edit a sound's waveform; Deck II and DigiTrax do not.

The Last Word

It's unfortunate that Macromedia didn't enhance SoundEdit's audio processing features to take advantage of the horsepower in a DSP- or PowerPC-equipped Mac, and it's inconceivable that it didn't add a record-level adjustment. But despite these flaws, there are enough goodies in SoundEdit 16 to earn it a place in a multimedia producer's toolbox.—JIM HEID



Editing Sound SoundEdit 16's QuickTime window (lower right) lets you play QuickTime movies and add sound tracks to them. The slow-drawing movie-frame thumbnails are visible in the track windows at the top of the screen.

SECOND LOOK

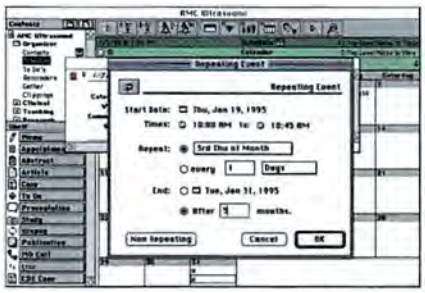
Arrange 2.0

Personal Information Manager

PROS: More calendar functions and print options than in previous version; supports plug-in tools; forms designer. **CONS:** Some functions less convenient than those of dedicated address books and schedulers. **COMPANY:** Common Knowledge (415/325-9900). **LIST PRICE:** $349.

MW ★★★★

ARRANGE 1.1 WAS A GREAT PLACE TO store day-to-day information, but it couldn't replace a contact manager or scheduler (see *Reviews*, May 1994). With 2.0, Common Knowledge is hoping to attract more PIM users by adding features



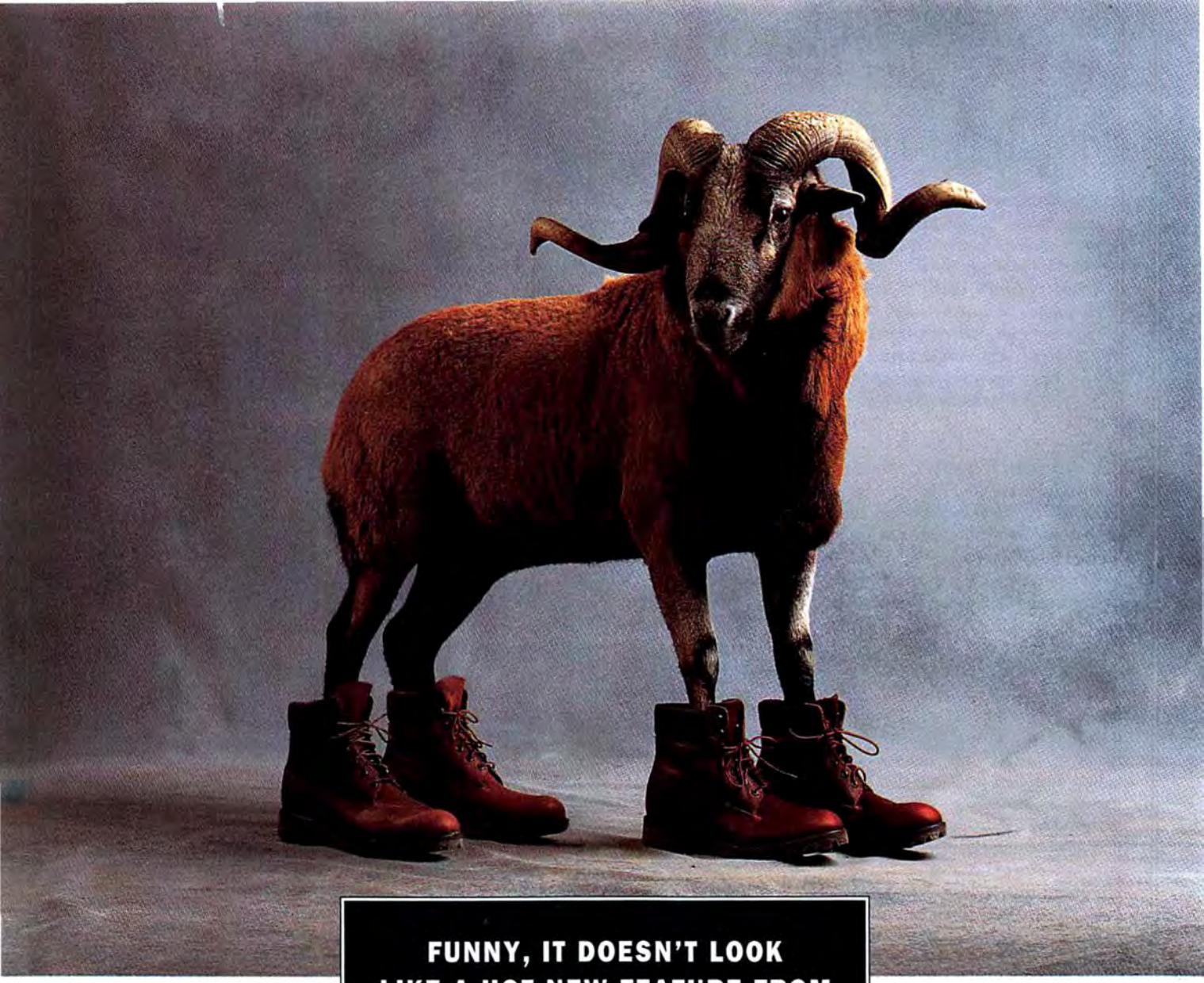
Calendar Update Arrange 2.0's calendar includes several features absent from version 1.1.

already in dedicated calendar programs, such as recurring, untimed, and carry-forward events. Also new to 2.0 are reminder alarms that you can set to go off anytime, even if Arrange isn't running.

Arrange 2.0 retains the outline-based approach to storing data in user-definable units called notes. Welcome additions include check-box fields for yes/no information; the ability to enter a date without a time in date/time fields; and support for centering, left alignment, and right alignment of text. And you can now add plug-in files into the Arrange folder. New forms-design tools let you create customized views that incorporate fields and graphics. And 2.0 sports enhanced output capabilities for printing labels.

The Last Word

Arrange is harder to learn than some address-book–and-scheduler combinations, and certain functions are less convenient than in dedicated PIM software. Still, with a little extra effort, Arrange can take the place of several programs. If your needs fall beyond the usual calendar and address-book functions, Arrange is a strong contender.—FRANKLIN N. TESSLER



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Circle 206 on reader service card

FlexCam

Video Camera

PROS: Small; unobtrusive; flexible gooseneck for positioning. **CONS:** Slight fish-eye effect on images; connection between power adapter and cable harness is easy to dislodge. **COMPANY:** VideoLabs (612/988-0055). **LIST PRICE:** $595.

MW ★★★★

MW LAB SINCE THE INTRODUCTION OF THE AV Macs and their onboard video-capturing and videoconferencing capabilities, I've been looking for a compact video camera for the lab bench. Desktop videoconferencing is slowly emerging in the Mac market, and most video cameras are bulky and noticeable. The less obtrusive the camera, the more likely it is you'll use it and the more value it can provide.

The FlexCam's camera head is about 1.5 inches in diameter, is connected to an 18-inch-long flexible gooseneck attached to a 7.25-inch-diameter base, and weighs only a little over 2 pounds. Because of its flexible neck, you can hide the FlexCam's base behind a monitor or on top of a shelf and position the camera head in front of your subject without the camera's being too obtrusive. If the image isn't straight, you can rotate the camera head 30 degrees in either direction. The camera is ideal for making "Candid Camera"–style QuickTime movies of your coworkers.

The FlexCam's high-resolution, 0.33-inch color CCD camera lens is designed to operate in high or low light (down to 2.5 lux). In most cases, lighting is not a problem but the CCD lens's sensitivity allows for better image detail. Keep in mind that the quality of the image displayed is only as good as that of the monitor displaying it. Whether you're viewing captured video or holding a videoconference, image quality from the FlexCam is at its best when used with a TV monitor (although you may experience audio feedback).

The focal length of the FlexCam ranges from 0.25-inch to infinity, which gives, at most, a 50:1 magnification. Zooming in that close to an object is great but has one minor drawback—the fish-eye effect, where the corners of images are rounded and appear to be bulging. Most people will not notice the rounded edges, but the effect is visible on close inspection. The FlexCam captures an image at 510 by 492 pixels for NTSC—just under a full 640 by 480 screen.

Below the camera lens are two tiny microphones for audio input. The manual recommends pointing the camera directly at your subject's face at arm's length

SCOTT PETERSON

away for best audio quality. I didn't find any problems when I moved farther away or to the side.

The power connection between the FlexCam and the Mac leaves a bit to be desired. The original cable harness, which houses the video- and audio-out jacks and power cord, was quite fragile, but a heavier harness is now available with all shipping units. My one remaining peeve is how power is supplied to the camera. A standard, block power adapter is attached to the cable harness via a small miniplug. Unfortunately, this miniplug is easy to dislodge.

The Last Word Despite its fragile power connection, the FlexCam is my choice for a desktop video camera. It's small and unobtrusive—plus, how can you resist having something resembling the alien ship from H. G. Wells's *War of the Worlds* stationed on your desktop?—DANNY LEE

CA-Cricket Graph III 1.52

Graphing Software

PROS: Clean, simple, fast graphing; careful provision for black-and-white publication graphs. **CONS:** Only 12 graph types; lacks presentation features. **COMPANY:** Computer Associates International (516/342-5224). **LIST PRICE:** $129.

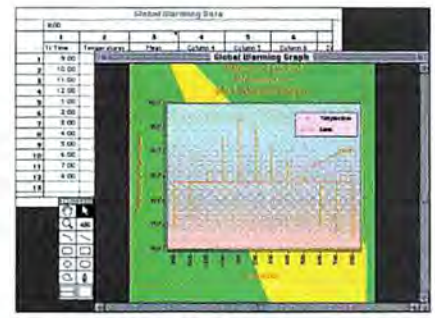
MW ★★★

CA-CRICKET GRAPH IS THE SIMplest popular graphing program in the Macintosh market, and simplicity has its proponents. When *Macworld* surveyed 11 charting programs recently ("Graphing beyond Excel," August 1994), our preference for DeltaPoint's more feature-laden DeltaGraph Pro resulted in a storm of letters from Cricket Graph fans. The essence of these letters was that Cricket Graph is a nice, comprehensible program that you can master quickly, and you won't need retraining each time you use it.

Cricket Graph (CG) provides a spreadsheet for data entry, and easy text-file import (but not direct Microsoft Excel file import). Besides the basic four-function math on spreadsheet columns for producing new, transformed columns, CG offers advanced functions, along with binomial and moving-average data smoothing. For scatter, line, and quality-control data (CG supports standard quality-control chart types), there's a curve-fitting option that will fit data to arbitrarily complex curves, and the option includes error bars.

If these features sound to you more like engineering than business elements, you're getting the point. CG includes a large assortment of black-and-white chart formats to accompany its 2-D–only chart types—you can add depth to columns or bars, but that's not true 3-D. Still, CG's formats will let you convert tables of data into aesthetically pleasing black-and-white charts ready for scientific publication in just a few minutes, and it's clear that careful design went into the font selection, sizing, and layout of these formats. The resulting charts, in color and black-and-white, look seriously better than any analogous default chart types in Excel.

That's a key point in the CG buying decision. It's not just that CG has 12 chart types compared with DeltaGraph's 50-odd. It's that Excel, the program where your data is likely to reside already, has 40 or so chart types itself. But CG's charts just look better than Excel's, unless you're willing to spend hours tinkering, customizing, and saving a repertoire of Excel AutoFormats (the equivalent of style sheets in a word processor). Basically, when you buy this product from Computer Associates you're paying someone who has fine-tuned optimized chart formats for you. That's not a bad bargain.



Just the Facts Cricket Graph gives you a spreadsheet structure for data and a basic repertoire of 12 two-dimensional graph types. The shading in this figure is as fancy as it gets.

The Last Word Cricket Graph's features are just right for charts in the physical and social sciences, but lack the pizzazz for a big-ticket venture-capital presentation. The program is easy to learn and use, and includes math features for data transformation and curve fitting.—CHARLES SEITER

FlightStick Pro for Macintosh

Game Control

PROS: Solid construction; authentic look and feel; smooth operation; extensive configuration options. **CONS:** No friction adjustment. **COMPANY:** CH Products (619/598-2518). **LIST PRICE:** $129.95.

MW ★★★★

RICHARD RETHMEYER

JOCKEYING AROUND THE SKY IN your F-16 jet fighter with a mouse in your hand is like playing tennis with a baseball bat: the experience loses a lot of its thrill. True armchair pilots need a realistic flight stick. FlightStick Pro fills the bill, combining the authentic feel of a real aircraft control stick with flexible software that adapts to most Mac flight simulators.

The all-plastic FlightStick has a solid base containing vertical and lateral trim wheels and a throttle thumbwheel. The self-centering control stick is a life-size aviator's handgrip on very smooth gimbals, topped with a trigger, three option buttons, and a four-way directional switch. The motion and heft of the stick is very realistic, and it's absolutely silent, without the toylike sloppiness or grating sounds found in some flight controls. The only mechanical feature it lacks is a friction adjustment.

FlightStick's software is preconfigured to load an appropriate settings profile when you launch your flight-simulation program, so the control stick is immediately usable without changing control-panel settings. The supplied profiles cover most popular Mac simulation programs and even arcade games such as Prince of Persia. If you want to change the default configurations, or make your own for a program not covered, the supplied FlightStick control panel lets you configure all of FlightStick's physical controls, as well as the operation mode. The operation-mode features include relative and absolute positioning, keystroke equivalents, and preset screen colors and audio level. This last feature is nice because many entertainment programs have specific screen color requirements (for example, 16 colors) and often start out loud enough to blow papers around on your desk.

FlightStick offers an abundance of customizing features. For instance, graphic sliders let you set deflection rates and control resolution so that a quick snap of the stick racks the aircraft into a snap roll, while gentle tick movements provide fine-grained control. You can also assign a FlightStick button or wheel to any combination of mouse movements or keystrokes.

During extensive testing, the FlightStick showed no tendency to drift or lose its orientation. The control panel provides an alignment tool to recalibrate the stick when necessary, but I never found a need for this.

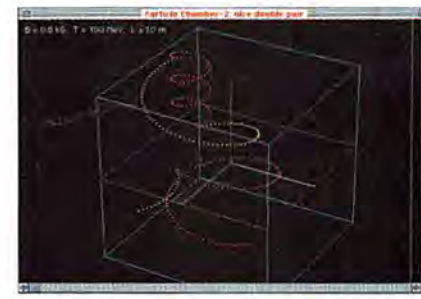
The Last Word FlightStick's only flaw—a missing friction adjustment—is minor. Its authentic look and feel, along with well-conceived software, make FlightStick a nearly perfect desktop pilot's companion.—MEL BECKMAN

Chamber Works 1.0.2

Particle Physics Software

PROS: Easy to use; nicely documented; extra HyperCard and in-program tools for particle identification. **CONS:** Handles only single-particle injections. **COMPANY:** OnScreen Science (617/776-6416). **LIST PRICE:** $79; ten-copy site license $249.

MW ★★★★



The Big Spin These spirals are the tracks of high-speed particles in the magnetic field of a cloud chamber. Chamber Works generates the random particles, and you use the program tools to identify them.

THE UNITED STATES WAS FOR FIVE decades the unchallenged center of elementary particle research, with huge amounts of government funding pouring into giant facilities. Although the Superconducting Super Collider in Texas appears to be a victim of hard times, FermiLab in Illinois recently reported some experimental evidence for the long-sought top quark. So particles are still the stuff of headlines.

Chamber Works is a simulator for particle physics events, targeted at college-level instructional use but actually useful and interesting to anyone who follows physics at approximately a *Scientific American* level. The key element in Chamber Works is a simulated cloud chamber that displays the tracks of particles injected from a simulated beam. You can see the tracks in 3-D or in projections in the x-y, x-z, and y-z planes, and you can control the energy of the injected particles, the chamber's magnetic-field strength, and the chamber's physical dimensions.

These are exactly the controls you want for this type of experiment. The basic principle in analyzing particle data is this: a particle sailing through space like a little bullet will show a curved track in a magnetic field. (This is actually the same principle used to steer electrons from an electron gun to different positions on your monitor screen.) The track curves one way for positive particles, and the opposite way for negative particles (Chamber Works also color-codes them). In the screen shot, "The Big Spin," a neutral (invisible) particle has decayed into two other neutral particles (also invisible), which in turn have decayed into pairs of positive and negative particles.

You can figure out the identity (from mass and charge and half-life) of the particles from the chamber tracks, using curvature, length, and direction of the tracks. Chamber Works includes an on-screen tape measure in projection windows and a HyperCard-based calculator that relates track length to half-life. Since the tableau of possible particles is large but still finite, you can usually identify a particle in a simulation after a few minutes of calculation. Chamber Works shows both finished track patterns and a slowed-down real-time simulation of tracks, so you can watch the tracks evolve. The program includes an LC version for Macs without a math coprocessor, but requires a 68020 processor or higher.

The only element I would add is the ability to inject groups of particles into the chamber, just to give a glimpse of the complexity of some real-world chamber results.

The Last Word Chamber Works is the best introduction to experimental particle physics yet produced, and it's even a bargain.—CHARLES SEITER

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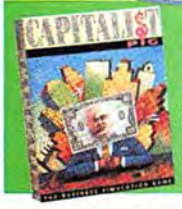

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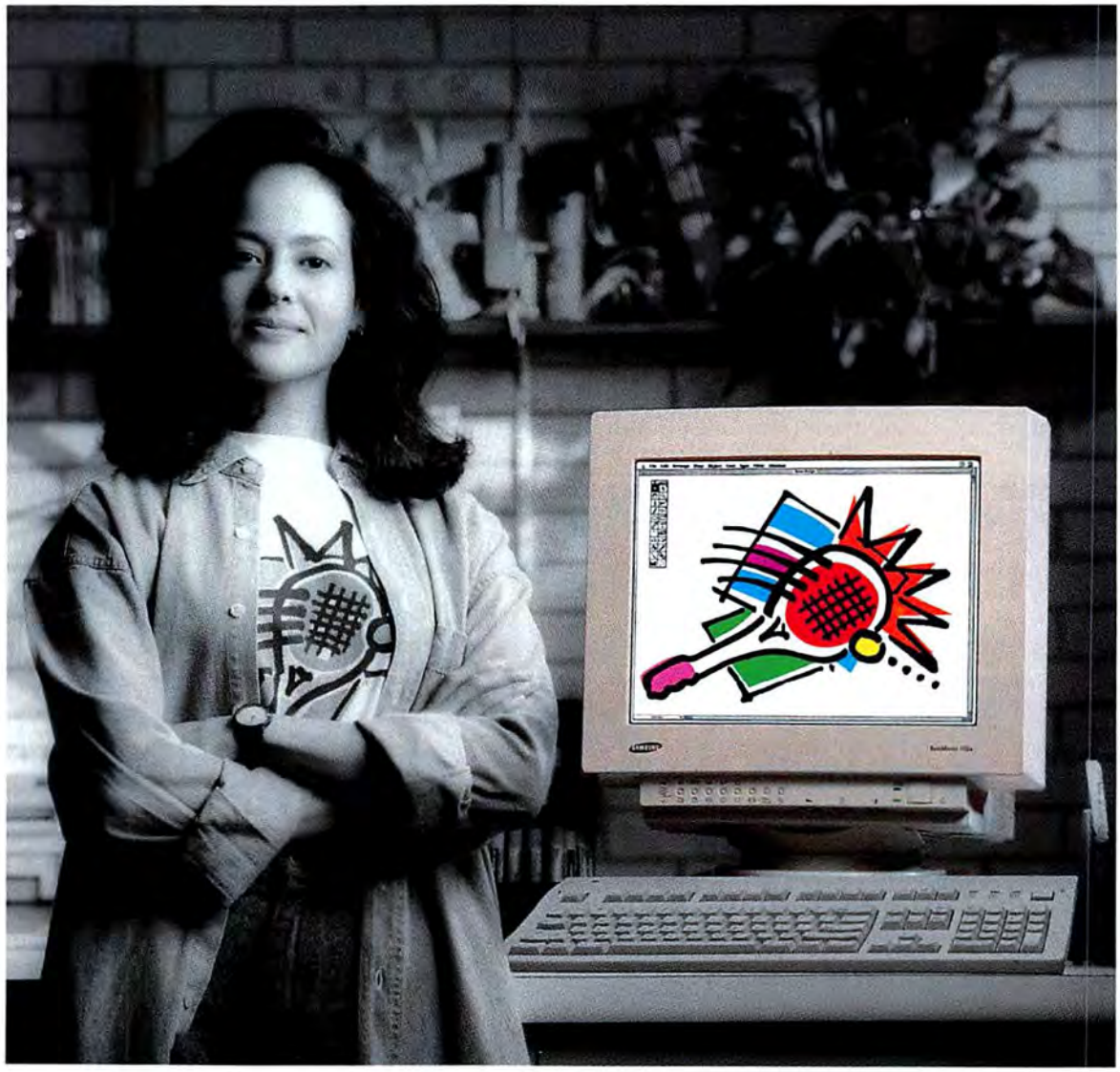

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Writing Coach 1.0

Writing-Skills Tutorial

PROS: Skillfully worded worksheets assist with planning, organizing, and revising; concrete suggestions; flexible structure; recognizes importance of motivation and focus. **CONS:** More expensive than a book on how to write. **COMPANY:** WritePlace Software (503/484-6380). **LIST PRICE:** $89.

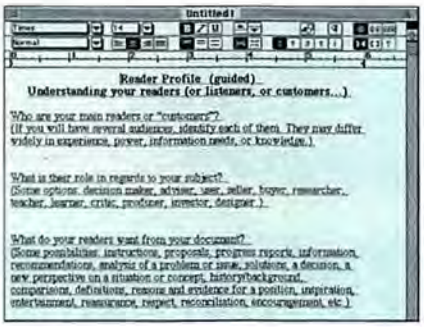
MW ★★★

WRITING COACH IS A DECEPTIVELY simple product. On its face, it is a set of worksheets, outlines, and techniques that help you write whatever it is you're having trouble writing, from formal business proposals to love letters. On a deeper level, each of its 60 worksheets is a set of guided questions that help you unlock your creativity, discover what you have to say, and express it effectively to your readers.

Writing Coach doesn't spend much time on grammar or the mechanics of good writing; you won't find rules about split infinitives or ending sentences with prepositions. Instead, like a good coach it breaks down a complicated act into a series of discrete tasks that you can learn step-by-step—making explicit a process that is intuitive to a lucky few—and motivates you to do your best. The clear manual guides you through the program's eight sections, each of which focuses on an aspect of the writing process.

Each worksheet is a template that opens up in your word processing application (Writing Coach comes with templates for Microsoft Word, WordPerfect, and ClarisWorks). You open up a worksheet, type in your responses, and save the document to use in the next step of the writing process.

Brainstormer worksheets help you discover and express your ideas about a topic by encouraging you to write without worrying about structure, grammar, or technique (those come later). Reader Analysis worksheets consider the needs of your readers; the Organizers and Outline Banks help structure your writing; and the Revising, Editing, and Proofreading guides provide checklists of things to look for when editing. Writer's Notebook and Writer's Block exercises help you identify and overcome the negative ideas that can squelch your words before they get to paper.



Good Advice This Reader Analysis worksheet helps you identify your audience.

The manual also covers techniques for improving your writing, such as writing as though to an audience of six-year-olds (to practice clarity), and creating tree diagrams to clarify the logical connections between your ideas.

Writing Coach has none of the question-and-answer routines some tutorials use. There's no rigid structure that guides you through lockstep writing. And the program doesn't suggest words or try to impose structure on your writing. Instead, it offers a series of well-designed exercises that you can use in any way and order you choose.

The Last Word True, since the program is essentially a self-guided study course, this material could have been presented in book form. But one of its central themes is that to write well you need the right tools, the right time, and the right place. If you'd like help with your writing, and you normally feel motivated and focused when you're sitting at your computer, Writing Coach could be a great investment.—LIZA WEIMAN

Souvenir 2.2

Contact Manager

PROS: Very fast; always available. **CONS:** Field names cannot be customized; fields are not truly independent; poor documentation. **COMPANY:** ComposeTel (415/327-0744). **LIST PRICE:** $49.

MW ★★

DURING THE PAST FEW YEARS, contact managers have evolved from simple desk accessories into complex applications. Souvenir tries to turn back the clock by combining simplicity with speed. Unfortunately, Souvenir suffers from a few quirks and deficiencies that could mean an uphill battle for market share.

Unlike other address books, Souvenir consists of only one system extension. Once the extension is loaded, tapping the ⌘ key twice opens Souvenir in less than a second. Although you can launch Souvenir no matter what you're doing—it even appears over modal dialog boxes like Page Setup—clicking anywhere outside Souvenir's window makes it disappear instantly.

Icons let you access Souvenir's major functions—browse, search, dial, print, and help—by clicking once. You enter search strings in a text box at the top of the window, and you select the active address-book file in a pop-up menu below the text box. (You can open and search more than one file at a time but can add new contacts only to the active file.) Souvenir also lets you share address-book files, even without turning on System 7 file sharing.

Souvenir provides 12 fields for contact information, plus a comment box that holds up to 3072 characters of text. Although the interface seems straightforward enough, there are a few surprises. For one thing, you can't customize the field names, a glaring omission for a program that has been available in Europe for six years. And since Souvenir treats all of its fields as one continuous text string, they're not truly independent. For example, if you select a person's city and press delete twice, all the information that follows the city scrolls up, shifting the phone number into the country field, and so on. Alas, this behavior isn't mentioned anywhere in the user guide.

Souvenir's documentation is weak in other areas, too. For example, a function that lets you customize dialing prefixes for different cities isn't adequately explained; this is only one of several instances where Souvenir's online help is more complete than the printed version. An entire menu—one that lets Souvenir work with other programs such as AppleLink—hardly receives mention at all. Finally, although the manual claims that Souvenir can print envelopes, the current release cannot. (According to ComposeTel, a maintenance upgrade may be shipping by press time.)

The Last Word When you can buy an integrated contact manager and scheduler like Aldus Consumer Division's DateBook & TouchBase Pro for about the same price, it's hard to recommend Souvenir. Still, Souvenir is fast and simple; with beefed-up documentation and a few more features, it might be the ticket for people who don't want to bother with a full-blown contact manager.—FRANKLIN N. TESSLER

Instant Access Souvenir lets you search for contacts that contain several text strings at once.

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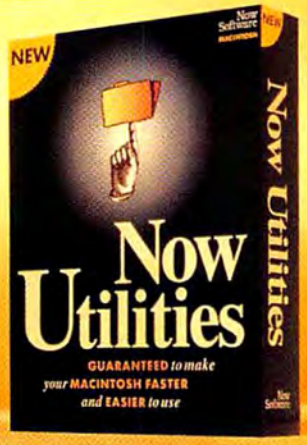

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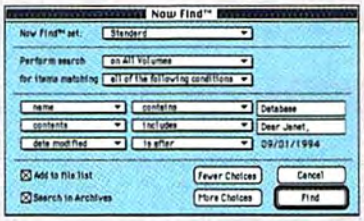

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FastSwitch 10

Switched Ethernet Hub

PROS: Provides greater bandwidth to individual nodes; good configuration options; outstanding documentation for novice users. **CONS:** Only one device (network address) can be used per port; beneficial only for certain network scenarios; no RJ-21 connection. **COMPANY:** Grand Junction Networks (510/252-0726). **LIST PRICE:** $6250.

MW ★★★

MW LAB SWITCHED ETHERNET SEEMS TO be the emerging low-cost champion of speedier network-data transport (compared with Fiber-Distributed Data Interface and Asynchronous Transfer Mode). Grand Junction's switched Ethernet hub is simple to install and manage and has a variety of configuration options. However, increases in network throughput depend on how you share files and access network services.

The FastSwitch 10 is a 24-port switched Ethernet hub. Its primary benefit compared with nonswitched hubs is its ability to deliver "personal," 10-Mbps Ethernet to and from each connected device. While standard hubs broadcast network traffic across all nodes, taking up bandwidth, a switched Ethernet hub can forward data directly to the intended recipient. Think of this as your own private expressway—you can go much faster on your own freeway than you can on one you share with other vehicles.

Another important issue is the quality of data forwarded. The FastSwitch 10 provides three methods of packet forwarding: FastForward, FragmentFree, and Store-and-Forward. The first two methods begin forwarding a packet before the entire packet is received; while this offers greater throughput, errors can occur if the later part of the packet is corrupt. The third option collects the entire packet at the hub before forwarding it, slowing down throughput but guaranteeing an error-free packet.

Other options include port monitoring, address aging, and congestion control (hub-memory allocation). In addition, the hub can be managed in and out of band and includes a 25th port (BNC, AUI, or 10BaseT) for backbone connectivity.

Macworld Lab evaluated the FastSwitch 10 against a standard nonswitched hub. Our tests show that the FastSwitch does increase throughput in a peer-to-peer environment (using System 7 file sharing). As expected, in a client/server environment with one server and many clients, we saw virtually no difference in throughput. This type of switched Ethernet hub is meant to be used on a network where traffic is traveling peer-to-peer or in a low client-to-server ratio.

The drawback to this hub is the lack of an RJ-21 connector (for connecting harmonica-style punchdown blocks) and the one-node-per-port limit, which precludes the use of port-extending devices such as Farallon Computing's EtherWave adapters.

PAUL BERG

The Last Word The FastSwitch 10 is a great solution for networks that handle large amounts of data traded peer-to-peer, such as in desktop videoconferencing and in prepress environments. Also, the only cost in moving to the FastSwitch 10 is for the hub itself; no additional high-speed network interface cards or repeaters are required. If your network environment consists of E-mail and one file server, you probably won't see much benefit in stepping up to switched Ethernet.—MATT CLARK

Crossword Wizard 1.0

Word Game

PROS: Fantastic play mechanics; best crossword generator yet. **CONS:** Clue generation is weak; some operations, like new-puzzle generation, are slow on old Macs. **COMPANY:** Cogix Corporation (415/454-7217). **LIST PRICE:** $49.95.

MW ★★★★

CROSSWORD WIZARD MEETS A NEED long unsatisfied. Computers should be ideal crossword-puzzle creators and players, but that's not been the case, with earlier software attempts being either too simplistic or too difficult to set up and use.

The puzzle-solving mechanics and options of Crossword Wizard are brilliant. Navigating and filling in puzzles using the keyboard and mouse is fast and easy, with color and sound used to excellent effect.

As you fill in a puzzle, the program is smart enough to move to the next logical open box or word without your intervention. If you want to solve the puzzle in a different order, you can do that, too. Optional visual hints tell you if the last letter you typed is correct. Even better are the optional audio hints, which perform the same function aloud. I wish paper crosswords had these.

Other puzzle-solving aids are Word Builder, which provides a list of all possible words, from the program's 70,000-word dictionary, that fit a selected square; and Idea Wizard, which shows definitions, related words, and grammatical data about any word in the dictionary. Idea Wizard can run as a stand-alone application and is useful for improving your vocabulary. It's unique among word games I've used.

Crossword Wizard comes with a mere five premade puzzles, and they're only so-so. But it excels at creating traditional-style puzzles up to 21 by 21 boxes square. It can't create acrostics, odd shapes, or any other crossword subgenre, however.

A Clue in the Ointment Weak clues are one of Crossword Wizard's drawbacks. Fortunately, you can create your own.

Puzzle-creating options range from letting the program do all the work to creating a puzzle from scratch using your own words and hints. You can choose any level of computer assistance in between. For example, you can specify ten related words and let Crossword Wizard do the rest, resulting in a theme puzzle using your ten words. The words and tips the program generates can easily be edited.

Watching Crossword Wizard build a puzzle from scratch is a pleasure. However, the dictionary has many odd and rarely used words, and it frequently comes up with weak clues. Would you know that Doha is the expected answer for "national capital"?

You can't add your own words to the dictionary. Along with the weak clues, that's Crossword Wizard's only real drawback. Tech support is a toll call to northern California and is excellent. You can print puzzles, and you can easily export them to word processing and page-layout programs.

The Last Word If you're a crossword fan, Crossword Wizard is a must. You can even create and sell, royalty-free, your own puzzles or those that Crossword Wizard builds.—STEVEN BOBKER

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Inside 3-D Modeling

by Carlos Domingo Martinez

Three-dimensional modeling is a peculiar product category in some ways. First of all, you can pay as little as $350 (list price) or as much as $3500 to buy the software. All of the Macintosh modeling products available provide the tools to create on-screen objects that look and behave like objects in the physical world. All of these products let you move objects within a work space and change your point of view. You can illuminate the objects with a variety of light sources so that they reflect, glow, and cast shadows from their surfaces. And all the programs let you render objects in a number of ways to simulate surface textures.

In short, all of these products let you create digital images of a now commonplace three-dimensional photo-realism. How, then, do you explain the price range? How do you know how much you should spend to enter the field of 3-D graphics?

As you'd expect, the products at the high end of the scale are professional-grade tools. You see the results of their work all the time, from the car you drive, to the toys your children play with, to the TV ads that entice you to buy all these goods. High-end modeling products include some capabilities required by mechanical engineers, Hollywood animators, and package designers—such as a high degree of numerical precision, alpha-channel support, exportability to CAD/CAM programs, and ultrarealistic rendering effects. You can also anticipate a formidable learning curve.

What you might not expect is the power that's packed into midrange and even entry-level modeling products. The simple fact is that many 3-D modeling projects can be accomplished with excellent results using even the simplest of the 12 programs discussed below.

Distinguishing Modelers

When you build physical models using materials like cardboard, plastic, or clay, you need to understand the nature of those materials in order to use them successfully. Similarly, with 3-D modelers you need some basic knowledge of the digital objects modeling programs use and how to combine these objects to produce models. This understanding lets you determine which tools are best suited to the task in your head. Then you just need to balance your requirements against the features and prices of the products available.

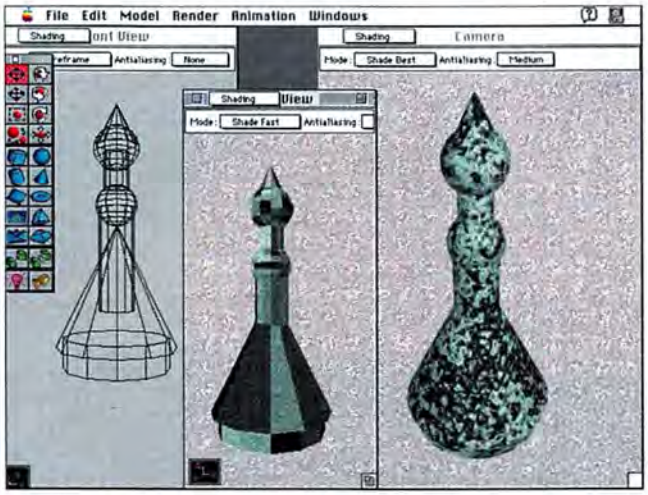
To some degree, 3-D modelers can be described by their approach to representing objects, such as whether objects are treated as surfaces or as solids and whether objects' shapes are constructed and controlled by means of polygons or spline curves. However, some modelers let you switch between object-description modes—say, from spline to polygons—to suit your immediate task, so you can optimize for speed, precision, or flexibility as needed. Other factors figure into the pricing of 3-D programs, such as the rendering and animation capabilities included, if any, but modeling prowess is a primary consideration when choosing a professional-grade program. Nevertheless, remember that you can achieve remarkable realism using even the simplest 3-D packages.

Surface Modelers Surface modelers build objects by stretching a skin over an underlying wire-frame structure. That skeleton can be constructed from either polygons or splines. The effect is like Buckminster Fuller's geodesic domes—a

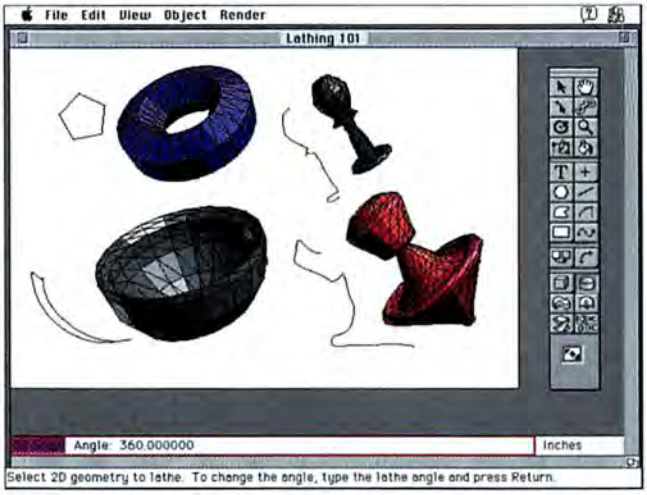
3-D modelers range from $350 to $3500. Macworld helps you pick the one that's right for you.

PAUL WILEY

WILEY



Primitive Constructions Object primitives let you easily model relatively complex shapes, like this stylized chess piece made in Infini-D from cones, cylinders, and spheres.



Lathing Beauties Lathing objects by turning an outline around an axis is an extremely versatile modeling method. These objects lathed in MacroModel only begin to suggest the possibilities.

framework and a skin containing empty space. Solids modelers produce objects that, like a brick, concrete slab, or wooden beam, have substantive characteristics defined by their spatial volume as well as by the shape of their surfaces. Some of the high-end surface modelers, such as Byte by Byte Corporation's Sculpt 3D and VIDI's Presenter Professional, can calculate an object's surface area and enclosed volume, making these programs capable of handling many, but not all, solids-type operations.

Solids Modelers Solids modelers offer greater modeling versatility than surface modelers but extract a heavier computational price. Surface modelers, with their inherently simpler object descriptions, usually have a performance advantage. All of the general-purpose modelers now out for the Macintosh, except FormZ, build surface objects. Solids modelers tend to be limited to building-block shapes for architectural applications. Solids modelers are not limited to simple constructions, however. More important, because they "understand" thickness and density, solids modelers are capable of performing certain tasks that surface modelers cannot do—for example, punching holes through objects.

Polygonal Modelers Polygonal modelers combine polygons to build objects (again think of a geodesic dome, its skin panels formed from interconnected triangles and hexagons); polygonal constructions can be either surface or solid, depending on the modeling package. A drawback of polygonal modelers is that curves are always approximations, produced from sequences of straight segments. However, polygonal modelers offer the advantage of computational speed (unless you really pile on the polygons). Polygon models are certainly adequate for simple shapes or preliminary design roughs.

Spline-Based Modelers By contrast, spline-based modelers build objects (either surface or solid) using mathematically defined curves similar to those of 2-D illustration packages. Artists and designers familiar with using Bézier curves in two dimensions therefore often find spline modelers easy to learn. Generally speaking, spline-based modelers offer greater precision than polygonal-based programs and are better at producing complex, organically shaped objects with smooth flowing lines.

Not all splines are created equal, however. Most 3-D modelers use uniform B-splines, which are defined by equally spaced points along a path. Nonuniform rational B-splines, or NURBS (a more advanced version), have irregularly spaced points, giving them extraordinary flexibility and smoothness. They're exceptional for accurately describing complex objects with compound curves, such as automobile fenders, that can cause lesser modelers to choke on their polygons. FormZ and Alias Research's Alias Sketch are currently the only Macintosh programs that use NURBS.

NURBS exact a price for this flexibility, and that's an explosion of data, even when defining the geometry and surfaces of simple objects such as cubes or spheres. If you're modeling a prototype for fabrication, you may need that degree of precision; but unless your application justifies the computational effort and consequent speed hit, NURBS can be like the proverbial sledgehammer solution to an ant problem.

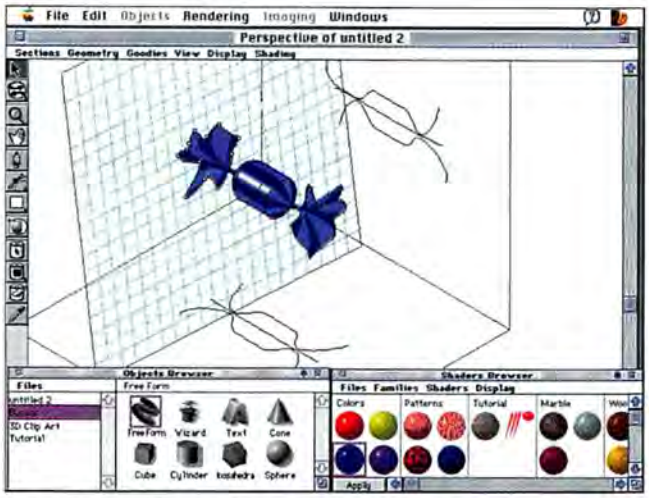
Tools of the Trade

Modeling programs are essentially multipurpose products. As with a child's construction toy, you use basic pieces to build models of everything from autos to buildings to spaceships. The difference is that modeling programs let you operate on those basic pieces using extrusion, lathing, vertex editing, and Boolean operators to build and manipulate a variety of objects.

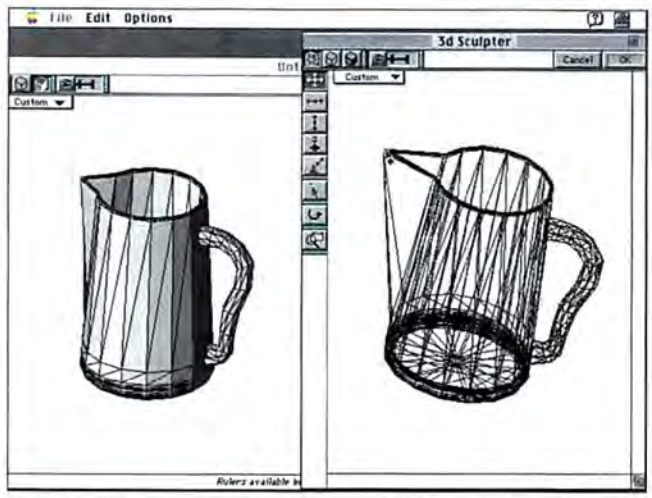
Primitives Most 3-D programs produce object primitives—such as spheres, cubes, cones, cylinders, and sometimes more-complex shapes like dodecahedrons—that you can place directly in the work space. Although primitives are uneditable in some programs, they can nonetheless be useful for quickly assembling some complex models—for example, by combining simple shapes and shading their outside surfaces (see "Primitive Constructions").

Extrusion After primitives, extrusion and lathing operations are the modeling backbone of 3-D programs. Simply put, extrusion takes a 2-D entity, such as a square, circle, or other closed path, and extends it perpendicularly into the third dimension to produce, in the case of a circle, say, a tube or a cylinder. Some programs also let you extrude along a curved path to produce more-complex shapes. For instance, extruding a circle over a curving, looping path would create the structure of a spring.

These days, most 3-D modelers import EPS files and can extrude TrueType or PostScript Type 1 font outlines for text objects. However, if that's all the modeling you need, look to less-expensive three-dimensional illustration packages such as Pixar Typestry, Adobe Dimensions, StrataType 3d, Ray Dream's



Going Aloft Lofting builds objects by stretching a skin over a series of shape-defining ribs, resulting in great modeling flexibility. This model of a wrapped piece of candy was produced in Ray Dream Designer from irregularly shaped ribs.



A Point at a Time Vertex editing lets you fine-tune the shape of an object down to the individual control points. To alter the spout on this pitcher in Studio-Pro, you simply move the controlling vertices at the tip of its mouth.

addDepth, and Specular International's LogoMotion. After you import the 2-D outlines, these easy-to-learn programs let you extrude, render, light, and position the object in space—the most basic functions of a 3-D program—yet sell for under $300 and won't burden you with lots of unnecessary baggage.

Lathing Lathing produces shapes by turning an outline around an axis. The effect is similar to lathing in a woodworking shop, except that in the shop you carve the outline into a spinning block of solid wood, while the computer simply spins the shape from the outline (see "Lathing Beauties"). Related to lathing is the ability to sweep surfaces, whereby you spin a surface around an axis that extends in three dimensions. Some programs also let you sweep a surface along a curved path to produce structures like a threaded screw or a twisting DNA helix.

Lofting Lofting enables you to apply a skin over a series of rib elements to produce tapered shapes—the bow of a ship's hull, for example, or the cinched segments of an insect's body. In essence, each rib is a cross section that defines the shape of the object at a particular point (see "Going Aloft").

Vertex Editing Vertex editing gives you the ability to manipulate the individual points that define an object's geometry or surface mesh. For example, you could create the spikes of a medieval mace by pulling vertices away from the surface of a sphere. Alias Sketch, Strata's Studio-Pro, Macromedia's MacroModel, Byte by Byte's Sculpt 3D, and VIDI's Presenter Professional all treat object-mesh lines as splines, letting you manipulate vertices in relation to the other vertices along that line (see "A Point at a Time").

In addition, Alias Sketch, FormZ, and Presenter Pro provide putty tools that let you deflect or stretch the surface mesh of objects. These tools preserve intervertex relationships so that if you pull or push on a vertex, neighboring points are deflected as well. In effect, you're deforming the object as if it were made of putty (see "Pliable Shapes").

Boolean Operators The most computation-intensive modeling function, using Boolean operators on solid objects, is available only in FormZ. Sculpt 3D and Presenter come very close, being able to perform Boolean operations on surfaces and volumes. With Booleans, any 3-D object is a tool that can operate on any other object. Using functions such as union, difference, and intersection, Booleans let you edit 3-D objects by calculating the interaction of their volumes or dimensions. For example, you could use a sphere to gouge a crater out of another object, much as you might take a scoop out of a brick of ice cream (see "Carving Objects").

Programs like FormZ, Sculpt 3D, and Presenter Pro provide numerous options that expand the capabilities of the basic operations outlined above, plus CAD-like powers such as corner filleting and snap controls for precision alignment.

Factoring In the Options

Although it's helpful and necessary to assess the modeling power your projects demand, personal working style and preference also count for a lot when you choose the 3-D package you're going to live with for a while. Working in three dimensions demands some adjustment on your part, whichever program you choose. But don't lose heart; once you get the hang of the various modeling tools, you'll find them extremely versatile. If a modeler you like working with lacks a particular feature, another tool in your kit can often serve in its stead. For example, if your modeler can't loft a complex tapered circular object, you could produce it by lathing the shape in segments and joining the lathed pieces together. The result will look the same. So don't think you must have every possible tool—remember, the more tools and features, the more complex the program and the steeper the learning curve.

Interface Also, just because two products lathe or loft doesn't mean they do it in the same way. For example, with programs like Ray Dream Designer and Specular International's Infini-D you build individual objects in one mode and then place them in a scene in the 3-D work space. With Sketch and Macro-Model you build objects immediately in the 3-D scene. Neither approach is intrinsically better, though each has advantages. Constructing objects in isolation lets you work without fear of disturbing other objects. In-scene construction enables you to build objects directly on the surface of other objects, making it easier to fit the pieces of a model together.

Rendering Another factor to weigh is the modeler's built-in rendering ability. Although rendering is usually considered to be a separate step from object building, in practice it can be an integral part of the modeling process. If your end product is to be a visualization rather than a precise representation of a given object, you can employ visual effects such as surface textures, bump and environment mapping, and high-quality Phong shading or ray tracing to transform simple

3-D Modelers Compared

	Alias Sketch 2.0	Design Reality 1.0	◀ FormZ 2.6	◀ Infini-D 2.6	MacroModel 1.5 [A]	Presenter Professional 3.0 [B]
Price	$695	$1995	$1495	$695	$895	$2995
Company	Alias Research	Ashlar	autodessys	Specular International	Macromedia	VIDI
Phone	416/362-9181	408/746-1800	614/488-9777	413/253-3100	415/252-2000	818/358-3936
Toll-free phone	800/447-2542	○	○	800/433-7732	800/945-4061	○
MODELING						
3-D primitives	●	●	●	●	●	●
Extrusion	●	●	●	●	●	●
Lathing	●	●	●	●	●	●
Lofting	●	●	●	○	●	●
Sweep surfaces	●	●	●	○	●	●
3-D vertex editing	●	●	●	○	●	●
Spline modeling	●	●	●	○	●	●
Clay modeling	●	●	●	○	●	●
Boolean operations	○	○	●	○	○	●
Font extrusion	PS Type 1	○	PS Type 1, TrueType	PS Type 1, TrueType	PS Type 1, TrueType	PS Type 1, TrueType
EPS file import	●	●	○	●	●	●
DXF import	●	●	●	●	●	●
RENDERING						
Phong shading	●	○	●	●	○	●
Ray tracing	●	○	○	●	○ [F]	●
Number of light sources	unlimited	unlimited	1	unlimited	16	unlimited
Shadows	●	●	●	●	●	●
Environment map	●	○	○	●	○ [F]	●
Texture map	●	●	○	●	●	●
Procedural textures	○	○	○	●	○ [F]	● bumps
Alpha-channel support	●	○	○	●	●	●
File-import formats	Adobe Dimensions, DXF, IGES, PICT, PIX, TIFF	DXF, EPS, PICT, VELLUM	3DGB, DXF, FACT, IGES, Illustrator, PICT, STL	DXF, EPS, PICT, QuickTIme, Swivel	DXF, EPS, PICT, Swivel 3D	DXF, EPS, FACT, IGES (optional), PICT, PostScript, Super 3D, VersaCAD
File-export formats	DXF, EPS, IGES, PICT, PIX, RIB, TIFF	3DGF, CADRender, CaliRay, DXF, EPS, Explore, HPGL, IGES, PICT, Vellum	3DGB, DXF, EPS, FACT, IGES, Illustrator, PICT, RIB, STL, TIFF	DXF, PICS, PICT, QuickTime, TIFF	PICT, DXF, Swivel 3D, RIB	DXF, Electric Image, RIB, Super 3D, VersaCAD, WaveFront, Strata 3D
ANIMATION						
Keyframes and tweening	○	○	○	●	○ [G]	●
Morphing	○	○	○	●	○ [G]	○

● = yes; ○ = no; ◀ = runs in native mode on a Power Macintosh; NA = not applicable. [A] A $995 version comes with either MacRenderMan or Macromedia Three-D animation module. [B] Modeler Professional, which has no animation and only a basic renderer, costs $1195. [C] Sculpt 4D, which adds animation, costs $3995. Sculptor, which has no animation and only a minimal renderer, costs $1995. [D] $595 with MacRenderMan. [E] With optional extension. [F] With MacRenderMan bundle only. [G] With Macromedia Three-D bundle only. [H] Available in Sculpt 4-D.

objects into naturalistic images.

For example, say you need to produce a pitted metal object, like a wrought-iron rod. You could directly model the indentations—deforming the surface mesh by means of vertex editing or Boolean operations—creating a very complex object. Or you could model a simple rod, apply an iron texture to the object, and finish it off with a bump map that visually re-creates the pitted surface. That's modeling the easy way.

File Transfer Nowadays most 3-D programs are integrated packages, incorporating modeling, rendering, and animation; but the programs vary a great deal with regard to the power of the separate components. Some of the most competent and demanding modelers, such as FormZ and Ashlar's Design Reality, have relatively modest built-in rendering and no animation; other modelers, such as Sculptor and MacroModel, offer the high-grade renderer and animation modules as options. If photo-realism and movement are required, you can export the models to professional-quality rendering and animation programs. The stand-alone modelers are targeted toward professions that require a high degree of numerical accuracy, such as mechanical engineering and product design. Their principal function is to define an object precisely, not to create a graphically realistic scene. For applications such as these, a modeler's ability to export in DXF or IGES for CAD applications and STL format for rapid prototyping is essential.

Even with such standard file-exchange formats, transferring 3-D models can be a problem. If you plan to regularly move models to another package, look for a pair of programs that directly support each other's files such as Ashlar's Design Reality ($1995), which works with Ashlar's CAD package, Vellum (2-D version $2495, 3-D $2995). And if you will be sending models to a prototyping

Ray Dream Designer 3.1.1	Sculpt 3D 4 [C]	ShowPlace/ MacRenderMan 2.1	StrataVision 3D 3.1	StudioPro 1.5	Swivel 3D Professional 2.0.4 [D]
$349	$2995	$495; $395 on CD-ROM	$695	$1495	$495
Ray Dream	Byte by Byte Corporation	Pixar	Strata	Strata	Macromedia
415/960-0765	512/795-0150	510/236-4000	801/628-5218	801/628-5218	415/252-2000
800/846-0111	○	800/888-9856	800/869-6855	800/869-6855	800/945-4061
●	●	●	● [E]	●	●
●	●	●	●	●	●
●	●	●	●	●	●
●	●	NA	●	●	●
●	●	○	●	●	○
○	●	third-party plug-in	●	●	○
●	●	NA	●	●	○
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○	●	NA	○	○	○
PS Type 1, TrueType	PS Type 1	PS Type 1, TrueType	PS Type 1, TrueType	PS Type 1, TrueType	PS Type 1
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●	●	proprietary algorithm	●	●	○ [F]
unlimited	unlimited	unlimited	unlimited	unlimited	8
●	●	●	●	●	●
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●	●	●	●	●	●
●	●	●	●	●	○ [F]
●	●	●	●	●	○ [F]
Architrion, DXF, EPS, MacPaint, Photoshop, Photo CD, PICT, QuickTime JPEG, TIFF	3DGF, DXF, IGES, STL (option)	DXF, Illustrator, PICT, RIB, TIFF	Illustrator, PICT, Super 3D, Swivel 3D	Illustrator, PICT, Super 3D, Swivel 3D	DXF
Architriion, DXF, EPS, Photoshop, Photo CD, PICT, QuickTime JPEG, TIFF	3DGF, DXF, IGES, STL (options)	PICT, PostScript, RIB, TIFF	PICS, PICT, QuickTime, TIFF	PICS, PICT, QuickTime, TIFF	DXF, PICT, RIB
○	○ [H]	○	●	●	●
○	○ [H]	○	○	●	○

bureau, make certain that its programs can read the files you produce.

Graphic artists and animators who need to composite models with backgrounds in image processors, such as Adobe Photoshop, should look for alpha-channel support from the modeler's built-in renderer, or for the ability to transfer models to other renderers. Macromedia's Swivel 3D Pro and MacroModel provide links to Pixar's MacRenderMan through RIB export, as does Pixar's own ShowPlace; VIDI's Modeler Pro and Presenter Pro support transfer to Electric Image's ElectricImage Animation System. Both MacRenderMan and ElectricImage rank among the preferred renderers of imaging pros.

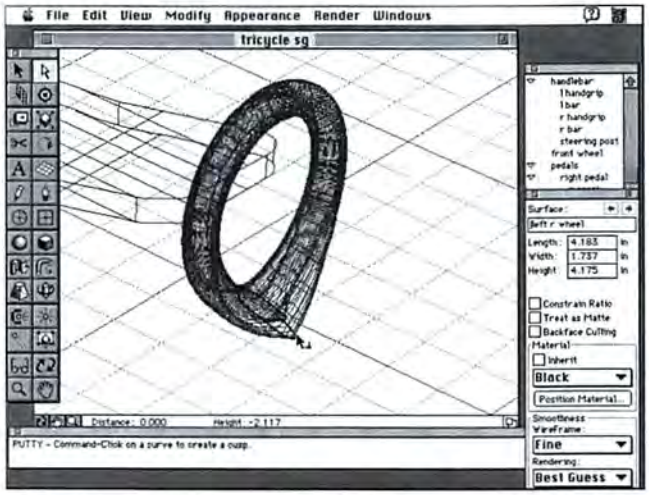
Money Matters With high-end modeling capabilities becoming increasingly available at midrange and even low prices, why would anyone choose to pay premium prices? All the packages at the high end of the price spectrum offer excellent one-stop-shopping solutions, but what do you get when you shell out $2000 to $4000? The answer is an ongoing relationship with the vendor, and for some users, that can tip the balance.

Unlike mass-market, over-the-counter modeling products, the high-end packages are usually available only directly from their vendors or through trained value-added resellers (VARs). Typically, the purchase price includes some training, a good deal of hand-holding, and an introduction to local users who can provide assistance and share their experiences. In a sense, you're inducted into a community of users that receives careful attention from the vendor and participates in the continual development of the program.

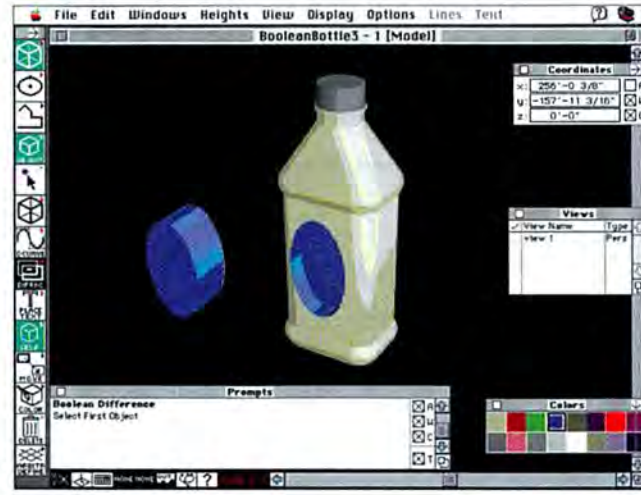
Is all that worth the extra cost? That depends on the complexity of your projects, your own self-assurance, and the level of experience you bring to the purchase. But such user-vendor relationships can be invaluable as you learn complex programs and when you need to solve design problems.

