

AUGUST 1996

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Mac User

**SNEAK
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SYSTEM 8

EXPOSED

**How Apple's Copland
Operating System Will
Transform the Mac**

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Navigating the
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System 7.5 Update 2.0 from Apple Computer. Now you can get the most from your Mac with Apple's free update for System 7.5 users. This update will improve overall stability and performance and, if you use Virtual Memory on your PowerMac™, start your applications up to four times faster than before.

Now you can download Microsoft's Internet Tools and discover the new Internet capabilities of your Mac. Free.* Microsoft's continued commitment to the Mac means you'll be browsing, creating, and accomplishing more than ever before. To obtain your Internet Tools, and

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the System 7.5 Update 2.0, please visit [//www.microsoft.com/macoffice/](http://www.microsoft.com/macoffice/). Or to order a free Microsoft Empowerment Pack for the Mac, which includes a CD-ROM with the software listed above plus a special offer on RAM from Kingston, Technology call 800-469-6520 Dept. MCA.

Microsoft

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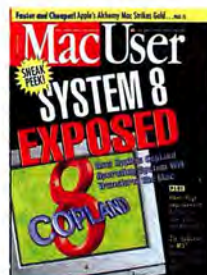
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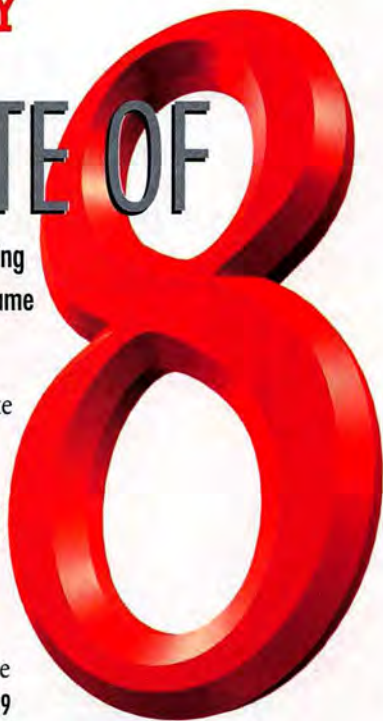


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OS 8 will be the first ever complete rewrite of the Mac operating system, and Apple can't afford any mistakes. Although pieces of 8 will appear earlier, the full release won't arrive until next year. But our sneak peek at the state of 8 indicates that 8 might be worth the wait. By Henry Bortman / 69



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MacUser (ISSN 0884-0997) is published monthly by Ziff-Davis Publishing Company, L.P., One Park Avenue, New York, NY 10016. Editorial Offices: 950 Tower Lane, 18th Floor, Foster City, CA 94404. Telephone: 415-378-5600. U.S. subscription rates are \$27 for 12 issues, \$45 for 24 issues, and \$62 for 36 issues. Additional postage for Canada: Add \$16 per year to the U.S. rates for surface mail. Single-copy price is \$3.95 (Canada, \$4.95). Canadian GST registration #R-140496720. Canada Post International Publications Mail Product (Canadian Distribution) Sales Agreement No. 278521. POSTMASTER: Send address changes to *MacUser*, P.O. Box 56986, Boulder, CO 80322-6986. Periodicals postage paid at New York, NY 10016, and at other mailing offices. Printed in the USA.



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POSTMASTER: Send address changes to *MacUser*, P.O. Box 56986, Boulder, CO 80322-

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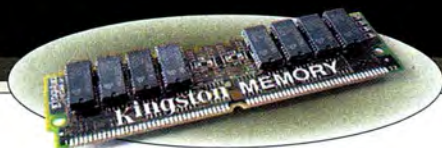
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MacUser January 1995

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LETTERS

Internet Angst

I CAN'T BELIEVE what I'm reading ("Internet Agonistes," May '96, page 21)! Tell people what they should or shouldn't put on the Web? Classify personal pages with a "mark" so they can be avoided? Why not just turn the whole thing over to Microsoft or the government and forget that we ever had a second chance at true democratic expression in the last bit of the 20th century?

David Showalter
via the Internet

I DISAGREE WITH Pamela Pfiffner's point about personal Web pages tending to "clog up the works." Pfiffner might just as rightly rail against commercial pages that waste bandwidth. And there is more than a little arrogance in the suggestion that *MacUser's* Web pages serve the public good more than some individuals'. We don't know what is going to become of the Web, but, please, God, don't let it be strictly business.

Mark Justice Hinton
MJHinton@aol.com

YES, BLACK PAGES and blue ribbons don't themselves do anything, but they can serve to get people to learn about the issues and tell them *how* to take action (most black pages and ribbons contain links to organizations such as the EFF, the VTW, and the ACLU).

Mike "Sunburn" Byrne
byrne@cc.gatech.edu

One Bad Apple

WHAT THE HELL is wrong with Apple? A \$69 million loss last quarter and now a \$700 million loss this quarter!?! It boggles my mind to

think that a company that revolutionized personal computing could let this happen. The problem, as I see it, is that Apple is trying to be all things to all people. I defy anyone to explain Apple's over-bloated product line to me.

With at least 35 Mac models on the market, each aimed at specific market segments, it just confuses the hell out of average consumers. Windows users don't have this market strategy to deal with. You want a PC? You choose a 486- or Pentium-based system, and all that's left is deciding what CPU speed you want.

Brent Millar
ON, Canada

A Call to Arms

MAC USERS, are you aware that MCI doesn't care about us? It now has a promotion for PC users only that gives them five free hours of Internet use per month. It has no plans to offer the same service to Mac customers at this time. I was told that even though Mac users can sign up for the full Internet service, it is impossible to sign up for the free connection.

What gives? A big telephone company that can service only some of its customers is not worth giving my long-distance business to. AT&T also has the five free hours of Internet service for PC users only, but it should be offering it to Mac people by June. Are we to be left out of the telephone companies' plans for giving service to the Internet? Call your long-distance company and complain.

Katherine Nell
Philadelphia, PA

System Failure

I CANNOT UNDERSTAND how you can praise System 7.5.3 so highly ("New OS Update to the Rescue," May '96, page 25). Our Quadra 840AV has only minor trouble with it, but it rendered our Power Mac 8100/110 virtually unusable. Many programs didn't work, networking was



Open Folder

Reader Andy Baird mistook as rank ribaldry our May mention of Dr. Fiorella Terenzi's *Invisible Universe* CD-ROM. Asked Andy, "Would you have published a review that read, 'This title will really get your juices flowing, as studly Carl Sagan struts his stuff in a galactic setting. You may even be able to tear your eyes away from the gorgeous hunk of manhood on the screen long enough to absorb some of the program's educational content.'?" Well . . . no, but only because Carl doesn't strut. Fiorella, on the other hand, comports herself like Aaron Spelling's dream vision of a female astrophysicist. This is cosmic camp, folks, but it's still darned informative.

Several readers have taken to judging our book by its cover. One "concerned reader" said that our covers "look not just stupid, but frickin' stupid." Well put. Reader Brian Bollard thanked us and encouraged us to "keep up the good work," adding parenthetically, "starting from the inside cover." And Brad Pack said our covers remind him "too much of DOS." Ouch! Tough crowd. Tough crowd. It seems if it were up to these folks, *MacUser* would have an obituary column, complete with the names of their least favorite designers. Look, people, don't think for a minute that you can goad us into revealing our top-secret plans for a scratch-and-sniff September cover.

Joseph Loutzenhiser graciously informed us "why the media continues to pick on Apple. It's quite simple if human psychology is taken into account. People don't like those who put on airs. Apple's marketing of the Mac has given it great snob appeal." Great snob appeal? Just when we thought we were a bunch of cretinous sexists who lewdly insult female scientists and whose magazine covers seem to remind some people of Army training manuals — you can't imagine what a relief it is to find out we're actually highbrow elitists. Speaking of human psychology, for our next session, could we ponder the lemminglike behavior that has long pervaded the community of Windows users?

WRITE TO LETTERS

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unstable, and printer selection became impossible. This situation did not change when we turned off all foreign extensions, nor did Norton Utilities find anything wrong. With Speed Doubler installed, the machine wouldn't even start up.

As a result, I have deleted the System Folder and reinstalled System 7.5.1. Sorry, guys, but you got a little too excited this time!

Markus Neumann
via the Internet

YOUR POSITIVE REVIEW of this update convinced me to download and install it. I installed it on three computers — a Power Mac 8100/100, a 5200, and a PowerBook 540c. The 8100 slowed down, the 5200 wouldn't run, and the PowerBook now gives an "error 8" message whenever it wakes up.

A retrospective suggestion: Apple should have included a "de-install" option.

J. A. Novack
jnovack@ctc.csustan.edu

YOU CLAIM THAT "If you're cursed with frequent visitations of dreaded Type 11 system-crash messages, redemption is at hand." But since installing System 7.5.3 on my AV Power Mac 8100/80, I have been cursed with nothing but Type 11 system-crash messages.

James Chamberlain
via the Internet

YOU REPORT THAT "Previously Open Transport ran only on PCI-based Macs. With System 7.5.3, it's available on all Macs that have 68030 processors or better." This information is incorrect. Even under System 7.5.3, Open Transport is still not available for the desktop 5200-, 5300-, 6200-, and 6300-series Macs.

Jim Jacobson
jacobson@nb.net

According to Apple, most users who follow the installation instructions to the letter have been able to successfully install and run System Update 2.0. For a smooth installation, make sure that, prior to installing the update, you run Drive Setup to update your drivers. In addition, you need to run Disk First Aid to correct any file-corruption problems that may exist on your disks. If all else fails, call 1-800-SOS-APPLE; Apple's tech support claims to have been able to resolve the majority of customers' problems. Open Transport 1.1.1, which will fix known bugs in version 1.1, including those that prevent it from running on 5200-, 5300-, 6200-, and 6300-series Macs, should be available in June. Check the usual online sources. / HB

Mac to the Future

YOUR POWERPC PLATFORM article ("The Mac of the Future," May '96, page 78) left me wondering who is going to buy these machines. Neither UNIX nor OS/2 nor even Windows NT has had a significant impact on the general-purpose-computer market. I can't see how running these operating systems on the Mac is going to do anything for Apple. After all, who wants a hardware platform more complex and expensive than the old PCs, just to flip-flop between obscure operating systems?

The product that has taken the market by storm is Windows 95. As a technician who works on hundreds of Macs and PCs for a large corporation, I'll tell you that Windows 95's interface is nearly identical to the Mac OS⁹ and is simpler and easier to service than the horribly complex System 7.5.3. Wouldn't Apple be better off patching the new Copland to run on Intel-based computers and then modifying Macs to run Windows 95?

Paul M. Williams
pmw123@aol.com

YOUR ARTICLE "The Mac of the Future" was excellent. Finally, PPCP information I could sink my teeth into.

Keep up the great work.

Michael Sohaski
michael@sedona.net

The PageMiller's Tale

I WAS SURPRISED that you gave Adobe PageMill four mice (see review, March '96, page 45). At the end of the review, you outlined all the problems that caused me to put it in the Trash. I suppose it is a fine application for someone who doesn't know HTML, doesn't want to, and doesn't have fussy clients to please. I do know HTML, and I was horrified to have my code re-created, my graphics altered, and a whole new directory structure built on my hard disk.

As an application for serious development it doesn't really interest me. At minimum, an HTML development tool should allow for customization, simply to keep up with the constantly changing nature of the spec. And if documents require tweaking in a text editor later, what's the point of using it? To date, I haven't seen an HTML editor without problems, but one that makes erroneous assumptions about the limits of control I might want or need is just wasting space on my hard disk.

Elaine Froehlich
Providence, RI

Caught with Our Browsers Down?

PERSONALLY, I THINK Netscape Navigator is great software and its stability is much better than you described (see review, May '96, page 42). True, it can cause lots of crashes with earlier versions of Open Transport (Apple's problem). And I am unhappy about the late release of Java support for the Mac, but then, that's Sun's problem for not releasing the Mac Java interpreter. I really hope Netscape can maintain its dominance on the Internet. Do you really want to see Microsoft dominating the Internet too? God forbid!

Douglas Gong
via the Internet

Quasimodem

YOUR ARTICLE "ISDN Made Easy" (May '96, page 29) strengthens my conviction that there's a lot of confusion over ISDN modems. This article referenced products from both Farallon and U.S. Robotics in a way I believe was especially unfair to U.S. Robotics.

There's a simple reason why the Farallon Netopia is a less expensive product. The U.S. Robotics product is a true ISDN modem, whereas the Farallon product is not. Does mere marketing and a label provide functionality where none existed before? I suggest that you will discover that the Netopia is not an ISDN modem, but rather an ordinary ISDN terminal adapter.

This distinction is critical for backward compatibility. Would you buy a modem that supported only the 28.8-kbps speed and not any of the older, slower protocols? Most people would not make such a purchase. They still need to connect to some services, bulletin boards, and so on that operate at the slower, older, modem speeds.

Incorrectly referring to all ISDN devices as ISDN modems confuses the marketplace. It also trivializes the significant technical advantage that manufacturers of real ISDN modems (such as U.S. Robotics) have achieved.

Paul Cook
via the Internet

/ Unfortunately for those who are sticklers for precise terminology (yours truly included), several vendors have chosen to call their external ISDN devices modems primarily because the term is familiar to most potential customers. In some cases, the products include an actual analog modem, whereas others simply add a port that lets you connect your modem to ISDN equipment. Although we always refer to products by their given names, we do note the features (or lack of them) in these devices. / SB

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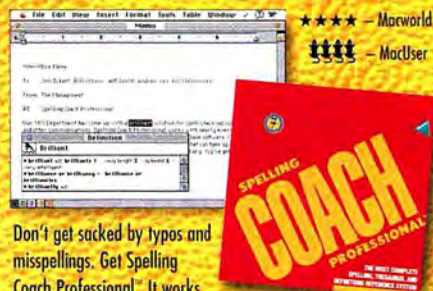
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LETTERS

Modem Madness

THANKS SO MUCH for "Make the Most of Your Modem" (May '96, page 113). For months I had been having problems connecting to AOL using my new 28.8-kbps modem, and the AOL techs were not able to help me. Along came your article, with the simple suggestion of checking the modem's error-correction setting. Quick as a wink, I connected at 28.8 kbps with no problems at all! Maybe you should send a copy to the techs at AOL!

Dave Madsen
Sioux City, IA

Sharing Shareware

I WOULD LIKE to congratulate you on the quality of your work. But I have noticed that you almost exclusively review commercial products.

I could understand this position if commercial products were so superior to shareware that reviewing the latter simply wouldn't make sense, but it's often not the case — many utilities and games available online are of a quality as high, if not higher, than some of their commercial rivals.

David Daix
daix@clipper.ens.fr

/ MacUser does review and rate shareware; we've rated thousands of titles. Unfortunately, there's not room to print these reviews, but they are accessible (along with the shareware) from CompuServe (GO: ZMACTECH and ZMACARTS), AOL (Keyword: MacUser), and MacUserWeb (<http://www.zdnet.com/macuser/software/>). / JB

Safety Net

YOU COVERED the fundamental planning requirements for setting up a Mac server quite well in a nice step-by-step format ("Setting Up an Internet Server," May '96, page 107), but one very important step was missing: providing security.

Security is a key consideration of which many people and small businesses setting up their own servers or Internet access are only marginally aware. Although the complete details of setting up a secure fire wall and secure Web server are beyond the scope of an article such as this, you have done your readers a disservice by not including a "Security Precautions" section.

Virtually all societies and communities have individuals who take perverse pleasure out of either damaging others' goods or stealing property or information. The Internet community is no different. In fact, the Internet

provides a large degree of anonymity for even moderately skilled hackers — especially when they are compromising insecure sites. Without adequate security for your Web server and LAN when you are connected to the Internet, these hackers can come and go as they please, and if it is only information they seek, you'll never even know they were there. A permanent Internet presence includes the need for security for all the systems connected to the external net.

Thanks for a great publication and an otherwise well-organized and -written article.

Steve Knox
fortknox@driftwood.com

/ As you point out, security is a vital component of any Internet connection. Although the specifics of safeguarding an Internet-connected server were beyond the scope of this article, we have dealt with them in the past (see Net Tools, September '95, page 111). / SB

Net Surfeit

I'M STARTING TO THINK you should change the magazine's name from MacUser to NetUser, due to the slew of articles on the Net in the past few months.

John Ostrom
jrostrom@bitstream.net

I THINK your magazine should do a "build your own Web page" article, showing how to make charts and forms. As the Internet grows, more and more features are added to Web pages. Even though programs are available that let you make your own page easily, no one wants to pay \$100 or more for them; most of the people who write pages are still using a simple text editor. It would be a blessing if there were an article that explained how to simply and easily make a chart or form.

Geoffrey Kimak
geoffk@pixi.com

/ Check out "A Do-It-Yourself Web Page," November '95, page 111. / Ed. ✎

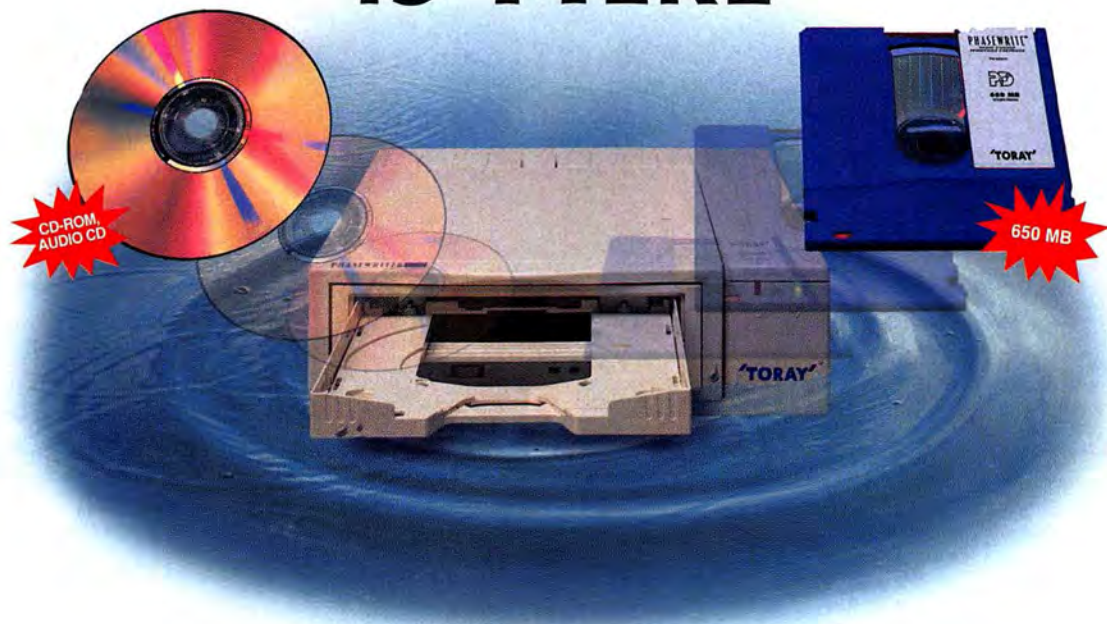
Corrections

In "Color Goes to Work" (May '96, page 84), we erroneously stated that HP sells a software PostScript RIP. A software PostScript RIP can be purchased from GDT Softworks (800-663-6222 or 604-473-3600), Birmy Graphics (407-768-6766), or Xionics Document Technologies (617-229-7000).

