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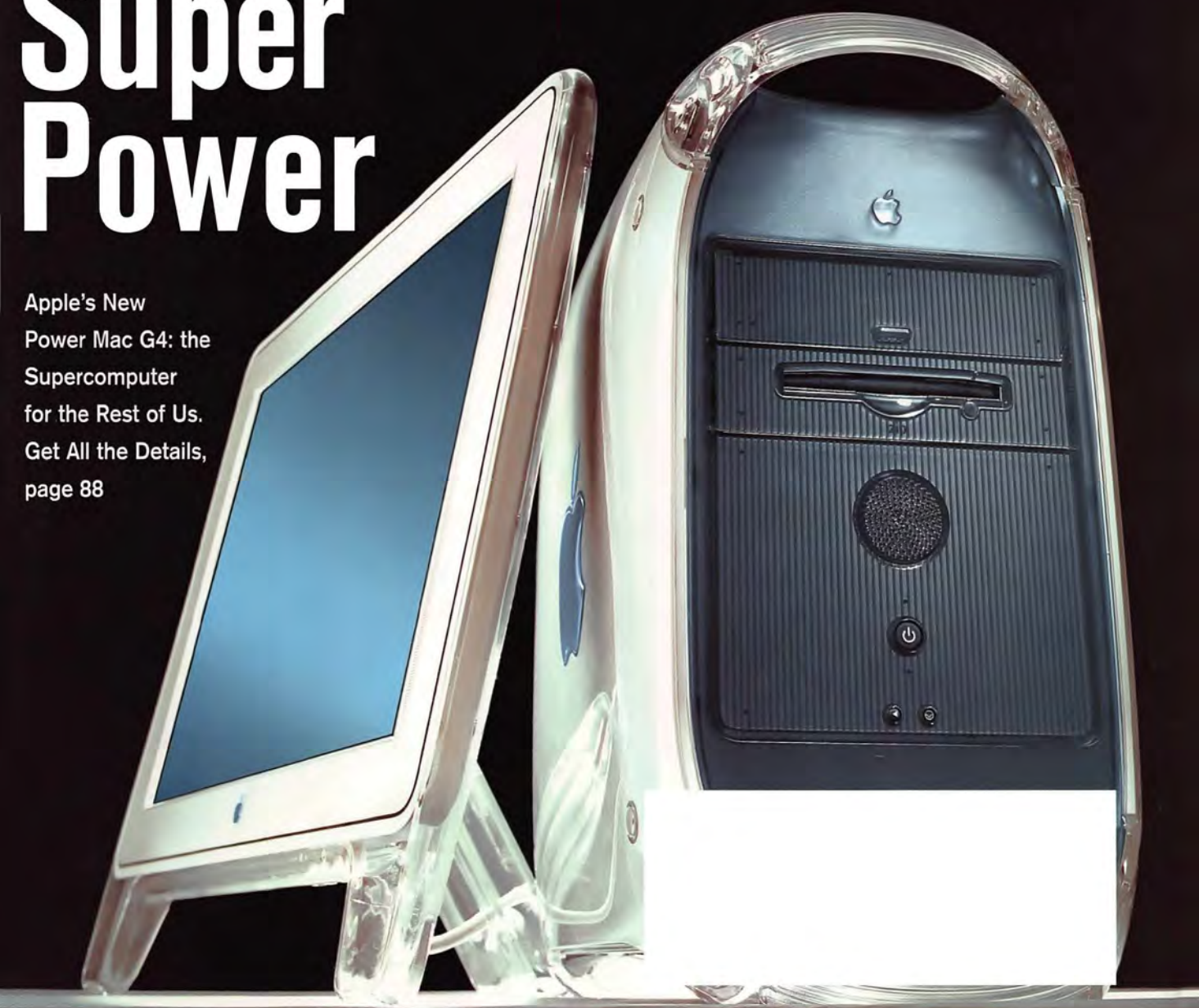

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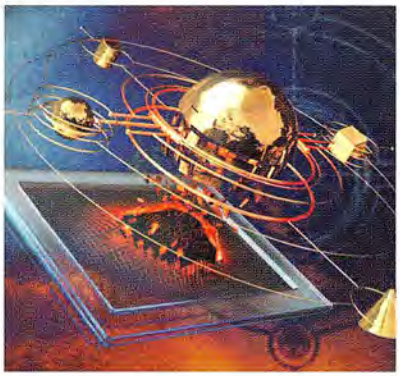

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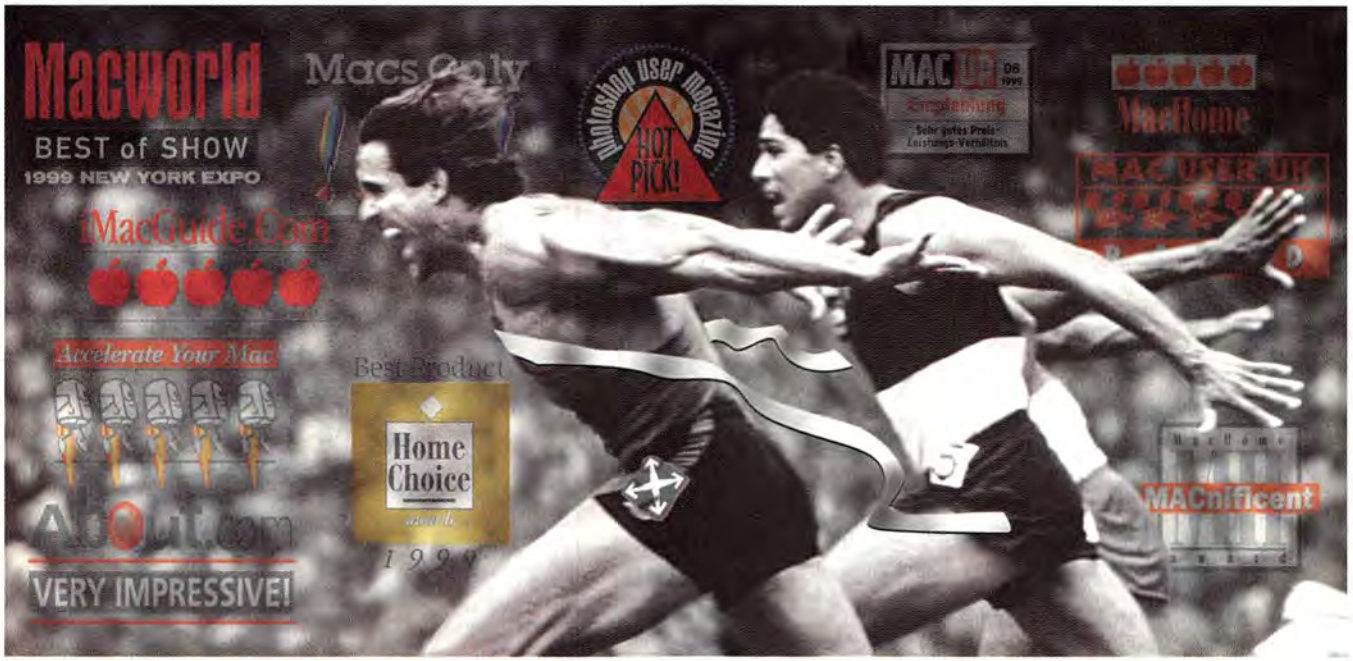

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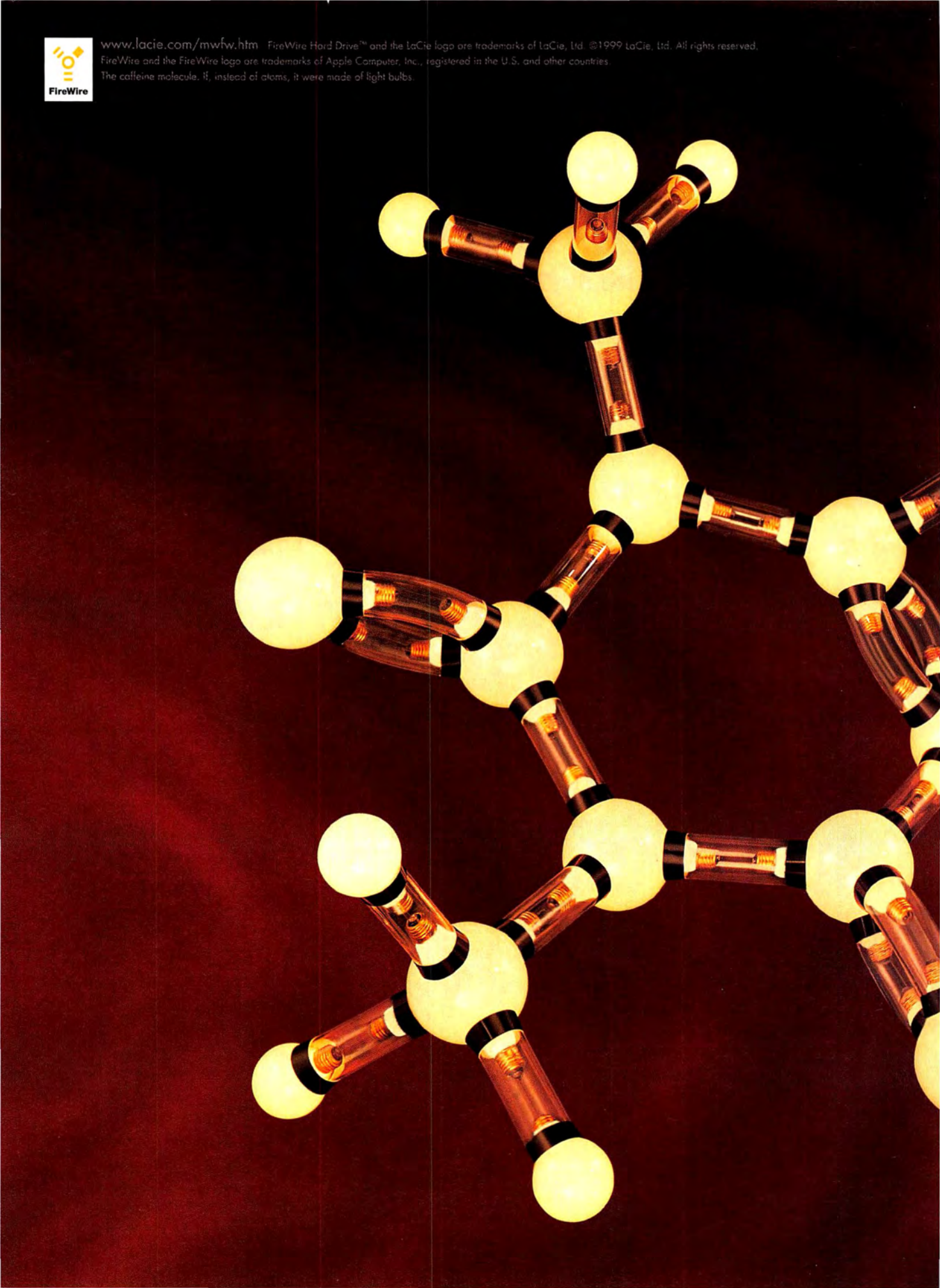
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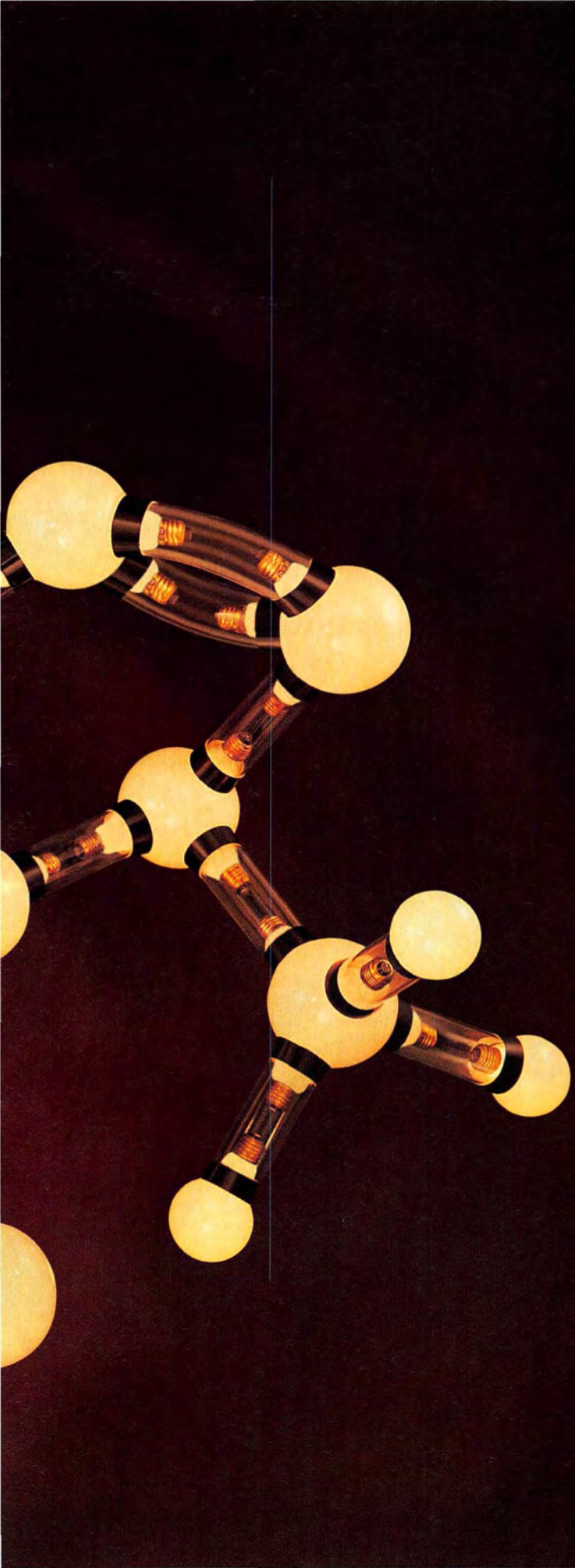

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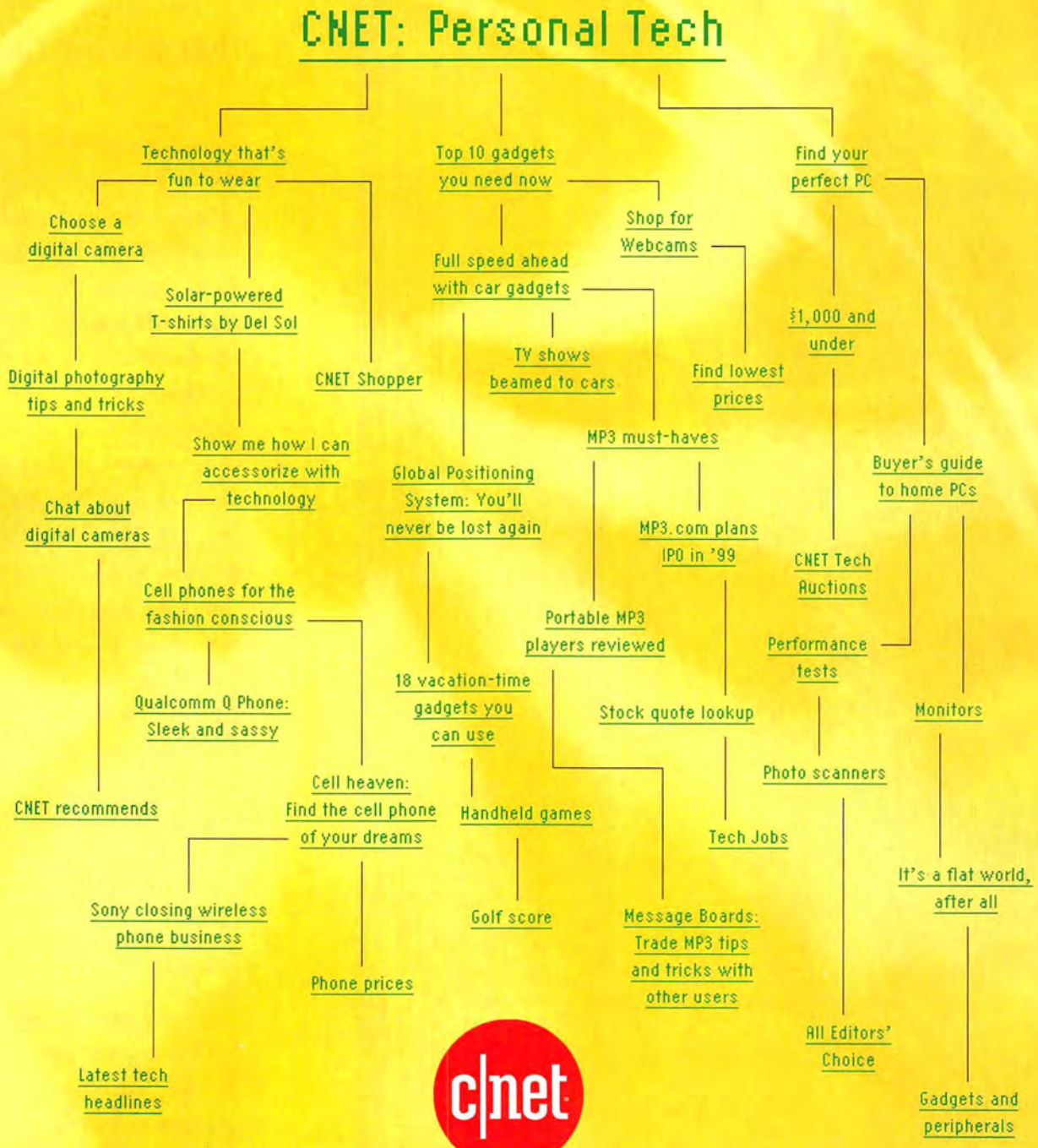

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Letters

Feuding over the Finder

STEPHAN SOMOGYI TELLS US IN "The Millennium Mac" (August 1999) that Mac OS X will have a new Finder. If this new list-oriented Finder is an addition to the traditional Finder, that's fine; if it replaces it, that would be disastrous.

From the beginning, the Mac used a graphical interface, treating the user as a human being. Instead of making you input command lines, the Mac OS allowed objects to be picked up and dropped wherever you wanted to have them. As in a real office environment, you could leave items on the desktop if they were of immediate importance or stow them away in folders for later use. Whenever you needed to retrieve a document, it could be found in the very same spot.

Imagine that your office cleaning staff rearranged all your documents. The next day, you would have a hard time finding them. That's exactly what happens when the desktop or folder contents are sorted according to some other rule. Gone is the bird's-eye view; say hello to the frog's-eye view among listed files in a folder.

If Apple wants to add a new menu item to the Finder, that's OK. However, if it wants to drop the traditional Finder, it will kill one of the unique features that make the Mac the Mac: a computer so easy to work with that you forget it's a computer.

ARTHUR REICHMUTH
Wetzikon, Switzerland

DAVE CUTLER

NEARLY EVERYONE HAS BEEN CRITical, or at best unenthusiastic, about Apple's decision to do away with the current Finder and replace it with a more advanced and powerful, Next OS–like Finder. To be honest, I was shocked at first. But a complete consideration of the situation makes it clear that Apple is right.

The new file-management interface, if anything like the one pictured in "The Millennium Mac," is clearly more efficient than the one in previous Mac operating systems. Although the new Finder has been condemned for making browsing more complicated, including two versions of the Finder won't solve that problem. Including the old and new versions would eliminate the Mac OS's simplicity and kill the incentive for new users to choose Macintosh instead of Windows. It would also make the Mac OS a nuisance for die-hard users who would either have to ignore the new Finder or cope with having to switch between two different file-management interfaces for different tasks.

It's the ability to use the best technology instead of many lesser technologies that has separated the Mac OS from Microsoft's blunt Windows. Apple should continue to do what it has always done by blending the best of what the old Finder has to offer with the best features of the new Finder in order to come up with one perfect file-management interface.

VICTOR RANGA
Mount Vernon, New York

The Joy of 8.6

MAC OS 8.6 IS TERRIFIC! I HAVE A Performa 6400/180 with 80MB of RAM and have had performance troubles since I installed 8.0, then upgraded to 8.1, 8.5, and finally 8.5.1. I was nervous about upgrading to 8.6 but figured my Mac was so slow that it couldn't get worse. And it didn't! Microsoft Office apps open as fast as when I had OS 7.6. The Finder doesn't pause for minutes at a time like it used to. From what I understand, this will be one of the last Mac OSs that will work on my PowerPC 601e processor, and that's fine by me. My Performa is back to its old self and matching the performance of the Pentium II Windows NT machine I use at work.

Thanks to Apple for giving me back my old Performa!

PAUL BERTAIN
Davis, California

Tools of the Trade

THANK YOU FOR THE INFORMAtive and timely "Essential Mac Tools" (August 1999). As a new Mac user, I found Franklin Tessler's descriptions of quintessential Mac utilities to be important to my understanding of how to keep Mac OS 8.6 running in tip-top condition. I hope that other articles or a special column for new Mac users will

continues

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follow on such topics as essential software applications and hardware.

EDWARD WEBSTER
Simpsonville, South Carolina

I DISAGREE WITH THE RATINGS given to Alsoft's Disk Express Pro 3.0.1 and Connectix's RAM Doubler 8.0.1 in "Essential Mac Tools." Franklin Tessler awarded Disk Express Pro four and a half mice even though it is still completely incompatible with HFS+-formatted hard disks. Apple released the HFS+ format more than a year ago. Ironically, Alsoft, the company that developed Plus Maker and Plus Maximizer, can't seem to update its own utility.

On the other hand, RAM Doubler received only four mice. I think it deserves five. The brief review failed to mention an important feature of RAM Doubler that's useful even if you have lots of physical RAM. When you run multiple applications simultaneously, RAM Doubler taps into the unused memory of the applications running in the background. This allows you to set large preferred-memory sizes for RAM-hungry applications such as Web browsers and graphics programs. RAM Doubler handles memory better than the Mac OS, and most power users experience fewer crashes when it is enabled.

GREGORY TETRAULT
Chesapeake, Virginia

Searching for the Mezzanine

IN "GENERATION GAP" (AUGUST 1999), Kristina De Nike and Jonathan Seff state that the iProRaid SCSI card works only in the original Bondi blue iMacs, which were built with a mezzanine slot hidden beneath the plastic case. How do I know if I have *that* iMac?

I bought mine in November 1998, before Apple introduced all the flavors, so I had no choice but to get the Bondi blue one. I would like to use the card to increase my all-too-small hard-disk space by adding an external SCSI 9GB hard drive. What do you recommend?

MICHAEL FISCHBECK
Milburn, New Jersey

All the 233MHz Bondi blue iMacs, both rev. A and rev. B, have the hidden mezzanine slot. It is difficult, although not impossible, to install a SCSI card in this slot. A simpler solution, which works for all iMacs, is to invest in a USB CD-RW drive (see Reviews, *September 1999) and move nonessential files off the hard disk.—Kristina De Nike*

Many Arms of netOctopus

SHELLY BRISBIN'S REVIEW OF Netopia's netOctopus (*Reviews*, August 1999) was mostly on the mark, but I believe she missed an important feature included with netOctopus: File Scripter.

File Scripter is not an AppleScript tool but rather a program that lets you build install packages, which can include extensions, applications, and preferences. File Scripter allows you to do this in two ways: by telling it where the files need to go when installed and where the files currently are on your Mac, or by taking a snapshot of your current state, doing the installation, and taking a postinstall snapshot. File Scripter then takes the difference to build your install. You can use the install package to create an Apple Installer script that netOctopus can employ to run the install. netOctopus can also use Apple Installer scripts for any package, not just the ones you create in File Scripter. It's very handy for such things as ColorSync updates and MRJ (Mac OS Runtime for Java) updates.

JOHN C. WELCH
Westboro, Massachusetts

Oh-So-Dreamy

I JUST HAD TO THANK LYNDA Weinman for her article about Macromedia Dreamweaver 2 layers ("Elegant Web Pages with Dreamweaver 2," *Create*, August 1999). I'm a graphic designer, and I receive more and more calls every week asking me to design Web sites. I've been a loyal fan of Dreamweaver for some time now (especially after pulling all my hair out trying to use Microsoft FrontPage). And yes, I'm also one of those people who learned HTML code in all its glory before the days of slick Web-page–design applications. Weinman's tips for converting layers to tables forever changed the way I design Web sites. A page that normally took me a full day and plenty of sweat was reduced to a mere five minutes of work. Incredible.

TODD DOMINEY
Charleston, South Carolina

continues

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No HP MFP for Me

IN STEPHEN BEALE'S STORY ON multifunction peripherals (MFPs) for the Mac, Beale states that Hewlett-Packard has closely allied itself with Apple ("Multifunction Peripherals Arrive for Mac," *News*, August 1999). This is the same HP, I presume, that used to charge $50 more for a Mac-compatible DeskWriter than for a PC-compatible DeskJet; the same HP that markets its PhotoSmart products for PC only; the same HP that was completely AWOL during Apple's dark days. There's apparently no technical reason that a printer can't be both PC- and Mac-compatible—just look at the Epson color ink-jet products. We can only hope that Epson decides to market an MFP so we can reward it for being there while HP either gouged us or completely ignored us. As far as I'm concerned, Epson has earned the loyalty of every Mac user and HP has not.

GARY STEWART
Galion, Ohio

As a matter of fact, Epson recently unveiled two new MFPs: the Epson Stylus Scan 2000 and Stylus Scan 2500. For more details, check out "Epson Joins MFP Fray with Stylus Scan," News, *September 1999.—Ed.*

Baby, You're a Star

HAVE YOU EVER NOTICED HOW many commercials and advertisements feature Macs? The reason is obvious—the Mac OS is more pleasant to look at than Windows. Its handsome silver title bar is certainly more appealing than Window's ugly blue title bar. The Mac OS is like a beautiful garden, whereas Windows resembles a lawn overgrown with crabgrass. Perhaps there's a concept advertising companies have grasped that Microsoft has not: elegance sells.

TED DZIUBA
Wallingford, Connecticut

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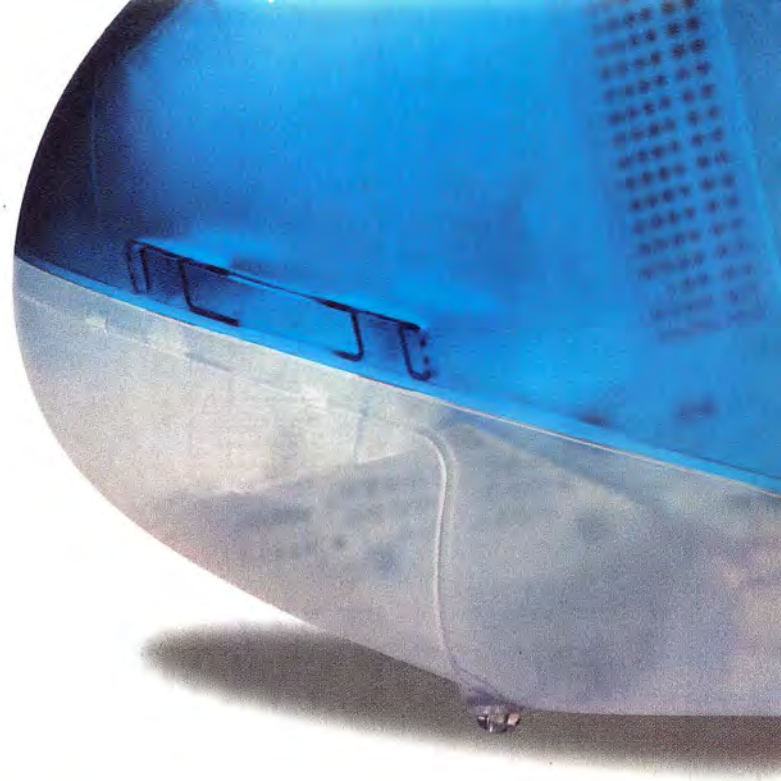

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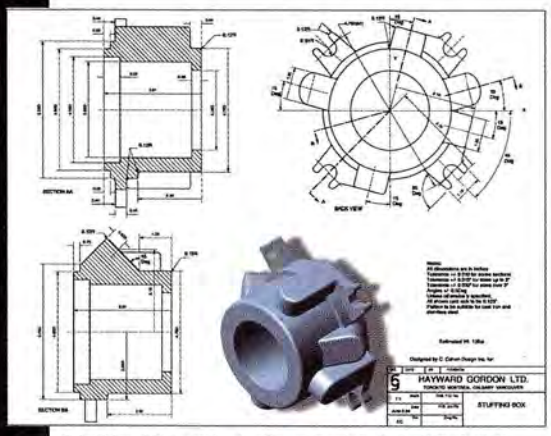

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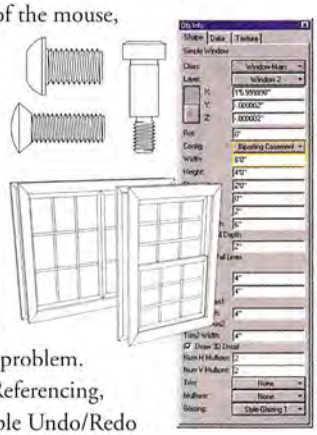

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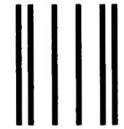

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The Vision Thing

by Andrew Gore

What's in a Name?

ONE OF THE BEST THINGS ABOUT THE POWER MAC G4: IT'S NOT NAMED THE POWER MAC G3

THE COEN BROTHERS' 1996 film *Fargo* was a big movie about small-minded people doing terrible things to each other. Besides its being a remarkable piece of cinema, one of the most amazing things about *Fargo* is that almost none of the film's action takes place anywhere near Fargo.

But at least *Fargo* is the only film made in the past 45 years with that name. Unfortunately, the names of Apple's latest product offerings don't have that kind of unique flavor.

A Mac Is a Mac Is a Mac

It seems that with its return to profitability Apple has lost the ability to come up with more than one name for a product line. This can become very confusing when, for example, you're trying to explain to a novice user how the iMac he or she bought a year ago is different from the iMac Apple was selling by Thanksgiving, and how that differs from the iMac the company shipped at the beginning of the year, when they're all named, simply, iMac. And when the next generation of the iMac appears, who wants to bet it won't just be called iMac as well?

Apple's stuck-in-a-rut naming practices aren't just limited to its consumer-oriented computers, though. There have been at least three very different PowerBook G3 models, all named PowerBook G3. The first was nothing more than a PowerBook 3400 with a G3 chip inside. The next was the PowerBook G3 series—the black ones with the white logo. And most recently, there's the "bronze" PowerBook G3, which looks a little thinner than the previous G3 series and has a translucent bronze keyboard but otherwise resembles its immediate predecessor.

Let's move to the desktop, where there have been two different Power Mac G3s, one beige and the other blue and white, which even Apple executives refer to as the "Blue and White G3" to differentiate it from the old "Beige G3."

As happy as I am with the Power Mac G4 (see the feature "Fantastic Four," elsewhere in this issue), I'm almost ecstatic simply because it's not named Power Mac G3. Unfortunately, beneath the Power Mac G4 logo are two different kinds of technologies that, in past days, would've been treated as different computer models.

Imagine a software company or a manufacturer of add-on hardware trying to divine over the phone or in an e-mail message exactly what kind of Mac someone is using: "Are you using the Power-

Book G3, or the PowerBook G3 series, or the PowerBook G3 series with the bronze keyboard?"

iMac Khakis

So what exactly is Apple thinking? It can't be out to confuse customers, hoping that the resulting cloud of befuddlement might confuse people into buying several identical computers.

My guess is that Apple's trying to create a simple message for its prospective customers. You need to revise names only if you're concerned about selling upgrades. If you're primarily concerned with selling to new users, you stick with the names you've got.

If Apple had its way, it would be the Gap of computers. When you go into a store to buy a pair of jeans, do you concern yourself with the technology underlying that product? No—you like the look and, especially if you're buying Gap jeans, you like the image the company's brand projects. Wearing a Gap product says something about you as much as it keeps the cold out and the rain off or keeps you from getting arrested for public indecency.

That's what Apple wants the world to think about Mac products—that they're personal statements. And by keeping its naming focused on who the product is for rather than on the product itself, Apple keeps the decision of which Mac to buy as simple as possible.

Split Personality

But while the Gap-ification of Apple makes sense from a marketing standpoint, I still have to wonder if it isn't a bit too early to sell computers by using generic brand names, as clothes are sold. The last time I checked, jeans didn't take advantage of add-on cards designed specifically for particular models. And they didn't need technical support, unless perhaps you're buying a pair of shrink-to-fit Levi's.

As this year's vast influx of new Mac users start looking to upgrade that old iMac to run G4-savvy applications (Think they won't? I've got two words for you: *voice recognition.*), do you think this homogenous naming is going to get them confused?

As the people of *Fargo* would say: Oh, yah. Yah, you betcha! **m**

Aw, geez. You can mail your questions and comments to Andy at visionthing@macworld.com.

JOHN RITTER

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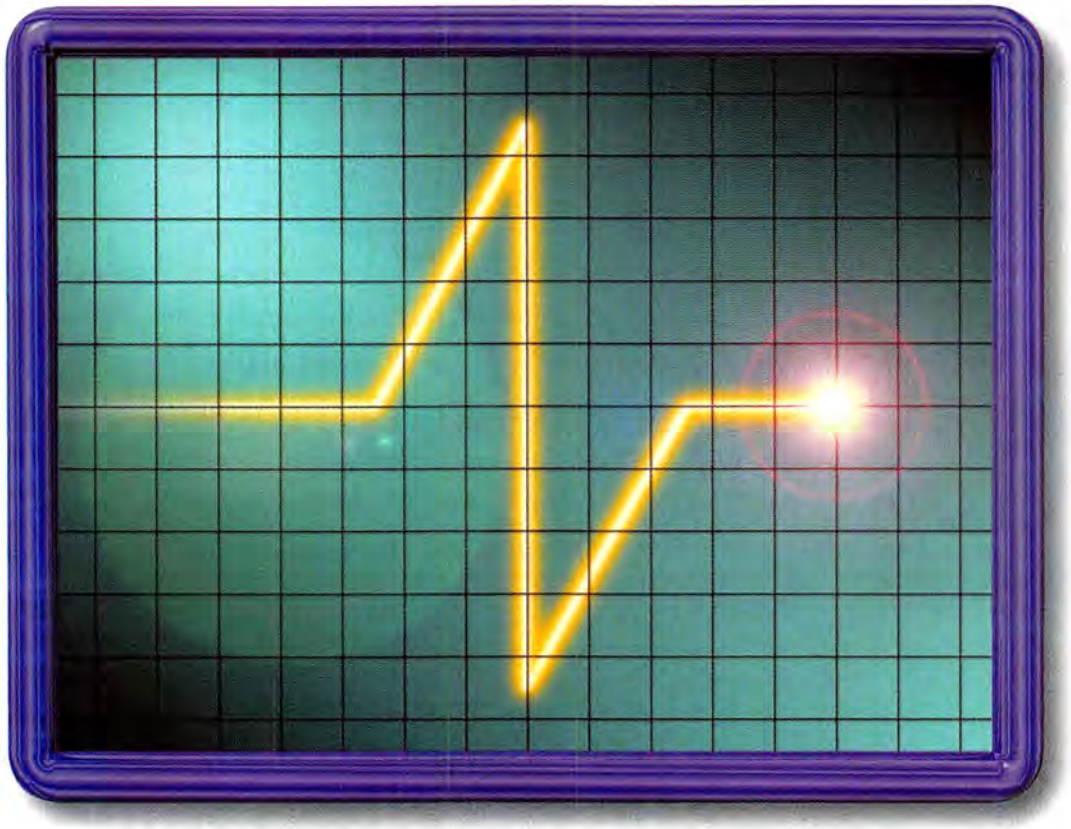

Introducing TechTool Pro 2.5

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News

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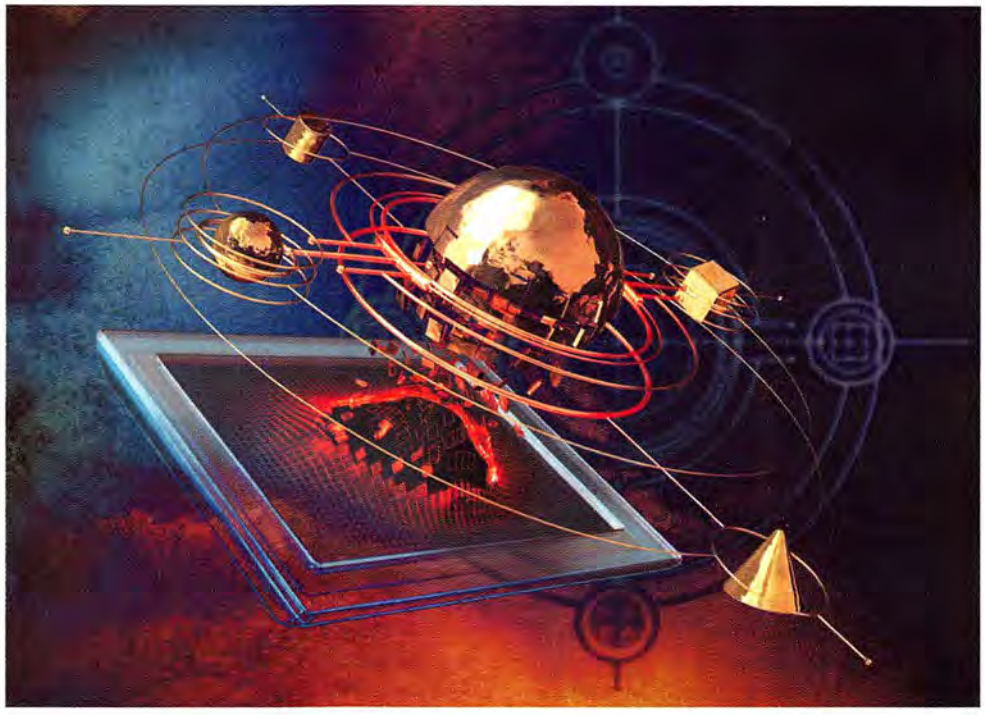
Mac Gains Ground in Web 3-D

NEW SOFTWARE RELEASES SPELL THE END OF A DROUGHT FOR THE MAC

by Stephen Beale



PAUL SHERSTOBITOFF

After years of false starts, the Web is ready to take off as a delivery vehicle for 3-D graphics, and this time it appears that Mac users won't be left behind. Several companies have unveiled Web-based 3-D technologies that support the Mac—at least for playback—and the long wait for a usable Mac Virtual Reality Modeling Language (VRML) browser seems to be over. Meanwhile, Sun Microsystems and the nonprofit Web3D Consortium are hard at work on the next generation of 3-D Web standards, respectively Java3D and X3D.

Zapped VRML Most of the recent Web 3-D action happened at Siggraph 99, the huge computer-graphics trade show held August 8 to 13 in Los Angeles. There, a little-known organization called Zap Technologies (www.zaptech.com) demonstrated a free VRML-HTML browser called Twirl. Zap, which describes itself as a pro bono software developer, is making the browser available on an open-source basis, allowing other developers to add modifications. Previously, the only VRML browser for the Mac was a buggy version of Cosmo Player that worked with older versions of Netscape Navigator. VRML is the reigning standard for 3-D content on the Web.

Other VRML browsers for the Mac could be in the works. Blaxxun Interactive (415/437-6160, www.blaxxun.com), through the Web3D Consortium, is making its VRML browser available under an open-source arrangement. As with Twirl, other developers are now free to create their own versions of the software.

Waiting in the wings is X3D, the successor to VRML. Essentially a hybrid of VRML and Extensible Markup Language, X3D will be backward-compatible with VRML, meaning you'll be able to view VRML content with X3D-enabled browsers. The Web3D Consortium, which is responsible for developing the standard, expects that the first X3D applications will ship in the first half of next year.

Built in Java Sun expects to play a role with Java3D, an extension of the Java language that supports 3-D modeling and rendering. Currently, Java3D is available only for Windows and Unix systems, but Sun says a Mac version is in the works.