The Last Word

As you weigh the balance of requirements, preferences, and price, realize too that choosing a 3-D package is a highly subjective decision. That's not a bad thing. The tough part is that you have lots of programs from which to choose. Here are some quick evaluations and my cur-



Pliable Shapes Molding surfaces in claylike fashion is another form of vertex-level editing. Using the Putty tool in Sketch, you can transform this wheel into an improbable flat tire by deforming the surface-defining splines.



Carving Objects Boolean operators let you use objects to reshape other objects. For example, with FormZ you can carve a recess for a bottle's label by using an extruded elliptical shape to remove material from the bottle.

rent personal preferences, grouped generally by one last critical factor—price.

- In the under-$500-list-price set, the stalwart Swivel 3D Pro ($495) remains a good program for learning 3-D modeling techniques—and it offers simple animation tools. However, Ray Dream Designer ($349) is a stronger modeler and it provides an excellent renderer, making it better suited for graphic arts applications.
- In the $500-to-$1000 category, plug-in modeling tools have elevated ShowPlace ($695) from a basic scene assembler to a reasonably effective modeler. It comes bundled with MacRenderMan, as good a renderer as you can buy.

Both Infini-D and StrataVision 3D (both $695 list) are excellent all-in-one programs suitable for many professional applications. While they are comparable in rendering capabilities, StrataVision provides more competent modeling and Infini-D excels at animation. Overall, these two are coin-flip close, but Infini-D's general ease of use gives it the edge.

For sheer modeling prowess in this price range, consider Sketch ($695) and MacroModel ($895). Sketch's NURBS-based modeling, first-class rendering, and lower price make it the value standout. If animation is your goal, however, go for the $995 MacroModel–Macromedia Three-D bundle.

- At $1500 FormZ is pound-for-pound the best modeler in this survey, with its mix of solids modeling, Boolean operators, and NURBS surfaces. If you can digest its voluminous documentation, live with relatively simple rendering, and do without animation, FormZ can produce any object imaginable. Alternatively, StudioPro ($1495), with a terrific balance of powerful modeling, rendering, and animation features, is the most complete all-in-one package this side of $3000.
- From about $2000 on, the competition between Presenter Pro ($1995) and Sculpt 3D ($2995) is another toss-up. Both are full-featured, integrated programs that rival CAD systems in power and complexity, and both vendors offer a modeler separately. Presenter Pro's emphasis on animation and sound are designed for multimedia work. Always a supercompetent modeler and renderer, Sculpt 3D at last has a Mac interface, reducing its learning curve. Sculpt 4D, at $3995, includes animation.

Ashlar's new Design Reality is a stand-alone modeler that offers direct compatibility with another Ashlar offering, Vellum, a full-featured CAD system.

A final word of advice: shop around. Street prices can be significantly lower than list, and special marketing promotions often reshuffle the standings. The trend is toward lower prices. Programs that last year lived in the $1000 neighborhood, such as Infini-D and Sketch, have moved several hundred dollars down the street. And MacroModel, bundled with either Macromedia Three-D or MacRenderMan, came down from $2495 to under $1000.

Entering the world of 3-D design can be a daunting prospect. Choosing a program and becoming familiar with its intricacies can be time-consuming and a bit perplexing. But once you're over those initial hurdles, 3-D modeling will change the way you think about design and suggest new creative approaches to your projects. Soon you'll discover that modeling in 3-D isn't really difficult, you just need to learn your way around. **m**

CARLOS DOMINGO MARTINEZ is a regular contributor to *Macworld*. He has covered Macintosh design products since 1986, but his first experience working with a 3-D modeler was an early encounter with Tinker Toys.

3-D MODELERS

MW EDITORS' CHOICE

3-D modeling on the Macintosh has matured to the point of offering many appealing options in several price ranges. When it comes to choosing the one to buy, personal preference plays a very important role. All of these programs are available in native Power Mac versions.

Stand-Alone Modeler

FormZ The only Macintosh package capable of true solids modeling, FormZ also has an extensive tool set that merits the extra learning effort. **Company:** autodessys. **List price:** $1495.

Integrated-Modeling Package

StudioPro This all-in-one package offers an excellent combination of modeling, rendering, and animation features for the price. **Company:** Strata. **List price:** $1495.

Entry-Level Modeler

Infini-D This appealing program provides a good balance of modeling, rendering, and animation capabilities along with an interface that eases the transition from two dimensions to three. **Company:** Specular International. **List price:** $695.

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EMPLOYEE EVALUATION

NAME: Chris Wolfe **DATE PREPARED:** 9-8-94

TITLE: Product Manager

DEPARTMENT: Account Management

OVERALL PERFORMANCE:

☒ **Outstanding** ☐ **Commendable** ☐ **Satisfactory** ☐ **Needs Improvement**

COMMENTS:

Chris has become an indispensable member of the account team. He has demonstrated a high level of motivation and enthusiasm for the job. Perhaps the most compelling evidence of this can be found in his ability to work independently, where he picks up new tasks easily with little need for supervision or instruction. He consistently recognizes and works around obstacles to maintain productivity. Consequently, he often completes assignments ahead of schedule. At a time when collaboration is more critical than ever, Chris has also proven to be an excellent team player. He works effectively with coworkers on projects where teamwork is essential, and can easily motivate and inspire others to achieve. When delegating tasks, his thoughts are well organized and his ideas clearly articulated – an indication of his excellent communication skills. His projects are all distinguished by an attention to detail. His conclusions are always sound and logical. And he excels in time management, effectively compiling and analyzing information. He always manages to work efficiently, setting an example for effort throughout the company. Promotion and appropriate compensation are recommended at this time.

Chris Wolfe
Employee's Signature

J Bloom
Evaluator's Signature

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SAFER COMPUTING

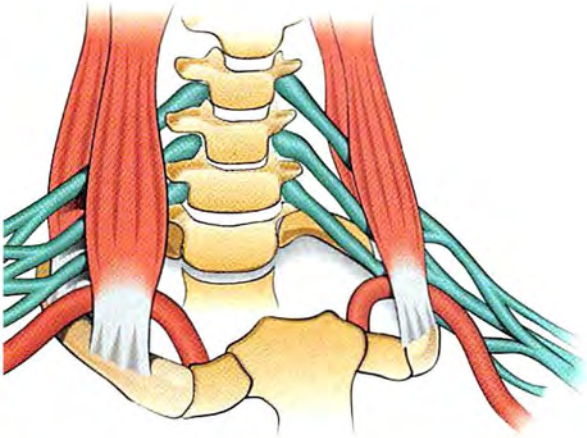
HOW TO STAY HEALTHY

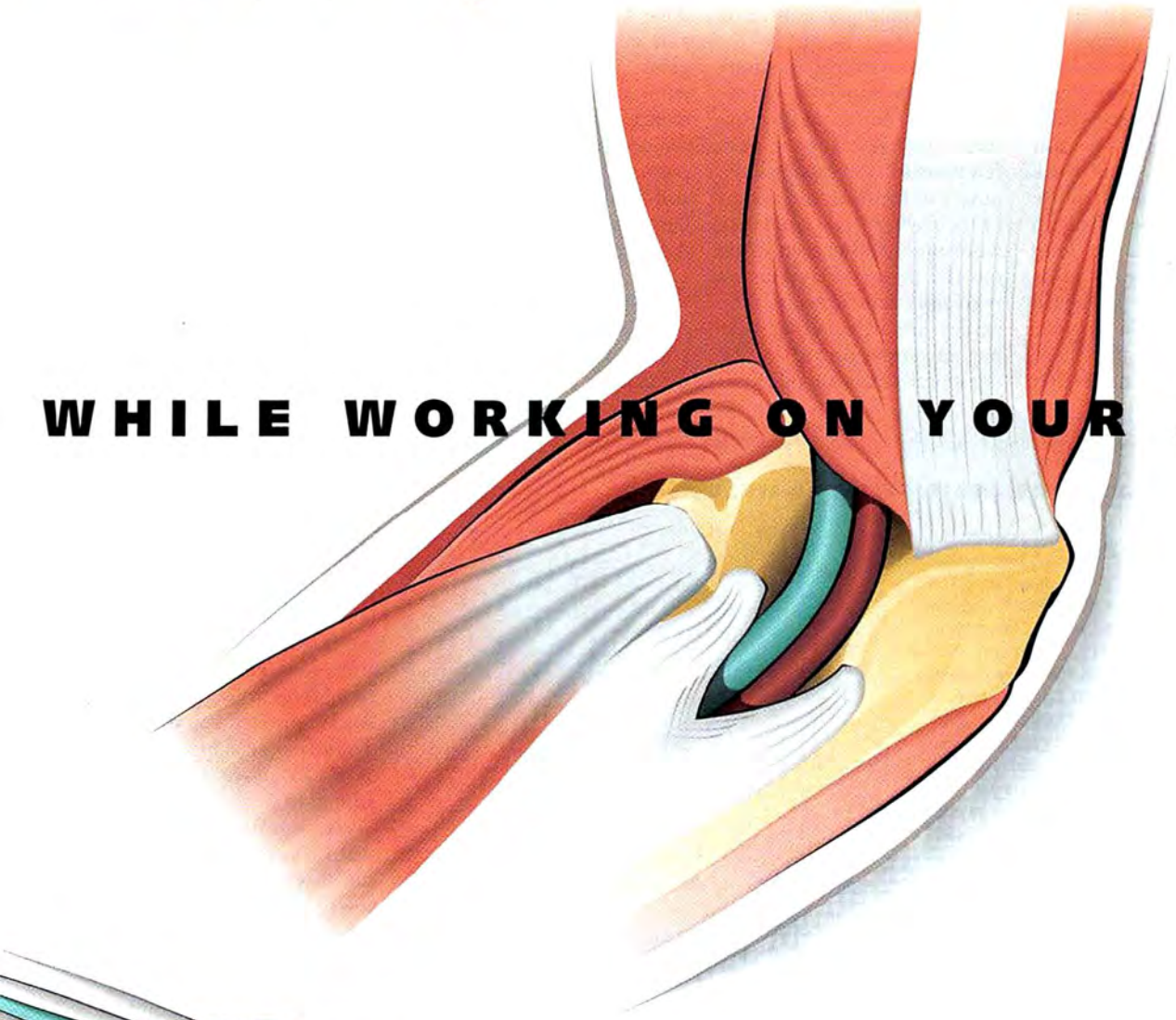
by
Franklin N. Tessler, M.D.

ILLUSTRATIONS BY ARNE HURTY

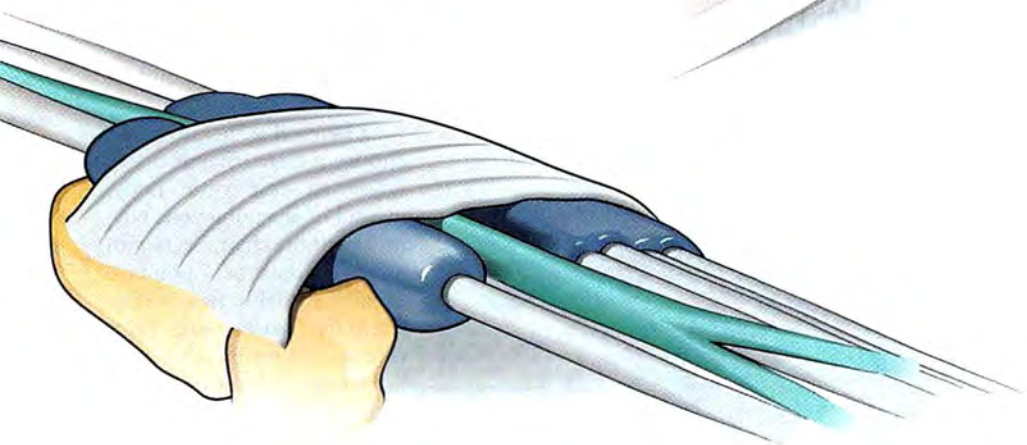
EVERYWHERE YOU GO, IT SEEMS, PEOPLE ARE SEARCHING FOR WAYS TO REDUCE THEIR RISK OF injury from using a computer. Go into any computer store and you'll find a host of add-ons—from foam wrist pads to antiglare screens, from futuristic keyboards to trackballs—that promise to prevent injury. The truth is that using a computer can be risky—it's all too easy to unknowingly misuse your equipment and abuse your body. ☐ The injuries that can result, known as repetitive strain injuries, are serious medical problems for workers and their companies, and a significant share are related to computer use. For example, 1992 government figures (the latest data available) show that carpal tunnel syndrome—a painful condition sometimes associated with computer use—required a longer average recuperation period than any other type of work injury, including fractures and amputations. ☐ Just how widespread is the problem? According to the Bureau of Labor Statistics, in 1992, almost 11,000 cases of lost work time resulted from typing or key-entry jobs. And that doesn't count the other computer-related injuries, which the bureau doesn't track as such. It's also hard to tell how many of those cases were due to computer-related injury, partly because so many different ailments have been blamed on computers. ☐ If anything, computer-related illness is likely more common than official estimates, since many workers are reluctant to report problems to their supervisors. Also, government statistics don't include hobbyists and others who use computers at home or in small businesses. ☐ Part of the current epidemic of computer-related disorders may be related to heightened awareness among workers and health professionals. And there are steps that you can take to prevent such disorders, many at little or no cost. ☐ In this three-part article, I'll look at some of the health problems faced by computer users, with an emphasis on physical injuries. (For an update on the possible side effects of electromagnetic radiation, see *Conspicuous Consumer*, elsewhere in this issue.) First, I'll show you how you can prevent problems from developing to start with. Second, I'll help you learn how to tell if you might already be affected. Finally, I'll tell you where to turn for help. This advice is based on extensive research and interviews with leading medical experts. ☐ As you take action to reduce your risk, keep in mind that many companies offer solutions they claim to be ergonomic. Take all such claims with some skepticism: there are no accepted standards for ergonomic design. But no product—whether or not it has undergone rigorous testing by ergonomics experts—can address every person's needs.

MEDICAL CONSULTANTS: ROBERT E. MARKISON, M.D.; EMIL PASCARELLI, M.D.; PAM SILVERMAN, O.T.R., C.H.T.; RICHARD UHL, M.D.; AND ELAINE VOLLOWITZ, P.T.





WHILE WORKING ON YOUR MAC



HOW TO **PREVENT** INJURIES

AS WITH OTHER TYPES OF illness, the most effective way to deal with computer-related disorders (CRDs) is to prevent them from happening at all. Even if you're not in pain, it pays to scrutinize your work area to make yourself more comfortable and less likely to suffer damage in the long term. Some changes, such as special chairs and keyboard trays, will cost you or your employer money. But there are many improvements that you can implement at little or no expense.

In the workplace, adoption of new standards by federal, state, and local government agencies over the next few years will force many businesses to focus on the design of their employees' computer workstations. But even without the threat of lawsuits or regulatory action, many companies are discovering that paying attention to office ergonomics makes good sense. That's especially true when you consider the potential gains in productivity and employee satisfaction, not to mention the savings in medical costs and salaries for temporary workers. When you add it all up, the payoff to business could total billions of dollars annually.

To help you evaluate your work space, I'll use a common-sense approach that divides your computer setup into three main areas: the seating arrangement (your chair and desk), the computer setup (your monitor, input devices, and other hardware), and finally, environmental conditions (such as lighting, noise, and air quality).

As you are considering your office layout, though, remember that making all the components work together—coupled with not overworking—is the key to preventing or lessening CRDs.

Where You Sit

There's not much you can do about your physique to make you less susceptible to CRDs, although keeping physically fit and performing simple exercises may help. For example, taking frequent breaks to get up and move your head, neck, shoulders, arms, and legs is one simple step you can take. The goal of such basic stretches is to move your body around to work the kinks out. (*Never* continue an activity that makes your pain worse, and check with your doctor if you're unsure about any exercise regimen.) But the design of your chair—and how well you use it—can have a significant effect on your comfort and health.

Chair To begin with, choose a chair that you can tailor to suit your body, instead of changing your posture to fit the chair. Seats with multiple adjustment points—usually available from office specialty stores—are best. (Because chairs fit each person differently, don't buy one without trying it out first. If you purchase from a catalog, make sure that there's a money-back guarantee.)

ASSURING THAT YOUR CHAIR FITS YOU WELL

A chair needs to fit your body size and shape, and adjust for different activities (such as typing, writing, and talking on the phone). Your chair should help you maintain your spine's natural curves. You also need to do your part: adjust your environment to fit you, change your working positions throughout the day, and vary the tasks you do so you're not in any one position too long.

You should be able to sit back all the way against your chair back and be able to move your knees and lower legs freely.

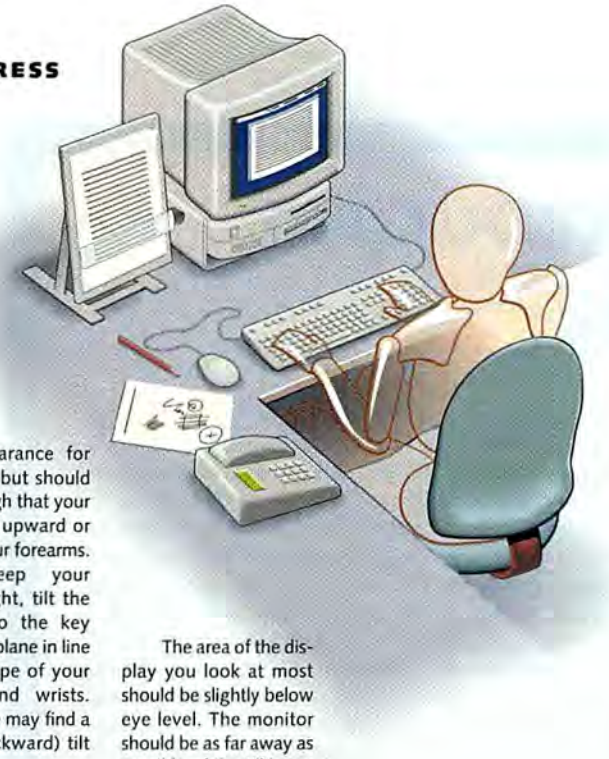
The seat should be low enough for your feet to rest flat on the floor and high enough to support your thighs evenly.

Arm rests should be high enough to support your forearms but not so high as to raise your shoulders. Arm rests should also be directly under your arms, and arm rests shouldn't bump against your work surface as you move close to it.

The angle between the seat and chair back should usually fall between 85 and 120 degrees—as is comfortable for you. It's OK to recline.

The chair should provide support for your lumbar region (at your waist). If you recline even slightly, you also should have support for your midback, at the base of your shoulder blades.

SETTING UP YOUR DESK TO MINIMIZE STRESS



As computers and peripherals get bigger, there's less room at most people's desks to work properly with their equipment. A larger space is what most people need, although most companies can't afford to provide it. But no matter what space you have, follow as many of these guidelines as possible to reduce stress.

The equipment you use most should be in front of you. Other frequently used equipment should be within

15 inches of the hands that use it.

Keep the pointing device in easy reach: close to the keyboard, at the same height. If you have a keyboard with a numeric keypad, try using your left hand for the input device.

Your desk or keyboard tray should leave enough clearance for your thighs but should not be so high that your wrists bend upward or you raise your forearms.

To keep your wrists straight, tilt the keyboard so the key tops form a plane in line with the slope of your forearms and wrists. Taller people may find a reverse (backward) tilt comfortable.

If you have to raise your hands and arms to type—and you can't adjust your seat, keyboard, or desk to compensate—try moving the keyboard away and resting your forearms on the desk (if you don't use the mouse a lot, try placing the keyboard in your lap).

The area of the display you look at most should be slightly below eye level. The monitor should be as far away as possible while still being readable; 16 inches should be the minimum distance.

If you use a copy stand frequently, place it at eye level, directly before you, with the monitor to the side. For occasional use, place the copy stand below the monitor or to the side of the monitor.

Work Surface Like office chairs, desks and other work surfaces are available in a bewildering assortment of configurations, ranging from basic, utilitarian models to complicated designs with adjustable shelves and cubbyholes. No matter what style you prefer, choose one that's appropriate for your body size, and make sure that there's ample work area for your monitor, keyboard, and other peripherals.

If you use a desk, there should be at least 2 inches of clearance between the tops of your thighs and the underside of the desktop or the keyboard tray. Pullout keyboard trays are helpful, particularly for desks that aren't adjustable, but they should have enough room for your keyboard and pointing device—you should not have to stretch to use your mouse or trackball.

It's also important to pay attention to items that aren't directly related to your computer. For example, placing your telephone opposite your writing hand makes it easier to hold the receiver and write at the same time. (Cradling the receiver between your head and shoulder is especially harmful, because it puts added stress on your neck muscles.) If you're on the phone a lot, consider a lightweight headset or a speakerphone so you can keep both hands free. Also make sure that you have enough room to write comfortably, without reaching awkwardly to either side. Perhaps you can set up a separate writing surface, such as an elevated desk return or cubicle work surface, that you move your chair to use. Be sure to move equipment as you change tasks—the equipment you use at the moment should be in front of you or in easy reach.

Your Mac Setup

Computer peripherals—especially keyboards and pointing devices—have received a lot of attention from vendors, who love to run ads touting their products' ergonomic advantages. But it's difficult to verify or refute specific claims without access to specialized test facilities and hundreds of volunteer subjects, and even then those results may not apply to you. Be especially suspicious about assertions that a particular product can prevent or heal injuries.

Still, there are things you *can* do when selecting peripherals to get ones that work well with your body and computer setup. While you're shopping, keep in mind that if you've already grown accustomed to a poor design, a better piece of equipment may feel worse when you first use it. Try any piece of equipment before you commit to it, and make sure you can return it after a trial period. In the store, always ask to use a device with a working computer.

Keyboards Keyboards have been singled out as contributing to many CRDs, particularly problems with the fingers, hands, and wrists. Here's what you should pay attention to when you're looking for a keyboard.

- Do the keys provide a comfortable level of resistance? The keys should require more than minimal force to activate, but not so much that they're hard to press.
- The keys should provide some auditory or tactile feedback. You can test this by watching the monitor as you type—can you tell when you've pressed the keys firmly enough to activate them?
- Is the keyboard's angle adjustable? Some ergonomists believe that the keyboard should lie flat, while others advocate a negative tilt, with the front row higher than the back row. Unfortunately, the built-in feet on most keyboards only allow a positive tilt (front row lower than back row), although some keyboard trays let you achieve a negative (backward) angle. You can also tilt your keyboard by attaching a piece of wood or metal to the bottom.
- Does the keyboard provide function keys to help you cut down on the number of keystrokes? (The sidebar "Stress-Reducing Software" shows you how to take advantage of keyboard shortcuts and other actions to save wear and tear on your fingers.) Does it provide scrolling keys like page up and home to minimize mouse movements?
- Does the keyboard provide any other ergonomic enhancements? For example, a numeric keypad that you can shift to the left side of the keyboard may be better for left-handed users, and a built-in trackball or other pointing device can help minimize arm and hand movement.

Apple and various third-

STRESS-REDUCING SOFTWARE

You work at the computer all day, and you know you're at risk. After you've adjusted your workstation and learned the appropriate body mechanics, what else can you do to reduce the risk of repetitive strain injuries (RSIs)? Get your computer to do more of the work *for* you.

Make the Mac Do the Work Store commonly used phrases and paste them from your word processor's glossary. Microsoft Word 6.0 offers a technology that automatically corrects commonly misspelled words and replaces preconfigured abbreviations. Two programs offer similar capabilities for almost any program: Riccardo Ettore's TypeIt4Me shareware and Magic Typist 2.0 from Olduvai Corporation ($29, 305/670-1112). System 7.5 supports scripting of both AppleScript-compatible programs (like QuarkXPress) and the Finder, so you can automate common tasks, even across programs. Other programs, like FileMaker Pro, offer their own scripting. Charles River Analytics' Open Sesame ($99, 617/491-3474) also lets you automate common tasks.

Avoid the Mouse Apple's Easy Access, which came with your system software, lets you use the numeric keypad as a mouse, and it also provides Sticky Menus (which keeps a menu displayed until an item is selected) to reduce motion.

Use Shortcuts Reduce your keyboard efforts with CE Software's QuicKeys ($139, 515/221-1801) and Dave Lamkins' PwrSwitcher 1.1.3 shareware.

Use Your Voice AV Macintoshes support voice commands for Finder functions; that functionality should increase as vendors add PlainTalk support to their products. Articulate Systems' PowerSecretary ($2495, 617/935-5656) lets you enter text into a word processor by speaking.

Take a Break Several programs can help you remember to take breaks: Visionary Software's LifeGuard ($79.95, 503/246-6200), Exercise Break from Hopkins Technology ($39.95, 612/931-9376), and Coffee Break, a shareware program by Thomas Reed. Or just set alarms using Apple's Alarm Clock desk accessory.

I've posted the shareware mentioned here, plus a "Top Ten Things to Do with QuicKeys" file with some examples in the *Macworld* forums' software libraries on America Online and eWorld.

BY JOANNA PEARLSTEIN

party vendors have introduced newer designs that promise improved hand and wrist positions. For example, the Apple Adjustable Keyboard ($219 company-estimated street price, 408/996-1010) splits down the middle to lessen sideways turning at the wrist, and the Comfort Keyboard System ($795, HealthCare Keyboard, 414/253-6333) consists of three sections that adjust separately to fit your hands. More radical approaches like The BAT chord keyboard ($349, Infogrip, 805/566-1049) claim to reduce wear and tear by doing away with most of the standard keys; instead, you use key combinations called chords to enter letters and other characters. Although hard data is scarce, individual users have reported that alternative keyboards can make the difference in some cases. (See "The Apple Adjustable Keyboard," *Macworld*, November 1993.) However, other users dislike these devices.

Pads and Braces Wrist pads and other add-ons offer an inexpensive solution for some deficiencies in keyboards and other hardware. Padded wrist rests that sit in front of the keyboard are quite popular, but Pam Silverman, a hand therapist and director of Hand Therapy of San Francisco, cautions that you should never brace your wrists on them while you're typing, because the added wrist pressure may actually *increase* the risk of some CRDs.

According to Silverman,

TIGHTLY GRIPPING

wrist splints can help sore wrists heal, but they're best used under direct professional supervision. It's important not to wrap your wrists too tightly, since that can make matters worse by aggravating nerves and blood vessels.

Pointing Devices With all the attention paid to keyboards, don't forget your pointing device. Many repetitive-strain-injury (RSI) experts say that the mouse and other pointing devices are becoming a major source of injury because people hold them incorrectly throughout the working day. Each major category of pointing device has its own legion of supporters—you should choose a device that feels comfortable to you and that works for the type of job you do.

Emil Pascarelli, an M.D. and director of ambulatory care at St. Luke's/Roosevelt Hospital in New York City, notes that mouse users increase their risk of injury by gripping the mouse too tightly. If you opt for a mouse, choose one that fits comfortably in your cupped hand. People who suffer from arm and shoulder pain may get relief by switching to a trackball, which requires less arm movement than a mouse to manipulate. Hands come in different shapes and sizes, so try to find a mouse or trackball that fits yours.

When shopping for a trackball, consider how resistant the ball is to movement. If the ball moves too easily or not easily enough, you'll have to work harder to control it using the small muscles in your hands and fingers, which are more prone to injury.

Pay attention to the placement and size of the buttons: Are they easy to reach and press, and do they provide adequate feedback? If you use the mouse or trackball a lot, look for user-definable shortcut keys to, say, replace a more stressful double-click with a single-click, to avoid the gymnastics of shift-clicking to handle multiple selections, or to save you the effort of switching back and forth from the mouse to the keyboard.

People who do a lot of graphics work, but not much word processing, may prefer a pen-based input device like a drawing tablet.

And since most input devices use the Mac's ADB port, you can plug several in at the same time and switch between them as needed. This lets you pick the right input device for the job—a pen, for example, is better-suited for illustration than a trackball, and a mouse is better than a joystick for fine movements in word processing—and prevents you from overusing one set of muscles and tendons.

Monitor The monitor is another component that plays an important role in certain CRDs, especially eyestrain. The monitor's height should be adjustable so that the top of the visible screen is just below eye level, and the monitor should swivel to help you get rid of annoying reflections. (If you have to pivot the monitor too far, you should try to eliminate the source of the reflections.) Choose a display that's sharp enough to read without straining your eyes, and one that's bright enough to match the ambient lighting.

A Healthy Ambience

Many computer users don't pay much attention to lighting and other environmental conditions, probably because they assume that anything outside of their immediate work area is beyond their control. In practice, though, small changes in your environment can have a major effect on your comfort level, and may help avoid some types of CRDs.

Lighting In designing lighting for a computer workstation, the most important goal is to strive for balance. As a general rule, the light coming from the monitor itself should match the brightness of the ambient lighting: a screen that's too dim or too bright can cause eyestrain. You should try to avoid glare and bright spots, which can also cause eyestrain and headaches. (In some cases, however, these symptoms may simply mean that you need new glasses or contact lenses.)

If your overhead or other lights are too bright and are causing reflections or are overpowering your monitor's display, you can solve the problem inexpensively by making a cardboard shield for your monitor, wearing a baseball cap or eyeshade, or changing the angle of the light. (Don't place paper over a light to diffuse it—you're creating a potential fire hazard.) If your office has fluorescent lighting, try removing one or two bulbs from the fixture directly over your work area.

If your work space has an outside window, make sure the window is not in front of or behind the monitor screen—daylight will overcome the monitor, making the screen hard to read and increasing your chance of eyestrain. Placing the monitor screen at a 90-degree angle from the window is the best choice.

Air Comfort Secondhand tobacco smoke is only the most notorious example of poor air quality that can endanger a worker's health. Fortunately, most businesses have come a long way in regulating exposure to smoke and other pollutants in recent years. Not so obvious, though, are the ways in which other conditions, such as temperature and humidity, can affect your health.

For most people, a working temperature of about 68 degrees Fahrenheit (20 degrees centigrade) is ideal, although some people feel their best in warmer or colder conditions. (If you're especially bothered by temperatures that don't seem to affect your coworkers, check with your physician, since some medical conditions—thyroid disease, for example—can affect temperature sensitivity.)

Cheap Fixes A cardboard hood can cut monitor glare, and a cardboard shield can cut noise from recessed equipment.

Very low humidity also bothers most people and can cause symptoms like dry eyes, nose, and mouth. (Contact-lens wearers are particularly susceptible, since their eyes are usually already dry from blinking less. People also tend to blink less often when working with computers, TV, movie screens, or other bright sources than they do in other situations.) Depending on the type of building you work in, it may be possible to adjust the temperature and humidity to your liking.

Noise Whether it's the constant hum of a disk drive or the incessant chattering of a coworker at the next desk, noise in your work area also can cause harm by increasing your stress level. (Many experts, including hand therapist Silverman, believe that people who are under stress are more prone to develop CRDs than people who are relaxed.) You can cut noise levels by placing offending equipment on the floor, and you can use padded partitions to muffle noise from adjacent areas. If you're particularly sensitive, you should consider wearing earplugs or lightweight headphones that cover your ears.

Adjusting Your Work Habits

Initially, it may seem strange that typewriter users tend not to suffer from RSIs—after all, for many people, using a computer mostly involves typing. But even electric typewriters only let you work in spurts; at the end of each page, you have to change the paper, and that gives the body a brief but welcome respite that computer operators don't enjoy.

Even more important, says Pascarelli, is the fact that, because of how a typewriter is designed, typewriter users can't rest their arms on the edge of the desk the way computer typists can. (Resting the arms that way while typing can lead to injury.)

When you're using the keyboard, your forearms and wrists should form a straight line, and your fingers should adopt a comfortable, natural curve downward. As you type, don't apply too much pressure on the keys. To avoid CRDs, take frequent, short breaks. At least once an hour, stop what you're doing and get up and stretch your body, arms, and legs. To give your eyes a rest, look away from the screen every five minutes or so and stare into the distance. And of course, don't overwork or work when you're in pain.

When you do make changes, make sure you give yourself time to adjust. Your body feels comfortable with the familiar, not the unfamiliar, and it may take as much as a week to know whether a particular work setup or set of work habits is going to work for you. And you may need to change your setup and habits over time. Your body is not static, and neither should your work be.

A MOUSE CAN CAUSE ARM DAMAGE

PART TWO

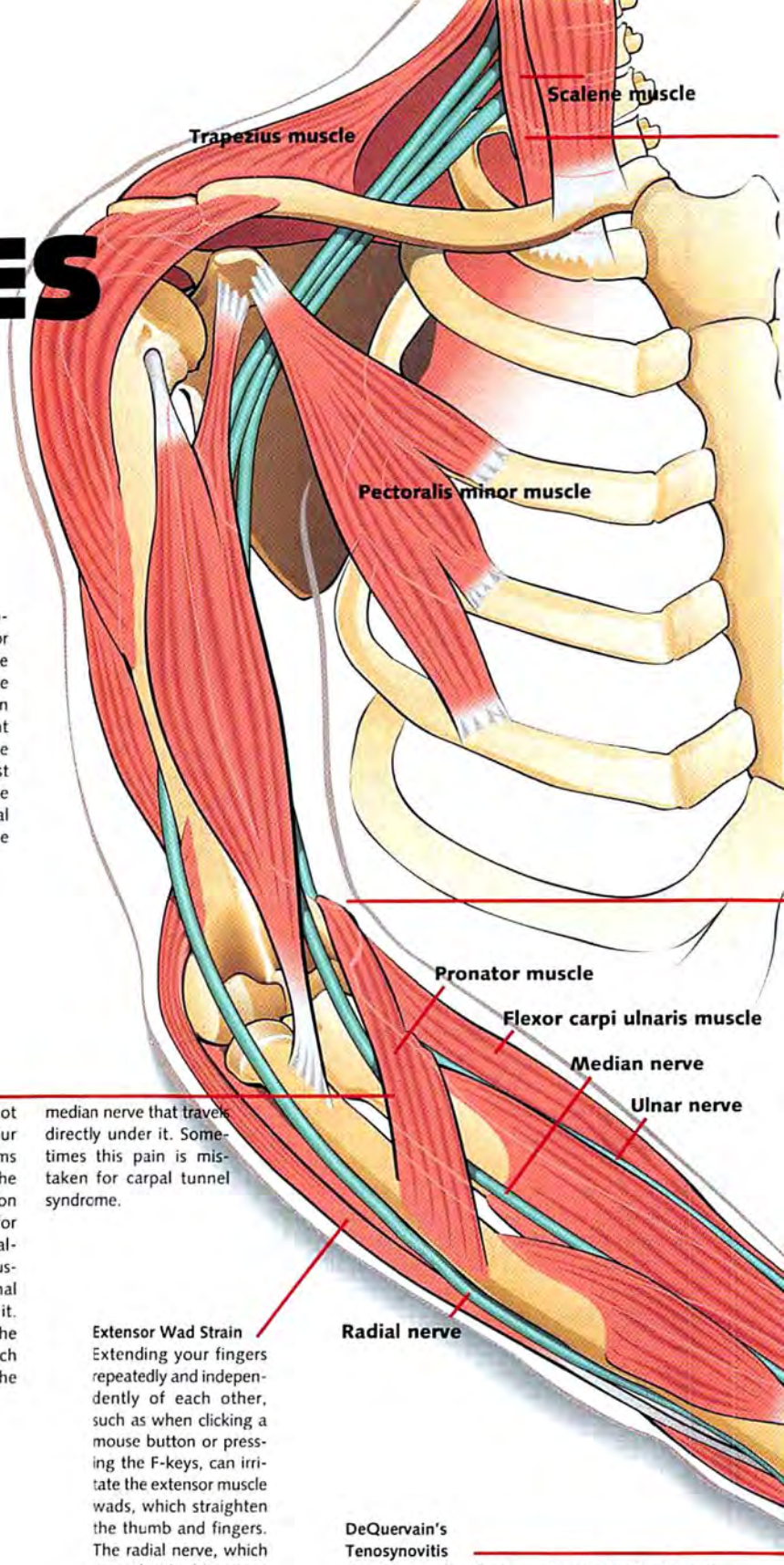
WHAT CAUSES INJURIES

COMPUTER-RELATED DISORders (CRDs) are a varied group of conditions that share one common feature: they are all somehow associated with repeated computer use. Unlike fractures, where the connection between trauma and injury is usually straightforward, CRDs often can't be linked to specific actions or events, like a fall. However indirect, for many people the connection between computer use and illness is real.

In fact, when you consider how poorly suited the human body is to deskbound tasks like word processing, it's a wonder that more people aren't affected. The human body really hasn't evolved very far since our ancestors roamed the African countryside searching for food. To put it another way, our bodies were not designed for working at a computer.

Classifying CRDs is difficult because the interactions between a computer user and his or her environment are so complex. For example, poor body position—one of the causes of CRDs—is governed by many interrelated factors, such as the design and setup of your chair, and the height and placement of the desk, monitor, pointing device, and keyboard, to name just a few. Other conditions in and around your work area—lighting, temperature, noise, dust or other air pollutants—are equally important, so causes can be hard to pinpoint.

Even if it were possible to design your environment to eliminate all undue stress, overusing your muscles, tendons, and other body parts can still lead to injury. Taking breaks can help by giving your



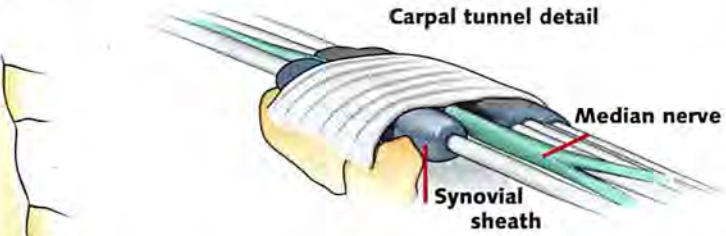
Common Ailments
Pain, tingling, numbness, loss of strength or dexterity—all possible symptoms of cumulative trauma disorders—can be caused by different kinds of stresses. Here are some of the most common causes. Note that not all medical experts agree on the causes or treatments.

Strained Pronator
Your body was not designed to hold your arms out with palms down (which twists the forearms into a position called pronation) for extended periods, although typing and mousing with conventional equipment require it. Pronation tenses the pronator muscle, which applies pressure to the median nerve that travels directly under it. Sometimes this pain is mistaken for carpal tunnel syndrome.

Extensor Wad Strain
Extending your fingers repeatedly and independently of each other, such as when clicking a mouse button or pressing the F-keys, can irritate the extensor muscle wads, which straighten the thumb and fingers. The radial nerve, which is sandwiched between these two muscle wads, can succumb to the pressure.

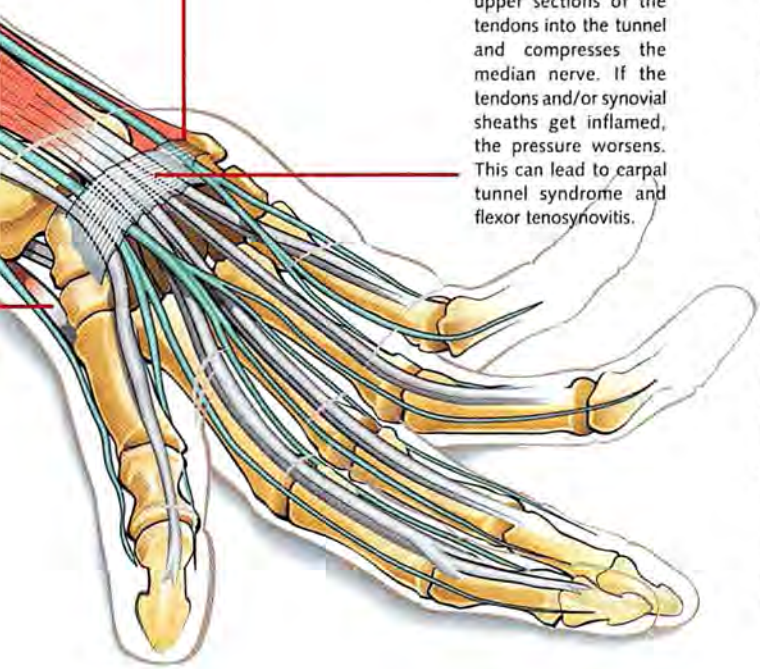
DeQuervain's Tenosynovitis
Repetitive and/or forceful use of the thumb through a full range of motion can irritate the tendons (and their sheaths) that run to the thumb base and knuckle. This can lead to DeQuervain's stenosing tenosynovitis. Also, repetitive thumb motion, such as in regular use of the spacebar, can strain ligaments and cartilage where the thumb meets the wrist.

Poor Posture
Hunching forward and holding your head too far forward can tighten the scalene muscles in your neck, compressing a major artery and nerve trunk and reducing blood flow and nerve function in the arms. The first symptom of this thoracic outlet syndrome can be numbness and tingling along the outside of your forearm and hand.



Cubital and Ulnar Tunnel Syndromes
Holding your pinky finger away from the hand at full span (such as when reaching for the tab, option, or enter keys) can tighten the flexor carpi ulnaris muscle origins at your elbow. This can in turn put pressure on the ulnar nerve as it exits the cubital tunnel (behind the funny bone). The result is cubital tunnel syndrome (a pinched ulnar nerve). The same finger movement can put pressure on the other end of the flexor carpi ulnaris muscle (at your wrist), leading to ulnar tunnel syndrome.

Carpal Tunnel Syndrome
The carpal tunnel (a narrow, inflexible passage in the wrist) houses nine tendons—each in a synovial sheath—along with the median nerve. These tendons widen the farther up the arm they go. Extending your fingers forces the wider upper sections of the tendons into the tunnel and compresses the median nerve. If the tendons and/or synovial sheaths get inflamed, the pressure worsens. This can lead to carpal tunnel syndrome and flexor tenosynovitis.



body a chance to recover throughout the day, but this is no substitute for limiting your work time to a reasonable, sustainable amount.

Two Types of CRDs

CRDs fall into two main groups: problems that primarily involve nerves, bones, tendons, ligaments, and muscles; and problems that originate in or primarily affect the eyes.

Repetitive Strain Injuries The first category includes repetitive strain injuries, or RSIs, which are related to repeated motions like typing or manipulating a mouse. According to hand therapist Pam Silverman, poor posture, badly designed equipment, and overuse all contribute to your risk of developing RSIs. (For many years, RSIs have plagued low-tech occupations like meat packing and mail sorting. Now that office workers and other professionals are being affected, RSIs have gained increased attention, says Robert E. Markison, a San Francisco hand surgeon.

Although the precise cause of RSIs remains unclear, the best hypothesis is that repeated small motions injure tissue. Over the course of time, this minor trauma takes its toll and causes inflammation and pain. For example, in carpal tunnel syndrome (CTS), repeated use causes the tendons in the wrist to swell, putting pressure on the median nerve as it passes through a narrow passage called the carpal tunnel. Pressure on the median nerve causes pain, numbness, and other symptoms in the hand. But since the nerve fibers that make up the median nerve actually originate in the spinal cord in the neck, anything that affects the nerve anywhere along its course—including the neck and upper chest—can cause CTS symptoms or make them worse.

Visual Problems and Headaches The second group of CRDs is related to visual aspects of computer use. Just as the human body wasn't designed to sit rigidly at a workstation for long periods at a stretch, our eyes aren't adapted to cope with the close focusing that computers demand. Staring at a computer monitor without a break eventually takes its toll in the form of eyestrain, which causes symptoms like headaches and painful, itching, or burning eyes.

It's possible that eye problems and headaches are more prevalent than other types of CRDs, say medical experts. But since these problems are relatively minor and fairly common, many people tend to brush them off as an unavoidable side effect of computer work, so they often go unreported. (Headaches also can result from body-alignment problems like poor head and neck posture.)

Are You Affected?

In deciding whether you're a CRD sufferer, the most conservative approach is to view any new symptoms with suspicion and assume that they may be computer-related. That's not always easy to do, since many CRD symptoms appear when you're away from the computer. For example, a few years ago I began to experience sharp pains in my upper back during the daytime. Since most of my time at the computer was spent after work, I didn't make the connection until an orthopedic surgeon asked me about my hobbies, which include computing at home.

To decide if you might be suffering from a CRD, jot down any unusual symptoms that you've experienced in various parts of your arm and compare them with the examples in the illustration at left. Remember that CRD symptoms can come and go, and you may not even be conscious of them if they've been around for a long time.

Urge your company to bring in an ergonomics consultant with medical training to diagnose such hidden symptoms.

PART THREE

WHERE TO GET **HELP**

APPLYING A FEW PREVENTIVE measures may be all the therapy you need if you're suffering from a mild form of computer-related disorder (CRD), so you may not have to consult a health practitioner. But if you have even the slightest uncertainty about what to do, or if your symptoms are likely to result in some sort of insurance claim, it's wise to seek outside advice. (If your symptoms are job-related, you may be required to visit a company physician first.) Also, remember that it's *never* a good idea to try to "work through" an injury by ignoring it, since that may make the problem much worse.

Computer users who suffer from CRDs face a dizzying choice of places to turn to for help, ranging from medical doctors to proponents of various forms of alternative therapy. There's also a huge assortment of reference materials. I've listed the best on *Macworld*'s forums on America Online and eWorld. Here's a brief rundown of the major medical options.

Choosing a Caregiver

Although most physicians (M.D.s and D.O.s) have probably heard of conditions like carpal tunnel syndrome, few receive intensive training in dealing with CRDs. Your best bet is to look for a board-certified doctor who specializes in hand surgery, or physical or occupational medicine. (If you're having visual symptoms or headaches, see an optometrist or ophthalmologist.)

Ask other computer users in your area for referrals, and take the time to interview potential candidates: how extensive is their background in diagnosing and treating CRDs, and what is their approach to therapy?

If you don't like the advice you get, consider a second opinion, but be aware that your medical insurance may not cover it—check with your insurance carrier. Also, be aware that workers' compensation often limits your ability to change doctors once treatment has begun.

A variety of other practitioners—including chiropractors, occupational therapists, hand therapists, and physiotherapists—can also treat CRDs. (In many cases, these practitioners work along with or are referred by physicians in occupational medicine and other specialties.)

Some RSI sufferers have also obtained relief with alternative therapies such as acupuncture, meditation, and relaxation techniques. Although I try never to dismiss any approach out of hand, it's important to remember that some treatments, including medication, may only mask the symptoms without doing anything to correct the cause and prevent further injury.

As always, rely on personal recommendations for referrals, and beware of therapeutic claims that seem too good to be true.

Although it's impossible to make any workplace completely risk-free, following these simple guidelines should help make your computing experience safer and more rewarding. ■

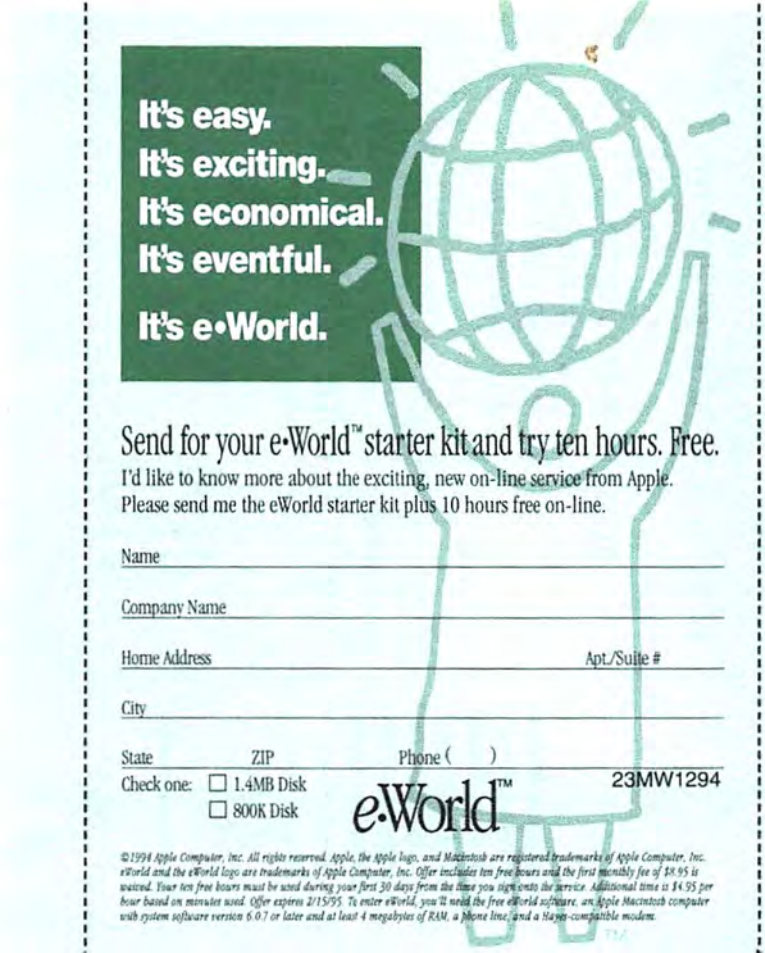
FRANKLIN N. TESSLER, M.D., is a radiologist and *Macworld* contributing editor with a special interest in computer-related disorders.

REPETITIVE STRAIN INJURY TREATMENTS

by Robert E. Markison, M.D.

While treatment for repetitive strain injuries will vary from person to person, use these general guidelines in consultation with a medical provider. Good diet, exercise, keeping the arms and hands warm, varying your activities, taking breaks, staying well-hydrated, avoiding caffeinated beverages, and not smoking all help reduce injury and speed recovery.

Poor Posture	**Self-help:** Do breathing and stretching exercises, get a chair that supports correct posture, reduce stress, avoid extra body weight. **Professional care:** Physical therapy, local anesthesia via trigger-point injections.
Cubital Tunnel Syndrome and Ulnar Tunnel Syndrome	**Self-help:** Keep arms and hands warms (via clothing and fingerless gloves), don't overuse hard-to-reach keys, try alternative keyboards and input devices, don't keep arms in a palms-down position. **Professional care:** Varies.
Strained Pronator	**Self-help:** Avoid sustained pronation, do gentle massage and stretches, keep arms and hands warm (via clothing and fingerless gloves). **Professional care:** Varies.
Carpal Tunnel Syndrome and Flexor Tenosynovitis	**Self-help:** Take breaks, keep arms and hands warm (via clothing and fingerless gloves), avoid salt, don't smoke (it reduces blood flow by as much as 60 percent), use dictation or voice recognition, type more gently. **Professional care:** Night splints, hand therapy, steroid injection if recommended.
DeQuervain's Tenosynovitis and Thumb Ligament Strain	**Self-help:** Change use of thumbs for pressing spacebar (for example, use rolling thumb movement or alternate use of thumbs), do gentle massage and stretches, keep hands warm (via fingerless gloves). **Professional care:** Night splint, steroid injection if recommended.
Extensor Wad Strain	**Self-help:** Avoid sustained pronation, do gentle massage and stretches, keep arms and hands warm (via clothing and fingerless gloves). **Professional care:** Physical therapy, steroid injection if recommended.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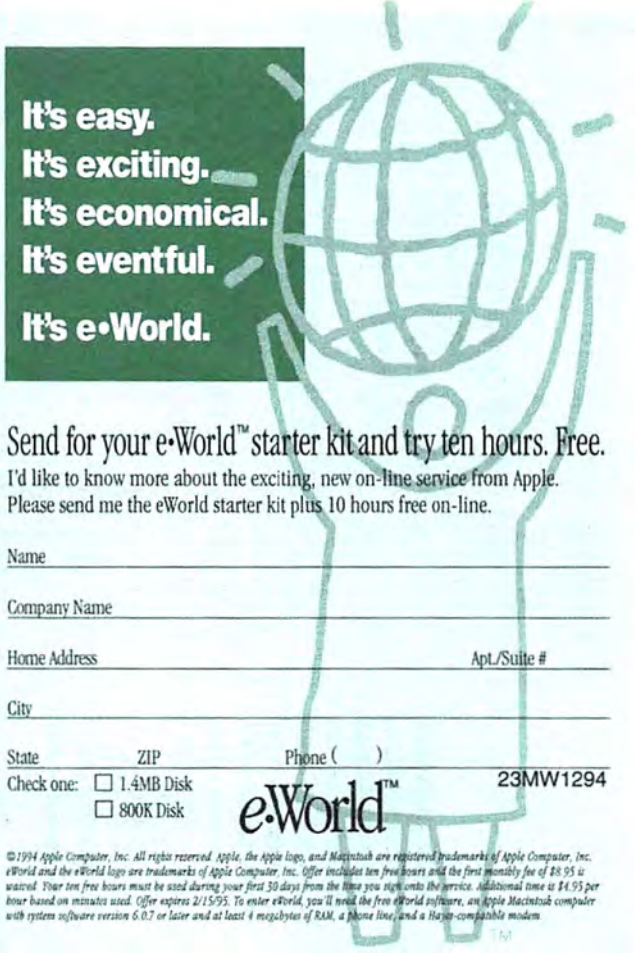
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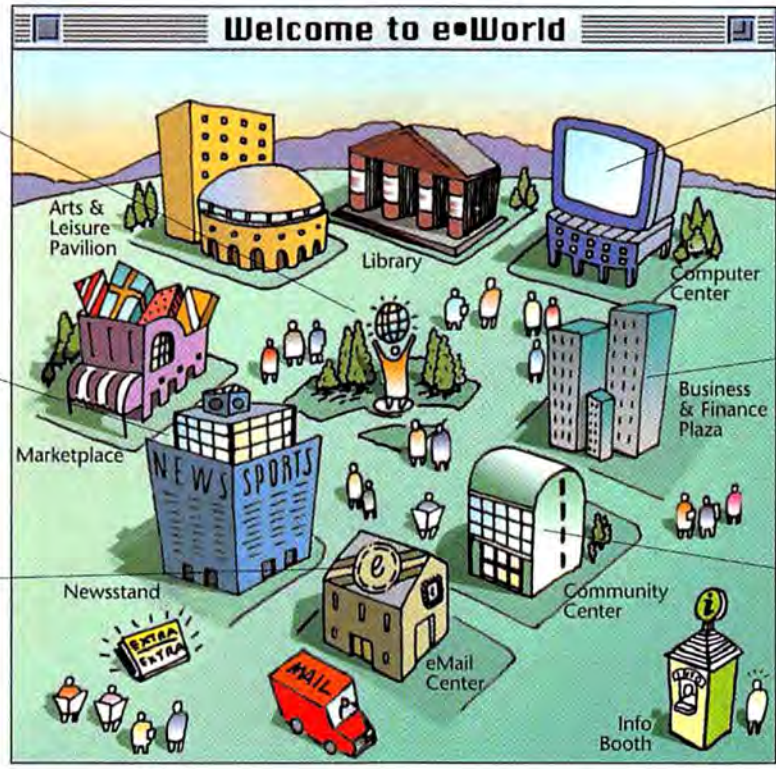

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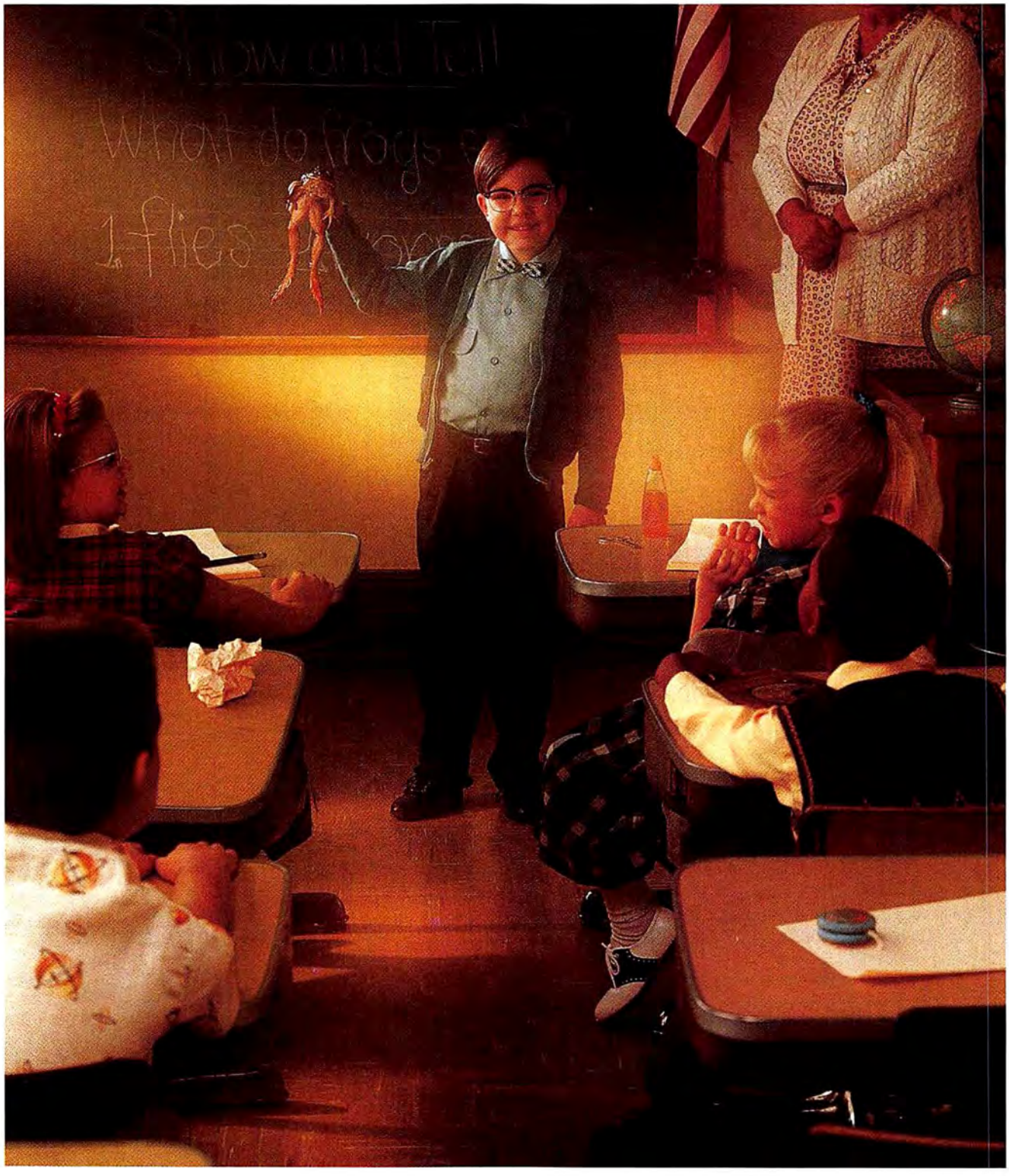

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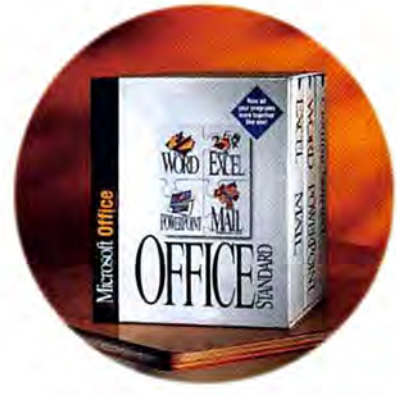

Microsoft Office

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MW LAB

Optical Expan

by Tim Warner

Today's business environment often poses massive storage challenges. Quick access to large amounts of data and stores of archived information can be vital to staying competitive. In publishing, where a single file can occupy 600MB, the flexibility of removable, rewritable optical disks can save time and money. Now affordable optical drives with capacities of 1.3GB or more, available from more than 20 companies, offer much larger storage volumes and much faster performance than earlier drives.