The correct price for Menlo the Frog is \$39.95 (The Two Dads, April '96, page 120).

The correct price for the Hunter Digital NoHands Mouse is \$260 (New & Notable, February '96, page 30).

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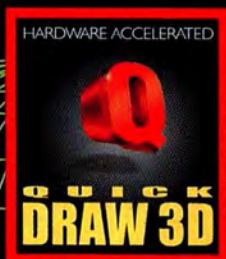
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MacBench 3.0 publishing graphics mix test performed on Power Mac 9500/132 with 40MB of RAM @ 1152 x 870 in 16.7 million colors with Matrox Millennium for PCI Power Mac, Number Nine Imagine 128, IMS Twin Turbo 128 and Radius Thunder 30/1600.

CIRCLE 94 ON READER SERVICE CARD



PAMELA PFIFFNER

Love and Marriage

APPLE AND ADOBE, Macintosh and graphics; they go together like a horse and carriage. Lately, I've been given cause to wonder if this is still elementary. As Adobe embraces the Internet, its eye is wandering from its Mac commitment. Has the Mac's middle age caused the largest Mac-software developer to look for fiscal fulfillment elsewhere? Judging by Adobe's latest moves, you might think so.

Adobe recently held a press event designed to herald its emergence as a major player in the Internet market. Adobe's new imaging technology, called Bravo, could do for the Web what PostScript did for paper-based publishing: enable the creation of graphics-rich, high-fidelity, device-independent content (for more on Bravo, see News in this issue). But, unlike at Adobe events of the past, Apple was noticeably absent from Bravo's gala debut. Instead, Sun Microsystems, Microsoft, and Netscape Communications took center stage, both in person and on videotape, which included glowing accolades from Intel's Andy Grove and a chummy aside from Sun CEO Scott McNealy. Conspicuously absent: Apple CEO Dr. Gilbert Amelio and Internet Czar Larry Tesler, although Mr. Tesler has since said his absence was due to time pressures brought on by Apple's Worldwide Developers Conference.

To be fair, Adobe CEO John Warnock and President Charles Geschke acknowledged that the Mac is the platform on which most graphics are created and that Bravo will run on the Mac OS as well as on Windows. But that was about it. Something seemed, well, wrong. Adobe sans Apple? Does this mean Adobe thinks if it wants to be a player on the Internet, Wintel and UNIX are the only games in town? This, despite the fact that Mac users are more than two-and-a-half times as likely to be on the Internet as their Windows counterparts.

Days later, at WWDC, Tesler invited several prominent industry figures onstage to give feel-good sound bites about their companies' commitment to Apple. Sun's Chief Technology Officer, Eric Schmidt, was positively ebullient

about the prospect of working with Apple and making Java a key component of the Mac operating system. Netscape wunderkind and *Newsweek* cover boy Marc Andreessen was so caught up in the moment that he pre-announced Netscape's intention to support Apple's OpenDoc technology. Better yet, Andreessen said Netscape was doubling the size of its Mac development team every month.

In stark contrast was Warnock, who seemed ill at ease and uncertain, like a dinner guest called on to praise the host after a badly prepared meal. Warnock fumbled for words until Tesler reminded him of current collaboration between Adobe and Apple, such as the bundling of the Acrobat 3.0 reader — code-named Amber — with Apple's Internet Connection Kit. Then Warnock perked up, offering that Adobe Page-Mill 2.0 supports QuickTime. That was all.

Maybe he was caught off-guard by Tesler's invitation. Warnock has a folksy delivery style that often does him a disservice in public. But I'll wager there's more to it than that.

Preaching Macintosh

Think about it: If you'd been invited to speak to thousands of software developers a few days after you'd hosted the glitzy debut of your company's major new Internet strategy, wouldn't you seize the opportunity to promote your agenda? After all, these same developers may very well want to implement that technology too. Considering that the Mac OS ranks first in Web authoring and second in Web servers (right after UNIX), it seems logical for Adobe to link its Internet strategy to the Mac.

I expected Warnock to say, "And we're looking forward to working with Apple to bring Bravo, our new Internet graphics engine, to the Mac platform." You can bet Macromedia head honcho Bud Colligan wouldn't have skipped the chance to tout Shockwave (one

WWDC demo showed Macromedia's Free-Hand with a Shockwave plug-in running inside a Netscape part within an OpenDoc-enabled version of ClarisWorks — cool!). Warnock's omission doesn't make sense. Unless the Mac has lost its allure for Adobe.



I'm not suggesting that Adobe is abandoning its Mac customers; Warnock has assured me he fully supports Apple's efforts. No, Adobe is chock-full of talented Mac engineers who make great products. Besides, the company makes way too much money on its graphic-arts applications. But I'm not the only one who feels that Adobe's interest is wavering. "Adobe thinks it's wrung everything it can out of the Mac," an Apple insider told me. "Now it wants the enterprise market." (I often refer to Adobe as the Microsoft of the Mac market — seems it's taking that analogy a bit too literally.)

Fair enough. Companies need to grow, and striking out in new directions is necessary for expansion. But as Adobe surely knows, the Internet is still new territory. The machine is merely the vehicle that takes us there. When it comes to Adobe applications, most of the company's customers drive Macs.

This apparent lack of interest may be just an instance of a long marriage in which one partner starts taking the other for granted. If that's the case, Adobe had best beware — there are lots of young suitors out there who'd love to be wed to the Mac's graphics and newborn Internet businesses. ☞

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NEWS

What Was All the Fuss About?

Apple Chairman and CEO Gil Amelio outlines strategy for bringing Apple back from the brink.

AT THE END of Gil Amelio's keynote address at the Apple Worldwide Developers Conference in May, Amelio predicted that "a year from now, people will look back at this period and wonder, 'What was all the fuss about?'" An optimistic forecast, but if Amelio can make good on his broad-ranging strategy, this just might come true.

Amelio said Apple is at a crossroads, where "one road leads to prosperity and once more changing the world and the other leads to a long, slow decline into irrelevancy." His road to success is a four-lane freeway: Information Appliances, Macintosh, Alternative Platforms, and Imaging.

INFORMATION APPLIANCES. Apple will offer "integrated products with targeted functionality that are easy to use and affordable" — in other words, *information appliances* — to the millions who have no interest in personal computers but who want to join the communications revolution for under \$1,000.

The Pippin and the Newton are ready. Bandai's Pippin@World will be available in the U.S. in September, and Apple plans to offer its own Web-surfing Pippin soon. The Newton Internet Enabler, now in beta, coupled with such software as AllPen's

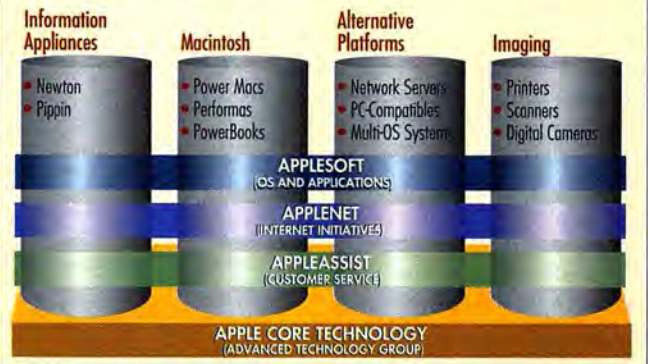
NetHopper and a wire-less modem, will give the Newton a new role as a hand-held, go-anywhere Internet on-ramp.

MACINTOSH. The number of Mac models will be cut in half in the next year; the number of mother-board designs will be cut from nine down to five and then again to two or three — and by the end of '96, all new Macs will have at least 12 MB of RAM. Also, ignore the rumors that Apple is going to scuttle its low-cost Macs; as Amelio said, "I need all the sales I can get."

Other good news: You won't have to wait until Mac OS 8 (née Copland) ships to receive all its benefits: Amelio is ending the "megarelease" OS-rollout tradition and will instead phase in features when they're ready.

ALTERNATIVE PLATFORMS. The long-awaited PowerPC Platform, which is able to run multiple

THE NEW APPLE / leaner and cleaner



operating systems, will give Apple an edge over its Wintel counterparts — especially if Amelio achieves his goal of licensing Windows NT.

Other alternative platforms — such as the AIX-based Network Server, which will be aggressively marketed as a cost-effective Internet and intranet server — will also fatten Apple's bottom line. Amelio's comments about building systems that "run more of the software that's out there" also suggest more PC Compatible systems.

IMAGING. Apple's imaging division, which provides cross-platform printers, scanners, monitors, and digital cameras, quietly rakes in a cool \$1 billion annually. Dispelling rumors to the contrary, Amelio said Apple plans to strengthen, not spin off, this division. Expect a new round of image-capture hardware soon.

Although Amelio's plan for Apple is aggressive — albeit still short on implementation details — he made it clear that Apple can't succeed alone. He announced a \$20 million fund to help developer marketing, an \$18 million investment in development tools, and a new emphasis on support of Apple-only dealers.

Support is appearing from other quarters as well. OpenDoc, for example, is attracting increasing interest: Netscape has announced that Navigator will soon be OpenDoc-compliant, and IBM has announced OpenDoc support for Windows.

There's even some fun resurfacing at Apple: A 20th Anniversary Limited Edition Mac will appear near the end of this year. Only 20,000 units will be made, so get your orders in early. / RIK MYSLAWSKI

FUTURE TECH

200 Times Faster Than Your Modem

EVERYONE LOVES THE WEB; everyone hates how slowly Web pages crawl onto their screens.

High-speed T1 access, which maxes out at 1.5 megabits per second, is a popular option for deep-pocket corporate sites. Cable modems promise 10-megabit-per-second home Internet access — someday. ISDN has become the favorite POTS (plain old telephone service) replacement for personal use, but it's often expensive and difficult to implement — and, besides, at 64 kbps for basic service, it's not all *that* fast.

Now there's a fourth option that's cheaper than T1, that has a theoretical maximum throughput that is faster than ISDN's and T1's, and that is managed not by a cable company (now *there's* a scary thought...) but by folks who live and breathe telecom. It's called ADSL (asymmetrical digital subscriber line), and it exists today — if you

happen to live in Irving, Texas, where a six-month trial began in February.

ADSL is, as its name indicates, asymmetrical: With it, you can download data at a blazing top speed of 6.144 megabits per second but upload at only around 500 kbps — which still isn't too shabby. Most ADSL users will experience download speed comparable to that of T1 and upload speed comparable to that of ISDN, but monthly rates should be cheaper than for either: Unlike some competing technologies, ADSL requires neither fiber optics nor coaxial cable — it works over existing copper telephone lines. What's more, ADSL data transfers can share the same phone line, simultaneously, with voice calls. More information on ADSL can be found on MacUserWeb, <http://www.zdnet.com/macuser/>, beginning June 14.

/ RIK MYSLAWSKI

Adobe Unveils Web Strategy

New imaging, printing, and font standards will make the Web a better place to publish.

IT DOESN'T MATTER if you use ink or electrons, CEO John Warnock wants you to think *Adobe* when you think *publishing*. Adobe recently announced imaging and font technologies that seek to do for Web-top publishing what Adobe standards did for desktop publishing a decade ago: enable graphics-rich, device-independent content with typographic fidelity. However, unlike during the early days of desktop publishing, Apple was noticeably absent from Adobe's recent Internet-technology rollout event. Instead, Sun Microsystems, Microsoft, and Netscape Communications took center stage — although Warnock did acknowledge that Adobe's strategy supports the Mac as the platform on which most graphic content is created.

The cornerstone of Adobe's Internet strategy is Bravo, a cross-platform imaging model designed to deliver high-quality graphics and type across the Internet. Derived from Adobe PostScript, Bravo supports millions of colors, on-the-fly scaling with anti-aliasing, and transparencies. Already the imaging kernel in Photoshop, Illustrator, and other Adobe graphics products, Bravo gives application developers a single API for the creation and delivery of Web content. Sun's JavaSoft division announced that it plans to incorporate Bravo into its next version of Java, which has already been licensed to Netscape, Oracle, and Microsoft.

To show the potential of Bravo, Adobe demonstrated a multimedia-authoring tool code-named

Vertigo. Slated for release in 1997, Vertigo lets developers harness the Bravo imaging model and the Java programming language to create interactive content for the Web.

Adobe also unveiled a raft of additional tools for

world. (GCC Technologies and Tektronix have developed similar technologies for their printers.) The first version of PrintMill is aimed at corporate intranets; a version for the public Internet is in development.

◀ **Web Presenter**, based on Adobe Persuasion, lets you use Adobe's Portable Document Format (PDF) to create interactive slide shows on the Web. The application rasterizes line art for the screen on the fly and lets you build interactive elements and drag and drop URLs into presentations to automatically create links to Web sites. You can also import Photoshop and Illustrator files as well as drag and drop QuickTime movies and sounds. A demo version is available at <http://www.adobe.com/>.

Adobe also demonstrated Acrobat 3.0, which lets you embed PDF files within HTML code, download one page of data at a time, and create interactive PDF forms for Web distribution.

One intriguing alliance in Adobe's Internet assault is that with Microsoft. Once arch-enemies in the font wars, Adobe is now working with Microsoft to develop a new Internet font format, OpenType, that combines TrueType and Type 1 fonts and that uses compression for fast transmission and faithful reproduction across the Web and to PostScript printing devices. Adobe says the OpenType format will encompass the previously announced font standard under development by Adobe, Apple, and Netscape. / PAMELA PFIFFNER



Web Presenter will make authoring a PDF-based Web-page as straightforward as creating a slide show in Adobe Persuasion.

creating and delivering content on the Web, including PageMill 2.0 (see "Adobe Responds to PageMill's Critics," July '96, page 28), PrintMill, and Web Presenter, all of which will be available later this year.

PrintMill is a client/server application for sending documents to remote printers. Like a global Chooser, PrintMill uses a Web browser, such as Netscape Navigator, and the Internet to locate, select, and print to printing devices around the

MACUSER UTILITY OF THE MONTH

From Moose to Mouse

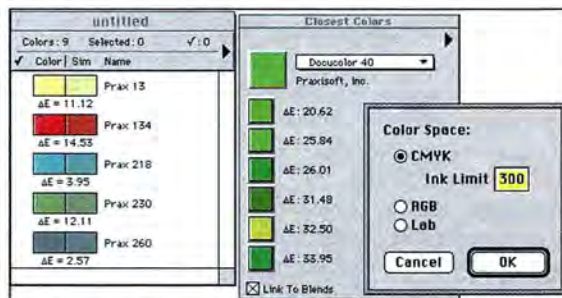
VETERAN MAC USERS will remember the Talking Moose, an animated Bullwinkle clone that randomly provided sardonic commentary about what was on your Mac's mind. In this age of downsizing, we've revived the animated know-it-all — not as a moose, but rather a mouse. You can edit Talking Mouse's phrases in any text editor — it uses Speech Manager and MacinTalk (available in the System 7.5.3 update) to create speech out of phonemes. Using AppleScript, Talking Mouse also responds to Apple-event cues. Created by Robert McNally, *MacUser's Talking Mouse* is available exclusively from the ZD Net service on CompuServe (GO ZMC:MACUSER) and on the Web (<http://www.zdnet.com/macuser/>). It is available as of June 30. / SCOTT LOVE



WYSIWYPrint Color Management

THE HOLY GRAIL of color publishing is to have your final print match the image you created on your monitor. Praxisoft's new MatchLink system takes a giant step toward that goal by using ColorSync 2.0 profiles to create custom color palettes for graphics applications. These palettes contain a range of colors limited to that which your targeted output device can reproduce. If you switch printers, a MatchLink Extender bundle for Adobe Illustrator and PageMaker, QuarkXPress, and Macromedia FreeHand will warn you if the new printer can't output selected colors correctly. MatchLink Admin, \$3,500; MatchLink

Extenders bundle, \$329; Color Compass 2.0, \$329. Praxisoft: 800-557-7294 or 703-729-3391; <http://www.praxisoft.com/>. / CAROLYN BICKFORD



Praxisoft's MatchLink system uses ColorSync's printer profiles to create a color palette that is limited to the colors your printer can produce.

CLONE WATCH

Big Blue Clone One Step Closer

APPLE AND IBM are now pals, as shown by the IBM Microelectronics Division's recent agreement to license the Mac OS. As Apple's licensing honcho, Garey De Angelis, put it, "The Mac OS is in good hands with IBM." Hinting at one reason for the agreement, he said, "Our enemies list is changing."

As Apple did with Motorola (see "Motorola Joins, Power Speeds," May '96, page 27), it has granted Big Blue the right to sublicense the Mac OS. But although Motorola plans to sublicense the Mac OS only to vendors that purchase Motorola-built motherboards, IBM will supply it to anyone who buys its PowerPC chips.

Two other developments brighten the picture for vendors eager to build computers based on the PowerPC Platform (PPCP): VLSI's Gold Eagle chip set provides required bus-interface and I/O-interface logic. FirmWorks' Power Firmware provides another required PPCP component: open firmware that lets a computer boot any of several operating systems — including Windows NT.