The Java developer sees

continues

Wacom Targets Consumers with Graphire Tablet

MANY VENDORS OFFER ALTERNATIVES TO THE MICE IN Apple's iMac and blue G3 systems. But the folks at Wacom Technology (800/922-6613, www.wacom.com) have a new variation on the concept: a $100 USB graphics tablet that includes a cordless, pressure-sensitive pen along with a cordless mouse with a scrolling finger wheel. The Graphire system, scheduled to ship in October, includes an 8-by-8-inch tablet with a 4-by-5-inch active area. The tablet is not compatible with Wacom's Intuos system and lacks such Intuos features as Tool ID and dual tracking.—MACWORLD STAFF

Java3D as a complement to X3D. Java3D applications will be able to read and write X3D files, and Sun says Java3D will offer interactive functions not available in X3D.

Some companies are using current versions of Java to generate 3-D content for the Web. For example, Shout Interactive (415/641-1121, www.shoutinteractive.com) has developed a Java-based 3-D renderer that runs on any Java-capable computer. Blaxxun's Blaxxun3D is a Java applet that supports some features in VRML. The advantage is that you can view 3-D content on any Java-capable computer without downloading a plug-in.

Plug-in Power Other companies are pushing proprietary 3-D technologies that require a plug-in download. The best known is MetaCreations (805/566-6200, www.metacreations.com), which has finally released the long-awaited Mac version of its MetaStream browser plug-in; the PC version has been available for more than a year. You can create MetaStream content by using a Save As option in Bryce 4, Poser 4, and other MetaCreations programs.

The Swedish company Cycore Computers (www.cycore.com) offers Mac playback software for its Cult3D Web technology, but you'll need Windows software to generate the content. Hypercosm (608/821-0500, www.hypercosm.com) has introduced a 3-D–graphics-programming language called OMAR (Object-oriented Modeling and Rendering), along with Hypercosm Studio, an application-development environment. Mac users can view Hypercosm content using the Hypercosm3D Player. The authoring software currently works only with Windows, but the company says that it plans to release a Mac version next year.

Hypercosm claims that its technology has an advantage over MetaStream and Cult3D, because the language allows you to define the function of objects as well as their geometry. For example, you can create a 3-D clock that works as a real timepiece. The content is very compact: at Siggraph 99, Hypercosm demonstrated an online air-hockey game that consumes about 14K of file space.

Another company, Web developer Pulse Entertainment (415/348-4000, www.pulse3d.com), has created a Web 3-D technology for its own projects, which include a digital version of comedian Jay Leno created for NBC's Web site. Pulse offers a 200K browser plug-in for the Macintosh and Windows.

multimedia

3-D Hardware Ready for Mac Market?

MAC RESURGENCE AND OPENGL SPUR INTEREST

by Stephen Beale

The recent Siggraph computer-graphics conference in Los Angeles could have been a frustrating experience for Mac users. The show, which covers such high-end graphics technologies as 3-D animation and virtual reality, is heavy on Windows NT and Unix applications. Wandering the aisles, you'd see hardware that could have walked out of a science-fiction movie—3-D scanners, solid-object printers, motion-capture rigs—only to find that none of it worked on a Mac.

However, given Apple's resurgence, the company's adoption of the OpenGL 3-D graphics standard, and the prospect for wicked-fast Mac systems running AltiVec-based PowerPC chips, some developers of high-end 3-D hardware are taking another look at the Mac.

Niche Product These are far from being mass-market products. A midrange 3-D scanner—for scanning models directly into 3-D modeling or rendering programs—will set you back $50,000 or more, as will a solid-object printer, which produces physical models from 3-D computer data. In some cases, the system price includes a dedicated Windows NT workstation.

Motion-capture systems, for controlling animated 3-D characters in real time, are even more esoteric. Most such systems feature a suit embedded with position sensors. When you wear the suit, any movements you make are automatically applied to the 3-D character. Some companies offer facial-tracking systems that similarly allow an actor to control the speech and facial expressions of an animated figure.

OpenGL Benefits Apple's embrace of OpenGL, a standard set of 3-D–graphics routines, will make it easier for developers to offer Mac versions of their hardware, because most are already using OpenGL-based driver software in their Windows NT or Unix products. The forthcoming G4 processor, with its AltiVec extensions,

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will offer unprecedented 2-D and 3-D graphics performance. And with Apple's resurgence, hardware developers are more confident in the long-term prospects for the Mac market.

Two developers of 3-D scanners, Digibotics and Cyberware, say they are considering Mac versions. Digibotics' Digibot II is a $50,000 scanner that currently works only with Windows NT. Cyberware offers a range of 3-D scanners, from tabletop models to a six-figure system designed to scan people's bodies.

Cyberware also offers a scanner, popular in film and broadcast production, for scanning heads. Combine it with a solid-object printer, and you have a workable, if expensive, system for producing portrait sculptures.

PAUL SHERSTOBITOFF

These may be costly and specialized products, but they occupy a niche—high-end graphics production—that's important to Apple. And as we've seen time and again in the computer business, those high-end, $50,000 products have a habit of migrating to the desktop. After all, it wasn't long ago that you had to shell out $50,000 for a high-quality color printer. Four or five years from now, 3-D scanners, printers, and other exotic hardware products could well become common sights in some Mac studios.

systems

Vimage Drops Mac Upgrade Business

SEEKS OTHER COMPANIES TO OFFER ITS PRODUCTS

by Macworld Staff

Vimage, a Japanese manufacturer that had been active in the Mac upgrade business, announced in August that it would no longer offer products to users or resellers, effectively ending the company's role as a Mac vendor. However, in a message on the company's Web site, Vimage said it was seeking potential partners to offer its products under their own labels.

The company offered a line of G3 CPU upgrades under the Vpower brand. It's a competitive market with little room for product differentiation because all the vendors get their primary components—the G3 chips—from the same sources (see "G3 Upgrade Cards," *Reviews*, in this issue). Vimage, a relative newcomer to the Mac market, was competing with well-known vendors such as Newer Technology, Sonnet Technologies, PowerLogix, and XLR8.

Other upgrade vendors have also undergone changes. Newer Technology, reportedly beset by financial problems, announced in August that it has hired three executives to implement new production, finance, and organizational strategies. They include APS Technologies veteran John Nelson, who will take on responsibilities previously handled by former chief operating officer Steve Worrell and former operations director Lanny Buntner, both of whom left the company.

In a statement, Newer Technology said it hopes to "accelerate product shipments, shorten product development cycles, and improve time to market." Along with CPU upgrades, Newer Technology also sells memory, USB peripherals, and a FireWire PC Card for Apple PowerBooks.

Interex, the parent company of XLR8, has hired much of the former management team of DayStar Digital to handle its Mac upgrade business. Interex purchased the XLR8 brand name in 1996. DayStar closed its doors in 1998 after Apple pulled the plug on Mac OS licensing.

printing

HP Throws the Ink-Jet Gauntlet

DESKJET 970C SQUARES OFF WITH EPSON MODEL

by Macworld Staff

Epson America (800/463-7766, www.epson.com), which until now has dominated the Macintosh ink-jet printer market, is about to get its stiffest competition in years. Hewlett-Packard (800/552-8500, www.hp.com) has announced a new ink-jet printer, the $399 DeskJet 970C, that appears to offer a breakthrough in speed and

continues

Product WATCH

Free for All You can't beat the price: Linker Systems (877/489-3525, www.linker.com) has announced that it will offer a free, fully functioning version of **Animation Stand**, its $5,000 2-D animation software, for the Mac. **Animation Stand Personal Edition** is limited to a maximum resolution of 256 by 192 pixels, but otherwise provides all the features of its high-end sibling. Linker also offers a $495 version for multimedia production. The company also announced that Animation Stand 4.1, expected to ship later this year, will include features that take advantage of advanced graphics capabilities in Motorola's G4/AltiVec chip.

Catching a Lightwave Time for an overhaul: **Lightwave 3D 6.0**, from Newtek (800/862-7837, www.newtek.com), features a completely reworked software architecture, along with new character-animation and rendering capabilities. The high-end 3-D–modeling, –rendering, and –animation software—available for Mac, Windows, and Unix—sells for $1,995.

Photo Gallery Two-megapixel cameras keep rolling in. The $899 **Samurai 2100DG**, from Yashica (800/526-0266, www.yashica.com), features a maximum resolution of 1,632 by 1,232 pixels and 4× optical zoom. The $899 **QV-2000UX**, from Casio (973/361-5400, www.casio.com), and the $799 **PhotoPC 850Z**, from Epson (800/463-7766, www

continues

.epson.com), both feature 3× optical zoom and a maximum resolution of 1,600 by 1,200 pixels. Epson also released a pair of USB flatbed scanners, the $149 **Perfection 610** and the $249 **Perfection 1200U.** The 610 features 600-by-2,400-dpi hardware resolution; the 1200U increases the resolution to 1,200 by 2,400 dpi. Epson offers a SCSI version of the 1200U for $299.

Painter by Numbers MetaCreations (800/846-0111, www.metacreations.com) has taken the wraps off **Painter 6,** an upgrade of the popular natural-media painting software that features new brush controls, 3-D painting features, and a text-on-a-curve function.

A Kazoo for Adobe? Adobe Systems (800/833-6687, www.adobe.com) has licensed **Kazoo** 3-D rendering technology from LightWork Design (www.kazoo3d.com). Kazoo, which LightWork sells to other software developers, allows users to manipulate and paint 3-D models in real time. Adobe says that it will use the software in future consumer products.

Video to Go Now you can capture—and export—video with your PowerBook. The iRez **CapSurePro,** from Par Technologies (602/922-0044, www.irez.com), is a $399 Type II PCMCIA Card that connects to camcorders, VCRs, and other video sources. It requires a PowerBook 3400 or later.—EDITED BY MICHAEL GOWAN

image quality. But Epson has its own response, with the $429 Stylus Color 900G, an iMac-inspired version of the Stylus Color 900.

HP's Challenge The DeskJet 970C prints at 600 dpi, but HP's color-layering technology increases the apparent resolution to 2,400 by 1,200 dpi for printing images on photo paper. Although it's only a four-color printer, the HP's photo-output samples are impressive; the images appear to rival the best photo output of Epson's six-color ink-jet models.

The DeskJet 970C is also fast—HP claims maximum color output of 10 pages per minute in draft mode. In its highest-quality mode, HP says, the DeskJet 970C can produce a full-page color photo in about three minutes. Although it does not feature an iMac-inspired industrial design, it does break from the standard beige designs of HP's earlier ink-jet printers. Other features include a print-cancel button, a low-ink indicator, and automatic two-sided printing—the latter a first for low-cost ink-jet printers.

The DeskJet 970C has a USB port for connection to iMacs or blue-and-white G3 systems, but no serial port for older Macs. Hewlett-Packard expects to ship the printer by the time you read this.

Epson Responds Epson's Stylus Color 900G—a blueberry version of the previously announced Stylus Color 900 (see *Reviews*, June 1999)—offers the same maximum 10-ppm print speed as the DeskJet 970C.

Judging from Epson's samples, photo output from the four-color printer looks just as impressive as the HP DeskJet 970C's output. USB and serial interfaces are built in; Epson also offers Ethernet, LocalTalk, and PostScript 3 options. The printer is expected to ship by the time you read this.

HP's DeskJet 970C features automatic two-sided printing.

input devices

Touch Screen Enhances iMac Kiosks

ELO TOUCHSYSTEMS OFFERS MODIFIED iMACS

by Macworld Staff

Apple's iMac, in addition to being a popular consumer computer, is also ideally suited to be an information kiosk. The iMac's look makes for an attractive kiosk display, the all-in-one design simplifies maintenance, and the Mac's legendary ease of use reduces navigation hassles for novice users. But what about that keyboard and mouse?

The most usable kiosks don't make you peck at a keyboard; instead, you make your selections by touching items on the computer screen. Three companies—Elo TouchSystems (800/356-8682, www.elotouch.com), MicroTouch (800/642-7686, www.microtouch.com), and Troll Touch (661/257-1160, www.trolltouch.com)—offer touch-screen systems for the iMac. In most cases, you buy the iMacs from the vendors with the touch-screen technology preinstalled.

The iMac touch screens use one of two technologies: capacitive or resistive. A capacitive touch screen distributes low-voltage current over the display area; when you touch the screen, your finger draws current and the controller detects the position. A resistive system detects finger pressure to determine coordinates.

Elo has developed a capacitive technology called iTouch that lets you make selections by touching the monitor glass directly. The modified iMacs carry the full Apple warranty. However, like other iMac touch-screen products, the system uses one of the two USB ports, leaving you with a single connection. Elo also offers touch-screen CRTs and LCDs for Power Mac G3 systems.

MicroTouch's TouchStation also uses capacitive technology, but with a thin overlay. The company has been demonstrating its systems with Kiosk Communicator, a $495 authoring tool from First Wave (888/221-5498, www.first-wave.com). An iMac with TouchStation costs $2,085 and carries Apple's standard warranty.

Troll Touch's TouchStar uses resistive technology. The system is available in a $795 internal version, which the manufacturer installs, or external $565 and $595 versions, which you can install yourself. Troll Touch also sells iMacs with the touch screen preinstalled for $1,995, and offers a $495 touch screen for Apple's new iBook.

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Memo Pad

Notes on Davis disappearance; directions to meeting w/informant.

To Do List

Download photos of Kendall surveillance; clean goop off Ethan's high chair.

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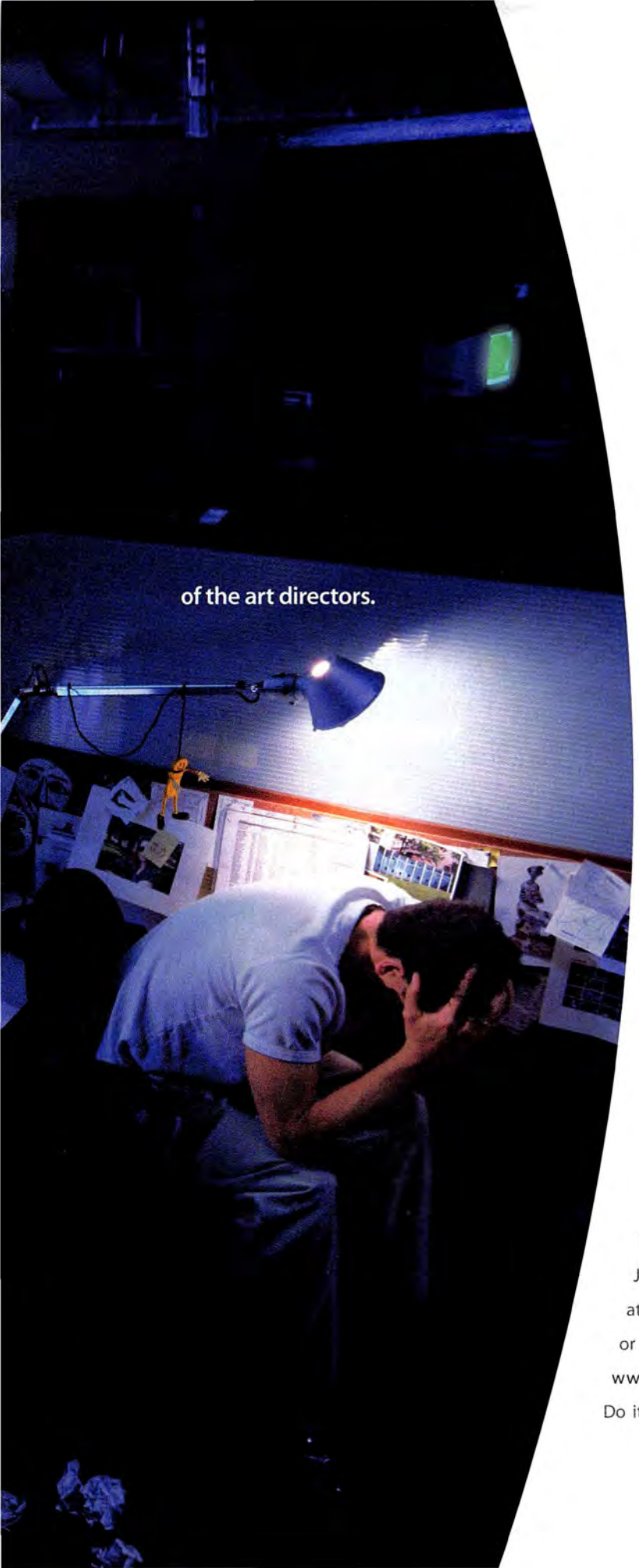

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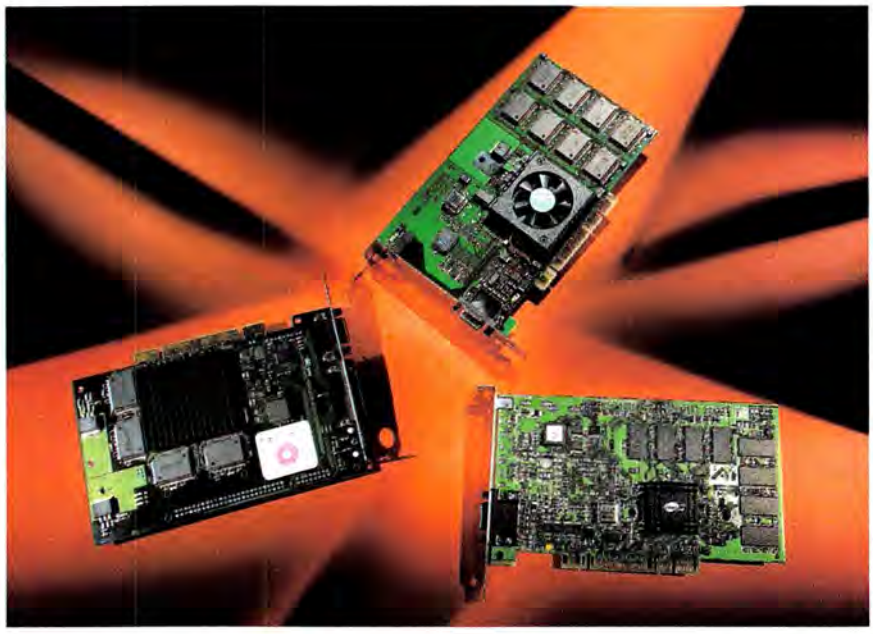
Reviews

Graphics Accelerators

RAGE ORION AND PROFORMANCE 3 PROVIDE BEST 2-D, 3-D ACCELERATION



ARNOLD TIOSEJO

WHETHER YOU'RE VIEWING A QuickTime movie, zooming in on a big Adobe Photoshop image, or playing the latest shoot-'em-up adventure game, it takes lots of horsepower to push all those pixels across your display. Apple's blue-and-white Power Mac G3 systems, driven by ATI Technology's Rage 128 graphics-acceleration chips, provide excellent graphics performance, but what if you have an older Mac system?

Macworld Lab tested three shipping graphics-accelerator cards designed for use with any PCI-equipped Power Mac: ATI Technology's Rage Orion, Formac Electronic's ProFormance 3, and IXMicro's ix3D Game Rocket. We also looked at a potential competitor in the graphics-accelerator arena: 3dfx's Voodoo3 2000 PCI card, using an unsupported beta version of its Mac driver. In the end, both the Formac and ATI cards are great choices for boosting graphics acceleration in beige G3s. But if you're looking to get more performance out of your blue-and-white G3, the cost doesn't justify the minor performance boost.

The Contenders

All of the tested cards use new-generation processors designed to boost the speed and display quality of 2-D and 3-D graphics. The $199 ATI Rage Orion features the same Rage 128 chip that drives the graphics accelerator in blue-and-white G3 systems. Sporting 16MB of nonupgradable video memory, it's designed primarily for gamers, but it will also accelerate systemwide graphics display. Formac's ProFormance 3, targeted at design professionals, uses the Permedia3 graphics processor from 3Dlabs. We tested the $259, 16MB version; Formac also offers a $189, 8MB model.

Two cards are powered by 3dfx technology: IXMicro's $249 ix3D Game Rocket uses the Banshee chip set, and the 3dfx card has the newer, Voodoo3 design. We tested both with 16MB of video RAM. The chip developer, whose Voodoo processors have become the standard for game acceleration in the PC market, is working with Mactell on a Voodoo3 card, due out this fall. The card we tested used an unsupported beta driver; we tested it only as a preview of what's to come.

Making a Difference

Using our test beds—a 300MHz beige Power Mac G3 and a 400MHz blue-and-white Power Mac G3 (the latter is not shown in the benchmark, "Boosting Beige G3 Graphics")—we timed common 2-D and 3-D graphics tasks, and a jury evalu-

REAL PRODUCTS REAL RATINGS
Reviews you can trust: Macworld rates only final shipping products, not prototypes. What we review is what you can actually buy.
OUTSTANDING: ♦♦♦♦♦ VERY GOOD: ♦♦♦♦ GOOD: ♦♦♦ FLAWED: ♦♦ UNACCEPTABLE: ♦

ated the quality of QuickTime movies played on the systems. For our 2-D tests, we used large QuarkXPress and Photoshop documents. We also timed video frame rates in Puffin Designs' Commotion. In the 3-D tests, we timed frame rates in Activision's Quake II; MacSoft's Unreal; and LightWork Design's Walker, a real-time 3-D–rendering application.

If you have an older Power Mac system, all of these cards will give you a significant boost in graphics performance—depending on which applications you use. We saw marked improvement when running Photoshop on our 300MHz system with each of the four cards, but hardly any with QuarkXPress. The ProFormance 3's Photoshop acceleration was especially impressive.

All three shipping cards offer built-in QuickTime acceleration. Here, the Rage Orion is the hands-down winner; our jury rated its QuickTime movie quality as excellent and that of the Game Rocket and ProFormance 3 as only fair. The 3dfx card did a poor job of displaying QuickTime movies.

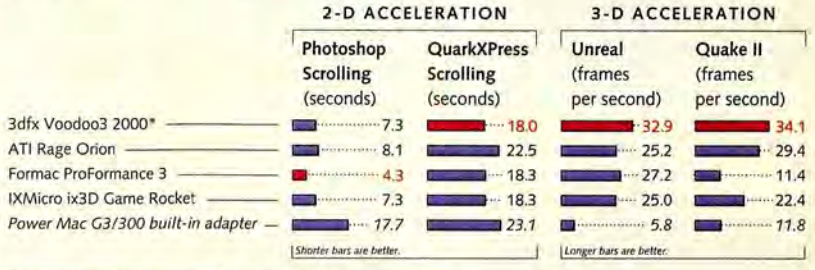
After we ran our 3-D tests, the benefits of the graphics accelerators were much clearer. As you can see in the benchmark, all four cards substantially boosted performance for Unreal. With Quake, the Rage Orion (in RAVE mode) and Game Rocket (in Glide mode) turned in excellent scores. But only the 3dfx Voodoo3 card passed the 30-frames-per-second plateau—the holy grail for gamers. On the other hand, the ProFormance 3—the performance leader in some of our other tests—barely kept up with the system's built-in graphics adapter because it lacks an OpenGL driver (coming this fall, according to Formac).

Although upgrading the graphics card in older systems is an easy choice, for most users of blue-and-white G3 systems, it doesn't make much sense. The ProFormance 3 outpaced the Power Mac G3's built-in Rage 128 chip for Unreal play and Photoshop document scrolling, but there wasn't enough difference to justify the $259 outlay.

Macworld LAB TEST

Boosting Beige G3 Graphics

Best results in red. *Reference product in italics.*



* *Unsupported accelerator with beta driver, included for comparison only.*

Behind Our Tests

We tested the graphics accelerators in a first-generation Power Macintosh G3/300 running Mac OS 8.6 with 256MB of RAM and virtual memory turned off. For detailed information on our tests, see the review online at www.macworld.com/1999/11/reviews/.—**Macworld Lab testing supervised by Kevin Mitchell**

Software Support

The Rage Orion and ProFormance 3 support RAVE, the hardware acceleration component of Apple's QuickDraw 3D software. Any game or 3-D authoring application that supports RAVE acceleration should see some speed increase when these cards are installed in a system. IXMicro promises RAVE support for the Game Rocket in the near future. The Game Rocket and 3dfx cards support Glide, a 3-D gaming API developed by 3dfx. A handful of popular games, most notably Bungie Software's Myth, are limited to Glide support; you'll need a Voodoo-based graphics card for the fastest and best-looking 3-D action.

A third standard, OpenGL, represents the future of 3-D graphics on the Mac. Only a few Mac applications support OpenGL at present, but Apple's decision to embrace the standard means OpenGL compatibility will soon be a common software feature. The Rage Orion and Voodoo3 cards currently offer built-in OpenGL support; Formac and IXMicro both promise OpenGL support in the near future.

Macworld's Buying Advice

The Rage Orion and ProFormance 3 both earned high scores in our performance tests. The Rage Orion was a more balanced performer, scoring reasonably well in all of our tests; it also provided the best QuickTime display quality. The ProFormance 3 outpaced the other cards in a few tests, but in our Quake benchmark it barely kept up with the reference system. Gamers may want to wait for the upcoming Mactell Voodoo3 card and its promised excellent frame rates. For general use in older Power Macs, the Rage Orion offers the best combination of price and performance, while the ProFormance 3 gives Photoshop users a boost.—STEPHEN BEALE

Graphics Accelerators Compared

Company	Product	Mouse Rating	List Price	Contact	Pros	Cons
ATI Technology	Rage Orion	♦♦♦♦	$199	905/882-2600 www.atitech.com	Excellent price/performance; good software bundle; excellent QuickTime quality; supports OpenGL.	Average 2-D acceleration.
Formac Electronic	ProFormance 3	♦♦♦♦	$259	925/251-0100 www.formac.com	Generally excellent performance; option for digital LCD and 3-D goggles.	Poor Quake acceleration; no OpenGL support.
IXMicro	ix3D Game Rocket	♦♦♦	$249	888/467-8282 www.ixmicro.com	Decent performance; supports Glide.	QuickTime artifacts; no RAVE or OpenGL support.

G3 Upgrade Cards

L2 CACHE CARDS BOOST PERFORMA SPEED

CALL THEM "UPGRADE-CHALLENGED" Macs: consumer-oriented Power Mac systems, circa 1996 and 1997, that were never intended for CPU upgrades. The most popular systems, based on PowerPC 603e CPUs, were Apple's Performa 6400, Power Mac 6500, and Twentieth-Anniversary Macintosh, but the list also includes Macintosh clones from Motorola and Power Computing. With a fat CPU soldered in place, there doesn't seem to be much of a way to add a G3 chip to these machines.

But wait—those clever upgrade folks have figured out an ingenious way to get near-G3 performance from old 603e Power Macs. Sonnet Technologies, Newer Technology, and PowerLogix have released G3 upgrade cards that fit in the Macs' L2 cache slot. Remove the L2 cache card and pop in one of these upgrades, and you'll soon be racing along at 300MHz or more.

Cruising Along

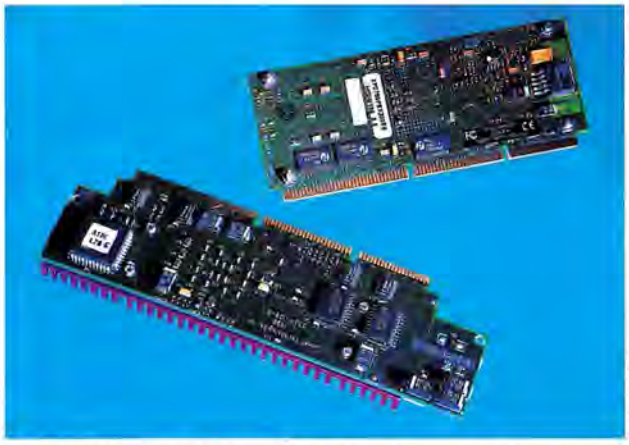
Macworld Lab tested five G3 cards that fit into the L2 cache slot: three Crescendo G3/L2 models from Sonnet and two Maxpowr G3 L2 models from Newer. One Sonnet card features a 400MHz G3 CPU; the others have 300MHz CPUs with a range of cache speeds and sizes. The Newer cards are both 300MHz, but one, the Maxpowr G3 L2 300/1MB, was a hand-built preproduction model; we included it in our tests as a preview, but we didn't rate it because it wasn't shipping at press time. The PowerLogix cards didn't arrive in time for testing.

It was impossible to test the cards in every supported model, so we chose a Performa 6400 with a 180MHz 603e CPU. Other supported Macs include the Power Macintosh 4400, 5400, 5500, 6400, and 6500; the Performa 54XX and 6360; the Twentieth-Anniversary Macintosh; Power Computing's PowerBase desktop; and Motorola's StarMax 3000 and 4000.

We found that the cards do indeed deliver speeds approaching that of a 300MHz G3 system, especially when performing such CPU-intensive tasks as 3-D rendering. The speed boost is apparent not only from our benchmark testing; the Performa also *feels* peppier with the upgrade cards installed. But as with any CPU upgrades, be prepared for some gotchas, especially considering the upgrade-challenged nature of these Macs.

Cache Back

How do you achieve G3 performance in an old 603e system? The L2 cache in those systems normally serves as a form of high-speed memory, feeding frequently used data into the 603e CPU. The G3 upgrades replace this memory with a fully functioning PowerPC G3 CPU running at 300MHz to 400MHz. In addition to the card, you install a system extension that directs all traffic from the main CPU to the L2 cache slot. Because the G3 processor includes its own backside cache, you won't miss the L2 cache card.



SUZANNE ROADY

The Newer Maxpowr G3 L2 (top) and the Sonnet Crescendo G3/L2 (bottom).

There is a limit to the performance you can get from an older Mac system, however, and these cards push right up against it. Much of the problem lies in the system bus: most of the upgrade-challenged Macs, including the Performa 6400, have a 40MHz bus. By comparison, Apple's iMac and PowerBooks have 66MHz buses, and the latest blue-and-white G3s' buses zip along at 100MHz.

But you don't just miss out on the latest bus speeds—the CPU speed of these upgrades is limited to eight times the system-bus speed. With a 40MHz system bus, your CPU maxes out at 320MHz. Obviously, it doesn't make much sense to get a 400MHz G3 upgrade. As we found in our testing, the 400MHz card delivered only marginally better performance than the 300MHz upgrades, and it sells for a premium. However, if you have one of the supported Mac models with a 50MHz bus—they include the Twentieth-Anniversary Macintosh and Power Mac 5500 and 6500—you'll see performance closer to what you'd expect from a 400MHz CPU.

A Tight Fit

Installing these upgrades is theoretically as easy as adding an L2 cache card. However, the cache slot was never meant to host a CPU, and the cards are much bulkier, in every dimension, than the cache cards they replace. The result, at least in the Performa 6400, is a tight fit.

Curiously, the Sonnet and Newer cards place the CPU on opposite sides. When you install the Sonnet upgrades, the heat sink fits snugly against the nearest RAM card; with the Newer upgrades, the heat sink almost brushes against the nearest of two PCI cards (if a card is installed). The Sonnet card is bigger but seems to fit better. However, both companies' cards installed with minimal fuss considering the tight quarters.

Software installation is a breeze. With each card, you just copy an extension to the System Folder and you're ready to go. Both Sonnet and Newer include software utilities that let you gauge your system's performance, and Sonnet's Metronome utility displays the CPU temperature—a concern given the tight fit. However, none of the cards—including two that we ran for days without shutting down—appeared to cause heat-related problems.

Render Me This

We tested the cards by running MacBench 5.0 and MetaCreations' Bryce 4 in Mac OS 8.6. All five cards showed hefty speed increases over an unaccelerated Performa 6400, but the difference was especially noticeable in Bryce 4: the upgraded system took 40 to 49 minutes to ray-trace a 640-by-480-

pixel scene, whereas the native 180MHz 603e CPU took nearly 3 hours.

The MacBench numbers were impressive but not quite as dramatic; even the slowest cards clocked Processor and Graphics scores close to those of a 300MHz beige Power Mac (see "Cards Meet Upgrade Challenge"). As you might expect, the upgrades provided only a modest boost to the MacBench Disk scores.

Even with a maximum speed of 320MHz, Sonnet's 400MHz upgrade (which features a 1MB backside cache) received the highest Processor score. However, unless you have a Power Mac with a 50MHz bus—allowing you to take full advantage of the CPU speed—it's hard to justify the $600 price tag. (Newer's 400MHz upgrade, which we did not test, costs $779.)

The other cards, all with 300MHz CPUs, showed little variation in performance. The primary difference is backside-cache size; Sonnet's 1MB cache version actually bested the 400MHz card in our rendering test, although Newer's card, a preproduction model with a 200MHz 1MB cache, was 4 to 5 minutes slower.

Not surprisingly, the cards showed the greatest variation in MacBench Processor scores, a measure of pure CPU speed. Here, the 400MHz card slightly outpaced the 300MHz G3 reference system and ran more than 30 percent faster than the 300MHz cards with 512K caches. However, all of the cards received similar Graphics scores.

None of the cards appeared to cause any unusual software conflicts or system crashes, but there's no guarantee that the cards will work perfectly with every Mac configuration. And it's unclear if these or *any* G3 upgrades will support Mac OS X.

Macworld LAB TEST

Cards Meet Upgrade Challenge

Best results in red. *Reference system in italics.* MacBench 5.0 scores are relative to those of a first-generation Power Mac G3/300, which is assigned a score of 1,000 for each test. Rendering times are in minutes:seconds.

	MACBENCH 5.0			Bryce Render Time
	Processor	Disk	Graphics	
Newer Maxpowr G3 L2 300/1MB/200*	940	465	834	44:41
Newer Maxpowr G3 L2 300/512K/150	742	470	834	49:11
Sonnet Crescendo G3/L2 400/1MB/200	1,028	489	831	44:17
Sonnet Crescendo G3/L2 300/1MB/150	895	461	829	40:18
Sonnet Crescendo G3/L2 300/512K/150	735	456	797	47:50
Performa 6400 180/256K	*241*	*398*	*433*	177:05

Longer bars are better.

* *Preproduction model, included for comparison only.*

Behind Our Tests We tested all cards in a Macintosh Performa 6400 with a 180MHz 603e CPU. For detailed information on our tests, see the review at www.macworld.com/1999/11/reviews/.—**Macworld Lab testing supervised by Stephen Beale**

Other Considerations

Because upgrade vendors have to struggle to differentiate their products, Newer offers a handy antistatic wrist strap for card installation and a two-year warranty. Sonnet offers a better manual and a three-year warranty. Sonnet also dropped its prices in August, giving its cards a definite price advantage. However, there's a common pattern in the upgrade business: when one company reduces its prices, the others inevitably follow.

Macworld's Buying Advice

Add one of these cards, and you'll be convinced that your old consumer Mac has been taking steroids. The performance boost is especially dramatic with rendering or other CPU-intensive operations. Sonnet's 400MHz card generally offers the best performance, but it makes sense only if your Mac has a 50MHz system bus. Of the remaining cards, Sonnet's $299 Crescendo G3/L2, with its 512K, 150MHz cache, gives the best combination of price and performance. However, if you plan to do a lot of rendering, the 1MB cache version may be worth the extra $100 outlay. The Newer cards offer comparable performance, but their prices are much higher than the Sonnet cards'.

Of course, the eternal question remains: Should I upgrade or should I buy a new system? Our standard upgrade advice applies here: If you have a big investment in memory and peripherals for your current system and can live with the inevitable performance bottlenecks, then an upgrade makes sense. But if you don't have a huge investment, and you're ready to step up to the next generation of Mac computing, then you're probably better off with a new iMac or Power Mac system.—STEPHEN BEALE

G3 Upgrade Cards Compared

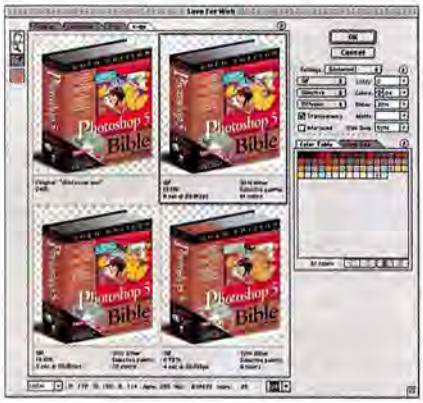
Company	Product	Mouse Rating	Company's Estimated Price	Contact	Pros	Cons
Newer Technology	Maxpowr G3 L2 300/512K/150	♦♦♦	$449	316/943-0222 www.newertech.com	Decent performance.	Expensive; tight fit.
Sonnet Technologies	Crescendo G3/L2 400/1MB/200	♦♦♦	$599	800/786-6260 www.sonnettech.com	Best performance.	Requires 50MHz bus for maximum performance; tight fit.
	Crescendo G3/L2 300/1MB/150	♦♦♦♦	$399	800/786-6260 www.sonnettech.com	Good performance; decent price.	Tight fit.
	Crescendo G3/L2 300/512K/150	♦♦♦♦	$299	800/786-6260 www.sonnettech.com	Decent performance; good price.	Tight fit.

Photoshop 5.5

IMAGE EDITOR FOCUSES ON THE WEB

EVER AGONIZED OVER WHETHER to buy a new version of Adobe Photoshop? Then get ready for one of the easiest decisions you've made in years. If you're a Web designer, you'll want to purchase the new version as soon as possible; if not, don't bother. It really is that simple.

What makes this decision a real no-brainer is that Photoshop's new features —including dramatically improved GIF and JPEG optimization—focus narrowly on the Web. Furthermore, the package includes ImageReady 2.0, a $199 Web-graphics editor that automates image slicing, JavaScript rollovers, and animation. The problem is that many of ImageReady's features overlap Photoshop's but are implemented differently enough to cause confusion.



Pick a Picture Photoshop 5.5's Save For Web command lets you index, compress, and save a Web graphic in one operation.

Extraction Made Easy

When it comes to masking, Photoshop has long provided only the bare essentials. Version 5.5 simultaneously addresses this oversight and ignores it: although three new tools make short work of separating complex subjects from their backgrounds, not one of them is capable of generating a mask. You can quickly isolate hair, leaves, and other intricate details, but Photoshop erases pixels instead of masking them, dramatically limiting your options for finessing the results.

The extraction tools vary wildly in utility. The first, optimistically dubbed the magic eraser, is the least useful of the three, erasing clumps of similarly colored pixels each time you click. Not only is it crude, but it's also redundant—you can accomplish the same feat by clicking with the magic wand and pressing delete. The prosaically named background eraser is actually more magical: as you trace an image, the tool samples and extracts the background color. The final option, the Extract command, calculates and eliminates the background automatically, based on a rough outline. Unfortunately, the controls in the Extract dialog box are far from intuitive. And because there's no undo function, you'll spend some time erasing your mistakes.

For my money, the background eraser does the best job of balancing ease of use, real-time feedback, and at least halfway-predictable results. But bear in mind that all three tools perform best with backgrounds of relatively homogeneous colors. If the foreground and background share similar hues or brightness values, you're better off creating a manual mask as in the old days.

Better Web Graphics

I've yet to meet a professional Web designer who doesn't use Photoshop—and hasn't grumbled about its shortcomings. Happily, Photoshop 5.5 tackles these complaints head-on. First, the type problems are 99 percent fixed. The underline style has been reinstated, and new anti-aliasing and kerning options make text more legible at small sizes. I'm frustrated that I still can't get 9-point Geneva and other system fonts to kern exactly as they do in the Finder, but small type looks much better than it did in the past. The new version also lets you preview the effects of JPEG compression before saving an image. And unlike JPEG previews produced by third-party plug-ins, Photoshop's previews are accurate.

But the GIF options are where 5.5 really shines. The Perceptual color-reduction option indexes GIF images to smaller sizes while allowing smoother transitions. You can specify a degree of dithering; matte translucent portions of a layer; preserve black, white, and Web-safe colors; and even apply lossy compression. When applying the Web-safe palette, Photoshop still has a penchant for saving colors you're not using, but there are plenty of workarounds.