The cost of 1.3GB optical media averages an enticing $0.12 per megabyte—a fraction of the cost per megabyte for removable hard disks. And optical cartridges can withstand high heat, strong magnetic fields, humidity, and dust without loss of data. As you slip a 1.3GB cartridge into your briefcase, rest assured that your data will arrive intact.

For this review, Macworld Lab tested 18 drives and discovered some clear trends. Prices are mostly under $3000, less than last year's 650MB units. (Cartridges for this capacity range from $96 to $125, depending on the vendor.) Although the 1.3GB capacity has been available for less than a year, optical is a mature, reliable technology.

Of the ten mechanism types we tested, the MaxOptix T3 showed the most impressive performance and strong cross-compatibility. Nearly half the products reviewed use the T3, increasing the chances that you'll run into the same drive mechanism on other 1.3GB drives. Also, MaxOptix's formatting software and media support industry standards to a high degree, which makes those cartridges more interchangeable than media from some other vendors.

Speed Factors

For specialized needs, such as permanent archiving, WORM (write-once, read-many) drives may be your best option. And companies that have standardized on the 1GB optical format may want to stay the course with that capacity range. But for most buyers with huge storage needs, the key buying considerations for optical storage are price, performance, compatibility, and support. And among most 1.3GB opticals, the primary distinguishing factor is performance.

Drive performance fell into three basic groups. The fastest drives performed at the level of a slow hard drive, better than the Quantum 80 of a few years ago, but slower than today's standard Apple drives. The fastest drives—from Pinnacle Micro, Microtech, Loviél, PLI, and FWB—use either the Pinnacle OHD-1300 or the MaxOptix T3-1304 mechanism (see "Optical Velocities"). Somewhat slower drives from MacProd-

Drives to Consider From top to bottom, the Microtech Genesis 1300, the Club Mac 1.3Gig MO—both Editors' Choice drives—along with the APS 1.3Gig MO.

PHOTOGRAPHY BY LUIS DELGADO

ucts USA, Hewlett-Packard, Liberty Systems, DGR Technologies, Club Mac, and Panasonic are still more than twice as fast as double-speed CD-ROM players. Using mechanisms from NEC, HP, IBM, Sharp, and Matsushita, these units deliver consistent performance for reliability in extreme or unpredictable environments. Drives from APS Technologies and Mirror finished last. Based on the Sony F521 mechanism, these drives suffer from relatively poor transfer rates during operations involving heavy writes.

Pinnacle Micro's Sierra 1.3GB drive edged out eight drives based on MaxOptix's T3 mechanism. The Pinnacle's advantage: a large, fast cache—and a bit of luck regarding how that cache operates.

Caching Considerations

Caches in optical drives are designed to overcome the chronic problem of sluggish write operations. The slow-switching magnets of magneto-optical drives require two write passes—the first one erases old data and the second writes new data. Given this limitation, the 10MB writes in our tests should be slower than the 10MB reads. However, to speed things along, drive makers such as Pinnacle, MaxOptix, HP, and others include massive caches—as much as 4MB of RAM—to accept data quickly and return control to the computer.

A write cache can lead to dramatic improvements. For example, the Pinnacle Micro Sierra 1.3GB saved our 3.9MB Aldus PageMaker document in 67 seconds on the first trial; this put it in the middle of the pack for this test. But on two subsequent trials, the Sierra drive took 19 seconds and 15 seconds, just over a quarter of the original time. The same dramatic effect occurred for our 4th Dimension sort. In each case, the size of the test files fit within the Sierra's cache.

But remember that our tests did not flush the cache between trials; flushing would happen if you used a series of large files. When we opened a 10MB Adobe Photoshop file between the PageMaker or 4th Dimension trials, the Sierra's performance dropped off significantly.

For most optical drives, caches are designed to handle a large number of

sion

MACWORLD LAB TESTS 18 HIGH-CAPACITY OPTICAL DRIVES

reads and writes at once—as would be the case in copying many files for archiving. Caches help maintain a consistent flow of data even when the file is larger than the cache. When optical drives are used to approach hard-drive-like speeds, large caches are ideally suited to small and medium-size files used repeatedly at one sitting (see "Caching Strategies").

Because caches are complicated beasts, and because each user's data-usage pattern is unique, the drive with the largest cache may not be the fastest. Vendors customize caches to fit the specific performance needs of a particular set of customers. The MaxOptix T3 is a good example. The PLI MaxOptical 1.3GB did well on the 4th Dimension sort test, taking only 92 seconds, but poorly on the 10MB read test, taking 42 seconds, whereas the Iomega LaserSafe Plus did well on the 10MB read (34 seconds) but poorly on the 4th Dimension test (158 seconds). Both companies use similar cartridges and software. (Historically, our tests have shown that driver software has little impact on overall drive performance.) The results were due to different cache configurations on the two drives.

Cache configurations seemed to play an important role in determining the overall rankings in reading-based versus writing-based tasks. For example, the Pinnacle Micro Sierra 1.3GB wrote a 10MB file to its cartridge in 38 seconds, reading the same file in 52 seconds. In contrast, the FWB hammerDisk 1300 wrote in 42 seconds and read in only 36 seconds.

In some cases, write verification played a large part in distinguishing the fast drives from the slow. The write-verify feature forces a third pass over the disk (after erase and write). On this pass, the drive reads back newly written data to ensure that it is correct. Write verify is especially useful in extremely dusty environments where contaminants might obstruct the laser, or in applications where even small data losses could spell disaster. But verification adds about 20 percent more time to any write operation. Many vendors, such as Pinnacle Micro and FWB, ship their products with write verification turned off although their software supports it. Others, such as Club Mac and PLI, ship with write verify permanently on. A few vendors take the opposite approach and do not allow write verify at all (see "Optical Velocities" for settings that products ship with).

In general, first decide whether your data-security needs require write verify, then compare performance.

Compatibility and Reliability

Compatibility represents another important factor in picking a drive. Even more than other removable media, optical cartridges—often used in long-term archives—should be readable by other drives. Interchange standards have long been in place for optical media, including 1.3GB cartridges. Drives can read any cartridge as long as the media conforms to standards issued by one of the two industry standards groups, ISO and ECMA. Occasional driver incompatibilities can easily be solved by removing mounting software and restarting with the cartridge in the drive. (Only the Panasonic LF-7300A, which uses a read-write technology called phase change instead of magneto-optical, is completely incompatible with other drives.)

CACHING STRATEGIES

Fast optical drives rely on large, sophisticated RAM buffers called caches. Much of a drive's speed comes from reading or writing data to a cache rather than directly to disk. But even the biggest cache can't anticipate the widely varied usage patterns of different people. So engineers have devised many ways of improving cache efficiency.

Sometimes they segment the cache into small pieces. Read-ahead caches read contiguous blocks of data from the disk in the hope that the data your program needs next will be near the data you just requested. However, the performance of read-ahead caches typically slows when reading more than 32K at a time. So several drive caches use 32K segments of cache memory to prefetch and preserve data that has been read from the disk.

Write caches work similarly, assuming that you will reuse (either read or write) the most recently saved information. Generally, the portion of a cache devoted to reads or writes is fixed; for example, half might be for reads only. Some newer caches can switch segments of cache to either read or write duty, greatly affecting performance in some situations. For example, Pinnacle Micro's Sierra cached files as large as 3.9MB in its 4MB cache, allowing it to cut the time needed for one operation by half, and the time for another operation by nearly 75 percent.

Another way of improving efficiency is to change the size of the segments on the fly. MaxOptix T3 drives, with ROM versions 1.0 or higher, gather statistics on data requests received from your Macintosh. If all of the requests are very small—10K or less, for example—the driver firmware makes the cache segments smaller so that more data can fit. MaxOptix claims that this feature can double a drive's speed. The company admits, however, that performance depends on the application. Our tests, which favor large transfers typical of high-capacity optical applications, showed no speed improvements from this caching scheme.

Although the benefits of novel caching strategies rarely match the vendors' predictions, they significantly increase the base performance of optical drives.

Optical Options

Company	Phone
APS Technologies	816/483-1600
Club Mac	714/768-8130
DGR Technologies	512/476-9855
FWB	415/474-8055
Hewlett-Packard	NA
IBM	NA
Iomega Corporation	NA
Liberty Systems	408/983-1127
Loviél Computer Corporation	612/828-6880
MacProducts USA	512/476-5295
MaxOptix	408/954-9700
MegaHaus	713/333-1910
MicroNet Technology	714/453-6100
Microtech	203/468-6223
Mirror Technologies	612/830-1549
Olympus	714/753-5935
Optima Technology	714/476-0515
Panasonic	201/392-4177
Pinnacle Micro	714/727-3300
PLI	510/657-2211, ext. 200
Procom Technology	714/852-1000
Smart Storage Solutions	713/333-0249
Sony	408/432-0190

Technical-support ratings are based on a series of calls made including bonuses and demerits, to derive the final rating. NA = not applicable; WORM = write-once, read-many. ^For not accept MO cartridges.

Toll-Free Phone	Product [A]	List Price	Tested	Tech Support	Warranty	Capacities Supported	Media Types Supported
800/874-1428	1.3Gig MO	$2499.00	tested	very good	1 year	650MB, 1.3GB	MO
800/258-2622	1.3Gig MO	$2099.00	tested	excellent	1 year	1.3GB	MO, WORM
800/235-9748	IBM 1.3 Optical	$2299.00	tested	very good	1 year	594MB, 650MB, 1.2GB, 1.3GB	MO, WORM
	NEC 1.3 Optical	$2399.00	not tested	very good	1 year	594MB, 650MB, 1.2GB, 1.3GB	MO, WORM
NA	hammerDisk 1300	$4099.00	tested	excellent	1 year	600MB, 650MB, 1GB, 1.3GB	MO
800/826-4111	C2550A Model 1300T Optical Disk Drive	$3495.00	tested	excellent	1 year	650MB, 1.3GB	MO, CCW-WORM
800/426-7299	0632 Model CHA	$2995.00	not tested	not rated	1 year	595MB, 650MB, 1.3GB	MO, WORM, CCW-WORM
800/777-6654	LaserSafe Plus	$3995.00	tested	acceptable	1 year	650MB, 1GB, 1.3GB	MO
NA	225MO 1.3G	$2999.00	tested	very good	1 year	650MB, 1.3GB	MO
	115MO 1.3G [B]	$2599.00	not tested	very good	1 year	650MB, 1.3GB	MO
800/688-3696	Lightning MO 1300	$2999.00	tested	very good	1 year	1.3GB	MO
800/622-3475	Magic NEC 1.3 Optical	$2325.00	tested	very good	1 year	594MB, 650MB, 1.2GB, 1.3GB	MO
	Magic IBM 1.3 Optical	$1999.00	not tested	very good	1 year	594MB, 650MB, 1.2GB, 1.3GB	MO
800/848-3092	MaxLyb Model 1.3	$3850.00 [C]	tested	poor	1 year	650MB, 1GB, 1.3GB	MO, CCW-WORM
800/786-1184	MAC1.3T4X [D]	$2489.00	not tested	not rated	1 year	650MB, 1GB, 1.3GB	MO, WORM
NA	SB-TMO-1300	$3995.00	tested	very good	2 years	650MB, 1GB, 1.3GB	MO
800/626-4276	Genesis 1300	$2899.00	tested	very good	2 years	650MB, 1GB, 1.3GB	MO
800/654-5294	Sony 1.3GB	$2399.00	tested	very good	1 year	650MB, 1GB, 1.3GB	MO, WORM
	Maxoptix 1.3GB	$2899.00	tested	very good	1 year	650MB, 1GB, 1.3GB	MO, WORM
800/347-4027	Deltis 1300MO/Mac	$3195.00	not tested	not rated	2 years	650MB, 1.3GB	MO, WORM
NA	Diskovery 1300MO	$2995.00	tested	very good	1 year	650MB, 1.3GB	MO
	Concorde 1300MO	$3195.00	not tested	very good	1 year	650MB, 1.3GB	MO
800/742-8086	LF-7300A	$3995.00	tested	acceptable	1 year	500MB, 1GB, 1.5GB [E]	phase change, WORM
800/553-7070	Sierra 1.3GB	$2995.00	tested	very good	1 year	650MB, 1.3GB	MO
800/788-9440	1.3GB MaxOptica	$4225.00	tested	unacceptable	1 year	650MB, 1GB, 1.3GB	MO, WORM
800/800-8600	MEOD 1301 [B]	$2829.00	not tested	not rated	2 years	650MB, 1.3GB	MO
800/476-0923	SSS1300 MACX [D]	$2269.00	not tested	not rated	1 year	650MB, 1.3GB	MO
800/352-7669	RMO-5570	$3099.95	not tested	not rated	1 year	594MB, 650MB, 1.2GB, 1.3GB	MO, WORM

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. Ratings are for companies, not individual products, and we call only those companies whose products Macworld Lab tests. CCW = continuous composite write; MO = magneto optical; mechanisms of tested drives, see "Optical Velocities." [B] Uses a Sharp JY-800 mechanism. [C] Version with 1MB cache costs $3595. [D] Uses an NEC OD155 mechanism. [E] Drive does

The compatibility issue is a particularly important one for optical cartridges because they are used in publishing, digital-image manipulation, computer-aided design, video, and other fields where data must commonly be created on one drive and then transported to another drive located in either a service bureau or a remote office.

Between magneto-optical drives, we found only minor compatibility problems, with one exception: Pinnacle Micro's cartridges, when formatted with Pinnacle's driver, would not mount in other drives. (The Sierra drive will accept most other cartridges, however, and can use other media without difficulty.) Pinnacle claims its media provide better performance than competing disks, but our tests revealed no significant differences.

Good compatibility also means that large data sets that would otherwise fill several hard drives can be accessed simultaneously from a jukebox. Hewlett-Packard, Pinnacle Micro, MaxOptix, Optima Technology, and Olympus, among others, sell Macintosh optical jukeboxes with capacities ranging from 6.5GB to mammoth towers holding over 100GB; these units use hard-drive caches to reduce cartridge changes.

Similar Values

Apart from performance and compatibility, the drives were remarkably similar. One-year warranty and rapid repair policies are the norm. Four companies—Procom Technology, MicroNet Technology, Olympus, and Microtech—offer two-year warranties. (Bear in mind, however, that the products could in some cases outlast the companies themselves; some optical companies have gone bankrupt long before their disks—or even drives—go bad.) DGR, MacProducts, PLI, and Sony do not guarantee quick turnaround on drive repair, citing times closer to two weeks. For an extra $65, however, Hewlett-Packard throws in its Express Exchange 24-hour turnaround guarantee. And for $75 Iomega will ship a replacement drive overnight.

Prices are surprisingly reasonable; on average, these drives cost nearly $1000 less than 650MB optical drives did two years ago. Naturally, the least expensive

Optical Innovation Pinnacle Micro's Orray uses four optical drives that work simultaneously in a tower, offering 2.5GB of storage. A prerelease unit showed slightly better results than optical drives, but the Orray was slower than most hard drives. Pinnacle predicts faster performance in the final model, which should be shipping when you read this.

MW LAB Optical Velocities

All times are in seconds.

Relative Speed
- 100%(fastest)
- 90%–99%
- 80%–89%
- 70%–79%
- 0%–69%

Mechanism Key
HP = HPC1716T
I = Iomega LaserSafe Plus
IB = IBM 0632CHX
M = MaxOptix T3-1304
MA = Matsushita LF-7300
N = NEC ODC141-155
O = Optima SMO-F521-81
P = Pinnacle OHD-1300
S = Sharp JY-800
SO = Sony SMO-F521-00

Overall Fastest

To determine rankings, Macworld Lab indexed test results against the fastest mechanism in each test. Thus, the Pinnacle Micro Sierra 1.3GB gets a 1.00, and the APS 1.3Gig MO gets a 0.49.

Overall Slowest

Index		Sort	Open	Save	Write	Read	Write Verify
1.00	Pinnacle Micro Sierra 1.3GB (P)*	71.7	72.1	75.2	37.8	51.9	OFF **
0.94	Microtech Genesis 1300 (M)	105.2	65.7	88.6	47.4	32.8	ON **
0.94	Loviél Lightning MO 1300 (M)	104.2	66.1	89.3	46.8	33.0	ON **
0.93	PLI 1.3GB MaxOptical (M)	91.5	68.7	95.2	38.2	41.7	ON ***
0.91	FWB hammerDisk1300 (M)	142.0	63.0	88.5	42.4	35.8	OFF **
0.89	Iomega LaserSafe Plus (I)	158.1	66.8	98.9	39.6	34.0	OFF ***
0.87	MaxOptix MaxLyb Model 1.3 (M)	134.1	60.9	141.3	39.2	40.1	OFF **
0.86	MicroNet SB-TMO-1300 (M)	94.0	70.1	128.4	53.5	34.7	ON **
0.85	Mirror Maxoptix 1.3GB (M)	141.2	63.1	98.3	58.7	36.4	OFF ***
0.76	HP C2550A Model 1300T Optical Disk (HP)	250.6	79.3	208.3	28.5	41.0	OFF **
0.75	Liberty 225MO 1.3G (HP)	252.4	78.7	209.0	29.5	41.4	OFF ***
0.70	MacProducts Magic NEC 1.3 Optical (N)	245.0	68.0	248.1	39.7	40.6	ON **
0.69	DGR IBM 1.3 Optical (IB)	213.3	71.0	213.6	50.3	39.1	ON **
0.65	Panasonic LF-7300A (MA)	292.7	68.2	261.8	133.1	79.0	ON **
0.61	Club Mac 1.3Gig MO (S)	306.1	65.7	313.3	106.5	32.7	ON **
0.60	Optima DisKovery 1300MO (O)	269.0	78.9	160.3	77.6	47.6	OFF ***
0.58	Mirror Sony 1.3GB (SO)	267.8	79.5	164.2	77.9	53.6	OFF ***
0.49	APS 1.3Gig MO (SO)	294.5	77.5	302.5	107.8	59.1	OFF ***

*Tested in standard mode. **User configurable. ***Cannot be changed.

BEHIND OUR TESTS

Although nearly all of the drives in this review can act as a start-up device, most people use optical drives for secondary strorage. Using a Centris 650 and System 7.1 with standard extensions, we tested access speeds with a 4th Dimension 3.1 sort of 4300 records. To test reads and writes using real-world applications, we opened and saved a 3.9MB Aldus PageMaker 5.0 document and a 10MB Adobe Photoshop 2.5.1 file without compression. Standard file copies to and from the optical disk (Write and Read) helped show differences in caching among these drives. We conducted each test three times and averaged the results. To determine compatibility between cartridges we mounted all cartridges in each drive mechanism, wrote a large file to the cartridge, and then read the file to ensure that data was transferred correctly.—**Macworld Lab testing supervised by Tim Warner**

drive tested was from a direct reseller. The Club Mac 1.3Gig MO, based on a Sharp mechanism, costs only $2099 and offers excellent tech support. APS Technologies' 1.3Gig MO ($2499) is another good deal, with its excellent documentation and very good tech support. Only APS included software besides a formatter (APS bundles various utilities and shareware) with the drives submitted for our review.

Nearly all of the drives we received have large, sturdy enclosures. Two drives are designed to be portable themselves: the Liberty 225MO 1.3G and the APS 1.3Gig MO are both small enough to be carried easily.

The Last Word

Although Pinnacle Micro's Sierra 1.3GB drive was the fastest in our tests, using Pinnacle's recommended cartridges may limit your choice of service bureaus or lock you into one product—a potentially serious drawback if you rely on optical drives at service bureaus, as many users do. The Microtech Genesis 1300 is right on the Sierra's heels in performance and offers the greater flexibility of the MaxOptix T3 mechanism. I have to tip my hat to Microtech as the overall best choice among fast drives, with its reasonable price and two-year warranty.

Considering the general quality of the products reviewed, you have the luxury of bargain hunting without nasty consequences. The six companies that sell their products direct—APS, Club Mac, Liberty Systems, Loviél Computer, Microtech, and Mirror—all provide very good to excellent technical support. Club Mac's 1.3Gig MO is the best choice of inexpensive drives, but the MacProducts Magic IBM 1.3 Optical at $1999 is awfully tempting.

While smaller 3.5-inch optical drives at 128MB and 230MB are still fighting for respect in the removables market, 1.3GB optical drives have arrived to replace their 650MB predecessors at just the right time. The flood of image-, video-, and sound-manipulation tools, as well as the growing data-storage needs of business and industry, have created a need for cheap, flexible archives. Better than any other medium, 1.3GB optical drives meet that challenge. **m**

Associate lab editor TIM WARNER has used, tested, and written about optical drives and a wide range of other storage technologies for the past four years.

HIGH-CAPACITY OPTICAL DRIVES

MW EDITORS' CHOICE In a market with many good options, two drives hold the right combinations of price, performance, and support.

Best Low-Cost Solution

1.3Gig MO Although this drive's speed leaves something to be desired, bargain hunters will appreciate the excellent tech support and quality of this drive. **Company:** Club Mac. **List price:** $2099.

Best Overall Performance

Genesis 1300 Excellent performance, very good tech support, good compatibility, and a two-year warranty make this drive stand apart from the pack for demanding applications. **Company:** Microtech. **List price:** $2899.

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SOFTWARE

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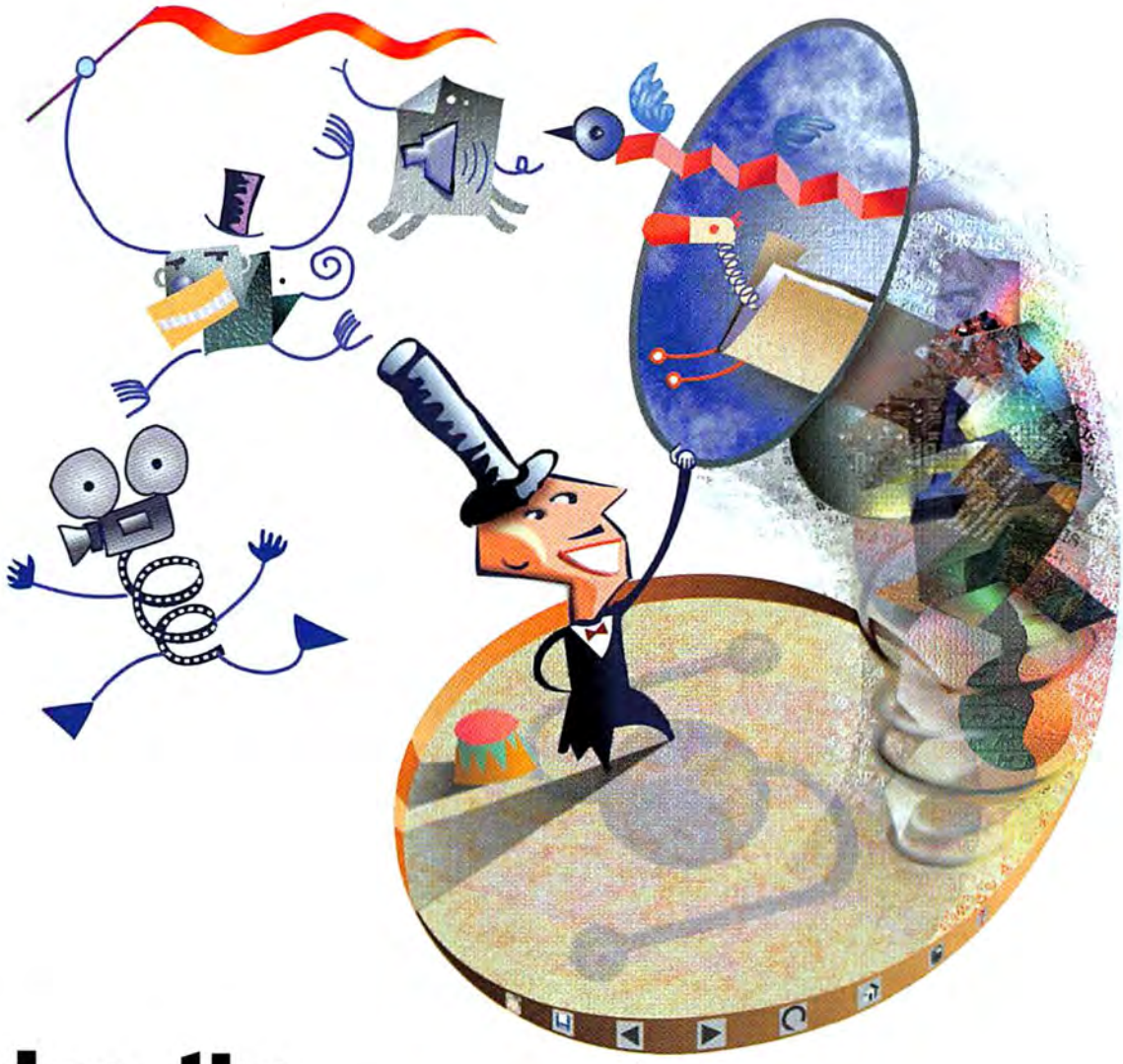


Taming the INTERNET

MOSAIC adds a graphical interface to the world's most complex network

BY JOEL SNYDER

Mosaic is to the Internet what the Macintosh is to personal computers. Sort of. Actually, Mosaic today represents what the Macintosh was in 1984: a little buggy, a little slow, limited in many ways—but a heck of a great idea. Mosaic tries to be a complete, graphical front end to information retrieval on the Internet, a single interface to all of the various information servers.

Traditionally, Internet users have many different tasks, and each task requires a different tool. For example, terminal emulation takes one tool, electronic mail another, and file transfer a third. When network tasks are easily partitioned, this makes sense: I log on to the mainframe to do payroll, then I check my mail. However, when the task is information retrieval, switching between tools is more a hindrance than a help because there is no separation of tasks.

Let's say you're looking for information about System 7.5. You would probably start in one of the Macintosh-oriented Internet newsgroups—for example, comp.sys.mac.system. From there, you might find out about a server at Apple Computer that talks about System 7.5. This would likely be a *Gopher* server—a client/server information-retrieval system that allows you to navigate menus to find information.

Gopher's strength is that all Gopher servers can be linked transparently so that users can access a large number of Internet systems without connecting to each system individually. On the Gopher server, you might find out about another server with some beta System 7.5 software. This is likely to be an *FTP server*—a server that uses the TCP/IP file-transfer protocol that lets you move files from an FTP server to your client across the Internet. In the traditional Internet world, you'd have to use three tools—Gopher, NTP, and TCP/IP—to accomplish one task. The goal of Mosaic is to replace those tools with a single, easy-to-use front end.

Mosaic is a client application that talks directly to Gopher servers and *World Wide Web* (WWW) servers—an information-retrieval system similar to Gopher except that instead of menus, WWW uses hypertext documents. Mosaic also needs helper applications; without them, Mosaic can access or use only a fraction of the information on the Internet. With these helper applications, you can view different kinds of graphics files and listen to sounds. For example, Mosaic doesn't know how to play QuickTime movies. But it does know how to send them to a helper application that can handle QuickTime. Helper applications also allow you to connect to a *Telnet server*—a TCP/IP virtual-terminal program that creates a terminal session across the Internet as if you were directly connected to a minicomputer or mainframe with a dedicated terminal.

What's Mosaic Like?

Mosaic is a hypertext-based information browser. If you're comfortable with the world of HyperCard, you'll probably be able to handle Mosaic. You start your Mosaic explorations by telling Mosaic which Home Page to find. Usually, a Mosaic Home Page is a *HyperText Markup Language* (HTML) document that is available from a WWW server or

Financial Figures, a Click Away Business and financial services are only now starting to become available on the WWW. Serious financial data will probably always cost money, however.

STEVE CAMPBELL

your local hard disk. The Home Page—like any page—can have text, graphics, and links to other pages. With Mosaic, you can see the Internet as a single, extremely disorganized system. The links can point to pages on any Internet-connected system using any of the protocols that Mosaic understands: Gopher, WWW, FTP, News, and Telnet. For the Mosaic user, jumping to an Internet resource of almost any kind is as simple as pointing to the link and double-clicking.

Most Mosaic users will start off with a network-based Home Page and then graduate to their own, custom-written page with their favorite jumping-off points and network resources. Inside an HTML document are *universal resource locators* (URLs)—text strings that Mosaic (and other WWW clients) use to find other network resources.

URLs identify the type of resource (such as news server or WWW server), the server where the resource is located, and a pointer the server uses to retrieve the data. For example, the URL **http://www.opus1.com/HomePage.html** identifies a WWW server (HTTP is the *HyperText Transfer Protocol*, used by WWW servers) running on the system **www.opus1.com** and a resource called **/HomePage.html** on that server.

The Web has become the hot new place for information services. The combination of a user-friendly Mosaic client and a huge population of Internet users has fueled a growth industry for information providers.

Joys and Sorrows on the Net

With the tools we've discussed so far you can find just about anything available through Mosaic. Click on a pointer to Yale University and hear a voice read the current time. Click and get stock quotes, buy a teddy bear, see an X-rated movie, download software, read customer-support bulletins, or check on the level of a coffeemaker in Cambridge, England. Suppose you are wiring an Ethernet network using Farallon EtherWave hardware and are having problems with some Quadras. Through Mosaic you can connect to Farallon's WWW server and get the latest notes on system compatibility.

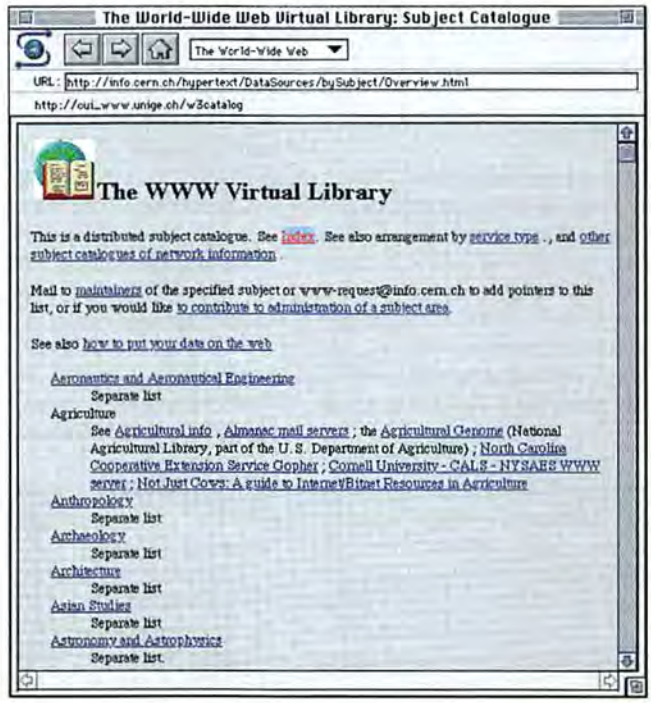
This is all tremendously convenient and easy, but Mosaic is far from foolproof. For example, when you read a particular document using Mosaic, there's no assurance that the pointers to other documents are still accurate. Things change fast, and it's not uncommon to follow a particularly promising set of links only to discover nothing at the end. Mosaic also has serious problems, including implementation bugs, poor design in some places, and conceptual limitations in others. (If your network link is slow, you'll get a poky response, but that's not Mosaic's problem.) Many of these flaws will never get fixed in the public domain versions of Mosaic, but they have not kept Mosaic from becoming one of the most popular Internet browsers and spurring the development of commercial products in search of the ultimate Internet interface.

Where to Get Mosaic

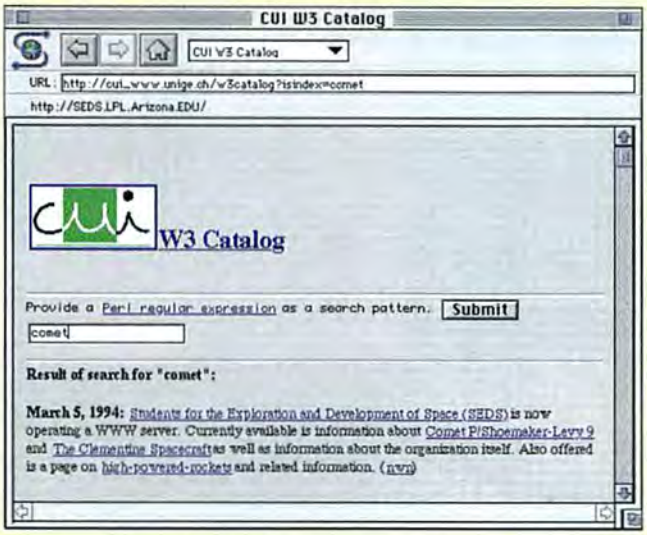
Mosaic was developed as part of a continuing series of projects at the National Center for Supercomputing Applications (NCSA), located at the University of Illinois at Champaign-Urbana. NCSA is a

A Trip to the Cosmos via Mosaic

1 A Good Beginning This screen shows a good place to start a Mosaic exploration—the Internet resource catalog at NCSA. On a Mosaic page, underlined words are pointers to other resources; blue underlining shows places we haven't been, red shows places we have. To jump to the next item, click on *Information By Subject*. In this Internet-surfing exercise, we seek info about the comet that recently hit Jupiter.



2 Library Visit After a 30-second wait, the WWW Virtual Library appears. We just jumped from NCSA, in Illinois, to CERN, the nuclear-research facility in Switzerland. At this page, you could look at the *Astronomy and Astrophysics* link (underlined in blue), but instead we try a full-text search of a database somewhere else by clicking on *Index*, highlighted at the top of the page. (You can see that we've visited this one before because it's underlined in red. The URL at the top shows your location on the WWW; you can save that as a personal hotlist item on your Mac under Mosaic's Navigate menu.)



3 Closing In on Jupiter That click jumps Mosaic to the University of Geneva's Centre Universitaire d'Informatique (CUI) and its WWW index. Fill in the blank with *comet*, press the Submit button, and Mosaic sends the data to the CUI server. CUI searches its index and returns the set of pointers indicated on this screen. From there, you're one click away (*Comet P/Shoemaker-Levy 9*) from your destination.

4 Comet Impact, On Screen This is one of many simulations and actual telephotos available on this subject from the CUI server. From here it's an easy jump to a wide range of other information, including computer animations of the comet's explosions and relevant academic papers about astrophysics. You can also forward your comments and suggestions to the system operators.

research center in the area of computational science, a style of scientific investigation that blends computers (and supercomputers) with more traditional laboratory and theoretical science. In keeping with this charter, NCSA has found itself writing a suite of software tools to help scientists acquire, analyze, and visualize data.

The freeware version of Mosaic is widely available on the Internet (anonymous FTP to ftp.ncsa.uiuc.edu will get you started), with the helper applications ranging from freeware to shareware. By the time you pay the fees and send in the postcards for all the helper applications, you'll be out about $50 and 6MB of disk space. Mosaic isn't just disk-hungry, it's also memory-hungry. Mosaic wants 3MB of memory, and the helpers will take even more. To use Mosaic, you need TCP/IP access. You can obtain this either via *SLIP* (serial line internet protocol) or some more powerful linkage, such as being on a school or workplace net that has a direct Internet connection (see "How to Ride the Internet," *Macworld*, August 1994).

NCSA has licensed Mosaic to Spyglass, which claims that it will "toughen up [Mosaic]" to commercial quality. Spyglass won't sell directly to users, though. It plans to sublicense Mosaic to others. For example, Digital Equipment Corporation has announced that it has bought rights to the Spyglass version of Mosaic and will be including the software with all of its new personal computers. Spyglass expects Macintosh network software vendors to include Mosaic in their commercial products by the beginning of 1995.

Mosaic is already up against committed competition. Microelectronics and Computer Technology Corporation, the Austin, Texas–based technology consortium, has a similar product (MacWeb), which is free to noncommercial users and available via anonymous FTP to ftp.einet.net. The original authors of NCSA Mosaic have also taken off to form their own for-profit enterprise, Mosaic Communications, which hopes to have products available early next year. They have been joined by former Silicon Graphics exec Jim Clark, and should be a formidable player.

The Last Word

The idea of a single interface to the chaos of the Internet is so attractive that users are ready to hail Mosaic as the salvation of the Net. Mosaic is a great first attempt—with a great number of flaws. Mosaic doesn't work with many FTP servers; it has a poor interface to Usenet news; it doesn't allow users to see what they're about to click into.

Even if Mosaic were perfect, the chaos problem remains. A key characteristic of the Internet is anarchy. There are no guidelines or central registries for information services. Because most of the information available on the Internet is the product of volunteer effort, we're left with a mishmash of services, systems, tools, and access methods. For the little corners that are well organized, Mosaic is just one piece in the overall puzzle of the Internet. **m**

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M

FAX OR FICTION?

BY DAVID POGUE

NEED TO SEND OR RECEIVE FAXES WITH YOUR MAC? INTREPID CONSULTANT MAX LEFACQUES OFFERS PRODUCT PICKS AND TIPS.

"I'm Max LeFacques," said the trim, bow-tied little man in the doorway. He offered his hand with a flourish. Terry Trueblood, 25, freelance writer, shook it with a worried look.

"I can't afford another phone line, and I can't afford a fax machine," Terry said. "But I need to fax. Can you help me?"

"I'm a fax consultant, miss," he replied, stepping neatly over the threshold. "It's my job."

Faxing for One

As Max LeFacques has always been fond of saying, in a perfect world there would be no faxes. Everybody would own a Mac and a modem to transmit files to one another, instead of sending only pictures of files—faxes. But in today's real world, LeFacques figured out early on it was up to him to make sense of fax modems, fax software, fax printers, fax switchers, and even fax "answering machines" for his Macintosh-enlightened clients. Like Terry Trueblood.

Max looked around: a basic home office, with a Quadra 605 on the desk, a telephone, a row of power outlets.

"If your faxing needs are light, Miss Trueblood, perhaps you don't really need to do your faxing yourself. You can simply send E-mail to CompuServe or America Online, and for a dollar or two they'll forward it as a fax. No long-distance charges, either."

"Oh no, Max; I want my letterhead to appear on my faxes."

"Ah. Well, even in that case, Miss Trueblood, you don't need a fax machine," he said, briskly unsnapping his immense stainless-steel briefcase. "What you need is a fax modem."

He extracted a silver box the size of a paperback book and connected it to her Mac. "You see, a fax modem receives

ALLEN WALLACE

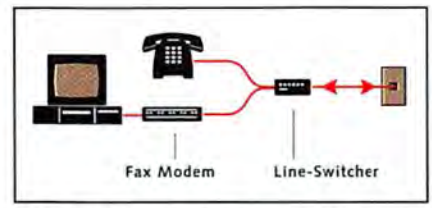
incoming faxes automatically in the background; your Mac will scarcely slow down." He installed the fax software on her Quadra. "When you get a fax, you can read it on the screen, save it, trash it, or print it. No curly fax paper for you, m' dear!

"And sending a fax is just like printing, really. You create a document, issue the fax command, and your fax is on its way. What's more, you can schedule faxes to go when phone rates are lower."

Terry was glad to learn that fax modems start at about $125—real fax machines start at $300. And Max mentioned that faxes sent by fax modem look better than traditional faxes because they're never scanned in by some fax machine's cheap lens.

"Now, many fax modems come with skimpy software, but you're not stuck with what comes in the box. For example, FaxPro for Macintosh ($129; Delrina Corporation, 408/363-2345) can transmit gray shades, such as photos, and can antialias faxes on-screen for easier reading. If you want more information about third-party fax software, I'll fax you David Pogue's *Desktop Critic* column from the October 1994 issue of *Macworld*.

"Meanwhile, this will work beautifully for you," said LeFacques, completing his installation, "though unless you add a scanner you can't fax anything that's already on paper, of course—only documents you create on the Mac."



Fax Solitaire Where a telephone and fax-modem share a single phone line, Radio Shack's Automatic Fax Switch or other line-switcher can distinguish between incoming faxes and voice calls and route them appropriately.

Terry nodded, uncertain. "But I only have one phone line," she said. "Won't I have to unplug this thing every time I want to make a phone call?"

LeFacques reached into his shiny case yet again. This time he extracted a device shaped like a ham-and-cheese sandwich. "Most people use something like this gadget," he said. It was an Automatic Fax Switch from Radio Shack ($79.99; item number 43-1241). LeFacques explained that the switcher intercepts your incoming calls and listens for the presence of those loud, long fax-calling beeps known as CNG (CalliNG) tones; if the switcher doesn't hear them, it assumes a live person is on the line and rings your telephone.

"Unfortunately," LeFacques continued, "some older or cheaper fax machines don't produce CNG tones. The sender must press a Start button when the receiving fax machine answers. So your fax modem won't answer until the switcher hears CNG tones—and the sending fax machine won't send the CNG tones until it's connected to a fax machine!" The same drawback, he told her, applies to Silent Answer, a built-in voice/fax switcher in such PSI or Supra fax modems as the SupraFaxModem 144LC ($169.95; 503/967-2410). Silent Answer eliminates the need for an additional gadget, but it does not recognize non-CNG fax machines.

"The alternative," he said, holding up a second sandwich-size box, "is this." It was the DLE-300 Fax Switch ($120; TT Systems, 914/968-2100). "This listens for calling tones, too, but it starts listening *after* you or your answering machine picks up the phone. If it hears CNG tones, it switches the call to the fax modem. If some old fax machine calls and doesn't make CNG tones, you'll answer the phone and hear silence. At that point, either you or the sender can dial 1#1, and the DLE-300 will route the call to your fax machine.

"This setup will work like a charm," he said, standing smartly. "Just remember to include the instruction 'Press 1#1 to send a fax' on your answering-machine message."

Terry Trueblood shook his hand gratefully. "Oh, thank you, Consultant LeFacques! Are you going to leave me an invoice?"

FIVE FAX TRIX

The world is filled with fax devices: Class 1, Class 2; Group II, Group III; manual, automatic; fax modems, stand-alone fax machines. But it is possible to get your Mac to work with all of them. Here are some tips on making faxing less taxing.

1. The GeoPort. If you have a Macintosh Quadra AV or a Power Mac model with an Apple GeoPort Adapter ($129; 408/996-1010), which is supposed to take the place of a fax modem, you probably already know that the Adapter can be a problem. Get the latest version of its software—Express Modem version 1.5 or later, which takes care of the bugs—and make sure that you get the correct version for your computer. The Quadra AV, Power Mac, and PowerBook series each use different versions.

2. Power Mac problems. The Power Mac's modem port has some problems. The one you hear most often mentioned is the "latency" problem: when receiving a fax, the port delays communication so long that the sending fax machine gives up and disconnects. Solution: Try connecting the GeoPort Adapter or fax modem to the printer port instead of the modem port. Or use fax software that solves the problem, such as version 1.5.1 or later of Delrina's FaxPro.

3. Unreliable faxing and system freezes. Fax software is temperamental, and more so when confronted with other fussy software, especially system extensions. You can use a program like Conflict Catcher II to figure out which extension doesn't like your fax software. Meanwhile, here's a head start. Get rid of out-of-date copies of Adobe Type Manager, Symantec's Suitcase, and Berkeley Systems' After Dark. Make sure you have only one company's fax software installed.

4. EPS graphics. If you try to fax a document that contains a PostScript or EPS graphic image, you'll get a blobby mess or nothing at all. Here are four solutions: (a) make a printout and fax it; (b) get a PostScript fax card for your laser printer; (c) import the graphic into a draw program, save it as a PICT file, and fax that; or (d) use T-Script ($145; TeleTypsetting, 617/734-9700) to convert the document into a TIFF file, which will fax.

5. QuarkXPress 3.3. Faxing from QuarkXPress 3.3 is rarely successful, even with no embedded EPS files. While Quark is developing a bug-fix, here's a workaround. Choose your printer, issue the Print command, and then cancel the print job. Now select your fax modem in the Chooser and try again. It should work this time.

LeFacques stood in the doorway, his fedora at a rakish angle. "I'll fax it to you, miss," he said, and then he was gone.

The Network Fax Story

The consultant's next stop was at a small office. Harvey Fiddler, the nervous, teapot-shaped network administrator, was nearly hysterical. "I got ten people on this network, OK? So I buy ten fax modems—we're talking 1500 bucks, OK? And guess what? They don't work on our PBX phone system! So now we gotta install a standard, non-PBX phone line for every desk—another $2000, plus $350 a month. Help us, fax man!"

"I hope you kept the empty boxes," LeFacques said sternly, tugging at his bow tie. "You'll have to return the modems."

He rummaged briefly in his big stainless-steel briefcase. "Here you go, Mr. Fiddler," he said. He handed Harvey a OneWorld Fax server ($999 for one-line model; Global Village Communication, 415/390-8200). "Plug this into your network and install the software on all ten Macs. Then everybody can send faxes at once; this little gadget oversees sending them in the proper order. And it doesn't require a dedicated Mac. It's simple to set up, too."

Harvey Fiddler looked at the gadget suspiciously. "Does it receive faxes?"

"No, I'm afraid not," said LeFacques. Fiddler looked uncertain, so LeFacques went on: "OK, well, how about this instead?"

He pulled out a FaxPro II ($550 for software-only version, which supports unlimited users per zone and is compatible with about 50 popular modems; $999 with a 14,400-bps modem; Cypress Research Corporation, 408/752-2700). "It's a genuine network fax system. You install the software on a Mac that's been designated as a server—you could put the server on a Mac that somebody actually uses, but it would slow down a lot whenever a fax goes out. Now everybody can send faxes when it's convenient. The server Mac stores outgoing faxes and feeds them to the phone line in order." (PSI Network is similar and works with most modems; $99 for server software plus $199 for five users or $299 for ten.)

Fiddler looked thoughtful. "And how do we route incoming faxes?"

"FaxPro and PSI Network give you three choices," came the reply. "Faxes can go directly to the printer. They can be stored until an administrator reads them on screen and forwards them. And both products come with OCR software that can read the beginning of the fax and figure out who it's to, although I can't say it works very well."

Fiddler liked it. "We'll set it up to print incoming faxes, and we'll distribute them from there," he said.

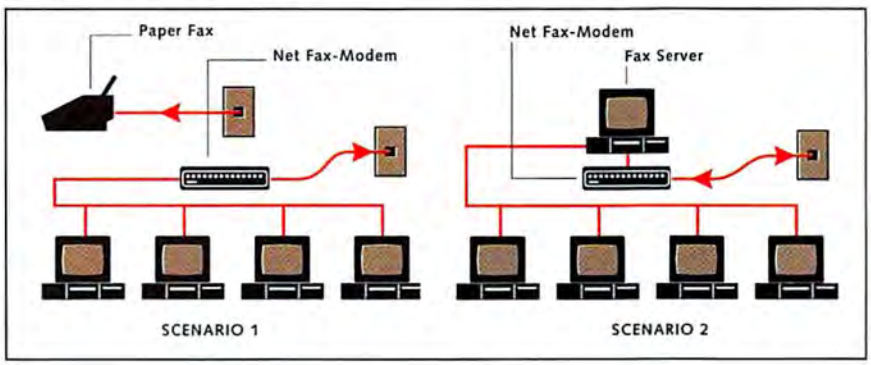
"Fine," said LeFacques. "Just two words of advice. First, be sure your server Mac has every font your staff uses. If you image the faxes on the server, they'll look terrible without the right fonts available. My second tip: you said you're going to have your incoming faxes print automatically. Send them to a QuickDraw printer, like a StyleWriter—they'll print many times faster than they would on a PostScript printer."

"Oh—speaking of PostScript," interjected Fiddler, "our art department is having a terrible time trying to send Adobe Illustrator graphics using a fax modem."

"It's true," said LeFacques. "Fax modems are allergic to PostScript; they usually just send a black square. Or they crash. You need a laser printer with a PostScript fax card, such as Apple's LaserWriter Select 360 PostScript Fax Card or the LaserWriter Pro 810 PostScript Fax Cartridge ($309 each; 408/996-1010). With a PostScript fax card on each end of the call, your artists won't really be sending faxes at all: they'll be sending PostScript files by phone. The images print

LUIS DELGADO

Fax Gizmos Clockwise from upper left: The Global Village OneWorld Fax server, which sends but does not receive faxes, attaches to a network without requiring its own Mac, and you can administer it from a Mac anywhere on the network. TT Systems' Fax Recorder 800 is a self-contained unit with no external software. That may sound like a good idea until you try to program it using its three buttons and observing the results on its two-character display. Macronix's Vomax 2000 can receive and forward voice messages and faxes to designated numbers, or can call to alert you that there are messages and faxes waiting for you.



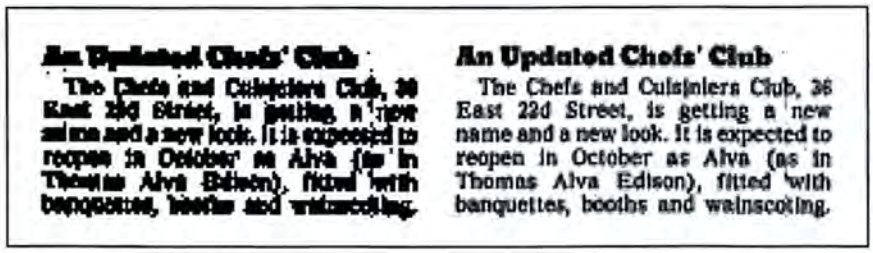
Network Fax Scenario 1: If your office has a standard fax machine for incoming faxes, you can send outgoing faxes with Global Village's OneWorld or another network fax-modem. Scenario 2: If your office needs to receive as well as send paperless faxes and can dedicate a Mac as a server, consider a full-blown fax server such as FaxPro II from Cypress Research.

out at the other end with the full resolution of the recipient's laser printer."

"So we have to have a PostScript card, and the other guys have to have one too?" asked Fiddler.

"For best results, yes," said the consultant. "But you could use one just on this end. The Illustrator files will print only at fax-machine resolution when they arrive, but at least they'll print."

Fiddler thanked him and then scurried off and went to pack up the ten useless fax modems.



On-Screen Faxes Fax software that antialiases a fax image (left), as do Delrina's FaxPro and the Global Village software, makes it so you can actually read your faxes on screen (right).

Have Fax, Will Travel

Max LeFacques's third client of the day was no picnic: Tiny McKee—broad-beamed, six foot five, and in no mood for small talk.

"I'll put it to you straight, Max," Tiny said. "I live my life on planes, and I do my business by fax. But I got a problem." He sat behind his huge walnut desk and paused to light a fat cigar.

"Let me guess, sir," said LeFacques. "When you're on the road, you have no way of reading faxes sent to your office." He reached for his big silver case.

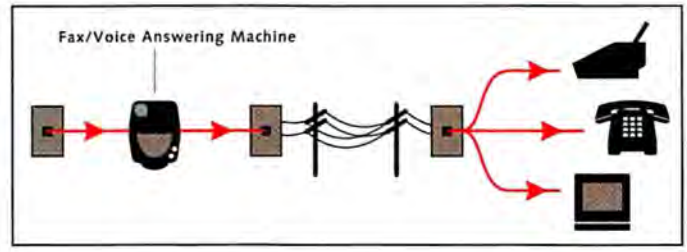
Tiny snapped his fingers. "Bingo."

LeFacques set on Tiny's desk a peculiar, futuristic-looking appliance. It was the Vomax 2000 ($370; Macronix, 408/453-8088). "A marvelous device," he explained. "It's a 14,400-bps fax modem, as well as a digital answering machine for voice and faxes. It can store 20 minutes of phone messages and 50 pages of faxes (for $150 you can quadruple its capacity). You can dial in from the road and retrieve them or have them forwarded to another number. You can even have the Vomax call you, at a number you specify, when messages come in. When somebody answers its call, the Vomax says, 'Please put Tiny McKee on the line; he has messages.' You'll look great at parties."

LeFacques pulled a second, equally odd-looking device out of his case. "Or there's this: the Fax Recorder 800" ($299.95, TT Systems). "This one's just a fax-answering machine—no voice answering. It stores up to 60 pages until you get home, or you can dial in and give it a number where you want faxes forwarded." He patted the box. "Another benefit: if your real fax machine jams or runs out of paper, the Fax Recorder intercepts faxes until you can fix it."

Tiny McKee pushed both gizmos back across the desk. "No good, Max," he said. "Forwarding faxes isn't what I'm after. I want my Mac to turn on automatically so my fax modem answers the call. Then I want to dial in using Apple Remote Access and read my faxes on my PowerBook's screen. Can you swing it?"

LeFacques looked stumped for a split second before reaching into his kit once more. "OK—but first we need this." He held up the inconspicuous, 1-inch PowerKey Remote ($49; Sophisticated Circuits, 206/485-7979). "Turns your Mac on when the phone rings and shuts the Mac off a while later." Since Tiny owned a Power Mac 7100, LeFacques didn't bother mentioning that Mac models with back-panel on/off switches, such as the LC series, most Performas, and Classics, require a PowerKey ($119) in addition to the Remote. Nor did he mention that the Quadra 610 and Power Mac 6100 (as well as PowerBooks) can't be switched on automatically at all, since their power-on buttons must be manually pushed.



Fax en Route The Fax Recorder 800 from TT Systems can receive faxes at your office, then forward them to a previously specified number or a number you call in from the road. Macronix's Vomax 2000 stores and forwards faxes and voice messages.

"That's not gonna work," growled Tiny, his huge hands spread flat on the desktop. "With all my extensions, my Mac takes more than a minute to start up. By the time it's ready to receive, the sending fax machine will have given up."

LeFacques considered this. "Well, most fax machines will attempt to resend if there's no answer. But we could add this." From his pocket he extracted a copy of Conflict Catcher II ($79.95; Casady & Greene, 408/484-9228).

"An extension manager? How's that gonna help?"

"Easy. We create a minimal set of extensions that includes only your fax and ARA software. When you go on a trip, select that fast-loading set to run when the PowerKey Remote turns your Mac on. When you get home, you boot up holding down the hot key you've chosen to reactivate your full set of extensions."

ARA versus Fax

The huge man was impressed but not satisfied. "Nice try, Max. But it's still not gonna work. My fax software will be running in the background, answering every incoming phone call. So when I call in with ARA to look at my faxes, the fax software will intercept the call."

For the first time, Max LeFacques was worried.

"Well, that's true." He rummaged frantically through his silver case while Tiny puffed on his cigar. "That's why they invented LineShare," he announced triumphantly (LineShare [$79; Stalker Software, 415/927-1026] works with Class 2 fax modems, which rules out Global Village modems). "LineShare runs in the background watching your modem port, ready to analyze calls and route them to ARA or your fax-modem software, as appropriate."

"I'm impressed. OK, one more: what if I need to fax something from a site where there's no phone lines?"

"You carry a cellular phone?"

"Of course, fax man."

"Then this Cellular/Data Link will fit the bill," said Max, holding up a gray adapter the size of a Mac mouse ($249; Ora Electronics, 818/772-2700). "It plugs in between your cellular phone's power jack and your modem's phone-line jack."

"You're amazing, LeFacques," said Tiny, leaning back in his chair.

Max LeFacques flipped his hat expertly onto his head. "I know," he said. And with that, he was gone. **m**

Contributing editor DAVID POGUE is the author of *Macs for Dummies* (1992) and *More Macs for Dummies* (1994), and coauthor of *Macworld Mac & Power Mac Secrets*, second edition, 1994 (all published by IDG Books Worldwide).