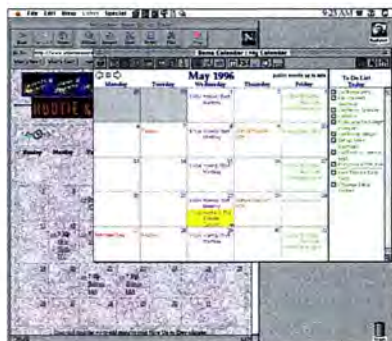
Two companies, U.S.-based Datatech Enterprises and Taiwan-based Tatung, will shortly announce plans to license the Mac OS from IBM. Neither has released any details of systems it plans to build or whether it intends to sell Mac OS-based computers in the U.S.

Although IBM has not yet said whether it will manufacture its own Mac OS-based desktop systems, Apple and IBM are codeveloping a Mac OS-compatible laptop to be sold by both companies — let's hope it has more in common with the innovative IBM ThinkPad than with the troublesome PowerBook 5300. / HENRY BORTMAN

Now on the Net

NOW KNOWS that the Web is where it's at — Now Software, that is. The company is starting to use the World Wide Web to enhance its products and to deliver free monthly upgrades and bug fixes to its customers.

The \$299 Now Up-to-Date Web Publisher creates Web pages that let you drag addresses from online contact managers and events from monthly calendars on the Web and drop them into Now Up-to-Date or Now Contact 3.6. The information automatically places itself on



Drag dates from an online calendar and drop them onto your personal scheduler, thanks to Now Up-to-Date Web Publisher.

QuickTime Numbers Game Continues

QuickTime 2.2 overtaken by more powerful version 2.5.

WHAT'S IN A NAME — or, in this case, a number? Apple apparently decided that QuickTime 2.2 wasn't a sufficiently exciting enumeration for its latest and greatest QuickTime upgrade (see "QuickTime Hits the Big Time," June '96, page 27).

A few more features in addition to beefed-up MPEG and Motion JPEG (M-JPEG) support have boosted QuickTime 2.2 a full three-tenths of a version point, to QuickTime 2.5.

The digital-video heavyweights Adobe Systems, Avid Technology, Data Translation, Radius, and Truevision have teamed up with Apple to forge a QuickTime 2.5 M-JPEG video-file format that will let you capture video on one brand of video card and play it back using a different brand. Also under development are such improvements as MIDI enhancements and multiprocessor support.

QuickTime 2.5 can play back MIDI files that use 16-bit instrument samples and let users add plug-in MIDI-instrument libraries from third parties such as Yamaha and Invision. And, on multiprocessor systems, such as the DayStar Genesis,

QuickTime will be able to divvy up compression and playback processing among processors — a second processor can as much as double decompression speed. Developers will also be able to place QuickDraw 3D objects into tracks, just as is done now with text and sprites.

Soon after QuickTime 2.5 comes out, expect further improvements. For example, Apple will enable QuickTime playback of MPEG movies at 640 x 480 pixels and at 15 frames per second with near-CD-quality sound on most Power PC-based Macs — without the need for MPEG-acceleration hardware. In fact, in the near future, MPEG will become an integrated component of QuickTime, so for example, you'll be able to cut, copy, and paste video frames be-

tween MPEG and QuickTime source files.

QuickTime 2.5 should be available by the time you read this. Apple will make it obtainable free of charge on services such as America Online and CompuServe and on Apple's QuickTime Web site, <http://quicktime.apple.com/>. / SEAN J. SAFREED



Through the Looking Glass

A NEW GENERATION of projectors may make LCD projectors a reflection of the past. Using Texas Instruments' new Digital Light Processing (DLP) technology, Proxima's \$9,495 Desktop Projector 4100 and InFocus Systems' \$10,999 Lite Pro 620 produce brighter, more vibrant colors than LCD projectors but are no more expensive than comparably equipped multimedia systems.

The key to the technology is a chip that is smaller than a dime and that contains more than 480,000 individually angling mirrors that reflect each pixel of light through a revolving color filter. The result: an image in which pixels are brighter and blend more closely together than those that are projected through an LCD panel. InFocus Systems: 800-294-6400 or 503-685-8888; <http://www.infs.com/>. Proxima: 619-457-5500. / CAROLYN BICKFORD

/ CAROLYN BICKFORD

Murder by Modem

Indulge in remote mayhem or replace Apple Remote Access.

YOU CAN BLAST perfect strangers in an online MUD (multiuser dimension/dungeon) and annihilate your loyal cubemate in a game on your office's local-area network — but how do you liquidate a crosstown buddy in a not-so-friendly game of network Marathon?

Get the NetLink Remote system extension, that's how. With it installed in their Extensions folders, two players can set up an AppleTalk connection

via modem and take each other on in any networkable game. Although the speed of most games played over a NetLink connection pales in comparison to that of games played over an Ethernet network, you can reach frame rates of up to 15 frames per second with 28.8-kbps modems — nearly what you'd get over a LocalTalk connection. Marathon runs slightly faster, thanks to optimized code in NetLink designed specifically to handle Marathon packets.

NetLink Remote's auto-answer, time-limit, and file-sharing features make it an inexpensive alternative to AppleTalk Remote for Mac-to-Mac connections. A two-person license for NetLink Remote, which is distributed exclusively online, costs \$15; subsequent licenses are priced at \$7.50 each. You can download NetLink Remote from MacUser's Software Center (<http://www.zdnet.com/macuser/software/>), from ZD Net on CompuServe (GO ZMACTECH), or from our forum on America Online (keyword MacUser). Kloss Software: 714-699-0077. / SCOTT LOVE



One-on-one combat in Marathon no longer requires a network if you have a fast modem and NetLink Remote.



CD-ROMS

Horror-ROM-a

NEW TECHNOLOGY is catnip to most science-fiction artists, so it's no surprise that some of the top authors and illustrators in the field are bringing their visions to your Mac.

I HAVE NO MOUTH AND I MUST SCREAM. If the title alone makes you squirm, you may not have the stomach to go up against AM, the malevolent mainframe that tortures you throughout this deliciously twisted game, which is based on Harlan Ellison's story of the same name. One by one, you have to help five struggling characters free themselves from AM's psychological warfare. \$69.95. Cyberdreams: 818-223-9990.

DARKSEED II. The artwork of H.R. Giger — who created the slimy fiends that chased Sigourney Weaver through the *Alien* movies — sets the macabre tone for this game. Not only do you have to help the star-crossed teenager Mike Dawson prove he didn't kill his girlfriend but you have to prevent the destruction of mankind to boot. \$69.95. Cyberdreams: 818-223-9990.

THE DIG. ▲ Science-fiction author Orson Scott Card wrote the dialogue for this game, in which you help a team of stranded clichés — uh, space explorers — piece together puzzling clues on a desolate planet in order to return home. If that's too difficult, you can try reading Alan Dean Foster's novelization of the game. But be forewarned: Both game and book seem to have been created by the dreaded Platitudians from the planet Bromide. \$45. LucasArts: 800-985-8227 or 415-472-3400; <http://www.lucasarts.com/>. / CAROLYN BICKFORD

Sony Makes CD-R Drives Easy to Use

CD-ROMS ARE CHEAP, light, durable, spacious, and cross-platform-capable — the ideal medium for transporting or archiving large files. The only reason recordable CD-ROM (CD-R) drives aren't more popular is because using one is a colossal pain in the posterior.

Sony's new CD-R drives, based on the company's new CD-R file-system (CD-RFS) technology, aim to reverse CD-R's reputation. Although most CD-R drives require you to write — or "burn" — an entire CD-ROM at a time, a CD-RFS drive can also write data in small packets, much as hard drives and floppy drives can. A CD-RFS disc appears as a volume on your desktop; you simply drag and drop files to copy them or drag them to the Trash to delete them. (Since CD-ROMs are a write-once medium, files aren't actually deleted; they're merely hidden. The CD-RFS History function lets you "undelete" hidden files.) When you want to share a CD-RFS disc, you use a Sony-supplied utility to "freeze" the data; the disc can then be read by any Mac OS, Windows 95, Windows NT, OS/2, or UNIX system (the necessary driver software is included on the disc).

The first CD-RFS-based drives from Sony are the

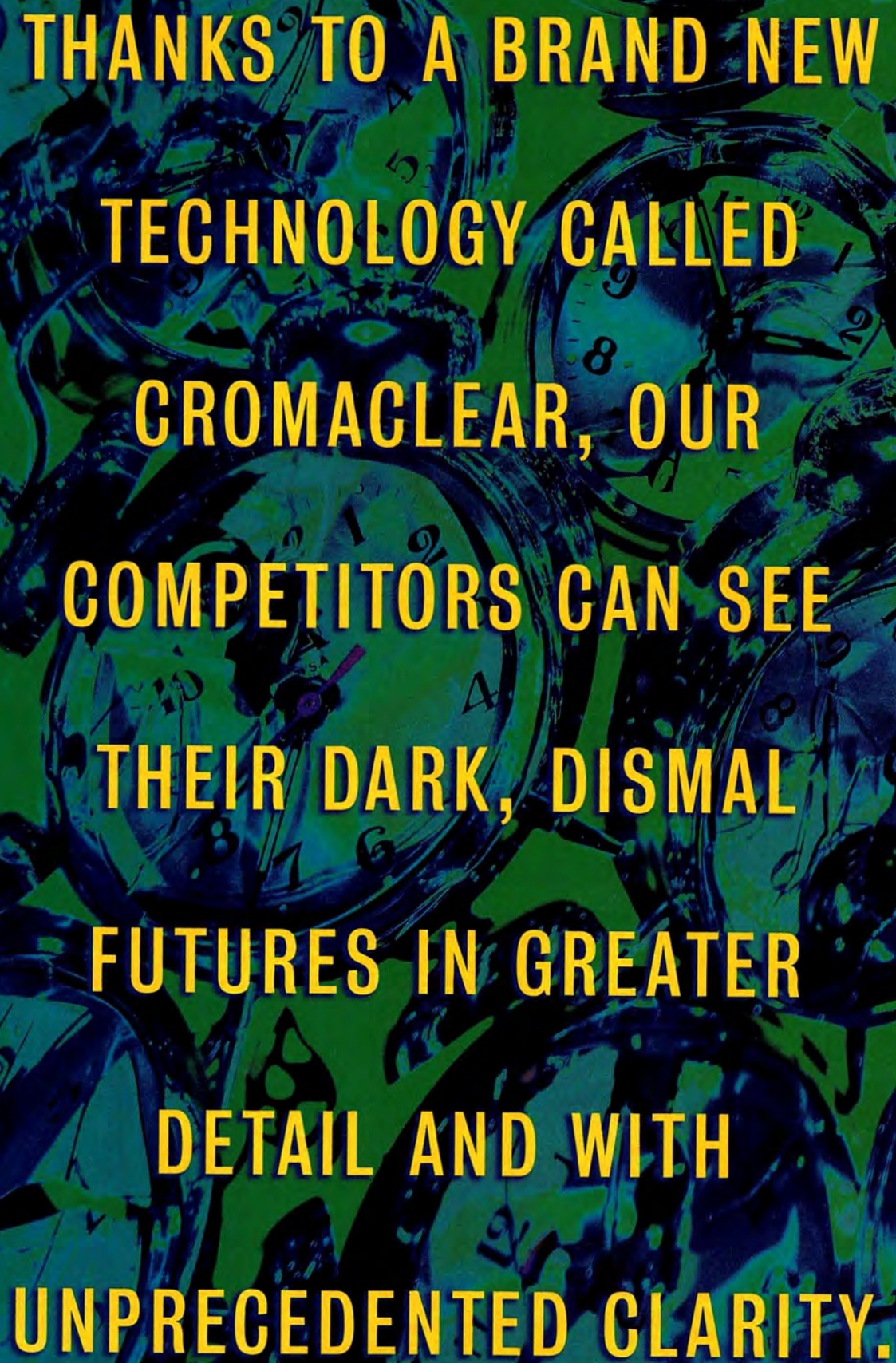
internal Spressa 940 and the external Spressa 941 I; both are also 4x CD-ROM drives. At prices hovering around \$1,000 (which includes the capable Corel CD Creator mastering software), they won't tempt you to replace your current CD-ROM drive. Let's hope Sony soon sees the advantages of high-volume pricing. 800-352-7669; <http://www.sel.sony.com/SEL/ccpg/>. / RIK MYSLEWSKI

THE OFF BEAT

Safety Gauntlets

THE PERFECT ACCENT to your gold-lamé tuxedo or sequin-covered gown might be a pair of Handeze gloves — wearing them is also an elegant way to avoid repetitive-stress injury. A Lycra-like material in these fingerless accessories supports your hand by gripping it firmly but gently. The gloves range in size from extra small to extra large and come in either periwinkle or champagne (colors, not flavors). You're likely to find yourself using them for all your daily tasks, although they do have a tendency to induce sweaty palms. \$20. Dome Industries: 800-432-4352 or 401-738-7900. / NANCY PETERSON





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TECHNOLOGY CALLED
CROMACLEAR, OUR
COMPETITORS CAN SEE
THEIR DARK, DISMAL
FUTURES IN GREATER
DETAIL AND WITH
UNPRECEDENTED CLARITY.**



**The New MultiSync® M Series Monitors
With Revolutionary CROMACLEAR™ CRT Technology.**

Behold the brightness. The clarity. The look of panic in our competitors' eyes. Introducing the MultiSync M Series monitors from NEC – think of them less as new monitors, more as the standard by which all others will be judged.

The MultiSync M500™ and M700™ monitors are the first to incorporate CROMACLEAR, NEC's patented new CRT technology. Similar in design to that found in today's televisions, CROMACLEAR lets you view text, graphics and video with enhanced focus, greater color saturation, better contrast and increased depth and dimension. Simply put, you'll enjoy the brightest, sharpest, clearest images in the industry – just what you've come to expect from NEC.

What's more, our Video Boost feature automatically sets the monitor screen to the optimal contrast and brightness

level for viewing TV and video images. Built-in speakers allow you to customize sound for movie, music, games and voice applications. There's even a built-in microphone.

Then, of course, there's the issue of our famed reliability. Which really isn't an issue at all since both monitors are backed by a 3-year limited warranty, one of the best in the industry. Perhaps of even more importance is the fact that each is backed by NEC's hard-earned reputation for building, without question, the most precise monitors in the world.

The MultiSync M Series monitors from NEC. Thanks to us, the only

thing that appears dim is the future of our competitors. On second thought, what competitors?

To learn more about either the MultiSync M500 or M700 monitors, call 1-800-NEC-INFO. To have information sent to you by fax, call 1-800-366-0476 and request document #157201.

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15" CROMACLEAR Technology CRT
(13.8" viewable image size)*

*Supports resolutions from
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Microspeed KidTRAC. ▼ It's the same size as an adult's



MacTRAC trackball but with a fun color scheme, stick-on letters, and even an optional glow-in-the-dark ball. Designed to appeal to children — or the child within.

\$99.95. 510-490-1403;

<http://www.microspeed.com/>.

Epson Stylus 1500. Designed for CAD printing, this 720-x-720-dpi color inkjet printer can print on sheetfed and tractor-fed paper up to 13.6 x 21.8 inches in size. \$995. 800-289-3776 or 310-782-0770; <http://www.epson.com/>.

RADLinX PASSaFAX PF-1. Your fax machine can send faxes over an Internet connection if you have this videocassette-sized device, which connects a local fax machine to an IP network. It encapsulates fax information in an IP protocol and sends it to a remote PASSaFAX, which in turn unencapsulates the fax and forwards it to a connected fax machine. \$950. 201-529-1100.

Visioneer PaperPort VX SCSI Adapter. If you still haven't been able to get your PaperPort VX to work properly when connected to your serial port, you can try hooking it to a SCSI port with this new adapter. \$70. 800-358-3298 or 415-812-6400; <http://www.visioneer.com/>.

Alps Adjustable Mouse. First there were adjustable keyboards — now there's an adjustable mouse. This three-button mouse has a movable shell with three lockable positions — for small-, medium-, and large-sized hands — and comes with software for customizing tracking speed, pointer size, and more. \$40. Alps Electric: 800-825-2577 or 408-432-6000.

Seiko ColorPoint 835 PS. Using thermal-wax or dye-sublimation technology, you can print in color on any size paper up to 11 x 17 inches. This dual-technology PostScript printer boasts a 33-MHz RISC processor, a built-in SCSI 256-MB hard drive, and MatchPoint color-calibration software. \$16,400. Seiko Instruments USA: 408-922-5900.

ColorgrafX VivagrafX XL. Print color images as large as 36 inches wide and 100 feet long with this 300-dpi color inkjet printer. \$15,995. 800-247-4412 or 408-225-2800.

Panasonic KV-S525. This production scanner can scan everything from business cards to 11-x-14-inch documents and can do so at a rate of up to 20 pages per minute and at resolutions between 150 and 300 dpi. Under \$5,000. 800-742-8086 or 201-348-7000.

SOFTWARE

Thumbs Up. Use up to 100 key fields to track multimedia files in this relational image database that can capture, catalog, organize, retrieve, and archive images, sounds, and videos. Single-user, \$1,950; client/server ten-license pack, \$19,950. Knowles Marketing: 919-419-1990.

LaserMerge Electronic Paper. This printing extension can superimpose watermarks, add signatures, create business cards, adjust text for printing on letterhead, make pamphlets, and much more with the click of a button and without QuickDraw GX. \$95. MindGate: 800-648-6840 or 615-937-6800; <http://www.mindgate.com/>.

Digital Chisel://HTML. The new version of this award-winning educational-authoring program lets you convert Digital Chisel multimedia projects into Web pages that can be viewed without a browser plug-in. \$119. Pierian Spring: 503-222-2044.

SoundSmart for Multimedia. Using this audio editor, drag and drop musical phrases onto a timeline to create soundtracks for multimedia presentations. \$180. Sonic Desktop Software: 800-454-1900 or 818-718-9999; <http://www.sonicdesktop.com/>.