Borrowing a page from ImageReady's playbook, Photoshop 5.5 lets you compare up to four GIF and JPEG settings side by side. The window lists file sizes, download times, and other pertinent details. You can also specify a target file size and let Photoshop generate the optimal GIF or JPEG settings automatically. With little effort, you can select an image that represents a perfect balance of bytes and beauty.

If you like to rough out page designs in Photoshop, you can slice the graphics apart with ImageReady 2.0. ImageReady not only saves every sliced graphic as a separate GIF or JPEG file but also generates the HTML table data. If you create rollover graphics, ImageReady automatically generates the required JavaScript functions. In both cases, ImageReady adds comments around its code, so you can edit the HTML document and change the graphic without having the program overwrite your work.

Photoshop 5.5 is packed with smaller changes that make life easier. It can open files in the PDF 1.3 format, a new effect can colorize a layer, you can fade brushstrokes and gradient fills, and the Contact Sheet command now adds captions. Creative types will appreciate the art-history brush, which draws impressionistic dollops of color from a source state in the History palette. Best of all, you can now undo a reversion, so you can confirm how an image looked when last saved, without losing any work.

Macworld's Buying Advice

Photoshop 5.5's extraction tools and minor enhancements add up to a worthwhile package, but they fall short of justifying the price of admission. What gives the update an edge is its Web capabilities. Web designers, here's the version you've been waiting for.—DEKE MCCLELLAND

RATING: ♦♦♦♦ **PROS:** Background eraser isolates intricate details quickly; program offers greater control over color indexing and JPEG compression; includes ImageReady. **CONS:** New extraction tools can't generate masks; ImageReady's features would be better rolled into Photoshop. **COMPANY:** Adobe Systems (800/492-3623, www.adobe.com). **COMPANY'S ESTIMATED PRICE:** $609.

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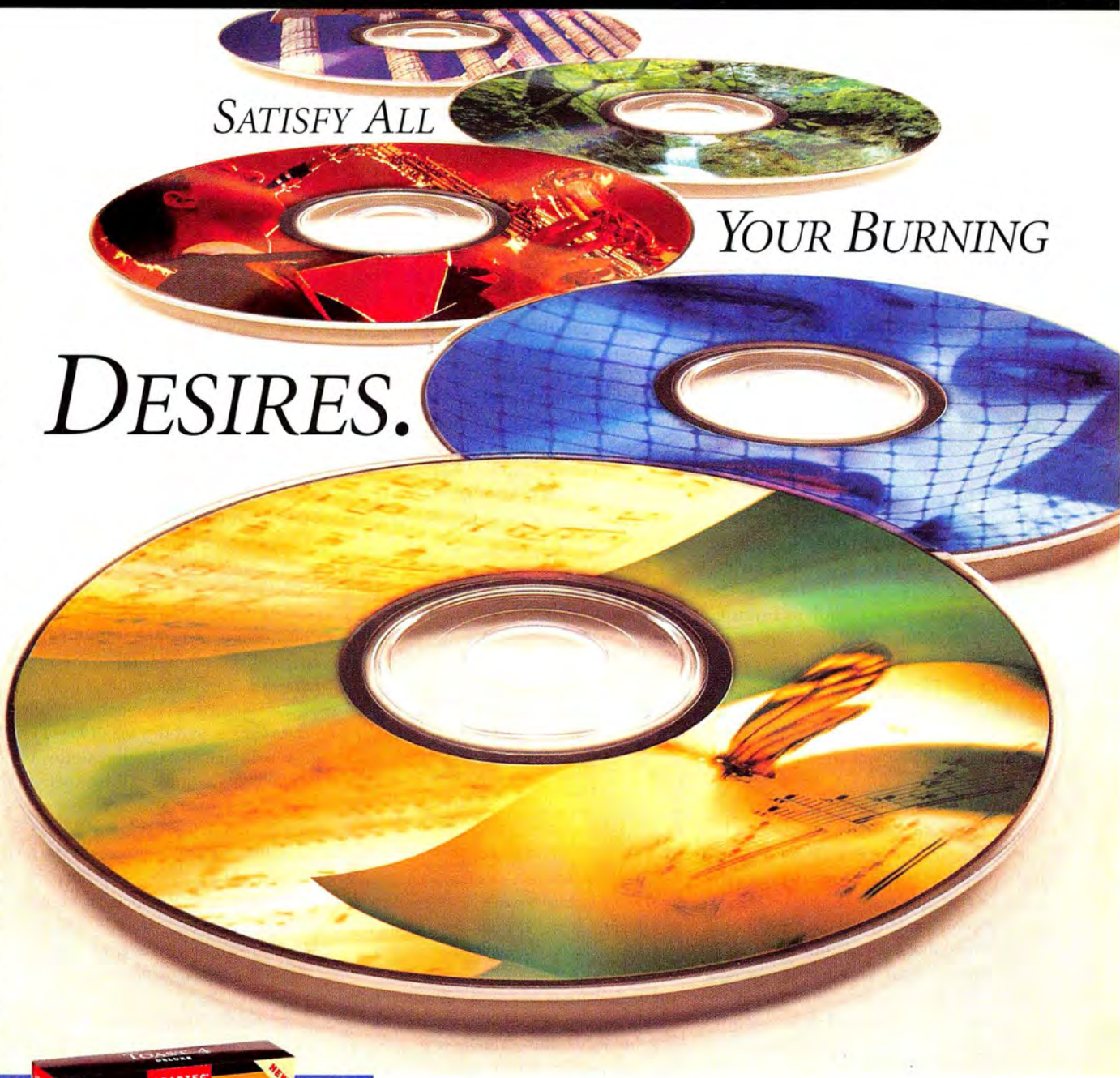

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You can also pull MP3 files from the Internet, as well as favorites from LPs and cassettes, to create your own compilation CDs. New CD Spin Doctor™ software removes hisses, pops and clicks from old recordings—your music is reborn in stunning digital quality. Get new Toast 4 Deluxe and satisfy all your burning desires.

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WebStar Server Suite 4.0

EASY-TO-USE WEB SERVER SPEEDS UP

UNTIL NOW, WEBMASTERS WANTing an all-Mac Internet presence had to get by with ad hoc collections of server software from assorted vendors; even Apple's own AppleShare IP bundle consists of weakly integrated programs that don't play together as well as they could. To remedy this situation, StarNine has stepped up to the plate with a suite of integrated products that endeavor to be team players. WebStar Server Suite 4.0 bundles a significantly faster version of the WebStar Web server; a full-function mail server; and Lasso Publisher, for publishing FileMaker and ODBC-compliant databases. In spite of a few minor errors, the suite hits a home run; using it is the easiest way to get a complete Internet presence on a single Mac.

Getting to First Base

With advanced features such as Web-based administration, IP multihoming, and more, WebStar was already a capable Web server. New in this release are a reworked data-caching architecture; persistent data-connection plug-ins that let you take advantage of HTTP 1.1 pipelining; and other performance tweaks that, according to StarNine, double WebStar's Web-serving traffic capacity, although our testing didn't indicate quite that much improvement. StarNine has also added Secure Sockets Layer (SSL) version 3 encryption features, as well as remote SSL administration using a Web browser.

WebStar's Web server still has a built-in FTP server and standard CGI capability. The server is easy to set up with the supplied Mac administration application, which supports encryption for secure remote control. Alas, StarNine has not kept WebStar's Web-based management up-to-date; many new functions can't be configured from the Web. StarNine says concern over browser-based–administration security has prevented the company from fully supporting browser-based management of all WebStar functions. StarNine intends to improve HTML administration after new encryption standards, such as Transport Layer Security (TLS), become widely available in browsers.

StarNine has enhanced its load-balancing plug-in, which lets Men and Mice's QuickDNS Pro dynamically route new users to the least-busy server. The plug-in now supports FTP load balancing and improves Web load balancing by handling traffic to virtual domains as well as to the main domain hosted by a WebStar server.

Also new in this release is WebStar Lasso Publisher, a plug-in module that's a subset of Blue World Communications' Lasso Web Data Engine. The plug-in lets you author Web pages that interface to FileMaker Pro or any ODBC-capable database. You embed Lasso Publisher commands in your HTML documents; Lasso then interprets the commands to retrieve database records for display in the user's browser. By combining Lasso with HTML forms, you can also create new database records. The plug-in can't update or delete existing records, however, and suffers from several other limitations compared to the full Lasso Web Engine product.

Surfer Mail WebStar Server Suite 4.0's built-in mail server lets users access their mailboxes via either a Web browser or traditional POP3 or IMAP e-mail clients.

It's Got Mail

WebStar's new integrated mail server supports the most popular Internet e-mail protocols—SMTP, IMAP4, POP3, APOP, and MIME—and a limited LDAP function of the mail server lets you store address books for user referrals. StarNine has paid attention to security, too, giving WebStar Mail comprehensive antispam features that prevent unauthorized mail relaying. Allow-deny filters let you control who can access various mail services, and an administration tool allows real-time monitoring of the server's activity log. The monitor function keeps tabs on queued mail, traffic rates, and access violations.

Users can access their mail via traditional Internet-capable mail clients or with any Web browser. They log onto WebStar's mail-access Web page using a special URL. Unfortunately, users can't store read messages or replies, organize messages into folders, change account settings such as their password or vacation message, or filter messages. Nor does the suite offer Web access to advanced mail functions, such as IMAP-stored mail or the LDAP directories.

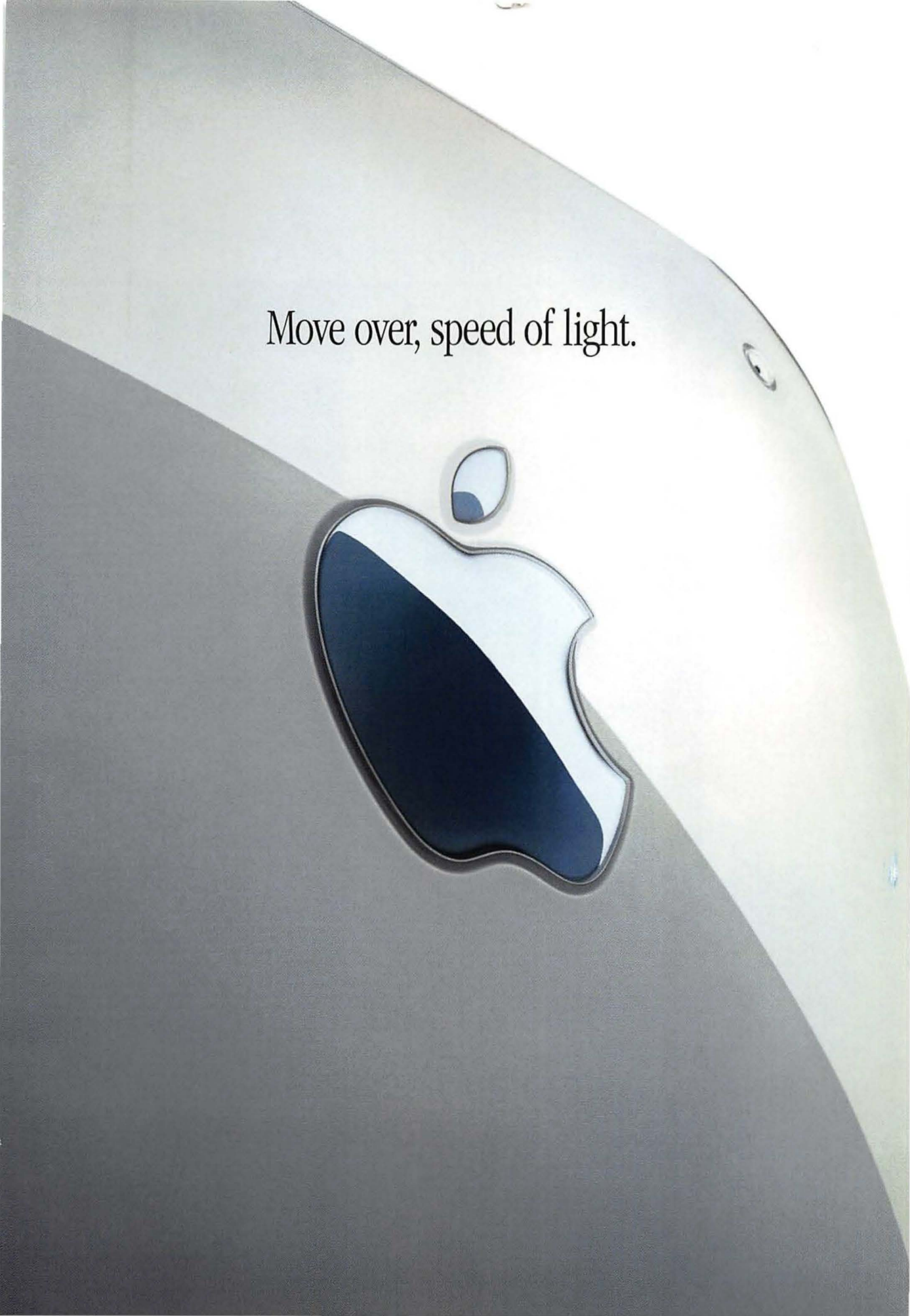
Speed, in Moderation

We tested the suite's Web server informally using the Unix-based WebStone tool, and found WebStar 4.0 easily 50 percent faster than version 3.0. We did not, however, see the promised 100 percent improvement in throughput. WebStar still requires considerable tweaking of cache settings to achieve optimal performance, and the Mac OS's TCP/IP protocol stack and nonpreemptive multitasking architecture still hamper it. You can get better performance using a server such as Tenon Intersystems' WebTen or LinuxPPC's Apache server (see the review of LinuxPPC 1999 elsewhere in this issue). Although WebStar lags behind its competitors in high-traffic environments, it's still plenty fast enough for most routine Web-hosting applications.

Macworld's Buying Advice

WebStar is still the easiest Mac Web server to set up, use, and administer, and the new mail-server component removes one more headache for Mac Webmasters. WebStar Server Suite 4.0 is no speed demon, but most Web administrators will find the bundle's convenience well worth the performance hit when user-friendliness is a priority.—MEL BECKMAN

RATING: ♦♦♦♦ **PROS:** Integrated mail server; Web-based mail access; DNS load balancing for both Web and FTP; improved performance. **CONS:** Incomplete Web-based administration; weak Web-mail interface. **COMPANY:** StarNine (800/525-2580, www.starnine.com). **LIST PRICE:** $599.


Move over, speed of light.

New face, new brain, new era.

We love building the fastest, best-designed computers in the world. We realize they're not for everyone. But for creative professionals, scientists, educators, artists, musicians and others who demand the highest possible performance, they're often nothing less than essential.

The Power Mac G4 has a revolutionary "open-door policy" that gives you easy access to every part inside.

With its Pentium-crushing speed and convention-crushing design, the Power Mac G4 picks up where the best-selling G3 left off. Its enclosure has evolved to a highly polished silver and graphite, yet it still offers easy access to every internal component through its unique swing-open side door.

Beneath its new face, however, is where the Power Mac G4 really shines. At its core is a brand-new brain—the G4 processor—that redefines high performance for the entire industry. (That's a story in itself, as you'll see in the following pages.)

And we've designed the rest of the new Power Mac G4 to keep up with the processor. Our two high-end models feature a 100MHz system bus with three times the memory bandwidth of the G3. As well as superfast Ultra ATA/66 hard drives and accelerated AGP 2X graphics.

There's a whole family of flat-panel and CRT displays, specifically designed to showcase the power of the Power Mac G4.

So, if you're one of those professionals who routinely push their computer to the limit, we invite you to witness the beginning of a new era of Power Mac power.

Hold on tight.

The Power Mac G4 is here.

Computers get marginally faster every year. Megahertz, a popular (but simplistic) measure of performance, usually increases around 35% annually. But once or twice in a decade, we experience a breakthrough that leaps far beyond these incremental steps. Today we present such a breakthrough: the new Power Mac™ G4.

This is not just the fastest Mac® in history. It's the fastest personal computer in history.

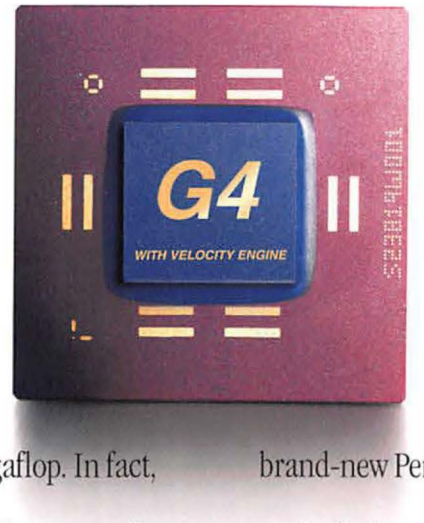
Rather than being just 35% faster, the new Power Mac G4 is up to a stunning 100% to 200% faster than the fastest Pentium III-based PCs*.

With performance increasing at its usual pace, the new Power Mac G4 wouldn't have arrived until 2003. Fortunately, breakthroughs do happen.

**In CPU and Photoshop tests.*

The first supercomputer on a chip.

What makes a supercomputer "super" is its ability to execute at least one billion floating-point operations per second. It's a staggering measure of speed known as a "gigaflop."



The new PowerPC G4, architected by Apple, Motorola and IBM, is the first microprocessor that can deliver a sustained performance of over one gigaflop. In fact, it has a theoretical peak performance of four gigaflops.

The secret of the G4's revolutionary performance is its aptly named Velocity Engine™. It's the heart of a supercomputer miniaturized onto a sliver of silicon. The Velocity Engine can process data in 128-bit chunks, instead of the smaller 32-bit or 64-bit chunks used in traditional processors. In addition, it can perform four (in some cases eight) 32-bit floating-point calculations in a single cycle—two to four times faster than traditional processors.

So how does the G4 with its Velocity Engine stack up against Intel's brand-new Pentium III processor?

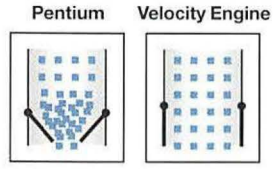
To find out, we went right to the source: We used a set of Intel's own performance tests published on their website.

Using six of Intel's tests, the 500MHz G4 was, on average, almost three times as fast as the 600MHz Pentium III (2.94 times, to be exact).

These benchmark advantages translate directly into real-world advantages.

For example, typical Photoshop tasks run twice as fast on the Power Mac G4 as they do on the fastest Pentium III-based PCs, with specific Photoshop filters running up to four times faster.* Compressing QuickTime files is also twice as fast.

In fact, "twice as fast" is a refrain you're going to be hearing often, as more and more software developers tap the power of the G4 with its Velocity Engine to accelerate the performance of their applications – just as Adobe has already done with Photoshop.



G4's Velocity Engine can process information in 128-bit chunks, compared with the 32- or 64-bit chunks in traditional processors.

Because gigaflops really do matter when your work revolves around graphics, animation, 3D games, video effects, 3D rendering and a host of other computation-hungry software.

Chances are, you've never even heard of a gigaflop before. But very soon you won't be able to live without at least one on your desk.

Intel Signal Processing Library Performance Specification

Test	Pentium III Clock Cycles	G4 Clock Cycles	G4 Performance	G4 Performance *(Adjusted for MHz)*
1024 dim. Square (bsqr1)	1.30	0.50	2.60 times faster	2.17 times faster
1024 dim. Multiply (bMpy2)	1.33	0.75	1.77 times faster	1.48 times faster
1024 dim. Dot Product (DotProd)	2.21	0.50	4.42 times faster	3.68 times faster
256 Pt. Complex FFT (FFT)	6.94	4.00	1.74 times faster	1.45 times faster
32 tap x 1024 dim. FIR Filter (bFir)	0.95	0.33	2.88 times faster	2.40 times faster
32 tap x 1024 dim. Convolution (Conv)	84.99	11.00	7.73 times faster	6.44 times faster
		Average	**3.52 times faster**	**2.94 times faster**

The 500MHz G4 processor, with its Velocity Engine, is an average of 2.94 times as fast as the fastest Pentium III (600MHz).

*Suite of 10 Photoshop filters.

What you really need is a supercomputer.

Supercomputers have helped achieve breakthroughs in almost every field of science. But almost no one outside the scientific community could possibly need one. Or so it was thought.

That was before Photoshop filters started resembling the most sophisticated image processing done by NASA. And before Internet security started demanding CIA-strength cryptography. And before compressing QuickTime® or MP3 files started expanding your workday.

These tasks, and many more like them, have two things in common: They choke traditional processors. And they can be dramatically sped up by exactly the kind of computational horsepower that supercomputers were created to provide.

But who has the money, or even the space, to have their very own supercomputer?

A revolutionary computer deserves a revolutionary display.

Introducing the ultimate companion to the Power Mac G4: the Apple Cinema Display.™ With its 22-inch screen (measured diagonally), it's the largest LCD display ever brought to market.

Its viewable area is as big as a 24-inch flat CRT display. But it's twice as bright and sharp, with triple the contrast ratio and zero flicker. And its millions of colors remain true from almost any viewing angle.

Like a movie theater, the Apple Cinema Display has a letterbox format (1600x1024 pixels), with room enough to display an entire 11x17 image. And unlike most other displays, it receives its data digitally from the computer, preserving the highest-quality image.

The Apple Cinema Display is state-of-the-art technology, and supplies will be limited. And at $3999* it's not for every pocketbook. But if you're fortunate enough to use one, your office view will never be the same again.

*Suggested retail price.

It would take a far, far bigger page than this to show you the actual size of the Apple Cinem

Display. Its 22-inch screen has a viewable area equal to that of a 24-inch flat CRT display.

If you don't see your perfect G4 here, feel free to build your own.

Price*	$1599	$1999	$2799	$3499
Processor	400MHz G4	450MHz G4	450MHz G4	500MHz G4
L2 Backside Cache	1MB 200MHz	1MB 225MHz	1MB 225MHz	1MB 250MHz
Memory (SDRAM)	64MB 1.0GB max.	64MB 1.0GB max.	128MB 1.5GB max.	128MB 1.5GB max.
Max. Memory Bandwidth	400MB/sec	400MB/sec	800MB/sec	800MB/sec
Graphics	RAGE 128/PCI 16MB graphics memory	RAGE 128/PCI 16MB graphics memory	RAGE 128/AGP 2X 16MB graphics memory	RAGE 128/AGP 2X 16MB graphics memory
Hard Drive 3 internal bays, 1 used	10GB Ultra ATA/33	13GB Ultra ATA/33	20GB Ultra ATA/66	27GB Ultra ATA/66
Removable Storage	CD-ROM	DVD-ROM DVD-Video playback 100MB Zip Drive	DVD-ROM DVD-Video playback 100MB Zip Drive	DVD-RAM DVD-Video playback 100MB Zip Drive
Ethernet 10/100BASE-T	Yes	Yes	Yes	Yes
FireWire Ports (400Mbps)	2	2	3 (1 internal)	3 (1 internal)
USB Ports	2 (12Mbps total)	2 (12Mbps total)	2 (24Mbps total)	2 (24Mbps total)
AirPort™ Wireless Networking 11Mbps IEEE 802.11	n/a	n/a	Optional	Optional
56K V.90 Modem	Built in	Built in	Optional	Optional
Apple Cinema Display	n/a	n/a	Optional	Optional

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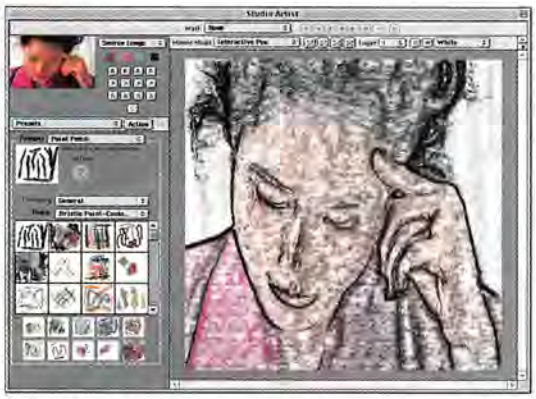
Studio Artist

BREAKTHROUGH PAINTING TOOLS, QUIRKY INTERFACE

CHALK, PENCIL, PAINT . . . MOST paint programs' tools try to mimic materials found in the real world. Synthetik Software's Studio Artist 1.0 goes a step further, producing images that combine natural media with amazing digital effects. Harnessing the program's power and range of painting options can be daunting, but the patient user will reap the reward with creations that would be impossible to achieve with real-world media.

Patching In

Billed as a "graphics synthesizer," Studio Artist is loosely modeled on musical synthesizers. Just as you would select instrument patches on a synthesizer, in this program you select from 600 paint *patches*, or brush effects, which you can refine and combine to create a nearly endless variety of effects. And the patches are more than simply textured brushes or variations on a few themes; they can also be procedural. For example, if you select one of the Cubist patches and start painting, your brush will create an array of multicolored, straight-line strokes. You can move the brush around to change the lines' direction and rotation or choose a patch such as Canvas Liquidifier 1, which smears and distorts the underlying ink.



Look, Ma, No Brushes By applying three or four color effects and a few hard-edged pencil effects, you can create images like this in Studio Artist without applying a single hand-painted stroke.

In the Paint Synthesizer, you can customize existing patches to create new effects. A pop-up menu listing 14 parameter categories lets you control everything from the shape of a brush path to color variation and how the brush interacts with underlying layers and paint. If you have a pressure-sensitive tablet, you can assign brush parameters to the pen's pressure, direction, tilt, and bearing, so a brush's behavior will vary depending on how you move the pen. New users may find the Paint Synthesizer daunting, but with more than 600 predefined patches to choose from, you'll probably never need to create or customize a patch.

In general, Studio Artist's interface is usable once you learn it, but you'll have to spend some time with the manual. Unfortunately, the program ships with PDF files rather than a printed manual, so you'll also have to spend some time printing out the documentation. And the program uses a rather un-Mac-like alternative to the traditional tool palette, asking you to choose a "mouse mode"—either the normal brush mode; the automatic-drawing mode; the Bézier mode; or the region mode, which lets you define areas you'll fill with brushstrokes.

Send In the Clones

Like MetaCreations' Painter, Studio Artist can sample colors from a source image to create new images based on existing photographs or paintings. When you click on the Action button, Studio Artist begins cloning your image by making brushstrokes with the selected tool. If you've chosen a picture of a duck as a source image, the shape and color of the duck will gradually emerge as you paint, but the image is rendered with the paint patch you've selected.

Studio Artist is much more sophisticated in its color sampling than Painter or Adobe Photoshop plug-ins such as Xaos Tools' Paint Alchemy. Rather than blindly sampling underlying colors, Studio Artist does an astonishingly good job of identifying edges and contours in your original image and brushing along them. And if you start with a source image, you'll understand the utility of some of the brush effects—they're meant for layering on top of existing paint to build up texture and color over time. Through a combination of automatic painting and manual brushing in of strokes, you control how much of the underlying image gets cloned as well as the textures used.

Moving Paint Strokes

Its painting skills are impressive enough for a first release, but Studio Artist has much more to offer. When you activate the program's path functions, it stores every stroke separately as a Bézier path. Because you can reshape and repaint the paths, you can edit complicated bitmapped effects as you would in a drawing program. And if you want to enlarge your drawing later, Studio Artist can scale up your paths and then rerender each brushstroke to create a larger painting with no jagged edges.

Studio Artist includes an array of distortion and special-effects filters and brushes. Although the program lacks support for Photoshop filters, the built-in effects tools are probably all you'll need. Studio Artist does support QuickTime—you can paint on a movie's frames by hand or have the program paint each frame using a predefined effect. Movies that Studio Artist paints tend to resemble video viewed through a filter, however; for better effects, you'll want to posterize or blur your original video to remove detail.

Macworld's Buying Advice

Plenty of filters and programs try to mimic real-world painting by manipulating an image to replicate the look of particular textures and media. Studio Artist is the first program to copy the way real painters choose their strokes, letting you apply brushstrokes that follow the shapes and contours of a source image. In addition, Studio Artist's still- and video-painting features are impressive for a first release. The program's nonstandard interface can prove frustrating, and it's a little pricey for nonprofessionals, but print and video pros looking for new tools will find it's worth the price and learning curve.—BEN LONG

RATING: ♦♦♦½ **PROS:** Huge assortment of brushes; automatic cloning feature creates hand-painted effect. **CONS:** Overwhelming number of controls; nonstandard interface. **COMPANY:** Synthetik Software (888/808-4188, www.synthetik.com). **LIST PRICE:** $295.

QuickMail Office 2.0

IMPROVEMENTS BRING SERVER ALMOST UP-TO-DATE

EVERYONE KNOWS THAT E-MAIL is the lifeblood of modern business. Alas, keeping e-mail flowing in a large or medium-size office is a tedious chore that grows rapidly with the user population. CE Software's QuickMail Office 2.0 lends a helping hand to harried e-mail administrators: It delivers a streamlined, browserlike client; server-stored message retrieval via IMAP; enhanced filtering to block annoying spam; and a Web-accessible address-book server that integrates with any Mac-based Web server. QuickMail Office still lacks two features commonly found on other mail-server platforms—Web e-mail access and remote administration—but the client delivers functions never before seen in any Web-based mail interface.

Package Deal

QuickMail Office 2.0 offers one-stop shopping for enterprise e-mail. The bundle includes the QuickMail Pro 2.0 mail server, a license for five QuickMail Pro clients—either Mac or Windows—and the new QuickMail Pro directory server.

Installing the server takes just seconds, and configuration requires only that you know the e-mail domains you wish to serve. Once you've installed the server, you create a mailbox for each user. You can also set default user preferences and organize users into groups.

Client installation is equally straightforward: users copy the client installer from the file server and run it, providing their user names and passwords when prompted. The client then retrieves the users' account profiles and configures itself. This feature greatly reduces the work required to roll out QuickMail for the first time and lets users move from one computer to another without administrative intervention.

Reliable Delivery

The QuickMail Pro server supports the most popular Internet mail protocols—SMTP, POP3, APOP, IMAP, and UUCP—over either a dedicated or dial-up Internet connection. The server application displays the status of all available protocols, as well as bar graphs showing the volume of traffic for each. Message filtering lets you block spam and sort incoming mail based on header content, or trigger AppleScripts to perform automated chores such as e-mail responding. Built-in gateway interfaces for Mark/Space Softworks' PageNow and 4-Sight PLC's 4-Sight fax sender let you route e-mail to alpha pagers or fax machines, and a built-in mailing-list server gives you standard mail-reflector functions.

New with this release are shared folders, which offer a bulletin-board–like central repository for general messages; IMAP support, allowing mail storage on the QuickMail Pro server rather than on users' desktop computers; and support for multiple e-mail addresses per user. This last feature lets users change their online "persona" to fit the situation; a customer-service clerk, for example, can become service@acme.com when replying to messages addressed to that e-mail alias.

I'm in the Book QuickMail Office 2.0's LDAP directory server sports a Web-based interface that gives you convenient access to centralized address books.

One of the nicest new features is a separate Lightweight Directory Access Protocol (LDAP) server, which maintains centrally managed address books. A Web-server CGI plug-in lets you put your address books on the Web, complete with search capabilities and e-mail URLs, making directories accessible to off-site users.

QuickMail Pro's server has some rough edges, however. IMAP support isn't complete, for example—users can't create or rename folders, archive messages, or search message contents. Alas, these are the very IMAP features that users most want when giving up control of their mail to a central repository. The server also has no Web-based—or any other—remote administration capability, making the server inconvenient to maintain from a distance. And QuickMail lacks Web-based mail access for end users, at a time when this feature is appearing in competing Mac mail servers.

Ready for Pickup

Users can read mail from the QuickMail Office server with any Internet-compliant e-mail client. However, QuickMail Pro's client offers features not found in most other clients. A new browserlike message viewer organizes incoming mail as a hierarchical list—you can automatically file those messages using mail filtering, but you can still find unread mail easily. A built-in contact manager stores a user's own local address book merged with LDAP directories, providing a convenient single point of lookup.

QuickMail's venerable forms feature—still a unique capability—lets users store data-entry forms as templates for collecting and distributing information in a standardized format. Return receipts let users know when the recipient has read their outgoing mail, and a lifesaving Unsend feature lets you reel in that ill-considered resignation notice.

Macworld's Buying Advice

QuickMail Office 2.0 provides one-stop shopping for e-mail serving and client software. The absence of Web-based e-mail and the limited IMAP support may inconvenience mobile users, but if your users primarily access e-mail from their desks—and you want consistent e-mail handling throughout your organization—QuickMail Office is all you need.—MEL BECKMAN

RATING: ♦♦♦½ **PROS:** Streamlined client; LDAP directory server with Web-enabling plug-in; built-in bulletin board; antispam controls. **CONS:** Incomplete IMAP support; no Web-based mail access; no Web-based or other remote administration. **COMPANY:** CE Software (800/523-7638, www.cesoft.com). **LIST PRICE:** Five users, $346; 10 users, $656; 25 users, $1,326.

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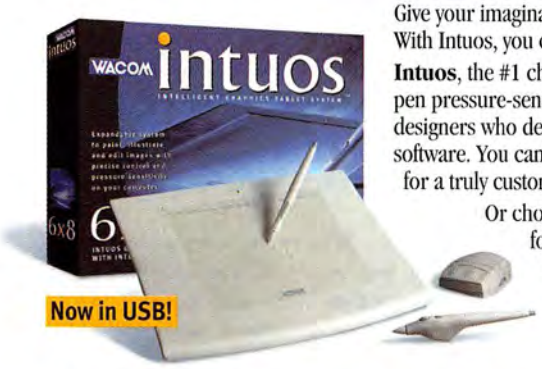

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Poser 4

BRING LIFE TO 3-D MODELS

AS A 3-D MODELER AND ANIMATOR, you've probably gazed longingly at the plethora of character-animation tools available for that *other* operating system. Yearn no longer—with Poser 4, MetaCreations has created a powerful 3-D character-animation tool that will appeal to 3-D animators as well as print and Web designers.

Strike a Pose

Poser has always been good for creating simple figure studies and animations, but with version 4, the program becomes a serious animation and illustration tool.

As with previous versions, you begin by importing a figure model into Poser 4's workspace. The application ships with more than 70 models, including humans, animals, and robots. Once you've chosen your figures, you pose them by dragging their body parts with one of three positioning tools. For difficult posings, you can also move parts numerically or by turning special Parameter Dials.

Like earlier versions, Poser 4 boasts full inverse kinematics (IK) for realistic body positioning. With IK activated, you can reposition a hand and have the rest of the arm move correctly. Unlike most other 3-D packages, Poser doesn't require you to define any complicated chains, limits, or weights. And unlike its predecessor, Poser 4 offers far more posing controls. With more-articulated models, you can create complex motion from head to toe. Joint animation is also much improved, with none of the weird splitting and intersecting of previous versions.

Distort and Contort

Despite Poser 4's level of control and detail, the models it creates can still look like well-animated mannequins. Fortunately, the program's new deform features change all that.

Deformers let you stretch, distort, and twist the geometry of any body part. You create a deformation by adding a magnet to a body part to pull the part into a different shape. By manipulating magnets, you can define everything from subtle deformations to extreme stretches and squashes. As with all models in Poser, you can animate deformers, creating bouncing bellies and twitching ears.

In addition to being powerful creative tools, deformers allow you to work around some of Poser's character-animation deficiencies. For example, because Poser doesn't take a bones-and-skin approach to character animation, you won't see any flexing muscles or rippling skin when you move a character's arm. Adding a deformation to a character's upper arm is a simple workaround.

Sunday Best

Better animation features aren't the only improvements in version 4; nearly every aspect of the program has been enhanced. For example, although earlier versions included clothing, Poser 4's fashion functionality is vastly improved. You can select from more than 40 articles of clothing and mix and match them on any model.

A Little Sketchy Poser 4's new Sketch Designer creates beautiful natural-media renderings and provides sophisticated controls for customizing the look of your sketches.

More important, clothes now have the same hierarchies and parameters as your characters. With the new Conform command, you can make a shirt match your model's IK hierarchy. Animate your character, and his or her clothes animate as well. Unfortunately, Poser still implements hair as a prop rather than as a true particle-based system. Because the hair on a Poser model is little more than a wig with a few animation parameters, making it blow or wave takes some work.

Poser's rendering has been improved with transparency and reflection maps. The program delivers good rendering performance, although it lacks motion blur for more-realistic animations. The program's incredible new Sketch Designer makes up for these deficiencies, letting you create beautiful natural-media renderings of your work. Once you've completed a project, Poser 4's excellent import and export features make it easy to move geometry and motion data to or from other programs. In addition, Poser can export directly to MetaCreations' MetaStream format to create small streaming Web files.

Also improved are Poser's lighting features, which offer a simpler interface and more options. The new version lets you select individual polygons on a model for regrouping and reordering with the new Hierarchy palette. These features make it easier to correct texture mapping on imported models. The camera controls are also good. Particularly handy is the Point At command, which forces the camera to point at a particular object or body part.

Unfortunately, you still can't undo some actions, and there's still no way to lock objects. Poser also has trouble with large geometries—import a very large prop, and you'll most likely crash the program. And the program's animation interface remains weak, offering poor visual feedback on keyframe location and lacking velocity tools for controlling a model's acceleration.

Macworld's Buying Advice

Although Poser has always been a good program, it becomes a serious production tool for animators and illustrators with version 4; its new features and controls are well designed and well implemented. Unfortunately, it suffers from a weak animation interface and needs to be able to handle larger, more complicated scenes. And Mac users may still want a true particle system, collision detection, and other character-animation features Windows users already enjoy. For many animation and illustration jobs that involve characters, however, Poser 4 is all you need.—BEN LONG

RATING: ▮▮▮▮ **PROS:** Models are more posable; good distortion tools; beautiful sketch rendering. **CONS:** Trouble supporting large geometries; no velocity controls; weak animation interface. **COMPANY:** MetaCreations (800/846-0111, www.metacreations.com). **COMPANY'S ESTIMATED PRICE:** $249.

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SoundJam MP

FAST MP3 ENCODING AND PLAYBACK

RECORD COMPANIES FEAR IT, music addicts love it: the MP3 audio-compression format has taken the Internet and the music industry by storm. Of all the MP3 software available for the Mac, Casady & Greene's new SoundJam MP is the most complete. It's the only Mac MP3 tool capable of not only playing back MP3 files but also encoding tracks from audio CDs—all with a comfortable, customizable user interface.

At first glance, SoundJam MP's interface evokes the look of Apple's QuickTime Player, the justifiably maligned movie and music player that accompanies QuickTime 4 Pro (see *Reviews*, October 1999). SoundJam MP sports the same brushed-aluminum, 1970s-swinger look. But Casady & Greene didn't mimic Apple's mistakes as well. SoundJam MP's volume control is a horizontal slider instead of an awkward virtual knob, and the program lacks QuickTime Player's gimmicky Favorites drawer.

Listen Here SoundJam MP's 11 graphic-equalizer presets optimize playback for various music styles.

What's more, as with @soft's popular MacAmp MP3 player (see "So Long, CDs," July 1999), you can completely change SoundJam MP's appearance by switching "skins." Most of the 13 skins that accompany SoundJam MP are pig-ugly, but you can download more from the SoundJam MP Web site or convert MacAmp skins to work with SoundJam MP.

Like nearly all other MP3 players, SoundJam MP lets you create a sequence of songs and store them in a playlist. The program's playlist features are straightforward and well designed—for example, you can have multiple playlists and drag and drop songs from one playlist to another. MacAmp lacks these niceties. SoundJam MP can also play live feeds from the growing number of Web sites that offer MP3 streaming. You can even include live streams in playlists.

But SoundJam MP is more than an MP3 player—you can use it to encode, or *rip*, MP3 tracks, simply by inserting an audio CD and clicking on a couple of buttons. SoundJam MP can also connect to an Internet CD database to retrieve track and artist names so you don't have to peck them in by hand.

You can customize SoundJam MP's encoding settings, but the program doesn't provide nearly as much encoding control as Xing Technology's AudioCatalyst 2.0. And unlike AudioCatalyst, SoundJam MP doesn't support variable-bit-rate (VBR) encoding, whose sound quality some MP3 gurus prefer. But SoundJam MP can play back VBR files, whereas Apple's QuickTime Player can't.