NOT SINCE YOUR SEVENTH GRADE SEX EDUCATION CLASS HAS LEARNING BEEN THIS MUCH FUN.

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Circle 44 on reader service card

EDITED BY JAMES A. MARTIN

Graphics

THE LATEST IN DESIGN, PUBLISHING, AND PREPRESS

Got a Problem? Get Online

GRAPHIC ARTISTS WHO LIVE AND work outside major metropolitan areas have few opportunities to exchange information, share tips, or keep up with the latest hardware and software releases. With that in mind, a group of artists in the Midwest have launched a national computer network, Regi, specifically for graphics professionals.

At the core of Regi are help documents written by graphics experts for users of QuarkXPress, Adobe Illustrator, and Adobe Photoshop. Subscribers with a technical question can perform keyword searches to locate the document that may contain the solution to their problem (Boolean logic isn't supported, however). After logging on, for instance, a QuarkXPress user with a technical question could click on the Library icon, where the help documents are stored, then click on the QuarkXPress folder. Within that folder would be at least four other folders: XPress FAQ (Frequently Asked Questions), XPress Troubles, XPress Quick Tips, and Glossary. At this level you could perform a keyword search or browse any of the folders directly. If all else fails, you can post a question in Regi's Blackboard forum; a Regi staff member who uses the program you've inquired about will post the answer.

In addition to help documents, Regi offers an online glossary of technical terms and a trade-show calendar. Regi costs $19.95 per year; flat online service fees are 35 cents per minute. There are no local access or toll-free numbers for logging on, however, and currently the network offers no Internet access. Regi supports modem speeds up to 19.2 Kbps. Plans are to add help folders for Aldus PageMaker, Aldus FreeHand, and CorelDraw users; product reviews (written by Regi subscribers); and a classifieds bulletin board. Regi, 309/757-7344.—J.A.M.

KEVIN IRBY

35mm Digital Camera

EASTMAN KODAK HAS ANNOUNCED its latest digital camera—the DCS 460, a single-shot, color, portable device capable of capturing images with up to 6 million pixels. Kodak claims the DCS 460 (with a suggested retail price of $27,995) is the first 35mm single-lens reflex (SLR) digital camera capable of capturing images at such high resolution.

The DCS 460 includes Kodak's digital-camera back affixed to a Nikon N90 SLR camera. The 460 includes a 3060-by-2036-pixel CCD and captures 36-bit color images, which the camera's Photoshop plug-in module resamples into optimized 24-bit image files. A spokesman said, however, that Kodak is working on revising the plug-in so that users can obtain full 36-bit graphics files, for use in applications such as HSC Software's Live Picture; that capability should be available when the DCS 460 ships in early 1995.

Like the recently introduced DCS 420 (see *Graphics* news, September 1994), the new Kodak camera stores images on Type III PCMCIA cards; a 200MB card will hold 33 images, according to Kodak. The camera doesn't ship with a PCMCIA card, however. Shutter speed is one image every 12 seconds after warm-up; unlike many high-resolution RGB cameras, the DCS 460 captures each image in a single shot. A standard SCSI interface links the camera to a Mac. Eastman Kodak, 800/242-2424.—J.A.M.

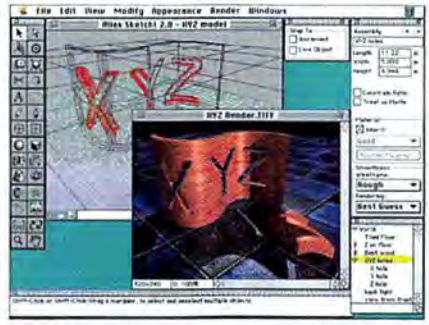
Doing 3-D in a 2-D World

A NEW VERSION OF ALIAS SKETCH offers more than 50 new features and a redesigned interface that lets artists create 3-D objects in an environment that simulates 2-D work methods.

The powerful new pen tool lets you draw perfect arc segments, drag points to create any kind of 3-D shape, and build a 3-D profile from any drawn path. You can also draw on the surface of a 3-D object, such as drawing a label on a bottle; your path automatically conforms to the object's 3-D plane.

You can align and blend objects, and you can join them by drawing a line between them. You can apply a mask to a texture map; you can also use masks to apply transparency, color blends, and bump maps.

Other new features include the ability to render or rerender any part of an image (a major time-saver); lofting/skinning; beveling; cutting holes in curved surfaces; true depth of field; and polygon support for export to animation programs. Sketch supports EPS, PICT, TIFF, DXF, IGES, and RIB formats. Sketch's newly reduced price—$695—includes SketchNet, a distributed rendering application, and RenderQ, a batch processor; upgrades are $199. Alias Research, 416/362-9181.—CATHY ABES



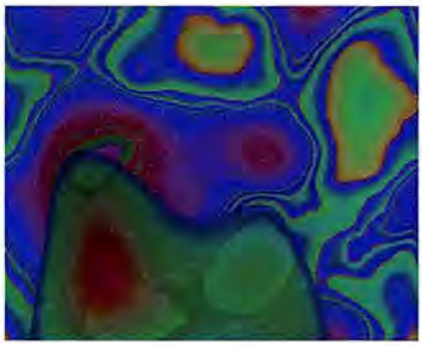
Alias Sketch's curve-on-surface capabilities let you draw directly on curved objects, which can be used as holes or as profiles to loft together.

Better Textures through Genetics

EVERYWHERE YOU LOOK lately there's another program or plug-in that lets you create an endless array of textures for your images. The latest entry, Alien Skin, from Virtus Corporation, adds a few twists to the genre. For one, Alien Skin is both an Adobe Photoshop–style plug-in and a stand-alone application. And unlike Xaos Tools' Terrazzo and Specular International's TextureScape, it works only with the mathematically defined textures (about 500) supplied with the program.

Alien Skin produces scalable resolution-independent texture tiles in RGB or CMYK. To create a new texture, you choose one of the presets, move a slider to set the Mutation rate, and click on the Mutate button. You'll get 12 new tiles, each a variation of the original; you can even "mate" two existing texture tiles.

Alien Skin lets you generate height maps for 3-D textures; it also supports transparency, lighten, and darken modes. The $99 program, optimized for the Power Mac, is due to ship in October. Virtus Corporation, 919/467-9700.
—CATHY ABES



Rain Drop is among the 500-some textures that ship with Virtus Corporation's Alien Skin.

IN BRIEF

■ **Page Layout with GX** SoftPress Systems is developing UniQorn, an object-oriented page-layout program that incorporates QuickDraw GX's type-manipulation and printing features. The program includes automatic trapping controls and is OpenDoc-compatible. The company hopes to release the program by early 1995; specific pricing and availability weren't set at press time. 09 93 882588.

■ **Speedy PostScript Generator** Productive Intelligence is shipping PSExpress, a $249 system extension that works within any page-layout or graphics program to accelerate the generation of PostScript files. It produces low-res mini-EPS files that you automatically replace with high-res versions when your layout is done. A service bureau edition of ten installations and five customer versions costs $1500. 818/541-0231.

◐ **PhotoFlash Forward** Release 2.0 of Apple's PhotoFlash software is fully Power Mac–native, offers new image-cataloging and searching capabilities, and—best of all—retails for $129, down from the previous version's $279 price tag. Upgrades are $39.95. 408/996-1010.

Bitstream's Portable Font Technology

FOR SOMETHING THAT COMES IN A suitcase, Macintosh fonts aren't very portable. Unless the sender and receiver of a digital document have the same fonts, problems will arise. Although several products have tried to tackle the font-portability problem (among them Adobe Acrobat and Farallon's Replica), none have been universally accepted.

Bitstream hopes to change that scenario with TrueDoc, a tool that will allow software developers to add font portability to their applications. TrueDoc, which is platform- and application-independent, consists of three major components: Character Shape Recorder, Portable Font Resource, and Character Shape Player.

Character Shape Recorder reads Type 1 PostScript or TrueType character outlines, curve-fits the character shapes, and generates hints. This information is stored in a compressed format called the Portable Font Resource, which can be attached to a document and sent along with it. When the recipient wants to view the document, Character Shape Player rasterizes the characters, producing a high-fidelity version of the original document.

No Hands Software has licensed the TrueDoc technology for a new release of Common Ground. Rather than imaging fonts at a fixed set of resolutions, as the earlier version did, Common Ground 2.0 allows the user to zoom in and view characters at any resolution. In addition, the new version supports printing at resolutions higher than 300 dpi. Common Ground 2.0 is expected to ship for the Macintosh later this year. Bitstream, 617/497-6222; No Hands Software, 415/802-5800.—ERFERT FENTON

There is nothing like the feeling of losing your data. There is nothing like booting up to find that your twenty-page conference report has burned to a crisp. Or watching a month's worth of virus-infected spreadsheets go up in smoke right before your eyes.

When it happens, a rush of job-security panic begins in your legs and rapidly bolts all the way up to your cerebellum. And the impact of losing all of your hard work affects you in a way you'll certainly never forget.

Data loss. It's one fiery disaster that makes for an awfully bad day.

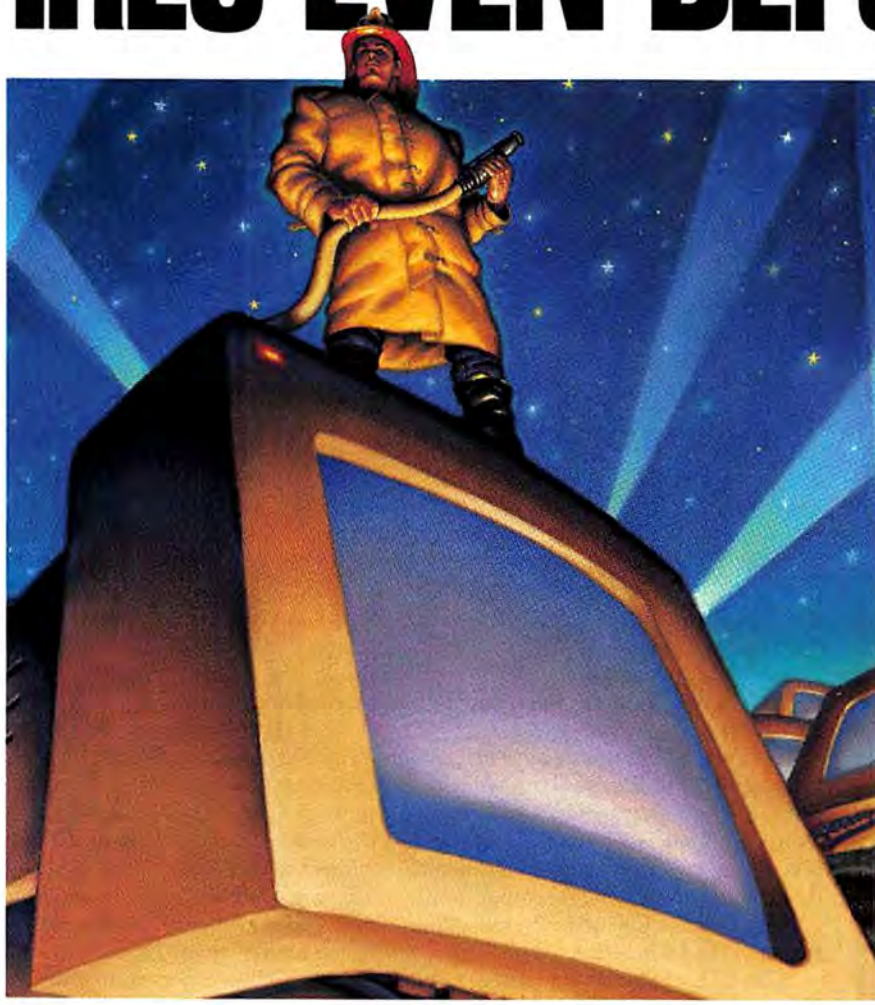
Proactive Protection For Your Macintosh.

This being the way things are, at Symantec we subscribe to the theory that the best way to deal with a disaster is, well, to prevent it in the first place. Which is the very reason for our newly updated Norton Utilities® and SAM.® In a word, they're proactive. But to put it more poetically, this improved data-protection software actually snuffs out fires without so much as the stirring of your mouse.

New Norton Utilities Detects Damage Before Disasters Happen.

For starters, look at our new Norton Utilities 3.0. We've taken the industry's most powerful data recovery and repair program and improved it to where it's almost invisible. So that now you can virtually load it and forget it.

NEW NORTON AND FIRES EVEN BEFORE YOU



The new versions of Norton Utilities and SAM provide proactive protection. Kind of like little firemen running around behind the scenes stamping out fires before they can ever start. So, even if it could've been a ten alarmer, you'll never hear a thing.

The enhanced Filesaver feature proactively and consistently works to maintain your system at premium health by scanning in the background for early signs of trouble. This new agent-oriented technology is a Norton exclusive that personally reminds you when it's time to do basic data maintenance such as backing up or optimizing. In terms you can easily understand. It also automatically monitors your data for up to 500 deleted files so they can be easily recovered.

Once a problem has been detected, Norton Disk Doctor takes over. Improved Disk Doctor recommends a solution and then executes it on your command. It now hunts down, diagnoses, and repairs problems in more areas of the disk than any other software.

*Prices may vary. Shipping, handling and tax extra. This offer not good with other promotional offers. Resellers not eligible. Offer expires 12/31/94. Symantec, Norton Utilities and SAM are U.S.

The enhanced Speed Disk's unique customization feature lets you defragment everything from a whole volume to a selected file.

And Norton Utilities 3.0 now also includes enhanced backup. Which creates self-extracting and self-restoring backups of your data.

This improved capability makes it even easier for you to restore data during emergency situations. And our backup now also supports tape drives.

Peter Norton has always been well ahead of the pack when it comes to desktop data recovery and antivirus protection software.

greatest level of protection against new viruses as they are discovered.

The new SAM also scans for and destroys viruses in more types of compressed files than any other antivirus software can. SAM covers DiskDoubler, Compact Pro, StuffIt, and Now Compress. This ensures your ability to detect and eliminate a virus in any compressed file.

And for all of you who have a healthy appreciation for speed, the means accelerated scanning speed, greater productivity, along with even more transparent protection.

What it shakes out into is that improved Norton 3.0 and SAM 4.0 now provide your Mac with the ultimate available levels of proactive protection against data loss. It's all rather amazing.

Then again, maybe all of these advancements are not so amazing. After all, Symantec is, of course, the proven industry leader when it comes to Mac data repair and recovery and virus protection.

SAM. THEY PUT OUT CAN SMELL THE SMOKE.

NEW SAM PROVIDES THE BEST PROTECTION AGAINST VIRUSES.

However, that's just the half of this proactive pair. We've also fully redesigned SAM 4.0 to provide the most complete and most effective virus protection, detection, and elimination of known and unknown viruses. So that what could turn your entire system into a towering inferno never even becomes a spark.

Accelerated for Power Macintosh

Norton and SAM are accelerated for Power Mac, letting users take full advantage of the speed capability this technology provides.

One of SAM's exclusive features is automatic virus updating. Through your modem, SAM automatically dials the Symantec BBS daily, weekly, or according to any schedule you tell it to follow.

It then downloads the latest virus antidotes and updates your virus definition files. So you now no longer have to mess with manual updating. This assures you have the improved SAM is also the faster SAM. The 4.0 version scans for viruses significantly faster than its predecessor. Which makes virus protection more seamless and less disruptive to your work flow.

Want more? Okay, SAM is also the only virus protection software that allows you to create a custom decontamination disk specific to your machine. This lets you reboot your Mac easily should your system crash from a virus.

The 4.0 version also simplifies the user interface by combining SAM Intercept and Virus Clinic into one easy-to-use component. This advancement allows you to configure more expert options from one convenient location.

POWER MAC NATIVE.

While these new versions will protect your original Mac, they are also Power Mac native. So those of you with a Power Macintosh can take full advantage of the increased processing power. Ultimately, that

So, pick up the entirely new versions of Norton Utilities and SAM. And then, if you smell something burning at the office, you'll know it's either yesterday's coffee or that guy two cubes upwind who's trying to put out his fiery data disaster. That you well know could have been prevented in the first place.

CALL 1-800-628-4777.

To keep data loss from casting a glow on the office landscape, call 1-800-628-4777, ext. 9FF1. If you own Norton Utilities and SAM, you can order upgrades for $39.95 and $29.95 respectively.* Or you can purchase the new versions at your software store.

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Expert Graphics

GRAPHICS PROFESSIONALS SHARE THEIR SECRETS

by Cathy Abes

Artist: Steve Campbell is a San Francisco–based digital artist who has been a prizewinner in the MicroPublishing News/3M Digital Art Contest for the past two years. His work will appear on the Expo '94 CD that accompanies Fractal Design's Painter 3.0, and in *The Painter WOW Book*, to be published by Peachpit Press in spring 1995.

How It Was Done: This image was designed to illustrate this month's feature about the Internet. Since he doesn't have a scanner, Campbell first made a video grab of his rough pencil sketch. After turning it into an EPS file, he placed it in a two-layer Illustrator file, where he built the foundation of the image, defined the areas of color, and created various masks that he would later use in Photoshop. After placing the EPS file on the background layer, he locked the layer and dimmed the placed image so he could trace it on the top layer without accidentally changing it. After drawing the circus performers with the pen tool, Campbell used the Scribble filter to create a ragged-edge effect, while deselecting some areas of the figures so they would retain a clean edge.

Before importing the image into Photoshop, he created three separate masks for the tornado shape. To keep each of the mask files the same size as the original art so they could be composited in Photoshop, he applied a white fill with no stroke to all the paths except the area making up the mask, which was filled with black. Unfilled, stroked paths were stroked with white at the same point size as their color counterparts.

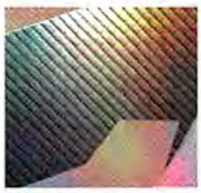
After importing the illustration and its masks into Photoshop, he applied several gradations to define the edges of the tornado and to create a transparent effect over the circus ring. Next he imported the file into Painter, where he defined more masks and applied a number of effects, including several paper textures he'd created, Paint Alchemy textures, Painter's Distorto brush, and the Lighting command to the tornado. m

1 One of the masks Campbell created in Illustrator for the tornado that he later imported into Photoshop (right).

The three mask files imported into Photoshop channels, where they were filled with gradations to define the tornado's boundaries (far right).

2 One of several textures Campbell drew by hand and applied to a section of the tornado for later manipulation in Photoshop.

3 A Paint Alchemy predefined setting, Diagonal Bricks, which Campbell customized by reducing the brick size from 15 to 12 and increasing the density from 11 to 18 percent.



4 After Campbell applied the Image Luminance option of Painter's Apply Surface Texture command and the Lighting command to bring out the brick texture's three-dimensional characteristics.

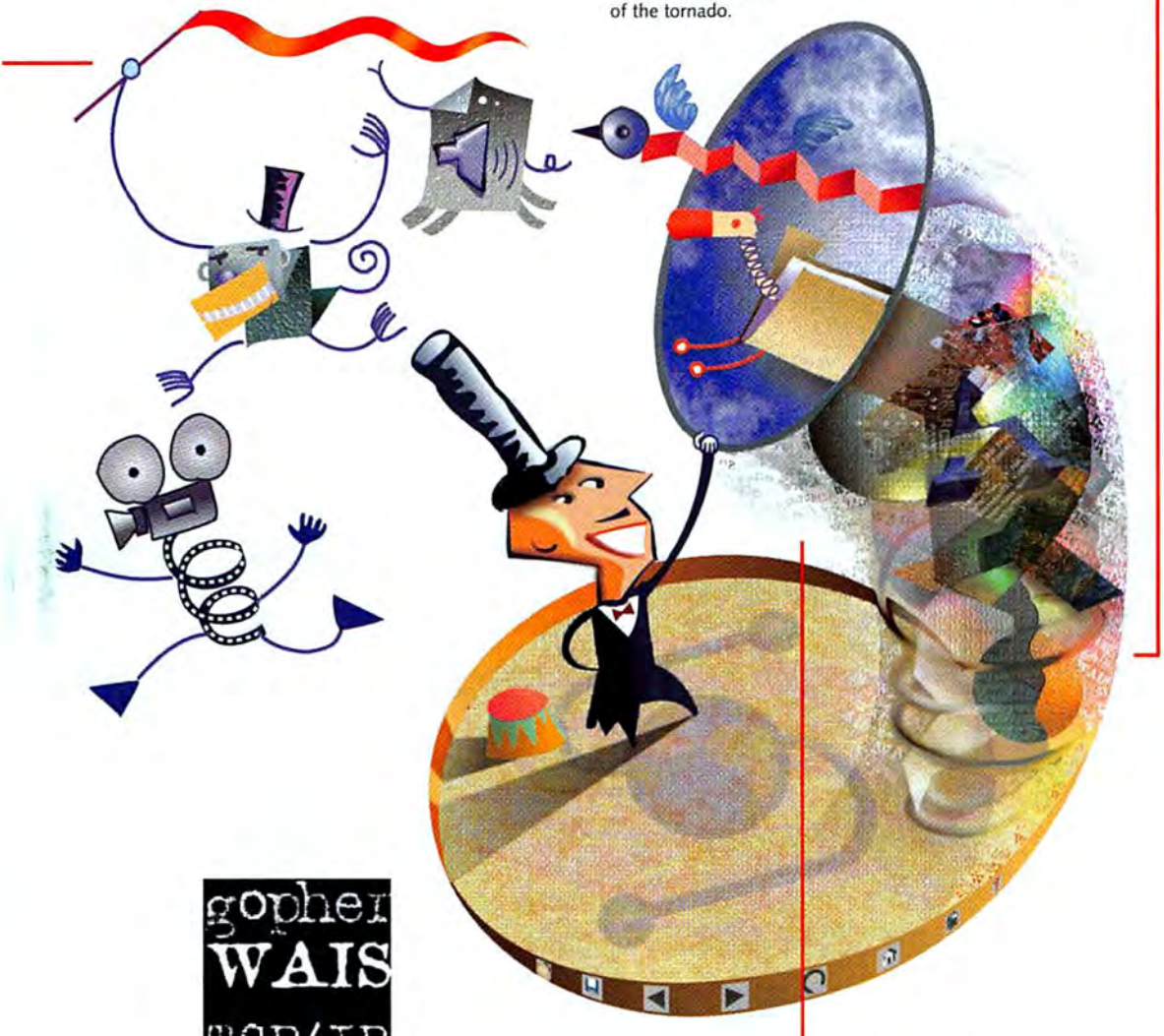
THE TOOLS

Hardware: Macintosh Centris 650 with 36MB of RAM and 80MB internal hard drive; RasterOps 24STV video board; Sony CCD-V101 high-band video camera; Wacom UD-1212 pressure-sensitive tablet; two external 120MB hard drives.

Software: Adobe Illustrator 5.1; Adobe Photoshop 2.5.1; RasterOps Mediagrabber Photoshop Plug-in; Fractal Design Painter 2.0 with Painter X2; Ray Dream Designer 3.0.4; Xaos Tools' Paint Alchemy 1.0; HSC Software's Kai's Power Tools 2.0.

5 Another texture, created from an Eadweard Muybridge photograph, that Campbell applied in Painter as a paper texture to an area of the tornado.

6 To create the whirling smears, Campbell designed a custom variant of Painter's Distorto brush. He reduced the penetration level in the Brush palette to 17 percent; reduced the brush size; made adjustments in the Brush Behavior palette to accommodate the new brush size and maintain a constant stroke; and set Size, Penetration, and Concentration to Pressure in the Expression palette.



7 The custom brush the artist created in Paint Alchemy with Internet-related text using two shareware fonts: Attic Antique by Three Islands Press (for the word *WAIS*) and Harting by David Rakowski (for the words *TCP/IP* and *Gopher*).

8 First he used the brush within areas at the edge of the shape, picking up the colors already incorporated into the artwork.

Next he extended the selection into the white background using Painter's frisket tool and reapplied the same brush using white as the foreground color, while picking up the background color from the artwork.

Pollution Solution.

This symbol identifies energy-efficient computers that save you money and reduce air pollution by "powering down" when not in use.

Over 2000 computers, monitors and printers have earned the right to bear the Environmental Protection Agency's Energy Star℠ logo. These computers are so smart, they go to sleep when not in use and wake up with a simple touch of the keyboard or mouse. Energy Star℠ Computers don't cost any extra, will save money on your energy bill, and prevent pollution from electricity generation. Be part of the solution and look for this logo when you make your next computer purchase. To receive a list of available products call the Energy Star℠ Hotline at 202 775-6650.

Buy It And Save.

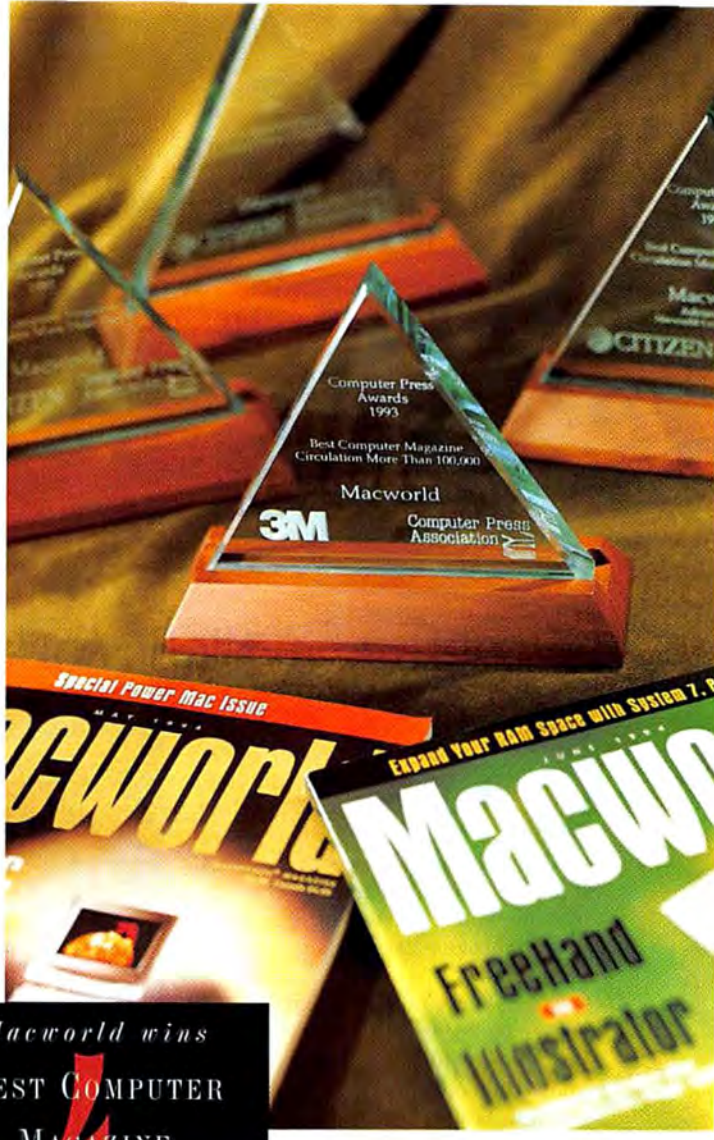
Technology changes

times change

people change

but one thing stays the same

we win.



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Why do we keep winning Best Computer Magazine? The Computer Press Association judges say it's because "Macworld is an outstanding mix of news and service journalism, humor and opinion." It's also because Macworld contains more product reviews than any other monthly Macintosh publication. And the magazine is designed with style—clean layouts and illustrations generated entirely by the Mac.

So, in an industry that changes every second, it's reassuring to know that Macworld continues to be the Best Computer Magazine and the Macintosh authority.

EDITED BY DAN LITTMAN

At Work

THE LATEST TOOLS FOR BUSINESS COMPUTING

Better Help in ClarisWorks 3

CLARIS'S ALL-IN-ONE INTEgrated application, ClarisWorks, is being upgraded to version 3.0. Where Microsoft went for accumulating new capabilities with the recent 4.0 release of its head-to-head competitor, Microsoft Works, Claris is focusing on improving access to its contender's features.

ClarisWorks 3.0's major innovation is what the company calls Claris Assistance Technology, which walks users through certain complex tasks, including creating footnotes, tables, envelopes, and labels; designing newsletters; and making presentations. Claris Assistance Technology will appear later in other Claris applications. The other major innovation in version 3.0 is an open architecture that makes it possible for third-party developers to create ClarisWorks add-ons; for example, the footnotes feature cannot generate a bibliography, but someone could write an add-on that would. ClarisWorks 3.0 should ship in native Power Mac and 680X0 versions in October. The list price will drop to $129 from version 2.0's current $299. Claris, 408/727-8227.—D.L.

GORDON STUDER

Acrobat's New Act

ADOBE ACROBAT IS GETTING A MAjor upgrade that includes permission for users to distribute, with no licensing fee, the Acrobat Reader utility required for viewing Acrobat files. Adobe is also making other changes that suggest a broader marketing strategy for the electronic-document-creation system.

Acrobat 2.0 comes in several versions. Acrobat ($195) includes PDF Writer, the application that creates Acrobat documents, and Acrobat Search, a text-searching add-on based on Verity's Topic engine. Acrobat Pro ($595) adds Acrobat Distiller, which is similar to PDF Writer but can process 24-bit color and PostScript files such as QuarkXPress and Aldus PageMaker documents. Acrobat for Workgroups ($1595) includes a ten-license version of Acrobat. (It also comes with Acrobat Catalog, the program required to index text for Acrobat Search, but Catalog runs only under Windows; networked Macs can send Acrobat files to Catalog on a Windows server.)

In addition, the version 2.0 products can scroll automatically to article jumps; give each person annotating a document a distinctive note style to make the authors easy to identify; and provide password protection to control who is allowed to read, annotate, copy, or print documents.—D.L.

Work Scheduling Made Easy

TIME DOMAIN'S WORKTIME IS NEW software intended to solve a gnarly old problem: scheduling workers. Unlike project-management software, which is used to make sure that the correct human and material resources are designated to keep a project on schedule, WorkTime is designed to establish work routines for shift workers—clerks in retail stores, nurses and doctors on the hospital floor, welders on the assembly line, and so on.

The manager creates profiles for the

employees and tasks with information such as the days a worker prefers to work, the tasks he or she performs best, and whether an employee knows how to operate a particular piece of equipment. The manager can choose parameters for WorkTime to optimize—for example, giving senior employees the best time slots, or keeping the best chefs in the kitchen on Friday and Saturday nights—and WorkTime then either generates a completed schedule or suggests a schedule that the manager can edit interactively.

WorkTime can suggest workers who are available and willing to work to fill a shift. Schedules can be sorted by employee, type of work, and work site.

The program can produce a wall chart listing all the workers' schedules or individual schedules for each employee, archive schedules for reuse, store reminders for long-term planning, and accommodate vacations and other scheduling deviations. WorkTime lists for $249. Time Domain, 301/253-7169.—D.L.

FolderBolt Adds Network Support

KENT MARSH IS UPGRADING FOLDERBolt with control of folders on AppleShare volumes or available through Apple's file sharing. This makes it possible to control access to your documents residing on a colleague's machine or the office server.

Besides completely locking folders against unauthorized access, FolderBolt Pro can create drop folders and read-only folders. FolderBolt Pro also adds the encryption capabilities of Kent Marsh's CryptoMactic, sidestepping federal restrictions on security software exports by making each encryption algorithm a separate, removable module. Foreign developers (or third-party U.S. developers) can add new encryption-algorithm modules to the product. Self-decrypting files can be created and then decrypted overseas without violating restrictions, although the overseas user must somehow be provided with secure access to the correct password.

Multiple copies of FolderBolt Pro can run on one Macintosh, so you might protect work documents with a copy that the system administrator could crack, and protect personal documents with a copy that only you could open. FolderBolt Pro lists for $129.95. Kent Marsh, 713/522-5625.—D.L.

DOUG ROSS

Cash: The Ebb and Flow

EVER WONDER IF YOUR BUSINESS will have the cash to open that new sales office in Miami next quarter, or if you'll be able to meet the monthly payments on your SBA loan? An Excel add-on called BottomLine can help answer such urgent business questions by forecasting cash flow for up to a year.

BottomLine 1.1 runs inside Microsoft Excel 4.0 and can read accounts receivable and accounts payable information from text files, FlexWare accounting databases, and, of course, Excel files. (An upcoming version, slated to ship soon after Excel 5.0 ships, will also read Great Plains and dBase/FoxPro files.) BottomLine prompts you to enter estimates such as when you expect to post receivables and how much bad debt you'll have to write off, and it then projects best-case, most-likely, and worst-case cash-flow scenarios. BottomLine can produce about 25 different reports and graphs that highlight its projections. BottomLine lists for $186 from end-if Software, 916/671-6700.—D.L.

IN BRIEF

■ **Shana Adds Forms Tracking** The only system for electronic-forms creation and distribution that runs entirely on the Mac, Shana's Informed series is getting a new module for ensuring that forms travel to the right stops and get the right sign-offs. Informed Tracker will include a server based on Everyware's Butler; Shana plans to support other SQL databases later. Tracker, which should ship before this goes to press, will cost $495 with server, administration module, and 25 clients; additional clients will be $10 each. The server can be queried for information about workflow bottlenecks and similar situations.

In other forms news, Shana and its Windows competitor Delrina are distributing a free utility that translates forms between Informed modules and Delrina's FormFlow. Shana, 403/463-3330.

4D Broadens Connectivity

ACI US IS EXPANDING THE OPtions available for 4th Dimension users who need to share data with minicomputer databases. 4D Passport and 4D Multi Passport, which replace ACI US's earlier connectivity products, provide tools for developing and deploying links between 4D databases and SQL platforms, including Oracle, Sybase, and DAL-compliant databases.

4D Passport provides tools for creating and managing reusable libraries of code and for documenting programs. 4D Multi Passport lets several developers collaborate on creating a database. It manages object locking and revision control automatically, so programmers don't have to go through checkout and check-in procedures, and it includes a 4D compiler.

4D Passport lists for $6000; 4D Multi Passport lists for $15,000 for three users; users can be added at additional cost. Both packages come with one SQL connection for either Oracle, Sybase, or DAL, and applications created with either version can be distributed to end users with no licensing cost. Both products are available. ACI US, 408/252-4444.—D.L.

Imagine this: Once every 15 seconds someone in the USA buys a new CTX color monitor.

That's a million last year alone – more even than sold under big names like NEC, Sony, IBM and Mitsubishi*.

And that's before the international experts started raving about our bigger, new, high-performance 1765GM and 1785GM 17-inch "green" monitors:

"Best 17-in. monitor" (Monthly PC Magazine, Japan). *"Best overall performance"* (Soft & Micro Magazine, France). *"One of the best monitors...bright, sharp display and excellent colors"* (Windows Magazine, Sept. '94). *"Symbol of Excellence Award"* (CETDC/ Business Week Asia, Taiwan). *"Best Display Products"* (Computex/Byte, Taiwan).

Not only does the larger, flat-square tube give you more display area for Windows,® an ultra-fine .26mm dot pitch and flicker-free 1280 x 1024 at 75Hz resolution bring your graphics to life as never before.

Users thrive on the ergonomic design; anti-glare, anti-reflection, anti-static screens; and its front-mounted, full-featured digital touch-panel.

These new low-radiation (MPR II-compliant) "green" monitors use only five watts of power when "on" but inactive. That's six times better than even the US EPA's own Energy Star guidelines.

So how did we get so big so fast? Simply by giving you more for less. For more information, call your nearest CTX office.

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Circle 38 on reader service card

BY JIM HEID

Working Smart

Secrets of the StyleWriter

APPLE'S STYLEWRITER FAMILY OF INK-jet printers has ably addressed the needs of students, small-business owners, and home-office workers for several years now. Built around compact printing mechanisms made by Canon, the StyleWriter II and the new Color StyleWriter Pro each provides a happy marriage of excellent output quality and economical operation. The StyleWriter II prints 360 dots per inch and sells for approximately $289; the Color StyleWriter Pro has the same resolution and sells for around $629.

The StyleWriters' small size is a big bonus for cramped home offices or dorm rooms, and weighing only 7 pounds and fitting easily in a briefcase, the StyleWriter II even makes a good portable printer. (It doesn't run on batteries, but it is faster and delivers better print quality than the Portable StyleWriter.)

One reason a StyleWriter is cheap and petite is its ink-jet printing mechanism, which is simpler and smaller than laser printer engines. But ink-jet printing brings its own liabilities: ink-jet printers are more finicky about paper than their laser counterparts, and print quality can vary with humidity and temperature.

Another reason StyleWriters are inexpensive is that they're QuickDraw printers, using your Mac's processor and its QuickDraw graphics architecture to image pages. (Most laser printers are PostScript-based and contain their own processor.) This slows performance and interferes with compatibility with some PostScript applications.

In short, living with a StyleWriter means making some compromises in output quality, performance, and compatibility. You can't escape these trade-offs, but you can do a lot to minimize their impact.

Choosing and Using Paper

Ink-jet printing is a messy business. In a StyleWriter II, streams of water-based liquid ink gush from tiny nozzles onto the paper, and paper quality is the factor that most affects output quality. Cheap photocopier bond works well for laser printers, but for ink-jet printing, its coarse fibers soak up the ink before it dries, creating mottled-looking output (see "StyleWriter Output").

You can get better results by using a smooth-surfaced, high-quality laser bond such as Hammermill's Laser Print (800/242-2148). Better still, use paper that's designed for ink-jet printing, such as InkJet Ultra and InkJet Cotton (available from PaperDirect, 800/272-7377). Most computer- and office-supply houses sell similar stocks.

Because of its textured surface and high cotton content, high-quality water-marked bond—the kind of paper often used for corporate letterhead—can deliver disappointing results with StyleWriters. One workaround is to print a business letter on plain stock and then photocopy it onto your letterhead.

When paper is manufactured it is sandwiched between a wire mesh and a felt belt, which gives each side different characteristics. The felt-belt side is smoother than the wire-mesh side and generally yields sharper ink-jet output. But how to tell which side is which? Most manufacturers indicate on the wrapper which side to use for printing. If there is no indication, print some tests and keep track of which side is up—you'll see that one side has a slightly different look.

Thinking about Ink

A StyleWriter II's disposable print head contains about an ounce of ink. Because the ink's pigments are water soluble, StyleWriter output can smear easily before it dries—or after it dries, if it gets wet again. Your pages may not be exposed to raindrops very often, but your envelopes might, so to protect the address on an envelope, cover it with a piece of transparent tape. If you are printing something that will be exposed to moisture, you can improve durability by spraying it with clear artist's fixative, such as Krylon Crystal Clear.

Apple says a StyleWriter II ink cartridge is good for about 500 double-spaced text pages. When the ink is spent, you throw away the cartridge and buy a new one. Or do you? The cartridge's components are good for more than just a few hundred pages, and if you can squeeze more ink into the cartridge, you can also squeeze more pages out of it.

In the StyleWriter's early days, some people used syringes to inject spent cartridges with fountain-pen ink. Things are a bit more civilized now, and several companies sell refill kits. I tested the JetInc kit ($15.99; Bottom Line Distribution, 512/892-4070), which comes with two refills (by comparison, one StyleWriter II ink cartridge sells for about $23).

Refilling is easy, but be careful: on my

continues

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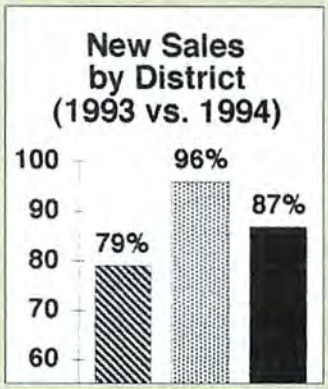
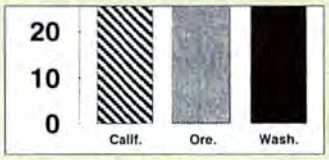
SYTLEWRITER OUTPUT

Because the StyleWriter uses a liquid ink, it relies on good quality paper more than does a laser printer with its dry toner.



Good StyleWriter II output doesn't look half bad, even on porous, low-quality paper.

Better The StyleWriter II produces better output on paper with a harder finish.



Best Laser printers use a finely ground plastic instead of ink, so there are no wrinkles or smearing.

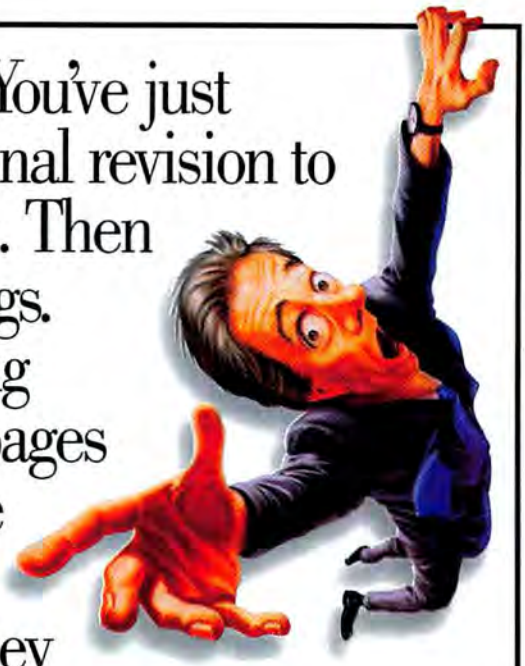
first try I trashed a favorite T-shirt. The first few pages you print with a refilled cartridge will be disappointing, but things improve after a few cartridge cleanings—click on the Print dialog box's Options button and then check the Clean Ink Cartridge Before Printing box. I couldn't distinguish between output created with a fresh cartridge and a refilled one.

But is it worth the trouble? It does cost less, and if you're on a tight budget, the answer is probably yes. But don't think you're doing the environment any favors; a refill kit contains about as much cardboard and plastic waste as a new cartridge does. (Refilling the larger cartridge used by laser printers, on the other hand, does cut down on waste.)

Streaking can occur after the car-

continues

It's 3:50 pm. You've just finished the final revision to the sales plan. Then the phone rings. "We're sending over 10 new pages of competitive info." Click. Good thing they lock the windows on this floor. You have to get it into the plan by the end of the day. What now?



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COLOR STYLEWRITER

The Color StyleWriter Pro is Apple's second ink-jet color printer but its first good one. The Color StyleWriter Pro uses a 360-dpi Canon mechanism with a driver that provides network sharing and excellent color-rendering features.

Here are a few tips to get the most from it.

- A bug in the Color StyleWriter Pro driver affects Macs with more than 32MB of free memory. To work around this, run enough programs that you are left with less than 32MB of RAM free, or use the Memory control panel to create a RAM disk that takes up the right amount of memory. Apple plans to fix this bug in a future release of the driver, but no ship date has been announced.
- To get PostScript output from a Color StyleWriter Pro, use StyleScript ($149; GDT Softworks, 604/291-9121). StyleScript is an actual Adobe PostScript interpreter that GDT has tweaked to work specifically with the Color StyleWriter Pro.
- The Color StyleWriter Pro has an array of indicator lights that illuminate or flash in various patterns when a problem exists. Trouble is, the printer's manual doesn't tell you what each pattern means. I've posted this information in *Macworld*'s forums on eWorld and America Online.

tridge is broken-in, too, when paper dust and fibers clog the ink nozzles. Clean Ink Cartridge Before Printing also prevents clogging. During the cleaning, the StyleWriter II wipes the ink nozzle tips, caps the ink cartridge with a rubber cover, and then pumps a small amount of fresh ink into the nozzles. The entire job takes about 13 seconds.

One final ink tip. Remember my T-shirt? Before transporting a StyleWriter, always remove the ink cartridge and put it in a zip-top plastic bag.

Driver Details

All printers require driver software—files that live in the System Folder's Extensions folder and tell the Mac how to talk to specific printers. It's always a good

continues

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idea to use the latest version of a printer driver. At this writing, the latest driver for the StyleWriter II is 1.2; for the original StyleWriter, it's 7.2.3 (the version number appears in the upper-right corner of the Print dialog box). Both drivers are included with new Macs, and are installed automatically when you use the Easy Install option in System 7's installation utility.

These StyleWriter drivers provide an amalgam of features that Apple calls GrayShare. The *gray* half of GrayShare refers to the drivers' ability to print gray-scale images (such as scans or illustrations). Before printing the final version of a document containing a gray-scale image, be sure the Print dialog box's Gray-scale option is selected. (If you're just proofing the document, it will print faster if you select Black & White.)

The *share* half of GrayShare means that you can make the printer available to other machines on a network. If you're on a LocalTalk network, connect the StyleWriter to your Mac's modem port, since the printer port is used for LocalTalk connections. If you are using Ethernet, you can connect the StyleWriter to the modem or printer port. You then use the Chooser's Setup button to turn printer sharing on (see "Share That StyleWriter").

GrayShare works much like System 7's file sharing. Just as file sharing turns your Mac into a file server, printer sharing turns it into a print server. And just as with file sharing, when someone uses the StyleWriter connected to your Mac, it's your Mac that has to process the file, so you'll notice a big slowdown. That's the price you pay for sharing.

Its light-duty, 2-pages-per-minute mechanism doesn't exactly make a StyleWriter II an ideal workgroup printer. But printer sharing is useful in very small offices and classrooms. In the classroom, you might want to use GrayShare's password-protection feature to

continues

Share That StyleWriter To share an Apple StyleWriter II printer on a network, click on the Setup button in the Chooser to display this dialog box, the Sharing Setup. Then check the Share this Printer box. You can also control access to the printer with a password.

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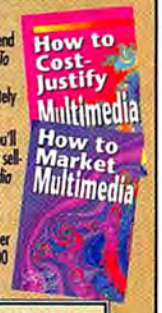

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track or control who uses the printer. Just specify a password in the Chooser's Setup dialog box or check the Keep Log of Printer Usage box.

GrayShare relies on a system extension named Printer Share. With Apple's At Ease program- and document-launching utility installed, you may have trouble sharing a StyleWriter II; be sure you're using Printer Share version 1.1 or later.

PostScript for StyleWriters

The StyleWriter driver does a great job with most documents, but there's one thing that is beyond its reach: PostScript. Try to print an illustration created in a PostScript-oriented program such as Adobe Illustrator, and the PostScript-ignorant StyleWriter driver, in its zeal to print *something*, prints the 72-dpi QuickDraw representation of the illustration.

You can add PostScript support to a StyleWriter with T-Script ($145; Tele-Typesetting Company, 617/734-9700), an application that captures the printing commands of your PostScript applications and translates them into QuickDraw for your StyleWriter (or other non-PostScript machines). Thus, the StyleWriter becomes a bargain PostScript printer—and a proofing device for documents destined for a laser printer or imagesetter.

T-Script can also act as a print server for other Macs on a network. You can use another Mac's Chooser to select the T-Script driver and then print as though you were printing to a LaserWriter. T-Script receives the PostScript instructions over the network and then processes the job.

Is T-Script too good to be true? Not quite: because T-Script makes your Mac crunch the PostScript image (and PostScript requires a lot of crunching), its performance depends on your Mac. I was pleasantly surprised by T-Script's speed on my Quadra 840AV. On a Power Mac, T-Script could yield processing performance comparable to that of a laser printer—T-Script 4.0 runs in native Power Mac mode. However, on slower 68000-family machines, you might want to plan for a coffee (or lunch) break, at least for printing complex images. But hey, what do you expect? You're getting PostScript output from a printer that costs about 5 percent of what Apple's original LaserWriter went for. **m**

Next Month: Making the Finder Efficient

Contributing editor JIM HEID is the author and producer of the third edition of *Macworld Complete Mac Handbook Plus Interactive CD* (1994, IDG Books Worldwide).

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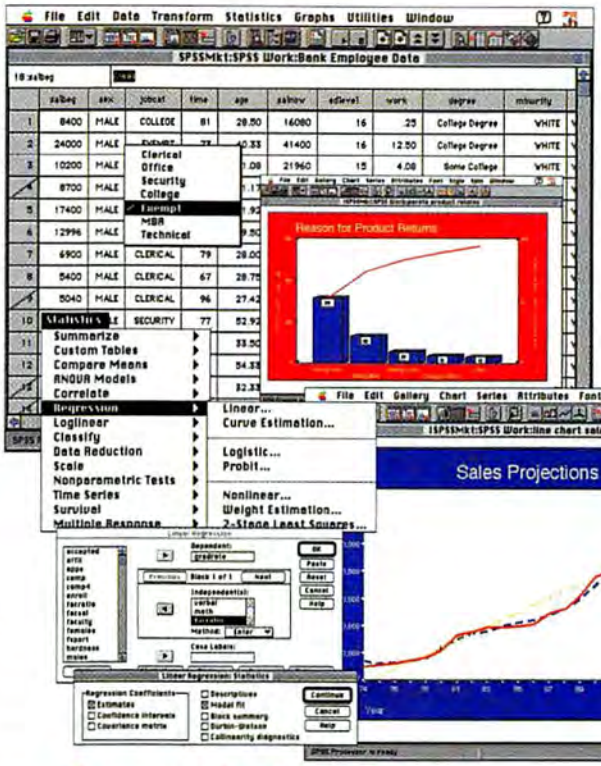

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MacSciTech Resource Center

If you are an engineer or scientist working with computers, you know the importance of up-to-date information — so don't miss the MacSciTech Resource Center, where you can connect with Macintosh users in chemistry, biology, computer science, design/test engineering, physics, mathematics and more!

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MACWORLD Expo/San Francisco; January 4–7, 1995

MACWORLD Expo/San Francisco will cover 400,000 square feet of exhibit space at Moscone Convention Center. When you come to MACWORLD Expo/San Francisco, you'll see uses and applications for the Macintosh in a variety of areas including: Networking, Spreadsheet Analysis, Databases, Education, Research, Word Processing, Accounting, Law, CAD/CAM, Forecasting, Design, Publishing, Illustration, Animation, Music, Programming, Entertainment and Multimedia. Plan to be in San Francisco from January 4-7 and experience the Macintosh at its absolute best!

JAMMIN' ON THE INFORMATION HIGHWAY

Keynote Session: Technology visionary Kai Krause has invited several prominent travelers on the Information Highway to join him in a lively discussion of what this long and winding road might lead us to. Confirmed to date (barring any last-minute demands by the entertainment world) are:

Thomas Dolby
Charles Fleischer
Herbie Hancock
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Todd Rundgren

Pre-Registration Savings!

Now is the time to pre-register for MACWORLD Expo/San Francisco. Return the attached pre-registration form with your payment by December 1, 1994 and save $30 on all Conference sessions* and Exhibits ($120 now vs. $150 at the door). An Exhibits-only admission saves you $15 ($25 now vs. $40 cash only at the door). And since your time is as valuable as your money, we'll send your admission badge early when you pre-register. Avoid the registration crowds and get a jump start on the exhibition!

*MACWORLD Expo conference sessions are on a first-come, first-served basis with no guaranteed seating and are subject to change without notice.

THE CONFERENCE PROGRAM

Tomorrow's Innovations Today

Here's a preview of MACWORLD Expo/San Francisco's 14 separate conference programs, from which you can create your own information-rich agenda:

1. The PowerPC Conference.

Everything there is to know about PowerPC — for users, vendors, and developers — including: new capabilities, features, functions, interfaces; compatibility and performance issues; dazzling new software and works-in-progress; upgrading/what to buy when; optimizing performance; next generation plans; new horizons for developers; and more.

2. The Design Conference.

Celebrated Mac designers share creative insights and power-user tips on: color management; creative imaging; prepress; digital photography; new media; digital art; key designer tools; and more.

3. The Entertainment Conference.

The best in the business present tools and techniques for TV, films, and commercial applications, featuring: interactive cinema; QuickTime movies; digital video; music; innovative effects; virtual reality; broadcast quality graphics; and more.

4. The Connectivity Conference.

Enhance communications, maximize networks, and see what's in store for the future with: cross-platform issues, client/server technology, e-mail connectivity, networking Newtons, TCP/IP, remote network connectivity, network management tools, troubleshooting AppleTalk, and more.

5. The Small Office/Home Office Conference.

Whether you're operating a smaller-size company — or running a business out of your home — or doubling the power of your work environment with a remote office in your home, your needs are different than organizations with hundreds or thousands of employees. See how other Macintosh users in home offices and small businesses are solving the kinds of problems that plague you most.

6. The Science/Technology Conference.

The Mac as a critical tool in laboratory and scientific settings, including tips on visualization using QuickTime, scientific data analysis, and virtual reality.

7. The Programmer/Developer Conference.

For in-house developers, veteran independents, and novice Mac techies alike: how to capitalize on the new world of opportunities in programming for Newton and PowerPC — plus valuable insights on AppleScript, OpenDoc, OLE, AppleSoft Solutions Tools, and more.

8. The Education Conference.

Educators share successful Mac experiences with multimedia, CD-ROM, HyperCard, telecommunications, QuickTime, Internet — and students demo their most outstanding in-school and at-home Mac projects in science, math, social studies, desktop publishing, and more.

9. The How-to-Get-Started Conference.

Learn the basics — of Newton, desktop publishing, telecommunications, on-line services, the Internet, design, multimedia, QuickTime, interactivity, and using CD-ROM (to name but a few).

10. The Advanced User Conference.

Veteran users share their expertise and insider's tricks for the most mileage from your PowerBook, customizing your Mac, resolving system conflicts, maximizing 7.5, and hot new ideas galore.

11. The Special Interest Group Conference.

Looking to compare Mac notes with others? Develop an invaluable "user network." Here you'll find sessions on The Mac in the Law Office, Health Care, Government, and MIS; and the perennial favorite MUSE (MACWORLD Expo User Group Extravaganza).

12. Application Workshops.

Intensive training sessions by MacAcademy on: Beginning Macintosh; Intermediate Macintosh; Advanced Macintosh; Macintosh Fonts; Claris FileMaker Pro; Microsoft Word; Aldus PageMaker; Microsoft Excel.

13. The Multimedia Conference.

Create quality productions and presentations with both high-end and low-end multimedia tools. Share insights from the world's most successful multimedia experts on interactivity, desktop video, animation, interface design, authoring tools — and see the profitable impact in education, museums, and more.

14. The CD-ROM Conference.

Want to publish an entertainment or consumer CD-ROM? Start with the Mac. Learn about building successful titles; developing interactive games; content licensing; document conversion and management; search and retrieval; marketing your CD-ROM; and more.

MACWORLD EXPO SAN FRANCISCO

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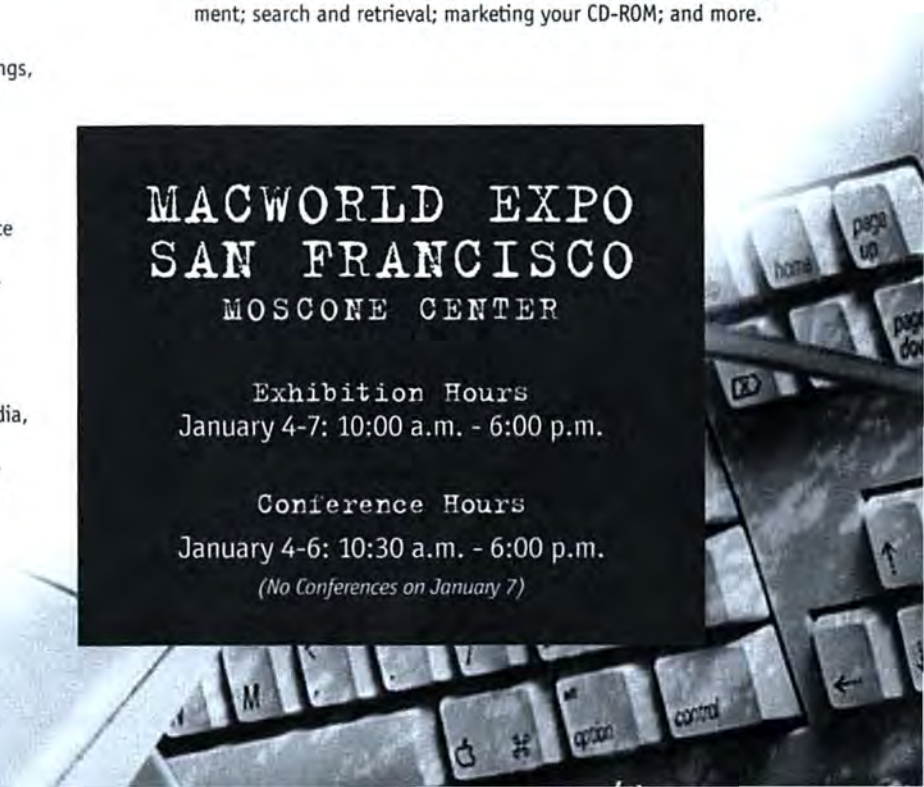
Exhibition Hours
January 4-7: 10:00 a.m. - 6:00 p.m.

Conference Hours
January 4-6: 10:30 a.m. - 6:00 p.m.
(No Conferences on January 7)



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❑ **Package Two $25.**
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I'm an international attendee. Please ship my badge by Federal Express. Enclosed is an additional $45.

Please choose your package and fill out the form completely. **Incomplete forms will be returned.** One form per person; make photocopies for additional people. Registration forms received after December 1 will be returned unprocessed. Purchase orders cannot be accepted. **All registration fees are non-refundable.** A $20 fee will be charged for all returned checks. Send completed forms to:

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U.S. BADGES: Mailed on or around December 16.
INTERNATIONAL BADGES (Including Canadian): Held on-site at the International Pre-registration counter

Badge Pickup hours are:
January 3, 11:00 a.m. - 4:00 p.m.; January 4-7, 9:00 a.m. - 6:00 p.m.