4-Sight ISDN Manager v. 4.0. Regardless of the ISDN device your clients are using, you can send huge files quickly with this ISDN point-to-point file-transfer application, which now lets you retrieve files from remote designated folders and track communications. Price varies by configuration. 4-Sight: 515-221-3000; <http://www.4sight.com/>.

InfoDepot 2.5. This flexible outliner now lets you drag a URL from your favorite Web browser and drop it into your table or timeline. And thanks to robust AppleScript support, you can define what happens when you drag and drop any item into an outline cell. \$189. Chena Software: 610-770-1210; <http://www.chena.com/>.

How to Draw Cartoons. ▼ With this CD-ROM, learn classic drawing skills from a professional cartoonist — you'll soon be sketching your own cartoon characters and action. \$49. Diamar Interactive: 800-234-2627 or 206-340-5975; <http://www.diamar.com/>.

Marathon Infinity. The newest version of Marathon is more challenging than its precursors, due to a less linear story line and physics models that vary depending on the level. There's also a Map Editor, with which you can develop your own levels. \$69.99. Bungie Software: 800-295-0060 or 312-563-6200; <http://www.bungie.com/>.

Meeting Maker XP 3.5. Newton MessagePad users can change or create meetings with this enterprise-wide group-scheduling program. Server option for the Mac OS, Windows, and DOS, \$249; group licenses begin at \$99 per user. On Technology: 800-767-6683 or 617-374-1400; <http://www.on.com/>.

/ CAROLYN BICKFORD



MACINTOSH PRICE INDEX

THE UNITED COMPUTER EXCHANGE index reflects average sales prices of new and used Macs as of May 1, 1996. Prices (other than those for compact models, Performas, and LCs) do not include a monitor or a keyboard. The United Computer Exchange is a national clearinghouse of used microcomputer equipment.

Mac Model	New	Used
Classic II (4/40)	•	\$275
LC III (4/80)	•	\$325
Performa 5215CD (8/1GB)	\$1,899	\$1,400
Performa 6220CD (16/1GB)	\$1,899	\$1,400
Ilisi (5/80)	•	\$250
Ilci (4/80)	•	\$325
Ilfx (4/80)	•	\$400
Quadra 605 (4/80)	•	\$375
Quadra 610 (8/160)	•	\$500
Quadra 630 (4/250)	•	\$500
Quadra 650 (8/230)	•	\$750
Quadra 660AV (8/230/CD)	•	\$675
Quadra 700 (8/230)	•	\$650
Quadra 800 (8/230)	•	\$850
Quadra 840AV (8/230/CD)	•	\$1,300
Quadra 900 (8/230)	•	\$800
Quadra 950 (8/230)	•	\$1,100
Power Mac 6100/66 (8/350/CD)	•	\$750
Power Mac 7100/80 (8/700/CD)	\$999	\$900
Power Mac 7200/90 (8/500/CD)	\$1,549	\$1,150
Power Mac 7500/100 (16/1GB/CD)	\$2,699	\$1,875
Power Mac 8100/100 (16/1GB/CD)	•	\$1,650
Power Mac 8100/110 (16/2GB/CD)	•	\$1,950
Power Mac 8500/120 (16/2GB/CD)	\$4,499	\$2,850
Power Mac 9500/132 (16/2GB/CD)	\$4,399	\$3,000
PowerBook 145B (4/80)	•	\$550
PowerBook 150 (4/120)	•	\$575
PowerBook 165 (4/80)	•	\$650
PowerBook 165c (4/80)	•	\$875
PowerBook 170 (4/80)	•	\$700
PowerBook 180 (4/120)	•	\$850
PowerBook 190cs (8/500)	\$1,999	\$1,400
PowerBook 520 (4/160)	•	\$800
PowerBook 520c (4/160)	•	\$1,100
PowerBook 540 (4/240)	•	\$1,075
PowerBook 540c (4/320)	•	\$1,500
PowerBook 5300cs (8/500)	\$2,499	\$1,700
Duo 250 (4/200)	•	\$800
Duo 280 (12/240) w/14.4-kbps modem	•	\$1,775
Duo 280c (4/320)	•	\$1,450
Duo 2300c (8/750)	\$3,499	\$2,800

• = discontinued model

For more pricing information on these and other models, call 800-755-3033 or 770-955-0569 or visit <http://www.uce.com/>. And find it on ZD Net, in Library 1 (Special Reports) of the MacUser Forum (GO ZMC:MACUSER).

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VisionTek: <http://www.visiontek.com> ©1996

Ride the new wave of productivity. With VisionTek's full line of high quality memory modules for your PowerBook, Power Macintosh, or MacOS compatible. Guaranteed compatible and supported with our toll-free Tek-Support, Tek-Fax, Tek-BBS, and Tek-Web technical and customer assistance. And our exclusive Corporate Assistance Program makes VisionTek the only choice for your MacOS systems. For Macintosh memory and the VisionTek reseller nearest you, call 1-800-360-7185.

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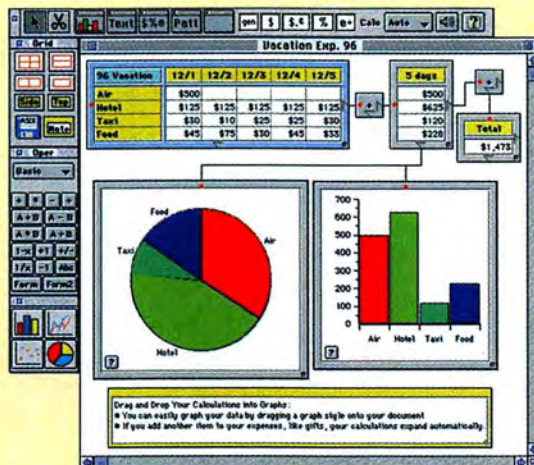
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MacWEEK **REPORT**

MacUser's Inside Track to Macintosh News

Tesler tackles the Net; unveils plan

By James Staten

Larry Tesler, Apple vice president of Internet platforms, staked the company's claim on the Internet at the Apple Worldwide Developers Conference in San Jose, Calif., this May when he said, "We are going to make the Internet as easy to use as the Macintosh."

With its Internet strategy, Apple seeks to make the company's computing devices the best for media-rich content authoring, simple client access and high-value servers. The plan relies heavily on the work of third-party developers, OpenDoc and a new QuickTime Media Layer. Apple will also use its Internet sites and those of partners to provide online content that is the "benchmark for what users expect from the Internet," Tesler said during the strategy-rollout presentation at WWDC.

Addressing an audience of Mac vendors, Tesler said, "You know who's responsible for Apple's strong position in the Internet market — and that would be you." He named Adobe Systems Inc., Netscape Communications Corp., Silicon Graphics Inc. and Sun Microsystems Inc. as Apple's key Internet collaborators.

During the presentation, Marc Andreessen, chief technical officer at Mountain View, Calif.-based Netscape, said that his company will make some functions in Netscape Navigator available as OpenDoc parts.

Tesler said OpenDoc and the Mac OS will integrate various forms of multimedia, grouped loosely together under the heading QuickTime Media Layer. The layer currently contains Sun's Java, HTML, Virtual Reality Modeling Language and upcoming font technologies for the Internet. Tesler characterized the layer as less of a technology substrate and more of an expandable collection of standards.

He said Apple is working with various industry committees to have the company's own technologies approved as Internet standards and will broadly license them.

"We're going to contribute our value-added

technologies to the Internet platform," Tesler said. QuickTime, QuickTime Conferencing, QuickTime VR and QuickDraw 3D will all be available on multiple client platforms and will be Internet-oriented, he said. Apple itself will create Windows versions of its graphics technologies, Tesler said, and from this point forward, all will be upgraded "virtually simultaneously" on Macs and Intel-standard PCs.

"We will work with anyone who is dedicated to providing Internet experiences on all platforms," Tesler said. The openness of Internet standards eases integration of Macintoshes into corporations, he said, and thus benefits Apple.

To improve the server side of Apple's strategy, TCP/IP will be added to several products, including AppleShare and Apple Remote Access, later this year. Garry Hornbuckle, Apple director of technology services, said the first step in making this happen will be the release of a Power Macintosh-native Point-to-Point Protocol stack this summer.

The company also plans to bundle a Web server with all Macs; the miniserver will let users publish documents on the Web by dragging files to a desktop icon. Quarterdeck Corp. of Marina Del Rey, Calif., this May announced just such a server, but sources said Apple is building its own.

On the client side, CEO John Warnock of Mountain View-based Adobe announced during the strategy presentation that future versions of the Apple Internet Connection Kit will include Adobe Acrobat 3.0, code-named Amber.

Tesler said that Macromedia Inc.'s Shockwave for Director and Farallon Computing Inc.'s Look@Me will be added to the kit as well.

Analysts were pleased with the direction Apple is taking its Internet strategy but expressed a thirst for follow-through. "The question is, can they implement all this stuff?" said Stephan Somogyi, senior editor for Digital Media, a Seybold Publications multimedia industry newsletter based in San Francisco. □



Apple fine-tunes clone strategy

By David Morgenstern

Apple this summer will fine-tune its clone strategy and tempt licensees with a new, scalable, low-cost Mac logic-board design code-named Tanzania.

Designed for entry-level and midrange systems, Tanzania will offer developers a wide range of options, Apple said. The design can handle PowerPC 603e and 604e processors with speeds up to 200 MHz and includes one, three or five PCI slots. Vendors can choose between PS/2 keyboard or ADB connectors and Enhanced IDE or SCSI internal hard drives. It will also include LocalTalk, GeoPort and SCSI connectors as well as an ATAPI CD-ROM drive. Tanzania will support either the Mac's auto-ejecting floppy drive or the manual-eject mechanisms common in Intel-standard PCs. It will come with a pair of DIMM slots as well as a single SIMM slot; it will handle up to 160 Mbytes of RAM. The system will use the less expensive EDO memory found in PCs.

Developers will receive the reference design around September, Apple said. Clones based on the platform will find their way into distribution in early 1997.

According to Steve Bernstein, Apple licensing marketing manager, the company's licensing is now divided into three phases that span the current Mac-only designs to the PowerPC Platform (PPCP), which can run multiple operating systems. Phase One encompasses Apple's first licensees, which offer clones based on the Power Mac 7500 and 9500.

Phase One Plus will offer a pair of platforms designated the Mac OS Licensing Design (MLD), previously called the Low End Reference Platform. The first MLD will be based on the Power Mac 5400; the second will use the Tanzania board.

Phase Two of the plan will be PPCP.

With a 40-MHz system bus, Tanzania will be slower than the 66-MHz PPCP machines, but Bernstein said it will be easier to engineer.

"It's a healthy sign," said analyst Amy Wohl, principal in Wohl Associates of Narberth, Pa. She said the low-cost designs will attract new licensees. "Power [Computing] is having a bonanza. If economic principles haven't been voted out of office, and they haven't, other players will enter the market." □

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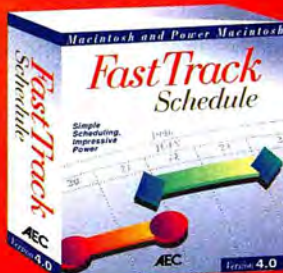


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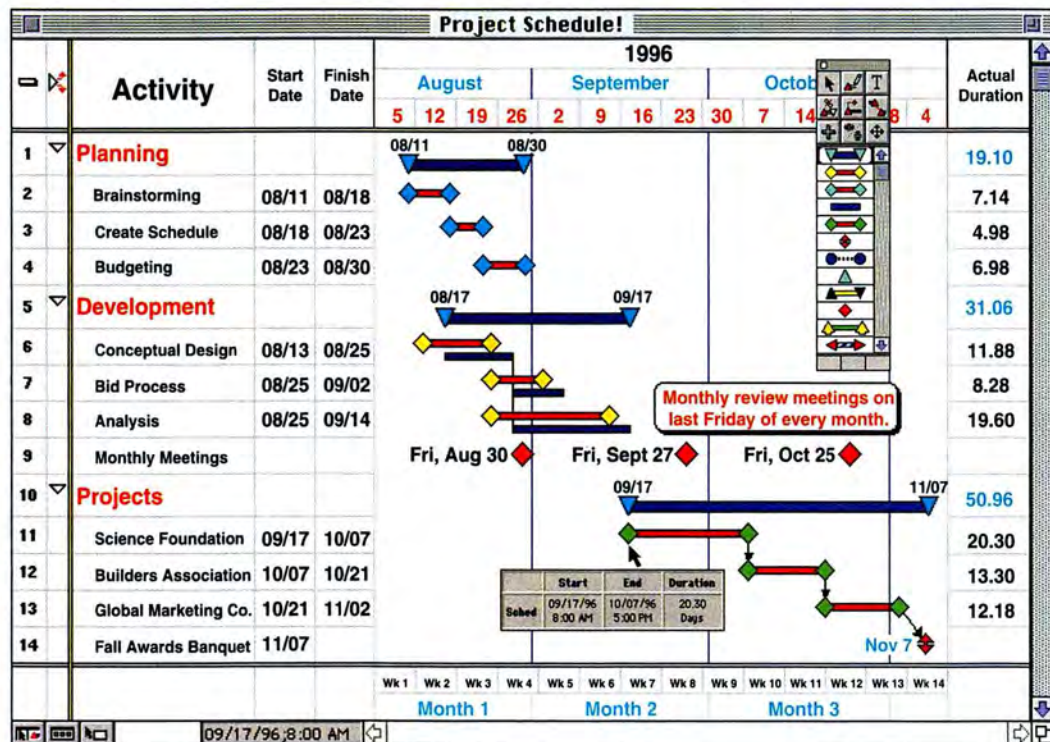
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Apple licenses Java VM and just-in-time compiler

By James Staten

Apple announced in May that it has licensed Natural Intelligence Inc.'s Java Virtual Machine and just-in-time compiler to use as the basis for its implementation of Java in the Mac OS.

Larry Tesler, Apple vice president of Internet platforms, said the company will build a new, hybrid version of Java by combining Natural Intelligence's Virtual Machine, or VM, with Mac code from Sun Microsystems Inc.

"We'll take code from both places and create the best — the fastest — implementation of Java on any platform," he said.

Tesler added that Apple is committed to delivering the integrated VM to users this year, most likely in the interim system software update code-named Harmony.

The Java VM is a runtime interpreter needed to execute Java code on a given platform; Java-enabled programs and applets execute within the VM.

Normally a vendor must license and ship a VM with any Java product. If it is built into the operating system, vendors can assume the VM's presence, which will ensure that the Macintosh can execute their applets. A Macintosh just-in-time compiler makes the interpreted Java code run faster by converting it into machine code immediately prior to execution.

Apple licensed the Java source code from Mountain View, Calif.-based Sun in April. Natural Intelligence of Cambridge, Mass., is not a Sun licensee; its Java tools are based on its own in-house implementation of Sun's language specification.

Tesler said the primary reasons for choosing Natural Intelligence were time-to-market concerns and end-user performance.

"We focused on the question of 'How do you do a very good implementation of Java?'" Tesler said. "We've licensed the stuff from Sun, but the Natural Intelligence guys know the Mac; they've done the work."

Hillel Cooperman, director of marketing for Natural Intelligence, said Apple expressed an appropriate urgency for delivering Java to Mac users. "They want to get this out as soon as possible," he said. "It's on a very aggressive schedule." □

Macs to divide along CPU lines

By Joanna Pearlstein

Apple is reportedly working on a plan to bisect the desktop Power Mac line into two streams later this year: high-end systems will use the upcoming PowerPC 604e chip and entry-level models will be based on the PowerPC 603e.

Sources close to the company said Apple wants to use the fastest PowerPC processors wherever possible to better compete with Intel-standard PC systems.

At the center of Apple's high-end plans is a group of CPUs code-named Montana, a project that reportedly aims to use 604e processors running at speeds as high as 225 MHz. One source said Apple chose the code name because Montana "is the only state without a speed limit."

The Montana line is expected to cost between \$2,500 and \$5,000, depending on speed and configuration, and is scheduled for a November introduction under the Power Mac Pro name.

Apple is reportedly considering releasing the Power Mac Pro systems in 166-, 180- and 200-MHz speeds. It is also looking at using a 225-MHz version of the 604e chip in a high-end Montana box.

Some Montana Macs will reportedly come in a new, larger enclosure that includes four 5.25-inch drive bays, three 3.5-inch bays, six PCI slots and the capability to add multiple

Apple to take the high road

POWER MAC PRO:

- ▶ Code-named Montana
- ▶ High end
- ▶ 166- to 200-MHz PPC 604e
- ▶ Due in late 1996
- ▶ Alternative I/O
- ▶ Multiple processor support



processors. Other offerings in Montana may include an 8x CD-ROM drive, multiple processors, and video-in and -out.

Sources were less clear about Apple's plans at the low end of the spectrum but said a key component of Apple's entry-level system plans for the short term is a machine code-named Instatower, reportedly due to ship in July.

Apple has reportedly increased the Instatower's speed from its original 120-MHz plan to 140-, 160- and 180-MHz 603e-based versions. Aimed at both consumers and entry-level business users as a multimedia tower, Instatower configurations will cost between \$2,000 and \$3,000.

Apple declined to comment. □

Internet's New Frontier

By Clifford Colby

UserLand Software Inc. took its scripting application into new territory this May with the release of Version 4.0 of Frontier.

The free Apple-events scripting software has been tuned for the Internet and includes Web-site-administration and -automation features.

The company said Version 4.0 includes HTML text handling, allowing users to write HTML in Frontier and upload it to a Web site. The update lets users manage URLs (uniform resource locators) via glossaries. Users can place text in double quotes, and when the double-quoted text is run through the URL

glossaries, Frontier will automatically link the text to an assigned URL.

Version 4.0 includes templates for Web pages and lets users include scripts in their HTML text. The software runs native on Power Macs, and UserLand said this version is up to 46 times faster than AppleScript.

A version of Frontier due this summer will be able to run AppleScript CGI (Common Gateway Interface) scripts multithreaded and unmodified, UserLand said. Frontier can run scripts from any Open Scripting Architecture language.