Like many other MP3 players, SoundJam MP includes a graphic equalizer (EQ) that lets you fine-tune sound quality to your tastes. SoundJam MP comes with 11 EQ presets, and you can add your own. For simple tone adjustments, SoundJam MP also offers basic bass and treble controls, which most MP3 players lack. And three bundled plug-ins display cool graphics in rhythm with the music. Some of the plug-ins are downright psychedelic; after a few minutes of staring at Melt-O-Rama, I felt like entering a rehab program.

Macworld's Buying Advice

SoundJam MP is hands down the best MP3 player for the Mac. Musicians wanting to encode MP3 tracks for Internet distribution may prefer Xing's AudioCatalyst for its more precise encoding controls, but the rest of us will find SoundJam MP's encoding features adequate. Test them for yourself by downloading a seven-day trial version of SoundJam MP from www.soundjam.com.—JIM HEID

RATING: ♦♦♦♦ **PROS:** Supports both encoding and playback; excellent playlist features; supports streaming. **CONS:** No variable-bit-rate encoding; lacks precise encoding controls. **COMPANY:** Casady & Greene (800/359-4920, www.soundjam.com). **LIST PRICE:** $50.

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multimedia artist

Baltimore: Experienced multimedia professionals needed for full-time, long-term contract work with large, international client. Candidates must be proficient in any combination of Director, After Effects, 3D Studio Max, Photoshop, Illustrator, Java, Javascript, or HTML. Be part of a team whose work is seen on a global basis! Two to three years of experience and on-line examples of your work are expected.

help desk administrator

Providence: The Help Desk Administrator supports a nationwide community via telephone, email, or in person as necessary. He/she provides first line support for Help Desk Technicians, with the responsibility to ensure all requests are being attended to, and tracks usage/response. Three to four years of help desk experience, a high level of organization, and excellent communication skills are required.

technical designer

Boston: The Technical Designer assesses the technical feasibility of design direction, translates layouts into HTML, dynamic HTML, Shockwave and/or Javascript, assists with prototype development, and tests projects on specified browsers and platforms. He/she may also help to develop new technology demos for client. Two to three years of experience in a web production environment involving large sites and multiple platforms is required.

senior art director

Dallas: A publishing company is looking for a Senior Art Director to design book covers and some packaging to be sold via catalog and point of purchase at bookstores. This company produces high-quality products for a wide range of audiences, so the work would always be changing. Five years of experience and a portfolio with full color samples is ideal.

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traffic coordinator

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oracle programmer

Chicago: This is not your average programming position! Our client is looking to hire an expert with Oracle's Developer 2000 who can take a project from inception through completion. You will be working directly with the clients and will have the freedom to be creative to give customers the best possible product. A minimum of three years of recent experience and excellent communication skills are required.

proofreaders

Philadelphia: Prestigious center city firm has an immediate need for proofreaders. Experience in tech writing is helpful, but not required. The ideal candidate will be bright, a quick learner, and have either a BA or BS in English, Communications, or some other related major. Excellent writing and editing skills are essential. Expect long hours, but a fun and challenging work environment.

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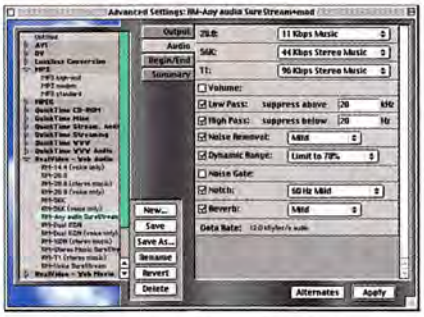
Media Cleaner Pro 4.0

COMPRESSION UTILITY GETS MEDIA CLEANER THAN EVER

COMPRESSING AUDIO AND VIDEO for delivery over the Internet or on CD-ROMs is a dirty business. Your mission: to shoehorn high-bandwidth content into the narrow pipes that are modems and CD-ROM drives. Your hope: that the content will still be recognizable at the other end of the pipeline.

Media producers employ a variety of tools to compress content, foremost among them Terran Interactive's Media Cleaner Pro. Version 4.0 adds support for the latest streaming and compression technologies and offers great new audio features and conversion options. Toss in thorough documentation, and you have the best compression tool available.



Sound Cleaner Media Cleaner Pro 4.0 adds a batch of new audio-processing filters.

Media Cleaner Pro 4.0's enhancements begin with support for the latest streaming technologies and compression schemes. The new version supports Apple's QuickTime 4 Streaming Server, Microsoft's Windows Media (formerly NetShow), and RealNetworks' RealSystem G2. Its QuickTime 4 support is particularly strong. The program can compress movies for various connection speeds and for older QuickTime versions and can create the **<embed>** tag required to display the movies in a Web page—just copy and paste the tag into your favorite HTML editor. Support for Windows Media and RealSystem G2 isn't quite as solid: because Microsoft hasn't yet released the final version of its Windows Media Player for the Mac OS, Media Cleaner Pro must rely on beta versions of the Windows Media codec.

Media Cleaner Pro supports all RealSystem G2 codecs, but it can't create a G2-compatible **<embed>** tag; instead, it creates a simple anchor tag that launches the RealPlayer helper application. If you want to embed your G2 efforts rather than linking to them, you'll need to either hand-code the **<embed>** tag or use RealNetworks' RealProducer Plus G2.

Fortunately, the new version lets you convert a file from one format to another without having to recompress it and further reduce its quality. Better still, you can selectively recompress during the conversion process.

Audio no longer takes a backseat to video, as it did in previous versions. The new Noise Gate filter cuts down on hiss, and other new filters reduce power-line hum and similar evils. Media Cleaner Pro 4.0 also offers better resampling algorithms that yield higher-quality results when you're changing a soundtrack's sample rate. A dynamic-range compressor beefs up audio tracks, and you can choose from several commonly used presets or supply your own values. Alas, Media Cleaner Pro doesn't let you preview audio settings without applying them.

One thing that hasn't changed is Media Cleaner Pro's efficient interface. Compression beginners can use the Settings Wizard; advanced users can choose settings directly. You can also use the Batch window to apply Media Cleaner Pro's skills to multiple files in one fell swoop.

Macworld's Buying Advice

At $499, Media Cleaner Pro 4.0 isn't for amateurs who want to publish the occasional audio or video clip on the Web. Media Cleaner Pro's HTML-generating features for RealSystem G2 content could use some improvement, but the program's ability to compress and clarify audio and (especially) video is unmatched. If your mission is to make media work on the Web or CD-ROMs, you'll want Media Cleaner Pro along for the ride.—JIM HEID

RATING: ▮▮▮▮ **PROS:** Broad compression-technology support; enhanced audio features; excellent manual. **CONS:** Doesn't create **<embed>** tags for RealSystem G2 content; no audio preview. **COMPANY:** Terran Interactive (800/577-3443, www.terran.com). **LIST PRICE:** $499.

Macworld EDITORS' CHOICE 4½

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Macworld

SonicWall Pro

SPEEDY FIREWALL DELIVERS 100 MBPS

REMEMBER WHEN 10-MBPS Ethernet seemed fast? Today you can get multimegabit Ethernet at home, and business LANs often reach 100 or 1,000 Mbps. Alas, affordable enterprise-class firewalls usually support only 10-Mbps networks. Sonic Systems' SonicWall Pro breaks the 10-Mbps barrier, with three 100-Mbps Ethernet ports, a high-speed RISC processor, and a rack-mountable enclosure.

Like its smaller siblings, the SonicWall Pro is a dedicated, Web-administered network appliance for connecting private LANs to the Internet. It supports Dynamic Host Configuration Protocol (DHCP), network-address translation, stateful filtering and tunneling, remote telecommuting, and optional content filtering. In addition to 100-Mbps Ethernet ports, this version sports a 233MHz StrongArm RISC processor, a PCI slot for future expansion, and Virtual Private Networking (VPN) support.

SUZANNE ROADY

You connect the unit to your Ethernet backbone and Internet router, using the supplied DMZ port to attach any servers you want the public to have full access to. If you choose not to make servers completely public on the DMZ port, you can open protocol-specific tunnels in the firewall for individual servers on your LAN. If you follow the instructions in the well-written user guide, configuration takes just minutes with any Web browser. The SonicWall Pro automatically e-mails you when it detects an attempted intrusion, a denial-of-service attack, or IP-address spoofing.

The unit can block all Usenet news access and disable Java and ActiveX applets, remote proxies, and HTTP cookies to prevent security breaches by unfriendly Web sites. An optional self-updating content-filtering feature ($695 for a one-year subscription) lets you monitor or block access to 12 predefined content categories. The filter combines the CyberNot content-filtering list, which blocks IP addresses and URLs known to be inappropriate for children, with phrase matching and a custom URL list.

Built-in VPN support provides secure private networking between two SonicWalls—or between the SonicWall and any other IPsec-compatible firewall—across the Internet. VPN creates encrypted tunnels for passing data safely, using either the fast, 56-bit ARCFour or the slower 56-bit DES or 168-bit Triple-DES methods. Supporting as many as 100 tunnels between endpoints, the SonicWall Pro can handle VPN traffic for up to 64 individually protected users per tunnel. You can optionally configure unencrypted tunnels to transport unsupported protocols between LANs.

A supplied single-user client license for Windows supports secure remote management, but the SonicWall offers no client VPN software for the Mac. Also missing is Internet Key Exchange support, which would simplify VPN administration of multiple SonicWalls across the Internet. Sonic says a free update, which should be available by the time you read this, will add this feature.

We tested Sonic's claim of 100-Mbps throughput, using multiple Mac clients and a 450MHz Power Mac G3 server on a 100BaseT switched-Ethernet LAN. The SonicWall Pro had no problem achieving 60-Mbps aggregate throughput, which is about the maximum for 100BaseT. A VPN performance test across a 10-Mbps Internet connection showed that the SonicWall Pro can sustain about 3 Mbps when encrypting traffic with the strongest encryption method.

Macworld's Buying Advice

The SonicWall Pro delivers the performance today's business LANs demand of their firewalls. Its VPN support and rack-ready packaging make it a great choice for high-speed security.—MEL BECKMAN

RATING: ♦♦♦♦ **PROS:** Web-based configuration; VPN support; built-in DHCP server; excellent performance. **CONS:** No Internet Key Exchange support; lacks Macintosh VPN client software. **COMPANY:** Sonic Systems (888/557-6642, www.sonicsys.com). **LIST PRICE:** $2,995.

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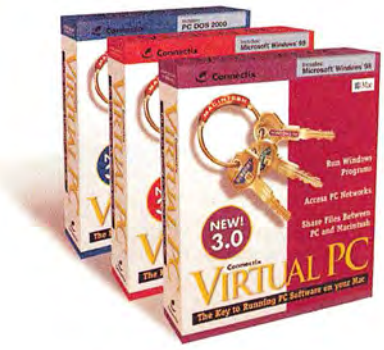

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Spell Catcher 8

WRITING TOOL WORKS ACROSS APPS

GIVEN THAT MOST WORD PROCESSING and page-layout programs have built-in spelling checkers, why would you pay for a dedicated spell-checking program? Casady & Greene offers a strong case for doing just that, with Spell Catcher 8, the latest version of its cross-application writing utility.

Spell Catcher is more than just a spelling checker. You can call up synonyms and dictionary definitions for any selected text. As you enter custom abbreviations, a shorthand function quickly spells them out—enter *adc*, for example, and the program automatically expands it to that all-too-common phrase "Apple declined to comment." You can also activate a dictionary of commonly misspelled words; if you enter *accomodate*, Spell Catcher automatically converts it to *accommodate*. The useful Ghostwriter function automatically saves your keystrokes in case the system crashes.

Another useful option, Modify Selection, applies a wide range of formatting adjustments to selected text. You can make quotes straight or curly, remove extra spaces, capitalize the first word of each sentence, or convert e-mails with odd line breaks into logically formatted paragraphs.

No More Typos Spell Catcher 8 can catch spelling and punctuation mistakes in any Mac program.

Spell Catcher lacks a grammar checker, but it catches double words as well as capitalization and punctuation errors. You can set up the program to ignore e-mail addresses, URLs, and words that begin with capital letters (unless they start a sentence). This version supports eight languages, and you can install an optional HTML dictionary for checking Web documents.

Spell Catcher's big advantage is that it works with any Mac program you're running. Whether you're composing a document in Microsoft Word or entering text in a shareware program, Spell Catcher checks spelling, looks up definitions, and suggests synonyms. You access the options through a menu Spell Catcher displays on the right side of the screen (the previous version functioned as a control panel).

But the question remains: why pay $50 for a spelling checker when so many packages have those facilities built in? For one, with a single systemwide spelling checker, you need store only one standard dictionary and one dictionary of user-defined terms on your hard disk. If you've spent time compiling unique word lists in other programs, you can import them into Spell Checker's dictionary. And Spell Catcher offers a few features you won't find in Microsoft Office, such as the ability to pronounce words and look up word meanings.

Macworld's Buying Advice For those who are sloppy typists or work with programs that don't include spelling checkers, Spell Catcher is a must-have product. It's less compelling if you work in Microsoft Office, but even then, the extra features may be worth the $50 price tag.—STEPHEN BEALE

RATING: ♦♦♦♦ **PROS:** Strong spell-checking options; works with any Mac application. **CONS:** No built-in grammar checker. **COMPANY:** Casady & Greene (800/359-4264, www.casadyg.com). **COMPANY'S ESTIMATED PRICE:** $50.

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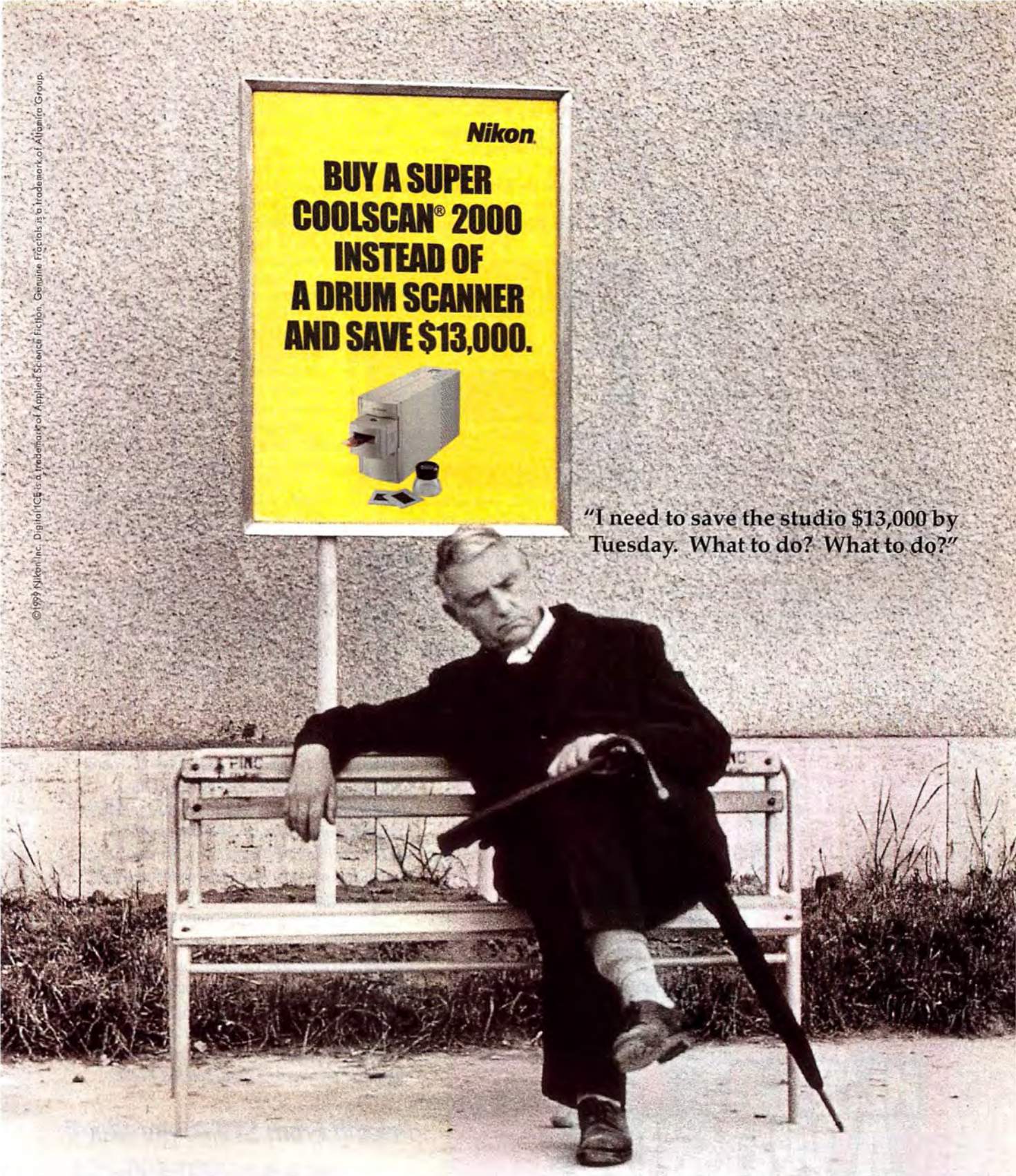

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LinuxPPC 1999

PORT BRINGS UNIX TO THE MAC

LINUX, THE FREE UNIX-VARIANT operating system that runs on just about any computer you could name, is now available as a commercial release for the Macintosh. LinuxPPC's LinuxPPC 1999 runs on most PowerPC-based Macs and works with most Mac peripheral hardware, including USB and FireWire peripherals. It also includes the latest Linux graphical interface and is easily installed by any steely-eyed propellerhead—but not, unfortunately, by mere mortals.

The packaging is stunningly minimalist: a single CD in a cardboard slipcover, with nary a scrap of paper documentation. (The company says a boxed version, complete with printed manual, is in development.) Inexplicably, the CD itself contains no installation documents—you must download those from LinuxPPC's Web site. You'll need those installation docs, too, because the install process is harshly nonintuitive. You first partition your hard drive to separate your Mac OS and Linux worlds, and then boot up Linux from the CD and run a graphical installer to load the application itself. If you do everything correctly, installation takes about an hour. Mac OS and Linux operation are mutually exclusive, but a Bootx utility lets you choose between the two at start-up.

Once you get LinuxPPC up and running, it's fairly easy to operate using the vaguely Mac-like X Window interface and

Pretty Face LinuxPPC 1999 sports a full-featured graphical user interface and desktop environment.

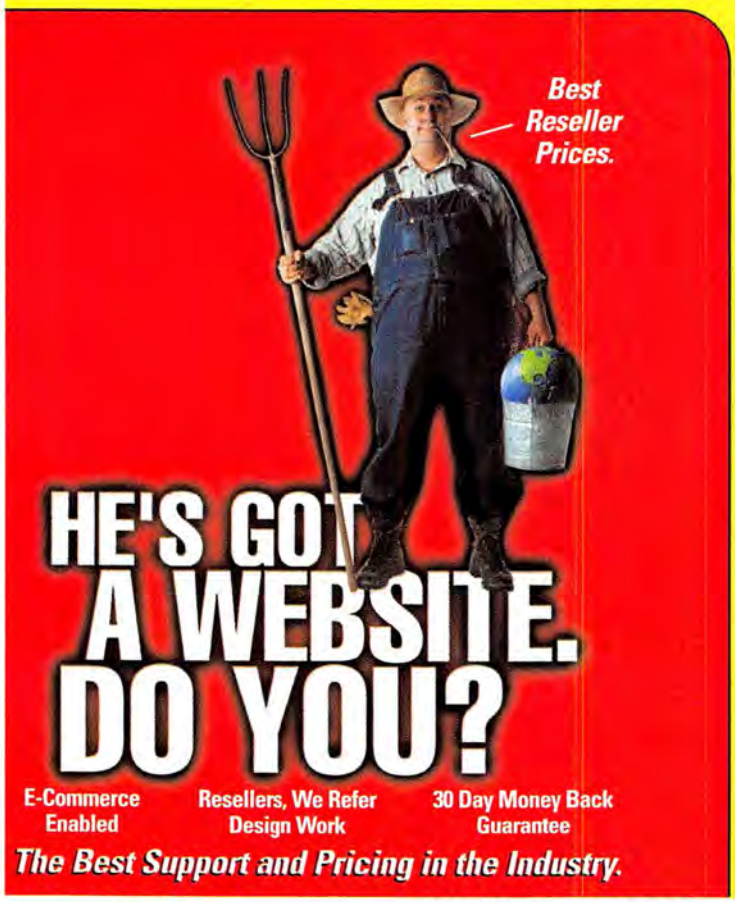
K Desktop Environment. You get plenty of bundled software: the Apache Web server, Netscape Communicator 4.5, multimedia players (including one for MP3), complete C and Java environments, other communication tools, and—Linux's hallmark—*all* the source code.

The most common application for Linux is as an Internet or intranet server—the Apache Web server boasts legendary performance and a price that can't be beat. Keep in mind, however, that you get what you pay for, and with the $32 LinuxPPC you didn't pay for support—at least not by phone. The company offers limited support via e-mail, and a number of mailing lists and newsgroups provide communal support.

Linux performed very well on our 450MHz Power Mac G3. The graphical interface was crisply responsive, and an informal test of the Apache Web server showed it to be considerably faster than Apache running under Apple's OS X Server. Alas, we experienced a number of unexplained crashes of the graphical interface.

Macworld's Buying Advice LinuxPPC 1999 is a well-executed port of the latest Linux distribution. If you're technically savvy, you'll find Linux a speedy server. But a Macintosh it's not, so don't even think about running a LinuxPPC-equipped machine as a desktop computer.—MEL BECKMAN

RATING: ★★★½ **PROS:** Runs on most PowerPC Macs; coexists with Mac OS; fast Web server. **CONS:** Poor documentation; complex installation. **COMPANY:** LinuxPPC (414/427-8555, www.linuxppc.com). **LIST PRICE:** $32.



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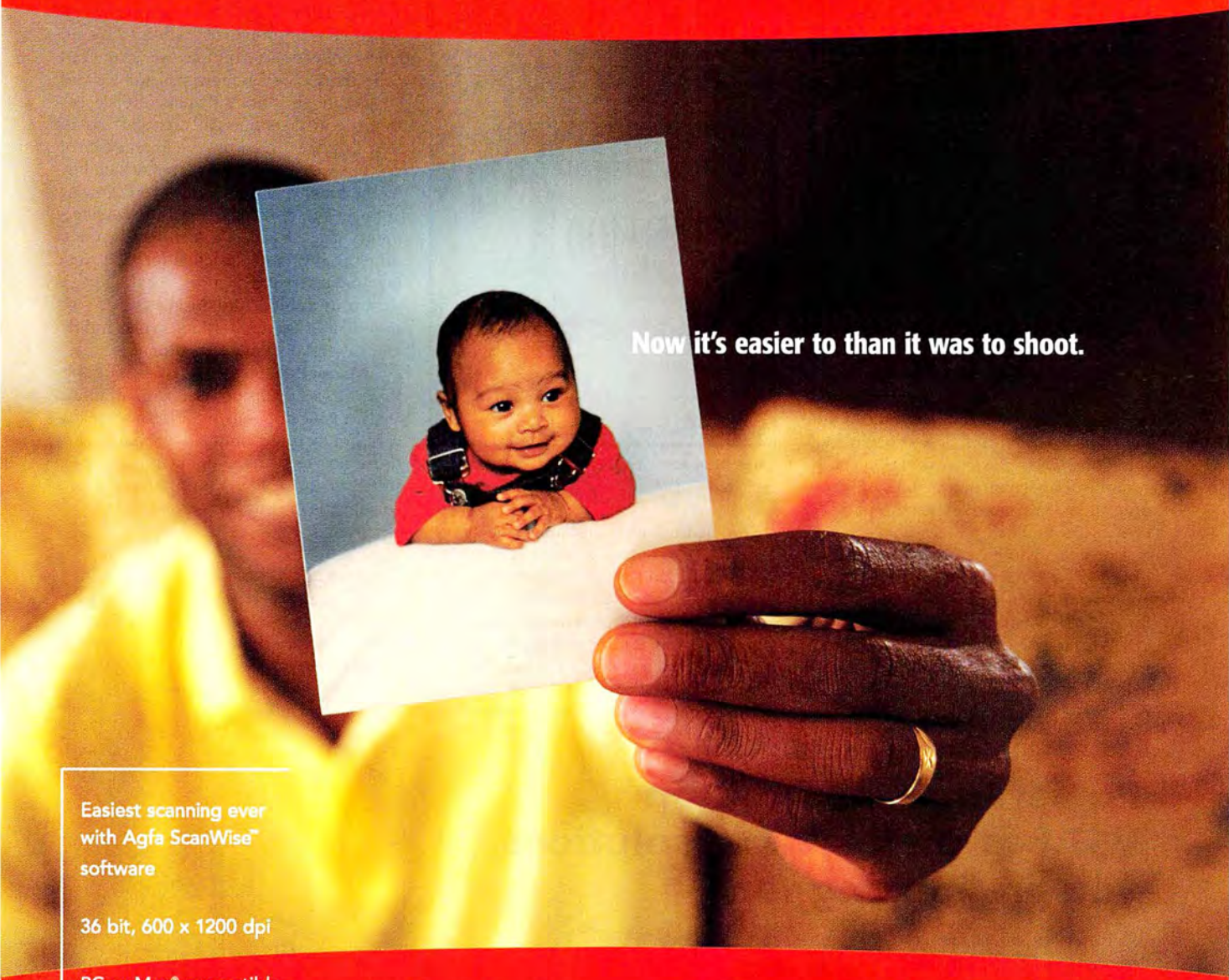

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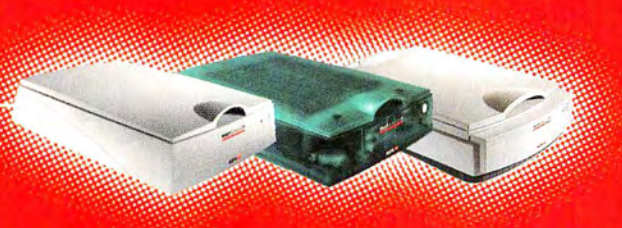

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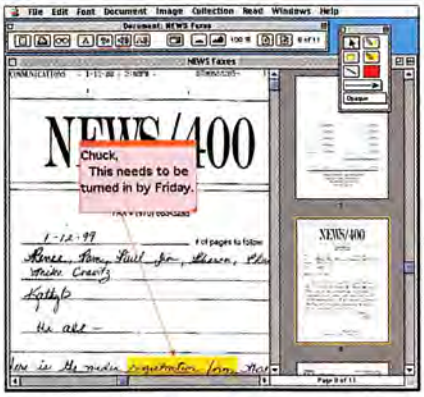
WorkingPapers Pro 2.0

PAPER-ARCHIVING TOOL HELPS YOU GET ORGANIZED

PAPER DOCUMENTS OF ALL kinds clutter your business and personal life. Dominion Software's WorkingPapers Pro 2.0 offers a solution: a centralized repository for scanned documents, faxes, and other scraps of information. WorkingPapers Pro lets you categorize, prioritize, and organize documents and find them later using keyword searches. Alas, its user interface is not as helpful as it could be.

Dominion sells WorkingPapers Pro exclusively as an online download that includes a nicely written user guide, online help, and a brief tutorial. You begin feeding documents into WorkingPapers by scanning, importing, or dragging and dropping them. WorkingPapers automatically creates a thumbnail picture of every page and prompts you for descriptive text. Any group of documents dropped onto the application's icon gets archived as a batch into a single WorkingPapers file.

WorkingPapers displays an archive file in a window with a full-size view on the left and a scrolling list of icons on the right. You pick a page from the thumbnails list and can then edit the image and annotate it with Post-it–style notes, arrows, translucent highlighting, and even a voice message. You can ask WorkingPapers to run an OCR scan on a document to retrieve editable text, which you may use for subsequent searching. OCR accuracy isn't critical, because WorkingPapers' search function lets you control the "fuzziness" of the search. In addition to categorizing documents by keyword, you can organize them into hierarchical collections. Multiple users can share collections as well as individual archive files.



Carpe Document WorkingPapers Pro 2.0 lets you capture, annotate, and archive documents.

Although WorkingPapers offers excellent record-keeping skills, the program's user interface has a few rough edges. You can't resize the thumbnail area, which limits the number of thumbnails you can view at once. You also can't view full-size documents side by side—a feature that most other applications designed for electronic document viewing support—or drag pages within an archive. And the absence of links to e-mail or fax applications makes it difficult to send documents to others.

Macworld's Buying Advice WorkingPapers Pro 2.0 puts powerful organizational tools at your disposal, but it lacks some features of scanner-bundled products. For those whose scanner didn't include such software, however, WorkingPapers is a worthwhile investment.—MEL BECKMAN

RATING: ❦❦❦ **PROS:** Built-in OCR; supports fuzzy searching; accepts voice annotations. **CONS:** Can't resize thumbnail area; no side-by-side viewing; no e-mail or fax interface. **COMPANY:** Dominion Software (617/332-1144, www.dominionsw.com). **LIST PRICE:** $99.

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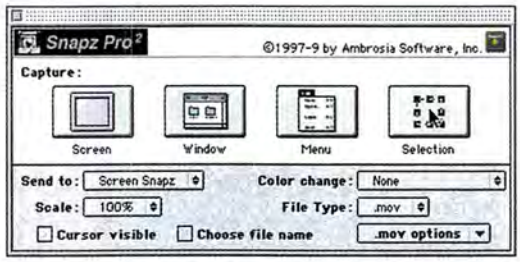
Snapz Pro 2.0

CAPTURE TOOL GOES TO THE MOVIES

MOST MAC USERS KNOW THAT capturing screen images is as simple as pressing ⌘-shift-3 or ⌘-shift-4. So why would you pay $40 for Snapz Pro 2.0, Ambrosia Software's screen-capture utility? Easy—not only is Snapz Pro more flexible and capable than Apple's method, but the latest iteration captures QuickTime video and audio as well.

Like earlier versions, Snapz Pro 2.0 easily outpaces the Mac OS's image-capture routine. After invoking the user-defined keyboard shortcut to produce Snapz Pro's Capture Palette, you can choose to grab an entire screen, a window, a menu, or a selection. You can also select the resulting file's format—PICT, GIF, JPEG, TIFF, or PNG. (You'll need QuickTime to save files as GIFs or JPEGs and QuickTime 4.0 to save them in the TIFF or PNG format.) In addition, you can assign a parent application for each saved-file type—for example, you can specify that all TIFF captures be saved as Photoshop documents. You can also change an image's scale and color depth.

Video and audio capture works similarly to static capture—you can capture action from an entire screen, a window, a menu, or a selection. The difference is that the success of your capture depends on which of these sources you select, how large that source is, and how willing you are to compromise on the color depth and frame rate. Although Snapz Pro 2.0 lets you capture full-screen, full-motion 30-frames-per-second (fps) video while your monitor is set to millions of colors, Macs simply aren't capable of producing adequate results with these settings—everything slows to a crawl during the capture, and the resulting QuickTime movie reflects that slowness.



No Fromage Snapz Pro 2.0's wealth of capture options is anything but cheesy.

Reducing the monitor's color depth helps a great deal—at 256 colors, from a large Microsoft Word window, we were able to capture at a reliable 10 fps on a Rev. B iMac. By decreasing the size of that window by two-thirds, we could capture at 15 fps. Capturing audio—you can capture the Mac's audio, click sounds, and microphone input separately or concurrently—also takes a slight toll on performance. With the proper settings, you can produce movies that are perfectly adequate for presentations or training videos (the purposes for which Snapz Pro was designed), but don't expect completely fluid motion unless you severely limit the size of your selections.

Macworld's Buying Advice For those who need a flexible tool for capturing static screens, look no further than Snapz Pro 2.0. If your needs include video and audio capture for presentations and teaching, be prepared to adjust your Mac, Snapz Pro, and your expectations. Once you've fine-tuned these elements, you'll find Snapz Pro a useful utility.—CHRISTOPHER BREEN

RATING: ♦♦♦♦ **PROS:** Flexible capture of static images; reasonable video capture after adjustment. **CONS:** Requires some initial tweaking. **COMPANY:** Ambrosia Software (800/231-1816, www.ambrosiasw.com). **LIST PRICE:** $40.

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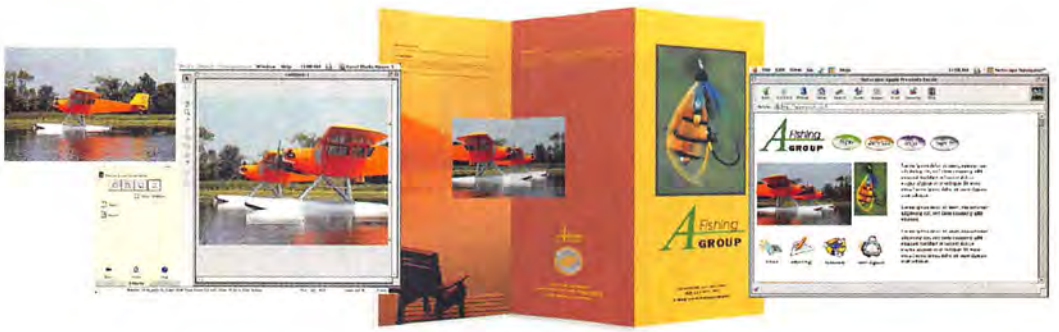

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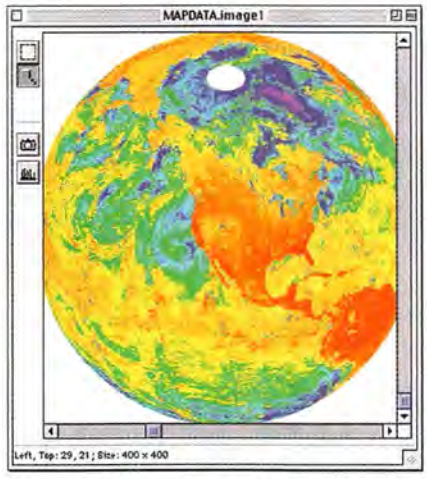
Noesys 2.0

COMPLETE TECHNICAL VISUALIZATION

DON'T BE MISLED BY THE RELATIVELY minor version-number jump from 1.1 to 2.0; the latest version of Fortner Software's Noesys is no modest update, but rather the most complete scientific-visualization program ever offered on the Macintosh. Despite some growing pains from grafting Research Systems' Interactive Data Language (IDL) onto Noesys's original FORTRAN interpreter base, this package easily handles problems that were beyond desktop computers only a few years ago.

To see why scientific visualization presents unique data-handling challenges, consider a color-coded map of world surface temperatures. Temperature data at one-mile intervals for this kind of map would normally yield a file of roughly 100MB, and such files require their own data-packing protocols for real-time display. That's why the geophysics and fluid-dynamics fields—among others—use special file types, each with its own requirements for efficient editing and handling. Besides faithfully displaying and translating all these types, Noesys can now open and display images of files that are too big to fit in memory, paging file sections from your hard disk at a usable speed.



Big Green Marble In Noesys 2.0, you can turn this projection of world surface temperatures into a rotating display, even using gigabyte-size files.

The integration of Noesys with IDL essentially gives scientists a complete C++-style programming language with single-command graphing for massive data structures. The software is available in three forms: Noesys 2.0 is the updated imaging suite with command-line IDL data-analysis commands; the $795 Noesys 2.0 Plus adds the ability to run compiled IDL routines; and the $2,390 Noesys+IDL makes the suite completely programmable in IDL. The latter two are distributed by Research Systems (www.rsinc.com, 303/786-9900).

Adding IDL's language to Noesys's intuitive Mac-based interface is generally successful, but IDL has a vast repertoire of tricks that have no analogue in Noesys; be prepared to spend some time developing IDL programming expertise. And the Mac and Windows versions of Noesys 2.0 don't match up exactly: the Mac version has some nice data-editing features that are missing from its Windows counterpart, but it lacks table formatting and nearly a dozen types of global map projection.

Macworld's Buying Advice The union of Noesys and IDL is good news for the Macintosh. Noesys 2.0, in any of its three forms, makes a G3 Mac a nearly ideal visualization device for large scientific, medical, or engineering images.—CHARLES SEITER

RATING: ♦♦♦♦ **PROS:** Easy introduction to IDL; large-file display is optimized for G3s. **CONS:** Mac version lacks some graphics and mapping features. **COMPANY:** Fortner Software (800/252-6479, www.fortner.com). **LIST PRICE:** $495.

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Quake II

PC SHOOTER FINALLY COMES TO THE MAC

GAMERS HAVE WAITED MORE than a year and a half for the Mac version of Quake II, Activision's sequel to the classic first-person shooter. Was it worth the wait? If you have hardware robust enough to run the game, the answer is yes.

As with most games of this type, the goal in Quake II is to dash about and blast everything that moves. However, unlike in the original game, Quake II asks that you tackle jobs more intricate than simply clearing hallways of hellions. Because the game is mission-based, you must perform such tasks as knocking out a communications system and sabotaging a reactor. This scheme also means that in Quake II, you must move between large areas of an alien complex to get the job done.

Quake II differs from the original in other ways. The game sports a host of new foes; some, such as the Parasite and Icarus, seem to pop out of nowhere and are both deadly and annoying. In addition, your enemies' AI is slightly improved—later in the game, the baddies crouch to avoid the deadly deliveries you've launched their way (you can now crouch as well). In networked play, you can choose a wider variety of skins and you can actually tell what kinds of weapons your networked opponents are holding. These new elements help improve a game that was a blast to begin with.

Quaking in Your Boots Expansive landscapes such as this are typical of Activision's Quake II.

Quake II is a far prettier game than Quake when played under hardware acceleration. The same can't be said for software rendering. It is downright ugly when played with software rendering at resolutions of less than 640 by 480 pixels, and performance suffers as well. On a Power Computing PowerTower 180e, the game became playable only with a Voodoo 2 card. Under software rendering at a resolution of 640 by 480, the game churned out a choppy 8.2 frames per second (fps). Software rendering on a 233MHz iMac wasn't much better—a scant 11.8 fps. Playing Quake II with the iMac's on-board Rage Pro accelerator boosted the frame rate to a more tolerable 13.8 fps. If you want the best from this game, however, you'll require a G3 processor and either ATI's Rage 128 or 3dfx's Voodoo chip.

Macworld's Buying Advice

"More of the same presented more attractively" pretty well describes Quake II. If you liked the original and have the hardware to pull the best from its sequel, you'll enjoy Quake II.—CHRISTOPHER BREEN

RATING: ▮▮▮▮ **PROS:** Beautiful under hardware acceleration; typically frantic shooter action. **CONS:** Requires robust hardware. **COMPANY:** Activision (310/255-2000, www.activision.com). **LIST PRICE:** $45.

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Does Apple Really "Get" Gaming?

IT'S TRYING . . . BUT IT NEEDS TO DO MORE

by Christopher Breen

Nobody should be surprised to hear that I care passionately about computer gaming. Give me a choice between hunkering down over the latest Mac-based digital diversion or a hot fudge sundae (*with* the cherry, thank you very much), and I'll take the game every time. But having this level of commitment to Mac gaming can be a burden. It's a bit like being a Chicago Cubs fan—the team may look good in midseason, but you just know that in the stretch the boys will find some way to screw it up.

This may help explain my feelings about the current state of gaming on the Mac. While I'm extremely enthusiastic about the latest advances, I also worry when those advances are undermined by the company that should be as passionate about this stuff as I am—Apple Computer.

JAMES YANG

The Word from Above

It's possible that those of you who've spent the last few years organizing your sock drawer missed Apple's latest pronouncement that it "gets" gaming. What the company means by this is that—unlike during most of the eighties and early nineties—the folks at Apple have finally recognized that a fair number of its customers like to while away their free time with such seemingly pointless diversions as blasting interstellar cooties, unraveling confounding puzzles, piloting high-performance aircraft, and doing battle with both friends and strangers over the Internet.