Please send my registration badge and further information to:

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U.S. Attendees.

Badges will be mailed on or about December 16. Be sure to check box indicating where badge should be sent.

International Attendees.

International Badges (including Canadian) will be held for pick-up at the International Pre-registration counter at Moscone Center. Badge Pickup hours are: January 3, 11:00 a.m. - 4:00 p.m.; January 4-7, 9:00 a.m. - 6:00 p.m. For Federal Express service, check the appropriate box on the pre-registration form and add $45 to your pre-registration fee. Fill in your exact street address (no P.O. boxes) and include your telephone number and country code. We will Federal Express your badge directly to you.

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Car Rental Discounts From Alamo.

Alamo Rent a Car has been appointed the official car rental company for MACWORLD Expo/San Francisco and special discounted rates have been extended to attendees. These rates are available one week before and after the meeting dates and include unlimited free mileage. To make reservations call Alamo at 1-800-732-3232 and request group I.D. #382751 and rate code GR. Advance reservations are required.

Hotel Accommodations

Participating hotels in the San Francisco area are offering MACWORLD Expo discounts. To receive the preferred rate, call one of the hotels listed and mention you'll be attending MACWORLD Expo. There are only a limited number of rooms at the preferred rate and they sell-out quickly. Make your reservations by November 30 for the best selections (rates and availability cannot be guaranteed). Prices reflect single and double occupancy. If you are reserving 10 or more rooms, you must supply the hotel with a rooming list and a non-refundable deposit for the first night, no later than November 18.

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Four Seasons Clift Hotel 495 Geary St. at Taylor, San Francisco, CA 94102	$150/160	(415) 775-4700
Grand Hyatt 345 Stockton St., San Francisco, CA 94108	$142/142	(415) 398-1234
Holiday Inn Civic Center 50 Eighth St., San Francisco, CA 94103	$99/114	(415) 626-6103
Holiday Inn Golden Gateway 1500 Van Ness Ave., San Francisco, CA 94109	$69/79	(415) 441-4000
Holiday Inn Union Square 480 Sutter St., San Francisco, CA 94108	$120/120	(415) 398-8900
Hotel Nikko 222 Mason St., San Francisco, CA 94102	$138/154	(415) 394-1111
Hyatt Regency San Francisco 5 Embarcadero Center, San Francisco, CA 94111	$139/169	(415) 788-1234
King George Hotel 334 Mason St., San Francisco, CA 94102-1783	$102/112	(415) 781-5050
Orchard Hotel 562 Sutter Street, San Francisco, CA 94102	$90/95	(415) 433-4434
Parc Lane's Parc Fifty-Five 55 Cyril Magnin St., San Francisco, CA 94102-2865	$125/125	(415) 392-8000
Ramada Hotel at Fisherman's Wharf 590 Bay Street, San Francisco, CA 94133	$90/95	(415) 885-4700
San Francisco Hilton 333 O'Farrell Street, San Francisco, CA 94102	$135/145	(415) 771-1400
San Francisco Marriott 55 Fourth Street. San Francisco, CA 94103	$164/184	(415) 896-1600
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Sir Francis Drake Hotel 450 Powell St., San Francisco, CA 94102	$125/135	(415) 392-7755
Stouffer Stanford Court Hotel 905 California Street, San Francisco, CA 94108	$129/129	(415) 989-3500
Westin St. Francis 335 Powell St., San Francisco, CA 94102	$137/137	(415) 397-7000

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We're committed to ensuring that our physically challenged attendees receive all the services they need to make their visit enjoyable. Call us at 800-945-3313 for details.

Pre-recorded Information.

For pre-recorded information about MACWORLD Expo/San Francisco, call the MACWORLD Expo Information Hotline at 617-361-3941. 24-hours a day, seven days a week.

Early Bird Registration.

Missed the pre-registration date? You can still register before the start of the show! On-site Early Bird Registration is from 11:00 a.m. - 4:00 p.m. on January 3 at the full registration rates of $150 for all Conference Sessions and Exhibits, and $40 (cash only at the door) for Exhibits-only admission.

Take the Shuttle and Enjoy the Free Ride.

Complimentary shuttle service is available from the Cow Palace and Cal Train. Look for specifics in your pre-registration package. Moscone Center is accessible from 80 East, 4th Street Exit; from the Bay Bridge, Fremont Street Exit; and from Golden Gate, Lombard Street Exit. Call 415-974-4000 for detailed directions.

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BY LON POOLE

Quick Tips

Tips, Tricks, and Shortcuts

IF YOU HAVE MORE THAN ONE HARD drive (or a hard drive partitioned into multiple volumes), you have no doubt noticed that an item you save or copy to the desktop is actually stored on the start-up drive (or volume). If you drag this item from the desktop to a folder not on the start-up drive, the Finder does not move the item to the folder, it copies the item there. You invariably end up dragging the original item from the desktop to the Trash—not a big deal but a nuisance nevertheless. Martin Koistinen of Houston, Texas, points out that it takes only a couple of mouse-clicks in a Save dialog box to save a file on any disk or volume you want and have the saved item appear on the desktop. Yes, when you go to the desktop in a Save dialog box (by clicking the Desktop button, for example), System 7 targets the start-up volume for the pending save. But you can target a different volume while keeping the desktop as the destination: first click (don't double-click) the desired volume to select it, and then click the box in which you type the name of the document you're saving. A glance at the upper-right corner of the Save dialog box confirms the target volume.

Koistinen has another maneuver for putting items on the desktop while having them stored on a non–start-up volume. He uses an alias of the non–start-up volume's Desktop Folder. Anything he puts into the alias shows up on the desktop and is stored on the desired non–start-up volume. This maneuver comes in handy for copying items from a CD-ROM or a file server to a non–start-up disk's desktop. Also, opening a Desktop Folder alias located within any folder provides faster access in a Save dialog box than clicking the Desktop button and then clicking a non–start-up volume's name.

Making the Desktop Folder alias is the tricky part of this maneuver, because a volume's Desktop Folder is normally invisible. It is visible on another Mac that shares the volume with System 7's file sharing. So Koistinen connects his Mac with network cables to a borrowed PowerBook and starts File Sharing in his Mac's Sharing Setup control panel. With the PowerBook's Chooser he connects to his Mac using its owner name and password, allowing him to access all volumes on his Mac from the PowerBook. On the PowerBook, he can see and make

aliases of the Desktop Folder icons of his Mac's shared volumes. Back on his Mac, he still cannot see any Desktop Folders, but he can see the aliases he made using the PowerBook. He recommends locking Desktop Folder aliases with the Finder's Get Info command, since he has seen an unlocked Desktop Folder alias inherit the invisibility of its original item. Warning: Clicking the Find Original button in a Desktop Folder alias's Get Info window causes a system crash.

DON BAKER

Persistent Playthrough

Q. My Power Mac 6100/60 plays an audio CD through the Mac's internal speaker if I choose Sound In from the Sound control panel's pop-up menu, click the Options button, set the Input Source option to Internal CD, and check the Playthrough check box. When I restart or shut down the computer, the Input Source reverts to Microphone and the Playthrough option gets turned off. Is there a way to retain my settings?

Shamish P. Patel
Renton, Washington

A. Installing Apple's System Update 3.0 software updates the PowerPC Enabler to version 1.0.1, which makes the Sound control panel retain an Input Source setting of Internal CD through restarts and shutdowns. An Input Source setting of Microphone still persists, and a setting of AV Connector still reverts to Microphone at the next start-up or restart.

If the Sound control panel doesn't retain the Internal CD setting after you install System Update 3.0, then the Sound Preferences file is probably corrupted. To replace it, drag it from the Preferences folder (inside the System Folder) to the Trash, restart, and set the Sound In and other Sound options again.

Macs with DOS Breath

Q. I have a Power Mac 6100 with MacTools 3.0 and SoftWindows. I understand that MacTools will take care of Mac viruses, but what about DOS and Windows viruses? I have been told that

continues

SIGNATURE SNOWFLAKES

You can make unique snowflake designs from signatures. You need a scanner to get your signature into the Mac as a graphic image, and to manipulate the graphic you need a drawing program (other than Adobe Illustrator, which can't manipulate bitmapped graphics). If you don't have a scanner but do have a fax modem, you can send the modem your signature as a graphic image from an ordinary fax machine. Alan J. Engard of Costa Mesa, California (where it never snows), created the snowflakes you see here using the following snow-making procedure:

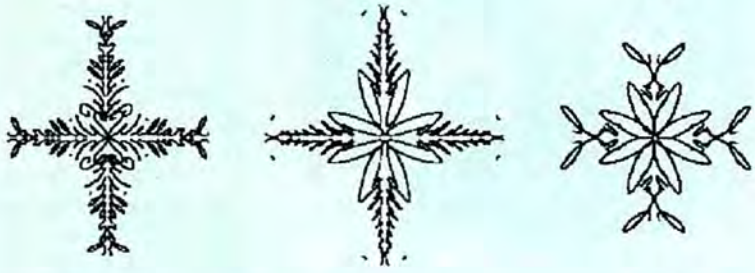
1. Scan or fax just a first or last name (to keep the design compact). Crop the scanned or faxed image to remove unnecessary white space, and save the cropped signature as a PICT file. Open the PICT file with a drawing program, select the signature, and make its fill transparent.

2. Duplicate the signature, flip the duplicate vertically, and align its baseline to the baseline of the original signature.

3. Group the two signatures and make three copies of the group. Flip one copy horizontally, and rotate the other two copies 90 degrees in opposite directions. Move all four signatures together.

4. Experiment with various amounts of overlap in the center. Also, see how it looks having the signature end at the center as opposed to beginning at the center. You'll have almost as many different designs as real snowflakes!

Shara D. R. Dow Irene



Willard Addison Paul

Larry Millie Lance

because SoftWindows is software, I don't need to worry about any viruses in DOS or Windows files; that MacTools will take care of them before they reach SoftWindows. I have also been told I need a separate antivirus utility for DOS and Windows. Which is correct?

Richard Fink
Portland, Oregon

A. SoftWindows creates true DOS files that can become infected with DOS viruses. Only DOS antivirus software can protect against DOS viruses. If you use SoftWindows you probably work in an environment with DOS and Windows computers that have antivirus software; you can and should use the same software with SoftWindows. You don't have to worry, though, about your Mac files catching DOS viruses before you install DOS antivirus software. Viruses are specific to an operating system, so Mac and DOS files can't infect each other.

Macs on the Side

Q. Can I put my Centris 650 on its side without adversely affecting my floppy, hard, and CD-ROM drives?

Jon Masami Kuroda
Los Alamitos, California

A. As long as you don't block any cooling vents or try to use a tray-loading CD-ROM drive vertically, you can probably get away with vertical operation of a Centris 650 or any other Mac with the same case—a IIvx, IIvi, Performa 600, Quadra 650, or Power Mac 7100. Having designed and tested these models only for horizontal use, Apple frowns on—but does not forbid—the vertical position. Certainly floppy disks, hard drives, and caddy-loading CD-ROM drives all work properly on their sides. (All Apple CD-ROM drives sold before March 1994 use caddies. The AppleCD 300i Plus internal drive used in Power Macs and some other Macs sold since then does not use a caddy, and you should not use this drive on its side.)

Warning: Do not operate your Mac in a position that disrupts the airflow through the case or you may damage the computer's internal components. Also, Apple hints that the Mac models listed above may generate more radio and TV interference when operated on their sides. This interference is annoying but not harmful.

Power Mac Virtual Memory

TIP Most native Power Mac software requires less RAM when virtual memory is turned on. For example, turn-

continues

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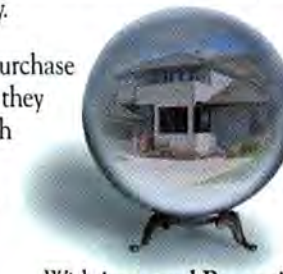

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In fact, we'll do it for you. Introducing Open Sesame!, the world's first intelligent software assistant for the Macintosh. Open Sesame! observes how you work, *learns* your repetitive patterns, and then offers to do them for you. Automatically.

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For example, suppose that every time you start up your Macintosh you immediately open your mail program. Open Sesame! will observe this and offer to do it for you. It will even find more efficient ways for you to use System 7.0, like making aliases and stationery automatically.

Here's what the critics say: "One that knocks my socks off is called Open Sesame! ...the simple fact is that Open Sesame! works smarter for me. It might just herald a new wave in mac smartware. ...The more you use it the better it gets." The Mac Manager, *MacWEEK*

"Macintosh users who like the flexibility of System 7 but tire of "tweaking" their desktop and Apple menu items will appreciate Charles River Analytics Inc.'s Open Sesame!" *INFOWORLD*

Open Sesame! is available at these quality resellers: MacWarehouse 800-255-6227, EGGHEAD 800-EGGHEAD, The Mac Zone 800-248-0800, ComputerWare 800-326-0092.

To order direct, call 1-800-913-3535.
For more information, call 617-491-3474 or fax 617-868-0780.

OPEN SESAME!

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Circle 18 on reader service card

ing on virtual memory reduces the memory size of Claris Impact by 2465K and ClarisWorks by 1233K. The trouble is, system performance suffers whenever virtual memory swaps segments of memory between RAM and disk. To minimize the performance loss, use the Memory control panel to set virtual memory only 1MB higher than built-in memory. For example, if your Power Mac has 16MB of built-in RAM, set virtual memory to 17MB.

Samir J
via eWorld

Color in Directory Dialog Boxes

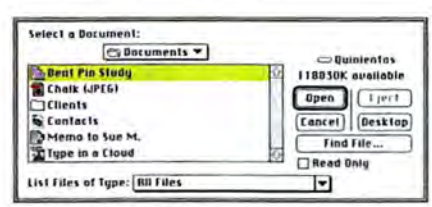
TIP Apple's System Update 3.0 (which is built into System 7.5) adds distinctive icons to directory dialog boxes, as shown in "Icons of Distinction." These icons appear in color in applications that contain a dctb resource for each DLOG resource. With ResEdit you can easily add missing dctb resources to an application that has only black-and-white icons in its directory dialog boxes. Begin by making a copy of the application you want to modify (for example, by pressing the option key while dragging the application's icon to the desktop). Drag the original application to a folder for safekeeping and put the copy where the original was.

In ResEdit, open the copy of the application and then its DLOG resources. You must determine which DLOG resources are for directory dialog boxes. The resources may have helpful names, but most likely you will have to open each DLOG resource and see if it defines a directory dialog box (a disk-related dialog box, such as Open or Save). Write down the resource ID number of each DLOG resource you find for a directory dialog box, then close the DLOG resource windows.

Next use ResEdit's Create New Resource command to create a dctb resource for each ID number you wrote down. When you create a new resource, ResEdit displays a window for it and assigns it an arbitrary ID number. Close the resource window without making any changes in it. Then use the Get Resource Info command to change the new dctb resource's ID number to one of the numbers you wrote down (and have not already assigned to another new dctb resource).

After creating dctb resources to match all directory-dialog DLOG resources, save and close the application in ResEdit. This modified application will now display color (and gray-scale) icons in its Open and Save dialog boxes.

John Feinberg
Middletown, New York



Icons of Distinction After you install System Update 3.0, the dialog boxes you get with Open, Save, and other disk-related commands show the same distinctive icons as the Finder. These icons even appear in color in applications that have the right resources (which you can easily add with ResEdit).

TYPE IN A CLOUD

Here's a quick way to double-outline type with Adobe Illustrator, contributed by Carla Michelini of New York City:

1. Set the type, kern as desired, and choose Create Outlines from the Type menu.

2. Copy the type outlines and then lock the original type outlines with the Lock command. Choose Paste In Back from the Edit menu; use the Paint Style palette to give this pasted copy a heavy stroke (in this example, a 10-point white stroke). To get rounded edges, select the middle setting for the Joins option in the Paint Style palette.

Cloud Nine

3. Copy the modified type outlines and lock them. Choose the Paste In Back command again, and give this pasted copy a stroke that's a contrasting color and a couple of points heavier than the white stroke (for example, a 12-point black stroke).

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. ■

LON POOLE answers readers' questions and selects reader-submitted tips for this monthly column. His latest book is *Macworld System 7.5 Bible*, third edition (IDG Books Worldwide, 1994).

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APC Voted most reliable by 3-to-1
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In a recent poll by PC Magazine's *MagNet, APC was voted the most reliable UPS manufacturer by a 3-to-1 margin. That's dependability that will see you though years of unmatched power protection.*

PC MAGAZINE UK EDITORS' CHOICE

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August 1993
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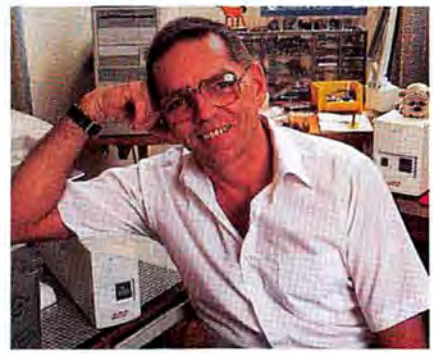
"All other brands of UPS die regularly in this lightning prone environment. My APC won't die!" said Paul Sisilli, Systems Analyst, City of Port St. Lucie . "With other brands, users don't find out until it is too late. The power interruptions here are very hard to live with. The other brands are dying off. Typically they last just beyond their warranty period. My Back-UPS is going on three years...no other brand is as reliable."



Don Truax knows first hand about Back-UPS reliability: "It ought to be against the law to buy a computer without an APC Back-UPS 250. I recently had a direct lightning hit right outside the house...my computer never blinked. Each morning I get a surge down the line and both APC's hate it - they simultaneously 'holler 'n clamp' while my 'Brand T' quietly sleeps in. I've relegated that unit to non-critical household stuff like my VCR."

Andrew Wargo, Manager at Baxter Land Company, tried two other brands before Back-UPS. "One lasted a few days, a second one went up in smoke after 48 hours, a third lasted less than 24 hours! I then bought my Back-UPS for less than half of what I had paid for the others. We've purchased three more Back-UPS and for the past 14 months they've been just hummin' away on the same power line that was eating the other brands alive!"

If you're protecting a network server, a communications interface port (on models Back-UPS 400 and higher) provides the security of an automatic shutdown to all major OS including NetWare, Windows, Windows NT, LAN Server, LAN Manager, LANtastic, SCO Unix, OS/2, Banyan Vines, AppleShare/System7 and more, so your data is safe whether the system is attended or not. (PowerChute software and interface kits sold separately.)

And since data processed on networked clients needs protection too, the $139 Back-UPS 280 provides an economical solution for all your LAN workstations. And if you have a new green PC, the price is even better at $119 for the new Back-UPS 200.

MADE IN

Discovering how essential Back-UPS protection is can be hard...if you wait for the next storm to roll through. But discovering how affordable it has become is easy...

Call today and find out (the easy way) why more than 2,000,000 satisfied users bank on Back-UPS from APC. With more awards than all other brands combined, field-proven reliability, and a two year warranty, Back-UPS are power protection you can purchase with confidence.

Back-UPS (L to R)	Application	Sugg. List
200	Green PCs, small desktop systems	$119
280	Desktop systems, LAN nodes, POS	$139
400	Desktop 486, 386 systems, servers	$229
450	Tower 486, 386 systems, servers	$279
600	Heavily configured systems, CAD/CAM workstations	$399
900	Multiple systems, longer runtime applications	$599
1250	Multiple systems, LAN hubs, small minis, telecom equipment	$799

More than... 2,000,000 Satisfied Users

APC has won more awards for performance and reliability than all other UPS vendors combined...including five consecutive LAN Times *Readers Choice awards...*

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Network-grade ***line conditioning*** *and* ***EMI/RFI filters*** *prevent glitches*

LAN Interface *(on Back-UPS 400 and up) provides automatic shutdown to all major OS: Windows, NT, NetWare, LAN Server, LAN Manager, LANtastic, Unix, OS/2, Vines, AppleShare/System7 and more.*

Site diagnostics *automatically spot missing ground and reversed polarity, two common miswirings which usually require an electrician's visit to diagnose.*

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Dept. D7

Circle 72 on reader service card

EDITED BY ELIZABETH DOUGHERTY

Networks

THE LATEST IN CONNECTIVITY AND COMMUNICATIONS

Router Roundup

IN TODAY'S HETEROGENEOUS WORLD, linking remote sites to each other and helping telecommuters talk to their corporate LANs means carefully choosing remote-access routing equipment. Four companies offer you more to pick from by adding communications features to their routers without adding a lot to the prices.

Cisco Systems' line of high-end remote-access routers called Access Servers let up to 16 remote users dial in to a LAN at high speeds. The Access Servers also let Ethernet and Token Ring users dial out to other offices or the Internet over leased or switched telephone circuits. Behind it all is a powerful new microprocessor that pushes the performance of each asynchronous communications port on the unit to 115.2 Kbps—the top speed of V.34 modems with 4:1 compression. The Access Server supports ARA 2.0, PPP, Novell's IPX, and TCP/IP. The Access Server family, scheduled to ship this fall, is an overhaul of Cisco's 500-CS Communications Server. Priced from $2995 to $5995, the routers come with either 8 or 16 remote-access ports and with 2 WAN ports that operate at speeds up to T1.

Other vendors offer several lower-capacity routers that are also packed with features and priced affordably. Compatible Systems Corporation is shipping its MicroRouter 1000R ($1695), a multiprotocol device that routes AppleTalk, TCP/IP, IPX, and DECnet traffic over PPP. The router has one Ethernet port and one WAN port that you can use for asynchronous (dial-up) operation at up to 115.2 Kbps or configure for synchronous operation at a data rate of 128 Kbps.

A new version of Engage Communications' ExpressRouter ($1795) supports 56-Kbps frame relay and other data traffic, including ISDN at up to T1 speed. Scheduled to ship this fall, the ExpressRouter supports AppleTalk, IPX, TCP/IP, and PPP and accommodates up to three WAN connections.

International Transware is shipping TransTalk MP, the company's first multiprotocol router. The two-port unit ($1799) handles DECnet and TCP/IP, as well as AppleTalk. The company expects to add support for PPP this fall.

Cisco Systems, 408/553-4000; Compatible Systems, 303/444-9532; Engage Communications, 408/688-1021; International Transware, 415/903-2300.

—MARTHA STRIZICH

SNMP Catches On

ON OCTOBER 3, SABER SOFTWARE entered the Macintosh market with its purchase of three TechWorks products. It joins a small but growing list of companies selling Macintosh network-management software that uses the Simple Network Management Protocol. Saber is bundling GraceLAN Network Manager (trouble-shooting software), GraceLAN SNMP (an add-on module), and Update Manager (a software-distribution tool) into one product: Saber LAN Workstation for Macintosh. The SNMP module gathers information over AppleTalk and TCP/IP networks from devices that support SNMP MIB 2, the AppleTalk MIB, and the Macintosh MIB. Saber LAN Workstation costs $199 for the first node and $49 for each additional node. Saber also sells network-management software for DOS, Windows, and NetWare.

Sonic Systems' recently announced LANscape SNMP console software ($799, expected to ship in October) manages MIB 2, AppleTalk MIB, and Repeater 802.3K (hub) MIB devices over AppleTalk or TCP/IP. Saber Software, 214/361-8086. Sonic Systems, 408/736-1900.—CAMERON CROTTY AND E.D.

Simplifying ISDN for Prepress

THE SUPERHIGHWAY PRODUCT LINE from 4-Sight enables communication between ISDN NuBus cards from different vendors. It also speeds up and simplifies file transfers over both ISDN and switched-56 networks. Targeted at the prepress industry, Superhighway Broadcast provides access to multiple ISDN and modem connections. It features a drag-and-drop interface and can send data on eight ISDN channels simultaneously to achieve a transfer rate up to 3MB per minute without compression. Software (for one server and ten users) packaged with a NuBus card costs $3995.

Superhighway iSDN Manager has a file-transfer utility that supports rates of up to 1MB per minute. It can work with other communication software to automatically redirect traffic over an ISDN link. Software packaged with a NuBus card costs $2495. 4-Sight L.C. (formerly CommForce), 515/221-2100.—E.D.

Mac Clients Multiply

WITH THE GROWTH OF CROSS-PLATFORM computer communities, more non-Mac-based network-management systems are reaching out to their Mac brethren by offering them client software.

On the PC side, Symantec recently shipped a Mac client for its Norton Administrator for Networks 1.5, which runs its server software on a Windows PC. The Mac client can inventory Macintosh hardware, software, and System Folder contents. It also can distribute software electronically to Macs. Norton Administrator for Networks 1.5 costs between $44 and $65 per node.

Over in the Unix camp, a Mac client is now available for Remedy Corporation's Action Request System. This Unix-server–based help-desk product tracks trouble reports from users and accumulates problems and solutions in a database that technicians can search by symptom. Software for one server and three support-personnel workstations costs $6500; an unlimited number of end users can install the system's client to submit problems or query the database. MacTCP must be installed on each client Mac.

For centralized management of TCP/IP services on a cross-platform NetWare network, Firefox has added a Mac client to its Novix software line, which runs on an Intel-based NetWare server. Prices for Novix for Macintosh 1.0, due to ship in the fourth quarter of 1994, start at $795. Firefox, 408/321-8344; Remedy, 415/903-5200; Symantec, 503/334-6054.—E.D.

BBS's Improve Internet Access

UPGRADES TO THREE BULLETIN board–management programs add more-sophisticated Internet connectivity options, among other improvements.

ResNova is adding HyperText Markup Language (HTML) support to its NovaLink software so users can browse the Internet's World Wide Web with an interface similar to Mosaic's. The upgrade, expected to ship by year end, doesn't require a direct Internet connection. Pricing wasn't set at press time.

Spider Island's TeleFinder bulletin board software now has a Unix-to-Unix Copy Program (UUCP) gateway that translates TeleFinder messages to Internet format, so users can exchange mail over the Internet. NetConnect TCP software turns a TeleFinder server into a TCP/IP host, allowing users to connect directly to the Internet or other TCP/IP-based networks. NetConnect TCP server software costs $295. The client comes bundled with TeleFinder Group Host Edition 3.5, which costs $425 and is expected to ship in October.

SoftArc has released an upgrade that beefs up its FirstClass bulletin board's support for TCP/IP. The enhanced FirstClass server ($995) can accommodate users in AppleTalk, IPX, terminal-emulation, and TCP/IP environments. The client software is free.

ResNova, 714/379-9000; Spider Island, 714/669-9260; SoftArc, 905/415-7000.—MARTHA STRIZICH

ROB DUDLEY

IN BRIEF

■ **Hubbub at Apple** Almost every company that sells network hardware offers a 10BaseT hub, so why not Apple Computer? The Apple Ethernet 10T/5 Workgroup ($149) fills that gap in Apple's product line. The five-port hub (one AAUI and four RJ-45 connectors) is scheduled to ship October 15. 408/862-3385.

■ **Chatter Reduction** LessTalk, a system extension from Information Presentation Technologies, reduces AppleTalk chatter by allowing a user to configure the time interval between a workstation's queries about the status of mounted volumes. (AppleTalk's default setting is every 10 seconds, which adds up to a lot of traffic, especially on big networks.) It costs $995 for 100 users. 805/541-3000.

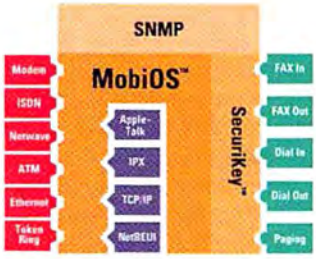
■ **Power Backup** Cheyenne's Power Mac version of its network-backup software, ARCserve for Macintosh 1.1, adds support for changers and performs virus prescans. It's scheduled to ship by the end of 1994 and costs $245 for 5 users and $495 for 20 users. 516/484-5110.

The Wireless Ethernet Wave

DIGITAL OCEAN'S SECOND WAVE OF network products give Macintoshes wireless access to Ethernet networks. The company's first-generation Grouper products used LocalTalk. Scheduled to ship in November, the Starfish I wireless access point ($1850) and its companion Manta wireless adapter ($799) both use spread-spectrum radio-frequency wireless technology.

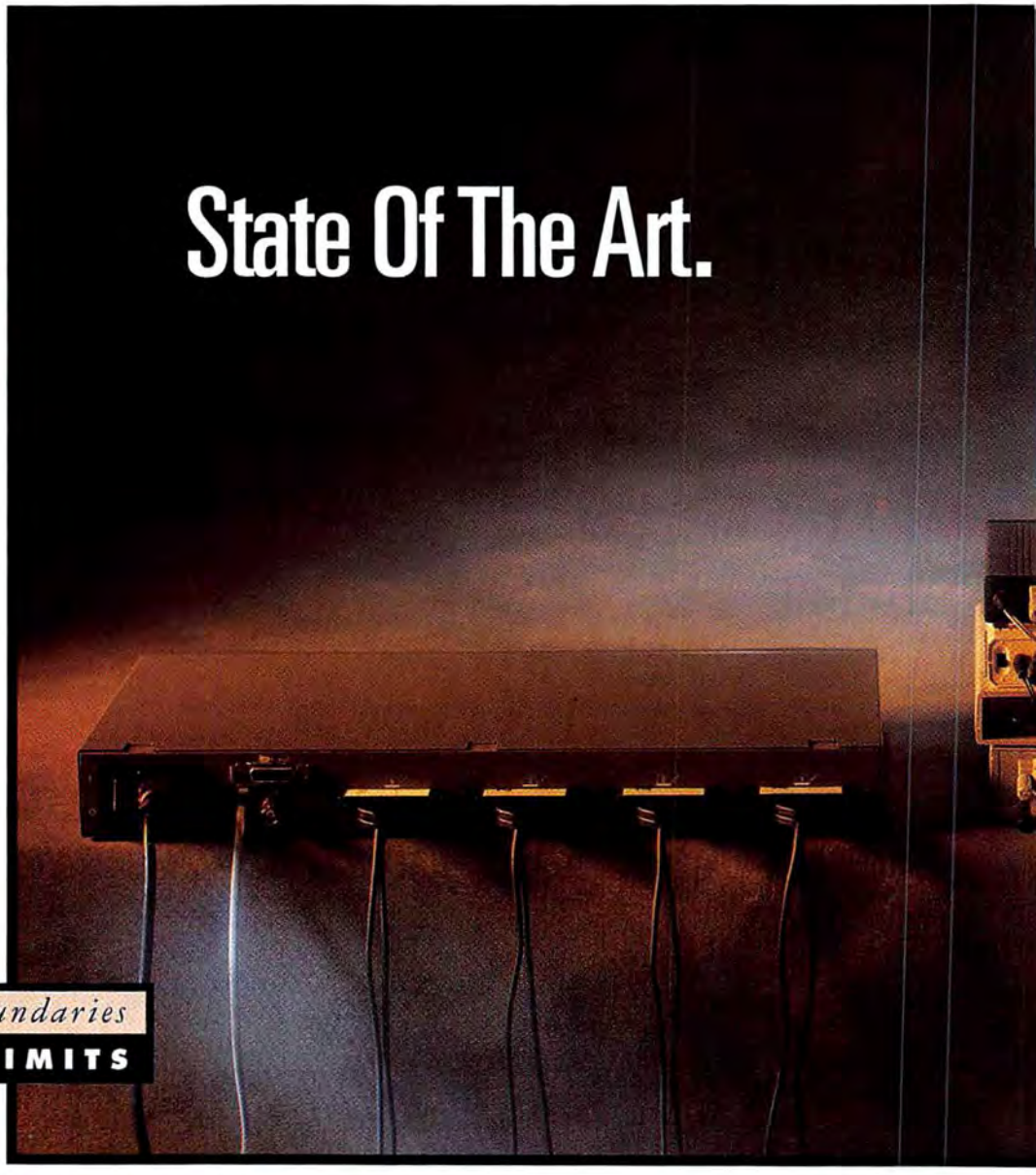
Designed to mount on the wall of a wiring closet, the Starfish I connects to an Ethernet network running AppleTalk via an RJ-45 or AUI port. It provides Ethernet access for up to 16 Macs or peripherals equipped with one of the company's Manta (Ethernet) or Grouper (LocalTalk) adapters, across distances up to 800 feet. The Manta connects to an AAUI port. To communicate with the Starfish I, a Grouper requires a firmware upgrade, available free. Digital Ocean, 913/888-3380.—NANCY E. DUNN

After This, You'll Think Of Remote Access Servers In One Of Two Ways.



DaynaLINK for ARA is a mobile networking platform built on Dayna's multi-tasking MobiOS operating system, allowing all industry protocols and services to be added with PCMCIA-based software modules. Each module can be independently managed via SNMP, and SecuriKey security software lets you control access to available services.

State Of The Art.



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DAYNALINK'S ADVANTAGES: *PCMCIA Type II and Type III compatibility, hot swappable data links, high performance RISC-based processing, trouble-shooting light panel and Dayna's Two-Year Warranty and 24-Hour Replacement Program.*

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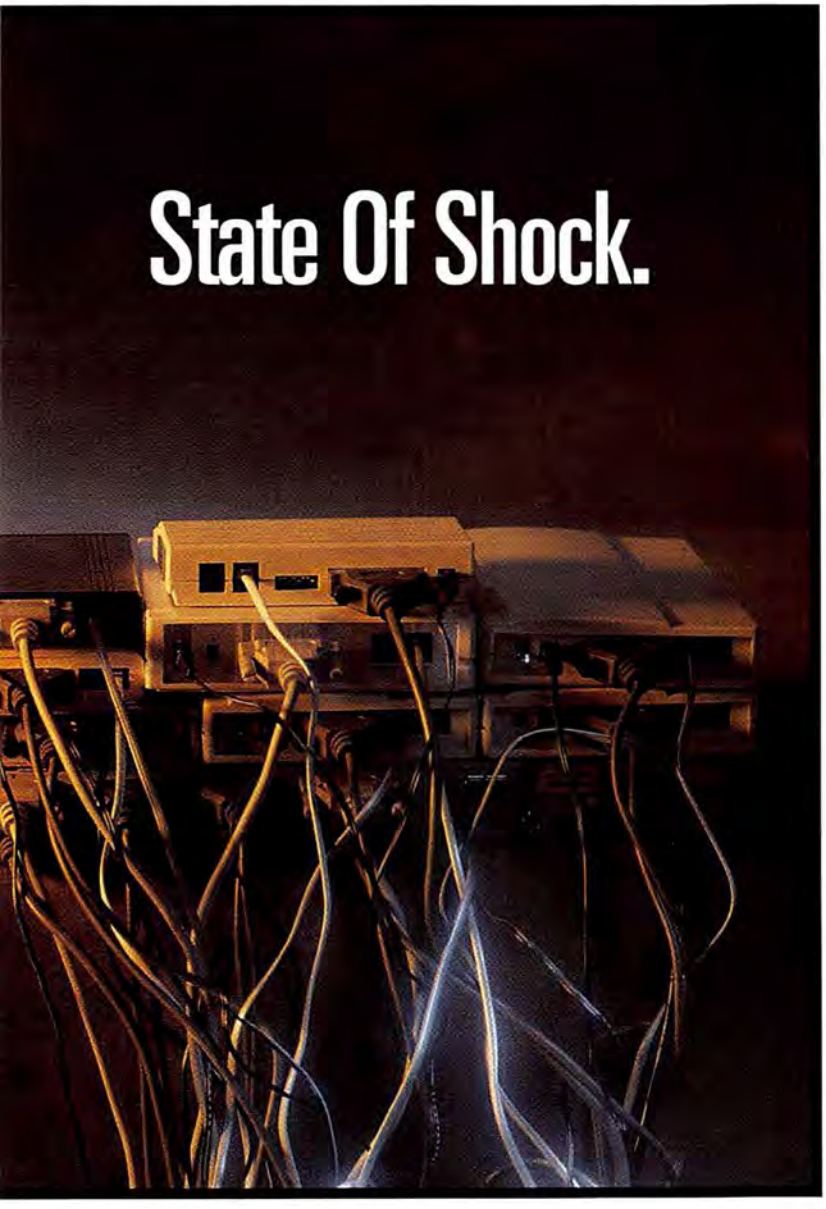
The First PCMCIA-Based Mobile Access Server.

A remote access server that uses PCMCIA technology is a pretty startling innovation. Especially when you realize it helps you avoid the rat's nest of cords that come with external modem servers. Not to mention the inflexibility of those with proprietary internal modems.



But if you think simplifying dial-in remote access is all there is to DaynaLINK for ARA, you're in for a bigger surprise. This patented technological breakthrough utilizes the multi-tasking MobiOS™ operating system, which will soon let you add such protocols as TCP/IP, IPX and NetBEUI, as well as services like dial out, fax in, fax out, paging, and both local and wide area wireless access. All as easily as popping in a PCMCIA card.

Which is precisely why we call DaynaLINK a Mobile Access Server. Any remote access server can give you dial-up network access once your mobile users finally find a place to connect. But only DaynaLINK is designed to cover you down the road by supporting cordless and cellular wireless networking. Now that's what we call mobile access.

Consider the added value SecuriKey™ security software provides, and the new DaynaLINK Mobile Access Server will leave you feeling rather comfortable about your network's future. Instead of shocked.

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FAX Response: 801-269-7340, Doc.#3000

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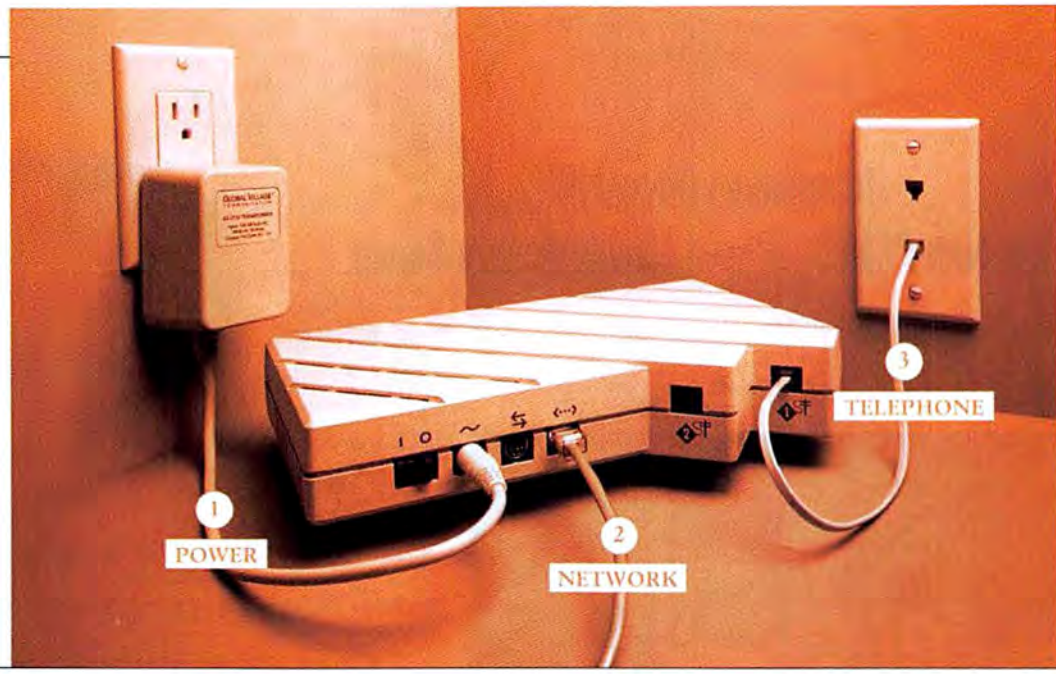
Circle 161 on reader service card



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Setting up OneWorld Fax is just as easy. It's completely plug-and-play, because all the hardware (even a 68302 processor), software, modems, and network connections are integrated. And unlike typical fax servers, you won't even need an additional Mac.

Managing the OneWorld Fax server is (surprise, surprise) easy, too. Its OneWorld Manager administration software lets you customize the server from any Mac on the network. And gives you a detailed log to track usage. OneWorld Fax lets you grow, too. Making it easy (there it is again) to add new communications capabilities by upgrading the software, exchanging modems, and adding memory.

So what, you may ask, will all this convenience wind up costing me?

Truth is, it can actually save you money. To find out how much, call us at 1-800-736-4821, ext. 2448, and we'll send you a free demonstration disk with a customizable fax-savings analysis. Making OneWorld Fax every bit as easy to justify as it is to install and use.

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BY CARY LU

PowerBook Notes

The Wireless Office

THE POWERBOOK LETS YOU COMPUTE nearly anywhere without wires—until you need to print or share files. A premises-wireless system replaces network wiring with infrared beams or radio waves. Freed from the network cable, you can move about with your PowerBook and still access all network services.

Infrared Systems

The Cooperative Adapter from Photonics Corporation (408/955-7930, 800/628-3033) works with infrared beams. This $349 transceiver for a PowerBook is small and light; it fits in most shirt pockets and all PowerBook carrying cases. The two-part cable attaches to the printer port for the network and to the ADB port with a pass-through connector for power. (See *Reviews* in this issue for more on the Cooperative Adapter.)

The Cooperative Adapter requires no software; you simply plug it in and use it as a LocalTalk connector. To connect to a wired LocalTalk network, set up at least one adapter with a Cooperative Access Point Base ($129 including an AC adapter) as a freestanding LocalTalk node; it needs its own LocalTalk interface adapter (typically a PhoneNet adapter). The Access Point Base also provides power from three AA batteries for a Duo without an ADB port. The Cooperative Adapter runs at full LocalTalk speed and shuts down if your PowerBook goes to sleep.

Normally, you set up the Cooperative's infrared beam to bounce off the ceiling; the beam is strong enough to cover a 25-by-25-foot area in a single room if the ceiling is no higher than 10 feet. A higher or dark-colored ceiling reduces the coverage area. Bright daylight can swamp the infrared; you cannot use the system

in a room with large windows or a skylight, and you can't use it outdoors except at night. Unlike radio systems, the Cooperative Adapter does not fasten onto the PowerBook. When you pick up and go, you may as well disconnect the Cooperative, since it works only within one room. You can extend the coverage over a large room or to additional rooms by connecting multiple Cooperative Access Point Bases with LocalTalk cabling. You can roam at will within the covered area. Photonics makes a $595 PCMCIA version of its infrared transceiver for DOS/Windows laptops; it does not currently support 500-series PowerBooks.

Radio Systems

The Grouper 100LT from Digital Ocean (913/888-3380, 800/345-3474) can operate through walls because it uses radio (915MHz). No license is necessary. Within a typical building with walls, it will work for a few hundred feet in any direction; you can usually go up or down several stories. (Digital Ocean says the range is 800 feet, if unobstructed.) Large metal objects—file cabinets, pipes, safes—can interfere with the signals, but generally you shouldn't have much trouble finding an operating location. The Grouper works fine outdoors as long as you stay close enough to the Grouper you are communicating with, so you can easily work on a patio or in a parking lot.

The $699 Grouper 100LT has its own NiCad battery and comes with a heavy, 28-ounce, AC adapter/charger (the 100LT uses five times the power of the Cooperative). The battery runs for about four hours, longer than a PowerBook's internal battery.

The wedge-shaped Grouper 100LT fastens to the bottom of PowerBook models 140 through 180 with two screws that fit into plastic inserts placed in the PowerBook's screw holes. Some carrying straps for the PowerBook use the same screw holes and are not compatible with the Grouper 100LT. An antenna unit clips onto the wedge; unfortunately, the electrical connection is a separate cable. Yet another cable connects to the printer port. The Grouper works with other PowerBook models, but does not fasten on, so you are pretty much limited to stationary operation.

The Grouper comes with three pieces of software to manage its operations. The software choices are moderately complicated: you have to set operating mode (as a remote unit, a hub, or autoswitching between the two), select the "school"—the Groupers you work with—and deal with battery management. You have to spend some time with the manual to

continues

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Premises-Wireless Products Compared

	Dayna Communications	Digital Ocean	Digital Ocean	Digital Ocean	Photonics Corporation
Product	DaynaComm Serial Roamer	Grouper 100LT*	Grouper 200LT	Manta 500 EN	Cooperative Adapter*
Medium	2.4GHz radio	915MHz radio	915MHz radio	915MHz radio	Infrared
Protocol	Ethernet	LocalTalk	LocalTalk	Ethernet	LocalTalk
Time for 2.5MB folder transfer, Timbuktu Pro	not available	340 sec.	not available	not available	167 sec.
Time for 2.5MB folder transfer, System 7 file sharing	80–90 sec.**	398 sec.	340 sec.**	50–60 sec.**	236 sec.
Weight of remote node	0.6 lb.	1.8 lb.	1.4 lb.	1.4 lb.	0.3 lb.
Traveling weight (includes AC adapter and cables)	1.5 lb.	3.5 lb.	3 lb.	3 lb.	0.3 lb.
Entry price (one base, one remote node)	$2198	$1398	$1398	$2649	$827
Price for additional remote node	$699	$699	$699	$799	$349

*Tested with PowerBook 180 and Mac IIfx as base unit. **Estimate based on vendor's test of beta units.

understand all the choices and learn the icons (check out the dead-fish icon). The Grouper performs at about half to two-thirds the speed of wired LocalTalk or the Cooperative, a definite drawback. You can extend the coverage area with multiple base stations, but you cannot roam freely because you must specify which base station you're connected to. The Grouper's transmitter may produce clicking sounds in nearby audio equipment (not in the Mac's built-in speakers, however).

Metricom (408/399-8200, 800/556-6123) sells its $495 Ricochet modems principally for connection to its regional wireless network, a topic I'll discuss next month. The Ricochet modems—about the size of a cordless phone—can also be used for peer-to peer communication without connecting to Metricom's network. They connect to a computer as modems rather than as a network node; one computer must be running Apple Remote Access (ARA) server software (about $150), and the other connects as a client ($35; included in System 7.5). On the client machine, you enter the server's address rather than a telephone number. Metricom says that a pair of Ricochets can exchange information at the speed of 9600- and 14,400-bps modems. The Ricochets operate in the same frequency band as the Groupers; the Ricochets achieve longer range (Metricom says 1000 to 1500 feet) with slower speed.

Coming Events

The Grouper 100LT represents Digital Ocean's first try at a network radio connection. It will soon be replaced by two smaller 915MHz models—each about the size of a portable CD player—that can attach to the lid of any PowerBook. A $699 LocalTalk model—the Grouper 200LT—has the same performance and features as the Grouper 100LT and connects to the printer port; the $799 Manta 500 EN operates at about one-third the speed of wired Ethernet and connects to the AAUI Ethernet port of a 500-series PowerBook. These new models should overcome some of the 100LT's problems.

The Manta requires the Starfish, Digital Ocean's $1850 base station, to connect to a wired Ethernet network. Besides supporting all Groupers and Mantas, the Starfish will support roaming if you can afford multiple Starfish; roaming software costs an additional $499.

Dayna Communications (801/269-7200) has introduced DaynaComm wireless-network adapters following the forthcoming IEEE 802.11 wireless standard—about one-quarter the speed of wired Ethernet in the 2.4GHz band. Dayna says its units will be upgradable to the finished standard. The $699 DaynaComm Serial Roamer is the size of a fold-up cellular phone and attaches to any PowerBook lid and the serial port. The Roamer uses a cellular phone battery and has a range of about 150 feet, compared with 250 feet or more for the Digital Ocean products. The PCMCIA version, also $699, plugs into a 500-series PowerBook through a PCMCIA adapter. On the wired-network side you'll need the $1499 DaynaComm Network Access Point (more than one for roaming).

Both Digital Ocean and Dayna will offer Newton versions of their products by late this year or early 1995.

Network Security

The radio-based wireless systems pose a potential security problem. Digital Ocean will offer optional DES encryption hardware for its systems. Although the limited coverage of infrared makes it more secure, eavesdropping is certainly possible, so some network security measures may be necessary. All the network-security tools for wired networks work with these wireless networks as well.

Wireless versus Wired

Wireless networking offers tremendous freedom, but that freedom comes at a considerable price. If walk-around mobility isn't absolutely essential, then I think you will be better off installing network ports around your offices, even outdoors if needed. LocalTalk ports are cheap (unless you can't lay down the wire easily); even Ethernet ports and adapters cost less than the cheapest wireless systems (see last month's column). And wired Ethernet is much faster and more reliable than any wireless network. Nevertheless, there are many situations where wireless networking makes sense:

- When the cost of wiring is prohibitive because of concrete or other barriers. Historic buildings that cannot be modified.
- Temporary networks, such as for a team of auditors who travel from site to site, or for a factory floor during equipment installation or testing.
- Warehouses where a PowerBook with a radio adapter can be carried around on a forklift truck.
- Reception areas where a PowerBook can get to a person more easily than the person can get to a desk (such as in a hospital, where it may be difficult to bring a patient to an admission desk).

If you can live with the limited coverage, the Photonics Cooperative infrared system is much cheaper and easier to use than the radio systems, although in most locations, installing LocalTalk cable is much cheaper yet. If you need room-to-room mobility, you'll have to choose one of the expensive radio systems. ■

Next month: wide-area wireless that covers a city or region.

CARY LU is a *Macworld* contributing editor who covers mobile- and remote-computing issues in this monthly column.

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POINTS OF LIGHT FOUNDATION

Ad Council

BY DAVID POGUE

The Desktop Christmas '94

Cheap, choice, cheery under-the-tree treasures

'm dreaming of a gray Christmas,
I love those gifts that match my Mac!
If it's housed in plastic
Then it's fantastic
And I'll plug it in the back.
I'm dreaming of a new scanner,
Printer, and multisync display;
May your Mac still work
New Year's Day—
And may all your Christmas gifts
be gray.

YES, KIDS, IT'S OUR FAVORITE TIME of year: our waistlines get larger, our wallets get thinner, and our SCSI chains get longer. There's been an explosion of interesting, funny, worthwhile Maccessories for gift-giving this year—it won't be just another mouse pad for *your* friends. For the fifth consecutive year, *The Desktop Critic*'s holiday roundup rules are simple: nothing over $100, and nothing buggy, cheesy, or predictable.

Personalized Mouse Pad

I know what you're thinking. After that big puffed-up no-mouse-pads speech, I've got a lot of nerve to lead off with a mouse pad. But listen, this one's different.

The gimmick here is that you send in a photograph, and they make it into a mouse pad ($19.95; VIP Communications, 602/544-4753); they accept PostScript files, too; takes 4 to 6 weeks, or 2 to 3 weeks for a rush charge. If you're wincing, envisioning some piece of clear plastic pathetically Scotch-taped over your Instamatic shot, you can relax: it's a much classier deal. Somehow they actually incorporate the image of your photograph onto the clothy surface of the pad itself. It's not a layer you can peel off; it's bright, clear, resized to fit the 8-by-9½-inch pad, and as twisty and flexible as the foam rubber itself.

This is a truly ingenious gift. It costs about as much as a piece of shareware, but it's unusual and practical, and your recipient will be forced to think of you for eight hours a day. There are probably some really neat psychological implications in rolling and scraping across somebody's face (your spouse? your boss? your in-law?) every day—but I'll leave that to your imagination.

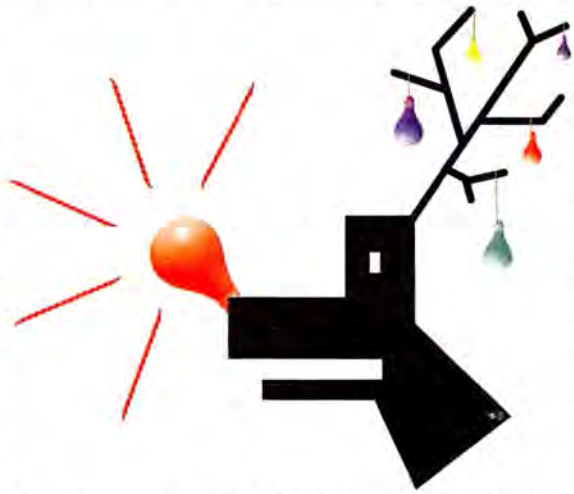
JOHN HERSEY

After Dark: The Simpsons Collection

Guy in my grocery last week: "I think Krusty the Klown symbolizes man's inhumanity to man." My mom: "I've heard it glamorizes juvenile delinquency." My niece: "Why is Marge's hair blue?"

Yep, everybody's talking about TV's "The Simpsons"; if you've never seen this satirical, masterfully scripted spoof of American culture, then it's hopeless for me to try to explain it. Suffice it to say that The Simpsons ScreenSaver will be a big hit with any Simpsons fan and an utter mystery to everybody else ($49.99; Berkeley Systems, 510/540-5535; After Dark control panel included).

A few of the 15 Simpsons modules are inventively infected with the spirit of the actual Simpsons characters. There's Chalkboard, in which a different one of Bart's opening-credits schoolroom punishments is scrawled across your screen each time ("I will not Xerox my butt. . . . I will not Xerox my butt"); Itchy and Scratchy, in which your desktop icons are used as tools of mutilation and death by America's least favorite cartoon-within-a-cartoon characters; and the savagely politically incorrect Grampa's Wisdom, in which the shriveled Grampa does nothing but mutter, Talking Moose–like, periodic utterances like "I'm hungry!" and "Who's got my pills?"



Some of the other modules feature likenesses of the Simpsons but aren't witty in the least. Nonetheless, considering that $48.99 of the program's $49.99 list price probably pays for the licensing of the music, voices, and characters, it's a good deal—and a good deal of fun for Simpsons nuts everywhere.

CD-ROM Caddies

I read a startling statistic: nearly half of all CD-ROM owners never buy another disc beyond the handful that came with their CD-ROM drive. I think I know the reason for this seemingly incredible fact: it's the hassle of using a CD-ROM drive's removable tray.

Last year, Apple, at least, had the merciful insight to retire this flimsy, infernal nuisance. (The ejectable caddy was replaced, in newer drives, by a tray that slides out but remains attached to the drive.) Tough, I guess, for the millions of us who are stuck with the original design.

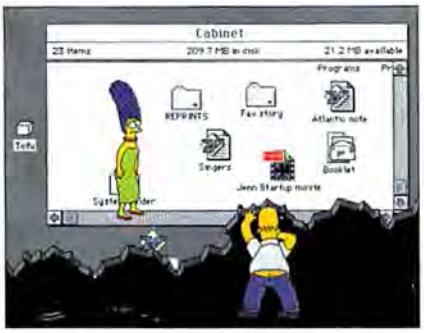
Therefore, buy, say I, a five-pack of CD-ROM caddies (from an Apple dealer; around $50). The lucky recipients will be able to leave their favorite discs nestled permanently in their caddies—one for Myst, one for Encarta, and so on—and just swap the whole enchilada in and out of the drive. This suggestion qualifies for the Perfect Holiday Gift Merit Badge: it's something that will substantially improve the quality of your friends' lives but that they'd never have bought for themselves.

CD3

So what, I can already hear you clamoring, is the ideal gift for the other half of the Mac population—those who *do* buy additional CD-ROMs?

For them, may I suggest the fascinating CD3, a hard, plastic, CD-ROM storage kit ($29.95; CD3 Inc., 512/869-0191). My various friends have described this unique cylindrical cabinet as looking like (1) a headless dachshund, (2) a black, post-

continues



Homer Run If you install The Simpsons Screen Saver, even your desktop is fair game for Homer.

modernist waffle iron, and (3) a 7-inch slice of a large German salami. (Of course, these descriptions may reveal more about my friends than about the CD3.)

Still, the idea is irresistible. You open the CD3 like a lunch box. Into the thinly spaced slots within, you painstakingly lower your 40 favorite discs. Then, into the equally thinly spaced numbered blanks on the CD3's lid, you painstakingly write the name of each disc.

The payoff comes the next day, and for the rest of your life: every time you want a particular CD, you simply slide a pointer along the outside of the unit until it points to the title you want. Open the lid, and—hey presto!—there's your disc, hanging neatly from the open lid (having been plucked by its safe-to-handle outer rim). Slip your finger through the hole, slide the disc into your CD-ROM player's caddy (enough said), and off you go for some compact fun. As you play, you'll know that your entire collection is safe from dust and marauding toddlers, and that the CD3's carrying handle portends portability for parties to come.

SCSI Sentry

As you probably know, there are two schools of thought when it comes to attaching multiple SCSI appliances (scanner, SyQuest drive, CD-ROM drive, and so on) to your Mac.

Method 1: To connect a single SCSI device, a desktop Mac requires a terminator plug; a PowerBook requires two terminators, and a Duo needs none. Each external device must have a unique ID number, usually set with DIP switches on the body of the unit, between 0 and 7 (but excluding 0, which is the internal hard drive, and 7, which is the Mac, and possibly 1, which is used for a built-in CD-ROM drive). The combined cabling must not be longer than 19 feet. If you have a Mac IIfx, Quadra, AV model, or Plus, special exceptions apply to your machine; see your manual.

Method 2: Junk the rules and do what works.

If you, like thousands of others, have found that Method 2 works more often, consider the SCSI Sentry ($99; APS Technologies, 816/483-6100). This thing looks for all the world like a regular terminator plug. It's much smarter, however, automatically turning termination on or off as befits the quirkiness of your particular chain. It apparently does a bunch of other stuff, too: APS literature says it can "regulate power with the monolithic digital IC solution" (really? how interesting) and that it "helps you diagnose problematic transmissions and instantly identify a frozen bus."