UserLand Software Inc. can be reached at <http://www.scripting.com/frontier/>. □

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REVIEWS

Mac OS Systems

Power Mac 9500/150	★★★★
Power Mac 8500/150	★★★★
Power Mac 7600/120	★★★★
PowerTower 180	★★★★½
PowerTower 166	★★★★½
PowerCenter 150	★★★★½
PowerCenter 132	★★★★½
PowerCenter 120	★★★★½
SuperMac S900L	★★★★

UMAX offers its first clone, and existing systems get faster.



IT'S RACING SEASON in the world of the Mac OS, as speedy new systems from three vendors line up at the retail starting gate. The field includes familiar (but nonetheless new) rigs from Apple and Power Computing and an all-new system from the latest entrant in the Mac-compatible field, UMAX Computer. The new systems are all based on PowerPC 604 chips, and collectively they set speed expectations for Mac OS systems another notch or two higher.

We tested UMAX's SuperMac S900L along with shipping versions of the "speed-bumped" machines from Apple and Power Computing we told you about in our last issue ("Power Takes the Lead," July '96, page 75). Consult the charts and "The Bottom Line" to see the standings at the checkered flag. But first, here's an introduction to the latest arrival on the Mac OS-system scene.

UMAX SuperMac S900L

Video editors and prepress pros should take a serious look at UMAX's first Mac OS system, the SuperMac S900L, which is built around a 150-MHz PowerPC 604 processor. The S900L offers an appealing alternative to the Power Mac 9500/150 for those who want or need a six-PCI-slot tower design.

Outside, the S900L's case sports stylish

waves down the sides and stands about the same height as Apple's Power Mac 9500. The CD-ROM tray and floppy slot are hidden behind a door. We like the way it unifies the look of the box, but we found opening and closing the door to insert and eject media a little tedious. Below the front-panel speaker, UMAX has added microphone and headphone ports, among the several thoughtful touches that distinguish the S900L.

Around the back, the S900L looks similar to the 9500, with AAUI and 10BASE-T Ethernet connectors, two serial ports, a SCSI connector, and a minijack connector for external speakers. Two ADB ports (compared to one on the 9500) will be appreciated by graphic artists who want to connect tablets and ADB copy-protection devices.

Opening up the S900L is child's play compared to the process with Apple's 9500. A single screw holds the side panel in place. Twist and pull, and you're inside. Very elegant. Once the computer is open, the six PCI slots and eight DIMM slots are easily accessible, as are the drive bays — one slim 3.5-inch and two half-height 5.25-inch spaces.

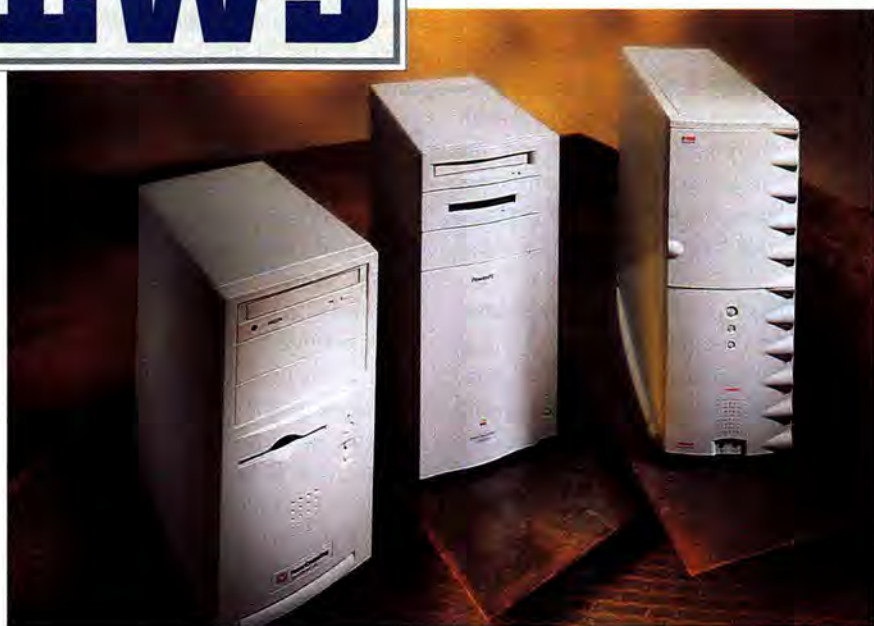
The S900L's logic-board design is derivative of the 9500 but has several important enhancements, chief among them an expansion slot for a second processor

card. UMAX plans to offer the SuperMac P150 upgrade card (\$995), which adds a second 150-MHz PowerPC 604 to the system. (Processor cards from other Mac OS-system manufacturers don't work in the slot.) We were unable to test the additional processor card, but it should offer increased speed for applications written to take advantage of multiprocessing, such as Adobe Photoshop and After Effects. UMAX has promised to provide faster 604-based processor cards as soon as they become available.

The six PCI slots also offer some capabilities not found in the 9500 or any other Mac OS system. Slot A features a special connector that essentially acts as two PCI slots when fitted with the SuperMac E100 upgrade card, a combination Ultra SCSI and 100BASE-T card UMAX created, using designs from FWB and Asanté. At \$495, the card is significantly less expensive than getting separate Ultra SCSI and 100BASE-T cards. The E100 card was not available for testing at the time of our review.

The S900L box's PCI architecture differs in

another important way from the 9500's: In the S900L, the six PCI slots are governed by a PCI controller; in contrast, the 9500 uses two controllers that each control a bank of three slots. According to UMAX, its approach results in



REVIEWS RATING KEY

★★★★★	OUTSTANDING
★★★★	VERY GOOD
★★★	ACCEPTABLE
★★	POOR
★	SERIOUSLY FLAWED
☹	DANGEROUS

better throughput between PCI cards, because a single controller means less overhead.

All S900L systems ship with an IMS Twin-Turbo video card containing 4 MB of VRAM. The card supports resolutions up to 1,152 x 870 pixels at 24 bits. We've experienced some minor display bugs with this card in the past, but the version of the driver that ships with the S900L fixed these problems. Overall, the card performs as well as or better than the ATI card that ships in Apple's Power Mac 9500, and it's well suited for image and digital-video editing.

The S900L ships with 16 MB of interleaved RAM soldered on the motherboard. The 8 DIMM slots accommodate up to 1 GB of RAM, in the form of 128-MB DIMMs. Also, the slots aren't obstructed by the power supply or the drive bays, as they are in the 9500, making it easy to add larger Series 3 DIMMs or DIMM trees — devices for combining two 72-pin SIMMs into a single DIMM.

UMAX bundles four utilities to make maintaining the system easier. The bundle includes Casady & Greene's Conflict Catcher 3, for resolving extension conflicts; Asanté Net-Doubler, for speeding Open Transport-based file transfers on Ethernet or Fast Ethernet; and FWB's Hard Disk ToolKit and CD-ROM ToolKit, for configuring your disk and CD-ROM drives. These utilities worked as intended, but they don't really match the productivity bundles offered by rival Power Computing.

The S900L held its own in our speed tests, performing on a par with the 150-MHz

PowerCenter and Power Macs on the Processor and Floating Point tests. Its speedy internal 2-GB IBM IDE drive earned it a first-place finish on our Disk Mix tests, and its 4 MB of video RAM and IMS graphics card won it high marks among all the new systems on our Graphics Mix tests.

The Bottom Line

Mac OS licensees are really giving Apple a run for its money — and for your hard-earned cash as well. Power Computing's PowerTower 180 is the fastest Mac OS system available today, followed closely by the PowerTower 166. The PowerTowers we tested are more expensive than the base-model Power Mac 9500/150, but you get lots of extras for the sub-\$700 difference in price: Both PowerTowers come outfitted with 32 MB of RAM (compared to 16 MB in the 9500) and an optional IMS TwinTurbo-128 graphics accelerator. Factor in the scads of productivity software Power bundles with every box, and the result is significant value.

The UMAX SuperMac S900L is priced about \$400 lower than the 9500/150 and offers comparable or better speed plus several compelling extras, including dual-processor support; refined PCI architecture; 2 MB of additional VRAM; and an elegant option for incorporating Ultra SCSI and Fast Ethernet with a single, competitively priced upgrade card. Although it may not match the PowerTowers in raw processing speed, it has a distinct edge in flexibility.

Descending from the towers to the realm of basic business systems, the Apple Power Mac 8500/150 still stacks up favorably, and its audio/video-capture and -playback options mark it as *the* out-of-the-box business multimedia machine. For the \$1,400 you'd save by buying the Power Computing PowerCenter 150, however, you could add on a decent business-class video-editing package — and you'd still also get Power's productivity-software bundle.

The lower-speed PowerCenters and the Power Mac 7600/120 all offer appealing systems for the money. Whether the 7600 is worth the \$500 premium over the PowerCenter 120 depends on whether you need the 7600's video-in capabilities for low-end movie editing or videoconferencing. If not, your money would be better spent on a faster Power Computing machine. / Sean J. Safreed and Jim Shatz-Akin

Apple Power Mac 9500/150 (16MB/2GB/512K), \$4,365; **Power Mac 8500/150** (16MB/2GB/512K), \$4,425; **Power Mac 7600/120** (16MB/1.2GB/512K), \$2,709 (estimated street). **Company:** Apple Computer, Cupertino, CA; 800-776-2333 or 408-996-1010; <http://www.apple.com/>. **Reader Service:** Circle #401.

Power Computing PowerTower 180 (32MB/2GB/512K), \$5,050; **PowerTower 166** (32MB/2GB/512K), \$4,650; **PowerCenter 150** (16MB/1GB/512K), \$2,995; **PowerCenter 132** (16MB/1GB/512K), \$2,495; **PowerCenter 120** (16MB/1GB/512K), \$2,234 (direct). **Company:** Power Computing, Round Rock, TX; 800-405-7693 or 512-246-7807; <http://www.powercc.com/>. **Reader Service:** Circle #402.

UMAX SuperMac S900L (16MB/2GB/512K), \$3,995 (estimated street). **Company:** UMAX Computer, Fremont, CA; 800-232-8629 or 510-226-6886; <http://www.supermac.com/>. **Reader Service:** Circle #403.



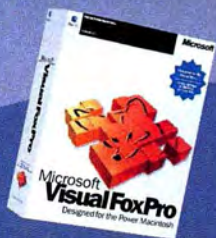
SPEED TRIALS / new systems face off

To determine how the UMAX SuperMac S900L stacks up against newly "speed-bumped" machines from Apple and Power Computing, we ran MacBench 3.0, Ziff-Davis' benchmarking software, which is a good indicator of speed for a variety of tasks. The products are grouped by company within each category. All MacBench 3.0 scores are relative to those of a Power Mac 6100/60 with an internal 250-MB Quantum hard drive, which is assigned a score of 10.0 in each test.

MACBENCH 3.0 SCORES						
	Processor	Floating Point	Disk Mix	Publishing Disk Mix	Graphics Mix	Publishing Graphics Mix
HIGH-END SYSTEMS						
Apple Power Mac 9500/150 (16MB/2GB/256K)	29.9	30.3	21.8	16.1	47.6	25.7
Power Computing PowerTower 180 (32MB/2GB/512K)	36.4	35.4	23.5	17.8	60.8	55.6
Power Computing PowerTower 166 (32MB/2GB/512K)	33.3	32.7	23.2	17.6	58.3	52.2
UMAX SuperMac S900L (16MB/2GB/512K)	31.0	30.4	30.4	17.8	53.3	59.2
BUSINESS SYSTEMS						
Apple Power Mac 8500/150 (16MB/2GB/256K)	26.5	30.2	22.0	15.8	29.2	25.5
Apple Power Mac 7600/120 (16MB/1.2GB/256K)	24.7	23.7	26.5	17.7	24.8	20.8
Power Computing PowerCenter 150 (16MB/1GB/512K)	31.0	29.5	25.3	16.2	29.7	33.6
Power Computing PowerCenter 132 (16MB/1GB/512K)	27.3	26.0	25.0	16.0	26.6	29.6
Power Computing PowerCenter 120 (16MB/1GB/512K)	24.7	24.0	24.5	15.7	23.9	27.2
	SCORE BETTER	SCORE BETTER	SCORE BETTER	SCORE BETTER	SCORE BETTER	SCORE BETTER



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After all, the powerful object technology of Visual FoxPro lets him create class libraries with inheritance and encapsulation and therefore reuse code quickly and easily. Fred has no trouble integrating data, either, whether it's located in applications, client/server databases, or local datastores. And because of Visual FoxPro's complete binary compatibility, he can develop in the familiar Mac™ environment and rest assured that all code, including Visual FoxPro objects, will run in Windows® 3.1 and Windows 95 operating systems with no modifications.

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Polaroid PDC-2000



Instant images, '90s-style:
Polaroid goes digital.



IT WAS INEVITABLE that Polaroid, the pioneer of "instant" photography, would eventually join other camera makers in offering a digital camera. After all, what could be more instant than an image captured electronically, without film or chemicals? Polaroid's PDC-2000 is true to the instant-photo tradition — even as it breaks new ground in the digital-camera arena.

Historically, digital cameras have fallen into two segments: High-end models, oriented toward professional photographers, provide high-resolution images and come with a price to match — at least \$15,000. Low-end cameras, by contrast, target small-businesses and consumers and trade point-and-shoot ease of use and prices around \$1,000 each for images of lower quality and resolution. The PDC-2000 stakes out the middle ground, creating impressive images from a 1,200-x-1,600-pixel CCD but with a price (under \$4,000 for the model we tested) far lower than that of any other camera of comparable quality. Unfortunately, it still has a way to go before it becomes a practical replacement for a 35mm field camera.

You'll never mistake the PDC-2000 for Grandpa's Brownie or for any other camera — traditional or digital — you've seen before. About the size of a paperback dictionary, it has a curvy, flat-black metal case. When someone's aiming the camera at you, four protrusions glint from the camera's black body: the lens, the viewfinder, a built-in flash, and a sonar range finder. Five buttons and an LCD atop the camera are for adjusting settings and getting camera-status information. Rubber grips make the camera easy to hold either horizontally or vertically.

The PDC-2000 has two resolution levels: high-res (800 x 600 pixels) and super-high-res (1,600 x 1,200 pixels). The images are not only significantly higher-resolution than those captured by most digital cameras but they're generally extremely high-quality as well. At its

best, the camera delivered remarkably sharp images, with rich, realistic colors and subtle shading. They ranked among the best we've seen from any digital camera, especially after minor cleanup in Photoshop.

Achieving top-quality images with the PDC-2000 wasn't always effortless, however: The automatic exposure setting worked reasonably well in many situations, but the camera occasionally ignored its center-weighted light meter and underexposed well-lit subjects. We often found ourselves wishing we could override the automatic settings to get the best-possible exposure. The camera's controls include a white-balance adjustment for



Black, sleek, and curvy, the Polaroid PDC-2000 looks nothing like any other camera.

choosing between fluorescent and incandescent indoor lighting; this adjustment is easy to make, using the well-labeled button. Far less easy to use is a function that lets you label each image with a ten-character designation by "typing" with buttons on the camera.

One control we found ourselves wishing for was an interlock to prevent you from taking a picture with the lens cap on. You get a flashing red light in the viewfinder when the cap is in place, but you can still trip the shutter — and we did several times. Thankfully, the camera allows you to erase images selectively, but wasted shots cost precious battery life.

Memory Storage

The PDC-2000 stores your images in flash memory. The basic model comes with 40 MB of RAM and stores 40 super-high-resolution images. A 60-MB version of the PDC-2000 is available for about \$1,300 more, and there's also a RAM-less model, which downloads all images directly to a computer as you take them, available for about \$1,700 less.

Unlike competing cameras such as Kodak's DC50 that use removable PC Card RAM, the PDC-2000's memory is fixed in place. According to Polaroid, eliminating the removable-memory hardware reduces costs and keeps the PDC-2000 case light and compact. That may be true, but we'd welcome a way of increasing the camera's image capacity if our needs demanded it.

Capacity aside, however, pros working in the field will find a few other significant limitations on the PDC-2000's practicality: Its four nickel cadmium AA batteries barely lasted through a 40-image shooting-and-download session, despite the camera's autoshutoff energy-conservation feature.

The PDC-2000 connects to your computer's SCSI port and comes with a standard 25-pin adapter and a 25-pin-to-50 pin converter but no 30-pin PowerBook connector. Supplied software (both a stand-alone application and an Adobe Photoshop-standard plug-in) lets you view images stored in the camera on your Mac and then download only those you wish to keep. You can also use the software to change camera settings or take photos whenever the camera is connected.

Downloading 40 super-high-resolution images took over 15 minutes — a long time to be away from the action. Even worse for field photography, the PDC-2000's short battery life makes an AC outlet a practical necessity for downloads.

Since the PDC-2000 is not built on a modified 35mm camera body, it doesn't use standard lenses. It ships with a lens Polaroid designates as being equivalent to a standard 38mm camera lens, and the company sells an optional 60mm-equivalent lens for \$199 list. Professional photographers may be frustrated that more options aren't available; pros and amateurs alike may long for a zoom option.

The Bottom Line

The PDC-2000 is capable of taking outstanding digital photos equal in quality to those of digital cameras two to three times its cost. But limitations in battery life, lens options, and image-storage options seriously hinder the PDC-2000's usefulness as a professional field camera. Polaroid is definitely off to a good start in its digital-camera debut; we look forward to future refinements. / Rick Oldano

Polaroid PDC-2000, \$3,695 (list). **Company:** Polaroid, Cambridge, MA; 800-816-2611 or 716-256-4436; <http://www.polaroid.com/>. **Reader Service:** Circle #404.



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Director 5



Despite a few snags, upgrade offers impressive benefits.

LONGTIME USERS of Macromedia's Director, the world's leading animation and multimedia-authoring program, will find much to like in the program's latest upgrade, a revision that also makes the dauntingly complex program more approachable for beginners. Enhancements in Director 5 address long-standing flaws in the program, simplify common tasks, and boost the program's overall speed and flexibility. Despite a few bugs, Director 5 should be considered a mandatory upgrade for all Director users.

Director 5 retains its predecessor's vast array of tools for creating and editing interactive multimedia programs, but a new interface design — including tool bars, buttons, and streamlined palettes — makes program functions more accessible. By making tool functionality more obvious, the new design also lessens Director's still steep learning curve. So does a new online help system, one of the best we've seen, which reduces Director's printed documentation by about a third.