The proof of Apple's commitment is tangible. The current lineup of blue-and-white Power Macintosh G3s contains a very powerful graphics card—ATI's Rage 128—offering the kind of quality 3-D hardware acceleration that beautifully enhances many of today's games. Apple has also adopted OpenGL, a hardware-acceleration standard used in several PC games. By employing a cross-platform standard rather than insisting on a proprietary one, Apple has made it easier for developers to port PC games to the Mac. This is vital, particularly considering Apple's push for game developers to release a Mac game in concert with the PC version. Simultaneous release isn't simply a bragging-rights issue: a number of serious Mac gamers—myself included—have begrudgingly purchased PCs because they haven't the patience to wait for a game to appear on the Mac a year after its release on the PC.

Certainly, Mac gamers have noticed that there are far more Mac games available this year than last. Apple's been working closely with developers to bring the best games available on the PC to the Mac market. One need only glance at the latest and upcoming Mac game offerings—Quake II and III, Half-Life, Fly!, SimCity 3000, Rainbow 6, Total Annihilation, Madden 2000, Tomb Raider 3, Caesar III, Railroad Tycoon II, Oni, Racer, and StarCraft—to understand that Apple's burning the midnight oil to get games to the Mac.

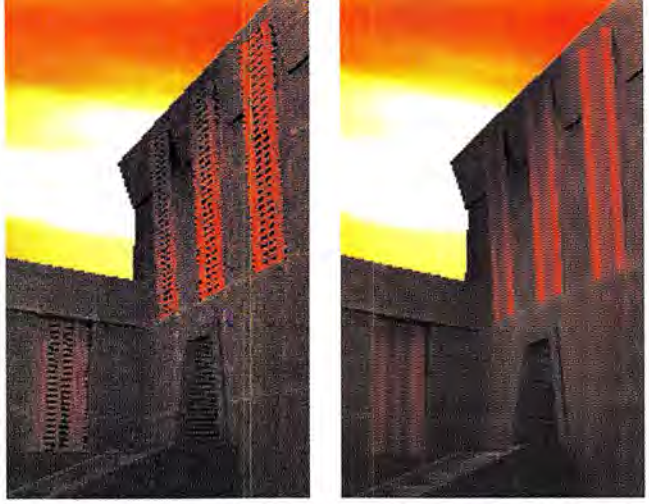
As a hard-core Mac gamer, I'm extremely pleased with Apple's efforts—I'm getting the games I want, and I'm getting them in a timely fashion. But I'm afraid that's not enough. Although Apple's addressing the needs of gamers like me, it's not doing enough to encourage other users to become gamers. Regrettably, this threatens the very future of Mac gaming.

Rumblings beneath the Surface

During the most recent Macworld Expo I had the opportunity to speak with a number of game developers, and the message from nearly all of them was the same: While Apple's made a good start, the company must make a greater commitment if the Mac is going to survive as a viable gaming platform.

A common complaint is that Apple isn't doing enough to promote gaming. Sure, more games are coming to the Mac, but new Mac users don't seem to be buying them. According to developers I've spoken with, per-title game sales are no greater now than they were two years—and 2 million iMacs—ago. A good Mac game sold between 25,000 and 35,000 units in 1997, and that number

continues



Seeing Is Believing Not only does Activision's Quake II play sluggishly on the iMac, the Rage Pro graphics chip on that machine (left) is incapable of producing the same smooth results as ATI's more powerful Rage 128 chip (right).

hasn't increased. In order for it to increase, Apple must lend its marketing and engineering muscle to the effort.

To begin with, Apple must make games more available to its customers. Unlike major PC hardware vendors such as Dell and Gateway, Apple offers no gaming add-on when you purchase a Mac through the Apple Store, nor are games (except Pangea Software's Nanosaur and a demo of Delta Tao Software's Eric's Ultimate Solitaire) bundled with new Macs. Offering some kind of bundling option—as an add-on at the Apple Store, as a "free gift" to buyers of new Macs, or included among the discs that come with new Macs—couldn't help but raise the profile of gaming on the Mac. If Apple's concerned about bundling violent games with its machines, it could simply include a coupon that offers a variety of gaming bundles—a bundle of nonviolent games that would appeal to children, a more action-packed bundle for those who prefer a little mayhem in their Mac-ing, and a collection of traditional card and board games for the seniors who seem to be buying the iMac in droves. Let the buyer decide what is and isn't appropriate.

Apple could also help by making games more visible to the public. Currently, the cost of promoting Mac games falls completely on developers. Those colorful displays and advertisements you see in retail stores and mail-order catalogs aren't cheap, and some of the developers I spoke with feel that since their products encourage people to buy Apple's products, Apple should return the favor by entering into comarketing arrangements. At the very least, it needs to devote a portion of its Web site to Mac gaming—presenting streaming QuickTime movie trailers of the latest hot games, for instance.

Before Apple cuts another deal with a vast retail outlet, it needs to be sure that said outlet also sells software. Case in point: although iMacs are sold at Sears, the software that runs on them isn't. It doesn't take a rocket scientist to figure out that developers sell more games when their products are placed side by side with Macs, not tucked away in a store at the other end of the mall or, worse yet, the other end of the county.

Viability is just as important as visibility, and unfortunately, Apple's consumer models—the iMac and the iBook—aren't the viable gaming machines they could be (see "What a Difference a Chip Makes"). These computers contain underpowered graphics chips and lack the kind of RAM necessary to run today's most demanding games. In a consumer machine, 32MB is no longer an acceptable amount of RAM—64MB should be the bare minimum; and Apple needs to replace the Rage Pro and Rage Mobility with chips that offer the kind of graphics performance found in the current Power Mac G3s.

Then Again . . .

It's possible that even if Apple makes all the moves I've suggested—bundles games, helps with in-store promotion, gives games a more visible presence on the Apple site, and transforms each member of its product line into a kick-ass gaming machine—Mac users still won't buy games. Perhaps Mac users find their fun in other ways. But we'll never know until Apple makes a greater effort to encourage Mac gaming.

While I may not be able to predict what will happen if Apple sees the light, this much I can tell you: If Apple continues on its present course—if it only "gets" the side of gaming that appeals to hard-core gamers like me—we'll be right back where we were a couple of years ago. Only those games guaranteed to be hits—the Quakes, Myths, and Tomb Raiders of this world—will appear in Mac form, Mac users looking for a viable gaming platform will look elsewhere, and Apple will sell fewer computers. This is bad news for Mac users and Apple alike. **m**

Contributing Editor CHRISTOPHER BREEN coauthored *My iMac* (IDG Books Worldwide, 1999).

Macworld LAB TEST

What a Difference a Chip Makes

Although these three Macs have darned-close megahertz ratings, this benchmark demonstrates that the Rage Pro graphics chips found inside the iMac and PowerBook just don't cut it in our Quake II tests. The Rage 128 chip set found inside the current desktop Power Mac G3s more than doubles Quake II's frame rate over those the iMac and PowerBook G3 produce. If Apple really "gets" gaming, it will get rid of the Rage Pro and place a more powerful chip inside the iMac, iBook, and PowerBook G3.

Best results in red. Results are in frames per second.

Behind Our Tests Frame rates were recorded using Quake II's demo map 1. Each system was equipped with 64MB of RAM, with virtual memory set to 96MB.—**Macworld Lab testing supervised by Ulyssis Bravo**

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FANTASTIC FOUR

With the Power Mac G4, Apple Brings Super Power to Your Desktop

by Andrew Gore

COMIC BOOKS MADE THEIR MARK ON the world by telling the stories of people with amazing and bizarre powers that place them far above the realm of mere mortals. Invisibility, superhuman strength, invulnerability, blinding speed —in the world of superheroes, no capability is too fantastic to be possible.

Though the ability to bend steel with a single thought is still firmly seated in the world of fantasy, another kind of super power just became a reality. With the arrival of the Power Mac G4, the personal supercomputer is finally here.

Based on the new PowerPC G4 processor, which is capable of executing well over 1 billion floating-point instructions per second (the requirement to qualify for supercomputer status), the Power Mac G4 is to most computers what Superman is to the average citizen of Metropolis.

In a world where Apple spends a fortune to get just the right tone, saturation, reflection, and transparency in its plastics, little things can mean a lot. As some readers may remember, *Macworld* wasn't sure what to make of the look of the blue-and-white Power Mac G3 (see "iMac

Envy," March 1999), a model now discontinued after a whopping eight months in existence. It wasn't that we didn't like the blue-and-white G3; we simply felt that it borrowed a little too much from the consumer-friendly look of the iMac to be taken seriously by the professional user it was designed for.

We're happy to report that we feel no such ambivalence about the chassis of the Power Mac G4. Words such as *elegant*, *refined*, and *striking* come to mind. Although the overall design of the case remains the same as for the G3, the Power Mac G4 replaces the blueberry front panel with a shade of gray that Apple calls graphite. The sides are now an opaque silver gray, and you can no longer see through the Power Mac's skin to the metal framework inside. Perhaps most striking are the clear handles, which beautifully offset the graphite Apple logo on the side panels.

Best of all, our favorite feature of the blue-and-white G3's design remains unchanged in the G4—the easy-to-open door that gives users full access to all the Power Mac's internal components.

PHOTOGRAPHY BY KEVIN CANDLAND

The G4's Wide-Screen Sidekick

YET AGAIN, APPLE IS TAKING THE LEAD WHEN IT COMES TO COMPUTER display technology. The $3,999 Apple Cinema Display is the industry's first 22-inch, 16:10 (wide-screen) aspect ratio, digitally controlled LCD panel. We were suitably impressed during our first look at near final prototypes of the display. This sleek, silver device looks remarkable even when it's turned off, and when it's on, it's truly stunning.

The Cinema Display is designed for designers. It's the first LCD panel that looks great from any viewing angle, horizontal or vertical, and it offers the most-consistent color of any LCD we've seen to date. With 1,600 by 1,024 pixels, there's plenty of desktop space for a razor-sharp two-page spread, with lots of room left over for palettes and tool bars.

Because it uses a digital interface, the Cinema Display is free of the complicated setup procedures common to analog LCD panels. In fact, the Cinema Display does away with complicated controls altogether—its only two buttons are for adjusting brightness.

The Cinema Display perfectly complements the new G4's clear, silver, and charcoal color scheme. The LCD panel is framed by a faintly striped silver bezel, which sits atop clear plastic legs that are wide enough apart to let you tuck your keyboard out of the way. An elegantly counterbalanced clear plastic support leg juts out of the rear of the Cinema Display, allowing for easy, single-handed tilting of the display from near vertical all the way back to an angle that's perfect for viewing by a standing group.

There is only a single, permanently attached cable coming out of the Cinema Display. It leads to a doughnut-shape box that features video, USB, and power inputs. The back of the Cinema Display also offers two USB ports.

The display quality on the prototypes we saw was impressive. The display was bright, sharp, and rock-solid. Colors were vivid and natural, even at wide viewing angles. The result is probably the first LCD worth consideration by serious designers and technology buffs alike.

However, at $3,999, it's clearly not for everyone. In fact, that price is somewhat misleading—you can purchase the Cinema Display only through the Apple Store and only if you buy it with Apple's fastest G4 systems. Prices start at $6,498. Even then, expect quantities to be limited for quite some time, as 22-inch LCD technology is brand-new and—at least for the time being—limited exclusively to Apple.—JEFF PITTELKAU

The Power Mac G4 features the same easy-to-open case as its G3 predecessor.

Flame On!

By any measure, the new PowerPC G4 chip is incredibly fast. Using megahertz as a measurement is a start: these three new Power Macs clock in at 400MHz, 450MHz, and 500MHz. But those numbers don't adequately describe the speed of the G4 chip.

The Flash That's because in addition to being faster than the G3 processor and offering higher clock speeds, the G4 includes a new subprocessor that Apple has dubbed Velocity Engine. The name may be new, but the technology is something we've been hearing about for some time—a high-speed subprocessor called AltiVec by the G4's inventor, Motorola. (For more on the G4 processor, see the sidebar "Introducing the G4 Processor.")

Although Motorola and IBM plan to produce G4 chips both with and without Velocity Engine, Apple currently plans to use only G4s that feature the subprocessor. This is a good thing, because applications have to be modified in order to take advantage of Velocity Engine features.

Several companies have already announced plans to support Velocity Engine—in fact, an Adobe Photoshop plug-in for Velocity Engine will come with every Power Mac G4. The first day the G4 arrived, several other companies announced Velocity Engine support in their products, including Casady & Greene (SoundJam MP) and Terran Interactive (Media Cleaner Pro).

Depending on the program, users could see up to a fourfold improvement over non–Velocity Engine versions in the speed of certain functions, such as complex encryption, graphics filters, and multimedia compression.

Speed Racer However, the speed improvements from the G4 don't end with Velocity Engine. According to Apple, even applications that aren't Velocity Engine–savvy will see significant performance boosts. Some of this has to do with the faster speed of the G4 chip itself, but some of it also has to do with improvements in the logic board on certain models of the G4 (see the section "Silver Surfer," below).

And keep in mind that the Power Mac G4 is a supercomputer even though there's only one processor inside that gray-and-silver box. Apple stopped shipping Macs with multiple processors mostly because the G3 chip didn't work with multiprocessing. However, the G4 has no such limitations—meaning that G4 Macs with several processors inside are a distinct possibility down the road, especially considering the powerful multiprocessing abilities that will be built into Mac OS X.

Silver Surfer

Not everything about these new Power Mac G4s is as crystal-clear as their curved handles, however. That's because while all these models share the same G4 moniker, some striking differences become apparent when you open their side doors.

Two-Face In the initial Power Mac G4 lineup there are two different configurations, one an intermediate step between the faster G4s and the blue-and-white Power Mac G3, and the other a high-end configuration featuring impressive new technologies.

In order to get one model in the G4 lineup down under $2,000—and to get it out to customers as soon as possible—Apple placed a 400MHz G4 processor onto a slightly modified version of the blue-and-white G3's logic board and put the board in the new Power Mac G4 case. In almost all other respects, the low-end Power Mac G4 is exactly the same as the G3 Power Macs. One notable exception: none of the Power Mac G4 models feature an ADB port.

As a result of using the older logic-board design, Apple was able to pack a lot into the low-end, 400MHz G4, considering its $1,599 price tag (see the table, "Power Mac G4 at a Glance"). A low-end version of the G4 featuring a 450MHz

POWER MAC G4 AT A GLANCE

Suggested Configuration *	Direct Price	Maximum Processor Speed	RAM (Maximum)	Memory Bandwidth	Cache RAM	Graphics Slot	Hard Drive	CD/DVD Drive
Power Mac G4/400 (low-end)	$1,599	400MHz	64MB (1GB)	400 MBps	1MB	66MHz PCI	10GB Ultra ATA/33	CD-ROM
Power Mac G4/450 (high-end)	$2,499	450MHz	128MB (1.5GB)	800 MBps	1MB	133MHz AGP	20GB Ultra ATA/66	DVD-ROM
Power Mac G4/500 (high-end)	$3,499	500MHz	256MB (1.5GB)	800 MBps	1MB	133MHz AGP	27GB Ultra ATA/66	DVD-RAM

● = yes; ○ = no. * Models can be configured differently at the online Apple Store (http://store.apple.com). ** Each port on these models is on its own bus, doubling the potential USB throughput.

processor will be available in October, according to Apple.

Clobberin' Time The high-end G4s, initially running at either 450MHz or 500MHz, are based on a totally new logic-board design and include some impressive refinements. For instance, the 66MHz PCI graphics-card slot in the blue-and-white G3 and the 400MHz G4 has been replaced by a 133MHz AGP 2× slot. AGP (Advanced Graphics Port) is a high-performance PC industry standard for connecting graphics cards. And according to Apple, with the right driver software, any of the ultrafast AGP cards currently available for Intel PCs will work in the 450MHz or 500MHz G4s.

Memory bandwidth has also been doubled on the higher-end G4s—to 800 MBps (up from 400 MBps on the low-end system)—with the maximum amount of RAM increased to a whopping 1.5GB. That translates to systems that are much faster reading to and writing from RAM—which means RAM-intensive applications, such as Photoshop, will receive major speedups with these models.

Connection Colossus Even USB will run faster on these systems: while maximum throughput remains at 12 Mbps, there is now a separate USB controller for each USB port, giving users with multiple USB devices two independent 12-Mbps data connections, so all USB devices no longer need to share a single connection. Apple has even added an internal FireWire port on the high-end G4s, so you'll be able to add fast internal FireWire devices later.

Taking a play out of Apple's own iBook announcement (see "Meet the iBook," October 1999), the high-end Power Mac G4s come with an AirPort wireless networking slot and an AirPort antenna built into their handle. For $99, you can add an AirPort card that will let the G4 hop on a high-speed wireless network.

What's more, software that will come with the high-end G4s will allow them to act as an AirPort hub, negating the need to buy the $299 AirPort base station. Apple is still testing the maximum number of wireless connections a Power Mac G4 can handle, but the company expects this capacity to be the same as the hardware base station's (up to 10 clients with a range of 150 feet).

With Great Power . . . At what price comes all this computing muscle? The standard 450MHz configuration will sell for $2,499, according to Apple. The top-of-the-line 500MHz configuration, featuring a DVD-RAM drive (offering both DVD playback and up to 5.2GB of writable DVD storage), will cost $3,499.

The Last Word

If you're itching to rush out and buy one of the high-end Power Mac G4s, hold your horses. While Apple says the low-end 400MHz system is shipping now, at press time the company was predicting shipment of the 450MHz G4 model sometime in September and the 500MHz unit in October.

Unless you absolutely can't afford the pricier models or can't wait another minute, we suggest you bide your time and wait for the high-end G4 configurations to appear. Although the G4 processor does account for a lot of the performance improvements in the new models, the niceties of the new logic-board design will also have major impacts on speed. And if you opt for the low-end model, you won't be able to play with cool new capabilities like using an AirPort card, internal FireWire devices, two separate USB ports, or the new Apple Cinema Display (see the sidebar "The G4's Wide-Screen Sidekick").

Beauty, speed, flexibility—the new Power Mac G4 could put even the most powerful comic-book superheroes to shame. Able to leap the fastest Pentium PCs in a single bound, this new Mac proves that Apple is truly a superpower in the desktop computer world. **m**

ANDREW GORE is editor in chief of *Macworld* and Macworld.com. He is also a coauthor of *My iMac* (IDG Books Worldwide, 1999).

Introducing the G4 Processor

THE POWERPC G4 PROCESSOR THAT DRIVES APPLE'S LATEST POWER MAC systems is not merely a faster version of the previous G3 chip. With its Velocity Engine subprocessor, the G4 incorporates functions that would previously have been performed by separate chips such as digital-signal processors or MPEG decoders.

In technical terms, Velocity Engine—Apple's clever brand name for the AltiVec technology developed by Motorola—is a 128-bit *vector-processing unit*. Most processors chew data one piece at a time; Velocity Engine can perform up to 16 simultaneous calculations. It's especially well suited to accelerating calculation-intensive multimedia operations.

Developers must rewrite their software to take advantage of Velocity Engine features. However, Adobe has already developed a Velocity Engine plug-in for Photoshop, and many other developers have announced Velocity Engine support.

Although software must be written specifically to support Velocity Engine, some other G4 features will accelerate performance in any application. The G4's floating-point unit—used extensively in 3-D rendering operations—is up to 25 percent faster than the G3's at any given CPU speed. In addition, the G4 supports up to a 2MB backside cache, compared with a limit of 1MB in the G3. The backside cache speeds performance by storing frequently used data for quick access by the CPU. Finally, the G4's cache-management system has been improved, so applications run faster than they would on a G3 processor running at the same speed, even if they don't make use of the G4's new features.

One downside of the chip is that it consumes more power and generates more heat than the G3. The main consequence is that current G4 chips cannot be used in laptops. However, it's likely that Motorola will develop low-power versions suitable for future PowerBooks.—STEPHEN BEALE

Zip Drive	FireWire Ports	USB Ports	56-Kbps Modem	AirPort Option
○	2	2	●	○
●	3 (1 internal)	2**	●	●
●	3 (1 internal)	2**	optional	●

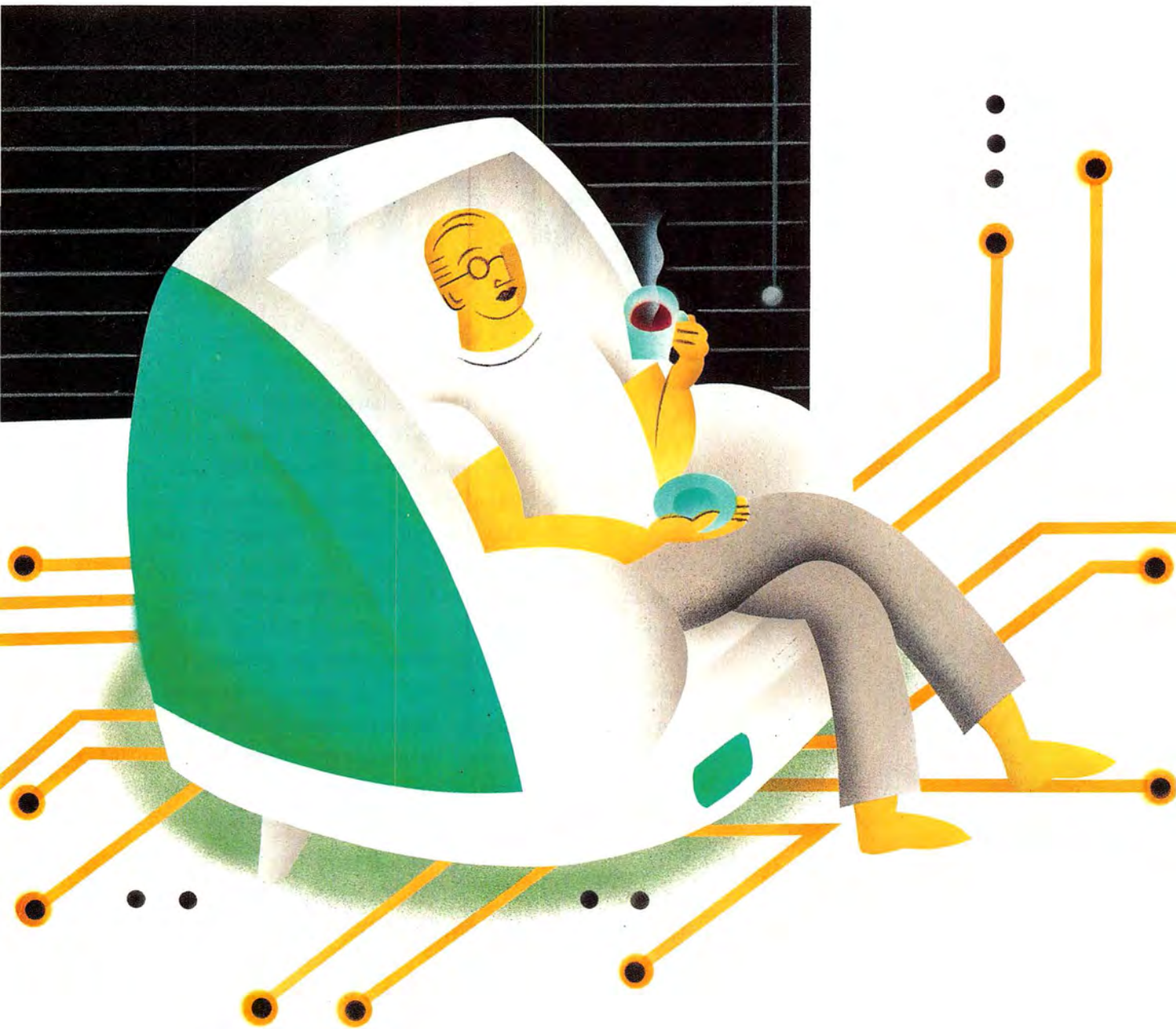
WIRE Your World

No one could call you an Internet newbie—you've been around the block a few times. You've got a speedy modem, an Internet account, an e-mail address, maybe even a Web site of your very own. But your life on the Internet is still a sporadic one—you dial in when you want to use the Net, then hang up and disconnect yourself from the world at large. | It's time for you to take the next step into the wired world of the future: integrating the Internet into your life and using the power of the Net to its fullest. | Network all the computers in your home or small office, so you can share files and printers, play games, and surf the Web at your leisure via a high-speed Internet connection. Take your old, tired Web site and reinvigorate it with the help of a professional Web designer's expert advice. And put that aging Power Mac back to use as an Internet server, giving you unprecedented control over your Web, e-mail, and file-sharing needs. | In just a short time, it can all be at your fingertips. Isn't it time to wire your world?

Illustrations by Coco Masuda

LINK IT

Share Printers, Surf the Web, and More—Set Up



UP a Small Network

WIRE YOUR WORLD

This is a scene that's becoming as quaint as the happy nuclear family of fifties sitcoms: a computer, a printer, and a modem. These days, that simple setup is about as unlikely as a modern family made up of an office-bound husband, a stay-at-home housewife, and two and a half perfect little kids. No, things are a bit more complicated now. Millions of households have more than one computer. The Internet has become part of everyday life—and everyone wants to get on it. At the very least, the appeal of exchanging files and sharing printers should make you consider networking all your home or small office's computers together.

With new high-speed technologies like DSL (Digital Subscriber Line) and cable modems arriving, a small network can also let all your computers share one fast, always-on Internet connection. You can even use the network to play games, not just over the Internet but also between the various Macs (and PCs) you own. And while transferring and backing up your files over a network may not sound sexy, the iMac's lack of a floppy drive makes the network more vital than ever.

You may think that connecting all your computers is going to be a complicated and costly proposition—but it doesn't have to be. Here's an in-depth guide to the terms you'll need to know, the skills you'll need to have, and what you'll get once you're all set up.

Why Create a Network?

At first glance, it might seem like creating a network inside your home is a task reserved for computer geeks and the same 12-year-olds who knew how to program a VCR the day they were born. But there are plenty of practical reasons for you to set up your own network, as I did.

Share Your Files Apple broke with tradition by eliminating the floppy drive from the iMac and the blue-and-white Power Mac G3s. You could spend extra money on a USB floppy drive, but then you have to schlepp disks from the family room to the den and back again. Using a network to transfer files from one Mac to another is faster and easier.

Surf Anywhere A simple problem: you have DSL, a cable modem, or some other means to connect to the Internet (see "Modems' Last Stand," May 1999), but it works only with the one Mac it's connected to. How can your other computers access the Net using the same connection? A simple solution: use a network and some Internet-sharing software (see the sidebar "Internet Sharing 101"). This is also a great way to avoid buying a modem for each computer.

Play Games All right, so you don't *need* a network to play games. But it's a lot more fun to play against real people, and many of today's hottest games let you beat up on either computer opponents or other humans via network play. You can play against other people on the Internet, family members on your home network, or both.

Share Printers Prices have dropped, but you probably don't want to buy a printer for each of your Macs. If you have a network, though, you can share most printers with every Mac on the network.

Back Everything Up Don't be frustrated by the fact that your new iMac can't back up to your old SCSI-based Jaz, CD-R, or tape drive. When your old and new Macs are networked together, you can back up over the network using Dantz Development's $175 Retrospect or $50 Retrospect Express. If you've got an older Mac, you can even set it up in a closet or on the floor as a dedicated backup server, preserving all the files you have on your current models. (For more about backup, see "Be Safe, Not Sorry," February 1999.)

Keep Your Dates Straight My wife and I each have our own Macs, and we have a PowerBook that mostly lives in the kitchen. Thanks to our home network and network-capable calendar and contact software, we can schedule dinner with some friends or look up a telephone number from any one of our computers. Changes are instantly available to any computer, so we don't have to worry about scheduling conflicts or outdated contact information.

Meet the Network

Now that I've convinced you to connect your computers together, it's time to give you an overview of network technology and terminology. That terminology can be intimidating—especially if it's spoken by scary people in white coats who are paid lots of money to keep large corporate networks up and running. But in reality, setting up a simple home network doesn't need to be rocket science.

Into the Ether The most common form of networking around is *Ethernet*, which has been a standard part of most Macs for quite a few years now. Some Macs have built-in Ethernet ports that let you plug an Ethernet cable (which looks like a jumbo version of a telephone cable) right into your Mac. Older versions require you to buy a *transceiver*, a little box that attaches to both your Mac and the Ethernet cable.

Today most Ethernet networks are *10BaseT*, letting you pass data at 10 megabits (roughly 1MB) per second. An up-and-coming protocol is *100BaseT*, which uses the same-size con-

by Adam C. Engst

nectors but can be ten times faster. Many new devices can switch between the two speeds with ease—the iMac, for instance, can work with either 10BaseT or 100BaseT networks.

Ethernet is a tried-and-true networking format. But it's also true that most homes don't have Ethernet running through their walls—and that means if you want to wire up computers in far-flung locations, you'll need to run cables yourself or hire someone to do it for you.

Both 10BaseT and 100BaseT Ethernet are what are called *star networks*. At the center of the network is a *hub*, a box you plug Ethernet cables into. The cables radiate out from the hub in a starlike pattern, hence the name. You don't usually chain Ethernet networks together as you would SCSI devices, connecting one to another and to the next (although Farallon's line of EtherWave products will let you do just that). Normally, you plug one end of an Ethernet cable into a computer and the other into a hub. Each hub can be connected to other hubs, extending the network even more.

Phone-Line Networking A recently developed networking standard is *HomePNA*, a system that uses regular telephone lines as the transport medium for your computer data. The strength of this approach is that unlike the case with Ethernet, most buildings in America are already wired for telephone service. Anywhere in your house you've got a telephone extension (on the same phone line), you've got a potential network connection area.

The most amazing part is that using a HomePNA network doesn't interfere with the voice traffic or DSL Internet connections going over that same set of telephone wires. Although HomePNA isn't as fast as a 10BaseT Ethernet network, at roughly 100K per second it's faster than almost any Internet connection you might have, and more than sufficient for most home network uses.

HomePNA does have some drawbacks, however. First, it's not built into Macs like Ethernet is—you need to buy a special PCI card for each computer in order to get HomePNA to work. It's also a relatively new technology, so there's not nearly as wide a variety of HomePNA products as there are Ethernet products. (As of this writing, Farallon's HomeLine is the only Mac-compatible HomePNA product, although more are on the way.) Several companies—including Intel itself—sell HomePNA products for PCs.

Second, currently there's no way to connect an iMac—which lacks a PCI slot—to a HomePNA network, although an iMac-friendly HomePNA product should be available soon. If you've got an older Mac, a PowerBook, no free PCI slots, or want to network a printer, you may be similarly out of luck.

Wireless Freeing your computers entirely from wires would, of course, be the easiest way to set up a network. Wireless technology is undoubtedly where the world of networking will eventually end up. Instead of using wires, network data can be translated into radio signals that pass through your walls, floors, and ceilings until they're received and deciphered. Wireless networking has traditionally been expensive and not particularly Mac-friendly—but the new AirPort technology introduced with Apple's new iBook threatens to change all that, providing slightly faster speeds than 10BaseT without any wiring. And the new SkyLine PC Card from Farallon, which is compatible with the AirPort, will provide wireless capabilities for older PowerBooks.

Home-Sweet-Home Network

ENOUGH THEORY—LET'S PUT TOGETHER A SAMPLE NETWORK so you can see how it all works. Our sample family has a PowerBook 520 and a Power Mac 7200 hooked up to a LaserWriter via a LocalTalk cable. When they want to move files back and forth, they use floppies, and when they want to print from the PowerBook, they swap the LocalTalk cable from the Power Mac. They've just purchased a shiny new grape iMac and put the Power Mac in the kids' room for games and school projects. They also have a SCSI-based Jaz drive that they've been using on the Power Mac along with Retrospect Express for backups. Finally, they've just installed DSL high-speed Internet access, so they've got a DSL modem that connects via Ethernet, and they want to attach it to all their computers.

In the end, they want a network that lets each Mac print, back up to the Jaz drive on the Power Mac, connect to the Internet, and copy files back and forth as needed. That's easily accomplished, but they'll have to go shopping first.

The newer your Mac, the easier it is to get it on Ethernet. This family's iMac has an Ethernet jack built right in. But they'll have to add Ethernet to the other two computers: in this case, an Ethernet transceiver for both the PowerBook and the Power Mac (roughly $25 each).

The LaserWriter is networkable but is designed to work only with low-speed LocalTalk networking. With a LocalTalk-to-Ethernet bridge, such as the $100 EtherMac iPrint LT from Farallon, any Macintosh on the new network will be able to print to it.

Throw in an Ethernet hub, some cabling to connect it all together, and a copy of Internet-sharing software, and you have a network.

Infographic by Peter Hoey

NETWORK SHOPPING LIST

ITEM	ESTIMATED PRICE
Ethernet cables (Cat5, five cables)	$65
Ethernet transceivers (two)	$50
LocalTalk-to-Ethernet bridge (LaserWriter)	$100
Ethernet hub (10BaseT, eight ports)	$50
IPNetRouter	$89
TOTAL	**$354**

1. Plug your Ethernet hub into an electrical outlet. Make sure to put it in a location that's accessible to all of the computers.

2. Run a cable from the iMac's Ethernet port to the hub.

3. Connect the first transceiver to the Power Mac's Ethernet port, and then run a cable to the hub—in this case, our homeowner ran wires through the walls to keep cords out of the way. (One day, wireless networking will make running wires between far-flung locations a thing of the past—but right now, this is probably the best option.)

4. Connect the second transceiver to the PowerBook's Ethernet port, and then run a cable to the hub.

5. Run a cable from the DSL modem to the hub. To share the Internet connection, install Internet-sharing software on the iMac, and make sure the iMac is turned on when any of the other Macs need to connect to the Internet.

6. Set up the LocalTalk-to-Ethernet bridge, and connect it to both the hub (via a 10BaseT cable) and the printer (via its LocalTalk cable).

7. Optionally, the family could purchase Apple's new AirPort base station ($299) and bring a new iBook home. After the base station is plugged into the hub, an iBook equipped with the $99 optional AirPort card can roam freely in a roughly 150-foot radius, surfing the Net and exchanging files at Ethernet speeds.

The Network Shopping List

For some people, HomePNA may be a good answer to setting up a simple network—buy the cards, install, plug in, and you're set. But Ethernet has stood the test of time, is readily available, and offers much more flexibility. That's why for the bulk of Mac users, it's probably wise to stick with Ethernet.

AirPort is also a promising technology, but it's still somewhat expensive—an extra $399 for a base station and an add-in card for one iBook. Even if you do buy an iBook with AirPort, Ethernet makes sense—the AirPort base station comes with a 10BaseT/100BaseT Ethernet port, so hooking that device up to an Ethernet network of desktop computers, printers, and perhaps a high-speed modem will be a snap.

Before you put together an Ethernet network, you'll need to gather all the parts you'll require. Just what's needed will vary depending on the Macs and printers you have, but here's a basic checklist:

Cabling The cabling in my home is called *10Base2* and looks a whole lot like the cable you'd plug into a TV set. But 10Base2's time has passed, and just about every recent Mac model provides built-in support for 10BaseT and/or 100BaseT. That's the type of cable you should use.

Not all cable is created equal. You need at least Category 3, or *Cat3*, cable for 10BaseT networking, but you should always buy Category 5, or *Cat5*, cable instead. Cat5 cable is not much more expensive than Cat3, and it works with the speedier 100BaseT Ethernet. That means if you want to upgrade your network to 100BaseT in the future, you won't have to pull out all your wires and start again.

Ethernet Cards and Transceivers Every Mac that Apple sells today has Ethernet built in, and many older Macs did as well. Although not every Mac is so well equipped, you can add an Ethernet card to just about any Mac, even the ancient SE/30. In most cases, the Ethernet card drops into a slot on your Mac, whether it's a NuBus slot (found on most Mac IIs, Quadras, and the first-generation Power Macs), a PCI slot (found on second-generation Power Macs and later), or even more esoteric slots such as the PDS (Processor Direct Slot) on the SE/30 and IIsi, and the LC Comm Slot found on many Mac LCs and Performas. Older PowerBooks with no such slots can get on Ethernet with the help of an adapter that attaches to the SCSI port, and newer PowerBooks can make use of Ethernet PC Cards. One great resource for this sort of information is Farallon's LAN Product Selector, located on the Web at www.farallon.com/products/selector/. While it covers only Farallon products, you can also use it to figure out generally what sort of items you'll need, whether you buy them from Farallon or some other company.

Older Macs and LaserWriters with built-in Ethernet aren't exactly plug-and-play—rather than the telephone-style jack found on 10BaseT and 100BaseT cables, they have a special connector called an AAUI port. For these devices, you

INTERNET SHARING 101

TO SHARE ONE INTERNET ADDRESS among several computers, you need a router—something that acts as a traffic cop to handle the flow of Internet data between your computers and the Internet. For most home and small-office networks, it's easier and more cost-effective to use a software-based router rather than an expensive hardware router.

With five different Mac OS software routers available, how do you decide which to choose to connect your network to the Internet? The decision depends on how many Macs will be using the Net simultaneously and what advanced features you might want.

No matter which product you choose, remember that whenever you're connected to the Internet, it's conceivable that someone could attempt to break into your Mac. All of these products include security features to protect you, but it's also a good idea to turn off guest access in the Sharing dialog box for shared folders and be careful what you publish using Personal Web Sharing. Realistically, if you take basic precautions, you have nothing to worry about.

Home Networks For a home network with a couple of Macs, your best choices are Vicomsoft's SurfDoubler ($64; 650/691-9520, www.vicomsoft.com) and SurfDoubler Plus ($74), or IPNetRouter from Sustainable Softworks ($89; www.sustworks.com). SurfDoubler is slightly cheaper but allows only two Macs at a time to access the Internet simultaneously. SurfDoubler Plus offers all of SurfDoubler's features, plus parental controls and content-filtering capabilities.

IPNetRouter has no per-user limitations and provides better performance than SurfDoubler when running on older Macs. On the downside, IPNetRouter is somewhat more difficult to install and configure, although Sustainable Softworks provides an excellent tutorial and background information on its Web site. Both companies provide free trial versions of their software on their Web sites.

Small-Office Networks If your network contains more than a few Macs, SurfDoubler's two-Mac limitation eliminates it in favor of Vicomsoft's multiple-user SoftRouter Plus ($155 to $430; price varies depending on number of users), which also provides additional features such as the caching of Web pages to increase page loading speed, a local DNS server, and a remote-access server so users can dial into your network. IPNetRouter remains an excellent choice for these networks as well, and can be significantly cheaper than SoftRouter Plus if you don't need SoftRouter Plus's additional features.

School Networks If you feel the need to restrict the users on your network from accessing specific Internet resources, Vicomsoft's Internet Gateway ($249 and up) might be the best option for you, since it can prevent users from accessing sites on the CyberNot Block List, a collection of Internet sites that researchers at Microsystems (www.cyberpatrol.com) have deemed inappropriate for the typical 12-year-old surfing the Web without adult supervision.

need to buy an AAUI Ethernet transceiver—essentially, an AAUI-to-10BaseT converter box. Luckily, these transceivers are cheap: about $25.

Hubs With a star network such as 10BaseT and 100BaseT Ethernet, you'll need a central hub that all your devices connect to. These days, you can buy a hub for as little as $50, although more full-featured hubs can cost significantly more.

When shopping for a hub, there are several issues to keep in mind. Be sure to consider how many ports you'll need on the hub—you'll need one for every device on your network, so make sure to plan for the future. You can also buy two hubs and connect them together, which might help if you've got collections of computers in two or more widely separated locations, such as a main level and a basement. Then all you'll need to do is run one cable between the two hubs. (Keep in mind, however, that 10BaseT and 100BaseT cables are limited to a length of 100 meters, or 328 feet.)

You should also consider whether it makes sense to get a hub that supports both the 10BaseT and 100BaseT protocols. If you own several devices that support 100BaseT, as the iMacs and the blue-and-white Power Mac G3s do, a hub that would let those devices communicate at 100 megabits per second (while every other device moseys along at 10 Mbps) might be worth the higher cost.