Well, shoot. Even *I* can identify a frozen bus—you see 'em in Manhattan every winter. But now you can ignore some rules in the scuzzy world of SCSI.

Label Once Disk Labels

When I want to relabel a floppy disk, I generally just slap another label sticker over the existing one. Trouble is, after a few years of this, some of my disks have so many overlaid labels they look like little bars of Ivory—and they won't fit into the disk drive.

It's hard not to love Label Once disk labels ($12.95 for 50, $8.95 for refills; Multicomp, 915/676-0844; sold through CompUSA, Staples, APS, and similar outlets). You put *one* label on each disk—the only adjustment I'm finding hard to make—and write on it with a permanent magic marker (one's included). When the disk's contents change, you can erase your original writing, using either a standard art-ink eraser (one's included) or rubbing alcohol—and then perform your rite of writing right onto the newly blank label. The scheme works beautifully.

(P.S. I know you're not reading *VHSWorld*, but listen—your lucky giftee might also appreciate a set of Label Once videocassette stickers, too.)

Stealth Stylus II

Who can account for the Newton's failure to dominate the galaxy in its first year on the market? I can. It's because of the chintzy plastic stylus/pen thing you use to write on the hand-held computer's little screen. I'm sure the Newton would have been a smash hit had it come with a more stylish stylus.

That drawback's been withdrawn. The Stealth Stylus II ($17.95; WriteWare, 408/262-6660) looks exactly like a garden-variety ballpoint pen—and, in fact, it is one. But if you click the end cap a second time, the ballpoint retracts and is replaced by a plastic Newton stylus tip! This Jekyll-and-Hyde split personality will make any gadget freak salivate, and it eliminates the debatable inconvenience of carrying around two different pens.

For your further phony-pen pleasure, WriteWare also makes black plastic Newton-ready replacement "cartridges," called S.N.A.P.'s (Stylus Not A Pen), for the expensive pens your Newton-owning friends may already have: Cross, Quill, MontBlanc, Sheaffer, Parker, and so on ($8.95 each). Finally—for the ultimate light packer—there's even a combo pen that includes ballpoint, mechanical pencil, and Newton tip.

Christmas Lights 1.0

Oh, how *cute!* That's all anybody can say about this adorable $19.95 software gem (Atticus Software Corporation, 203/348-6100). It strings up tiny blinking Christmas lights and tree ornaments around the edges of your screen, with your choice of 27 other decorations (holly, hung-up stocking, menorahs) as lightbulbs. If you wish, sweet orchestral carols play from your Mac speaker. All of this merrymaking goes on in the background while you struggle through your year-end finances in Excel. Cute!

One Share of Apple Stock

Who could stifle a gasp of joy upon pushing aside the wrapping paper to reveal a crisp, new, official stock certificate (from your friendly local broker or Charles Schwab–type discount brokerage, about $35)? It's one thing to own the computer; it's quite another to own the *company*. Now your voice can be heard! Vote Spindler out of office . . . or reelect him! Demand satisfaction on that broken ImageWriter! Clamor for better icons on the eWorld start-up screen!

OK, owning one share of Apple is a little like owning one grain of sand on the French Riviera—you do indeed have a voice in Apple Computer's affairs, but it's the voice of a gnat on Neptune. Still, imagine the rush your friends will get from knowing they're in the fast lane, and they can whip open the newspaper every morning to see how their portfolio is doing, and they'll get mailed Apple's annual report, which has a lot of impressive-looking numbers in it and a lot of Mac photos.

And even if that Appleshare doesn't appreciate, you and your friends will clearly appreciate each *other*, and that, after all, is the purpose of this ho-ho-ho whole thing.

Happy hollydays, all. **m**

Contributing editor DAVID POGUE is coauthor of a sterling stocking stuffer: the Macworld Macintosh Secrets 1995 Desk Calendar (Andrews and McMeel), which imparts a tasty trick or tip for every day of the coming year.

This holiday, give the gift of safe computing...

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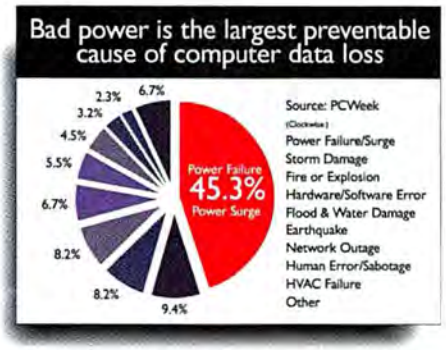

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THE ICONOCLAST

BY STEVEN LEVY

Confessions of a Mosaic Addict

Surfing the World Wide Web

THERE IS A WINDOW IN MY office. Sometimes when I look out the window, the sun is shining. Other times it is dark. For a while the days were long, and now they are getting shorter again. But I don't think too much about days or nights, or anything else outside my window for that matter. I am too busy staring at a 13-inch Apple color monitor that is attached to a PowerBook 180, which is hooked to a modem that is connected to an Internet dial-up server. I am running Mosaic, hanging ten on the data wave, and nothing else seems to matter.

Elsewhere in this issue you can read the facts about Mosaic itself—what it is, how to get it, how to use it (see "Taming the Internet"). I thought about writing the article myself but, really, I'm too busy. Too busy net surfing with Mosaic.

At this moment on my screen is a picture of a half-empty coffeepot in the Trojan Room, a university lounge in Cambridge, England. Someone has rigged a video camera to catch live images of the coffeepot, and all over the world people like me can see how the pot is doing. I monitor this on a daily basis, sometimes three and four times a day. Sometimes the woman whom I have taken as a bride asks me what possible fascination a person could have with the state of a coffeepot in Cambridge, England. She doesn't get it.

"Don't you understand," I tell her, "that Mosaic transports me anywhere in the world? A coffeepot may not be interesting, but the fact that I can go and *see* the coffeepot and view millions of other things at locations in Japan, Norway, and Champaign, Illinois, is very interesting. There's a lot of information in the world—with Mosaic you just swoop down in front of it, like Superman going through a window, and the info is yours.

"Do you want to hear sound bites from Grateful Dead records? Do you need a clue to solve Myst? Are you curious about the airtimes of 'Babylon 5' episodes in Singapore? Need to download the Pretty Good Privacy encryption program? Want to know where Ted Kennedy stands on the crime bill? To subscribe to *Vibe* magazine? Poof! Just link and you're there!"

"I don't want to do any of those things," she says, and leaves the room. I lock the door behind her. She is the Antimosaic and is hereafter banished from my sanctum.

Hot Stuff

The Trojan Room coffeepot, of course, is on my Hot List, the Mosaic menu item that saves the addresses (which are called URL's) of places worth revisiting. I have a very long Hot List—the drop-down menu is too long for the screen. Sometimes friends send me their Hot Lists, and then I have dozens of new places to virtually visit. These lists are as good as letters, really—they provide a snapshot of what my friends are thinking. Oh, I think, seeing one Hot List—this friend has taken an interest in intellectual-property law and has finally gotten into industrial music. You can tell how cool a person is by his or her Hot List. It's the modern equivalent of "Who's your favorite Beatle?"

Maintaining an up-to-date Hot List means monitoring what fascinating new Mosaic sites come onto the World Wide Web (WWW), and it is pretty much a full-time job. The high point of my existence these days comes when the NCSA (National Center for Supercomputing Applications) releases its weekly summary of "What's New with NCSA Mosaic." Last week I learned about the Elvis Presley Home Page ("where The King lives on in cyberspace"), which offers sound clips from The King's music, as well as a tour of Graceland. (I put the Presley site on my Hot List.) And I found a queen, too: from the home page of the Illinois State Fair, I linked to a description of the fair's reigning monarch, Amy Maguire, whose interests include reading, jigsaw puzzles, and dance.

Then I bounced over to a site called Jesuits and the Sciences, where I learned that "Saint Ignatius Loyola considered the acquisition of knowledge and the performance of mundane labor as spiritually profitable tasks, and this fostered in the Society an action-oriented, utilitarian mentality sympathetic to scientific study." Nicely stated. There were some artworks available, but I figured it might take a long time to download them, so I went back to the What's New page and saw that a new WWW site at the Federal Institute of Technology at the University of Lausanne offered text and radio broadcasts of "general information about what's

continues

SCOTT BALDWIN

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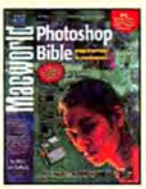

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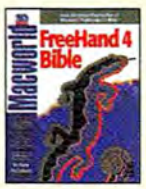

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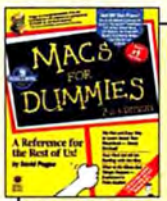

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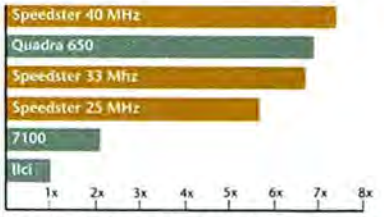

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going on in the universities of western Switzerland." Unfortunately, all of this was in French, a language I don't understand. Still, it was fun going to Switzerland. Sort of the vacation I never took this summer because I was too busy with Mosaic.

Suddenly I had a craving for nature. So I linked over to the Missouri Botanical Garden for a tour. Had I been interested, I could have linked to other biological Web sites or perused a database of more than 600,000 taxonomic entries. But instead, I linked my way to the home page of a musical group called Violet Arcana, whose music was described as "ethereal, dreamy, organic, moody, ambient, melodic, contemplative soundscapes for the surreal music listener." I pressed a button, and my computer received a short music clip that seemed more ambient than melodic. But I was happy to hear it.

This is what my days are like in the thrall of Mosaic. Using only my mouse, I get survivors' accounts of the Holocaust, photographs from Jupiter, the philosophy of Hugh Hefner, artwork of a sixth-grade class in Saint Paul, quotes from former MTV vee-jay Adam Curry, press releases from the White House. There is a baseball strike, and once this would have made me sad. But now the main damping effect is that when I go to the home page for Major League Baseball I see the message, "Yesterday's MLB highlights are not available," and therefore I cannot access the video clips of yesterday's home runs. So instead I go on to the next site. And the next one. The info surf is up, perpetually. Gotta ride it.

Gimme Bandwidth

I don't want to imply that Mosaic does not have drawbacks. First of all, setting it up is a process that hackers delicately call *nontrivial*. You begin by downloading the program. There are several versions, as well as some alpha versions of upcoming releases, and every one of them is buggy. Then there is a list of companion programs that have to accompany Mosaic so you can process text files, graphics, sounds, and animations. Each one seems to require some tinkering. Even when everything is installed properly, you often wind up in crash city. Maybe soon the various companies concocting commercial versions of Mosaic will produce bulletproof code. Until then, using Mosaic is like cooking a soufflé—if the factors aren't just right (and they're often not), everything falls flat.

But the real problem, and the utter bane of my existence, is lack of bandwidth. Everyone who uses Mosaic on a dial-up connection will tell you this—it's too slow. Like drinking margaritas through an eyedropper. The irony is unbearable and a little embarrassing. On one hand we are the mighty sojourners of the net, jumping from site to site around the world as if we had paratrooped into 1994 from an episode of "Star Trek." On the other hand, we spend an inordinate amount of time watching the little ball move around on the S shape on the Mosaic logo—the signal that information is moving, however slowly, into our computers. At one time I would have considered a modem moving 14,400 bits of information a second as more than adequate. Now it is simply a joke. Sooner or later I will have to spring for an expensive acronym like ISDN or a T1 connection. Don't ask me what those letters and numbers mean; all I know is that they cost a lot and will enable me to do Mosaic faster.

Still, I know how much time I spend with Mosaic now—what would happen if I got a T1 connection? Is it possible I would spend all my time hooked to the net? It is an interesting thought, but I am too busy to consider it. I have a new list of URL's to check out.

In fact, it is getting harder to keep up. It seems that every company imaginable is getting its own Web site. Even individuals are taking the plunge. The latest status symbol is putting up one's personal home page—a private URL is more desirable than a Beverly Hills area code—complete with digitized portrait, hypertext résumé, your vacation photos, and of course the proper links to your favorite Web sites and the home pages of all your friends. Mosaic, I think, will one day be everyone's personal interface with the world. Soon we will have Secure Mosaic and be able to use our credit cards to buy things directly from Mosaic sites. Already, you can order a pizza via Mosaic, from the Pizza Hut Web site.

There is a banging on the door. It is the Antimosaic, demanding that I abandon my activity and watch my child grow up. I don't let her in, and she starts screaming at me from the other side of the door. "Get a life!" she shouts, and then it is quiet.

Life? The word sounds strange to me. For a second I am really not sure what that is. Then I remember. Life is what happens while you're waiting for the graphics to open. ■

STEVEN LEVY's latest book is *Insanely Great: The Life and Times of Macintosh, the Computer That Changed Everything* (Viking, 1994). He is a Fellow at the Freedom Forum Media Studies Center in New York.

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Monitors and Health

Low-emission displays are now the norm

LIKE OTHER ELECTRICAL DEVICES, computer monitors generate both electrical fields and magnetic fields in the very-low-frequency (10kHz to 300Hz) and the extremely-low-frequency (below 300Hz) ranges. Less than five years ago, monitor manufacturers didn't give much thought to these electromagnetic emissions. Neither did most consumers. But in the wake of published reports that exposure to electric power lines might be linked to cancer, *Macworld* had questions: What are the emission levels from monitors? And are these emissions harmful, as some people contend?

In the July 1990 issue we published the results of Paul Brodeur's investigation for *Macworld* in "The Magnetic-Field Menace," which cited several studies that suggested that extremely-low-frequency (ELF) magnetic fields might be a health risk. In the same issue, *Macworld* contributing editor Robert Eckhardt's feature on color monitors listed the results of Macworld Lab measurements of the magnetic fields of 17 popular Macintosh monitors, information that had never before been published.

Nearly five years later, the scientific debate over low-level electromagnetic emissions remains unsettled. Nevertheless, the monitor industry has moved rapidly to reduce emissions. In the absence of scientifically established standards, most manufacturers support the Swedish guidelines known as MPR-II (set forth in 1990 by the Swedish Board for Measurement and Testing, which is known as MPR). A smaller number of manufacturers conform to stricter guidelines known as TCO (for the Swedish office workers' union that developed them).

When Macworld Lab tested color monitors in 1990 and 1991, for example, it measured the intensity of ELF magnetic fields from a low of 2 milligauss (or 200 nanoteslas) to a high of 100 milligauss (10,000 nT). Today, however, many monitors have sharply lower emissions, thanks to the MPR-II guidelines, which limit ELF fields to 2.5 milligauss (250 nT) when measured at 50 centimeters (just under 20 inches) from the monitor. The tougher TCO guidelines also limit ELF fields to 2.5 milligauss but at closer range—30 centimeters (just under a foot) from the monitor.

Reducing Your Exposure

One way to lower your exposure to monitor emissions is to buy a display that is compliant with MPR-II or TCO. If a new monitor is in your future or if you bought one recently, be aware of a few issues involving MPR-II testing requirements. Generally speaking, the higher the resolution and the brightness, the stronger the electromagnetic fields. Manufacturers test monitors at only one resolution and at midpoint brightness. So if you use a multiresolution monitor at its top resolution and with the brightness cranked all the way up, it's possible that you may be exposed to higher emissions than the MPR-II guidelines allow.

According to Apple, its 15-, 17-, and 20-inch Multiple Scan Displays, 14-inch AudioVision Display, and 14-inch Apple Color Plus Display all fully meet the MPR-II guidelines for low emissions. Other monitor manufacturers, including E-Machines, Mirror, Mitsubishi, Nanao, NEC, Nokia, Radius, RasterOps, and Sigma, also offer at least one MPR-II–compliant display.

Outside the United States, many companies make monitors that meet the TCO guidelines. Stateside, only two companies make such monitors for Macs: Nanao (310/325-5202) and Nokia (415/331-0322). Nanao's 17-inch and 20-inch T2 and its 21-inch F780iW list for from $1999 to $3999. The company says it expects its full line of monitors to meet TCO guidelines sometime next year. Nokia's 15-inch MultiGraph 449E, 17-inch 447X, and 21-inch 445X are available with a TCO option and retail for from $750 to $2775. (Nokia ships the monitors with a single-resolution Mac cable; a multiple-resolution adapter is available free on request.)

Reducing your exposure to ELF emissions doesn't require buying a new monitor, however. With distance, electromagnetic emissions drop sharply; the fields from the front of virtually any display should be negligible at 28 inches. For a cheap fix, just make sure you sit at least an arm's length from your computer when working.

The left and back sides of a monitor generate the strongest emissions, so you should steer clear of those areas if you are especially concerned about emissions. If you can't keep as far from them as you'd like because of the location of a coworker's computer, or if you have an old monitor that you can't replace, consider retrofitting the monitor to reduce its emissions.

NoRad's (310/605-0808) ELF ProTech ($65 to $131, depending on monitor size) is a set of special metal bands that fit around the top and sides of a monitor. The product works by deflecting magnetic fields from the monitor toward the bands. Macworld Lab tested ELF ProTech a couple of years ago and

continues

ANDREW FAULKNER

found a reduction in ELF magnetic-field emissions of between 17 and 69 percent, depending on the measuring points ("Seeking ELF Relief," *Macworld*, October 1991).

At the same time, Macworld Lab tested Get Safe's (515/472-5551) E.L.F. Armor ($89.95), a steel-alloy tube that goes over the yoke of a display's cathode-ray tube. Monitors fitted with the device showed significantly reduced magnetic-field emissions, according to *Macworld* measurements. Note that E.L.F. Armor requires installation by a qualified technician.

Beware of companies that claim or imply that computer-glare shields or screens can block electromagnetic emissions. Such screens may be able to block much of the electric fields generated by computer displays, but they do not block magnetic fields, which have been linked to health concerns.

Unanswered Questions

As I reported back in February 1993, there's still no scientific consensus that exposure to electromagnetic fields constitutes a genuine health hazard. Some scientists strongly believe there is no credible evidence that these fields are in any way harmful.

Others disagree. A 1992 Finnish study by the Institute of Occupational Health in Helsinki found a link between miscarriages and exposure to magnetic fields generated by video display terminals (VDTs). According to Louis Slesin in an editorial for the July/August 1993 issue of *VDT News*, "If a VDT does present a miscarriage risk, then it has to be caused by some aspect of VDT work. Possible risk factors include magnetic fields, stress, and harmful posture. Even though magnetic fields are easy to quantify, and therefore easy to study, the Finns were the first to test the obvious hypothesis, and their results show that electromagnetic fields may indeed be the culprit."

Other potential concerns are cancer and Alzheimer's disease. A 1992 study by scientists at the Karolina Institute in Stockholm found a dose-response relationship between childhood leukemia and exposure to weak magnetic fields from power lines. As a result of that study, the Swedish government has said it will act on the assumption that a link exists, for example, when planning where to locate transmission lines. More recently, *VDT News* reported that Dr. Eugene Sobel of the University of Southern California has found a link between workplace exposure to electromagnetic fields and Alzheimer's disease. (The study did not include computer users.)

VDT News and *Microwave News* are valuable resources for keeping current on this topic. Both of these thoughtful and comprehensive newsletters are edited and published by Louis Slesin in New York. Annual subscriptions are $150 and $285, respectively; call 212/517-2802 for details.

What You Can Do

It's terrific that manufacturers have responded to this health issue by making low-emission monitors available. As a result, consumers using modern computer equipment are now exposed to considerably lower emissions than they were a few years ago.

But computer monitors are not the only source of electromagnetic emissions. At work, office wiring is the primary source of exposure; at home, all kinds of electrical appliances—electric blankets, heaters, electric razors, and so on—emit these fields. And emerging technology such as cellular telephones and wireless networks will add to the overall exposure level for many people.

Because it appears that if any health risk exists it is quite small, some people argue against continued research. But even a small risk can affect large numbers of people, since virtually the entire population is exposed to electromagnetic emissions. Under the circumstances, we need more research in this area, not less.

If you agree, please lobby Congress, the president, and the appropriate companies for support. Apple, Compaq, and IBM, for example, are funding research into the biological effects of magnetic fields. The computer threesome established the Center for VDT and Health Research at Johns Hopkins University in 1992 to fund independent research into computer use and health. Despite the need, there's been little additional industry support for the center. And that's a shame, because there are too many unanswered questions about electromagnetic emissions and health.

"If electromagnetic exposures came only from VDTs, that would be one thing, but we are just beginning to address building wiring and other electromagnetic-field sources in offices," says Louis Slesin. "And of course, we are in the midst of the wireless revolution. This is the stuff of the twenty-first century. Sooner or later we must answer the question, What is it all doing to us?" **m**

Send nominees for sainthood to *Service Heroes, Macworld*, 501 Second St., San Francisco, CA 94107, or via the Internet (branscum@aol.com). Conversely, drop *Conspicuous Consumer* a line if a company is ignoring you.

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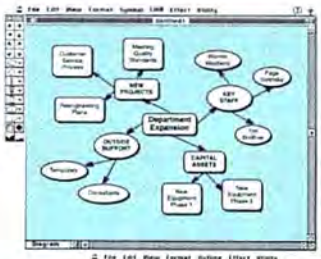

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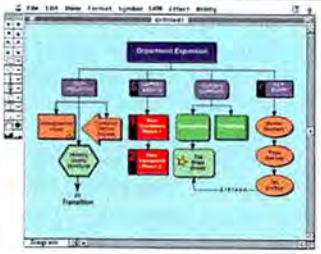

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Edited by Elizabeth Maffly

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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.

SMALL COLOR MONITORS, Jan 94

14-inch display: ❖ Sony CPD 1430; Sony Corp. of America, 800/222-7669; $779.95. ❖ Nanao FlexScan F340i•W; Nanao USA, 800/800-5202; $799.

15-inch display: NEC MultiSync 4FGe; NEC Technologies, 708/860-9500; estimated street price $755.

TWO-PAGE COLOR MONITORS, Nov 94

PressView 21 Display System; SuperMac Technology, 408/541-6100; $3999.

NETWORK HARDWARE

HIGH-SPEED FAX MODEMS, Oct 93

Teleport Gold and Silver with Global Fax; Global Village Communication, 415/390-8200; Gold $499, Silver $429.

REMOTE-ACCESS SERVERS, Oct 94

Mixed networks: NetConnect Remote Access Server; Asanté Technologies, 408/435-8401; $3899 for eight ports.

AppleTalk networks: ARA Multiport Server; Apple Computer, 408/996-1010; four ports $1799, eight ports $3298.

PRINTERS

COLOR PRINTERS, Aug 94

Low-end ink-jet: DeskWriter 560C; Hewlett-Packard, 800/752-0900; $719.

Solid ink-jet: Phaser 300i; Tektronix, 503/682-7377; $9995.

Thermal-wax transfer and color laser: Phaser 220i; Tektronix, 503/682-7377, $5995.

DYE-SUBLIMATION PRINTERS, Jul 94

Prepress proofing—tabloid size/fastest: Phaser 480; Tektronix, 503/682-7377; $14,995.

Prepress proofing—tabloid size/most complete: Rainbow; 3M, 612/733-1110; estimated street price of $20,000.

Prepress proofing—letter size: ProofPositive Full Page; SuperMac Technology, 408/541-6100; $7999.

General publishing and business: Phaser IISDX; Tektronix, 503/682-7377; $9995.

PERSONAL PRINTERS, Sep 94

Ink-Jet: DeskWriter 520; Hewlett-Packard, 800/752-0900; $365.

Laser—$1000 to $1600: microLaser Pro 600; Texas Instruments, 214/995-6611; $1599.

WORKGROUP PRINTERS, Feb 94

High-speed: Hewlett-Packard 4Si 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/IMAGE CAPTURE

ELECTRONIC CAMERAS, Sep 94

Apple QuickTake 100; Apple Computer, 408/996-1010; $749. ◀

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, 800/444-6784; $1495.

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

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.

IIfx 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.

1.3GB OPTICAL STORAGE, Dec 94

Best low-cost solution: 1.3Gig MO; Club Mac, 714/768-8130; $2099.

Best overall performance: Genesis 1300; Microtech, 203/468-6223; $2899.

PC COPROCESSING, Oct 94

OrangePC Model 210; Orange Micro, 714/779-2772; $1283.

VIDEO/DISPLAY

24-BIT VIDEO CARDS, Apr 94

Inexpensive acceleration: PrecisionColorPro 24XP; Radius, 408/434-1010; $599.

Full-featured acceleration: Thunder II GX•1360; SuperMac Technology, 408/541-6100; $4499.

HIGH-END VIDEO EDITING, Jun 94

Presentation video: ❖ MoviePak2 Pro Suite; RasterOps, 801/785-5750; $4199. ❖ VideoVision Studio; Radius, 408/434-1010; $4499.

Corporate video (offline): Media Composer 400s; Avid Technology, 508/640-6789; $14,995.

Corporate video (online): VideoCube; ImMix, 916/272-9800; $40,500.

PHOTOSHOP ACCELERATORS, Apr 94

PhotoBooster; Radius, 408/434-1010; $999.

continues

MACWORLD Editors' Choice

Software

ACCOUNTING/FINANCE

GROWING A SMALL BUSINESS, Nov 93
Small-business system: M.Y.O.B.; Best Ware, 201/586-2200; $199.
Home office/personal finance: MacMoney; Survivor Software, 310/410-9527; $119.95.

BUSINESS TOOLS

STATISTICS, Oct 93
Exploratory data analysis: DataDesk 4.1; Data Description, 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

COMMUNICATIONS SOFTWARE, Aug 94
Basic connectivity: ZTerm; David P. Alverson (no phone number available); $30.
Terminal emulation: Crosstalk for Macintosh; Digital Communications Associates, 404/442-4000; $195.
Internet exploration: VersaTerm; Synergy Software, 215/779-0522; $125.

DOS WINDOWS EMULATION, Oct 94
Timbuktu Pro 1.0.3 for Macintosh, Timbuktu 1.1 for Windows; Farallon Computing, 510/814-5000; $199 each.

HIGH-SPEED FAX MODEM SOFTWARE, Oct 93
Faxstf; Telefocus, 816/886-9800; $79.

NETWARE CONNECTIVITY, Sep 93
NetWare for Macintosh; Novell, 801/429-7000; $495 for 5-user license to $2295 for 200-user license.

PROTOCOL ANALYZERS, Jul 94
EtherPeek, AG Group, 510/937-7900; $795.

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

3-D MODELING, Dec 94
Stand-alone modeler: Form Z; autodessys, 614/488-9777; $1495.
Integrated-modeling package: Strata StudioPro; Strata, 801/628-5218; $1495.
Entry-level modeler: Infini-D; Specular International, 413/253-3100; $695.

CLIP ART'S GREATEST HITS, Jan 94
Overall collection: ❖ ClickArt Studio Series; T/Maker Company, 415/962-0195; $99.95 per volume.
❖ Electronic 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 unlocking families.
Display/decorative-face collection: Fontek; Letraset, 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.

Vendors: Please write to *Macworld Editors' Choice*, 501 Second St., San Francisco, CA 94107, or send a fax to 415/442-0766 to inform us of changes in your phone number or your product's list price.

ONLINE SERVICES

ONLINE SERVICES, Aug 94
E-mail: America Online; America Online, 703/893-6288; basic monthly fee $9.95.
Reference: CompuServe; CompuServe Information Service, 614/457-0802; basic monthly fee $8.95.

ORGANIZATION/PRODUCTIVITY

CALENDARS, Jul 93
Alarm system: ❖ First Things First; Visionary Software, 503/246-6200; $79.95.
❖ Smart Alarms Plus; JAM Software, 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.

GRAPHING SOFTWARE, Aug 94
DeltaGraph Pro 3 3.0.4; DeltaPoint, 408/648-4000; $195.

SALES-AUTOMATION SOFTWARE, Oct 93
❖ Contact Ease; WestWare, 619/274-5053; 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

PRESENTATION SOFTWARE, Jul 94
Persuasion 3.0; Aldus Corp., 206/622-5500; $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 Technology, 800/843-7263; $84.95.

PRINTING, Sep 93
PC-printer cable packages: PowerPrint; GDT Softworks, 604/291-9121; $149.

VIRUS KILLERS, Jul 94
Commercial software: Virex; Datawatch, 919/549-0711; $99.95.
Free software: Disinfectant; free from online services.

VIRTUAL MEMORY SOFTWARE

VIRTUAL MEMORY, Jun 94
Virtual memory software: Virtual 3.0; Connectix Corp., 415/571-5100; $99.
Memory-boosting software: RAM Doubler 1.0.1; Connectix Corp., 415/571-5100; $99. m

ADD YOUR *Handwriting* TO THE FONT MENU!

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Courier
▶ Your Font
Helvetica
Times

Perfect Holiday Gift

Now for Mac AND Windows!

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Personal Font™
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Patent Pending

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Actual Handwriting vs. Personal Fonts:

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Peter's Personal Font.
Peter Matthews - Toronto, ONT

Colin's actual handwriting.
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Colin Johnson - Portland, OR

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System Requirements:

Mac - System 6.05 or higher
PC - Windows 3.1
Postscript printers or interpreters. On non-Postscript printers, characters will be disconnected, just as they appear on the screen, *similar to this.*

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☐ *Yes! Include SUPERscripts with my Personal Font order for the special bundle price of $139.95*

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Personal Font™

The Original Custom Cursive Handwriting Font

Name:_____ Phone #: _____

SAMPLE FORM INSTRUCTIONS

1. Write your signature within the Signature box. For best results, try to ensure that the signature fits within the box.
2. Write the words shown within each box using the broken lines as a base. Begin each word on the left side of the boxes. Characters can be connected or disconnected or a combination of both!
3. Write naturally and consistently. Practice first on a separate sheet of paper. Remember, what you write here will become the final font.
4. For best results use a rollerball or fibertip pen. **Do not use ballpoint pens or pencils!**
5. Use the grid lines in the boxes as an aid to maintain consistent height and slant. Be sure capital letters are proportional to lower case letters. kagvals kagvels
6. Write your capitals normally. Consider the appearance of capitals when at the beginning of words AND when words are all capitalized. Don't forget the punctuation!
7. Name your font and complete the ordering information on the front of this form. **Indicate PC or MAC on card!**

NOTE: Strike out mistakes and write corrections nearby. Signature Software can even make changes after you receive your font! kagvals ~~kagvels~~ kagvels

NAME YOUR FONT!
The name must be seven alphabetic characters or less.

Signature (your name)		adjoint	bowman
cyclops	doubt	egtype	forgiven
grocery	hydrodyke	ionize	jewfishes
kagvels	lysozyme	mojxe	novque
oxyfobe	polygyne	quote	rybema
skyque	toyjoke	unfaxed	vogue
waywhips	xylosse	yachtque	zigzag

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Personal Font Personalized Handwriting Font
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Star Ratings

HARDWARE AND SOFTWARE REVIEWS AT A GLANCE

Edited by Wendy Sharp

Macworld Star Ratings lets you compare hardware and software products for the Macintosh by providing summaries of *Macworld*'s authoritative product reviews from the past year. The number of stars at the beginning of each capsule review indicates quality; our reviewers assign five stars to outstanding products and one star to poor ones. The ◀ symbol indicates that a product is available in a native Power Mac version, although unless stated otherwise the version we reviewed was the 680X0 version.

If a product has been upgraded since our last review, the most recent version number supplied by the vendor appears in parentheses after the reviewed version number. To read a full review of any product in the listing, please consult the issue listed at the end of each synopsis.

Vendors: Please write to *Macworld Star Ratings*, 501 Second St., San Francisco, CA 94107 to inform us of changes in the version number or list price of your product, or of changes to your phone number.

Software

BUSINESS TOOLS

★★★ **4D First 1.0 (1.0.1), ACI US, 408/252-4444, $295.** This entry-level relational database is a low-cost way to distribute the power of 4D and 4D Server to an office full of Macs. It's not much easier to use, however, than the full-fledged 4D. **May 94**

★★★ **AccuZip6 1.8.7, Software Publishers, 800/233-0555, $689.** Bulk-mail software has informative progress indicators, low rates, and flexible parsing during import, but the interface is incomprehensible. **Sep 94**

★★ **BaseMap 1.0.1, GeoPoint, 415/957-1560, $149.** For simple maps displaying simple data, this map-making tool may be useful. It's not for the cartographic sophisticate, however, as it offers very limited data-display abilities and only one projection. **May 94**

★★ **Bulk Mailer CASS 1.00d, Satori Software, 206/443-0765, $150.** Unattended operation is possible with this bulk-mail software, but batch processing is slow and the program has coding problems. **Sep 94**

★★★★ **ClarisImpact 1.0 (1.0 v3), Claris Corp., 408/727-8227, $399.** Business graphing, project management, object-oriented drawing, word processing, and presentation functions merge in this business graphics software. The outstanding integration offers versatility that dedicated programs are pressed to match. **Jun 94** ◀

★★★ **Cricket Graph III 1.5 (1.52), Computer Associates International, 516/342-6000, $129.** Basic and foolproof charting program produces cleaner charts than Excel with little effort, although its feature set is fairly modest. **Apr 94**

★★★★ **Crystal Ball 3.0, Decisioneering, 303/449-5177, $295.** Compact business-simulation software is fast enough for complex projects and can pay for itself in disaster-avoidance in a variety of business tasks. **Oct 94**

★★★★ **Decision Analysis 2.5, TreeAge, 800/254-1911, $379.** Decision-assistance software handles complex business cases by constructing tree diagrams of probabilities and payoffs. It offers a type of modeling that is more realistic and easier to modify than other options. **Nov 94**

★★★★ **DeltaGraph Pro 3 (3.5), DeltaPoint, 408/648-4000, $195.** At its new lower price, this charting program is the best feature-for-feature value in Macintosh charting. There's even a new Chart Advisor function that suggests the appropriate display for your data. **Apr 94** ◀

★★★ **Extend+BPR 3.0, Imagine That, 408/365-0305, $990.** Business-modeling software includes superior templates for business-process reengineering, but some programming experience is helpful. **Oct 94**

★★★ **FastTrack Schedule 2.1, AEC Software, 703/450-1980, $279.** Simple project-management software is ideal for managers who need to put together a schedule quickly and easily, but if you require more power, you'll need a more comprehensive program. **Sep 94**

★★★★ **Helix Express 2.0.1 (2.0.4), Helix Technologies, 708/465-0242, $589.** Icon-based relational-database software's improved performance makes it a serious competitor for all-Mac networks. Especially notable is its much faster speed; multiuser operation is downright snappy. **Jul 94**

★★★ **Map II 1.5, ThinkSpace, 519/858-5047, $395.** Well-structured program has most of the functions a simple geographical information system needs and is suitable for introductory instruction in GIS and for alert first-time users who just like maps. **May 94**

★★★ **MicMac 2.0v1, Nirvana Research, 408/459-9663, $89.** The concept of Mac as dictation machine is undeniably attractive, and Nirvana Research has pulled it off well. It takes lots of hard drive space to save recordings, though. **Nov 94**

★★★★ **Microsoft FoxPro for Macintosh 2.5 (2.6), Microsoft Corp., 206/882-8080, $495.** Dazzlingly fast and easy to use relational database has a greatly improved interface and cross-platform compatibility. For projects of 4 to 20 users that handle large amounts of data, it offers excellent performance. **Apr 94**

★★★ **Office Tracker 1.1, Milum Corp., 512/327-2255, $195 to $995.** The efficient user interface of this software sign-out board makes it easy to learn and use; but it has some minor flaws. **Dec 93**

★★★★ **Pablo 2.0.1 (2.03), Andyne Computing, 613/548-4355, $695.** This effective end-user data-reporting tool puts a considerable workload on the corporate information department, but it sidesteps the hassles of SQL data access and produces great reports with minimal effort. **Jul 94**

★★★ **Street Atlas USA 2.0, DeLorme Mapping, 207/865-1234, $169.** For the most part, this geographical information software delivers what it promises at a great price. Although inaccuracies in the data are troubling, DeLorme pledges to fix all reported errors in subsequent annual updates. **Oct 94**

★★★ **TeamFlow 3.1, CFM, 617/275-5258, $295.** Total Quality Management flowchart software is a valuable business tool. Its report printing and customizability are limited, however. **Nov 94**

★★★★ **TopDown 4.0 (4.1), Kaetron Software Corp., 713/298-1500, $345.** Flowcharting program's support for custom symbols and automatic drawing aids, along with its ability to let you easily create and navigate lower-level charts, make it a productive tool. **Jul 94**

★★ **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**

★★★★ **ZipZapp 1.0, True Basic, 603/298-8517, $39.95.** You can use this data-reference utility to find an area code, the correct spelling of a city's name, and more. The interface is intuitive, and the cost, low. **Oct 94**

★★★ **ZP4 12.1 (14), Semaphore Corp., 408/688-9200, $125.** Inexpensive bulk-mail software supports batch and individual processing, but the progress indicators are uninformative, and unattended operation requires extra work. **Sep 94**

COMMUNICATIONS/NETWORKS

★★ **AccessPC 3.0, Insignia Solutions, 415/694-7600, $129.95.** Utility translates most word-processor and some database formats, but it doesn't translate graphics and some of its translations result in data loss. **Apr 94**

★★★ **Crosstalk for Macintosh 2.0 (2.0.1), Digital Communications Associates, 404/442-4095, $195.** Commendable communications product has a strong feature set but complex script editing. You must manually enter phone numbers each time you use it. **Apr 94**

★★★ **Delrina FaxPro for Macintosh 1.0 (1.5.1), Delrina Corp., 408/363-2345, $129.** Fast, efficient fax software has an excellent address book but also has some interface quirks and minor bugs. **Feb 94**

★★★★ **DOS Mounter Plus 4.0, Dayna Communications, 801/269-7200, $100.** File-transfer and translation utility works with floppies, removable drives, and network volumes and supports wild cards in DOS extensions. **Apr 94**

★★★★ **EtherPeek 2.0.3 (2.0.4), LocalPeek**

continues

Star Ratings

2.0.3 (2.0.4), 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**

★★★★ **MacLink Plus/Translators Pro 7.5, DataViz, 203/268-0030, $149.** If your PC files are in archaic formats, you'll need this file-transfer and translation utility. It's a great option for most users, but it doesn't support removable drives or network volumes. **Apr 94**

★★★ **MicroPhone Pro 2.0, Software Ventures Corp., 510/644-3232, $295.** The new feature set of this communications package includes multiple sessions, faxing, TCP/IP networking, and more, but it's a mixed bag. Not all the features are well integrated, although some are innovations for which users will be grateful. **Oct 94**

★★★ **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 only when a printer is available. **Dec 93**

★ **PowerShare Collaboration Servers, Apple Computer, 408/996-1010, $999.** Before this collaboration software will be ready for prime time, Apple needs to overhaul the complex Admin application, add serious diagnostic aids, provide comprehensive documentation, and offer knowledgeable technical support at a price less than that of the program itself. **Aug 94**

★★★★ **Silver Cloud 1.2 (1.2.1), AG Group, 510/937-7900, $495 to $1595.** 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**

★★★ **SITcomm 1.0 (1.0.1), Aladdin Systems, 408/761-6200, $120.** Inexpensive telecommunications software is fairly easy to set up and use, and will do well for people who use just one or two online services. **Apr 94**

★★★ **Snap Mail 1.0.1, Casady & Greene, 408/484-9228, $200 to $1440.** Software will put you on the electronic-mail trail more easily and more cheaply than any competing product, if you can live with some minor (but surprising) shortcomings. **Jun 94**

★★ **SoftPC 3.1, Insignia Solutions, 415/694-7600, $499.** While the speed of this Windows PC emulator is greatly improved, buying an add-in PC card for your Mac is more efficient. **Mar 94**

★★ **SoftWindows 1.0, Insignia Solutions, 415/694-7600, $499.** You can run Windows software on a PowerMac with this emulation software, but although it's a viable solution, you pay the price in terms of performance, compatibility, and actual cost. **Aug 94**

★★★★ **Timbuktu Pro 1.0 (1.05), Farallon Computing, 510/814-5000, $199 to $1999.** Terminal emulation product is a must-have for in-house technical-support staff and for people who need direct connection to computer systems on a variety of networks. The major enhancements of this version are TCP/IP support for Macs and noticeably faster screen redraw. **May 94**

★★ **TrafficWatch II 2.0 (2.1), Neon Software, 510/283-9771, $495.** Without printing, alarms, triggers, or true multiprotocol support, this AppleTalk traffic monitor misses the mark. **Jun 94**

★★★★ **VersaTerm 5.0 (5.04), 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. **Jan 94**

★★★★ **White Knight 12.0, The FreeSoft Company, 412/846-2700, $139.** While this telecom software can be bewildering, it works impressively well. If you're willing to read the manual from cover to cover, the program may become your favorite telecom tool. **Nov 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**

★★ **CheckPost 1.3, Working Software, 408/423-5696, $249.95.** Interface aside, this imagesetter-simulation software is generally disappointing. It can't automatically scale pages, it prints on a single sheet, and its error reporting is limited. **Nov 94**

★★★ **ClickBook 1.1, BookMaker Corp., 415/354-8161, $69.95.** If you need to create inexpensive booklets quickly and without hassle, this print utility that helps you format documents in double-sided booklet form is an excellent tool. **Nov 94**

★★★★ **FontChameleon 1.0.1, Ares Software Corp., 415/578-9090, $295.** Font utility builds serif and sans serif fonts from a master outline file. It offers high-quality renditions of popular fonts, plus the ability to customize fonts. **Sep 94**

★★★ **FontMixer 1.0, Monotype Typography, 312/855-1440, $79.** Although a tad expensive for a one-trick pony, this font utility is a straightforward, relatively painless way to mix characters from different fonts to create composite fonts. **Oct 94**

★★★★ **Fontographer 4.0.4, Altsys Corp., 214/680-2060, $495.** No other font editor does more or works better than this one. For the price of a few font families, it can give you a universe of unique faces. **Oct 94**

★★ **FotoTune 1.1 (1.13), Agfa Division of Miles, 508/658-5600, $395.** Color-management software has a capable engine, but it's not a complete color management system. Invisible tech support and poor documentation were only part of the problem. **Apr 94**

★★★★ **FrameMaker 4.0 (4.04), Frame Technology Corp., 408/433-3311, $895.** For such projects as books and instruction manuals, this desktop publishing program is one of the best tools available. It's fast, well mannered, and a real time-saver. **Mar 94**

★★★★ **LaserCheck 1.0, Systems of Merritt, 205/660-1240, $199.** Imagesetter-simulation software can save you hundreds of dollars, and many hours, on imagesetting jobs by letting you use a laser printer to proof your work. **Nov 94**

★★★★ **Print Shop Deluxe 1.0 (1.1), Broderbund Software, 415/382-4400, $49.95.** Even the most ham-fingered can create greeting cards, signs, banners, letterhead stationery, and calendars with these desktop publishing templates and graphics. **Apr 94**

★★★ **ReadySetGo 6.0.2, Manhattan Graphics Corp., 914/725-2048, $395.** There's no strong reason not to use this destop publishing software if its tools meet your needs, but there's no compelling reason to choose it, either. Its low price is nice, but not enough. **Oct 94**

★★★★ **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

★★★ **Creative Writer 1.0, Microsoft Corp., 206/882-8080, $64.95.** Graphics/page-layout/word-processor hybrid offers some terrific type effects, zany sounds, and bright graphics. While it doesn't teach kids to be better writers, it does encourage them to develop ideas and provides a fun vehicle to express those ideas creatively. **Sep 94**

★★★ **The Cruncher, Davidson & Associates, 310/793-0600, $59.95.** If you want to teach a child spreadsheet basics, this combination educational spreadsheet and business application will do the job. It's creative and easy to use, but slow. **Aug 94**

★★★★ **Grolier Multimedia Encyclopedia, Grolier Electronic Publishing, 203/797-3530, $395.** CD-ROM encyclopedia has excellent search capabilities, weighs much less than a shelf of books, and is lots of fun. Its timeliness and some hierarchical snafus were slight problems. **Jul 94**

★★★★ **How Computers Work, Time Warner Interactive Group, 818/955-9999, $43.60.** 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**

★★★ **MacGrade 1.5.5 (2.2.7), CalEd Software, 800/795-0641, $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**

★★★★ **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. **Jan 94**

★★★ **Small Blue Planet 1.2.1, Now What Software, 415/885-3432, $79.95.** Nicely integrated collection of beautiful Earth-from-space images on CD-ROM lacks many features of standard atlases and doesn't have a search function, but is endlessly fascinating. **Jul 94**

ENTERTAINMENT

★★★★ **Crystal Crazy, Casady & Greene, 408/484-9228, $49.95.** Ultraglossy, superpolished version of the classic Crystal Quest is challenging and fun without being overly difficult. Each level retains some old elements, and adds some new ones to keep you on your toes. **Jun 94**

★★★★ **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 combat flight simulator. **Dec 93**

★★★ **Firefall Arcade 1.0 (1.0.2), Inline Software, 617/935-1515, $49.95.** If you loved the classic video game Centipede, or are just looking for a fun shoot-'em-up, this arcade-style game will satisfy. **Jun 94**

★★★ **Hell Cab 1.0.1, Time Warner Interactive Group, 818/955-9999, $35.97.** 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 it succeeds. **Jan 94**

★★★★ **Myst 1.0 (1.01), Broderbund Software, 415/382-4400, $59.95.** The smooth pacing of actions and sounds in this beautiful CD-ROM game give it a dreamlike quality. This is a game that's been polished until it shines. **Mar 94**

★★★★ **SimCity 2000, Maxis Software, 510/254-9700, $54.95.** Your goal with this marvelous city-simulation software is to build a city and run it successfully. The game is fascinatingly complex, but it's simple to use, and the elaborate graphics are lovely. **Jun 94**

★★★★ **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. Dec 93

★★★★ **Spin Doctor, Callisto Corp., 508/655-0707, $59.95.** In the tradition of the best Macintosh games, this game tests your wits and reflexes alike. It's part stategy game, part kinetic scultpure. Jun 94

FINANCE/ACCOUNTING

★★★★ **Andrew Tobias' TaxCut 1993, MECA Software, 203/255-1441, $79.95.** The free-form approach and flexible Help menus of this tax-preparation software make filling out your tax return a smooth, almost relaxing process. Apr 94

★★★ **ExpensePlus 1.0.1 (1.0.2), State of the Art, 714/753-1222, $139.95.** Software uses a Newton MessagePad to record expenses, then sends data to a Mac to create expense reports. While it's a real time-saver, you'll need AppleScript expertise to modify the reports. Apr 94

★★ **Financial Competence 1.5, Competence Software, 603/435-5098, $99.** Business economics tutorial explains how financial statements are compiled and how they relate to each other, but you could learn the same things from a book. Jul 94

★★★★ **MacInTax 1993, Intuit, 602/295-3110, $69.95.** Tax-preparation software provides a reasonably detailed manual and a reliable, structured interface for building your tax return. Its inability to accept figures containing amounts in cents or round off to whole dollar amounts will frustrate some users. Apr 94

★★★ **MacInTax Tax Planner, Intuit, 602/295-3110, $29.95.** Software allows you to construct a five-year forecast of your tax liability, projecting tax figures through 1997 in a concise summary format. If you have a tax preparation program, you can do the same thing by creating alternative tax returns. Apr 94

★★★ **MacInTax Tax Savings Guide, Intuit, 602/295-3110, $19.95.** Simple, straightforward collection of tax tips and suggestions is designed to help you better understand your tax return and reduce your tax liability. Although strong in content, it doesn't allow you to copy and paste, export as a text file, or even print. Apr 94

★★★ **MacMoney 4.01, Survivor Software, 310/410-9527, $89.95.** Personal-finance software has new and improved features that will please longtime users, but it hasn't kept up with the leaders in the field and won't win many new converts. Jul 94

★★★ **Managing Your Money 6.0, MECA Software, 203/255-1441, $79.95.** Personal-finance program does a good if somewhat roundabout job of keeping track of your total financial picture. Although it isn't as easy to use as the competition, it excels in tax, investment, and financial planning. Jun 94

GRAPHICS

★★★★ **Adobe Illustrator 5.5, Adobe Systems, 415/961-4100, $595.** Despite slight speed disappointments, this draw program's upgrade is a bargain. It includes more than 200 tile patterns, 220 fonts, and the Acrobat Distiller and Exchange utilities. Sep 94

★★★★ **Aldus FreeHand 4.0 (4.0a), Aldus Corp., 206/622-5500, $595.** The new page-design and text-editing functions of this powerful draw program make it more than worth the price of admission. Aside from some bewildering interface elements, it's an outstanding program. Mar 94

★★★ **Canvas 3.5 (3.5.2), 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

★★★ **Collage 1.0.1 (2.0), Specular International, 413/253-3100, $399.** Image-compositing software allows you to combine and composite multiple RGB images stored in PICT, TIFF, and Photoshop 2.5 formats. While it's functional and indisputably easy to use, its oversights, including slow screen redraw with no interrupt option, are nearly as numerous as its benefits. Jul 94

★★★ **Dabbler 1.0, Fractal Design Corp., 408/688-5300, $99.** Art-education and paint software provides an excellent paint set with an appealing if slightly quirky interface, at a great price. Nov 94

★★★★ **DeBabelizer Lite 1.0 (1.1), Equilibrium Technologies, 415/332-4343, $129.** Terrific graphics utility converts graphics files from one format to another. It offers a choice selection of capabilities at a nice, slim price. Aug 94

★★★ **DesignWorkshop 1.0 (1.1), Artifice, 503/345-7421, $895.** The accessible interface and versatile modeling environment of this 3-D modeling software may be worth the fairly high price, particularly for architectural-design conceptualization. May 94

★★★ **Infini-D 2.5.1 (2.6), Specular International, 413/253-3100, $695.** Serviceable 3-D graphics program has a wide range of modeling, rendering, and animation options, with a straightforward interface. Feb 94

★★★★ **IntelliDraw 2.0, Aldus Consumer Division, 619/558-6000, $129.** Wonderful general-purpose graphics package works well, does a great job of automating drawing tasks, and is straightforward. Despite its breadth of features, it always feels approachable. Sep 94

★★★★★ **Kai's Power Tools 2.0a (2.1), HSC Software, 310/392-8441, $199.** Phenomenally powerful suite of Photoshop plug-ins have an addictive quality typically associated with arcade games. There's no end to the automated effects you can generate and the artwork you can create. May 94

★★★ **Koyn Fractal Studio 2.02 (2.1), Koyn Software, 314/878-9125, $119.95.** Software lets you generate beautiful fractals of your own design. It's a reasonable choice if you are interested in Sierpinski triangles or naturalistic forms, but it's not an all-fractals-for-all-people program. Aug 94

★★★★ **LogoMotion 1.0, Specular International, 413/253-3100, $149.** Easy-to-use 3-D package is eminently affordable. It's a terrific program, both for creating flying logos and as an entry-level 3-D package for nonprofessionals. Nov 94

★★★★ **MacroModel, Macromedia, 415/252-2000, $1495.** This 3-D modeling software is a solid resource to have along when you venture out into 3-D space. The interface is elegantly simple, making the Mac's inner space a more pleasant place to work. May 94

★★★★ **MetaFlo', The VALIS Group, 415/435-5404, $595.** Graphics utility yields interesting visual effects with a minimum of fuss. It imparts elasticity to 2-D images, letting you push and pull collections of pixels while retaining the visual integrity of the image. Aug 94

★★★★ **MiniCad 5, Graphsoft, 410/290-5114, $795.** Excellent CAD software for the Power Mac offers major performance for its price. It's admirably easy to learn. Nov 94

★★★★ **Paint Alchemy 1.0, Xaos Tools, 415/487-7000, $99.** For the price, these plug-in graphics effects are a tremendous value that both casual users and professional artists can use to design a little chaos into their work. May 94

★★★ **PhotoMatic 1.01, DayStar Digital, 404/967-2077, $199.** AppleScript-based utility lets you automate tasks in Adobe Photoshop 2.5.1 or later. Although it's limited, it can relieve you of some mundane chores. Nov 94

★★★ **Pointillist, Pictor GraFX, 310/865-0495, $39.95.** Gleefully wacky stereogram software creates images that look, at first glance, like random dots, but as you focus, a 3-D image appears. Jul 94

★★ **Ray Dream Designer 3.0.3 (3.1), Ray Dream, 415/960-0768, $349.** Although this 3-D-illustration software remains a price leader, unstable operation, misbehaving features, and sluggish performace are problems that need to be rectified. Jul 94

★★★ **ScanPrepPro 1.2, ImageXpress, 404/564-9924, $695.** Adobe Photoshop add-on automates the scanning and image-massaging process and produces good results, although the program is somewhat unstable. Nov 94

★★★★ **Scenery Animator 1.0.4 (1.1), Natural Graphics, 916/624-1436, $149.** Landscape rendering and animation software uses U.S. Geographical Survey data to create remarkably realistic 3-D representations of terrain. Aug 94

★★★★ **Showplace 2.0 (2.1), Pixar, 510/236-4000, $495.** Adequate, entry-level, 3-D modeler is suitable for illustration. This version offers improved access to MacRenderMan, one of the best renderers around, plus plug-in modeling tools. Apr 94

★★★ **StrataVision 3d 2.6.3 (3.1), Strata, 801/628-5218, $695.** 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 and sometimes sluggish. Feb 94

★★★★ **StudioPro 1.0 (1.1), Strata, 801/628-5218, $1495.** If you need a well-balanced, all-in-one 3-D modeling, rendering, and animation solution, this application is an excellent choice. Mar 94

★★★ **Terrazzo 1.0, Xaos Tools, 415/487-7000, $199.** Turning a random group of pixels into a geometric pattern may not be everyone's consuming passion, but this plug-in graphic-effects module has definite appeal for a select niche of designers. Nov 94

★★★ **Typestry 2.0 (2.1), Pixar, 510/236-4000, $299.** An approachable interface, animation support, and outstanding Renderman rendering technology make this 3-D type-renderer a popular choice. This version improves on the original, but still lacks canned positioning effects. Jun 94

★★★ **upFront 2.0, SketchTech, 612/379-9181, $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

MATH/SCIENCE

★★★★ **Caduceus Science Review Macintosh Project 1.0 (1.1), Scientia, 617/776-3427, $250.** If you're taking the MCAT, you'd be nuts not to buy this interactive science review. With proper use, its 9MB of files are certain to improve your score. Apr 94

★★★★ **CSC ChemOffice 2.0, Cambridge Sci-**

continues

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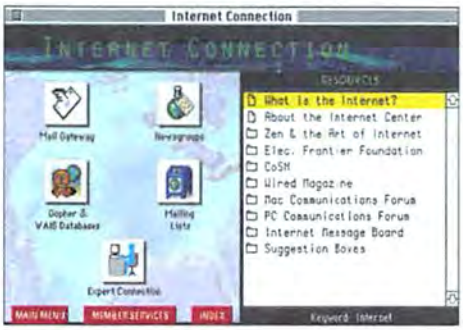

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Star Ratings

entific Computing, 617/491-6862, $995. Comprehensive chemistry software is the Mac equivalent of software that seven years ago would have cost $200,000 and required an equally costly minicomputer. **Feb 94**

★★★★ **JMP 3.0, SAS Institute, 919/677-8000, $695.** This statistics software can be used for a wide range of biological, chemical, and physical-science investigations. New features include floating tool palettes, an annotation tool for data tables, and an experimental-design module. **Sep 94**

★★★ **Kekulé 1.1, PSI International, 410/821-5980, $495.** Science software reads scanned chemical-structure drawings and interprets them, giving both a diagram for checking interpretation accuracy and a formal string representation of the structure. **Nov 94**

★★★★ **LabView for Mac 3.0.1, National Instruments, 512/338-9119, $1995.** For large-scale, demanding projects in data acquisition and analysis, this scientific software is an unchallenged standard. **Jul 94**

★★★ **Maple V 3.0, Waterloo Maple Software, 519/747-2373, $795.** If you prefer to do your own programming and function creation, you'll benefit from this symbolic mathematics software's efficient use of your Mac's resources. This version hits most of the points on your symbolic-math wish list. **Oct 94**

★★★★ **MATLAB 4.1, The Math Works, 508/653-1415, $1695.** Relatively expensive numerical math software has added nearly 100 new graphics commands, improved its treatment of sparse matrices, and added commands for sound processing. Its toolboxes make it a first choice for many applied-science specialties. **Nov 94**

★★★ **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. **Jan 94**

★★★★ **Resampling Stats 1.0, Resampling Stats, Inc., 703/522-2713, $225.** Innovative statistics software has proved itself to be a superior teaching tool in numerous classroom tests. If you have any interest in statistics, you should give this admirably straightforward approach careful consideration. **Jun 94**

★★★★ **SerePlot 2.12, Scientfic Visions, 301/593-0317, $135.** If you have piles of data and don't need animated bar-charts in 24-bit color, this scriptable plotting software should be in your analysis tool kit. **Jun 94**

★★★★ **Spyglass Plot 1.0, Spyglass, 217/355-6000, $295.** This scientific-charting software is the first choice for serious large-set plot crunching. **Oct 94**

★★★★ **SuperScope II 1.25, GW Instruments, 617/625-4096, $1490.** Despite a relatively small instrument library, this laboratory data-acquisition software effectively covers a wide range of needs, and learning to use it won't become your life's work. **Oct 94**