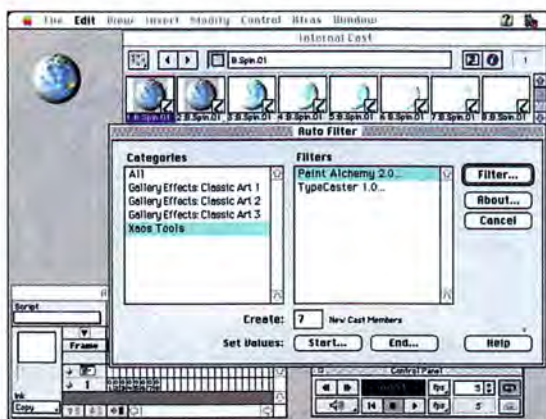
Beyond the new interface, one of the first changes experienced users will notice in Director 5 is the ability to create multiple casts, or libraries of animations, images, and other media for building Director projects. Previous versions of Director limited you to one cast per project. Version 5 enables you to organize casts on a scene-by-scene basis and to create templated scenes you can reuse by switching casts.

Another new feature that simplifies scene creation is the ability to overlay a snap-to grid on the Stage — the active area where a Director movie's action takes place. This grid makes it much easier to arrange multiple objects and characters on the Stage. A buggy implementation limits its usefulness, however: If you don't create a grid at the outset of a project, you may not be able to turn it on later.

The new onionskinning feature is better implemented. When you are animating a

particular cast member, you can use this feature to see ghosted images of other nearby cast members as they appear in the current scene or in past or future scenes. This is a great help in coordinating object motions.

Director 5 at long last addresses one of the program's greatest historical weaknesses, type handling. Director can now generate anti-aliased type, which greatly improves the appearance of titles, labels, and other text. Even better, it can also handle real-world typographic formatting — basic kerning, tracking, leading, indents, and tabs. These advancements are welcome, although there's still room for improvement: Support for tabs and indents is weaker than we'd like, for instance. And anti-aliasing is confined to text you create as the



Via the Auto Filter tool, Director lets you interpolate some third-party Photoshop filters over time, like this gradual erosion effect in Xaos Tools' Paint Alchemy.

author; text the user types in (a player name in a game, for example) is not anti-aliased. Additionally, although Director can now import raw text and RTF (Rich Text Format) files as cast members, many RTF attributes are not preserved, and we'd still like to see direct support for popular word-processing formats.

Director's paint module, long considered its weakest link, gets a much needed boost from the addition of support for Adobe Photoshop and Adobe Premiere plug-ins. The new Auto Filter tool even lets you apply some Photoshop filters over time, by "tweening" from the unfiltered image to the transformed final one over as many frames as you specify. Unfortunately, only a small subset of the available Photoshop filters can be applied this way. Furthermore, using Auto Filter produced a variety of annoying redraw problems.

Not content with supporting a competitor's plug-in scheme, Macromedia has introduced a new plug-in architecture for Director itself. You can now use plug-ins called Xtras to add

new tools directly to Director. Out-of-the-box Xtras include Animation Wizards — which automatically create simple text effects such as animated bullet charts, zooming, and scrolling — and a utility for batch-updating earlier versions of Director documents.

Lingo, Director's programming language, continues to enjoy meaningful improvements in version 5. More than 100 new commands have been added, including scripting for Shockwave files (the format for playing Director projects on the Web). Code execution is significantly faster, and an interactive debugger replaces Director's largely useless message window.

General playback improvements include the ability to preload a Director 5 movie in the background while another is playing, which boosts the speed of launching a movie within a movie. And Director's tools for optimizing playback from CD-ROM remain unmatched.

The price of Director has gone down significantly, especially in a new bundle, called Macromedia Studio 2, that also includes Macromedia's other production applications — xRes, Extreme 3D, DECK II, and SoundEdit 16 — for \$999. The interaction among the various Macromedia applications has been enhanced, with standardized interfaces and a new cross-application common scripting language. For example, double-clicking on an audio cast member in Director automatically launches SoundEdit 16. Although we're pleased by the pricing, we're sorry to see that technical support for Director is now free for just 90 days from your first help call; after that, you have to cough up a hefty fee for continued support, a drawback for individual users and small production studios.

The Bottom Line

Nearly every enhancement in Director 5 makes the program more useful for professional multimedia developers. And although we're looking forward to a bug-fix upgrade in the near future, the flaws we uncovered were annoying but not project-threatening. These shortcomings aside, Director remains the most comprehensive authoring and multimedia-production tool available for use on the Mac and on Windows platforms. / David Biedny and Nathan Moody

Director 5, \$850, or \$999 as part of Macromedia Studio 2 (estimated street). **Company:** Macromedia, San Francisco, CA; 800-326-2128 or 415-252-2000; <http://www.macromedia.com/>. **Reader Service:** Circle #405.

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Connectix Color QuickCam

★★★½

New digital 'eyeball' camera focuses on color.

ADMIT IT: YOU JUSTIFIED BUYING a black-and-white Connectix QuickCam as a business expense — to experiment with videoconferencing maybe, or to snap an occasional photo or movie for inclusion in a presentation — but you ended up using it mostly for fun. We suspect that Connectix's long-awaited Color QuickCam will find similar uses. Even though it's more than twice as expensive as the \$99 black-and-white version, it's by far the most affordable color digital camera around. And even though it's plagued by annoying visual artifacts, you *can* coax decent images from the camera, and it's undeniably fun.

From the outside, the Color QuickCam is virtually identical to its black-and-white cousin. The most telling difference between them is a notched collar surrounding the Color QuickCam's lens, for adjusting focus. There's also a difference

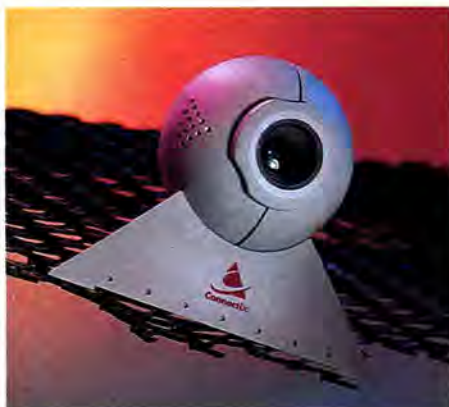
on the cable end: Because it requires more electric power than the Mac's serial port can supply, the Color QuickCam has connectors for both the ADB and the serial ports. (The ADB connector has a pass-through, so you can still hook up other ADB peripherals along with the camera.)

Inside the QuickCam is the gadgetry that uses the extra juice: a charge-coupled device (CCD) that captures images at up to millions of colors at a 640-x-480-pixel resolution and a chip that delivers Connectix's new proprietary video compression, VIDEDEC (Video Digitally Enhanced Compression). VIDEDEC enables the Color QuickCam to deliver movie frame rates comparable to the original QuickCam's, despite the need to process three times as much data (red, green, and blue color channels, instead of only a single black-and-white channel).

An X-ray view of the Color QuickCam also reveals the absence of one component included in the original camera: The built-in microphone was scrapped to make room for the VIDEDEC chip. You can employ any Mac-compatible microphone instead, but you may have a hard time figuring out how to do so — we couldn't even find the word *microphone* in the Color QuickCam manual.

Like the black-and-white camera, the Color QuickCam comes bundled with two programs — one for creating videos and another for capturing still images. With color comes a wider range of image-quality adjustments for both programs and a few nifty new features as well.

The original software let you adjust image brightness but not much else — and that was just about all you needed. The color camera's controls govern brightness, white level, hue, saturation, black level, and sharpness. The three-level sharpness control is particularly



Collar ID:

You can tell the Color QuickCam from its black-and-white cousin by its lens-adjustment ring, or collar.

important, since it allows you to trade image quality for video frame rate: The least sharp setting, which Connectix recommends for videoconferencing, gives you smooth video by sacrificing the number of pixels captured in each frame.

The Color QuickCam manual touches on each of these controls only briefly, but you won't have to worry about them most of the time, thanks to the camera's Auto Hue and Auto Brightness settings: When activated, these controls set the camera's color and brightness controls automatically. We were hard-pressed to improve on them in normal indoor room lighting.

New features of the still-image photo software include AutoCapture, which enables you to take shots at any interval you choose, and an automatic timer that snaps a picture after any delay you specify.

Focus on Focus

A welcome improvement to the Color QuickCam is adjustable focus. To users of the original QuickCam who've longed for variable focus, this will sound like a boon, but it's more necessity than luxury: The Color QuickCam's lens is far less forgiving than its predecessor in terms of focal depth. An object a foot from the camera and one six feet away would both remain in focus with the original QuickCam, but with the Color QuickCam, focusing on one of those would blur the other.

Given the need for frequent focus adjustments, we wished the Color QuickCam's focusing knob had been more responsive. Twisting the focus ring to widen the focus sometimes seemed to have no effect on-screen, and the ring turned so easily it offered little feedback. Conversely, when we were tightening the focus, the knob offered so much resistance that we needed two hands to twist the ring — and twice snapped it off. It snapped right back on, but we were left with a distinct impression of cheesiness.

In terms of overall image quality, the Color QuickCam is at once better and worse than its predecessor: Along with adding color, Connectix has succeeded in improving on the black-and-white camera's image sharpness, all without dropping video frame rate. However, the images are unfortunately marred by persistent *blooming* — the presence of flat-white artifacts, with some green or blue around their edges, that appear no matter what the lighting conditions are. This problem diminishes significantly when you're taking close-up shots of still objects, but it makes the Color QuickCam useless for serious video work.

The Bottom Line

Given its price, the Color QuickCam is a remarkably good color digital camera, and the automatic adjustments in its video-recording and still-photo software make it easy to use. Despite many improvements over the camera's black-and-white predecessor, though, the Color QuickCam's image quality is seriously marred by the blooming effect. The camera's professional uses should be limited to occasional still shots for presentations or "rough draft" video prototypes. Or you can use it just for fun. / Nancy Peterson

Connectix Color QuickCam, \$230 (estimated street).
Company: Connectix, San Mateo, CA; 800-950-5880 or 415-571-5100; <http://www.connectix.com/>.
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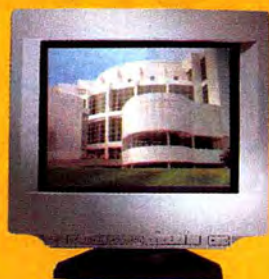
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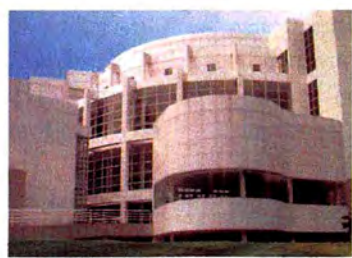


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Pantone ColorDrive



Color management shoots for less-spotty spot color.

MOST COLOR-MANAGEMENT systems tackle the tough problem of simulating output from CMYK process-color presses, both on-screen and on low-cost proofing printers. Largely neglected has been another thorny — and extremely common — color problem facing desktop publishers: matching Pantone spot colors from monitor screen to composite desktop color printer to four-color press. Pantone's ColorDrive 1.5 provides the best solution we've seen to the problem.

Process color is produced with four inks — cyan, magenta, yellow, and black — which are printed sequentially. Spot color involves mixing inks before printing — each spot color uses a different ink mixture. For years Pantone, the industry leader in providing spot-color inks and spot-color specification systems, has distributed color libraries and swatch books that purport to provide CMYK equivalents for Pantone spot colors. Those who have tried these solutions have quickly found them problem-fraught and confusing. For example, Pantone has distributed several different sets of CMYK values for some colors over the years, so sometimes two different applications would use different Pantone-sanctioned values to simulate the same Pantone spot color.

Apart from these blatant ambiguities, a larger problem is the device-specific nature of CMYK color specifications. There simply is no one-size-fits-all set of CMYK equivalents that produce the desired color on all color printers or under all press conditions. ColorDrive addresses this problem by using color-management technology to furnish device-specific values needed to reproduce a Pantone color on a given monitor, printer, or press setup.

Palette Pal

ColorDrive 1.5 replaces the generic Pantone libraries that accompany numerous graphics and DTP applications with palettes that are calibrated for your specific output devices. You still have to load your custom palettes manually into each application and, if you employ multiple output devices, keep track of which

palette is targeted to which device.

For Pantone-licensed printers, the program includes a set of special visually calibrated color-matching libraries created by Pantone color scientists. For other devices, the program uses ColorSync 2.0-format (ICC) device profiles to calculate a calibrated color library.

In practice, we found more-consistent color matches for Pantone colors from the visually calibrated libraries than we did from ColorSync-generated palettes. This is no surprise: A given printer's ColorSync profile contains visually measured values for somewhere between 200 and 800 colors distributed throughout the range of colors the device can reproduce; matches for the remaining 16.7 million on-screen colors are calculated by interpolation of these measured values. By contrast, the visually calibrated libraries have precise values for each of the thousand or so



Pantone ColorDrive lets you preview the accuracy with which your printer will reproduce spot colors.

Pantone colors and require no interpolation.

ColorDrive contains color data for all the Pantone libraries, including Hexachrome, Metallics, Plastics, and Textiles. In most cases, the color information is saved as spectral data, the most unambiguous type of color specification available. (Spectral data is produced by a spectrophotometer, an instrument that divides the visible spectrum into bands and records the amount of light energy present in each band.) The only exceptions are the Pantone Process library and the printer-specific libraries, which store CMYK values.

To build a palette for a particular project or print job, you drag and drop colors from any of the Pantone libraries into a new palette document — or add new colors you measure

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Considering the move to Fast Ethernet? Look to MacUser's October issue for in-depth coverage of Fast Ethernet issues. Learn the pros and cons to running Fast Ethernet on a Mac network and why there are performance differences between PCs and Macs. Our editors test and mouse-rate 11 Ethernet cards for NuBus and PCI Macs. Our editors also offer alternative hardware and software solutions for boosting your network's performance.

AND THE WINNERS ARE...

MacUser, in conjunction with Ziff-Davis Interactive, pays tribute to the selfless software programmers who give their software away for free (or close to it). Shareware, with its try-it-before-you-buy-it credo, is the best deal out there for Mac users. Tune in to the October issue for the 1996 MacUser Shareware Awards. Winners will be announced in 10 categories, including Utilities, Graphics, Networking Tools and Education.

MOVING TO IP

Should you switch to IP or stay with AppleTalk? In our October issue, we address the pros and cons of using IP with your network. Whether you are a network administrator or a home-office Mac user, this issue will help you make the right decision for your needs.

OCTOBER AD CLOSE:

TUESDAY,

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from physical objects with a spectrophotometer. The program supports several popular spectrophotometers, including the low-cost Light Source Colortron and the X-Rite Digital Swatchbook. Spectrally measured colors behave just like Pantone colors.

To calibrate a palette for a specific device, you use the Matching Options dialog box to select your monitor profile for accurate screen display and your printer profile for accurate color output on your chosen output device. You can save the palette in application-specific formats for most popular page-layout and graphics applications, including QuarkXPress; Adobe Illustrator, PageMaker, and Photoshop; and Macromedia FreeHand. For applications that aren't directly supported, you can save the palette as an EPS file — you open the file in the application and then read the color values from it manually.

To give you an idea of just how accurate your new palettes will be, ColorDrive lets you simulate on-screen the way the printer will render your colors. The Simulate button opens a new window that shows the actual Pantone colors next to the printer simulations. The accuracy of these simulations depends entirely on the accuracy of your monitor profile — with a good custom monitor profile generated by a measuring device, they're excellent. What they tend to show you is that some Pantone colors will simulate a lot more accurately than others on your chosen printer.

The Bottom Line

ColorDrive won't get you perfect matches of every Pantone color on every device, but it will give you consistent simulations of Pantone colors, some more accurate than others, while showing you ahead of time just how close the simulations will be. There are pitfalls associated with its use, but they aren't of Pantone's making. The transitional state of color management makes current application support patchy at best. With ColorDrive, the application doesn't need to support color management. You do have to manage all the palettes yourself, however, and you have to make sure the application isn't trying to apply its own color management to your custom color palettes. Despite these caveats, ColorDrive 1.5 is a very valuable tool for anyone trying to control Pantone color. / Bruce Fraser

Pantone Color Drive 1.5, \$199 (list). **Company:** Pantone, Carlstadt, NJ; 800-222-1149 or 201-935-5500; <http://www.pantone.com/>. **Reader Service:** Circle #412.

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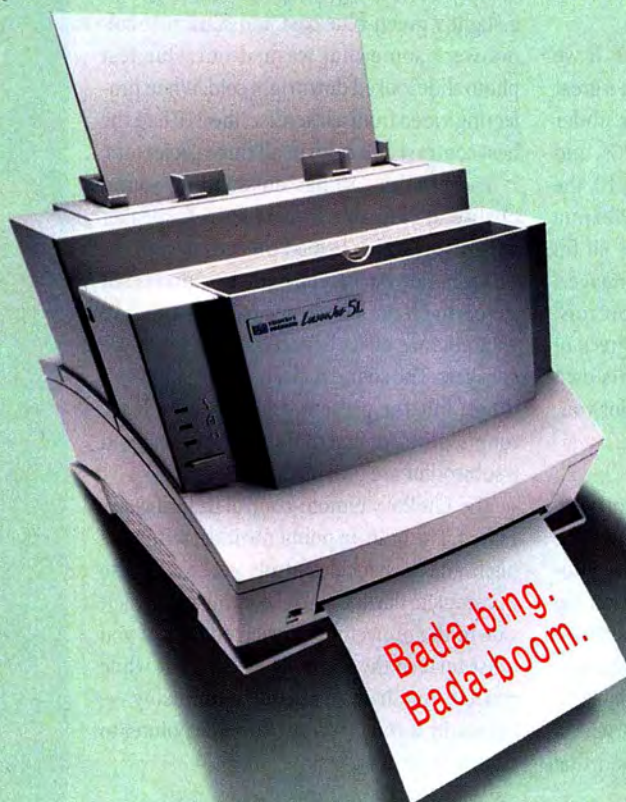
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Portable Multimedia Presentations

InFocus LitePro 210 ★★★★★^{1/2}

Lightware Viewpoint 100 ★★★★★

Proxima Desktop Projector 2400 with Cyclops ★★★★★

Three projectors worth seeing — and hearing.