Make sure the hub you buy doesn't require you to use a lot of switches, jumpers, or software to get it to work correctly. Ideally, using a hub should be as easy as plugging it into a power outlet and plugging in your networking cables.

Bridges What if you have an old LaserWriter that supports only LocalTalk networking? You can add an Ethernet card to an old Mac, but that's seldom possible with older printers. To solve this problem, you need a *bridge*, a device that connects two dissimilar networks, such as LocalTalk and Ethernet. Bridges are relatively dumb—all they do is pass network traffic from one network to another without analyzing it or routing it in any way. Thus, bridges, which come in either software or hardware form, are relatively cheap.

Software bridges require a Macintosh connected to both networks—it's a good use for an old Mac that has both a printer port for LocalTalk and an Ethernet card. Apple's free LaserWriter Bridge is the most well known bridge software, but it only lets Macs on the Ethernet network print to a LaserWriter on the LocalTalk network. More recently, Apple released the free LocalTalk Bridge, which lets you share files with LocalTalk-based Macs as well as print to LocalTalk-based printers. Download it at http://asu.info.apple.com/swupdates.nsf/artnum/n11358. (You can also share StyleWriters on a network, using Apple's Printer Share software.)

The problem is, Apple's bridge software isn't officially supported by Apple—meaning it may have some minor problems running under Mac OS 8.5 and later. Also, activities on the Macintosh running the bridge software can reduce performance between the two networks, and that Mac must remain on at all times if you want to use the devices it's connecting you to.

Hardware bridges don't require a Mac, may not require configuration, and offer more functionality. For instance, some hardware bridges work not just with AppleTalk for printing and sharing files between Macs but also with TCP/IP, so Macs on the LocalTalk network can access an Internet connection attached to the Ethernet network. If the free LocalTalk Bridge doesn't work for you or if you don't have a Mac that supports both LocalTalk and Ethernet, go for a hardware bridge such as the $100 EtherMac iPrint LT from Farallon (510/346-8000, www.farallon.com) or the $129 AsantéTalk bridge from Asanté (408/435-8388, www.asante.com).

Routers Where bridges blindly pass network traffic back and forth between networks, *routers* (also called *gateways*) act more like traffic cops, analyzing and routing network traffic appropriately between two different networks. In the context of small networks such as the ones we're discussing, routers are primarily for connecting an entire network to the Internet. As with bridges, routers can be either software programs or hardware devices.

Hardware routers often sport specific ports for different types of Internet connections. For instance, you might buy an ISDN-capable router, which would have a jack for an ISDN connection and an Ethernet jack. Such a router would connect an Ethernet network to the Internet via an ISDN connection.

The devices you get when you have DSL or cable-modem Internet connections installed are usually called modems, but often they're also routers, since they often use Ethernet to connect to your computer. Though you can sometimes attach these devices to an Ethernet hub, that doesn't mean that all the computers on your network will be able to simultaneously share that Internet connection. In many cases, DSL and cable-modem connections are meant for single computers, despite their Ethernet interface.

Whether you're using a cable modem, DSL, ISDN, or even a regular modem, you can often share your Internet connection among all the computers on your network. What you need is Internet-sharing software, and there are several different options for Macintosh users. To find out how it works, see the sidebar "Internet Sharing 101."

ONLINE RESOURCES

For more resources to help you set up your home network, check out our special report at www.macworld.com/1999/11/features/wire.html.

The Last Word

Networking Macs has always been easy, thanks to LocalTalk and built-in software support in the Mac OS. But not until recently has networking become something for everyone, in large part due to more households purchasing multiple computers, especially the network-savvy iMac. The Internet has also played a starring role, since anyone with multiple Macs wants them all to be able to access the Net through a single connection.

Whether it's for sharing an Internet connection, sharing files and printers, backing up your files, or playing games, if you have several Macs, you need a network. **m**

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DRESS

Make Your Web Site More Effective and

WIRE YOUR WORLD

Never before has it been so easy to build a Web site. From Adobe PageMill to Macromedia Dreamweaver, WYSIWYG ("what you see is what you get") software packages let you create pages by just dragging and dropping text and graphics into place instead of learning to write HTML code by hand. Heck, you don't even need to buy software—many Web-site services such as Tripod (www.tripod.com) have page-generating templates that create your code for you.

But is your site easy for its visitors, too? Although WYSIWYG editors can help you build a site quickly and painlessly, they don't guarantee the same ease of use for the folks on the other side of the browser—the people actually trying to use your site. Just like tourists at an amusement park or customers in a grocery store, your readers need some basic things to help them avoid getting lost or frustrated: orientation, guidance, reference, and motivation. When you really think about it, why build all those pages if they're so frustrating to use that no one comes back?

Make sure that all the work you put into your Web site is time well spent by taking a few simple strategies to heart. They will make your Web site less frustrating to use and will help you build the kind of site that you'd like to visit yourself.

First Figure Out What You're Doing

The best work you can do to make your site easier to understand doesn't even require touching your Mac's power button. First, ask yourself some basic questions: What's the purpose of my site? What will people be looking for? What cues might help visitors remember where they are and why they're here? How can I get readers to stay and compel them to return?

Get to the Point Sit down with pen and paper and write down your site's purpose in one sentence. Then sketch out what you think the basic building blocks will be. The example we'll use is a personal site, the purpose of which is to promote your hobby of Apple Computer worship. You might start out initially with a long list of topics you love and think will be fun additions, including a shrine to the System 7 team, your collection of haiku about the Mac Classic, and the scrapbooks of cross-country trips you took with your Apple IIe one summer.

Here's the list we made for this site: (1) the home page; (2) news; (3) contact information, including an e-mail address; (4) links; (5) Mac news; (6) Mac shareware; (7) a scrapbook; (8) a personal PowerBook collection; and (9) the Apple IIe.

Stick to It After you've made your list, look at it with a critical eye. Because you've seen numerous other Mac sites that feature links to news and software resources, you might automatically think this kind of links page would be a good idea for your site too. There's no doubt that many people appreciate useful links, but that alone isn't enough reason to throw them in the mix. Remember, the goal is to show how crazy you are about your computer—and what do news and software sites have to do with that? If you stick to your theme, your readers will be able to understand immediately what your site is about, and each section will make sense to them.

With this in mind, we decided to scratch links off our list altogether and focus on the hobby sections: the scrapbook, haiku, and System 7 shrine. (You might decide instead to have a links page but include only links to other fan sites like yours.) As you make these decisions, be vigilant. Extra stuff simply for the sake of extra stuff could make your site charmingly eccentric, but more likely it will make it confusing.

Map Your Site on Paper After you get a good idea what your site's purpose is and what types of content it will contain, you need to figure out how everything will connect. One of the best ways to do this is to actually map out your site (see the diagram, "Sketching It Out," for an example).

Note that a lot of the arrows in our example seem to crosslink, leading to a tangled mess. This is not a bad thing—in fact, it's one of the main points of the exercise. Try to keep your tangled, linky messes on paper. You can erase illogical connections, rearrange everything, or toss out a failed paper diagram much more quickly and easily than you can redo a Web site full of HTML files.

With everything in front of you, you'll be able to think realistically about whether the way you've connected your pages makes sense. For example, our diagram shows that the "What's New" page links only to the top level of each different section.

by Lisa Schmeiser

IT UP

Attractive with These Expert Tips

Wouldn't it make more sense to link directly to whatever's new within those specific sections? We reorganized the site to add those links.

As you untangle your pages, you'll discover key entry points to the site, how to direct readers to informative pages, and how to group the pages of your site together logically. For example, the pride and joy of your site might be the scrapbook pages of your Apple IIe sitting in front of assorted national monuments. Do you give those pages their own section—"Road Trip"—or do you put them with other scrapbook pages such as your PowerBook bungee-jumping trip? In this case, we decided to create a single page called "Scrapbooks" that lists the different scrapbooks and links to a separate page for each one.

Once you've got a solid site outline in place, you're ready to generate the signposts and breadcrumbs that help your users find their way around—the site navigation.

Nail Down Your Navigation

Your users are entirely dependent on you to tell them how to find what they're looking for. Navigation—consisting of the

hyperlinks, graphics bars, or buttons that allow people to move from page to page within the site—provides the guidance they need. This means it deserves some careful contemplation.

The Two-Tier Technique Good navigation typically includes two parts: the primary level (usually the home page) that leads users to the entry points of separate sections (in our example, the scrapbook page, the news page, and the PowerBook collection page) and a secondary level (the main pages for each section) that steers users through the unique contents of your sections. If your site includes a lot of lengthy documents, you may also want to include a third type of navigation—links that move users to the beginning or end of a particular story, or allow them to move back and forth one page at a time.

Sketching It Out Before you put your ideas in code, make sure to sketch them on paper. It's a lot easier to sort out a mess like this *before* making your Web pages.

Nix on the Name Game You should strive to give your sections and navigation elements clear, unambiguous names. Some readers might appreciate whimsy or metaphor, but others certainly won't. For example, some of your readers will know right away what a section called "The Dirt" is about, but you can bet that *everyone* will understand what they'll find in the "News" section. The entire purpose of navigation is to *help* people get around and feel at ease in your site—the last thing you want is to have the basic tools for getting around your site mystify your readers.

Be Consistent

Unlike most software programs, the Web doesn't really offer a predictable *user interface*, or way to get around sites. When you open an application on your Mac, you can be reasonably sure that you'll find pull-down menus at the very top of the screen, and that the leftmost one (which will almost always be called File) will allow you to open and save new files. The rules for navigating the Web, however, change from site to site.

As a result, it's your job as a Web-site builder to provide an easy-to-grasp interface for your user. Start by assuming that all visitors to your site are first-timers and have less than a minute to figure out where they are and how to get where they want to be. Make the job easier for them by providing clear cues.

A Place for Everything These cues don't have to be complicated. In fact, it's better if they're not. Why set up an elaborate metaphor that you'd have to explain later? The best way to help people get around is to set up a predictable place for everything on your home page or in the section. Save the exceptions for items that you want to stand out.

For example, if the primary navigation on your site is always via a vertical list of links in the left-hand margin of the page, then readers will assume that they can *always* move around the site by clicking in that area. This is how you'll provide references to readers, by giving them a set of constant cues that tell them what to expect from every page.

Color Cues Layout is only one area where you'll want to be consistent; color is another. Readers rely on the colors of links to tell them when they've visited a link or not. You can carry this relationship between color and function further and associate specific colors with different sections of a page or site. (For example, if the section's peach, you must be in today's headlines.) Color is a quick way for your brain to figure out where you are and what you're looking at. One example of this is the *Washington Post*'s Web site (www.washingtonpost.com), where each section has a unique color scheme.

The Little Touches Finally, always include page titles (they're in the **<head>** tag at the beginning of the HTML document) so readers can quickly see where they are. You should also include your e-mail address or a link to a contact form on every page; readers like to be able to give feedback quickly.

Provide a Clear Way In and Out

Thanks to search engines, you'll always face the possibility that new readers will land in the middle of your site instead of on the front page. Your job is to provide those readers with a well-lit Exit sign to help them get to your site's front page. Doing this lets your readers reorient themselves so they see your site in a way that makes sense to them, and it allows people to bail out of pages quickly if they aren't where they want to be. If they've dropped in on page five of your epic poem to the System 7 team, for example, they may want to get back to page one quickly so they won't miss a single verse.

Entrances and exits are especially important if you're building a site that includes sequences stretching over several pages. For example, if you're going to ask users to register online, you want to let them know where they enter the registration process, where they are relative to the beginning and ending of the registration, and how to get to the last page. Few people like filling out forms online, but mild dislike can turn to loathing if your reader is filling out page after page with no clear idea of when the task will be done. Make entrances and exits a part of your site navigation.

Readers subconsciously regard your site as a series of tasks. They're looking for a starting point, a specific action to be performed with specific results, and an exit that lets them know they've completed the task. When a reader gets dropped into the middle of a task—be it reading an article or browsing a

directory of links—the first response is usually to get out and then reapproach the pages after figuring out the context.

Employ a Lab Rat

You may think your site makes perfect sense, but you'll find out if that's true only after someone else has tried to use it. Before you post your new and improved site, ask some friends to click through a version of it and give you their honest feedback.

Another person can catch flaws in site navigation or inconsistencies in visual cues that you've tuned out. For example, your fearless lab-rat friend may think that your "Scrapbook" section is a personal scrapbook, not an homage to the road trip you took with your Apple IIe—"I want to see pictures of *you* in front of the Statue of Liberty, not your computer!" After mulling this input over, you might decide to change the title of the section to "Computer Scrapbook."

Getting another point of view is crucial: it will either confirm that you were on the right track with your site's organization and look, or will let you know what areas you need to refine before releasing your site on an unsuspecting Web audience.

The Last Word

Building an easy-to-use site takes time, experience, and many forehead-slapping lessons you wish you didn't have to learn. Fortunately, if you learn from the past mistakes of Web pioneers, you'll have a strong beginning for making your site a more reader-friendly place to visit. **m**

LISA SCHMEISER is a Web-site developer for Studio Verso in San Francisco and writes books about Web-site development in her spare time.

FOUR MISTAKES THAT WILL SABOTAGE YOUR SITE

THE BEST-LAID PLANS OF MOUSE-clicking and man can go awry if your site's technical performance undermines the overall organization. Here are four of the biggest—and easiest-to-make—mistakes.

1 Bad Colors In real life, there may be no bad colors, only bad color combinations. On the Web, however, there *are* bad colors: colors that do not display consistently from browser to browser or across different computer operating systems and monitors.

As a Web-site guru, you need to be concerned about this because you're going to be using color as part of your site navigation. If colors vary wildly depending on whether your users view the site using an old 256-color monitor or a newer one with thousands of colors, users will lose the ability to distinguish between different colors and their corresponding functions.

It's in your best interests to design your site around any combination of the 216 colors in the Web-safe palette. A good online reference for this is Lynda Weinman's site at www.lynda.com.

2 Bad Graphics Artistic merit has nothing to do with this: a graphic is bad if it's too big for a browser to display quickly, or if it's not saved in a Web-friendly way. If you're using graphics to connote headlines, navigation, or a site's look and feel, try to keep the sizes of the individual files small, and save the graphics in the Web-safe palette in your graphics program.

3 Bad HTML Writing code that works across different browsers isn't enough to guarantee speedy site performance. Once you feel confident enough to muck about in HTML code, you should also work on streamlining your code so that it loads as quickly as possible. What's the biggest offender? The nested table—in other words, a table within a table within a table.

A browser will not display a table until it has figured out how to draw the whole thing. That means when one, two, or three tables are nested inside a table, the browser has to chug through the contents of *those* tables before displaying row one of the outside table holding them all. All the while, your viewers will be twiddling their thumbs. Instead of relying on carefully nested tables to simulate a paper-based layout, stack your tables in a series of structured horizontal-only elements. The tables will load one at a time, allowing your viewer to look at the topmost tables while waiting for the rest to appear.

The other culprit is wordy code: although adding attributes like **size**, **align**, and **color** to a tag may add visual precision, the words weigh down the file and provide a browser with more HTML to chew on before rendering a page. Consider streamlining your use of attributes. For example, instead of assigning the vertical alignment **valign=top** to each **<td>** in a table row, write the attribute once in the table row: **<tr valign="top">**.

4 Bad Layout Finally, remember that your audience will be looking at your site on monitors of all sizes, from laptop computer displays to 27-inch behemoths. Setting the layout of your page to a specific width may knock key features off the screen or force users to scroll from side to side simply to read a page. You can avoid annoying your users by adopting one of two layout strategies: find out what the average monitor resolution for your users is and design to that, or adopt a "liquid HTML" building style that lets the layout expand and contract according to the browser window's size.

"Liquid HTML" means that you're taking absolute numeric values (such as **<table width="400">**) out of your tables and putting in percentages instead (such as **<table width="80%">**). The idea behind liquid HTML is to allow the layout to preserve a sense of scale relative to the size of the browser window; as the user expands or contracts the browser window, the layout expands or contracts relative to the window's width.

SERVE

Take Control of Your Web Site and E-mail

Running an Internet server has always been something for big businesses and hard-core computer geeks. After all, to operate a server you must have a continuous connection to the Internet—not something most people have—and a compelling reason not to use the e-mail and Web services offered by your Internet provider. But with the spread of always-on connection technologies, such as DSL (Digital Subscriber Line) and cable modems, the rules have changed. Now many people who once could connect to the Net only by an intermittent modem connection have the ability to serve information out of their own homes and small businesses. And the wide variety of server software available for the Mac makes it easier than ever for them to take control of their Internet lives.

WIRE YOUR WORLD

Why Serve It Yourself?

In all likelihood, somewhere at the offices of your ISP (Internet service provider) is a climate-controlled room housing anywhere from a handful to dozens of computers being used as Web servers, e-mail servers, file servers, and several other kinds of servers. And chances are, there's a team of trained technical professionals whose jobs involve keeping those servers up and running at all times, protecting them from catastrophic hardware failures that would put your Web site out of business or erase vital e-mail messages you haven't read yet.

Running your own server doesn't mean you'll need to hire a team of technicians in white coats and give them a key to your house. But it does mean you'll need to do more work than you do now. So the question is, What can you gain by setting up your own server rather than using the ones at your ISP?

Web Control If your Web site is made up of a collection of static files, then running your own Web server may not offer much of an advantage over using someone else's server. However, if your ISP charges an extra fee for space on its Web server or charges you by the byte for all the traffic on your site, you might be able to save some money by putting an older Mac into service as your Web server.

Running your own server really becomes an advantage when you've moved beyond a simple home page. Perhaps there's some specific interactive feature you want to implement on your Web site—fill-in forms, pages with content that changes based on who's viewing them, and the like—but it's something you just can't create on your current ISP's Web server. You can take advantage of all your Mac-based server's built-in features and buy Web-server plug-ins to add any other special features you might want.

E-mail Might Most high-speed connections come with one or several e-mail accounts. But what if you want more? With your own e-mail server, you can create as many accounts as you want; you can even create extra e-mail addresses that automatically forward to some other mailbox—great if your friends can't remember if you're bob_johnson@mydomain.com or bjohnson or bobj or bob.

Most e-mail–server programs, such as Qualcomm's Eudora Internet Mail Server ($249; 800/238-3672, www.eudora.com), also let you do things like create accounts that automatically reply to incoming mail. (For example, you could put a text file containing street directions to your house on the mail server and then whenever you need to give directions, you'll be able to say, "Send an e-mail to directions@mydomain.com!")

If you're really ambitious, you can also set up mailing lists. These can be simple, unchanging groups—for example, family@mydomain.com could be an address group that automatically forwards to all your family members, saving people from having to remember everyone's individual address. But mailing lists can also be a bit more complicated. Using mailing-list–processing software, such as Fog City's LetterRip Pro ($395; www.fogcity.com), you can set up automated mailing lists that people from the outside world can subscribe to (and, later, unsubscribe from).

Share Files If you're constantly trading files with friends or business associates, it's easy to get tired of the flurry of e-mail attachments. If you find yourself wishing you could return to the old days when you shared space on a file server, you can—by running an FTP (File Transfer Protocol) server, such as Stairways Software's NetPresenz ($35; www.stairways.com). FTP is a standard Internet protocol for exchanging files, and FTP client software is available for just about every computer operating system.

One warning: although running Web or e-mail server software can be somewhat risky (see the sidebar, "Play It Safe"),

by Jason Snell

IT UP

by Running Your Own Internet Server

running a file server can be *extremely* dangerous. Before you start, carefully plan your security system. Make sure guest access is disabled. Make sure people can get into only the areas you want them to get to. Carefully read the documentation for your server software; the last thing you want to do is open your hard disk to anyone roaming the Internet, giving them free rein to read your personal documents and trash your hard drive.

Video Voyeurism Even folks who don't want to set up their own Web, e-mail, or file servers may be intrigued by the idea of putting a live picture up on the Internet. If you attach a camera to your Mac and run software such as Rearden Technology's SiteCam ($199; 510/523-2267, www.rearden.com), you can broadcast live images of yourself, your dog, your backyard, or whatever you choose. These can be still pictures updated every few minutes, or they can be a live video stream.

Share Databases You don't need to become a Web-publishing expert to share your databases on the Web. Using FileMaker Pro 4.0 ($150; 800/725-2747, www.filemaker.com) or later, you can let people view, search, and even modify (if you wish) your FileMaker databases over the Web.

Let the Server Beware

Before you get started setting up that plug-and-play Web and e-mail server that will make your life so much cooler, here's the truth about running an Internet server: it's *hard*. Granted, it's

much easier than it used to be—and it's much easier to get up to speed on the Mac than it would be if you were trying to run a Unix-based server. But it's not a situation where you can install some applications, double-click on them, and forget them.

Running a server brings with it a whole set of issues that people who use their Mac all day long and shut it off at the end of the day never have to worry about. And before you decide to spurn your Internet provider and set out to process all your e-mail yourself or host your own Web site, you should know if you're up to the challenge.

Always On For a server to be effective, you shouldn't shut it off. That means, for all practical purposes, that you shouldn't set up your Mac as a server and continue to use it to render 3-D images, update databases, or even write your first novel. The job of a server should be done by a dedicated Mac, although it need not be the latest top-of-the-line model. An older Power Mac is ideal, and even older pre-PowerPC Macs can master simple serving tasks, such as running an e-mail server or a basic Web server. If your current ISP provides you with only one Internet address (common with cable modems and low-cost DSL services), you may need to run Internet-sharing software if you want to surf on one Mac while you're serving on the other (see the sidebar "Internet Sharing 101" in the companion feature "Link It Up").

You'll need to be sure that your Mac will restart itself in case of a crash or a power outage. There's a cornucopia of hardware and software that helps recover your Mac—we've put up a long list of server tools as part of the Wire Your World special report, at www.macworld.com/1999/11/features/wire.html.

Backing Up Servers hold vital information—but then so does the computer you use every day. The difference is that servers hold information that's vital to everyone who uses them, not just you. So whereas you might (unwisely) avoid backing up your own computer because you're willing to take the risk, you can't take such risks with your server data. You'll need to regularly back up your server to some form of removable-storage device, using software such as Dantz Development's $175 Retrospect or $50 Retrospect Express (800/225-4880, www.dantz.com).

Restrictions on Serving Before you buy everything you need in order to set up a server, be sure to check the rules you agreed to when you signed up for high-speed Internet service. Many Internet providers ask that users not run servers on their computers. Your connection to the Internet must also be via an unchanging Internet address—otherwise, nobody will know where to find your server. Be sure to ask your Internet provider if you've been given a *static IP address;* if the answer is no, you won't be able to run your own server.

The Last Word

Running your own Internet server isn't for the faint of heart. Before you take the plunge and kiss your Web-hosting company good-bye, think carefully about whether the added cost and time required to set up and run a server are worth it. If you've got the inclination and need the power and flexibility, operating your own Internet server can be quite a rewarding experience. **m**

Executive Editor JASON SNELL cowrote *Providing Internet Services via the Mac OS* (Addison-Wesley, 1996).

PLAY IT SAFE

RUNNING A SERVER MEANS THAT anyone on the Internet can talk to your computer, even if all your computer tells them is "Buzz off." The Mac is quite a formidable opponent for hackers, but a carelessly configured server can lead to major security problems. If you run a server, you have to be painfully diligent about making sure it has been configured properly, or your private information could be stolen or even destroyed.

Smart Passwords No matter what kind of servers you're running (even if you're just running File Sharing), always make sure your passwords are secure. For example, don't let people use their first name as their user name and their last name as the password. Don't use any word that can be looked up in a dictionary as a password. And don't use obvious passwords, such as *password,* or easily guessed referential passwords, such as *Joshua.* (*Joshua* was the password used in the 1983 computer-hacker film *WarGames.*)

Know Your Surroundings If you're letting your data be seen by people all across the Internet, realize that you're giving people you've never met the chance to break into your system and see your data. Plan your security accordingly. For example, you might think nothing of sharing a FileMaker Pro database over the Net—but if you don't protect it with passwords, anyone could stumble along and read, alter, or even destroy your data.

Before you use any program that communicates via network, consider carefully what your security measures are. It's one thing to feel secure when you're using an AppleTalk-based network of four Macs; that feeling can be quite dangerous if your computer is attached to every other computer on the Internet.

Spam Trap If you're running an e-mail server, you need to make sure that it's secured against "relaying"—receiving mail from someone and then resending it for them. That's because relaying is a feature exploited by senders of junk e-mail, and spammers are always on the lookout for new e-mail servers that will relay their messages to unsuspecting victims.

Protect Yourself There is a plethora of software packages that can protect your Macs. For example, Open Door Networks' DoorStop ($299; 541/488-4127, www.opendoor.com) monitors connections to your server and lets you restrict access as you see fit. Intego's NetBarrier ($75; 305/629-3501, www.intego.com) provides similar security functions, blocks "denial-of-service" attacks that can slow down your network to the point that it's unusable, and more.

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Macworld
LAB TEST

Where's

It's Been Available on Power Macs for Nearly a Year, but FireWire Is Still in Its Infancy

IT WAS SUPPOSED TO BE ONE OF those Holy Grail technologies, the perfect way—both fast and convenient—to connect external devices to your personal computer. On the PC side, it's known as IEEE-1394; Sony calls it i.Link. But Apple named its cool technology FireWire.

Even though FireWire was officially standardized back in 1995, it has been more a myth than a reality. However, Apple changed all that when the company added two FireWire ports to the back of every blue-and-white Power Macintosh G3.

Hope blossomed among the many Mac owners who've been eagerly awaiting a SCSI replacement. FireWire was the technology that would put an end to the days of SCSI-termination hassles and ID conflicts that lead to Macs that lock up or do nothing but show a blinking question mark.

But FireWire was never positioned as a mere improvement on SCSI: it's also a technology that lets you connect many more devices per chain (63 to be exact; 9 times as many as SCSI) and supplies its own power (so that many devices don't need any external power supply).

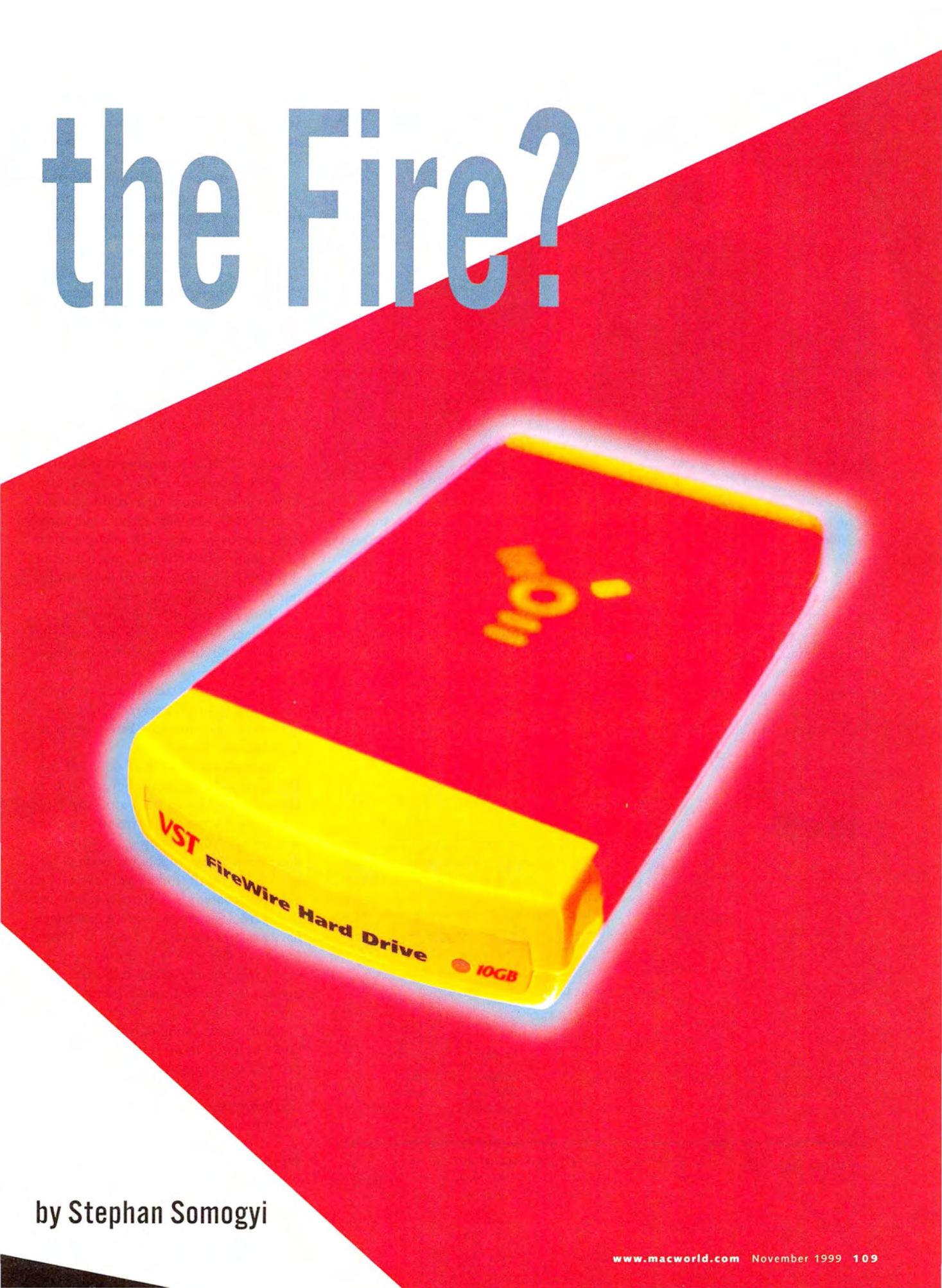
And then there's speed: FireWire provides a tenfold increase in bandwidth compared to the built-in Narrow SCSI ports previously found on Power Macs.

Yet six months after the arrival of the blue-and-white Power Mac G3s, the FireWire universe is still a bit tepid. FireWire devices—such as CD burners, scanners, and hard drives—are only just beginning to appear.

Like any other technology, FireWire needs time to become prolific, but is this promising new connection gaining momentum or just muddling along?

PHOTOGRAPHS BY KEVIN TWOMEY

the Fire?



by Stephan Somogyi

Where's the Fire?

Canon Elura digital-video camera

Light My Fire

FireWire is Apple's answer to some of the most annoying and common problems with connecting external devices and getting them to work. Imagine a peripheral-connection scheme that lets you blithely connect a mix of hard drives, CD-R drives, scanners, and digital cameras without worrying about which order they're in—or whether they'll play nicely together at all—on the chain.

To anyone who's used external SCSI devices, especially scanners and other miscreants, FireWire is nothing short of a miracle. No longer will anyone have to move devices up and down the chain, with some devices demanding to be at the end and others at the front. With FireWire, it's plug-and-play in the truest sense—plug devices in and they work, at least theoretically.

Hot-swappability is another key FireWire feature: you can connect FireWire devices to and disconnect them from your Mac without shutting down. ID conflicts are a thing of the past, since FireWire devices talk among themselves and sort out which one gets which ID.

A Big Boost Traditional Narrow SCSI, Apple's original external connection of choice, was first used on the Mac Plus, in 1986. This state-of-the-art (for the 1980s) technology had a throughput of only a measly 5 megabytes per second (MBps). Although there are faster, more expensive versions of SCSI, Narrow SCSI has been the built-in standard against which all comers are measured. Apple's FireWire allows throughput of up to 400 megabits per second (Mbps), which translates to 50 MBps—a substantial boost. And an 800-Mbps version of FireWire—four times faster than today's—is already nearing completion.

Just because FireWire has this tremendous bandwidth available doesn't mean that all FireWire devices will automatically offer such high performance. As with other technologies, the maximum throughput of FireWire doesn't always translate into real-world results.

Today's standard hard drives typically move data back and forth between the computer and the drive at 10 to 15 MBps. So despite the availability of up to 50-MBps throughput today, the hard-drive mechanisms—and not FireWire itself—determine the speed of FireWire-connectable hard drives.

Four-Alarm Fire Not only is FireWire fast and easy to use but it also supplies power—up to 60 watts—over its cable. This means that many FireWire devices with smaller power requirements don't need an external power source.

VST's small FireWire drives, for example, contain hard drive mechanisms that were designed for laptops and hence have a small appetite for electricity. When you plug the FireWire cable into the drive, you not only establish the data connection to the computer but you also power the drive.

Sixty watts is enough power to run one—or two, at most—of these small drives. Sony's take on FireWire, i.Link, omits the power supply from its cables. For this reason, you need a cable adapter to connect i.Link devices to a Mac.

Building a Fire

To help determine the current state of FireWire, Macworld Lab tested a 4GB FireWire hard drive from VST Technolo-

Macworld LAB TEST

Fire Drills

Even with FireWire's promise of 400-Mbps throughput, it's going to take a collaborative effort between Apple and peripherals makers to enable devices to take full advantage of FireWire's speed. Macworld Lab tested a 4GB VST Technologies FireWire hard drive and found significant improvement when using the latest drivers and firmware from Apple and VST.

Best results in red.

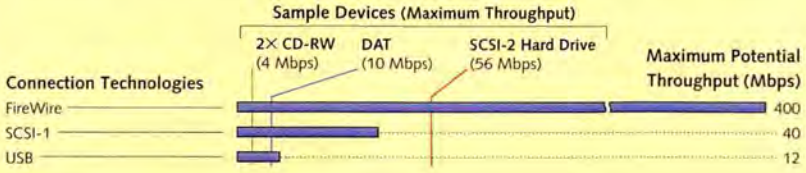
	VERSION NUMBER			50MB FILE COPY	
	Apple FireWire Driver	VST Driver	VST Firmware	Copy from Drive (in Mbps)	Copy to Drive (in Mbps)
VST Technologies 4GB FireWire hard drive	2.0	1.0	39C	34.4	17.6
with Apple upgrade only	2.1	1.0	39C	48.8	26.4
with all three upgrades	2.1	1.1	43	48.8	48.8

Longer bars are better.

Behind Our Tests We tested the hard drive with a Power Macintosh G3/400 with Mac OS 8.6, 128MB of RAM, and a 4,096K disk cache. We used a 50MB Adobe Photoshop file for our file-copy tests.—**Macworld Lab testing supervised by Gil Loyola**

FireWire Speeds Ahead

As you can see from this chart, many devices simply don't need the speed advantage that FireWire offers over USB. But others—especially fast hard drives—will benefit greatly from FireWire's increased capacity.



gies (978/263-9700, www.vsttech.com) and found that FireWire's software is definitely still teething.

Not only is Apple's own FireWire system software changing rapidly but the drivers—which form the conduit between the system software and the FireWire hardware device—are also going through a similar evolutionary process. In addition, many FireWire hardware devices contain their own built-in software, known as firmware, that can affect the devices' behavior and performance.

We compared three software combinations, involving two versions of the Apple FireWire driver software and two versions of the VST driver and firmware, on the same VST hard drive (see the benchmark, "Fire Drills"). With the latest Apple software and the most recent VST driver and firmware, the hard drive performed much better than with the software combination that came with the VST drive when it originally became available. Even such simple software upgrades can provide a significant performance increase.

The Real World Keep in mind that even with FireWire's flexibility, you must be careful when adding or removing devices. For instance, if you add a hard drive to a chain while you are burning a CD in a FireWire CD burner, you are likely to end up creating a coaster instead of a usable disc. That's because anytime a device is added to or removed from a FireWire chain, all the other devices pause to make sure that their connection is still available. This rechecking of all the connected FireWire devices unavoidably interrupts the CD-creation process.

Today's FireWire on the Mac has other shortcomings that need to be addressed by Apple. For example, you can't currently boot a Macintosh from a FireWire drive, although Apple has promised to offer this ability before the end of the year. In addition, the way Apple's FireWire system software works currently prevents the Finder from displaying the icons of files whose applications are stored on FireWire drives. Finally, when reading from and writing to FireWire drives under the Mac OS, even the fastest Macs can suffer from unresponsiveness, especially during long file copies. This is in stark contrast to Apple's SCSI system software, which provides smooth background file transfers.

In the Hot Seat

If FireWire is so wonderful, why isn't it ubiquitous yet? Here's the problem: until there are more computers with FireWire ports, building FireWire devices is prohibitively expensive. Luckily, the paucity of ports will soon be alleviated, with the inclusion of FireWire across the Macintosh product line, not just in the "professional" desktops.

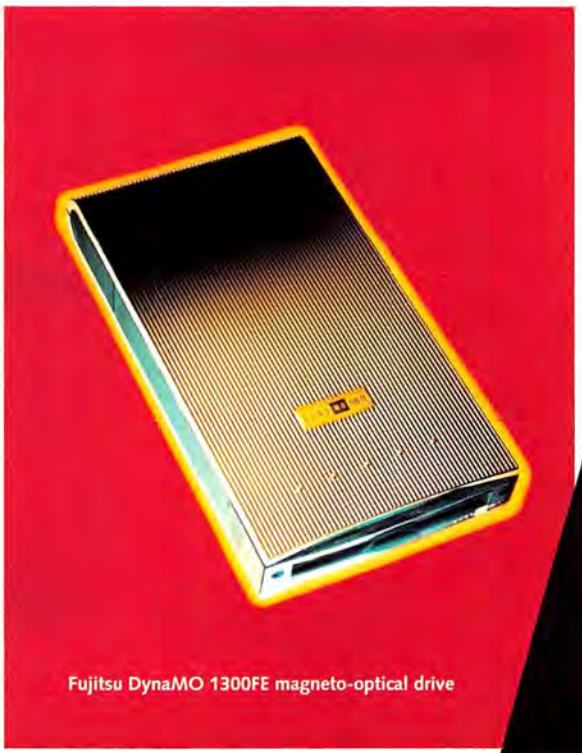
Because FireWire is only just arriving on PC motherboards, there are no "native" FireWire storage devices today. All storage devices that use FireWire employ a "bridge chip," so called because it translates between FireWire and ATA, the mass-storage connection standard used in today's Macs and Windows PCs. But if Windows-based computers offer FireWire, less expensive, native FireWire devices should appear.

Another reason for the slow acceptance of FireWire is the growing popularity of the Universal Serial Bus (USB): many low-bandwidth devices don't need more than the 12 Mbps of bandwidth that USB offers (see the diagram, "FireWire Speeds Ahead"). USB's success means that FireWire will initially become popular only for high-bandwidth applications that simply must have more speed than USB delivers. But don't frown just yet. Once it costs less to build FireWire devices, we can expect the number of peripherals to grow rapidly.

Although FireWire hasn't been adopted as quickly as Apple would hope, there are interesting technology developments in each of the following categories. And for a detailed list of current FireWire products, log onto www.macworld.com/1999/11/features/firewire.

Digital Video The Digital Video (DV) standard uses FireWire for connectivity. Typical DV cameras, such as the Canon Elura, can be remote-controlled from a Mac via FireWire, with software such as Apple's Final Cut Pro (see *Reviews*, August 1999). Such software transfers DV data to disk for later editing.

FireWire has an additional media-specific feature—isochronous transfer—that guarantees that a particular stream of data traveling across the FireWire cable will always have enough bandwidth. This is critical for video and



Fujitsu DynaMO 1300FE magneto-optical drive

audio applications, because if the available bandwidth drops below a certain threshold, disruptive dropouts happen.

Storage Hard drives, CD-ROM drives, CD-Recordables—storage is a hot place for FireWire. The Device Bay standard, under development for the Windows OS, is driving many hardware manufacturers—such as VST Technologies, Mactell, Sony, and Indigita—to offer FireWire compatibility. The Mac will benefit as a result.

However, until native drives become available, FireWire-to-ATA bridge chips will be used for mass storage, including hard drives, DAT drives, and CD/DVD readers and burners. These bridge controllers are still being refined, and performance is improving as new versions of the bridges' firmware are released.