★★★★ **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. **Jan 94**

ORGANIZATION/PRODUCTIVITY

★★★★ **Arrange 1.1 (2.0), Common Knowledge, 415/325-9900, $349.** This personal information database's flexible, intuitive approach to data-handling makes it an excellent tool for storing all kinds of day-to-day information. **May 94**

★★★★ **DateBook & TouchBase Pro Bundle 4.0, Aldus Consumer Division, 619/558-6000, $89.99.** Personal information manager package is now easier to use and offers many new features. The excellent linking between contacts and calendar is the most significant feature. **Sep 94**

★★★ **DateView 1.0.1 (1.0.2), Advanced Software, 515/225-4163, $99.95.** If you're willing to sacrifice some features to get simplicity and speed, this calendar/to-do manager makes sense. It integrates with the contact manager, InTouch. **Aug 94**

★★★ **Dynodex for Macintosh 3.5, Portfolio Software, 802/434-6400, $69.95.** Although this program doesn't currently link to a calendar program, it is an excellent contact manager. This upgrade has a few new features, improved performance, and an easier-to-use interface. **Sep 94**

★★★ **First Things First Proactive 1.1, Visionary Software, 503/246-6200, $149.** Capable scheduling program has some convenient features. It's worth a look if you don't have to share information with a contact manager. **Nov 94**

★★★ **Full Contact 2.01 (2.02), FIT Software, 408/562-5990, $169.** Personal information manager can handle with speed and style tasks that would choke other products, but frequently, using it feels like a full-time job. **Aug 94**

★★★★ **In Control 3.0.4, Attain Corp., 617/776-1110, $85.** Excellent to-do-list manager and outliner, coupled with a good calendar is a strong choice if you live and die by to-do lists. It does have some oddities, though, such as not allowing you to copy across views. **Oct 94**

★★★ **Now Contact 1.0 (1.1), Now Software, 503/274-2899, $69.** This contact manager has some innovative features but could add some features, such as file reconciliation. **Mar 94**

★★ **Rae Assist 1.0.2 (1.5), Rae Technology, 408/725-2850, $99.** 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**

★★★ **TimeSquare 1.0, Team Building Technologies, 514/278-3010, $149.** Fast, flexible, network calendar program has lots of handy features, but it's missing a few as well, such as multiday events and label grouping. **Aug 94**

PRESENTATION TOOLS

★★ **Animation Master 2.0.5, Hash Enterprises, 206/750-0042, $699.** Although this animation software packs extraordinary power at a reasonable price, it's needlessly difficult to learn and prone to instability. **Oct 94**

★★★★ **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. **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**

★★★ **Deck II 2.1, OSC, 415/252-0460, $399.** AV Macs turn into digital-audio workstations with this software that enables you to record, mix, modify, and play back CD-quality sound. It doesn't include equalization features. **Jun 94**

★★ **Elastic Reality 1.0 (1.2), Elastic Reality, 608/273-6585, $349.95.** 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**

★★★★ **FlipBook 1.0, S. H. Pierce, 617/338-2222, $89.** Animation printing utility lets users make flip-books (consisting of a series of printed images that, through application of an extremely technical thumb-and-forefinger method, appear to move) out of QuickTime movies, PICS animations, and Scrapbook files. **Jun 94**

★★★ **HyperCard 2.2, Apple Computer, 408/996-1010, $249.** Authoring tool strikes a good balance between power and ease of use, and its price is reasonable. It may not satisfy all your wishes, but it should keep you happily building stacks until the next version comes along. **Sep 94**

★★★★ **Macromedia Director 4.0, Macromedia, 415/252-2000, $1195.** Although this multimedia program remains far from easy to use, this admirable upgrade increases the program's power and improves its interface. Multimedia professionals will continue to find it the best package available. **Sep 94**

★★★★ **Morph 2.0 (2.5), Gryphon Software, 619/454-6836, $239.** Easy to use morphing software is beautifully designed, with delightful new features, including the ability to morph QuickTime movies. Using it is as painless as morphing gets. **Apr 94**

★★ **MovieWorks 2.0.2, Interactive Solutions, 415/377-0136, $295.** With diligence you can get decent results with this all-in-one QuickTime-based multimedia package. But other entry-level programs make leaping into multimedia easier and more rewarding. **Sep 94**

★★★ **The Multimedia Workshop 1.0, Davidson & Associates, 310/793-0600, $79.95.** Children or adults can use this media-integration tool without big investments of either time or money. It's full of compromises, though, such as the inability to layer narration over music. **Nov 94**

★★★ **Passport Producer Pro 1.0 (1.1.2), Passport Designs, 415/726-0280, $995.** Superb, albeit quite expensive, media-integration package makes assembling even complex presentations surprisingly easy. Path animation is limited to entrances and exits. **Apr 94**

★★★★ **Persuasion 3.0, Aldus Corp., 206/622-5500, $339.** Users have plenty of new features to cheer about, including improved tool palettes, extensive charting options, and hypertext functions with this presentation graphics program's upgrade. High memory and disk-space requirements are drawbacks, however. **Sep 94**

★★★ **QuickFlix 1.0 (1.1.1), 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**

PROGRAMMING

★★★★ **IDL 3.5, Research Systems, 303/786-9900, $1500.** In this shockingly powerful, compact, graphics-oriented, interpreted language, a single command is worth a page of C-language code. If you're an image processing professional, you should consider adding it to your tool kit. **Oct 94**

★★★★ **Object Master for Think C and C++, ACI US, 408/252-4444, $255.** Object-oriented development environment is full of goodies and will pay for itself in about a week due to increased programmer pro-

continues

Star Ratings

ductivity. Apr 94

★★★★ **Smalltalk/V for Macintosh 2.0 (2.02), Digitalk, 714/513-3000, $495.** Object-oriented development system is viable for commercial projects, while Digitalk's customer support and documentation set a standard other vendors should emulate. Feb 94

★★★ **VIP BASIC 1.0.1 (1.0.3), Mainstay, 805/484-9400, $295.** Popular programming language lets programmers who know only BASIC get started producing real, if interpreted, Mac programs. It's a serious developer's tool, though it's not on the same footing as VIP-C. Jun 94

★★★★ **VIP-C 1.0.1 (1.5.1), Mainstay, 805/484-9400, $495.** If you've mastered the rudiments of C, this programming-code generator will let you code about ten times faster than you could using only an editor. Its real strength is in rapidly assembling smaller projects. May 94

UTILITIES

★★ **Apple Personal Diagnostics, Apple Computer, 408/996-1010, $129.** In trying to make a hardware tool for the rest of us, Apple has come up short. This hardware-diagnostics utility has an uneven manual, some less than thorough tests, and a surprisingly unsatisfying interface. Nov 94

★★★ **AppleSearch 1.0, Apple Computer, 408/996-1010, $1799.** Although it has some rough edges, this product for archiving and retrieving text is highly useful. It presents retrieved information clearly and extracts text from documents in many formats. May 94

★★★ **Atticus Vista 1.0 (1.0.2), Atticus Software Corp., 203/348-6100, $69.95.** Control panel and application automatically catalog the disks you mount on the desktop. It has a few problems, including limited search options, but it can help bring order to disorganized disk collections. May 94

★★★★ **Automap Road Atlas for Macintosh 2.01 (2.04), Automap, 206/455-3552, $99.95.** Mapping software tells you how to get where you're going better than any other map or atlas our reviewer has seen. Although screen redraw is slow, it's worth it for the written directions and maps the program has to offer. Jul 94

★★★ **CD AllCache 2.0, CharisMac Engineering, 916/885-4420, $79.95.** CD-ROM accelerator improves access time by caching a CD's directory and putting its most frequently used data into RAM. Despite this software's limitations, most CD addicts will find the speed improvement worth the trouble. Sep 94

★★★★ **CD-ROM ToolKit 1.0.5 (1.1), FWB, 415/474-8055, $79.** Software accelerator can halve the time it takes to open files and search on a CD-ROM. The product supports a wide variety of formats and CD-ROM drives, but users should be aware that playback of QuickTime movies is often uneven. May 94

★★★★★ **Conflict Catcher II 2.1.1, Casady & Greene, 408/484-9228, $79.95.** Customizable, fast, and safe extension-management utility goes well beyond the basics. For Power Macintosh users, it even tells which extensions aren't written in native code and are likely to slow down Power Macs. Oct 94

★★★ **CryptoMactic 1.01, 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

★★★ **DiskDoubler 4.0, Symantec Corp., 503/334-6054, $79.95.** In pure efficiency terms, this file-compression software is a winner, but it lacks many features of previous versions, including passwords on self-extracting files and automatic recompression. Aug 94

★★★★ **DiskLock PB 1.0 (3.0), Symantec/Fifth Generation Systems, 503/334-6054, $99.** PowerBook security software balances robust security with simplicity and ease of use. Will keep out all but the most determined. Jan 94

★★★★ **DiskTop 4.5 (4.5.1), PrairieSoft, 515/225-3720, $99.95.** Organizing a crammed hard drive is a more manageable task with this simple but powerful file-management utility that lets you copy, move, rename, delete, and find files—without using the Finder. Jul 94

★★★ **The Disney Collection Screen Saver, Berkeley Systems, 510/540-5535, $49.99.** Mickey, Goofy, Peter Pan, Ariel, and other Disney favorites cavort around your screen with this screen saver that includes 16 different modules. Mar 94

★★★★ **Drive7 3.0, Casa Blanca Works, 415/461-2227, $79.95.** Highly recommended hard drive–formatting utility easily formats and partitions most drives and provides all the options you need. And within its limitations, its Mount Cache utility provides a real performance boost. Nov 94

★ **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. 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

★★★ **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

★★★★ **Icon Mania 1.0 (1.01), Dubl-Click Software, 503/317-0355, $69.95.** Delightful icon-editing utility comes with terrific tools for building new icons, including an outstanding thumbnail feature that builds custom icons from graphics files. Aug 94

★★★★ **MacTools 3.0, Central Point Software, 503/690-8090, $149.** Recovering trashed files is a snap with this utility package that fixes more disk problems than its competition. It includes disk-and-file maintenance, disk repair, virus protection, and backup. Mar 94

★★★★ **Maxima 3.0, Connectix, 415/571-5100, $99.** If you have more than 8MB of RAM, you can use some of it as a RAM disk, speeding up disk-based operations, with this inexpensive utility. Nov 94

★★★★ **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

★★★ **Now Compress 1.0 (1.0.1), Now Software, 503/274-2899, $69.** Compression utility is easy to use and complete, and it compresses as well as or better than other options. Dec 93

★★★ **Now Fun, Now Software, 503/274-2899, $45.** Five control panels let you liven up your Mac by customizing everything from menu colors to system sounds. Dec 93

★★★ **Open Sesame 1.02 (1.1), Charles River Analytics, 617/491-3474, $99.** Utility automates Finder operations, such as opening files, without macros or scripts. It has an elegant interface, but people with strict work habits are more likely to find its suggestions worthwhile than are those who don't follow a routine. May 94

★★★ **OptiMem 1.4.1 (1.5.6f), Jump Development Group, 412/681-2692, $129.** Systemwide memory manager monitors RAM use and allocates RAM where it's needed. Works best with software that handles minimum-memory situations effectively. Mar 94

★★★ **PopupFolder 1.0 (1.5), Inline Software, 617/935-1515, $59.95.** Finder utility is so handy and easy to use, you wonder why it isn't built into the Mac's system software. On the other hand, it's sluggish when readying pop-up menus for every folder. Aug 94

★★★★ **PowerAgent 1.1, SouthBeach Software Corp., 305/858-8416, $159.** You can revolutionize your Macintosh work with this agent program that manages scripts. It provides excellent support for FileMaker Pro, but unfortunately in many other mainstream applications scripting is difficult to implement. Nov 94

★★★★ **PowerMerge 2.0, Leader Technologies, 714/757-1787, $129.** Powerful file-management tool helps you keep individual files, folders, or entire volumes organized and up-to-date. This version lets you compare and launch documents, rename files, trash superfluous files, and lots more. Aug 94

★★★ **Power To Go 2.0, Claris Corp., 408/727-8227, $39.** 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

★★★ **ProFiles 1.0, Dayna Communications, 801/269-7200, $129.** Unusual new utility lets you group related files and folders for quick access and actions such as making aliases, copying, turning sharing on and off, and more. The recommended RAM allocation of 1MB may be a problem for computers with limited memory. Aug 94

★★★★ **QuicKeys 3.0, CE Software, 515/221-1801, $139.** The simple, unintimidating interface of this macro-building utility allows you to build a set of useful shortcuts quickly. Mar 94

★★★★ **RAM Doubler 1.0.1 (1.5), Connectix Corp., 415/571-5100, $99.** Inexpensive system extension doubles available RAM for many Mac users. There are a number of requirements, however, including System 7, 4MB of physical RAM, and a 68030 board. May 94

★★★ **Redux Deluxe 2.0.2 (2.5.1), Inline Software, 617/935-1515, $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

★★★★ **SAM 3.5.8 (4.0), Symantec Corp., 503/334-6054, $99.** Efficient, thorough virus-protection software slows down system start-up and application launching, but this program is a worthwhile investment for anyone who exchanges or downloads files. Mar 94

★★ **SCSI Director Pro 3.0.6, Transoft Corp., 805/565-5200, $99.** Utility provides simple, one-button hard disk formatting, but when it comes to doing some of the fancy tricks described on the program's box, the going gets rough and technical support costs $1.90 per minute. Sep 94

★★★ **Stop & Go 4.0, Engram International, 415/455-1100, $69.99.** File-protection/relaunch utility uses a portion of your hard disk to save a snapshot of the data in your Mac's RAM. It's fast, and it relaunches files, applications, and extensions in a single, unified process, but it's unduly complicated. Oct 94

★★★ **Tempo II Plus 3.0.9 (3.0.9a), Affinity Microsystems, 303/442-4840, $179.95.** Very capable macro-creating utility may be daunting for novices but offers plenty of power for advanced users. Mar 94

continues

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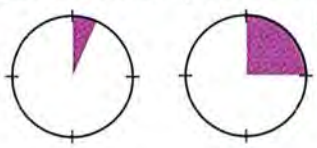

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Star Ratings

★★★★ **TimesTwo 2.0, Golden Triangle Computers, 619/587-0110, $149.** This driver-level compression utility is transparent and robust. It caused no problems through a two-month course of testing, on a system with myriad utilities and system software tools. **Mar 94**

★★★★ **Toner Tuner 1.0.3 (1.06), 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. **Dec 93**

★★★★ **ultraShield 1.252 (2.0), usrEZ Software, 714/756-5140, $149.** Sophisticated security product combines practically every feature you might need into an integrated package. **Dec 93**

★★★ **UnderWare 1.0.1, Bit Jugglers, 415/968-3908, $59.95.** Inspired, silly fun for your Mac's desktop comes from a control panel that adds three features: a screen saver, desktop patterns, and animations that run on your desktop while you work. **Jun 94**

★★★★ **Virex 5.0 (5.03), Datawatch Corp., 919/549-0711, $99.95.** The extremely fast, trouble-free performance of this software makes the task of guarding against computer viruses almost painless. Its speed puts it ahead of the pack. **May 94**

★★★★ **VirtualDisk 1.1a (2.0), Continuum Software, 206/695-8136, $79.** Rapid disk cataloging; fast, efficient label-printing; and an excellent disk-copy utility make this software package a wonderful value. **Jul 94**

★★★ **Working Watermarker 1.02 (1.06), Working Software, 408/423-5696, $49.95.** Simple, useful system extension allows you to print or fax "watermarks" in the background of virtually any document. Although it has imperfections, it's earned a permanent spot in our reviewer's System Folder. **Jan 94**

VERTICAL MARKETS

★★★ **Claire, The Personal Music Coach 1.0.1, Opcode Systems, 415/856-3333, $129.95.333, $129.95.** Musicianship program teaches pitch and interval recognition, sight singing, and intonation. Although the interface is nonstandard, it's logical and easy to learn. **May 94**

★★★★ **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**

★★ **MacInteriors 1.0 (1.2), 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**

★★★★ **Mayo Clinic Family Health Book 1.2, IVI Publishing, 612/686-0779, $69.95.** Medical CD-ROM for home use deals with the full gamut of health-care topics, from AIDS to zygotes, although it doesn't include any reference to alternative therapies. **Sep 94**

★★★ **Mayo Clinic: The Total Heart 1.0, IVI Publishing, 612/686-0779, $59.95.** Cardiovascular health and related subjects are the topics of this medical CD-ROM for home use. Although it makes liberal use of drawings, photographs, and animations, video sequences would have been more effective. **Sep 94**

★★★ **MusicTime 2.0, Passport Designs, 415/726-0280, $149 to $249.** Music-notation program is geared for hobbyists and students. If your needs aren't complex, it may fit the bill, at a great price. **Oct 94**

★★★ **SAM-CD, Scientific American Medicine, 212/754-0550, $395.** Despite a few shortcomings, this medical reference work—a popular series of publications covering topics in clinical medicine—should prove a worthwhile addition to any medical library. **Sep 94**

★★★★ **WillMaker 5.0, Nolo Press, 510/549-1976, $69.95.** Legal software quickly and easily automates the creation of wills, health-care directives and proxies, and final-arrangements documents. It offers excellent supporting explanations and background. **Jun 94**

WRITING TOOLS

★★★★ **MacWrite Pro 1.5 (1.5 v2), Claris Corp., 408/727-8227, $249.** The clean, uncluttered interface of this low- to middle-level word processor is still one of its major assets. This upgrade adds support for QuickTime, PowerTalk, AppleScript, and more. **May 94**

★★★★ **OmniPage Professional 5.0, Caere Corp., 408/395-7000, $695.** In a historic first for OCR, this Power Mac software has an accuracy of 100 percent on good text samples. It does still make occasional baffling minor errors on real-world documents. **Nov 94**

★ **The Oxford English Dictionary, Oxford University Press, Electronic Publishing, 212/679-7300 ext.7370, $895.** CD-ROM dictionary contains 20 print volumes, including half a million words, but the flaws, omissions, unreliability, and unforgivably poor design are unbearable. **Apr 94**

★★★ **Random House Unabridged Dictionary, Random House Electronic Publishing, 212/572-2600, $179.** Dictionary on CD-ROM works within any program and is good at guessing misspelled words. Although some functions don't work reliably, the quality and design of the software are better than those of other dictionaries on CD-ROM. **May 94**

★★★ **TextBridge 2.0, Xerox Imaging Systems, 508/977-2000, $99.** Optical character recognition software is impressive on good documents and can be trained and automated. You won't find that anywhere else at this price. **Sep 94**

★★★★ **WordPerfect for Macintosh 3.0 (3.0a), WordPerfect Corp., 801/225-5000, $495.** The innovative interface of this word processor uses context-sensitive button bars and expandable rulers to make innumerable features accessible with a click of the mouse. It's an accomplishment in ease of use. **Mar 94**

★★★★ **WriteNow 4.0.1, WordStar International, 617/494-1200, $119.95.** Tidy word processor's conservative use of memory (the application fits into a dainty 600K partition) and graceful interface will continue to win it fans. This version adds elegant table capabilities and several PowerBook-friendly features. **Jun 94**

Hardware

INPUT DEVICES

★★★ **DrawingSlate, CalComp Digitizer Division, 714/821-2000, $395.** Digitizing tablet is a good, compact, low-cost implementation of pressure sensitivity, although the battery-operated stylus is a bit heavy. **Jun 94**

★★★ **Ear Phone Streamline AV, Jabra Corp., 619/622-0764, $169.** As a hands-free telephony tool—and as a replacement for the Apple PlainTalk microphone—this telephone/speech-recognition earpiece is a winner. Its biggest drawback is that you can't hear other Mac sounds when it's plugged in. **Jul 94**

★★★★ **Mac Keyboard Deluxe, MicroSpeed, 510/490-1403, $125.** If you're in the market for a new or replacement keyboard, this one, which is both smaller and lighter than Apple's Extended Keyboard, is worth considering. It has four ADB ports. **Nov 94**

★★★ **PenDirect ADB, FTG Data Systems, 714/995-3900, $398.** Input device lets you manipulate items on the Macintosh screen using a special stylus called a light pen. It works well, although it seems ergonomically inferior to a mouse for routine tasks. **Mar 94**

★★★ **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**

★★★ **Wacom UD-1212R, Wacom Technology Corp., 206/750-8882, $749.** Graphics tablet with pressure-sensitive stylus is easy to use and highly customizable, though it's incompatible with AppleTalk and AppleTalk Remote. **May 94**

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**

★★★ **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, 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. **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**

★★ **G-Vox, Lyrrus, 215/922-0880, $399.** Hardware-software guitar-instruction package lets your Mac "hear" the notes you play on your guitar. Although the hardware works well, the software has some basic problems and doesn't live up to the hardware. **Apr 94**

★★★ **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**

★★ **Macintosh TV, Apple Computer, 408/996-1010, $2079.** As a computer, this combination computer-television-CD player is sleek but slow. You can get faster performance and better expandability from several less-expensive Performa models. **Apr 94**

★★★ **PowerPlate, Technöggin, 513/321-1777, $169.95 to $299.95.** Line of long-lived, external PowerBook battery packs, each of which lets you work for three to five times as long as the usual PowerBook battery. Unfortunately, the System 7 power manager periodically alerts you that your battery is not charging and dims the screen though battery pack has hours of time left. **Mar 94**

continues

Star Ratings

★★★ **RCD-202, Pinnacle Micro, 714/727-3300, $2495.** Writable CD-ROM drive is good for archiving data simply and inexpensively, but it's incompatible with many hard drives. Mar 94

★★★★ **SCSI Sentry, APS Technologies, 816/483-6100, $99.** Although the price of this terminator may seem steep, this device may well be the cure for SCSI woes. Our reviewer heartily recommends it. Sep 94

★★★★ **ThinPack, VST Power Systems, 508/287-4600, $199.95.** External battery pack for PowerBooks is compact, with a lightweight design. It comes with handy power-management utilities. Mar 94

★★★★ **TurboDialer, Advanced Software, 408/733-2364, $69.95.** Automatic telephone dialer is a well-executed product, except for occasional computer noise that seeps into phone conversations. If you constantly dial phone numbers that are stored in your computer, this product will save you time and energy. Jul 94

★★★★ **Yamaha YST-M10 Powered Monitor Speakers, Yamaha, 714/522-9240, $149.95.** Powered speakers have a good balanced sound and a great volume range at an outstanding price. Apr 94

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

★★★★ **Cypress PhonePro 1.2 (1.4), Cypress Research Corp., 408/752-2700, $349 to $950.** By improving its integration with FaxPro and with PowerTalk and PowerShare, this powerful telephony software has greatly extended its business scope. May 94

★★★ **DaynaPort Pocket SCSI/Link, Dayna Communications, 801/269-7200, $299 to $369.** Inexpensive, lightweight SCSI-to-Ethernet connector works with both desktop Macs and PowerBooks and can use the Mac's ADB port as a power source. Nov 94

★★★★★ **EtherWave, Farallon Computing, 510/814-5000, $129.** If you need to expand your network at a reasonable price with minimal fuss, get this Ethernet transceiver. Instead of providing only one 10BaseT twisted-pair jack, it includes a second jack that allows you to daisy-chain to another device through an additional 10BaseT line. May 94

★★★ **OneWorld Fax, Global Village Communication, 415/390-8200, $999.** Easy-to-use network fax product lets an office share fax-sending resources without dedicating a hard drive and CPU; however, it can't receive faxes and can't queue more than one fax document at a time from a single CPU. Aug 94

★★★ **Pocket EtherTalk Adapter, Xircom, 818/878-7600, $349 to 399.** All-in-one SCSI-to-Ethernet connector is lightweight and works with desktop Macs and PowerBooks. Nov 94

★★★★ **PowerPort Mercury/PB 500 Series, Global Village Communication, 415/390-8200, $399.** Top-notch fax modem is capable of exemplary fax and data communications performance. Nov 94

★★★ **Spectra-Com P192mx, Bay Connection, 408/270-8070, $199.95.** If you must have absolute portability and AC power isn't available, this pocket data/fax modem can do the job. It's not that much smaller than a regular desktop modem, however. Oct 94

★★★★ **SupraFaxModem 288, Supra Corp., 503/967-2410, $329.95.** This 28,800-bps fax modem is a very good performer, as good as or better than 14,400-bps modems, and the price of admission isn't terribly steep. Combined with fast, stable fax software and a good terminal program, it's hard to beat. Aug 94

★★★ **Watermark Message Central 2.0.2, High Tide Software, 510/704-9927, $499.** If you're willing to put in a lot of effort, you'll find this highly sophisticated voice-mail system supremely flexible. It includes a specially modified modem with voice chip, as well as fax software and telecommunications software. Jul 94

PRINTERS

★★★★ **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

★★ **Brother HJ-400, Brother International, 908/356-8880, $369.** Compact, 360-dpi ink-jet printer is fairly slow and does not allow background printing. Some large files require additional application memory to print correctly. May 94

★★★★ **Color StyleWriter Pro, Apple Computer, 408/996-1010, $629.** Color printer represents one of the best values in the inexpensive color-printing market. It's fast, produces nice-looking output, and has some good features, including a great way of handling color ink cartridges. Sep 94

★★★★ **DeskWriter 310, Hewlett-Packard, 800/752-0900, $379 to $455.** Versatile, low-cost ink-jet printer is a 4.3-pound, battery-powered portable. With its 60-page sheet feeder, it's also a great desktop printer; and with a $49 color print cartridge, it offers inexpensive three-color printing. Mar 94

★★★ **HP LaserJet 4ML, Hewlett-Packard, 800/752-0900, $1279.** Primarily for those of you who use a PC or work in a small, mixed-platform environment, this energy-efficient laser printer offers automatic port and language switching, and is a good buy. Its advanced PC features may not be worthwhile for those who use Macs only. May 94

★★★★★ **LaserWriter Select 360, Apple Computer, 408/996-1010, $1599.** Low-cost, high-performance, 10-ppm printer is perfect for small LocalTalk or mixed networks. For bigger networks, consider buying more than one; they're more cost-effective than a 20-ppm printer. Apr 94

★★★ **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

★★ **Notebook Printer II, Citizen America, 310/453-0614, $399.** If weight and size are your biggest concerns in choosing a portable printer, and you print primarily in black and white, this thermal-fusion printer may be a good choice. If speed is at all an issue, however, other options may be preferable. Jun 94

★★★★ **Personal LaserWriter 320, Apple Computer, 408/996-1010, $959.** If you've been holding out for a high-quality personal laser printer that's fast enough to share over LocalTalk, the small inconveniences of this 300-dpi printer are easily outweighed by its low price, good speed, and PostScript Level 2 support. May 94

★★★★ **PowerPrint 2.5, GDT Softworks, 604/291-9121, $149.** Ingenious hardware-software combo lets you print from your Mac to almost any PC printer. It supports over 1000 printers, ranging from aging dot matrix models to the newer color ink-jet and laser printers. Sep 94

★★★ **P-Touch PC, Brother International Corp., 908/356-8880, ext. 4307, $449.95.** Versatile label printer is easy to set up and use, and produces high-quality output. The cost per label is high, though, and the documentation is weak. Sep 94

★★ **QMS ColorScript Laser 1000, QMS, 205/633-4300, $7999.** Color laser printer succeeds in combining the versatility of monochrome laser printing with attention-getting color, but if you don't need to chase rainbows right away, you might wait and see if competition drives capabilities up. Jul 94

★★★ **Silentwriter 640, NEC Technologies, 508/264-8000, $825.** With 3MB of RAM, PostScript Level 2 support, and a 6-ppm engine, this printer is a capable performer. Generally, it represents hassle-free printing, but it doesn't handle single sheets of paper well. Jun 94

★★★ **Smart Label Printer Pro, Seiko Instruments, 408/922-5900, $299.95.** If you need to print only a few labels at a time, this label printer may be an expensive but good choice. It prints very quickly, and with excellent print quality. May 94

SCANNERS

★★★★ **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

★★★★ **IX-4015 Color Image Scanner, Canon Computer Systems, 714/438-3000, $1169.** The price of this color flatbed scanner is competitive, and its speed and excellent bundled software make it easy to use and a good choice for the small office. If you can get by without legal-size scans, it should serve you well. Jul 94

★★★ **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

★★★★ **Mirror 800 Plus Color Scanner, Mirror Technologies, 612/830-1549, $999.** Add the NuBus JPEG board ($300) and easy-to-use 35mm transparency scanning module ($599) and you get a nifty—if slow—desktop scanning package for a reasonable price. Jan 94

★★★ **ScanMaker 35t, Microtek, 310/297-5000, $1999.** Speedy 35mm film scanner accommodates loose film and delivers a good image, but the included software is weak. Dec 93

SYSTEMS/STORAGE

★★★★ **Alacrity PM 6100, KS Labs, 614/374-5665, $165.** Installing a clock booster is the quickest, easiest, and cheapest way to extract more power from Apple's entry-level Power Mac. Oct 94

★★★ **Conley SR2 RAID System, Conley Corp., 212/682-0162, $25,335.** While RAID technology is typically praised for its fault-tolerance rather than its speed, this high-performance storage system proves that you can have both. For critical tasks requiring redundancy and round-the-clock operation, this is one of the best Mac RAID systems shipping. Sep 94

★★★ **EtherDock, E-Machines, 408/541-6100, $699.** Heavy-duty Duo docking option is equipped with a full set of 11 ports, including an Ethernet port. The locking mechanism is alarmingly wobbly—although reliable enough to ensure a good connection. May 94

★★★ **Expert Pad PI-7000, Sharp Electronics**

continues

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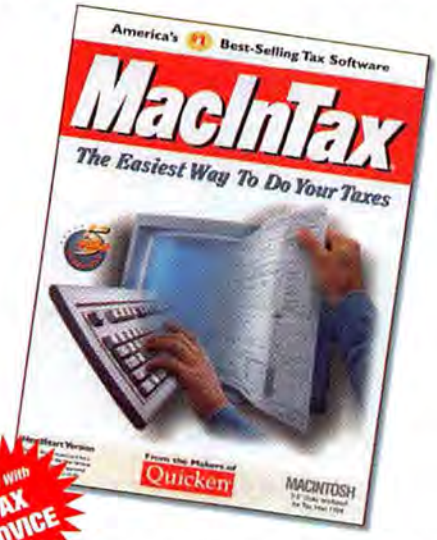

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Star Ratings

Corp., 800/237-4277, $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**

★★ **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**

★★★★ **LC 575, Apple Computer, 408/996-1010, $1699.** For students and small-business professionals who want high power and the convenience of having everything integrated into one case, this 33MHz 68040 system is an ideal choice. **Jun 94**

★★★ **Newton MessagePad 110, Apple Computer, 408/996-1010, $599.** This is the personal digital assistant that Apple should have shipped in August 1993, with improved handwriting recognition, including deferred and letter-by-letter recognition. It also has more memory, longer battery life, and a more efficient design. **Aug 94**

★ **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 Model 200 Series, Orange Micro, 714/779-2772, $1139 to $3237.** If your goal is to get a Mac that runs Windows as fast as a PC, you can't get there from here. If your goal is to get business-level performance for day-in, day-out use, these PC coprocessor cards are probably your best choice. **Aug 94**

★★★★ **PLI Infinity 270 Turbo, PLI, 510/657-2211, $651.** This 270MB SyQuest drive is fast, reliable, and a very good product. The cost of the medium is competitive with that of optical drives. **Sep 94**

★★★★ **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 540c, Apple Computer, 408/996-1010, $4839.** The prestige PowerBook du jour, this sleek, curvy and futuristic-looking notebook makes a good computer for both on-the-road and in-the-office use. Its nonstandard battery, memory, and Ethernet ports are not ideal features, however. **Oct 94**

★★★★ **PowerBook Duo 270c, Apple Computer, 408/996-1010, 4/240 $3099.** Notebook computer meets all the demands of power users; it weighs less than five pounds, features a color active matrix display, and offers longer battery life. The lack of a floppy drive can be inconvenient, though. **Feb 94**

★★★★ **PowerBook Duo 280c, Apple Computer, 408/996-1010, $3759.** If you travel a lot, this notebook computer is hands down the best Mac to get. It offers close to the power of a Quadra 650 in a subnotebook. **Oct 94**

★★ **PowerBook Duo Dock II, Apple Computer, 408/996-1010, $969.** Apple has added Ethernet to this full-featured docking station, but installing NuBus cards is still absurdly difficult. If you don't need NuBus expansion, consider other options. **Oct 94**

★★★★ **Power Macintosh 6100/60, Apple Computer, 408/996-1010, base model $1819.** Given its price and performance, this Power Macintosh is hard to resist. When developers offer in PowerPC format the software that most business users run daily, this should be a system that will give you power to spare. **Jun 94**

★★★★★ **Power Macintosh 7100/66, Apple Computer, 408/996-1010, $2899.** Midrange Power Mac makes an outstanding workstation whose power should last for several years. The price is nothing to take lightly, but this system delivers every dollar's worth. **Aug 94**

★★★★ **Power Macintosh 8100/80, Apple Computer, 408/996-1010, $4249.** While this system doesn't quite offer the excellent price/performance ratio of the other available Power Macs, you should consider it if you're a high-end user moving your work over to RISC-based computing. **Aug 94**

★★★ **Power Macintosh Upgrade Card, Apple Computer, 408/996-1010, $699.** Current 33MHz 040 machines will get the best bang for the buck with this card, which is a less expensive upgrade path than a standard motherboard replacement. However, other Macs won't realize as much of a performance gain. **Oct 94**

★★★★ **Quadra 605, Apple Computer, 408/996-1010, 4/80 $979.** Never before has Apple offered so much performance for so little money. The performance and price of this 040-based machine match those of a standard entry-level 486SX-based Windows PC. **Mar 94**

★★★★ **Quadra 630, Apple Computer, 408/996-1010, $1279.** Fast, inexpensive, expandable 33MHz

continues

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Star Ratings

68040 machine may be the last 680X0-based desktop Macintosh, but it's one of the best entry-level Macs ever. **Nov 94**

★★★★ **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**

★★★ **SCSI MicroDock, Newer Technology, 316/685-4904, $175.** Tiny Duo docking station is just under 4½ ounces and barely 5 inches long. It adds only an ADB port and a SCSI port—but both are useful. **May 94**

★★★★ **SledgeHammer2000FMF, FWB, 415/474-8055, $3179.** RAID drive is both fast and inexpensive. Although it can be a bit noisy when accessing data, it's a good deal. **Apr 94**

★★★ **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

★★★ **Apple Macintosh Display Card 24AC, Apple Computer, 408/996-1010, $1579.** 24-bit accelerated graphics card offers a satisfactory price/performance ratio, although it can't switch resolutions from the keyboard. **Oct 94**

★★★ **Apple QuickTake 100 for Macintosh, Apple Computer, 408/996-1010, $749.** If you're in the market for a medium-quality, digital color camera that costs less than $1000, this is the best deal around. But if you're not in a hurry, you may want to wait until some of the camera's more obvious problems, such as its fixed-focus lens and lack of a zoom option, are ironed out. **Jul 94**

★★★★ **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**

★★★ **Intellicolor Display/20, Radius, 408/434-1010, $2399.** Although with its exceptional brightness and clarity this monitor would be a fine addition to any designer's desk, the included Intellicolor software, which lets you control the settings of your display, doesn't offer much added value. **Apr 94**

★★★ **L-TV Portable, Focus Enhancements, 617/938-8088, $299.** Sturdy, inexpensive, external TV-converter plugs into your Mac and converts video output to NTSC. It provided a crisp, clean image, but mild flickering and conspicuous shimmers were persistent. **Aug 94**

★★★ **L-TV Pro NuBus, Focus Enhancements, 617/938-8088, $399.99.** NuBus card converts your Mac's RGB video signal to NTSC so you can use your Mac with a TV or VCR. It supports a wide range of Macs, but the image has some flicker and distortion, despite flicker-filtering software. **Aug 94**

★★★★ **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**

★★★ **The Presenter Plus Mac/PC, Consumer Technology Northwest, 503/643-1662, $429.** Small, external TV-converter supports output to television from most Macs with built-in video. It does a barely passable job of providing a stable image. **Aug 94**

★★★ **QA-350 LCD, Sharp Electronics Corp., 800/237-4277, $2495.** At less than half the cost of a typical active matrix LCD panel, this passive matrix projection panel offers an economical alternative for presenters who don't need multimedia capability. **Jul 94**

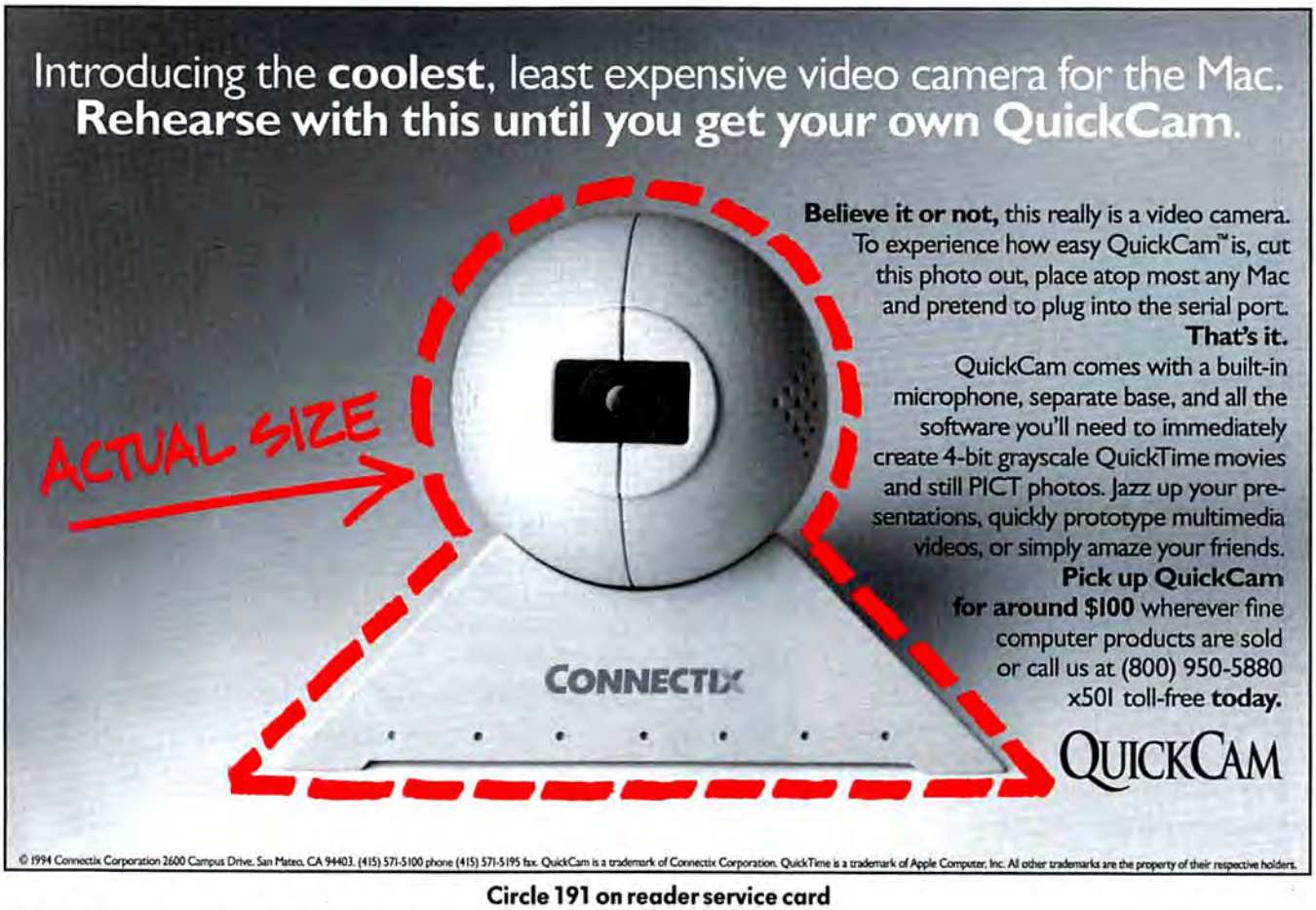
★★★★ **Radius LeMansGT, Radius, 408/434-1010, $2499.** Fast, 24-bit accelerated graphics card has automatic 30-bit CLUT calibration and can switch resolution on the fly via a pop-up menu. **Oct 94**

★★ **RasterOps Horizon 24, RasterOps, 408/562-4200, $1999.** This 13-inch 24-bit accelerated graphics card is slower than anticipated and overpriced. The ROM can, however, be upgraded via software. **Oct 94**

★★★ **Simply TV, E-Machines, 408/541-6100, $439.** Easy-to-install video card plugs snugly into a PDS slot, and allows you to use your Mac with a television for display. The image is impressively flicker-free, but the resolution is limited to 256 colors. **Aug 94**

★★★★ **SuperMac Spectrum Power•1152, SuperMac, 408/541-6100, $1399.** Fast, relatively inexpensive, 24-bit accelerated graphics card can switch resolutions from the keyboard and offers zoom and pan options. **Oct 94**

★★ **Tornado Graphics Card, Mirror Technologies, 612/832-5622, $699.** Inexpensive 24-bit accelerated graphics card has zoom and pan options, but is relatively slow. **Oct 94** m



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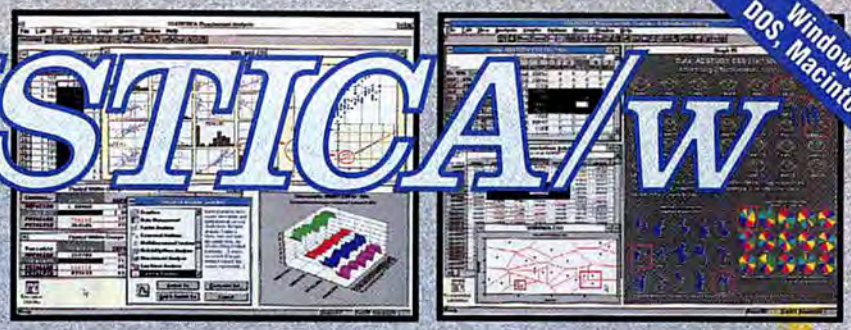
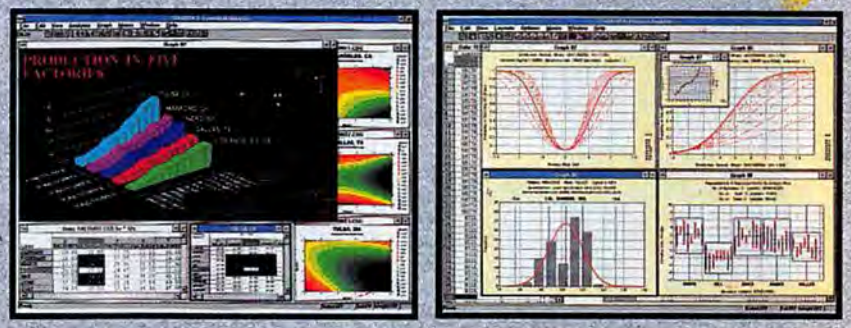
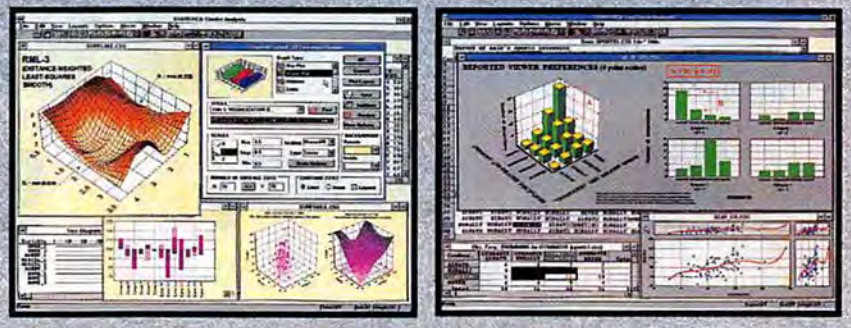
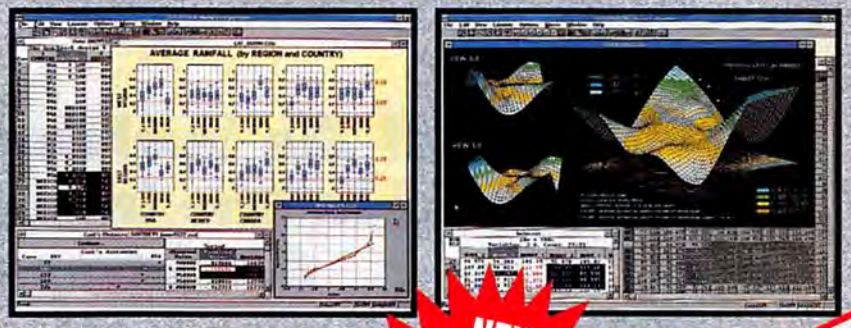
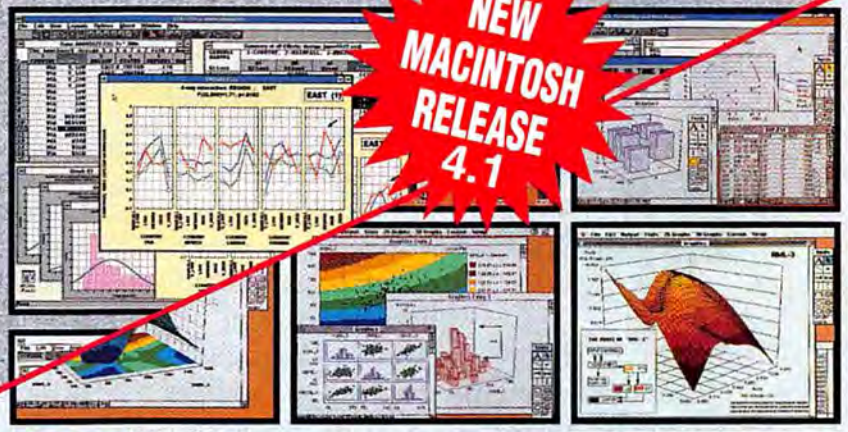
Windows, DOS, Macintosh











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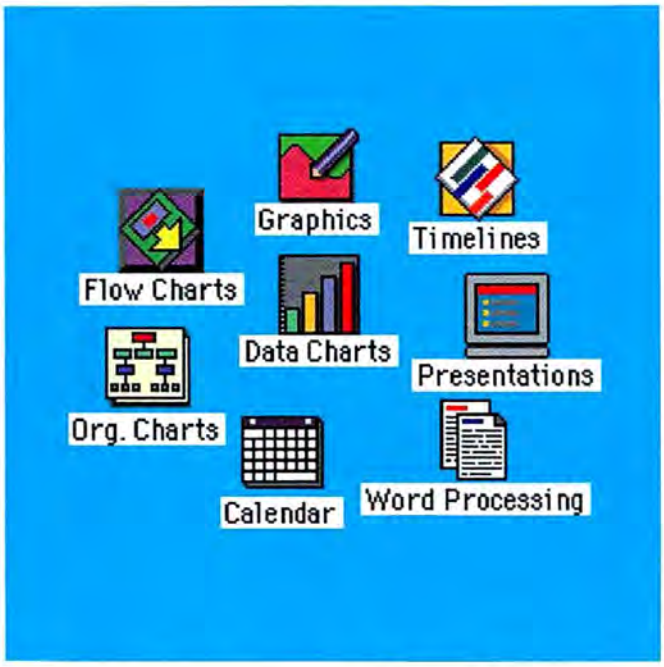

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ClarisImpact was awarded four stars by Macworld magazine and four mice by MacUser magazine in their respective June 1994 issues; it was awarded the Buyers Assurance Seal by InfoWorld magazine in the April 4, 1994 issue. *The regular suggested retail price for ClarisImpact is $399; special introductory price offer good now through January 31, 1995 when purchased direct from Claris only. Introductory price available in the U.S. only. Available in Canada for $499 by calling 800-361-6075. Pricing subject to change. Reseller price and terms may vary. © 1994 Claris Corporation. All Rights Reserved. Claris is a registered trademark, and ClarisImpact, the ClarisImpact design and Simply powerful software are trademarks of Claris Corporation.

Streetwise Shopper

SPECIAL HARDWARE AND SOFTWARE BUYING OPPORTUNITIES

Selected and edited by Charles Barrett

The following listings include both time-sensitive promotions and open-ended offers being sponsored by Macintosh vendors and their resellers. Each listing indicates which products have been awarded a star rating in *Macworld's Reviews* (products rated ★★ or lower are not eligible for inclusion), have been selected as an **Editors' Choice**, or have won a **World-Class** award. In some cases, the editorial evaluation quoted is for an earlier product version. The ◆ symbol indicates that the product is Power Mac related.

When placing an order, please mention that you saw the offer in *Macworld*. Should any problems arise, contact the *Streetwise Shopper* editor by fax (415/442-0766), phone (415/978-3241), or mail (*Macworld*, 501 Second St., San Francisco, CA 94107).

Vendors and resellers desiring to have products and services included in this section are encouraged to contact the *Streetwise Shopper* editor with particulars.

BUNDLES

Brother HL-600 Laser Printers + ClickBook Brother International is including BookMaker's $69.95 (SRP) ClickBook print utility (Nov 94 ★★★ for version 1.1) with its straight-paper-path, 300-dpi HL-600 series printers. ClickBook transforms Windows or Macintosh application-generated documents into one of 20 predefined booklet formats. Papers designed specifically for ClickBook and an assortment of fonts are also included. Estimated street prices: HL-630 $399; HL-645 $499; HL-655 $599. For more information, call Brother at 800/276-7746, 714/859-9706 in California.

DataLife Disks + Ejector Pack Verbatim Corporation is offering a free storage ejector pack, which holds two 3½-inch floppy disks (or one rewritable optical disk), plus a bonus disk to customers who purchase specially marked ten-packs of DataLife disks.

◆ **Power Macintosh 8100/80 + QuarkXPress 3.3** Apple Computer is offering a limited-edition version of its Power Macintosh 8100/80 (Aug 94 ★★★★) specially priced at $5629, including an internal CD-ROM drive, 16MB of RAM, a 1GB hard drive, and Quark's $895 (SRP) QuarkXPress desktop publishing system (Nov 93 ★★★★ for version 3.2; **1993 World-Class**). Call 800/538-9696 for nearest authorized reseller. *Offer expires 1/3/95.*

Pro AudioSpectrum 16 + Trax + Sound Edit Pro + Headphones Tiger Software is offering a bundle that consists of Media Vision's $179.90 (SRP) 16-bit sound system; Passport Design's $85.50 (SRP) Trax software for MIDI recording, editing, and playback; Macromedia's $133.20 (SRP) Sound Edit Pro; and a pair of $24.90 (SRP) LabTec headphones. Available for $49.90 (specify LC or NuBus version) by calling 800/666-2562 (ask for N27-260). *Offer not to expire before 11/30/94.*

◆ **StuffIt Deluxe 3.5 + ◆ Conflict Catcher II or ◆ StuffIt Deluxe 3.5 + QuicKeys 3.0** MacWarehouse is offering Aladdin Systems' $129 (SRP) StuffIt Deluxe compression, encryption, and archiving program (Aug 93 ★★★★ for version 3.0) bundled with either Casady & Greene's $79.95 (SRP) Conflict Catcher II INIT-manager utility (Mar 93 ★★★★ for version 1.0) or CE Software's $169 (SRP) QuicKeys keyboard-shortcut utility (Mar 94 ★★★★). Call MacWarehouse at 800/255-6227 to order either StuffIt Deluxe/Conflict Catcher (#MSB 0021) for $69.95 or StuffIt Deluxe/QuicKeys (#MSB 0029) for $89.95. Both bundles come in promotional packaging. *Offer expires 12/31/94.*

SummaSketch FX Tablets + Fractal Design Painter 2.0 Fractal Design Corporation's $399 (SRP) natural-media paint and image-editing software (including free upgrade to version 3.0) is being bundled with both of Summagraphics Corporation's cordless, pressure-sensitive digitizer tablets. The 18-by-12-inch tablet bundle is available for $1099, and the 12-by-12-inch one for $749—savings of $449 and $299, respectively. For more information, call 800/444-3425. *Offer not to expire before 12/31/94.*

SyQuest 270MB Drives + Fastback Express SyQuest Technology is including a free copy of Symantec's $149 (SRP) Fastback Express backup software on the SQ3270 cartridges that are provided with its family of 3½-inch, 270MB removable hard cartridge drives (Apple's PC Exchange 7.5. required). Street prices start at approximately $500 for a drive and one cartridge. CompUSA (800/451-7638) is the first reseller to offer this bundle.

SIDEGRADES/UPGRADES

Impact RGB and Vandal Accelerators Extreme Systems is offering owners of Applied Engineering's TransWarp LC '030 33MHz, Total System Integration's Enterprise LC, or Harris Labs' Performer LC cards a $50 trade-in credit toward the purchase of the Impact RGB, a 24-bit-video and CPU accelerator for the LC. The same offer applies to owners who trade in their 33MHz or faster TransWarp SE '030, Gemini Ultra, or Novy Systems' Quick30 SE toward the purchase of a Vandal SE accelerator. Call 800/995-2334 for more information. *Offer expires 1/15/95.*

◆ **MacTools 3.0** Central Point Software is offering this $149 (SRP) hard disk utility (Mar 94 ★★★★) for $49.95 to users of any Symantec Mac product. Call 800/937-9842.

◆ **Microsoft Excel 5.0; ◆ PowerPoint 4.0; ◆ Word 6.0** Microsoft Corporation is offering a $30 mail-in rebate to users of each of these applications who upgrade to the latest version. Complete details on how to receive a rebate directly from Microsoft are included in each product package. Call 800/622-4445 for rebate information. *Offer expires 12/31/94.*

Org Plus for Macintosh 1.0 Banner Blue Software is offering this $195 (SRP) organization-charting program to users of competing business graphics products for $69. Available through MacWarehouse (800/255-6227) and Rocky Mountain Computer Outfitters (800/881-3090).

SPECIAL DISCOUNTS/REBATES/OFFERS

Adobe Typefaces Adobe Systems is offering 14 Multiple Master typefaces, new Adobe Originals display faces, and 23 newly released type packages for $69 each. Adobe is also discounting over 400 packages by up to 40 percent. This offer applies only to orders placed through Adobe's *Font & Function* type catalog, which you can obtain by calling 800/445-8787. *Offer expires 12/31/94.*

FileMaker Pro 2.1. Claris Corporation is offering this $399 (SRP) flat-file database (Jan 93 ★★★★ for version 2.0) for $99 ($149 in Canada). Call 800/325-2747 for more information. *Offer expires 12/31/94.*

LS-10 Coolscan Film Scanner Nikon Electronic Imaging is offering a $75 cash rebate that applies to every Coolscan model (Dec 93 ★★★★ for LS-10e) purchased after 9/1/94. Rebate coupons are available at the point of sale, or can be requested by calling 800/526-4566. *Offer expires 12/31/94.*

MailLink E-mail Gateways StarNine Technologies is offering a special introductory price of $49 ($65 after 12/31/94) for a single-user license of MailLink MS for PowerTalk, which permits users to access their Microsoft Mail for AppleTalk Networks mailbox from within PowerTalk. MailLink Internet for PowerTalk 1.5, which links System 7.5's universal mailbox with Internet mail, is also available for $49 ($65 after 3/31/95). Version 2.0 of MailLink Directory Services, which allows access to the directories of a wide variety of E-mail systems, is being introduced for $1995 ($2995 after 12/31/94). For product and ordering information, call 510/649-4949. *Offers expire 12/31/94 and 3/31/95.*

UnderWare 1.0.1 Bit Jugglers is offering a $10 mail-in rebate on this screen-saver entertainment utility (Jun 94 ★★★). UnderWare has over 75 original background patterns, and many of the characters in its 26 modules can interact with objects already on the screen. Details on how to get your rebate are included in each product package. *Offer expires 12/31/94.*

◆ **Workgroup Server + FileMaker Pro Server or 4D Server** Apple Computer is offering a $750 rebate on any Workgroup Server 6150, 8150, or 9150 (with base model estimated prices of $4219, $5319, and $7419, respectively) with the "same time, same invoice" purchase of Claris's $1499 (SRP) FileMaker Pro Server. A similar rebate arrangement is also available (with rebates varying from $650 to $1000, depending on software configuration) when you purchase either an 8150 or 9150 server with ACI US's 4D Server database and application-development software, which starts at $1195 (SRP) for two-user configuration. For Apple Computer reseller information, call 800/538-9696. *Offers expire 12/31/94.* **m**

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Macworld

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There's no cost or obligation. We even pay the postage! Simply fill in the questionnaire, then circle the numbers on the card below for the products that interest you. Numbers for advertised products can be found in the ad and in both the Product Index and Ad Index. Fold card and mail. No staples please.

FASTFAX
For faster results just fax this sheet to +1-415-657-4343. Please indicate your fax number where indicated.

Please answer these questions so that we may better serve you.

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.)

	C	D
500+	❑ 09	❑ 15
499 - 100	❑ 10	❑ 16
99 - 50	❑ 11	❑ 17
49 - 10	❑ 12	❑ 18
9 - 1	❑ 13	❑ 19
None	❑ 14	❑ 20

E. In which ways are you ever involved in purchase decisions for Macintosh products at this entire work-site? (Check all that apply.)