WHAT WOULD YOU SAY if we told you that you could get a great multimedia projector for under \$7,000 with full support for Macs, PCs, and video players? The InFocus LitePro 210, the Lightware Viewpoint 100, and the Proxima Desktop Projector 2400 with Cyclops all fill the bill. All three offer bright, clear images; responsive LCD screens; remote controls; and built-in speakers of varying degrees of quality. Each system stands out for its own reason — find out which one's right for you.

InFocus Systems LitePro 210

The LitePro 210 from InFocus is not your garden-variety projector. For starters, in place of the stereo speakers common to other multimedia projectors, it has one speaker on top and another at the rear of a cone-shaped tube that also houses the projector's lens. Flip up a lid on the left side, and you'll find well-labeled, backlit controls. And finally, it ships with a CableWizard, a unique connection pod that

lets you hook up to the mouse, video, and audio ports of either a Mac or a PC with one set of reversible cables. Neat.

The light source in the 210 is the now common metal-halide arc lamp. This kind of lamp has a very long life, although its brightness diminishes over time, so you may want to replace the lamp assembly before the 210's warning light tells you to do so.

The 210's lens had some distortion, producing a slight pincushion effect (inward warping of the sides of the images), with a slight bulge in the top of the projected image. The keystone control did a good job of equalizing the top and bottom sides of the projected image.

Image quality on the LitePro 210 was generally good, although the projected image had a slightly green-blue cast and saturated colors were somewhat washed-out. Our test photo slide looked downright cold. When projecting video from a laserdisc, the 210 had the best contrast and color of all three projectors.

The LitePro 210 has outstanding sound quality, attributable in part to hi-fi speaker maker JBL, which helped InFocus design the 210's sound system. The built-in sound is not stereo, but it does use some tricks to produce an ambient effect between the top and rear speakers. The sound is clean, even at high volumes, but for presentations in very large rooms, ports for external stereo speakers and a subwoofer are provided.

The LitePro's remote-control design is excellent. The built-in pointer worked without a hitch, and the backlit controls were easy to use in complete darkness. The controls on the left side of the projector are oriented so that you must turn so the screen is on your left while you're using them. This can be confusing — especially if you're trying to use the pointer to control your Mac.

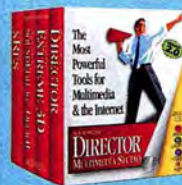
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PHOTOGRAPHY / ADRIAN ORDENANA

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CIRCLE 28 ON READER SERVICE CARD

Lightware Viewpoint 100

The Viewpoint 100 from Lightware is the smallest and lightest of the new projectors. It lacks bells and whistles, but its controls are simple and functional.

Image quality on the Viewpoint unit is quite good, if you don't mind the slight yellow cast caused by the halogen light source. Halogen lamps burn out without warning — so Lightware designed the Viewpoint with a backup lamp holder (with backup lamp preinstalled) and even ships two extra lamps (for a total of four). Even better, Lightware packs the projector and bulbs in a hard carrying case that's perfect for airline carry-on.

The Viewpoint lacks height-adjustment feet, so we did have to place the unit on a few back issues of *MacUser* to get the proper projection height. However, the keystone adjustment on the Viewpoint worked like a charm, producing a perfectly square image.

The other controls on the projector are similar to, although not quite the same as, those on the remote. Kudos to Lightware for placing arrow keys on the projector that actually point in the right direction as you face the screen. The controls lack backlighting, so use in a completely dark room may be a problem. The speakers inside the projector are very small and distort easily. You'll want to use external speakers for larger audiences.

The Viewpoint ships with cables for connecting to your Mac's video port or a VCR, but you'll need to purchase an eighth-inch stereo-to-RCA cable to connect the projector to your Mac's audio port.

The Viewpoint is a fine entry-level projector. And it's easily the most portable of the three new projectors. If you're on a budget and make presentations only to small audiences, the Viewpoint is great.

Proxima Desktop Projector 2400

The Desktop Projector 2400 from Proxima features a unique, flip-up cover that contains stereo speakers that face backward — toward the audience — when the cover's opened. Under that cover is a flip-up mirror that reflects the upward-facing lens's projected image. The mirror affords you a wide range of projected-image heights, but the 2400 lacks keystone correction. So unless the unit is perpendicular to the screen, the projected image will be wider at the top than at the bottom. This is a significant oversight.

The 2400 uses a halogen light source, and a hot-swappable spare is included. Of the three

projectors, the 2400 had the sharpest focus and produced the most-neutral-looking white. Contrast was excellent. Our PowerPoint slides and our test photo image both looked slightly washed-out.

Proxima gives you all the cables you need in order to connect to a Mac, but its video cables do not provide Mac-monitor sense codes, so you must connect either a monitor or the supplied terminator to activate your Mac's video-out circuitry — a minor hassle.

Sound quality from the built-in speakers is good. Even though the speakers are a bit tinny, they get quite loud without significant distortion, so they're adequate for classrooms or medium-sized audiences. For large audiences, however, consider external speakers.

The 2400's controls are backlit, although they are oriented so that you face them when looking away from the screen. The remote control duplicates all of the projector's controls, labeled with glow-in-the-dark lettering.

Unique to Proxima's projectors, however, is Cyclops, an integrated mouse-control system that incorporates a camera inside the 2400. The Cyclops uses an LED pointer to activate mouse clicks. An optional dual-brightness laser pointer (\$295 list) can move the cursor too. Both laser-pointer options work well, provided you have a steady hand. If your presentations require lots of on-screen interactive work, a Cyclops-enhanced Desktop Projector may be just what you're looking for.

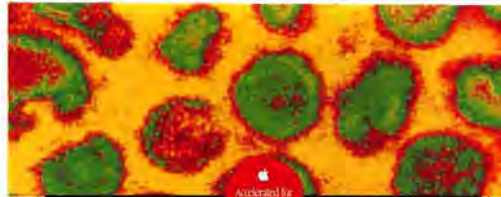
The Bottom Line

Which projector is right for you depends on your needs. If you need true interactivity with your presentation, there's no beating the Cyclops option for Proxima's Desktop Projector 2400. If you need great color — and size and weight are strong considerations but sound quality isn't — go for the Viewpoint 100. If you need a great-performing multimedia projector for computer graphics and video, the LitePro 210 is the best bet. Of all three projectors, it represents the most complete and elegant package. / Jeffrey S. Pittelkau

InFocus LitePro 210 Multimedia System, \$5,999 (list). **Company:** InFocus Systems, Wilsonville, OR; 800-294-6400 or 503-685-8888; <http://www.infs.com/>. **Reader Service:** Circle #413.

Lightware Viewpoint 100, \$6,500 (list). **Company:** Lightware, Beaverton, OR; 800-255-9469 or 503-641-7873. **Reader Service:** Circle #414.

Proxima Desktop Projector 2400, \$4,495; Cyclops option, \$495 (list). **Company:** Proxima, San Diego, CA; 800-447-7692 or 619-457-5500; <http://www.prxm.com/>. **Reader Service:** Circle #415.



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WebArranger 2.0



Complex but flexible, Web PIM organizes URLs and more.

WEBARRANGER, CE SOFTWARE'S newly rechristened PIM/Internet organizer, began its life as Arrange, an innovative and largely ignored PIM from Common Knowledge. Arrange had a keen cult following, but it left most users unimpressed, due to its unusual and complex object-oriented-folder metaphor — and a sky-high price. CE has slashed the price and gone into denial about the product's complexity (as demonstrated by its release of just two slim pamphlets as printed documentation). CE also has added some new Web features and third-party Internet products; and repackaged Arrange as WebArranger, the first Web PIM. This reinvention works to an extent, but many of the obstacles that blocked Arrange's widespread acceptance remain.

WebArranger is still first and foremost a contact manager that lets you organize virtually any type of text information — including but not limited to URLs, e-mail addresses, and phone numbers and addresses — as “records.” You organize these notes within a Finder-like hierarchy of folders, *topics* in WebArranger parlance. The format and layout of records and the arrangement of topics are highly customizable, so you can set up hot lists and addresses in a way that makes the most sense to you. And powerful search features make it possible to sift information in many ways. Such flexibility is admirable, but taking full advantage of it can mean hours of fiddling.

A feature called Grabber lets you import anything highlighted in a browser into your WebArranger database with a single keystroke, whether or not WebArranger is running. Many online pros had already discovered this feature in Arrange — and loved it.

Along with the URL-organizing features that originated in Arrange, CE has given WebArranger a couple of intelligent agents that can make online life easier. URL Agent monitors user-specified URLs at set intervals to make certain that they are still valid. FTP

Download Agent automatically keeps trying to download files from an FTP site until it succeeds. These plug-ins alone will justify WebArranger's purchase for many Net jockeys.

WebArranger comes bundled with Internet Config, a freeware utility that allows you to designate your favorite Internet applications as helper applications. Once you've done so, clicking on a URL in a WebArranger record launches the appropriate helper program. WebArranger also derives some of its new Web-ness from a separate bundled product, WebWhacker, from ForeFront. WebWhacker lets you copy an entire Web site or page to your hard disk, for instant access.

WebWhacker's inclusion with WebArranger may be mainly to let you download the Web-



Customizable but complex, WebArranger lets you organize online information the way you want and link to any stored address with your favorite Internet programs.

Arranger manual from CE's Web site — the only place you can get full documentation on the product. That's a problem, because WebArranger's unusual interface and advanced abilities (custom note or form design, query by example, and so on) scream for detailed manuals. The included pamphlets are woefully inadequate, and the online help, although good, doesn't hit all the program's intricacies.

The Bottom Line

WebArranger is a valiant attempt by CE Software to jump-start a failed PIM by turning it into a Web tool. Most Web surfers, however, will find it too complex and will be better served by utilities such as DragNet or GrabNet, which are far easier to use and enjoy right out of the box. But WebArranger works as advertised, and offers unrivaled opportunities for tinkering. / Gregory Wasson

WebArranger 2.0, \$79 (list). **Company:** CE Software, Des Moines, IA; 800-523-7638 or 512-221-1801; <http://www.cesoft.com/>. **Reader Service:** Circle #416.



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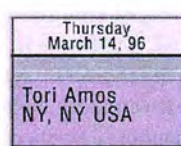


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CIRCLE 82 ON READER SERVICE CARD

Specular TextureScape 2.0



Weave shapes into unique textures with ease and precision.

NEW TOOLS AND GREATER versatility improve an already outstanding product in version 2.0 of Specular TextureScape. Specular's tool for creating tilable textures for backgrounds, 3-D objects, and animations.

As in previous versions of the program, texture building in TextureScape 2.0 begins with a 2-D shape. You can select one — a circle, say, or the outline of a leaf — from a pop-up menu or use the new drawing tools to create one from scratch. Next, you use slider controls to set attributes such as color, transparency, bevel, softness, and density. Finally, you orient the shape (or multiple copies of it) to complete your pattern. Here again, new tools simplify the process: Version 2.0 enables you to set a center point for rotating or scaling shapes with greater control. When you're satisfied with the results, TextureScape turns your pattern into a texture.

To create more-intricate textures, you can layer up to 99 patterns; you can even blend layers. New to version 2.0 is the ability to drag an entire layer to offset its placement over or under other layers in a texture.

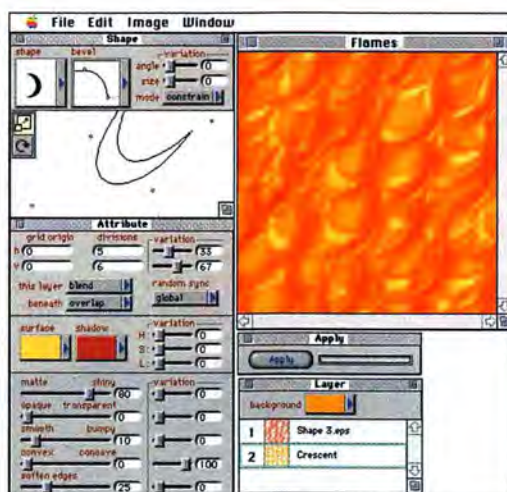
Fuller-Featured Tools

TextureScape 2.0's eight drawing tools — including a Bézier pen, a pencil, a rotation tool, and some primary shapes — are fairly basic, but they're more than adequate for creating closed shapes for use in TextureScape patterns. If you're a design pro, they'll save you the time it would take to move between TextureScape and a drawing program. If you desire greater complexity or want to build textures from type or logos, you can import EPS graphics created in Adobe Illustrator or Macromedia's FreeHand into TextureScape's Shapes Library, where they're available for quick use. (You can save drawings you make in TextureScape in the library as well.)

TextureScape files are composed of EPS

descriptors, so they take up very little space on your hard disk. Yet, since the EPS format is resolution-independent, you can render any TextureScape file, no matter how simple or complex, into a PICT, TIFF, or EPS file at a resolution of up to 4,000 x 4,000 dpi without any image degradation.

As in previous versions, TextureScape can animate textures, so you can create dynamic textures for your video projects. Using a simple, keyframe-based sequencer, you can straightforwardly create seamless animations in which a virtually unlimited number of textures morph, one into the next, in a continuous loop. You can save the resulting animations as QuickTime movies, PICS animations, or numbered PICT sequences.



Draw your own shapes for your patterns within Specular TextureScape 2.0, and then determine how much or how little you want to vary the design attributes.

To get you started — or perhaps to inspire you — TextureScape 2.0 ships with a CD-ROM that contains hundreds of prerendered editable TextureScape files.

The Bottom Line

Generating textures with other texture generators, such as MetaTools' KPT Convolver, requires less effort than with TextureScape, but the other programs' automatic nature leaves a lot to chance. For precise control of the elements that go into your textures and the ability to subtly alter them to get exactly what you want, TextureScape 2.0 — with its powerful new drawing tools — is in a class by itself. / David Biedny and Nathan Moody

Specular TextureScape 2.0, \$199 (list). **Company:** Specular International, Amherst, MA; 800-433-7732 or 413-253-3100; <http://www.specular.com/>. **Reader Service:** Circle #418.



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SoftWindows 95 for Power Macintosh



Windows 95 programs run (or crawl) on PowerPC machines.



PLATFORM SKIRMISHES continue, and as is so often the case, the innocents in the middle suffer most: If you prefer the Mac OS but must run one or two Windows programs required by your company or clients, you know what we mean. Budgets and desk space rarely allow the luxury of two computers, and just one or two legacy applications don't often justify the \$800+ expense of a DOS compatibility card. Enter the peacekeeper: Insignia Solutions offers SoftWindows 95 for Power Macintosh, a sub-\$400 alternative to the hardware wars.

The primary differences between SoftWindows 95 for Power Macintosh and the hardware alternatives are cost and speed of

program execution. With a price about one-quarter that of a marginally acceptable, \$1,500 Windows desktop machine, it's no surprise that SoftWindows 95 comes up on the low end of the speed scale. The gymnastics required to make programs written for a PC processor run on PowerPC systems demand a lot of processing effort. So SoftWindows 95 for Power Macintosh won't — and can't — run as fast as Windows 95 on a real PC.

So How Slow Is It?

To test SoftWindows 95's performance against PC hardware, we used the industry-standard Winstone 96 benchmark from *PC Magazine*, which tests a PC's performance on several business and desktop-publishing applications. We began by comparing SoftWindows 95 running on an Apple Power Mac 9500/132 (just under a year old) with a three-year-old Dell 486DX/50 machine running Windows 95. We expected the 486 to outperform the 9500, and it did — by a wider margin than we expected. Since Intel 486-standard computers are obsolete, we climbed the evolutionary ladder a bit and next compared SoftWindows 95 with a Dell XPS Pentium 90, a year-old system that's still on the market, and found that

the newer Intel machine really left all the other test machines in the dust. On a PowerPC 601-based Power Mac 8100/80, SoftWindows 95 was about two-thirds as fast as it was on the Power Mac 9500.

Despite the apparently poor performance suggested by our benchmark tests, subjective speed with several Windows applications was far more favorable. In fact, a popular Windows contact manager felt only slightly slower on the Power Mac 9500 than on the 486 test machine, and it was perfectly usable.

SoftWindows 95 runs Windows applications smoothly, without a hitch. One reason is that the Windows 95 you get with SoftWindows 95 is identical to the version for PCs. But Insignia has taken extra steps to ensure that peripherals and network services you'd expect to work on either a PC or your Mac-compatible are available under SoftWindows 95. For instance, all manner of SCSI devices, including Apple CD-ROM drives and removable-cartridge drives work seamlessly from within Windows. SoftWindows 95 also handles network and Internet connections with remarkable ease, by automatically routing Windows 95's WinSock calls and Mac TCP/IP applications simultaneously through Open

Little known Mac fact #31

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Transport. SoftWindows 95 even uses the Mac Clipboard to let you use cut-and-paste to move objects between PC and Mac programs.

SoftWindows 95 for Power Macintosh also offers a nifty speed boost over previous versions of SoftWindows, by way of a feature called TurboStart, which significantly cuts Windows' loading time. TurboStart takes a snapshot of the system's status at the end of a SoftWindows work session and uses it at the next startup to eliminate a number of time-consuming bookkeeping tasks, such as the scanning of Windows .INI files and apportionment of system memory. TurboStart is so effective that it actually enabled SoftWindows to launch Windows faster than PC hardware could. This nifty feature can't be set as a default, however; you must activate it at each Windows shutdown. Even more frustrating, TurboStart may not work if you have too many Windows applications running at shutdown; you get an error message saying there's insufficient memory to save the TurboStart data and must reboot the conventional way.

There are some limitations in the way SoftWindows 95 works in synthesizing a full-blown Wintel machine. The file that emulates a Windows hard disk defaulted to 150 MB in



SOFTWINDOWS VERSUS HARDWARE

For overall speed in running Windows applications, as measured by PC Magazine's Winstone benchmarking software, SoftWindows 95 can't even approach bona fide PC hardware. But Insignia Solutions' innovative TurboStart feature gives SoftWindows a leg up in one area: Startup time is considerably shorter with TurboStart than on PC hardware. Winstone 96 scores are relative to those of a Dell PC with a 25-MHz Intel 486SX CPU running Microsoft Windows version 3.1 in enhanced mode.