PC/PCI Cards If you think FireWire is only for owners of blue-and-white G3s, think again. Newer Technology, Racom, and VST Technologies have announced FireWire cards for PowerBooks. These CardBus cards provide greater bandwidth between the card and the computer. Since the PowerBook 3400, Apple's portables have included built-in CardBus support.

Owners of older Macs can also add FireWire to their computers, by purchasing a PCI card from a manufacturer such as Orange Micro or Adaptec. One shortcoming of this approach is that some manufacturers, notably VST Technologies, won't support devices running on a Mac unless the Mac came with FireWire already built in. Currently there seems to be no way to retrofit FireWire into iMacs, but we expect the next generation of iMacs to have FireWire built in.

FireWire at Work

FireWire promises hassle-free connections without termination issues or problems with ID conflicts.

SEAN MCDONALD

Scanners Although there are plenty of inexpensive USB scanners, the USB connection is too slow for frequent high-quality scans. For the best results, you need FireWire, and until now, finding a FireWire scanner was nearly impossible. Thankfully, Umax has announced the first scanner for FireWire, the PowerLook F3.

Spreading Like Wildfire

FireWire also promises to become a hot ticket in consumer electronics, where it's intended to replace the rat's nest of cables behind today's televisions and stereos. FireWire speakers, DVD players, and amplifiers are coming to a superstore near you over the next year or two. Instead of having your receiver be a home-audio/video cabling hub, you'll be able to simply add FireWire-enabled devices such as TVs or set-top boxes to the chain—a huge convenience, since each device will have at most two FireWire connections, one going in and the other going out to the next device on the chain.

Another clear indicator of this hopeful future is Sony Electronics' forthcoming PlayStation 2, which will have at least one i.Link port built in.

The Last Word

After a long dormancy period and many missed opportunities by Apple, FireWire is gaining momentum of its own accord. The current standard is constantly evolving, with 800- and 1,600-Mbps versions already well under way. And if the Device Bay standard is adopted widely, FireWire will proliferate through the Wintel world with great speed, making more FireWire peripherals available at lower prices.

However, what will ultimately happen with FireWire remains a big question. Will this technology on the back of your Mac make the computer easier to use and bring computers and consumer electronics closer together?

Given the recent interest in FireWire from so many directions, we believe that the question for Mac users is not whether FireWire will succeed but whether Apple will be able to keep up with the remarkable technology it created. **m**

Contributing Editor STEPHAN SOMOGYI is *really* looking forward to booting the Mac OS from a FireWire hard drive.

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Secrets

AppleScript for the Programming-Shy

HOW TO CREATE USEFUL SCRIPTS WITHOUT WRITING A SHRED OF CODE

by Joseph Schorr

When AppleScript was introduced in the early days of System 7, it sounded like a dream come true: here, at last, was a scripting language for normal people—a language with a syntax built around plain English, one that would let average users automate their Macs without requiring the skills of a software engineer.

Then I got my first taste of AppleScript. I found myself staring at sample scripts with lines of code like this:

```
if (not (exists (file PrefFileName of¬
folder "Documents" of preferences folder)))¬
then
        set lstatel to "New"
    else
        if askOnRun then
                display dialog "Continue to¬
watch" & ((FolderToWatch) as string)¬
buttons {"OK", "New", "Cancel"} default ¬
button 1
                set lstatel to the button¬
returned of the result
        else
                set lstatel to "OK"
        end if
```

To my nonprogrammer's brain, this looked less like English than like a nightmarish cross between C++ and a bad e. e. cummings poem.

I quickly discovered, however, that you don't have to write code to create scripts. You can *record* AppleScripts using Script Editor, the little script-making program that comes with every Macintosh (it's in the AppleScript folder inside the Apple Extras folder). If you click on Script Editor's Record button and then perform tasks in any application that supports AppleScript recordability (such as the Finder in Mac OS 8.0 and later), Script Editor will record your actions, translating them into lines of AppleScript code on the fly. This capability lets you build useful AppleScripts that require little or no tweaking. Consider a few examples that take advantage of some of the Mac's easily recordable system components.

Ultimate Desktop Cleanup

The Finder's built-in Clean Up command tidies things up by snapping your icons (on the desktop or in a folder) into position along an invisible grid, but you can't control *where* it places those icons. With AppleScript, you can create a smart Clean Up command.

To start, launch Script Editor and click on the Record button in the Script Editor window. With Script Editor still running (you can collapse the window, drag it to a corner, or hide it in the background), clean your desktop—making it

continues

KERI SMITH

look precisely the way you want it to. One by one, drag each desktop icon to the exact place you want it to appear. Even if an icon is already where you want it, drag it slightly out of place and then back into position.

The Script Editor window records every action you perform in the Finder, capturing the final screen coordinates for each item you've selected and moved (see "Cleanup Code"). When you're done, click on the Stop button in the Script Editor and choose Save from the File menu. In the Save dialog box, change the Kind pop-up menu to Application, check the Never Show Startup Screen check box, and then save the script.

You now have a genuine AppleScript that will reposition all your desktop icons exactly where you want them. Test the script by dragging the icons out of place and then launching the script to neaten them instantly. (You can set up similar scripts to clean up particular folders instead of the desktop, but beware: this simple script will always look for the exact icons you've specified, so use it only with items that will continue to be present.)

Cleanup Code Here's an entire AppleScript created without typing a word of code. All you have to do to produce this script is drag icons around on the desktop with Script Editor's Record function activated. Playing back the script automatically moves the icons into the recorded positions.

The Voices of AppleScript

APPLESCRIPT CAN DO MORE THAN STREAMline your business and automate your workflow. It can also talk. AppleScript provides access to all those lovely voices used in the Mac's text-to-speech functions—the same ones you can choose from the Sound menu in SimpleText or from the Voice pop-up menu in the Speech control panel.

Adding speech to a script involves typing code, but it's pretty painless. Just type the word *say*, followed by the phrase you want to have spoken, enclosed by quotation marks, like this:

```
say "boy, this script is sure going to save you a lot of time!"
```

If you want a voice other than the Speech control panel's default voice to speak the phrase, add the word *using* to the end of the phrase, followed by the name of the voice, again in quotation marks. For example:

```
say "your files have been copied" using "Kathy"
say "have a nice day" using "Zarvox"
```

You can place the voices anywhere in a script. You can even create a script that contains nothing but voices speaking to each other (see "Shakespeare in Code"). For information about controlling the pace and pitch of voices used within AppleScript, choose AppleScript Help from the Help menu in Script Editor and do a search on the word *speech*.

Shakespeare in Code By following a simple syntax, you can have multiple Mac voices talk to each other within any AppleScript. In this example, Zarvox and Bubbles perform a pivotal scene from *Othello*.

Background Switcher

Suppose you're fond of the Bondi Extra Dark desktop pattern, but your spouse prefers to work against a background photo of a Cancun beach. You can record an AppleScript that enables you to switch automatically between the two backgrounds.

Again, start with a fresh script window in Script Editor, as outlined above. Click on the Record button, and then follow the steps for changing the desktop pattern: open the Appearance control panel, choose the pattern or picture you want, click on Set Desktop, and close the control panel. Then stop recording.

This script requires just a tiny tweak, due to an ugly recording bug. Notice that when you selected a pattern from the list, Script Editor recorded a line of code that says something like

```
set background pattern to "3Ñ˜¿3Ñ˜¿3Ñ"
```

Replace the garbage characters between the quotation marks with the actual name of the pattern you chose, such as Bondi Extra Dark, so the line reads

```
set background pattern to "Bondi Extra Dark"
```

You must type the name of the pattern accurately, including the correct case, for the script to work. Save the script as an application, as described in "Ultimate Desktop Cleanup" above.

You can create a script for several favorite backgrounds and place them in the Apple menu for easy access. Once they're in place, you'll be able to switch backgrounds by simply choosing a different script from the Apple menu.

Windows on Demand

Do you find yourself opening the same folders day after day to get your work done? Why not create a single AppleScript that opens *all* the folders you need simultaneously *and* sets the sizes, positions, and view options of the resulting windows all at the same time?

It's easy with Script Editor's recording feature. Once you've started a new script and clicked on Record, open the folders you want. Set the view (such as icon or list) in each window, as well as the size and position of each window. Finally, close unwanted windows, so that only the items you want revealed are on screen. Then click on Stop and save the script. The finished script will fetch multiple folders in rapid succession, opening the windows just where you want them.

If these examples inspire you to create scripts for your favorite applications, first check to see how AppleScript-aware they are—some actions may not be recordable in every program.

Of course, if you take the time to actually learn AppleScript, there's much more you can do to automate your Mac. But even if you're not ready to tackle the syntax of a scripting language, experimenting with AppleScript's record-and-play approach to automation can make at least some of your work a little easier. ■

JOSEPH SCHORR, a confirmed nonprogrammer, is a coauthor of *Macworld Mac Secrets*, fifth edition (IDG Books Worldwide, 1998).

Tips, Tricks, and Shortcuts

by Lon Poole

Officially, AppleWorks (formerly known as ClarisWorks) allows you to create only one automatic macro that will play whenever you open any document in a particular AppleWorks environment (such as word processing or drawing). But Jeffrey L. McLean of Woodbridge, Virginia, has discovered a workaround: he has figured out a way to make individual automatic macros for any number of AppleWorks documents—and without the help of AppleScript.

First, in each environment, create an automatic macro that triggers a keystroke combination, such as ⌘-option-A, that can play another macro. (For instructions on creating an automatic macro, see the AppleWorks help topic "Create Automatic Macros.")

Now, whenever you want a document to have its own unique automatic macro, just create a document-specific macro that plays whenever ⌘-option-A is pressed. The next time you open this document, the automatic macro for the environment will "press" ⌘-option-A, causing the document-specific macro to play. AppleWorks does the right thing—nothing—if you open a document without a macro that responds to ⌘-option-A.

Irksome Icon Files

Q. Sometimes when I create a new folder, it contains an odd file that I did not create—an invisible Icon file with a size of 0K. This bugs me because sometimes I need to transfer entire folders to a Unix Web server, where the Icon file becomes visible. Why are these files created? Can I do something to prevent them from being created in a new folder?

RENE P.F. KANTERS
Richmond, Virginia

A. The Finder creates an invisible Icon file to store a folder's custom icon. (The name of this file begins with the word *Icon* and ends with a return character.) In Mac OS 8.5 and later, the Finder also uses this file to keep track of some folder view settings such as custom column positions and sizes in a list view.

To prevent the Mac OS from creating an invisible Icon file, refrain from giving a folder a custom icon. And in Mac OS 8.5 or later, don't change any view settings that are stored in this file. Since Apple has not disclosed which view settings are kept in the Icon file and which are kept elsewhere, you'll have to determine this through trial and error.

Icon files are of no use in Unix, so you can safely delete them on a Unix system. Not so fast on your Mac, however: Apple doesn't document all the settings that the Finder stores as resources in Icon files, so don't delete an Icon file in Mac OS 8.5 or later unless you are certain the file contains no resources at all. To see if a file has resources, open it with Apple's free ResEdit utility. ResEdit displays an alert when you use it to open a file that has no resources.

Here's how to eliminate an invisible Icon file: drag the contents of the folder that contains the Icon file to a new folder that doesn't contain one. Now you can drag the folder with the Icon file to the Trash. Note that in Mac OS 8.5 or later, you must create the new folder inside the window of a folder or disk that doesn't have an Icon file, because a new folder inherits the view settings of its enclosing folder or disk. If the enclosing folder or disk has custom view settings stored in an invisible Icon file, so will a new folder created in it.

Unclog a Jammed Folder

Q. I have created an unusual problem—apparently I've stored so many files in one folder that I can't open the folder. When I double-click the folder to open it, the folder window displays no files, no total number of items, and no total MB available. The watch pointer keeps spinning but the folder contents never appear, even after 30 minutes on my Power Mac G3 with Mac OS 8.5. Does the Mac OS limit the number of files in a folder? How can I access my much-too-large folder?

PAUL WERMAGER
Honolulu, Hawaii

A. The Mac OS file system cannot access more than 32,767 items in a single folder, but the Finder can get bogged down or even run out of memory trying to open a folder containing far

continues

GENE GREIF

fewer files. You can correct this problem by employing the free Fat Folder Fixer utility, from Alsoft (www.Alsoft.com/AskAl/download.html); this utility distributes files from an overfilled folder to new folders it creates. You specify the number of files to put in each new subfolder.

Invert a Backward List View

Q. Recently the windows I set to View As List in the Mac OS 8.5 Finder started displaying in reverse alphabetical order. (Other people have access to my computer.) How do I get the windows back to normal?

ERIC SMITH
San Francisco, California

A. Notice the triangular icon that's next to the last column title displayed in a List view? Clicking this icon reverses the sort direction of the List view. As you may know, clicking a column title such as Name or Date Modified causes the Finder to sort the list by that column.

Voice-Activated MP3 Player

TIP For an awesome twenty-third-century effect, make your MP3 player voice-activated by using a derivative of a previous tip that showed how to open any document by voice command (see *Quick Tips*, July 1999).

In your MP3 player application, create a playlist, set it to autoplay when opened, and save it with a name such as Play Some Cool Tunes. Then in the Finder, select the playlist, hold down the escape key, and say into your Mac microphone, "Make this speakable." (If you have set the Speech control panel to use a different key or a spoken name to alert the speech-recognition software, press that key or speak that name instead of pressing escape.)

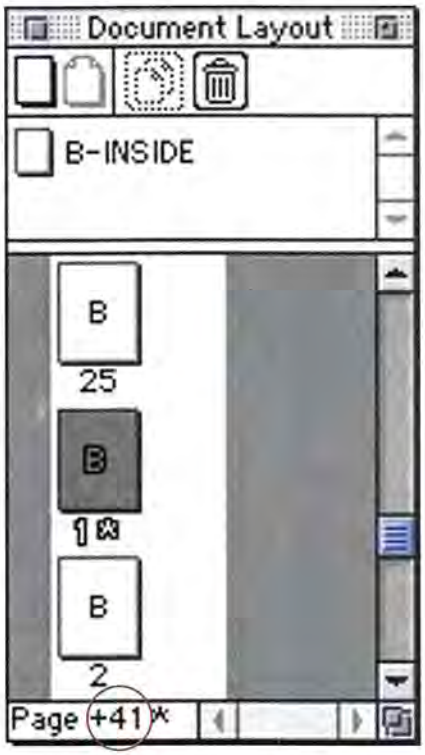
From now on, you can start playing this playlist by pressing escape and saying, "Play some cool tunes" into your Mac microphone—and blow away your PC-using friends!

BYRON BRAY
Albany, Oregon

Apple's speech-recognition software is included with Mac OS 8.5 and later but might not be installed by default. You can use the Mac OS Install program to custom-install English Speech Recognition. You can also download the free software from Apple, at http://asu.info.apple.com/swupdates.nsf/artnum/n11400. After installation, turn on the Speakable Items option in the Speech control panel. If your MP3 player doesn't autoplay when a playlist is opened, try MacAmp Lite, $10 shareware from @soft (www.macamp.net).—L.P.

Print Discontinuous QuarkXPress Pages

TIP Need to print discontinuous pages from a QuarkXPress 4.X document in which the pages are not uniquely numbered? For example, the pages in each section may be numbered 1, 2, 3, and so on, and have no section prefixes (such as III-2). You can print discontinuous pages by specifying absolute page numbers in the Pages field of QuarkXPress's Print dialog box. To specify an absolute page number (which defines a page's sequential order in the document), enter a plus sign (+) before the number. But determining absolute page numbers can take a long time in a lengthy document. For a shortcut, see "Absolute Page Number."



Absolute Page Number To see the absolute page number of a page in a QuarkXPress document, option-click the page in the Document Layout palette and look at the lower left corner of the palette.

ROBERT NEMOZ
Toronto, Ontario, Canada

Reminder at Shutdown

TIP If you forget to turn off your monitor when you power down your computer, here's an easy way to create an on-screen reminder that will appear every time you shut down.

In SimpleText or any other application, create a document that reads "Don't forget to turn off the monitor!" Use large type to make it noticeable. Then select the message and drag it to the desktop to make a clipping file. (If this doesn't create a clipping file, select the message, copy it, open the Scrapbook, paste it in, and then drag it from the Scrapbook to the desktop.) Next, double-click the clipping file to open it, and then adjust the size and position of its window to your liking. Rename the clipping Monitor Reminder and place it in the Shutdown Items folder inside the System Folder. Now whenever you shut down, the message reminding you to turn off the monitor will pop up.

GARRETT ALBRIGHT
Fortuna, California

You can also create a vocal reminder. Record it as a sound file with SimpleSound. Open the sound file with MoviePlayer Pro or QuickTime Player Pro, and then export it as a System 7 Sound file. Put this file in the Shutdown Items folder.—L.P.

LON POOLE answers readers' questions and selects reader-submitted tips for this monthly column. He authored *Macworld Mac OS 8.5 Bible* (IDG Books Worldwide, 1999) and coauthored *The Little Network Book* (Peachpit Press, 1999).

All shareware and freeware mentioned in *Quick Tips* is available from the Macworld Online software library (www.macdownload.com).

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From Printed Page to Web Page

FOUR WAYS TO TAKE QUARKXPRESS DESIGNS TO THE WEB

by David Blatner

The words can strike terror into the heart of any QuarkXPress user: "This printed piece looks great. Why don't you just stick it up on our Web site?" Ah, if only it were that easy. But contrary to what *some* people think, you can't just upload a QuarkXPress document to the Web. (Well, technically you can, but no one would be able to view it.)

First, you must convert the file to some other format (such as HTML) suitable for Web viewing. Second, you must keep in mind that the Web page you're looking at in your favorite browser will rarely look exactly the same in someone else's browser.

These two problems—the need to wrench your QuarkXPress documents into Web-compatible formats and the general inconsistency among Web browsers—may be enough to quell your desire to repurpose any QuarkXPress file, but they probably won't change your boss's mind. So, in the spirit of compromise and peace in the workplace, I offer these tips.

There are basically four ways to get a QuarkXPress document onto the Web: convert it to HTML, rasterize it into a picture, save it as an Adobe Acrobat PDF file, or use it to build a QuarkImmedia multimedia project. None is a perfect solution; choose the one that best fits your particular audience and needs.

WHAT YOU NEED

QuarkXPress
Web browser

Optional:
Adobe Acrobat
Adobe Acrobat Distiller
Adobe Photoshop
Extensis BeyondPress
QuarkImmedia

PAUL WATSON

Exporting HTML

While HTML is certainly the most popular foundation for Web pages, its limitations can frustrate creative designers. For example, HTML cannot reproduce all the complex formatting QuarkXPress allows. Kerning, tracking, justified columns, Bézier-shaped boxes and clipping paths—none of these are available in HTML. Each iteration of HTML has become more powerful, however. For instance, version 4.X Web browsers understand commands to overlap text and graphics. But browsers based on earlier HTML versions will not be able to display such attributes.

Still, if you want to export your QuarkXPress document to HTML, there are several options. QuarkXPress 4 alone cannot export HTML, but the addition of one or more XTensions will allow you to prepare QuarkXPress files for the Web.

HTML Text Export Filter This free XTension from Quark (800/676-4575, www.quark.com) lets you export text (and only text) in HTML format. It's very basic—it assigns only font size, font name, and text color—but if you need to get a story from QuarkXPress to a Web authoring program, it's fine.

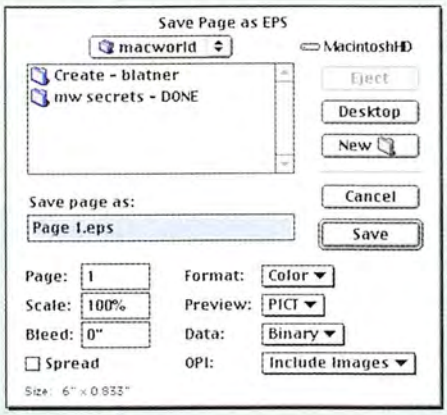
BeyondPress This $299 XTension from Extensis (800/796-9798, www.extensis.com) is probably the most popular and powerful XTension for exporting HTML from QuarkXPress (see "Exporting HTML with Beyond-

continues

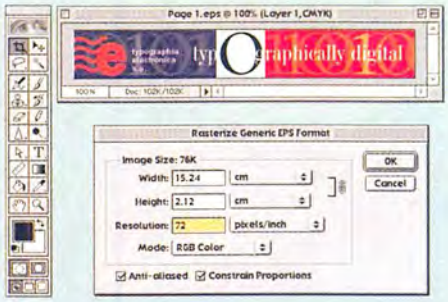
Master the Raster

QUARKXPRESS HAS GREAT TOOLS FOR HANDLING TYPE, SO I OFTEN USE IT TO create logos, graphics, and text for my Web pages. The key is to export your QuarkXPress file as a graphic that you can incorporate into a Web page. Here's how to do it.

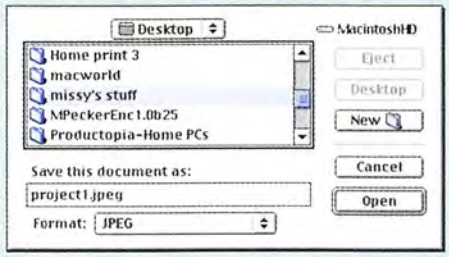
1 Save your QuarkXPress page as an EPS file. (Choose Save Page As EPS from the File menu.)



2 Open the EPS file in Adobe Photoshop. Versions 4 and later can rasterize most EPS files (translate them into bitmapped images). A word of warning: TrueType text and QuarkXPress's blends often *don't* work.



3 Save the file in Photoshop as either a GIF or JPEG file, depending on your needs. (See "Photoshop Discovers the Web," October 1999.)



4 Place this graphic in your Web page. You can use transparency or similar colors to make the graphic blend into the Web page.

Press"). Its Conversion mode lets you mine your document for the text and graphics you want to export. The result is a linear flow of information. Authoring mode creates HTML that tries to reproduce your page geometry, either with complex tables or Dynamic HTML (DHTML) tags. BeyondPress even lets you author Web pages directly in QuarkXPress and also liven up your site by including dynamic media such as animated GIFs and QuickTime movies.

HexWeb If you create a daily newspaper or magazine and you need to extract text and graphics for your Web site, check out HexWeb, a $289 XTension from HexMac Software Systems (www.hexmac.com). It includes excellent site-management and indexing tools.

WebQuarkXPressXT WebQuarkXPressXT, a $189 XTension from Gluon (888/458-6698, www.gluon.com), is a very good intermediate step between Quark's free export filter and the higher-end tools. If your primary job doesn't involve converting documents all day long, take a look at this option.

Another choice for occasional document conversions is Myrmidon, a $69 product from Terry Morse Software (www.terrymorse.com). It acts like a printer driver and works not only with QuarkXPress but also with most Macintosh programs. When you print your document, the software converts it to the nearest HTML equivalent.

In general, no matter how you convert your QuarkXPress documents to HTML, the results may not be exactly what you envisioned. Plan on tweaking the files in another program, such as Macromedia Dreamweaver, BareBones BBEdit, or Adobe GoLive.

Exporting Graphics

One of the main problems with HTML is its difficulty with fonts. The XTensions mentioned above let you specify which fonts to use, but unless your audience has those fonts installed on their machines (or unless their Web browsers support certain font standards), the typefaces those people see on their screens won't be the ones you had in mind.

If your QuarkXPress document has a lot of cool type, you can make sure your Web page maintains that look, by exporting the file as a graphic (see

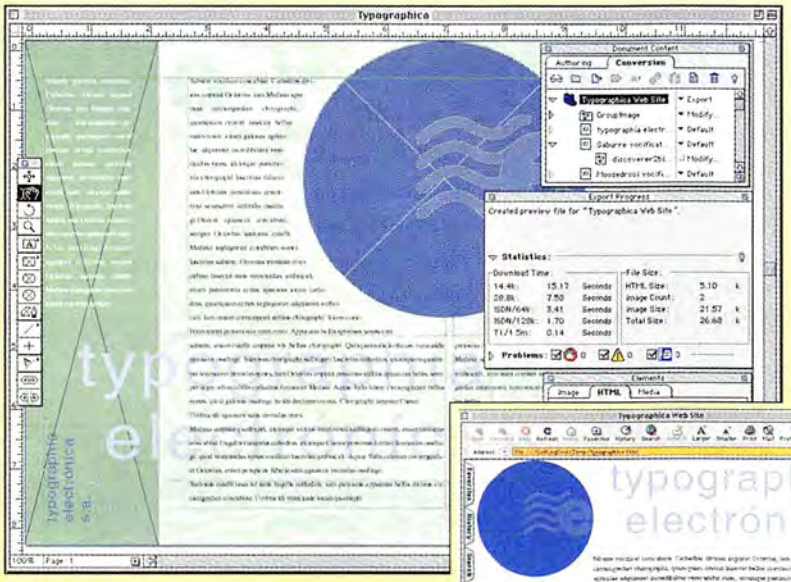
Exporting HTML with BeyondPress

SO YOU'VE DECIDED TO TAKE THE HTML ROUTE TO THE WEB. ONE OF THE BEST WAYS TO CONVERT YOUR QUARKXPRESS FILE TO HTML is with Extensis's popular BeyondPress XTension. It gives you several methods for converting documents and even lets you author Web pages right in QuarkXPress. Here's how to get started.

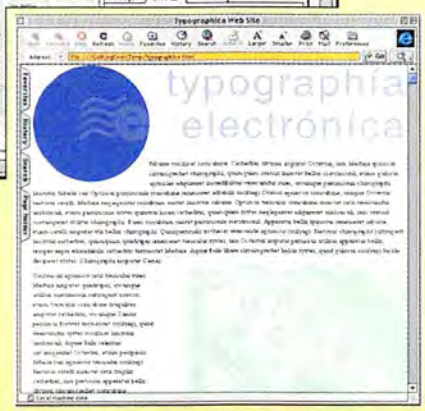
1 In Conversion mode, BeyondPress exports text and graphics into a linear flow that you can import into another Web authoring tool.

2 BeyondPress converted the text box in the lower left of Figure 1 (*typographia electrónica*) into a GIF image in Figure 2 to retain its look.

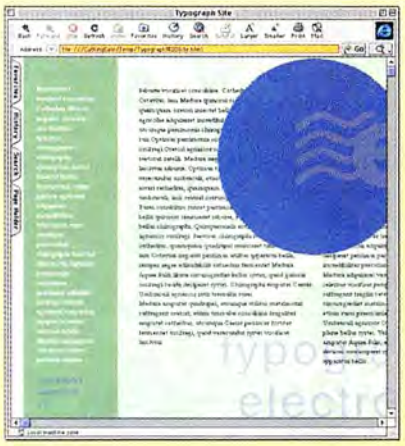
3 Using Authoring mode, you can re-create the look-and-feel of a page. BeyondPress creates HTML that tries to reproduce your page geometry, with either complex tables or DHTML tags. It's not a perfect system, though: HTML doesn't recognize drop caps and other special formatting.



1



2



3

"Master the Raster"). You'll need a program that contains a PostScript RIP, such as Adobe Photoshop ($654; 800/833-6687, www.adobe.com) or TechPool's Transverter Pro ($395; 800/925-6998, www.techpool.com), to convert XPress's vector graphics to bitmapped images.

Exporting Acrobat PDF

Adobe's Acrobat PDF format was designed to display print files on anyone's screen—even the screens of those who don't have the proper fonts—so it should be a perfect solution for repurposing QuarkXPress documents for the Web. But there are always trade-offs. While PDF is similar to PostScript and can therefore simulate almost anything you can create in QuarkXPress, PDF file sizes are usually slightly larger than corresponding HTML documents, so they take slightly longer to download.

To display PDF documents within a Web browser, your audience needs both the Acrobat Reader software and the appropriate browser plug-in (both come standard on most new computers). Without the plug-in, people can still download the PDF files to their hard drives and view the files with Acrobat Reader—and this may be a better solution, as the plug-in is notoriously buggy.

You've got three options for exporting your QuarkXPress documents to PDF format; all of them require Adobe Acrobat ($249). The simplest method is to print the QuarkXPress file to disk as PostScript and then process it with Acrobat Distiller. You can streamline the procedure slightly: select the AdobePS printer driver in the Chooser and then print a PDF file directly to disk (select Printer in the QuarkXPress Print dialog box to tell the program where to save the file). This method still requires Acrobat Distiller, but it runs automatically.

If you want interactive features in your PDF file (such as bookmarks or hyperlinks), use one of the following XTensions to write the PostScript to disk before distilling it. Quark's free PDF Filter, available on the company's

Web site, automates the process of building PDF files from QuarkXPress documents (see "Quark's PDF Filter"). And Techno-Design's PDF Design XT ($345; www.techno.nl) offers additional features that can merge multiple documents into a single PDF, insert additional hyperlinks, and so on.

Building with QuarkImmedia

Finally, there's QuarkImmedia, Quark's own XTension for building interactive multimedia projects directly within QuarkXPress. (See "QuarkImmedia on the Web Frontier," *Create*, July 1998.) While Quark has reduced the price of Immedia dramatically, to $249, it's clear that the company has tabled further development of this powerful XTension.

Like PDF files, Immedia files have two downsides for Web publishing: they require the Immedia Viewer (free from Quark's Web site), and Immedia documents can easily become too large to transmit well across phone lines. However, if you forgo QuickTime movies, large sound files, and other data-intensive items, your files should play trouble-free.

Quark's Future on the Web

Like many companies, Quark was slow to realize the importance of the Internet. However, in the past year, the company has announced and demonstrated several products that make clear its rapid progress. For example, Quark has announced support for the Macromedia Flash standard. While details are sketchy, with luck you'll be able to export QuarkXPress pages in Flash format before long.

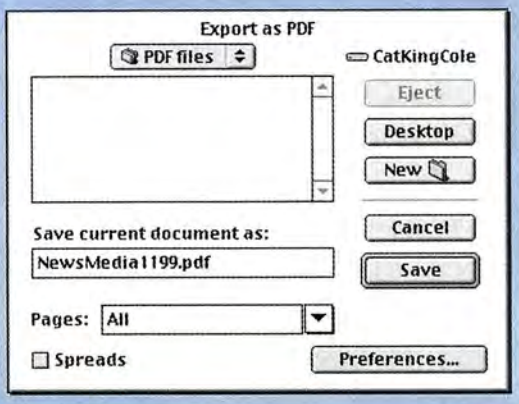
Quark will also soon release three Web programs (code-named Troika) that will export information from QuarkXPress documents in XML format, build templates for DHTML generation, and interact with XML databases to generate these dynamic pages. Finally, QuarkXPress 5 will be able to import and export HTML and PDF files (even without Acrobat Distiller).

In the meantime, these XTensions and other tools help make some of those "unreasonable" repurposing requests less of a compromise. **m**

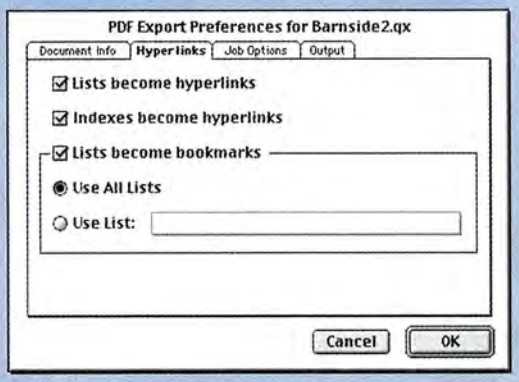
DAVID BLATNER (david@moo.com) is the author of *The QuarkXPress 4 Book* (Peachpit Press, 1998) and *The Joy of Pi* (Walker and Company, 1997).

Quark's PDF Filter

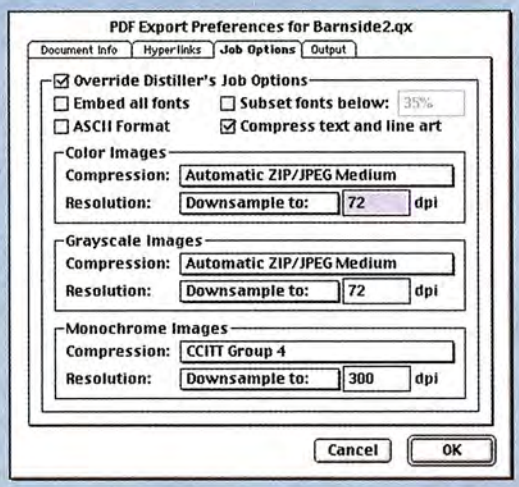
AFTER QUARK WAS accused of ignoring the PDF needs of the desktop publishing market, it responded by releasing a free XTension that automates the process of building PDF files from QuarkXPress documents. (You can download the XTension from www.quark.com.) This filter also lets you *import* PDF files—but they import as graphics and are not editable. Here's an example of how to use the filter.



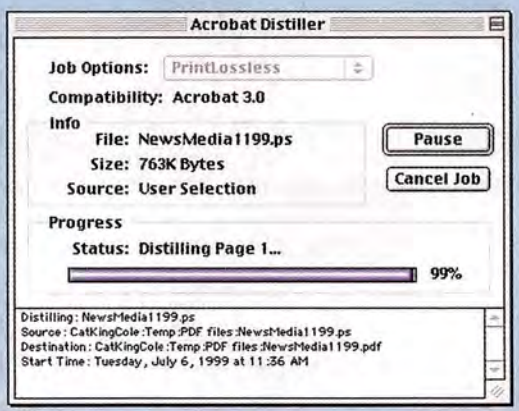
1. Select Export As PDF from the Utilities menu, and choose the pages or spreads you want to export.



2. When you click on Preferences, you can control various aspects of the job, including whether lists and indexes are converted to PDF bookmarks or hyperlinks.



3. You can always override Acrobat Distiller's job options if you have specific font-embedding and image-compression needs for your document. You can even control separation features such as registration marks and bleed by selecting the Output tab of this dialog box.



4. When you click on Save, QuarkXPress automatically writes the PostScript to disk, launches Acrobat Distiller (yes, you still need Distiller to build PDF files), and converts the PostScript to PDF format.

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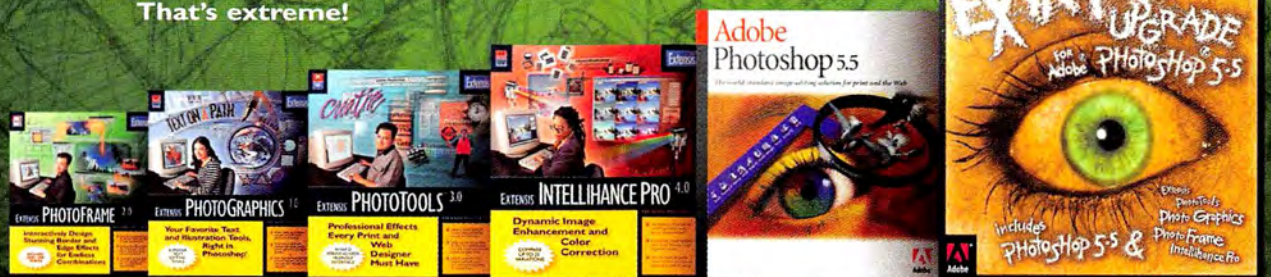

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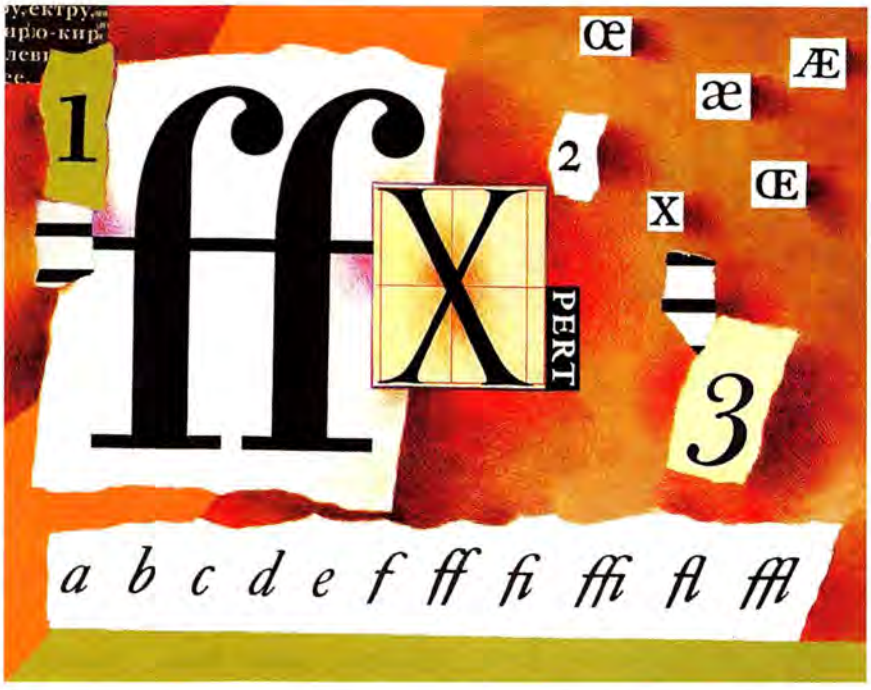
USE EXPERT CHARACTERS TO MAKE YOUR TEXT LOOK PROFESSIONAL

by Kathleen Tinkel

At no other time in history have so many people had the wherewithal to set type. As far as technology goes, this is typography's golden age. We have more power than the commercial typesetters of a decade ago: faster computers with larger hard drives; WYSIWYG software such as Adobe PageMaker and QuarkXPress that allows us to assemble whole pages with type and images in place; and access to any commercial-quality font we can think of (at a tiny fraction of the cost typographers used to pay).

One thing hasn't changed: Good typography still aims to give readers easy access to the printed word. The craft of typesetting is a never-ending quest for perfect spacing and good typographic color (a nice tweedy texture). Some of the problems that mar the graceful flow of text and impede reading are caused by a lack of appropriate characters in the fonts we use. Software is getting better at helping us solve these problems—QuarkXPress and Adobe InDesign both automatically replace appropriate letter combinations with the fi and fl ligatures, for example; and InDesign can in some cases go even further, fetching old-style figures (numerals) or small caps, so long as you're using OpenType fonts that include these characters (see "The Hope of OpenType").

For now, however, we still need to search out other solutions for at least two of the problems that plague contemporary text. One problem is the tendency of some characters—the *f* in many typefaces—to collide with their neighbors, which creates distracting blobs that not only mar the graceful flow of text but also impede reading. And the other problem is the increasingly common use of acronyms, abbreviations, and runs of figures, which create small barriers to swift reading—it's as if the reader must climb over these rectangular objects. To solve these problems, you can turn to supplemental expert, alternate, or SC&OSF (small caps and old-style figures) fonts.



STEFAN GUTERMUTH

That Obstreperous f

It's almost certain that you'll need the standard five *f*-ligatures (ff, fi, ffi, fl, and ffl) to set readable, professional-looking text. This is because the lowercase *f*—which in many typefaces is topped by a sweeping arch that bows into the next letter's visual space—fits awkwardly next to some letters, including the *l*, the *i*, and the *f* itself. This ugly collision of letter parts can distract even casual readers and make the words hard to read. Combinations with *f* are especially likely to cause problems because we use *ff*, *fi*, and *fl* frequently in English.

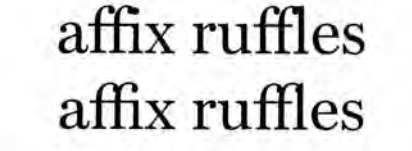
Look at what happens with Carter & Cone Type's ITC Galliard and Adobe Caslon in the examples on the next page. In each case, the serif or finial at the end of the arch bumps into the dot of the *i* or the stem of taller letters, and the crossbars are the wrong length in these combinations. Using ligatures fixes these problems. Here are a few ways to find the ligatures you need.

1. Choose a font package that includes at least five of the *f*-ligatures in the base font. Although the mainstream font companies—among them Adobe, Agfa, Monotype, and Linotype-Hell—include only fi and fl ligatures, some smaller companies make room for five *f*-ligatures. Most Font Bureau (617/423-8770; www.fontbureau.com) fonts have all the ligatures, for example. So do the

continues

ITC Galliard Without ligatures, top; with ligatures, bottom.