- 21 ❑ Initiate/Determine need for product/capabilities/features
- 22 ❑ Evaluate, recommend, or approve brands/models
- 23 ❑ Evaluate, recommend, or approve purchase source
- 24 ❑ Authorize purchases

F. Over the next 12 months, how much will this entire work-site spend on Macintosh products and/or services? (Check one.)

- 25 ❑ $1 million or more
- 26 ❑ $999,999 – $500,000
- 27 ❑ $499,999 – $100,000
- 28 ❑ $99,999 – $50,000
- 29 ❑ $49,999 – $10,000
- 30 ❑ Under $10,000

G. Considering the entire work-site, which of the following Macintosh hardware and software products are currently installed? (Check all that apply.)

- 31 ❑ Business software (Word processing, spreadsheet, database, etc.)
- 32 ❑ Graphics/publishing software
- 33 ❑ Monitors/displays
- 34 ❑ Printers/scanners
- 35 ❑ Networking/communications hardware and/or software
- 36 ❑ Multimedia/AV hardware and/or software
- 37 ❑ Mobile computing products (PowerBooks, peripherals, software, etc.)

H. What is your primary job function? (Check one.)

- 38 ❑ Computer Reseller/VAR/VAD
- 39 ❑ MIS/DP/IS/Network Management
- 40 ❑ Engineering
- 41 ❑ R&D/Scientific
- 42 ❑ Corporate/General Management
- 43 ❑ Accounting/Finance
- 44 ❑ Marketing/Sales/PR/ Communications
- 45 ❑ Art/Design/Creative Services

Thank You!

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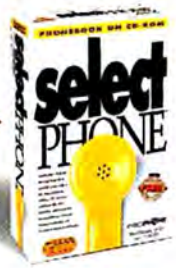

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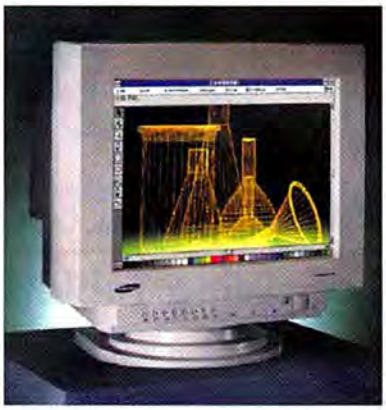
Includes Mac Adapter

$349.99 65541



SyncMaster™ 17GL 17" Color Monitor

- 1280 x 1024 (max. res.) at 60Hz refresh rates
- .28 mm dot pitch
- INVAR shadow mask
- Tilt-swivel base

Includes Mac Adapter

$749.99 64989

The SyncMaster 17GL is the ideal monitor for general business, desktop publishing, multimedia or entry-level CAD applications. This high performance monitor has a large viewing area with a small footprint for easy integration into an existing desktop system. Also included is a power saving mode that complies with VESA guidelines. The SyncMaster 17GL features a flat square CRT with Invar Shadow mask for sustained brightness levels, and its Dynamic Focus provides optimum focus across the large 17" viewing surface. Additional features include an On-Screen Display that makes it easy to carry out precise adjustment of screen geometry. The SyncMaster 17GL is also covered by a full two-year warranty.

SyncMaster™ 17GLs 17" Color Monitor

For the most exacting visual applications, Samsung offers the top-of-the-line SyncMaster 17GLs. This 17" flat-square monitor offers ultra-precise, sharp images—even in the corners—thanks to its .26mm dot pitch and extremely high resolution. The SyncMaster 17GLs carries the EPA Energy Star logo, which attests to its compliance with low power consumption standards. Outstanding features of this display include an On-Screen Display that makes it easy to carry out precise adjustments and a power-saving mode that complies with VESA guidelines. It has up-front digital controls for easy image adjustments, as well as a special AR coating to limit glare while maximizing focus. The 17GLs is covered by a two-year warranty.

- 1600 X 1200 (max. res.) at 60Hz refresh rates
- .26 mm dot pitch
- INVAR shadow mask/New Anti-Reflective coating
- On screen color temp control
- Tilt-swivel base

Includes Mac Adapter

$889.99 64988

SyncMaster™ 15GL 15" Color Monitor

- 1024 x 768 at 76Hz refresh rates
- .28 mm dot pitch
- Digital (one touch) picture controls
- Tilt-swivel base

Includes Mac Adapter

$379.99 64991

The SyncMaster 15GL is a full-featured 15" monitor that provides superb image quality with reduced distortion–thanks to its flat square screen. The 15GL carries the EPA Energy Star logo, which attests to its compliance with low power consumption standards. It delivers extra sharp, high-quality images required for Macintosh applications or any high-end tasks such as presentation graphics or desktop publishing. Additional features of the SyncMaster 15GL include a power saving mode that complies with VESA guidelines. The 15GL also complies with stringent MPR-II safe-emission standards and comes with a two-year warranty.

SyncMaster™ 14GL 14" Color Monitor

- 1024 x 768 at 76Hz refresh rates
- .28 mm dot pitch
- Digital (one touch) picture controls
- Tilt-swivel base

Includes Mac Adapter

$299.99 64990

The SyncMaster 14GL is Samsung's flagship 14" color monitor. It's designed to meet the requirements of all Macintosh applications. This full-featured display offers users a combination of excellent screen performance and an advanced ergonomic design. All screen images are stable and flicker-free for easy on the eyes viewing. The SyncMaster 14GL meets all of today's environmental and safe workplace requirements x by adhering to the Swedish MPR-II guidelines for lower ELF and VLF emissions and EPA Energy Star requirements for power consumption. In addition, Samsung's attention to production quality has been awarded ISO 9001 certification, and the SyncMaster 14GL is backed by a two-year warranty.

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Conflict Catcher II

THIRTY DAY MONEY BACK GUARANTEE MBG
Accelerated for Power Macintosh

The Essential Macintosh Start-Up Software Manager & Problem Solver

This utility locates problems with start-up files including printing problems, crashes and frozen screens. Enables you to "link" software in three ways - GroupLinks for start-up files that rely on one another to work, Incompatible Links for files that need to load in a specific order. This feature-loaded product also moves fonts in and out of the System 7.1 font folder to free up more memory, creates detailed System reports and offers keyboard shortcuts. Invaluable for power users and novices alike - no Mac should be without it. Requires System 7 (System 7.5 Savvy).

Conflict Catcher II (when purchased separately) $49.99 66374

$29.99 64605 (with purchase of PowerMac CPU)

SOFTSPOT™ TheraSoft™ Mouse Pad
BY ENVIROGEN

An ergonomically designed mouse pad with a cushioning foam support insert made of TheraSoft™, a unique material used in the medical field to cushion healing bones, tendons and muscles. It has the ability to distribute weight evenly across its surface. Without causing pressure, friction, or impairing circulation, TheraSoft gives your wrists a floating sensation. The TheraSoft insert can also be used to do basic theraputic hand/wrist exercises (an illustrated card is included to provide step-by-step instructions on how to perform the exercises).

$31.99 BLUE 66890 AQUA 66892 RED 66893 BLACK 66895

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WACOM Drawing Tablets

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THIRTY DAY MONEY BACK GUARANTEE MBG

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12x12 inch Electrostatic Tablet
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A breakthrough in 3D modeling for designers.

Accelerated for Power Macintosh

DesignWorkshop™ presents a new paradigm for modeling on the Macintosh, with design-oriented 3D direct manipulation. By extending the familiar click-and-drag MacDraw style of interaction into true 3D, the unique interface provides a fluent environment for designing in 3D with a computer – for the first time. Fast shadow-casting gives you true-color object-based renderings, not just pixel images. The sun position is set directly by latitude, date and time. And the view-independent shadows permit multiple views of the shadowed model without recalculation. Time-lapse sun studies are easily calculated and automatically saved as QuickTime™ movies. DXF import and export for both models and drawings is built in, and hidden-line and pochéd section drawings are generated automatically.

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CAPACITY	SIZE	ACCESS	INTERNAL	EXTERNAL
240MB*	2.5"	14MS	$ 315	$ 375
530MB**	3.5"	13MS	$ 379	$ 439
1.2GIG	3.5"	8.5MS	$ 595	$ 655

Seagate — 5 YEAR WARRANTY

CAPACITY	SIZE	ACCESS	MODEL	EXTERNAL
2.4GIG	3.5"	9MS	ST12450N	$ 1749
2.5GIG	3.5"	8MS	Barracuda 2	$ 1399
2.5GIG	3.5"	8MS	Barracuda 2 WIDE	$ 1549
3.4GIG	5.25"	10MS	Elite 3	$ 1999
4.1GIG	3.5"	8MS	BARRACUDA 4	$ 2335
9.0GIG	5.25"	11MS	Elite 9	$ 3749

CONNER — 5 YEAR WARRANTY

CAPACITY	SIZE	ACCESS	MODEL	EXTERNAL
330MB**	3.5"	12MS	CFA340S	$ 320
545MB**	3.5"	12MS	CFA540S	$ 450
1.0GIG	3.5"	9MS	CFP1060S	$ 635
2.1GIG	3.5"	9MS	CFP2105S	$ 995

Quantum — 5 YEAR WARRANTY

CAPACITY	SIZE	ACCESS	MODEL	EXTERNAL
1.0GIG	3.5"	9MS	E1080S	$ 645
2.2GIG	3.5"	9.5MS	E2160S	$ 1099

HITACHI — 5 YEAR WARRANTY

CAPACITY	SIZE	ACCESS	INTERNAL	EXTERNAL
3.7GIG	5.25"	12.8M	$ 1645	$ 1745

MONITORS

COLOR TRINITRON MONITORS

Sony GDM-15SF1 15" $ 469

Flat anti-glare coated supports every PC and Mac resolution from VGA up to 1280 x 1024.

Sony GDM-17SE1 17" $ 1059

Sony GDM-20SE1 20" $ 1899

The Cadillac of all Monitors!

CD ROMS

Toshiba 4101	$ 275
Toshiba 3401	$ 335
Toshiba 3501 4 Speed	$ 525
Yamaha 4 speed recorder	$ 5245
Ricoh 1000 CD-Recorder	$ 2395

1.2MB Buffer so you won't get data transfer interruptions (Thats double the buffer size of the Pinnacle Micro). And 680MB media for only $15.99. Just set the recording format, select the files, and hit create.

DIRECT CONNECTIONS 7668 EXECUTIVE DR. EDEN PRAIRIE, MN 55344 * 1 yr warranty. ** 2 yr warranty. Gov't, Corp, and Univ. P.O's accepted. 30 day money back does not apply towards monitors.

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128MB EXTERNAL $599

INCLUDES ONE CARTRIDGE

1 YEAR WARRANTY

CAPACITY	MODEL		ACCESS		EXTERNAL
128MB	Ricoh		30MS		$ 599
230MB	Fujitsu		30MS		$ 925
230MB	Olympus	2YR. WARRANTY	28MS	4200 RPM	$ 915
650MB	Sony		40MS		$ 999
1.3GB	Ricoh		40MS		$ 1999
1.3GB	Sony		40MS		$ 2099

TAPE BACKUP SYSTEMS

JUKEBOX UPTO 140GIG

INCLUDES TAPE + RETROSPECT SOFTWARE

2 YEAR WARRANTY

CAPACITY	MODEL	MEDIA	INTERNAL	EXTERNAL
250MB	Tandberg TDC 3660	DC6250	$ 445	$ 499
1.3-2GIG	DC DAT	4MM	$ 729	$ 789
1.3-4GIG	DC DOUBLE DAT	4MM	$ 839	$ 899
4.0-8GIG	Connor 4326 DDS-2	4MM	$ 939	$ 999
4.0GIG	Sony 5200 DDS-2	4MM	$ 989	$ 1049
4.0-8GIG	Sony 5000 DDS-2	4MM	$ 1029	$ 1089
1.3-5GIG	Exabyte 8205	8MM	$ 1539	$ 1599
1.3-10GIG	Exabyte 8505	8MM	$ 2179	$ 2279
7.0-14GIG	Exabyte 8505XL	8MM	$ 2255	$ 2355

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MEDIA

128MB	Optical	$ 25	60M Tape	$ 10
230MB	Optical	$ 35	90M Tape	$ 12
650GIG	Optical	$ 79	112M Tape	$ 18
1.3GIG	Optical	$105	120M Tape	$ 22

1-800-258-2622 1-800-CLUBMAC 1-800-258-2622

DAYTONA Series

LPS Series

The Quantum LPS 540S is a high-performance 3.5-inch hard drive that improves the efficiency of mid-range to high-end Macs. Performance-enhancing features like AutoTransfer and Adaptive Segmentation offers support for increasingly complex Mac designs and applications.

EMPIRE Series

Quantum

ClubMac 30 DAY MONEY BACK GUARANTEE

The Quantum Daytona Series are high capacity 2.5-inch hard disk drives that provide unmatched mass storage solutions for the Apple PowerBook. The drives have advanced performance features like StackWrite firmware and a unique latching mechanism, called ShockLock, that provides maximum protection against non-operating shock.

Capacity	Access	Internal	External
2.5" Portable Drives			
256MB	17ms	$285	$405
514MB	17ms	$469	$589
Value/Entry Level			
3.5" Low Profile			
170MB	14ms	$179	$239
270MB	12ms	$195	$255
340MB	12ms	$225	$285
540MB	12ms	$279	$339
Value/Performance			
3.5" Low Profile			
730MB	11ms	$379	$439

The Quantum Empire Series are low-profile, 3.5-inch hard disk drives designed to meet the most demanding performance and reliability standards of workgroup servers and disk arrays. Performance-enhancing features on all four drives include Optimized Recording of Command Algorithm (OCRA) firmware.

High Performance/Capacity			
3.5" Low Profile			
1080MB	9.5ms	$629	$689
1400MB	9.5ms	$819	$879
3.5" Half Height			
2100MB	9.5ms	$1139	$1199

Quantum LPS, Lightning, and Empire Series carry a 30-Day Money Back Guarantee and a TWO Year Warranty. Quantum Daytona Series carry a ONE Year Warranty.

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The ClubMac Removables are designed to give you superior performance in all notebook and desktop computers requiring a removable expandable storage subsystem for multimedia, desktop publishing, and other data-intensive imaging applications in your Macintosh system.

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GENUINE SyQuest Cartridges

Media	Qty 1	Qty 10	Qty 20
44MB	$57 each	$56 each	$55 each
88MB	$67 each	$65 each	$63 each
200MB	$79 each	$78 each	$77 each
105MB	$55 each	$53 each	$51 each
270MB	$65 each	$63 each	$61 each

SyQuest Cartridges carry a FIVE Year Warranty.

ClubMac 44MB Removable

ClubMac 200MB Removable

ClubMac 270MB Removable

ClubMac Removable Drives

	Internal	External
5.25" ClubMac 44MB	$179	$219
5.25" ClubMac 88MB	$328	$368
5.25" ClubMac 200MB	$448	$488
3.5" ClubMac 105MB	$259	$299
3.5" ClubMac 270MB	$449	$489

Includes FREE Formatted Cartridge

All drives include SCSI Director formatting software, ONE FREE Cartridge, necessary cables for "plug-and-play" and documentation. All SyQuest drives include a 30-Day Money Back Guarantee and TWO Year Warranty.

Seagate

FIVE Year Warranty

ClubMac 30 DAY MONEY BACK GUARANTEE

Unformatted Capacity	Model	Description	Access Time	Actual MAC Capacity	Internal	External
3.5" Half Height						
2.4GB	ST12400N	*Hawk 2*	9ms	2000MB	$1279	$1339
4.3GB	ST15230N	*Hawk 4*	9ms	4000MB	$2139	$2199
1.7GB	ST11950N	*Barracuda 1*	8ms	1350MB	$1379	$1439
2.5GB	ST12550N	*Barracuda 2*	8ms	2050MB	$1339	$1399
4.3GB	ST115150N	*Barracuda 4*	8.5ms	4000MB	$2469	$2529
5.25" Full Height						
3.4GB	ST43400N	*Elite-3*	11ms	2750MB	$2149	$2249
9.1GB	ST410800N	*Elite-9*	11ms	8600MB	$3769	$3869

Seagate drives include a 30-Day Money Back Guarantee and a FIVE Year Warranty.

ClubMac OPTICAL Drives

ClubMac 230MB Olympus Optical

Move up to the next generation in MO storage with the 3.5-inch 230MB Olympus drive. With higher performance and expandable 230MB capacity, the Olympus drive offers the ultimate in removable storage solutions.

- 28ms Average Seek Time
- 4,200 RPM rotational speed
- SCSI-2 Interface
- 30-Day Money Back Guarantee and a TWO Year Warranty
- 256KB data buffer memory, 128KB cache
- 50,000 hours MTBF
- FREE formatted optical disk

ClubMac 30 DAY MONEY BACK GUARANTEE

FREE FORMATTED OPTICAL CARTRIDGE

Optical Drive	Size/Capacity	Seek Time	Internal	External
ClubMac Optical	3.5" 230MB Olympus	28ms	$865	$895
ClubMac Optical	3.5" 230MB Fujitsu	30ms	$865	$895
Fujitsu Dynamo	3.5" 230MB	30ms		$929
MaxOptix Tahiti III	5.25" 1.3GB	19ms		$2499

ClubMac Opticals include ONE cartridge, 30-Day Money Back Guarantee and a ONE Year Warranty (Olympus Optical includes a TWO Year Warranty.)

OPTICAL MEDIA	3.5" 128MB	$29	5.25" 594MB	$79	5.25" 1.2GB	$99
	3.5" 230MB	$39	5.25" 652MB	$79	5.25" 1.3GB	$99

CD-ROMs

ClubMac 2X CD-ROM

- Dual Speed CD-ROM Reader
- 320ms average access time
- Caddy-less design
- LED lights, headphone jack and RCA jacks
- Kodak PhotoCD (Multisession) compliant
- Includes Anubis driver software
- 50,000 hours MTBF and ONE Year Warranty
- 300KB/sec data transfer rate
- 64K data buffer

NEC

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			with ClubMac CD bundle
NEC MultiSpin 2V	(available in gray) 320ms access time, 300KB/sec transfer rate	$249	$349
NEC MultiSpin 3Xp Plus	240ms access time, 500KB/sec transfer rate	$399	$499
NEC MultiSpin 4Xe	220ms access time, 600KB/sec transfer rate	$499	$599
ClubMac Dual-Speed	320ms access time, 300KB/sec transfer rate	$199	$299
ClubMac Quad-Speed	220ms access time, 600KB/sec transfer rate	$439	$539

NEC MultiSpin CD-ROM Readers carry a TWO Year Warranty.
ClubMac CD-ROM Readers carry a 30-Day Money Back Guarantee and a ONE Year Warranty

ClubMac TAPE BACKUP Drives

Exabyte 2501 Tape Drive

NEW!

- 33 MB/min data transfer rate (uncompressed)
- Capacity up to 2.0GB compressed
- 3.5-inch form factor minicartridge tape subsystem
- 80,000 hours MTBF • SCSI-2 interface (QIC-121)
- Bundled with Retrospect Backup Software
- ONE Year Warranty

ClubMac 30 DAY MONEY BACK GUARANTEE

Capacity	Model	Format	Media	Internal	External
1-2GB	Exabyte 2501	QIC-121	EX-HC2000	$579	$629
2.0GB	ClubMac DAT	DDS	60m, 90m	$739	$789
2-4GB	ClubMac DAT/DC	DDS-DC	60m, 90m	$929	$979
4.0GB	ClubMac DAT/2	DDS-2	60m, 90m, 120m	$999	$1049
4-8GB	ClubMac DAT/2DC	DDS-2DC	60m, 90m, 120m	$1139	$1189

MEDIA	4mm 60m $10	4mm 90m $12	4mm 120m $25	Exabyte EX-HC2000 $35

ClubMac DAT and DAT/DC drives include Retrospect v2.1 Backup Software, ONE 90 Meter Tape and a TWO Year Warranty. Exabyte Tape Backup drives carry a ONE Year Warranty. The ClubMac DAT/2 drive includes Retrospect Remote v2.0 (3-Pack) Network Backup Software, ONE 120 Meter Tape and a ONE Year Warranty

ClubMac CD Bundle

$800 VALUE

Monitors, Graphic Cards & Multimedia

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The T16 II delivers 70% more display area, providing you with the elbow room for full-page layouts or working with several applications in multiple windows at the same time. Its multiple resolutions range from 640 x 480 to 1024 x 768. Automatically syncs to most popular Macintosh timings; plus it works with on-board graphics on the Quadra and Centris.

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HURRY! While Supplies Last!

VideoVision Studio

With JPEG hardware compression and decompression for full-screen, full-motion recording and playback from a hard disk, VideoVision Studio combines the power and flexibility of the Macintosh with the ease and transportability of video tape.

$3295

Thunder II GX• 1360

Thunder II GX•1360's 1152 x 870 resolution is great for viewing a full two-page spread without scrolling. A cost-efficient solution with all the power of a CMYK acceleration.

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IntelliColor Display/20e

The Radius IntelliColor Display/20e delivers unrivaled command of your desktop, from on-the-fly resolution switching to state-of-the-art color temperature control. Combined with Radius' IntelliColor software, it allows you to emulate 3 lightning conditions and user-adjustable color temperature, so you get more accurate color representation.

$1875

$1199

DigitalFilm Deluxe

Real-time capture of 60 fields/sec, full-motion video and audio to disk, supports 30 frames/sec with video capture up to 640 x 240, hardware JPEG compression, includes MacroMedia Director.

IN STOCK !! INCREDIBLE PRICE

LeMansGT

Delivering 24-bit color at resolutions up to 1152 x 870, Radius' high-octane LeMansGT delivers the best on-screen performance of any interface in its class. The LeMansGT features a 7" board, instantaneous resolution switching, on-board acceleration, razor-sharp photorealistic color, and Adobe Photoshop Acceleration.

$1835

Monitors

IntelliColor Display/20e (0461)	$1875
PrecisionColor Display/17 (0460)	$959
PrecisionColor Pivot (0353/M152-02)	$799
SuperMatch 21•T XL Trinitron (STD2102)	$2099
E-Machines T16 II (PV2101)	$799

Multimedia Solutions

VideoVision Studio (0418)	$3295
VideoVision Studio Upgrade (0419)	$1499
VideoVision Studio Basic (0416)	$1509
DigitalFilm Deluxe (DV2050)	$1199
Spigot II Tape (DV1530)	$835
Video Spigot NuBus (DV1030)	$359
Video Spigot NuBus LC (DV1050)	$235

Graphic Cards

LeMansGT (0447)	$1835
PrecisionColor Pro 24X (0429)	$1319
PrecisionColor Pro 24XK (0430) / Pro 24XP (0431)	$749/439
Thunder II GX•1600 1600 x 1200 CMYK acceleration	$3199
Thunder II GX•1360 1360 x 1024 CMYK acceleration	$2579
Thunder II GX•1152 1152 x 870 CMYK acceleration	$2169
Thunder/24 v3.0 (G1130)	$1399
Spectrum Power • 1152 (G3430)	$1169
Spectrum/24 Series V (G3930)	$829

$1049

NEC's Enterprise Series... The Next Generation in Monitors

3 YEAR WARRANTY

14" MultiSync 2V 832 x 640	$335
15" MultiSync 3V 640 x 480 to 1024 x 768	$469
15" MultiSync XE15 640 x 480 to 1024 x 768	$569
17" MultiSync XE17 640 x 480 to 1024 x 768	$1049
21" MultiSync XE21 640 x 480 to 1152 x 870	$2079

Scanners

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Better Images Through Innovation.

ScanMaker IIG OmniPage Direct	$399
ScanMaker IISP Photoshop LE and OmniPage Direct	$769
ScanMaker IISPX full version Photoshop and OmniPage Direct	$899
ScanMaker IIHR full version Photoshop and OmniPage Direct	$1079
ScanMaker II Photoshop LE and OmniPage Direct	$519
Transparency Media Adapter	$519

Microtek Scanners carry a ONE Year Warranty.

HEWLETT PACKARD Authorized Reseller

HP ScanJet IIcx Scanner

The HP ScanJet IIcx Scanner features 1600-dpi enhanced resolution (400 dpi optical) with one pass, 24-bit color scanning (up to 16.7 million colors) and it includes the HP AccuPage 2.0 software.

HP ScanJet IIcx Scanner	$985
HP ScanJet 3p Scanner	$489

EPSON Epson ES-1200C Pro Mac Scanning System

$1299

ES-1200C Pro-MAC Up to 4800dpi, Full version of PhotoShop, ScanTastic, Kai's PowerTools	$1299
ES-800C LE Up to 1600dpi, PhotoShop LE, ScanTastic	$899
ActionScanning-Mac Up to 1200dpi, PhotoShop LE & ScanTastic SAVE $100	$599*
Transparency Unit	$749

*After MFR $100 mail-in rebate, offer ends 12/31/94

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NEC Silentwriter Model 640

- 6ppm Print Speed • 300 dpi print resolution
- Adobe PostScript Level 2 interpreter, 35 True Type fonts
- 3MB RAM standard • AppleTalk Interface
- Limited TWO-Year Overnight Replacement Warranty

$729

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HP DeskWriter 320 Printer

- Perfect companion for the PowerBook
- 600 x 300 dpi with HP's exclusive REt technology for crisp, black output
- Up to 3ppm (draft mode) • Up to 16.7 million colors with the optional Color Kit

$299

HP DeskWriter 320 Printer 600 x 300 dpi, up to 3ppm	NEW $299
HP DeskWriter 320 Printer with Cutsheet Feeder (60-sheet)	NEW $369
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96598	GlobalFax for One World 10-User Lic Pk	$219.98
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97961	Quantum 270MB	$319.98
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99927	Quantum 1GB	$588.98
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APS ST 4.0[5] Seagate ST 15150 mechanism	4294MB	2499.95	2599.95
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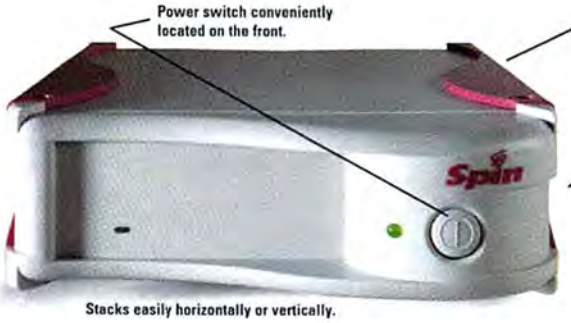

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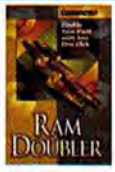

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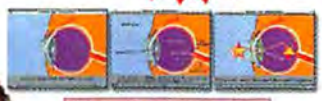

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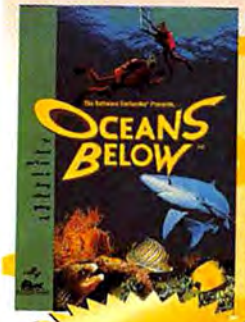

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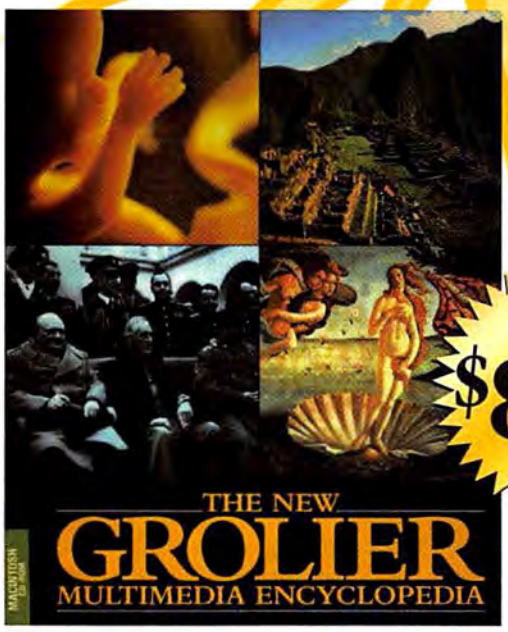

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Hard Drives

Quantum Quantum Quantum

LPS Series

Capacity	Size	Access	RPM	Cache	Int.	Ext.
170 MB	3.5"	11 ms	4500	128K	$170	$230
270 MB	3.5"	11 ms	4500	128K	195	265
340 MB	3.5"	11 ms	3600	128K	235	295
540 MB	3.5"	12 ms	4500	128K	279	339

LPS drives include a 2 year factory warranty and are SCSI 1 & 2 compatible.

GO Power Book Drives

Capacity	Size	Seek	Warrenty	Int.	Ext.
80 MB	2.5"	17ms	1 Year	$185	$255
256 MB	2.5"	17ms	1 Year	335	415

Empire and Pro Series

Capacity	Size	Seek	RPM	Cache	Int.	Ext.
540 MB	3.5"	9.5 ms	5400	512K	Call	Call
700 MB	3.5"	10 ms	4500	512K	385	445
080 MB	3.5"	10ms	5400	512K	640	700
440 MB	3.5"	9.5 ms	5400	512K	825	885
800 MB	3.5"	10 ms	4500	512K	995	1055
100 MB	3.5"	9.5 ms	5400	512K	1135	1195

Empire and Pro drives include a 5 year factory warranty.

MICROPOLIS MICROPOLIS

Capacity	Size	Model	Access	RPM	Cache	Int.	Ext.
1.2 GB	3.5"	M4110 Low Profile	8 ms	5400	512K	$625	$685
1.7 GB	3.5"	M2217	10 ms	5400	512K	895	955
2.1 GB Low Profile	3.5"	Taurus-2	8.5 ms	7200	512K	Call	Call
3.6 GB	5.25"	M1936	11 ms	5400	256K	1875	1975
4.3 GB	3.5"	Capricorn	8.5 ms	7200	512K	Call	Call
9.0 GB	5.25"	Scorpio	12 ms	5400	512K	Call	Call

Direct to Disk Recording AV Drives

1.2 GB	3.5"	M4110AV	10 ms	5400	512K	$675	$735
1.7 GB	3.5"	M2217AV	10 ms	5400	512K	945	1005
3.6 GB	5.25"	M1936AV	11 ms	5400	512K	1925	2025

Micropolis drives include a 5 Year (HOT SWAP) Warranty.

Seagate Seagate Seagate Seagate

Capacity	Size	Model	Access	RPM	Cache	Int	Ext
1.2 GB	3.5"	ST31200N	10ms	5400	256K	$630	$690
1.9 GB	3.5"	Hawk 2	9ms	5400	512K	1265	1310
4.2 GB instock	3.5"	Hawk 4	9ms	5400	512K	2120	2180
2.4 GB	3.5"	Barracuda 2	8ms	7200	1024K	1295	1355
4.2 GB instock	3.5"	Barracuda 4	8ms	7200	1024K	Call	Call
3.4 GB Elite 3	5.25"	ST 43400N	10ms	5400	512K	2045	2145
9 GB Elite 9	5.25"	ST 410800N	11ms	5400	512K	Call	Call

All Seagate drives include a 5 year factory warranty.

FUJITSU FUJITSU FUJITSU FUJITSU FUJITSU

Capacity	Model	Access	RPM	Cache	Int.	Ext.
330MB	M2622	9ms	4500	512K	$310	$370
520 MB	M2624 F/A	9ms	4500	512K	Call	Call
1.2 GB	M2694ESA	8.5 ms	5400	512K	650	710

All Fujitsu drives include a 5 year factory warranty.

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Capacity	Model	Access	RPM	Warrenty	Int.	Ext.
1.2 GB	C3323	9.5 ms	5400	5 Year	$740	$799
2.4 GB	C2490	8.5 ms	6400	5 Year	1195	1255
2.35 GB	C3010	11 ms	5400	5 Year	1975	2075

IBM IBM IBM IBM IBM IBM IBM IBM

Capacity	Model	Access	RPM	Warrenty	Int.	Ext.
540 MB	94G2646	12 ms	4500	2 Year	$320	$380
720 MB	94G2647	12 ms	4500	2 Year	455	515
1.0 GB	70G8492	11 ms	5400	5 Year	730	790
2.0 GB	70G8493	9 ms	5400	5 Year	1245	1305

NEC NEC NEC NEC NEC NEC NEC NEC

Capacity	Model	Access	RPM	Warrenty	Int.	Ext.
540 MB	D3817	12 ms	5400	2 Year	$275	$335

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SyQuest SyQuest SyQuest SyQuest SyQuest SyQuest

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88 MB	SQ5110C	20ms	3200	32K	325	385
105 MB	SQ3105	14.5ms	3600	64K	255	315
200 MB	SQ5200	18 ms	3200	64K	445	505
270 MB	SQ3270	13.5ms	3200	128K	455	515

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SyQuest drives come with Disk Manager Mac formatting software.

Capacity	Model	Warranty	Price
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88 MB	SQ800	5 year	68
105 MB	SQ310	5 year	56
200 MB	SQ2000	5 year	78
270 MB	SQ327	5 year	64

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NEW!!! CD Rom Drives

NEC

Model	Access	Cache	Price
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MultiSpin 3Xe	195ms	450K	$468
MultiSpin 4XPro	180ms	600K	$928

NEC CD -ROM drives include a two year warranty.

HEWLETT PACKARD

Capacity	Model	Access	RPM	Warranty	Int.	Ext.
1.3 GB	C1716T	23.5ms	2400	1 Year	$2350	$2395

FUJITSU DynaMO 128

Capacity	Model	Access	RPM	Warranty	Int.	Ext.
230 MB	DynaMo	30ms	3600	2 Year	N/A	$965

NEC NEW!!!

Capacity	Model	Transfer	RPM	Warranty	Int.	Ext.
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Capacity	Model	Transfer Rate	Media	Int.	Ext.
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4-10 GB	1533A	60 MB/min.	4mm	1315	1365
20-50 GB	1553A Auto Tape Loader	60 MB/min.	4mm	3495	3595

Exabyte

Capacity	Model	Transfer Rate	Media	Int.	Ext.
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MICROPOLIS

1.2GB	2210	3.5"	10ms	$640	$700
1.7GB	2217	3.5"	10ms	$895	$955

Seagate

260 MB	ST3290A	3.5"	15ms	$180	$240
420 MB	ST3491A	3.5"	12ms	$225	$285

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- Dual spin CD ROM drive
- SuperMac 17, 24-bit color monitor
- SuperMac Thunder 24, 1152 x 870 video card
- Image processing multifunctional drive: 650MB optical and SyQuest 88c in one enclosure

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- SuperMac Thunder 24, 1152 x 870 video card
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- Archive 2.0GB tape backup system
- TI Pro 600, 9 ppm, 600 dpi laser printer
- AVision 680AV, 6400 x 6400 dpi scanner w/PS LE

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- SuperMac Thunder 24, 1152 x 870 video card
- SyQuest 88C read/write drive
- AVision 660AV, 4800 x 4800 dpi scanner w/PS LE
- TI Pro 600, 9 ppm, 600 dpi laser printer

Zero Down! $45 per week — $6 a day!!

SyQuest Drives

Model	Internal	External
SyQuest 270	$390	$430
SyQuest 200	**$389**	**$429** SALE
SyQuest 105	$199	$239
SyQuest 88C	$270	$310
SyQuest 44	$140	$170

Includes external drive, 25/50 SCSI cable, Mac SW, terminator.

Cartridges	44MB cartridges only $49
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88MB Cartridges	(S+ or with drive purchase) $59/69
44MB Cartridges	(S+ or with drive purchase) $49/57

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Fujitsu 1.2GB only $595

Capacity	Description	Internal	External
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Capacity	Description	Internal	External
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42 MB	3.5" LP 1 7ms	$109	$169
85MB	3.5" LP 17ms	$130	$190
170MB	3.5" LP 17ms	$175	$235
240MB	3.5" LP 10ms	$185	$245
270MB	3.5" LP 10ms	$195	$255
340MB	3.5" LP 10ms	$225	$285
540MB	**3.5" LP 10ms**	**$285**	**$345** SALE
1000MB	3.5" HH 10ms	$695	$755
1400MB	3.5" HH 9.5ms	$835	$895
2100MB	3.5" HH 9.5ms	$1165	$1225

Seagate Hawk 1 only $1150

Capacity	Description	Internal	External
2100MB	B'cuda 2, 8ms, 3.5"	$1385	$1445 SALE
4300MB	**B'cuda 4, 8ms, 3.5"**	**$2475**	**$2535** SALE
1700MB	**Hawk 1, 9ms, 3.5"**	**$1150**	**$1210** SALE
2100MB	Hawk 2, 9ms, 3.5"	$1275	$1335
4300MB	Hawk 4, 9ms, 3.5"	$2135	$2195
9100MB	Elite 9, Ilms, 5.25"	$3735	$3835

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- Built-in gamma correction controls

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Scanner	Price
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AV680, 6400x6400 dpi w/ Adobe Photoshop LE	$679
AV680, 6400x6400 dpi w/ full Adobe Photoshop	$879
AVision transparency adapter	$299

Tape Drives

Sony DAT drives are specifically designed for high capacity data backup, distribution and archival mass storage. With its built-in data compression capabilities, the Sony SDT-5000 can hold up to 16GB of files on a single 120 meter cartridge.

Model	Capacity	Size	MacKit
Sony SDT-2000	2GB	3.5"HH	$785
Sony SDT-5000	**5-16GB**	**3.5"HH**	**$1185** SALE
Exabyte 8200	2GB	5.25"FH	$1275
Exabyte 8500	5GB	5.25"FH	$2175
Exabyte 8205	2-5GB	5.25"HH	$1585
Exabyte 8505	5-10GB	5.25"HH	$2265

Includes external drive, 25/50 SCSI Cable, MAC SW II and terminator. Retrospect add $75

Optical Drives

5.25" Optical Drives dsc 650MB $1199

Model	Capacity	Seek	MacKit
IBM 650	**594/650MB**	**40ms**	**$1199** SALE
Ricoh-9200 EX	594/650MB	35ms	$1849
MaxOptix-Tahiti II	**594/1GB**	**25ms**	**$1899** SALE
MaxOptix-Tahiti III	**650/1.3GB**	**25ms**	**$2499** SALE
Sony-650	594/650	19*ms	$1899
PMO-1.3GB	650/1.3GB	19*ms	$2799
Sony 1.3GB	650/1.3GB	25ms	$2299

3.5" Optical Drives Panasonic 128MB $689

Model	Capacity	Seek	MacKit
Panasonic	**128mb**	**35ms**	**$689** SALE
Fujitsu-230	230mb	30ms	$899
Sony P-301	128mb	35ms	$999
Most-256	128/256mb	37ms	$895

Includes external drive, 25/50 SCSI cable, Mac SW & terminator.

5.25" Cartridges	Price
dsc / 3M 650MB	$79 /99
Sony 650/1.3GB	$119 /139
Komag 650 /1.0 /1.3GB	**$78 /94 /98** SALE

3.5" Cartridges	Price
dsc 128MB /Sony 128MB /Komag 230	$27 /45 /49

Multifunctional Drives

A multifunctional drive is a custom-made combination of hard drive, optical drive, CD-ROM, tape or Syquest drive mounted in the same enclosure. Multifunctional drives require less space, eliminate compatibility problems and cost less than separate components.

Multifunctional	Price
SyQuest 200 /540MB hard drive	$759
SyQuest 88c /650MB optical drive	$2059
SyQuest 88c /NEC 3X CD ROM /540MB HD	$1149
128MB optical drive /540MB hard drive	$979
NEC 3X CD-ROM /1.3GB optical drive	**$2449** SALE
2.1GB Quantum HD /8.0GB Sony DAT drive	**$2099** SALE
4.0GB Seagate HD /Nikon CoolScan	$3029

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7100 8/540/CD	SuperMac 17	$4129	$3.58/day
7100 24/540/CD	SuperMac 20/Thunder 24	$6089	$5.39/day
6100 24/540	**14" hi-res monitor**	**$2939**	**$2.59/day** SALE
Q950 24/540	SuperMac 20/Thunder 24	$5939	$5.23/day
Q800 24/540/CD	SuperMac 17	$4129	$3.58/day
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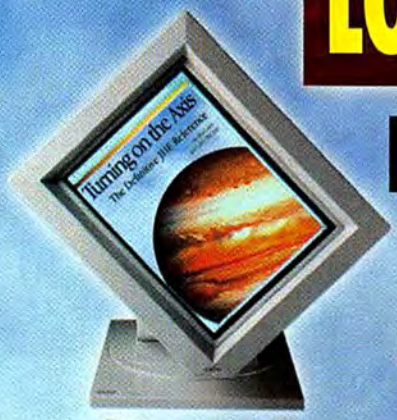

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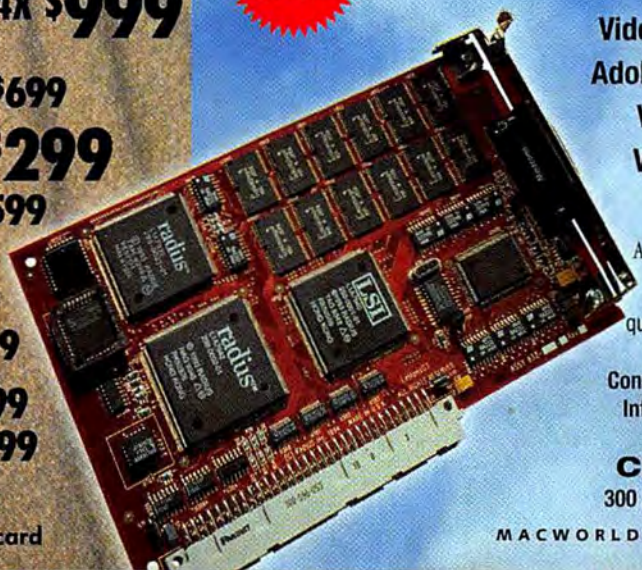

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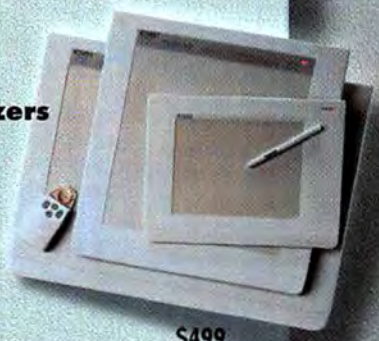

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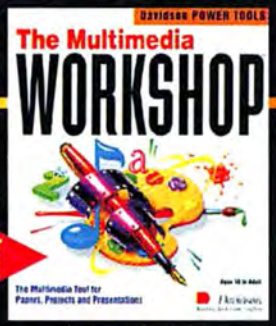

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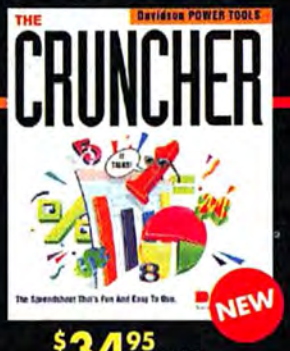

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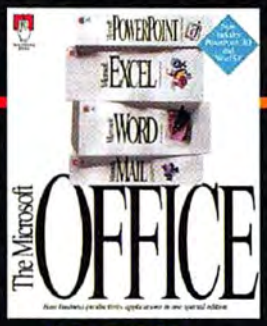

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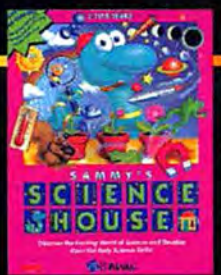

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540MB	12ms	4500	128K	2yr	LPS540S	$269	$329
1080MB	9.5ms	5400	512K	5yr	EMP1080S	$589	$649
1440MB	9.5ms	5400	512K	5yr	EMP1440S	$749	$799
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Capacity	Speed	Compatible	Model	Buffer	Internal	External
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105MB	14.5ms	105MB	SQ3105S	64K	$259	$309
200MB	18ms	44,88,200MB	SQ5200C	64K	$449	$489
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Toshiba	XM3401	200ms	330KB/sec	256K		$269	$339
Toshiba	XM3501	120ms	600KB/sec	256K		$439	$509
Pioneer	DRM602X	300ms	307KB/sec	256K	6 Disc CD Changer	$489	BEST BUY!
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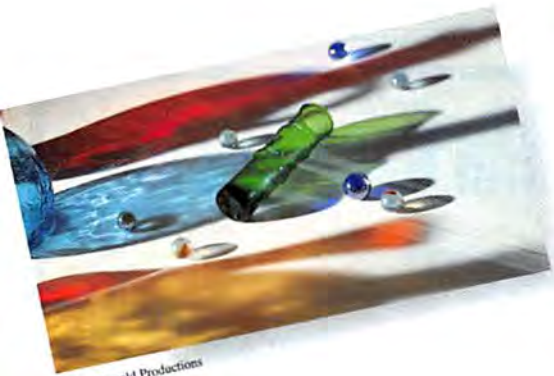

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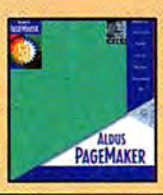

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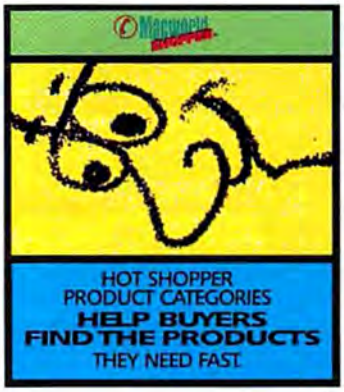

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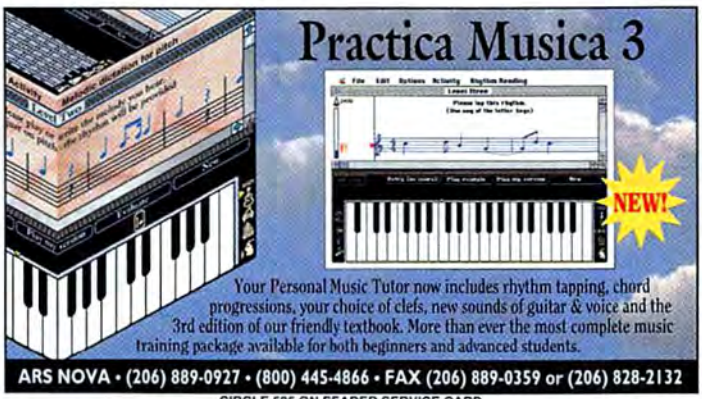

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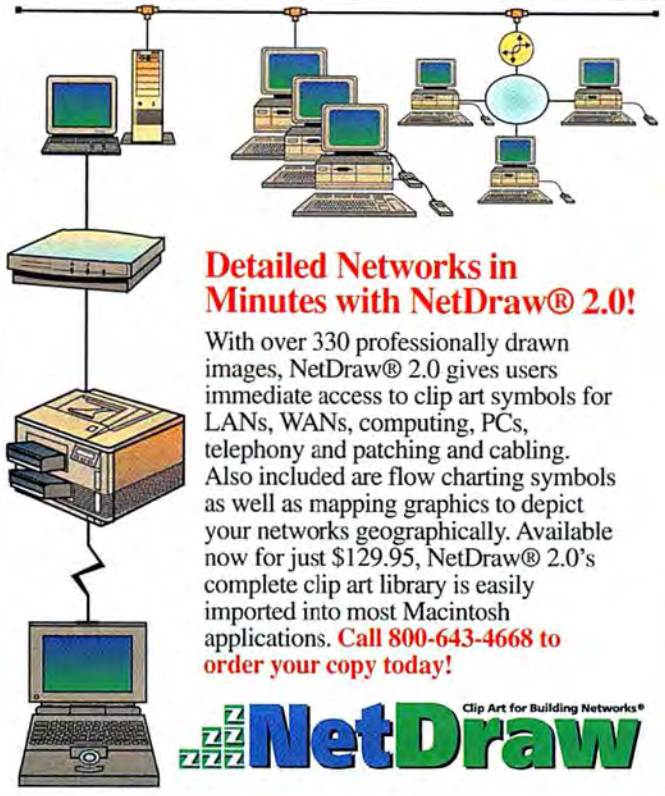

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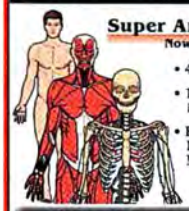

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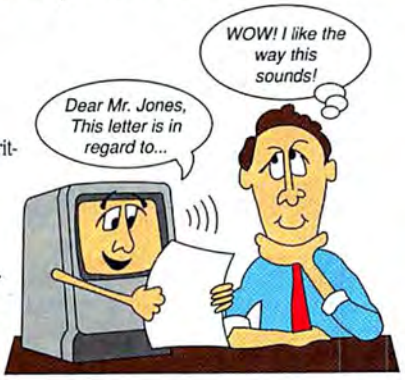

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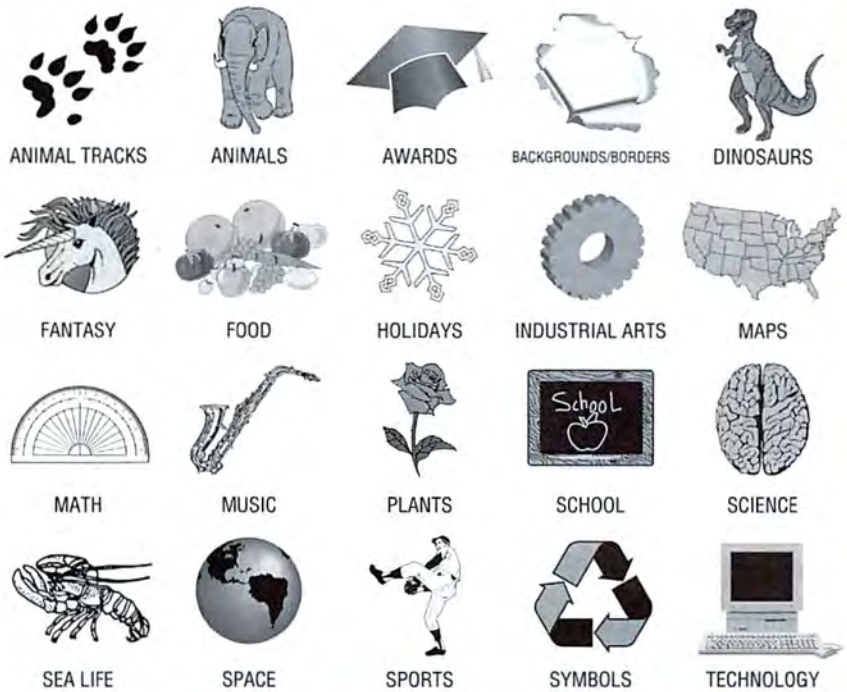

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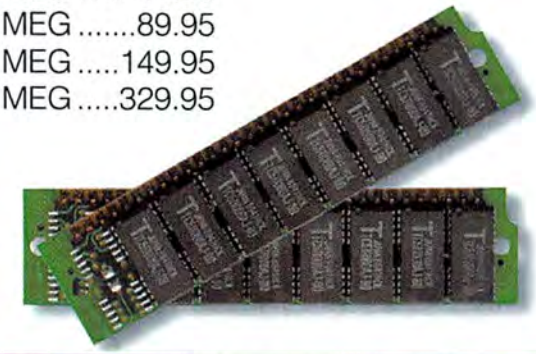

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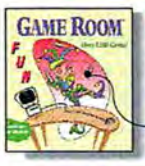

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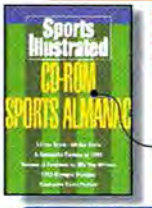

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Dumb Macintosh Things

From anal to banal, Guy tells it like it is

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To be a challenger once, you only have to challenge existing conventions. To be a challenger twice, you have to challenge your own conventions. Allow me to start with my list of the ten dumbest things about Macintosh.

1. Too many models. I defy anyone at Apple to explain who should buy which model. The best algorithm I've found is to go to a superstore and buy the one that's on sale and never read a newspaper ad or computer magazine again. If any reader has figured out how to help people determine the model they should buy, please contact me; I have a lot of E-mail I'd like to forward to you.

2. Depending on Microsoft for Macintosh applications. What would you say if your country's weapons were manufactured by its enemies? Yet in the war against the Intel/Microsoft megalith, Apple depends on Microsoft for key applications. To add inaneness to injury, Apple promotes Microsoft's products. To add insaneness to inaneness, Claris, Apple's homegrown weaponette, is too chicken to take on Word, too impatient to take on Excel, and too arrogant to come up with another ClarisWorks.

3. INITs and cdevs (a.k.a. extensions and control panels). Which INITs and cdevs conflict? In what order should they be loaded? Which are necessary and which aren't? Managing INITs and cdevs is pure witchcraft, and I don't like riding a broom. I run a minimalist system, and I load 32 of these puppies. Half of them should be part of the system software. If you needed 32 different patches for your television, you'd have trouble getting it working, too.

4. The cover dates of Macintosh magazines. They bear no sensible relation to when you get each issue. This is the December issue of *Macworld*. When did you get it—sometime in June? I'm writing this column in January of 1993. I propose a cover-date amnesty between *MacUser* and *Macworld*, so we can all reset our calendars to real time.

5. Setting up a Macintosh for file sharing. Here's a quick test: what four pieces of software do you use to set up file sharing? The answer is Users & Groups, Sharing Setup, Chooser, and Network. It may be an order of magnitude easier to add a Macintosh to a network than any other computer, but like I said, we have to challenge our own conventions. A good test is, can you explain how to set up file sharing to your mother or father over the phone?

6. Macworld Expo exhibitors that use models, actors, and actresses, or that throw hats or T-shirts into the audience as a prize for yelling "NerdPerfect,"

"Polaris Organizer," or "Aldobe Frustrator" the loudest. If I wanted flesh, I'd tune into "Baywatch." If I wanted acting, I'd see a Van Damme movie. If I wanted a hat or shirt, I'd go to the Gap. On the other hand, I would support a computer show where the audience is made up of vendor personnel, and they have to scream and jump to get our business.

7. The bomb-box Resume button. When your Mac crashes (never happens to you, right?), you sometimes get this great dialog box with two buttons in it: Restart and Resume. Have you ever, *ever* had the Resume button work? The very best thing that happens is the machine starts buzzing and flashing in ways that DOS-based computers never dreamed of.

Do you want to know why Restart and Resume are there? Steve Jobs once decreed that if a programmer's work crashed, it had better restart, or the programmer had better print up a résumé. Apple should rewrite the error messages in one of two ways: tell us what went wrong, or give us sarcastic humor. (Maybe this could be a preference in the next rev of system software.) I would pick humor: "You're hosed. I bet you wish you'd saved more often. Hasta la vista, baby."

8. The danger of reinstalling a System over an old System. You're pretty much guaranteed a trashed system disk unless you remove your old system and install from scratch. Does the Installer tell you this? Does Apple tell you this? Does Apple know this?

9. Running Windows and MS-DOS applications on a Macintosh. There's a coprocessor card. There's emulation software. Soon there will be a chip. Does anyone care? Someone who wants a Macintosh wants a Macintosh. Someone who wants an IBM PC isn't going to lower himself or herself and buy an overpriced "cute graphics toy."

10. A few miscellaneous items: mysteriously named enablers in your System Folder for Macintoshes you've only read about; the slowest file copying this side of the Franciscan monks; and dragging a disk into the Trash to eject it. In the real world, when I want something out of a machine, I throw it in the trash. Don't you?

There you have it: ten dumb things about Macintosh that should be fixed. I may have gotten under the skin of a few people, but like the oyster and the cultured pearl, a great computer needs a little irritation to develop. **m**

GUY KAWASAKI'S views are his own, and only sporadically reflect those of *Macworld*. His latest book is *Hindsights* (Beyond Words Publishing, 1994). 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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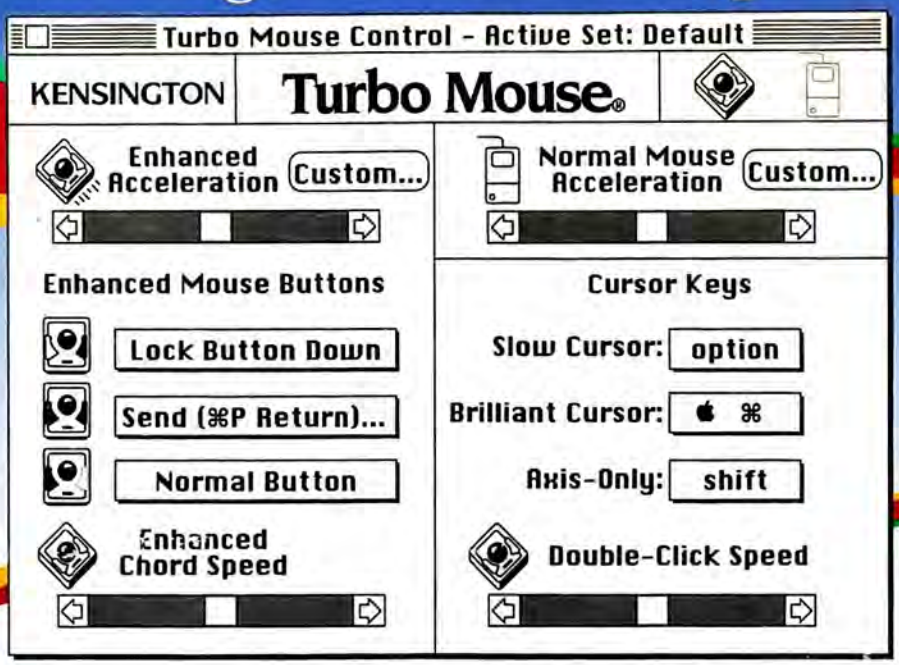

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