Adobe Caslon Without ligatures, top; with ligatures, bottom.



ITC Winchester New Some fonts offer ligatures (bottom) that you may not need. The *f* in this font behaves without ligatures (top).

FF Thesis font from FontShop (888/333-6687; www.fontshop.com); Winchester New, Founders Caslon, and Johnston from ITC (212/949-8072; www.esselte.com/itc); Adagio Didot from PrecisionType (800/248-3668; www.precisiontype.com); and Miller from Carter & Cone Type (800/952-2129). This approach narrows your typeface choices considerably, but having all the ligatures available at a keystroke (rather than in an expert set) is easier and less likely to cause the expert character ligatures to revert to the regular face (the font defined in your style sheet). It also helps ensure even spacing and saves on manual kerning.

The main drawback to using fonts with custom encoding schemes is that the wrong characters show up if you reset the text in a different font or if you exchange files across platforms.

2. Choose a font package that has a supplemental expert set available with the full set of ligatures. Most foundries produce these for their exclusive lines: the Adobe Original fonts, including Minion, Myriad, Utopia, Adobe Caslon, Adobe Garamond, and Jenson; some classical fonts from Monotype (800/424-8973; www.monotype.com), including Bembo, Centaur, and Perpetua; and Cataneo and ITC Charter from Bitstream (800/522-3668; www.bitstream.com).

The drawback to expert sets is that since kern pairs do not work from one font to another, you'll probably need to kern the imported ligatures manually to adjoining letters. If you use style sheets, there's also a risk that text will revert to the base font, so you'll have to proofread carefully just before output.

3. Choose typefaces whose *f* doesn't overhang—they don't require *f*-ligatures. Paradoxically, this could include ITC Winchester New (see examples at left), which has lovely ligatures in the base font. Other text faces with little need for *f*-ligatures include Sabon, Meridien, and Trump Medieval.

Lumps in the Text

Another impediment to well-spaced, easy-to-read text is strings of large characters, usually capital letters or figures (also called *lining figures*—the kind normally provided in standard fonts today). These are as disastrous to text as lumps in mashed potatoes, and they're common nowadays, with our frequent use of acronyms and abbreviations, dollar figures, long telephone numbers, and mixed letter-and-number expressions such as *FY1999* or *Millennium 2000*. These unyielding strings of bulky characters form dark clots in the text, which is unattractive and distracting to readers (see "Remove the Lumps"). Worse, they become barriers to easy reading. They can also cause spacing problems, forcing gaps or crowding to avoid breaking a problem term.

Get rid of such nuisances by using old-style figures for the numbers in running text and designed small caps instead of all caps for acronyms. Today's type designers provide old-style figures and small caps for fonts inspired by many historic periods, even for that quintessentially modern invention, the sans serif typeface. Berthold Formata (from Adobe), Scangraphic's Today Sans (DsgnHaus [800/942-9110; www.dsgnhaus.com]), FF Scala Sans (FontShop), and non-Adobe versions of ITC Legacy Sans (from DsgnHaus or FontShop in the United States) are among the sans serif font sets that include these useful characters.

Old-Style Figures Old-style (lowercase, nonlining) figures have ascenders and descenders like those in the text around them, and normally vary in width as do the lowercase letters, so they fit together more gracefully when mixed with text. You have a few options for incorporating old-style figures into your text:

1. Use fonts that have old-style figures with the basic character set. This is the easiest way to get old-style characters into your text, although there aren't many of these fonts. With some of its newer fonts, including ITC Octone and ITC Winchester New, ITC gives you the choice of sets with either old-style or lining figures, each with standard bold and italic variants.

2. Although only a handful of fonts, such as Monotype's Bell and Dante and Carter & Cone Type's Miller, have them, you can also use three-quarter–height figures instead of full lining figures (see "Three-Quarter–Height Figures").

3. Use fonts that come with an expert set. This solution gives you all the characters you need, including the *f*-ligatures, but means that you'll be using two fonts in your text and that you'll therefore need to proofread extra

carefully before printing the job.

4. Use fonts that come with an SC&OSF set. The main drawback to using a type family with only an SC&OSF supplemental font is that you have no access to the three missing *f*-ligatures, which are essential for many type designs that feature a dramatically overhung *f* (and useful for aesthetic reasons in many other type designs as well).

Small Caps Designed small caps were out of style for decades (except in traditional book design), but they have had a renaissance in the past few years. These are not crudely reduced versions of the standard uppercase letters—they're proportioned differently and are usually a bit wider than their larger cousins, with line weights balanced for use in text that includes both upper- and lowercase characters (see "Small-Cap Comparison"). If your software has a small-caps function, it's simply reducing the regular caps; one of the tip-offs is a kind of pinched look to the characters, along with spindly line weights that appear awkward next to all the standard characters.

Although the small caps in many fonts today are just about the same height as the lowercase x-height, they should actually be a bit taller. You may need to increase the type size of small caps by half a point or a point to make them fit more gracefully amid lowercase letters.

Small caps are useful in lieu of italics to set off book titles in text, or for acronyms of three or more letters (but you'll have to convert the text to lowercase first). Small caps make a graceful transition into standard text from a rising or dropped cap at the beginning of a chapter or article. They are also traditional for running heads and secondary titles in books.

Gently add letterspacing for small caps (that is, add space between the letters), just as you would for all caps.

The ways to create small caps are similar to the methods for attaining old-style figures:

1. Use fonts that come with an expert set that includes small caps (this also gives you the *f*-ligatures).

2. Use fonts that come with an SC&OSF set. These fonts, available from Linotype, Adobe, and other mainstream companies, should have regular caps on the uppercase keys, which makes using caps with small caps much easier.

Traditional Wisdom

Our Macs may have brought typesetting to a golden age, but for all its magical powers, the computer doesn't automatically produce professional-quality type that is both appealing to the eye and easy to read. For that we need expert characters, as well as some of the tricks of the ancient typographic trade to help us use them. **m**

KATHLEEN TINKEL monitors design, type, fonts, and other aspects of publishing from Tinkel Design in Westport, Connecticut.

The Hope of OpenType

ADOBE AND MICROSOFT HAVE been collaborating on a new cross-platform font format called OpenType, which can include thousands of characters in a single font with either Type 1 or TrueType outlines. On the Mac, Adobe's new InDesign page-layout program, expected out by the time you read this, will be the first major application to support the new format, and some new "wide" fonts are expected from Adobe and others at the time of InDesign's release.

Unlike the case with Apple's QuickDraw GX a few years ago, users will not have to choose between traditional font formats and the new one—applications are supposed to be able to use any of the formats interchangeably. Users will be able to convert existing fonts to OpenType for purposes of exchanging fonts across platforms (although this will not cure the inherent conflicts between the Mac and Windows character sets), but no utilities will be capable of merging, say, regular and expert sets to create new wide OpenType fonts. We'll have to wait for the foundries to release these at some time in the future. So it doesn't seem that OpenType will help most of us solve problems with the use of expert characters in the next year or so.

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In FY1997 we posted a $256 billion profit, followed by a $34 million loss in FY1998. But in FY2222, the 6,798 employees of Widget Company will receive bonuses ranging from $1,035 to $5,750, depending on salary and length of employment.

Remove the Lumps Text without expert characters, top; text with old-style figures and designed small caps, bottom.

ABC1234567890
ABC1234567890
ABC1234567890

Three-Quarter–Height Figures Three fonts whose figures are three-quarter–height: Bell, top; Dante, middle; and Miller, bottom.

Small-Cap Comparison A designed small cap (top right) is more graceful than a regular cap reduced to match the small-cap height (top left).

Re-create the Past

CREATE AUTHENTIC-LOOKING ARTWORK USING VINTAGE IMAGES AND PHOTOSHOP'S LAYERS

by Jackie Goodman

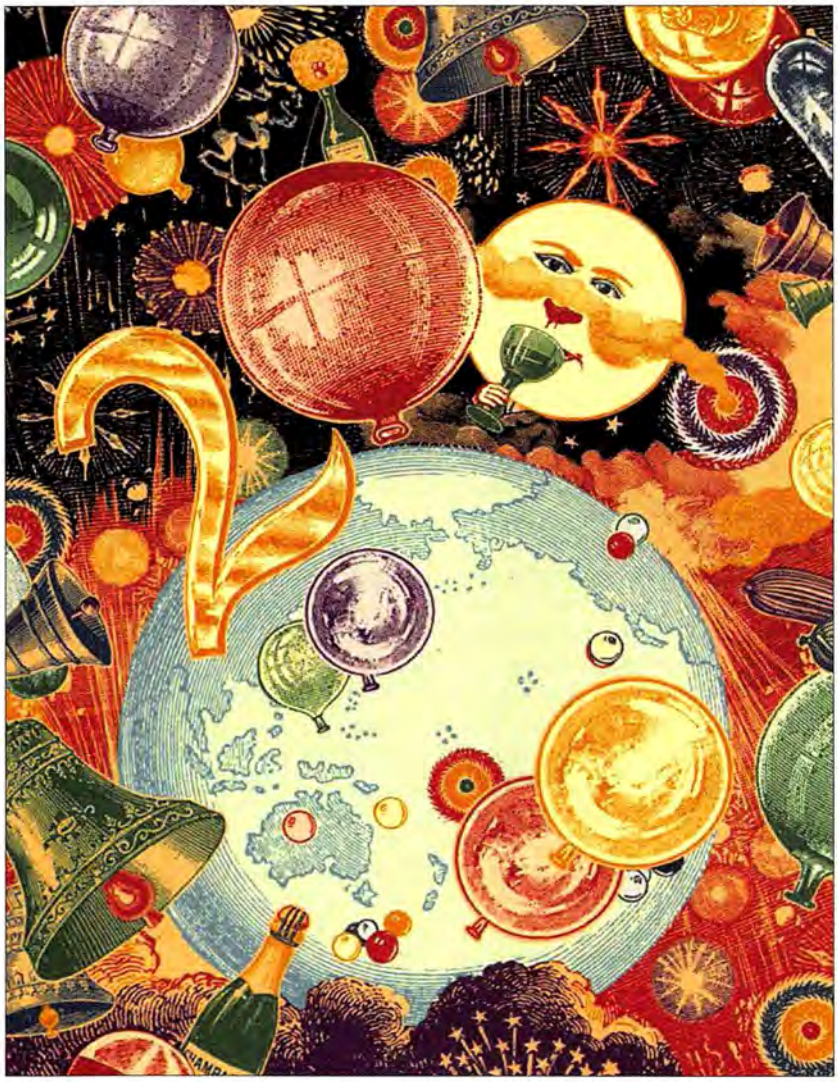
Creating authentic-looking period pieces requires the right touch—details, color, and images must all add to the effect. Graphic artist and illustrator John Craig creates collages with that in mind. He combs antique stores and estate sales for vintage wood engravings, photos, and illustrations. His work goes further than appearing nostalgic; he uses digital tools to mimic old-fashioned production techniques.

Craig started making vintage collages years ago without any help from computers. But the work process he established then still affects how he works with a digital system. In the beginning, he used a stat camera to photograph engravings and images, pasted them up by hand, and colorized the whole image with Pantone film overlays. He also experimented with different ways to use film. For instance, he noticed that using the acetate side of the film gave his collages a cream-colored, aged-looking background. Now that digital tools are so powerful, he includes them in his process but still relies on some of his original hands-on techniques. He has also kept his original color palette so that his digital creations maintain that nostalgic feel.

Craig creates each composition manually, scans it, and colorizes it in Photoshop. He converts his scan to bitmap format, restoring the image to line art while preserving its details. Converting an image to a bitmap lets him later selectively apply color by lassoing only those details in the original line art that he wants to colorize.

For this project, Craig used a Canon CJ10 scanner/printer/photocopier and Adobe Photoshop 5 running on a Power Mac G3. You can see more of his work at www.theispot.com/artist/craig. m

JACKIE GOODMAN is a *Macworld* design associate.



Countdown to 2000 Craig uses a palette that includes only seven dark colors, but his detailed application of color gives the piece beauty and impact. His lasso-and-fill technique, with its sometimes painstaking pixel-by-pixel selection, preserves the detail in the original images. His patience pays off, as does his artful use of turn-of-the-century images to provide a nostalgic look at *this* century's passing.

1 For this composition, done for a travel magazine's survey of worldwide millennium celebrations, Craig began with illustrations taken from antique novelty and party-supply catalogs. He cut out the images, sized them on a photocopier, and created a collage.

2 Setting his scanner to ensure high contrast, he scanned the image and converted it to a bitmap and then back to gray scale for editing. He used Photoshop's pencil and lasso tools to clean up stray lines.

3 In Photoshop, Craig began with a parchment color as the background, placed the scanned line art on another layer, and chose Preserve Transparency so that Photoshop would apply color only to black pixels within the areas he would be selecting. He then created a third layer for his highlight colors. Using the line-art layer as a guide, he traced various items (such as the balloons) in the collage with the lasso tool and filled them with light colors. He derives some of these tints from the darker colors in his palette and some from secondary colors, giving tone and depth to the highlights without competing with the richness of the darker colors.

4 Craig then filled all noncolored areas with a gold tone. Note that the cream base is still visible in the moon face and selected fireworks centers.

5 Next Craig colored the entire line-art layer red (using Fill); he then selectively colored the balloons, bells, fireworks, and portions of the background with the darker colors in his palette. To select each item, he used the lasso tool, and he simply used the paint bucket for shapes that were fully outlined in the original engraving. Craig wanted a deeper background tint, so he created a new layer and gave it a butterscotch fill. Finding that a bit too dark, he added another layer of white with an opacity of 50 percent.

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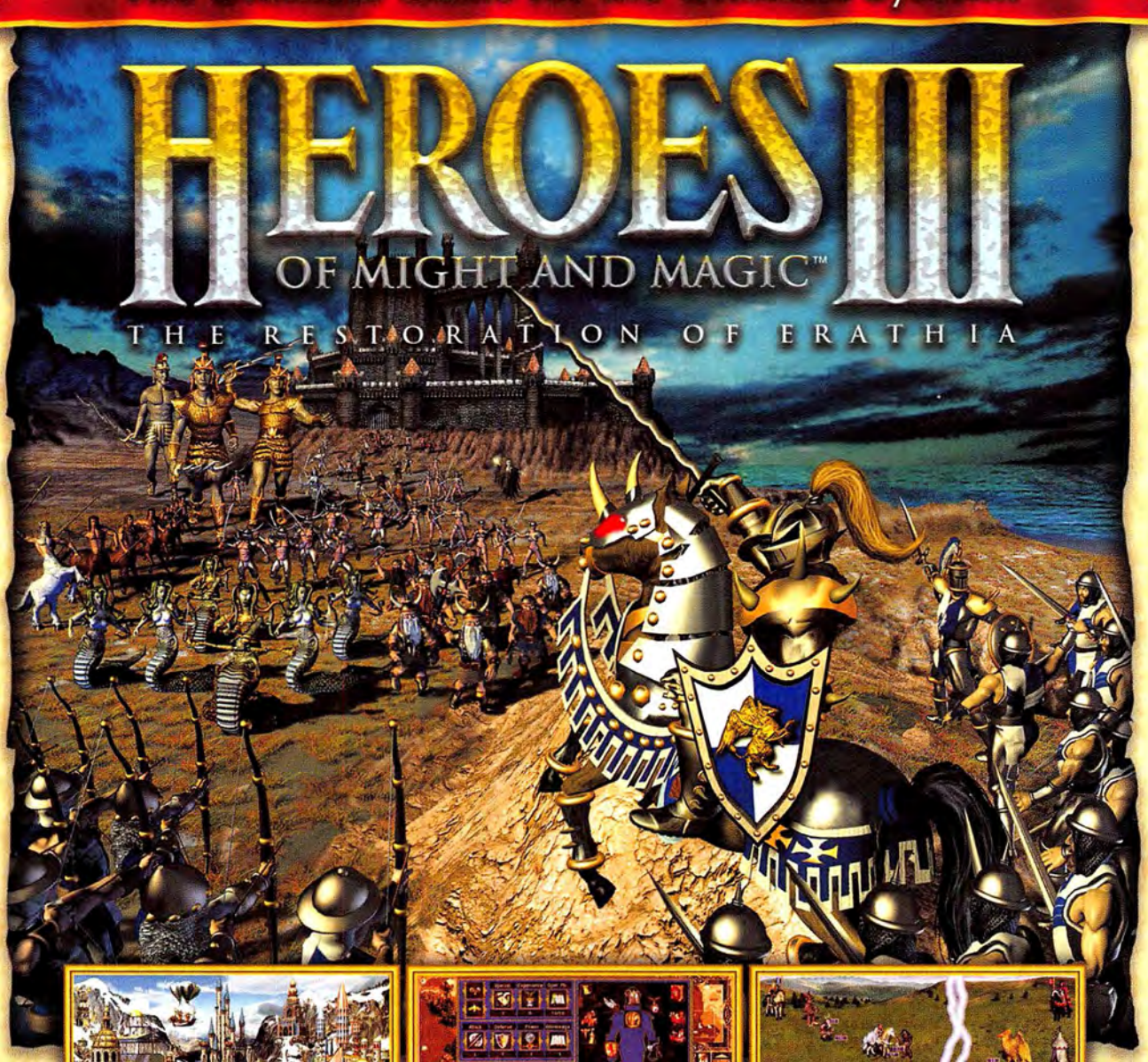

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DR11308

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- USB compatible with iMac
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DTP0694

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- 1536 x 1024 ppi resolution
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The Power Mac G4 runs at over a gigaflop — a billion floating-point operations per second! . . . and a full 100% to 200% faster running Photoshop than the fastest Pentium III-based PC!*

*Based on Apple internal tests

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- 17" Trinitron CRT (16" vis.)
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Item #MON1044

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- Translucent Bondi blue!
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New Low Price! 10ppm Color!

Only $399.95! PR14811

- 12ppm black; 10ppm color
- 1440 x 720 dpi
- Optional networking

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- 2" color LCD • 3X optical zoom
- 2.11 million pixel resolution
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Nikon

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Ideal for Power Mac G3!

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- Internal & external connectors
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adaptec

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PR14684

- USB compatible only
- 9ppm blk; 6.5ppm clr
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iMac USB Hubs

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Available in all 5 colors!

The 333MHz iMac blows the doors off anything else on the information superhighway!

iDock 2, from CompuCable, expands iMac's connectivity. iDock is a swivel base with an integrated 4-port USB Hub, a 3.5" Floppy Drive, 1 ADB Port, plus 2 Apple Serial Ports. iDock is molded in "Ice" to match any iMac perfectly.

Includes 3.5" Floppy Drive! NEW!

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128MB SDRAM
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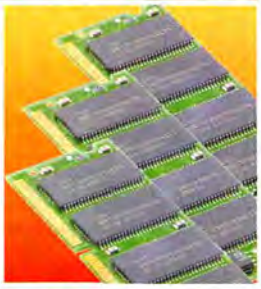

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Broderbund

A $29.95** Value

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- Designed specifically for use with USB
- Fits the natural shape of your hand, ideal for right or left-handed users
- Manufacturer's 5-year warranty

USB

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Only $299.95!

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- 11ppm black
- 8.5 ppm color
- PhotoRet II technology

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Black Ink Cartridge: 67208 ....$29.99

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for your iMac G3! only $1199† ea.

See below for details.

Epson • Connectix • CompuCable • Farallon • Microsoft • XLR8 • Intuit

- 333MHz G3 Processor
- Built-in 15" Color Monitor (viewable size: 13.8")
- 32MB (256MB max.)
- 6.0GB hard drive
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- 6MB of Video RAM
- Built-in 24X max. variable CD-ROM drive
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- Built-in 10/100 Base-T Ethernet
- 2 USB Ports
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Grape: item #CPU1337
Lime: item #CPU1338
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USB

Zip Disk sold separately.

Iomega 100MB Zip Disks
as low as $9.95! each, in 10-pk qty. #BND3314

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Only $109.99! DEP1734

- Connects your iMac to LocalTalk printers and other Macintosh computers
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Only $179.95!* after rebate

EPSON

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Other color covers available for only $14.95 each!

Item # PR15063

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- 6ppm blk; 5ppm clr • USB/Mac serial compatible

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$29.95 a value!**

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USB Twin Serial Adapter

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- Supports up to 1Mbps per port
- Compatible with Apple StyleWriters and Personal LaserWriters

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3Com Palm V Connected Organizer

Only $399! BN6356

- Clearer backlit display
- Holds up to 5 years of appointments!

Palm IIIx Connected Organizer BN6334 ..... $329

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1.3 MEGAPIXEL!

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- 1.3 megapixel resolution
- 3X optical/2X digital zoom
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OLYMPUS

SupraExpress V.90 Modem

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DIAMOND COMMUNICATIONS DIVISION

Capable of receiving data up to 56Kbps. Actual send and receive speeds may vary.
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HP LaserJet Printers

HP LaserJet 2100M $779.95! Item #PR14691 Lease It! for $24/mo.§

HP LASERJET 8000N

Only $2489.95!

Ask for item #PR13724. Lease It! for $72/mo.§

- Prints 24ppm • 1200 dpi max. resolution
- 133MHz RISC processor

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HP LASERJET 2100M

- Prints 10ppm
- 1200 dpi resolution
- HP PostScript Level 2
- LocalTalk connectivity

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HP LASERJET 2100 SERIES BLACK TONER CARTRIDGE Only $109.95 ea. Item #PA1871

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HP LASERJET 4050N

Only $1399

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NEW!

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- 1200 dpi maximum resolution
- 100MHz RISC processor
- Ethernet 10BaseT/10Base2 + Localtalk

HP LASERJET 8100N

- Prints 32ppm • 1200 dpi

Item #PR14315 .....Lease It! for $82/mo.§ $2809.95

HP COLOR LASERJET 8500N

- Prints 24ppm blk/6ppm color • 600 dpi

Item #PR14213 .....Lease It! for $184/mo.§ $6359.95

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- Prints 16ppm • 1200 dpi • Prints 3" x 5" thru 11" x 17"

Ask for item #PR13443 .....Lease It! for $58/mo.§ $1999.95

VIEWSONIC P810 21" MONITOR

ViewSonic on top

- 21" (20" viewable) screen
- .25mm dot pitch
- 1600 x 1200 resolution @ 76Hz
- Manufacturer's 3-year warranty

Only $979.95! Item #MON0668

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Free CD-R 5-pack when you buy a 100MB Zip Disk 10-pack! Limit one per customer. While supplies last. Item #AAA1017.

Only $8.99! ea., in 60 pack quantity Item #BN6205

100MB Zip Disk 10-pack BN5265 ..... $99.95

NEW VERSION! FILEMAKER PRO 5

- Microsoft Office Integration
- Excel Import and File Conversion
- Enhanced Instant Web Publishing
- Greater Security

Upgrade only $139.95! Item #UPG1102

FileMaker

NEW VERSION! NORTON UTILITIES 5.0

- Prevents computer disasters
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- Helps prevent crashes, and speeds recovery from emergencies.

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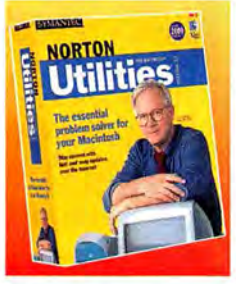

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- 74 min.
- 650MB
- Jewel cases included

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*10-pack before manufacturer's mail-in rebate: $21.99. Download coupon at www.warehouse.com/rebate/ imation or ask for coupon #AA1590. Limit 3 rebates per name or mailing address. Offer expires 12/31/99.

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- ATI Rage Mobility 2D/3D Graphics Accelerator with 2X AGP
- USB port • 4MB Video Memory
- Lithium-ion battery—up to 6 hours of use!

Only $1599! each
LeaseIt! for $47/mo.§

300MHz!

Additional Lithium-Ion Battery Item #ACC3807 ..... $129

Blueberry: Item #CPU1463
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The fastest Apple PowerBook G3s Ever!

These PowerBook G3s—with speeds up to 400MHz—run up to twice as fast as comparable Pentium® and Pentium II processor-based notebooks, based on BYTEmark integer index processor scores! ***What's more, the new Apple PowerBook G3s are now almost 20% thinner and nearly 2 pounds lighter than their predecessors!***

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Almost 20% Thinner!
Nearly 2 lbs. Lighter!

333MHz PowerPC G3 processor/64MB SDRAM/4.0GB IDE HD/24X max. variable CD-ROM/56K Modem/14.1"Active-Matrix Display/512K Backside level 2 cache/8MB SDRAM Video Memory

ASK FOR ITEM #CPU1359. ..... LeaseIt! for $73/mo.§ $2499

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32MB iBOOK G3 MEMORY UPGRADE

Upgrading your memory is the most cost-effective way to increase the performance of your system!

32MB iBook G3 Memory only $99.95! each

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POWERBOOK G3 DVD-VIDEO KIT

- DVD-ROM drive reads CD-ROM discs up to 12X, DVD at up to 1.5X
- DVD-Video PC Card
- DVD player software
- Works with 1998 PowerBooks

Only $499.95!

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While supplies last.

NEW!

VST Zip 100MB Drive

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For New G3 PowerBooks (CPU1359, CPU1360)

- Hot swappable — no need to sleep, shut down, or restart.

NEW!

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Only $59.95! each AC19972

Call for other cases!

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As low as $139.95! ACC3728

- Lithium-Ion

ACC3728 (fits new 1999 models) $139.95
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56K* V.90 FaxModem PC Card

Only $149.99! DMD3824

- K56 Flex and V.90 technology
- Send, receive, view, print, and manage faxes right from your PowerBook

*Capable of receiving data up to 56Kbps. Actual send and receive speeds may vary.

FireWire 2 Go

Add FireWire to your PowerBook G3!

Only $199! DRI3505

NEW!

Fits in CardBus slot

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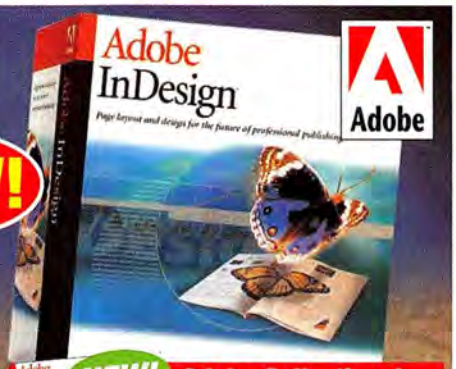

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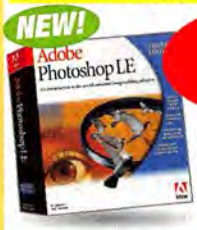

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How fast is the new G4? This fast: The Power Mac G4 is the fastest desktop computer ever built to run graphics applications like Photoshop, InDesign and QuarkXPress. The G4 is actually years ahead of its time thanks to new supercomputing technologies like vector processing, data stream prefetching and 128-bit data paths. In fact, the 500MHz G4 is a stunning 2 to 3 times faster than PCs based on the fastest Pentium III processor.

So if you like the Pentium-crushing speed and the convention-crushing design, call MacMall today. The new G4 is just what you need for 3D rendering, advanced voice recognition and digital video production.

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Outrageous power.

- PowerPC G4 processor running at 400, 450 or 500MHz
- Velocity Engine vector processing unit
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- Supports up to 1GB of low cost, high performance PC100 SDRAM
- 1MB of backside level 2cache running half processor speed
- 100MHz system bus
- 64, 128 or 256MB RAM
- Supports up to 1.5GB of high performance PC100 SDRAM
- 10, 20 or 27GB Ultra ATA hard disk
- 32X CD-ROM drive, or DVD-ROM drive, or DVD-RAM drive
- 100MB Zip drive (some configurations)
- Built-in 10/100BASE-T Ethernet networking; optional Gigabit Ethernet

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- Two 400Mbps FireWire ports
- Two USB ports for keyboards, mice, printers—up to 127 devices at once
- 10/100Base -T Ethernet
- Optional AirPort wireless networking card
- Two additional internal drive bays
- Three 64-bit PCI slots

Great graphics and video features.

- ATI RAGE 128 Graphics Accelerator with 16MB of SDRAM graphics memory
- Support for up to 1,600-by 1,200-pixel resolution at 32 bits per pixel (millions of colors) and up to 85Hz refresh rate
- Hardware acceleration of graphics and video
- Advanced integrated triangle setup engine
- Single-pass multi-texturing design

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- Translucent silver and graphite case
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New Power Mac G4s!

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Order#	#51578	#51579	#51580
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Airport!

The Power Mac G4* is ready for wireless networking– the first desktop computer with this capacity!

#49221	AirPort Hardware Access Point	$299.99
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* Works with the 450 and 500MHz.

The Power Mac G4 comes with 2 (400MHz) or 3 (450 & 500MHz) FireWire ports for connecting digital video cameras, hard disk drives and high-speed multimedia peripherals!

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All models include:
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- 512K backside level 2 cache on processor module
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- 66MHz system bus
- Integrated floating-point unit and 64K on-chip level 1 cache (32K data and 32K instruction)
- 32MB of SDRAM; two SODIMM slots support up to 256MB
- 64-bit memory bus

Connectivity
- Two high speed Universal Serial Bus (USB) ports (12 Mbps), which support USB devices such as keyboard, mouse, printer, storage devices, and USB hubs

Storage
- Internal 6GB IDE hard disk drive
- Internal 24X (maximum) CD-ROM drive

Communications
- Built-in 10/100BASE-T Ethernet
- 56Kbps modem supports K56flex and V.90 standards

Multimedia Capabilities
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- ATI RAGE PRO TURBO accelerated 2D/3D graphics controller and 6MB video memory
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The iBook's case is a rugged polycarbonate, built to survive life in a back pack. It has no doors or latches to break. And it's easy to charge. When it's time to reenergize, just plug it in until the light turns green. Simple.

Outrageous performance.
- PowerPC G3 processor running at 300MHz
- 512K backside level 2 cache on processor
- 32MB of SDRAM; supports to 160MB RAM
- 3.2GB IDE hard disk drive
- Built in 24X CD-ROM drive

Connectivity.
- One 12-Mbps Universal Serial Bus (USB) port
- Built-in 10/100BASE-T Ethernet
- Built-in 56K modem
- Optional AirPort wireless networking card

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- Lithium-ion battery
- Up to 6 hours of battery life

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- ATI RAGE Mobility graphics controller with 2X AGP
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- 12.1-inch (diagonal) built-in TFT SVGA active-matrix display
- 800 x 600 resolution with millions of colors
- 16-bit stereo sound output minijack
- Single built-in speaker

Compact size.
- 13.5" x 11.6 " x 1.8" average; depth ranges from 1.24" to 2.06"
- 6.6 pounds

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- Microsoft Internet Explorer
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- World Book Encyclopedia
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#49221	AirPort Hardware Access Point	$299.99
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G3 PowerBooks up to an incredible 400MHz!

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- 64MB RAM; 2 SO-DIMM slots support up to 384MB RAM

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- 24X CD-ROM (#49517) or DVD-ROM drive (#49518) for use in expansion bay
- Removable 1.44MB floppy disk drive for use in expansion bay (sold separately)
- Hot-swappable expansion bay supports CD-ROM, DVD, Zip, SuperDisk or hard drive

Expansion & Networking Ports
- 2 USB ports, SCSI port, power adapter port
- Built-in 10/100BASE-T Ethernet
- RJ-11 modem port, 4Mbps Infrared (IrDA) port
- Support for a Zoom Video PC card
- PC Card Slot for one Type I or Type II card

Graphics, Video & Sound
- 14.1 inch (diagonal) display features built-in TFT XGA active matrix display, supporting millions of colors at 1024 x 768 resolution
- 8MB SDRAM video memory; supports millions of colors on external displays up to 21"
- 2D/3D graphics, through integrated ATI RAGE LT Pro video controller
- S-Video port
- 24-bit video output port (VGA-style connector)
- 16-bit CD quality stereo input/output
- Two built-in stereo speakers
- Internal omnidirectional microphone

Portability
- Kensington cable lock slot and keyboard lock
- Includes one Lithium-ion battery for up to 5 hours of normal use; supports two batteries for as much as 10 hours of use (depending on configuration and usage)

Software (Pre-installed)
- Mac OS 8.6, Apple File Synchronization, Apple Location Manager, Microsoft Internet Explorer, Microsoft Outlook Express, Netscape Communicator and FAXstf

Size and Weight
- Width: 10.4"; Height: 12.7"; Depth: 1.7" long Weight: 5.9lbs. (w/CD-ROM + battery installed)

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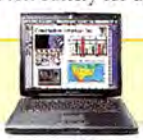

Order	MHz	RAM	HD	Cache	Drive	Modem	Display	Price	Lease
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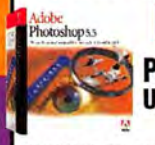

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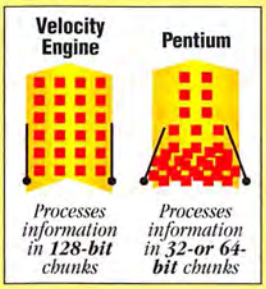

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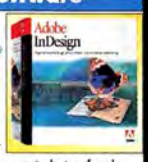

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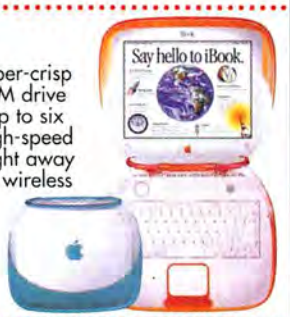

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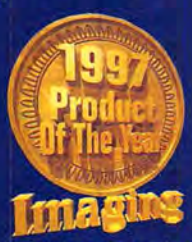

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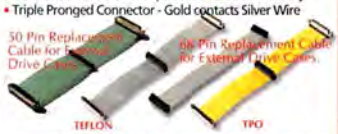

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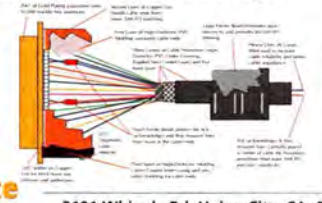

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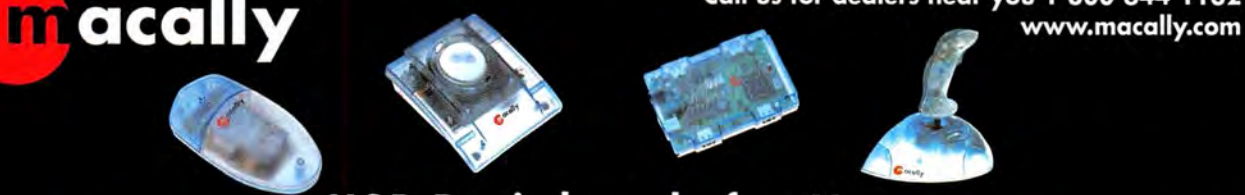

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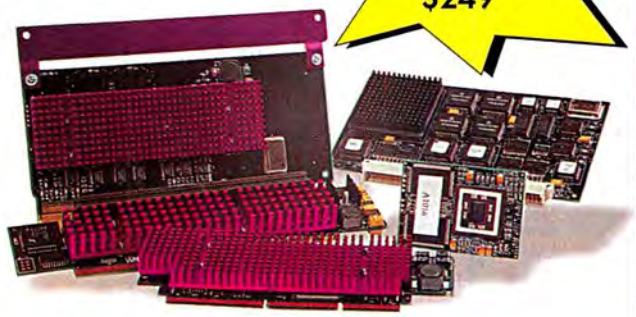

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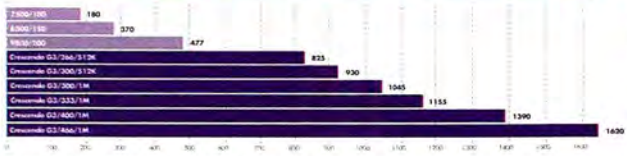

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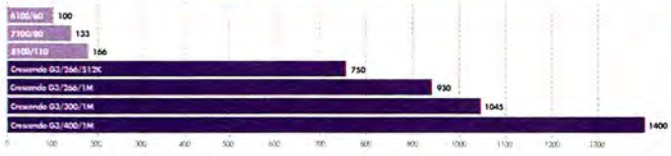

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The Desktop Critic

by David Pogue

The Repeal of Moore's Law

THE CHIPS ARE FAST ENOUGH. WHEN WILL THE REST OF THE MAC CATCH UP?

IN A 1965 SPEECH, COMPUTER scientist Gordon Moore, who shortly thereafter became a founder of Intel, predicted that personal-computer speeds would double every year. That impressive observation, soon dubbed Moore's Law, surprised millions of people, prepared the PC-buying world for the "whatever you buy today will be obsolete next year" syndrome that dogs us to this day, and became a favorite of journalists everywhere. Writers trot it out to justify whatever argument they happen to be making, from "Buy the stuff reviewed in our magazine" to "Apple is dead."

Get It Right

But believe it or not, Moore's Law is malarkey. First of all, we didn't even get the quote right. Moore wasn't talking about computer *speed* doubling at all; he was talking about the *number of transistors* on a typical chip, which isn't necessarily related. (For that matter, he didn't actually say that the doubling would take place every year; he really said "every 18 to 24 months.") Second, even if we had understood it right, Moore's Law wouldn't be accurate anyway. The first Mac, in 1984, ran at 8MHz; if that speed had doubled every 18 months, we would now be scooting along on 8,192MHz PowerPC chips that would melt right through our desks and straight on down to China.

Instead, the state of the Macintosh art today is a 400MHz PowerPC G3 chip. Now, the following may shock you, so I hope you're sitting down: I think that today's chips are fast enough. I'm not one of these people who scans the Mac rumor Web sites every week looking for news of the G4, G12, or G28 chip; my Mac scrolls, displays graphics, and totals spreadsheets instantaneously. I can't imagine why anyone would want to pay more for a faster chip.

I'm not saying that I think *Macs* are fast enough—I'm saying that the *chips* are fast enough. There's a big difference. For example, ten years ago, today's Macs would have been considered unimaginably quick. (Remember the Mac IIx, ten times slower than today's Power Macs? This very magazine called it "wicked fast.") And yet, consider how many times every day you wind up just sitting there waiting for something to happen: every time you launch a program, turn file sharing on, switch your AppleTalk connection, dial the Internet, wake up your computer from sleep, or—this is the big one—start up the computer. These and many other bottlenecks make a mockery of our hopes that faster processors will help us get our work done sooner.

Bright Ideas

Fortunately, as the computer industry heads into the year 2000, a few bright minds have begun to discover that software can compensate for such bottlenecks. These clever programmers are making it clear that to get faster Macs, we don't have to wait, like sitting ducks, for the next generation of PowerPC chips.

For example, programs like SpeedStartup (Casady & Greene) and StartupDoubler (shareware) memorize your extensions, shaving 30 seconds or more off every start-up. The iBook's new Save And Shut Down command is equally brilliant: according to Apple's prerelease documents, it memorizes the current status of all your open programs. When you turn on the iBook again later, you're taken directly back to whatever you were doing, bypassing the entire start-up and document-opening sequences. Any program (such as Intuit's Quicken and Palm Desktop) that attempts to autocomplete your typing is also a godsend.

Also doing remarkable work in SpeedSmart Software is, of all companies, Microsoft. Because the company's gigantic applications may never actually run quickly, they compensate by saving us time in other ways. Classic example: a single click on the glorious AutoFill icon on the Internet Explorer tool bar tells the application to fill your name, address, phone number, and other repetitive information into the blanks on any Web page. Similarly, when you save a document, Word proposes naming the file after the first line of the document ("November Meeting Agenda," for example) instead of "Untitled." You save ten seconds each time it guesses right.

Only if such not-so-artificial intelligence blossoms in our everyday software (and in the Mac OS) will we ever catch up to the speed gains promised by Moore's So-Called Law. Otherwise, we'll continue to suffer from the effect described by *Pogue's* Law: any extra speed introduced by faster chips is soon offset by increasingly bloated software. **m**

DAVID POGUE (www.davidpogue.com) is the author of the upcoming *The iBook for Dummies* (IDG Books Worldwide, 1999).

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