	WINSTONE 96 SCORES	ELAPSED STARTUP TIME
PRODUCTS TESTED		
SoftWindows 95 on Power Mac 9500/132	6.9	17
SoftWindows 95 on Power Mac 8100/80	4.8	26
REFERENCE SYSTEMS		
Dell Dimensions XPS P90 Pentium system	44.5	30
Dell 450SE 486DX/50 system	15.1	86
	SCORE BETTER	SECONDS SLOWER

size on each of the machines we tested. SoftWindows 95's Mac OS-based formatting utility made it easy to expand it to 250 MB, but that was as much space as we could get, even though the 1-GB drive on our Power Mac 9500 had plenty of room to spare.

In the course of testing SoftWindows 95, we

also discovered that it shares its PC counterpart's voracious appetite for RAM. We began our testing with machines that had only 16 MB of installed RAM, and although we were able to launch SoftWindows 95 easily, we found ourselves fiddling with memory settings in a vain attempt to run larger Windows programs, including our benchmark Winstone 96. Eventually, we upped the installed memory to 32 MB, and from then on it was smooth sailing.

The Bottom Line

SoftWindows 95 is for people who use a Mac for their daily work but need to run one or two essential legacy applications designed to run on a Windows machine and who can't afford a PC card or a processor card. The vast majority of these legacy applications will be custom applications, such as corporate databases, built to run on Windows 3.x. For these applications, SoftWindows 95's sibling, SoftWindows for Power Macintosh 3.0, will serve just as well, at about \$50 less. / Nathan Garcia

SoftWindows 95 for Power Macintosh, \$365 (estimated street). **Company:** Insignia Solutions, Santa Clara, CA; 800-848-7677 or 408-327-6000; <http://www.insignia.com/>. **Reader Service:** Circle #419.

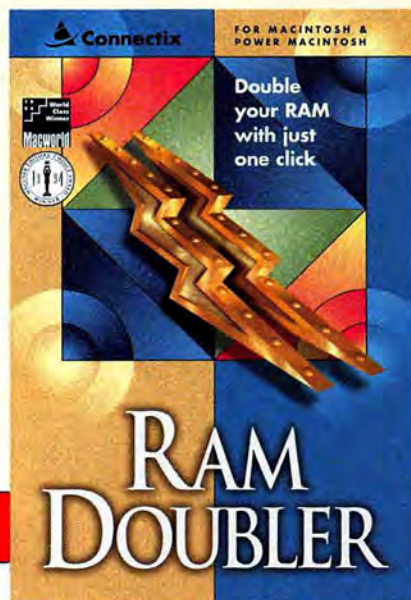
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System Requirements: Macintosh equipped with a 68030, 68040 or PowerPC microprocessor. System 6.05 or later, including all versions of system 7 • 4 MBs required (hard disk required for machines with 4 to 6 MBs) • Not compatible with Mac SE, original Mac Classic, original Mac LC or PowerBook 100 or Mac II without a 68851 PMMU or any accelerator that does not work with virtual memory.



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XChange



Affordable utility lets Windows users read and write Mac disks.

IT'S EASY FOR MAC USERS to insert a DOS-formatted floppy disk or CD-ROM and have it mount on the desktop. When Windows users try to do the same with Macintosh disks, they get an error message. This reinforces the myth that Macs are incompatible and out of place among PCs.

To help keep your Macs on an equal footing, you can furnish PC users with software that gives Windows users the same cross-platform ability Mac users get with System 7's PC Exchange. The newest such utility is Optima Technology's XChange for Windows 3.1 and Windows 95. XChange scores some points against its chief competitor, MacOpener from DataViz (the developer of PC Exchange), but is not as easy to use.

XChange enables PCs to read Mac CD-ROM discs and to read, write, and format Mac HFS (hierarchical file structure) disks of all types.

These include floppies, removable cartridges, and even Mac hard disks, provided the PC has an ASPI-compatible SCSI card and ASPI-compatible drivers. MacOpener can do all this as well, but XChange has the added ability to read CD-recordable (CD-R) discs recorded with Optima's CD-R Access for Mac and to read Mac tapes recorded with the company's DeskTape software. Neither XChange nor MacOpener translates files; for a Windows user to use data that's on a Mac disk, it must be in a format a PC application can read.

XChange does a good job handling the differences in filenames among the Mac OS, Windows 3.x, and Windows 95. It displays full Mac filenames of up to 32 characters in both environments, despite Windows 3.1's "eight-dot-three" filename convention and Windows 95's ban on certain characters, such as forward slash, that the Mac OS permits in filenames. XChange reads the Type and Creator info embedded in a Mac file and automatically creates the appropriate PC extension, such as .DOC for Word files.

The PC user accesses Mac files and formats Mac disks from within the XChange application. Unfortunately, XChange forgoes Windows 95's simple drag-and-drop interface and

instead offers an interface for moving files that recalls Windows 3.x's File Manager, but without File Manager's convenient Copy command. Inside the XChange window, you open one window for the Mac disk directory and another for the PC disk's and then drag files from one window to the other. If you're moving a file to a Windows disk, a dialog box pops up and asks how you want to rename the file. This process works pretty well, but it's far from effortless.

The Bottom Line

XChange and MacOpener are the two most full-featured products that enable Windows PCs to use Mac disks. However, XChange isn't as easy to use as MacOpener and can't preview text and graphics files, as MacOpener can. XChange is the less expensive of the two (MacOpener costs \$75), and its CD-R and tape functionality will come in handy for some users. Otherwise, the nod goes to MacOpener.

/ John Rizzo

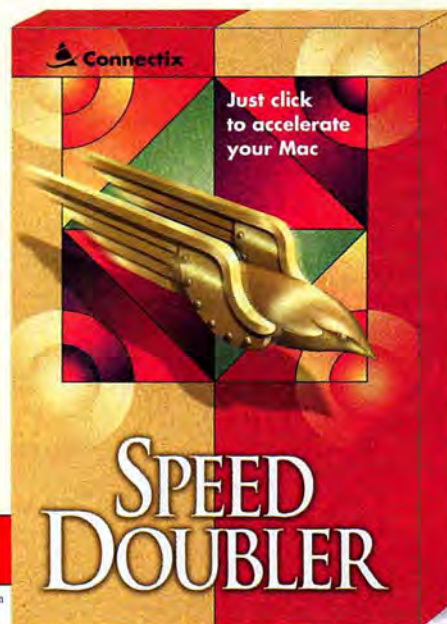
XChange for Windows 3.1 and Windows 95 1.0, \$49 (estimated street). **Company:** Optima Technology, Irvine CA; 800-411-4237 or 714-476-0515; <http://www.optimatech.com/optima/>. **Reader Service:** Circle #420.

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Multimedia Labs TC-1500SP Book Amp



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HIGH-FIDELITY multimedia speakers for your Mac don't have to wreck your budget: One of the latest additions to the growing number of affordable speakers, the TC-1500SP Book Amp stereo-amplifier system, will set you back only about \$100. And you have few compromises to make for that price. This sound system offers impressive sound quality, great functionality, and a unique remote-control unit.

The TC-1500SP Book Amp system consists of a central amplifier and a pair of satellite speakers. One of its top advantages is its placement flexibility. You have to place the small amplifier near your computer, but you can place the speakers anywhere, as far away as

the 4.5-foot-long cables allow. Best of all, you can use the infrared remote control to mute the speakers or to turn the volume up or down.

You'll find most of the main audio functions — including controls for volume, bass, treble, balance, and microphone gain — on the front of the 12-watt amplifier. A button also lets you switch between mono and stereo sound. On the front, you'll also find a quarter-inch microphone and headphone jacks and sound level controls you can use to prevent sound distortion. On the back of the amplifier are RCA inputs for one or two stereo sources.

The speakers have 5-inch woofers and 1-inch tweeters directed to the side. This makes the speakers especially useful for presentations, when sound should aim at the audience.

We tested the sound system in an echo-free chamber to see how consistently it could reproduce sound within the varying frequencies of the human hearing range. We found that the speakers produce strong midtones and reproduce high-range sound modestly well, but without the optional \$99 subwoofer, the bass tended to be somewhat thin. Even so, the system's sound quality is on a par with that of similar speakers (see "Fast Drives, Loud Speakers," September '95, page 86).



A handy remote control and side-firing speakers make the Multimedia Labs TC-1500SP Book Amp sound system well suited for multimedia presentations to small groups.

The Bottom Line

The TC-1500SP Book Amp delivers plenty of volume and versatility for the price, and the remote control is a useful addition, especially in an office. Like most multimedia sound systems in its price range, the TC-1500SP Book Amp gives you good midrange sound, but for strong bass, you'll probably have to spend a bit more for the system's optional subwoofer.

/ Martin Wong

Multimedia Labs TC-1500SP Book Amp, \$129 (list).
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XPert Tools Volume 1



XPert Tools Volume 2



Extraordinary XTension sets expand QuarkXPress' horizons.

YOU DON'T HAVE TO WAIT FOR an upgrade to get some great new features in QuarkXPress 3.3. XTensions, software modules from third parties, can enhance QuarkXPress in a variety of ways. The latest products from a lowly apprentice production (alap), XPert Tools Volume 1 and XPert Tools Volume 2 each deliver a pack of 15 XTensions. Although a few of the XTensions in each set are duds, the remaining gems justify the \$129 cost. In each volume, about a third of the XTensions streamline production tasks, a third simplify design work, and the rest help both.

When you drop the XTensions into QuarkXPress' XTension folder, you'll notice the appearance of new menu items, palettes, and

tools in QuarkXPress that add new features, including some for text handling, document navigation, and scaling of items on the page. Many of the XTensions come from discontinued alap XTensions such as ScaleIt, ScriptIt, and the widely acclaimed Kitchen Sink. And unlike Kitchen Sink, a single XTension crammed with numerous features, the XPert Tools bundles let you choose and use just the XTensions you need. In fact, loading or disabling XTensions is a snap, thanks to the XTension manager included in each volume.

XPert Tools Volume 1

For designers, the handiest XTensions in Volume 1 include XPert Color and XPert Scale. XPert Color drops a Find/Change Color command into the Edit menu. As QuarkXPress' Find/Change command does with text, the Find/Change Color command can locate any color by name and can substitute one color for another throughout your document. This makes it easy to experiment with new color schemes and combinations.

Select the XPert Scale tool to scale an item, such as a text box, or a grouped set of items. The accompanying dialog box, in which you type scaling values as a percentage, would be better if it also had arrows that let you scale up or down without having to take your hand off the mouse.

Production time-savers in Volume 1 include

XPert Print, which lets you make a selection with a special tool and then either print the selection or save it as an EPS file. Another time-saver, XPert ImageInfo, drops a pop-up palette into the corner of each picture. This palette lists the original image's file type, path, and other information. It also has controls for flipping, scaling, and rotating the picture and, most impressively, making the picture fade into the graphic equivalent of greeked text. The key-and-click combinations you need to master in order to fully exploit the palette are somewhat unwieldy, but mastering them is well worth the effort.

XPert Tools Volume 2

The best XTension in Volume 2 is the XPert CommandPad. Overhauled since its days as part of Kitchen Sink, CommandPad now lets you create custom floating palettes. Tired of schlepping through menus to specify typefaces, apply style sheets, or use spell checking? With CommandPad, you can simply create buttons for frequently used commands and drop them into a personal palette. The buttons give you access to any QuarkXPress or XPert Tools function with the click of a mouse, and you can create as many palettes as RAM permits.

If you work with text-intensive documents, you'll appreciate an XTension that lets you define and apply style sheets to individual characters, as well as a tool that lets you draw a box around text you'd like to change and then specify styles for all the text inside the box. The latter XTension is particularly terrific for tables and bulleted lists. These XTensions require little effort to learn, unlike the complex but helpful new options for linking and unlinking text chains that are also included in Volume 2.

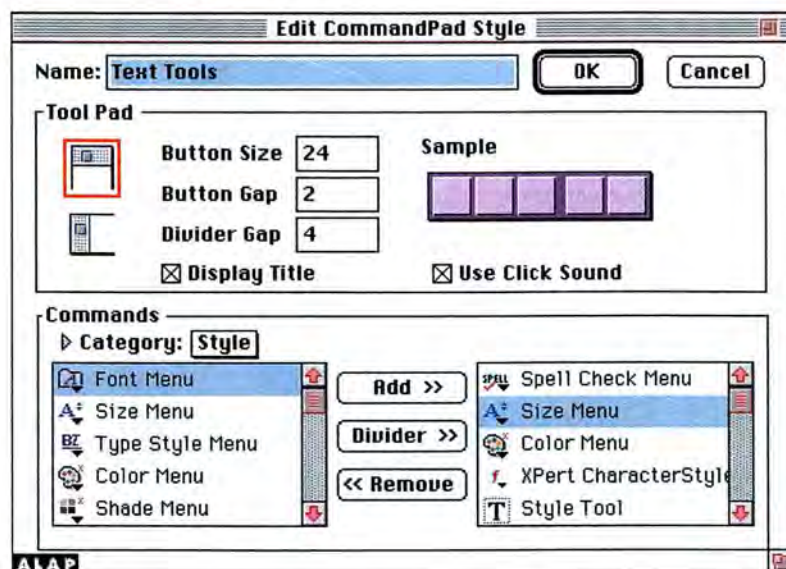
The Bottom Line

Both of the XPert Tools packages have enough goodies to more than justify their price. Their expense is really in the extra RAM you'll need to allocate to QuarkXPress — alap recommends 1.5 MB for each volume. The additional palettes also add clutter to your screen, so you may want to be choosy about which ones you use. Whichever ones you hang onto will soon be incorporated into your daily QuarkXPress work. / Shelley Cryan

XPert Tools Volume 1, XPert Tools Volume 2, \$129 each (list). Company: a lowly apprentice production, Carlsbad, CA; 619-438-5790. Reader Service: Circle #422.



The ability to create custom palettes is one of the best features in XPert Tools Volume 2. A simple dialog box (below) lets you add command buttons to new palettes (left). The buttons give you one-click access to QuarkXPress and XPert Tools functions.



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THE STATE OF

APPLE'S NEW OPERATING SYSTEM IS CHOCK
FULL OF HOT NEW FEATURES. BUT DON'T
PLAN ON MAKING THE UPGRADE JUST YET.

By Henry Bortman

It's a shame that rewriting an operating system is such a major undertaking. Windows 95 slipped many times before Microsoft managed to get its first "modern" OS out the door. Likewise, Apple's efforts to get Mac OS 8, code-named Copland, into users' hands seem to be blocked at every turn. In fact, last year at this time, Apple was telling the world System 8 would be shipping by mid-1996. When it became apparent Apple wouldn't make that date, company representatives revised the estimate to the end of 1996. Now it appears that that date, too, will pass Apple by.

The new predicted ship date is mid-1997. And, after an extensive look at the current state of System 8, we're hoping three times will be a charm.

System 8 promises to be a hot ticket. When the next major Mac operating system ships, Power Mac owners will finally get the speed of a fully-native OS. The new system will run only on Power Macs and Power Mac clones; although the company is looking at ways to move some of System 8 onto older Macs, there are currently no plans to do a 680x0 version of the new Mac OS.

System 8 will introduce other performance enhancements as well: limited preemptive multitasking and protected memory and improved I/O and networking. In addition, Apple will introduce a host of interface improvements, giving the Mac the most flexible and customizable interface of any computer on the market.

Laying a New Foundation

Perhaps the most profound of the changes from System 7.x to System 8 will be the least obvious to users — the under-the-hood stuff. On the surface, System 7.5.3 seems in pretty good shape. After all, millions of people use it every day with a minimum of fuss.

But anyone familiar with the technical underpinnings of today's "modern" computer operating systems can tell you that the Mac OS is on shaky ground. Frankly, it's an engineering marvel that users are able to do large-format, color-critical publishing work and produce broadcast-quality video on computers using an operating system that still has some hereditary links to the small black-and-white 128K Mac it was originally designed for.

The Mac pays a price for Apple's evolutionary approach to OS development: System 7.5.x is built from blocks piled up over the course of a decade, and that has compromised the OS' stability and performance. For the Mac to move forward, that OS needs to be rebuilt from scratch. OS 8 is the first example of that reconstruction.

Speed. Mac OS 8 will be faster. First and foremost, the operating system will be entirely PowerPC-native, except for those parts that deal directly with 680x0 compatibility. In System 7.5.x, because the OS contains significant chunks of 680x0 code, PowerPC-based Macs must switch back and forth between native and emulated portions of system software. When running native applications or performing

system tasks, System 8 will not execute a single line of emulated code.

Perhaps the most basic change in the new OS will be in how the Mac schedules tasks. System 7 runs multiple applications simultaneously with a scheme called cooperative multitasking — when an application is active, it controls the processor until it relinquishes it. As a result, cooperative multitasking depends entirely on applications being “good citizens.” However, not all applications are good at sharing. If you’ve tried to do anything else while downloading a file

in the background, you’ve experienced this noncooperation in action.

Today, a typical workday might find a user batch-sending and receiving e-mail messages online, copying graphics files across a network, and printing mail-merged letters — all in the background — while laying out a promotional brochure. Tomorrow’s workday might add manipulating 3-D elements as part of that page-layout document, which is simultaneously being shared with a colleague across the country. That’s a heavy load for any computer to bear, and today’s Mac OS wouldn’t be up to the task.

Preemptive multitasking will go a long way toward fixing

FIGURE 1

THE MAC DESKTOP OF TOMORROW

SYSTEM 8 WILL OFFER a wealth of new human-interface elements and options to Mac users. Although today one Mac desktop looks pretty much like another, users will be able to customize the look and behavior of their workspaces in OS 8 to suit their personal preferences and level of nerdishness. A word of caution: Many of the elements on this simulated desktop of the future are works in progress. Don’t be surprised if, when Mac OS 8 ships over a year from now, it looks or behaves somewhat differently than what we describe here.

d RELOCATED HELP MENU.

Have you always hated that little question mark on the right side of System 7’s menu bar? It’s gone, replaced by a more traditional-style Help menu, from which users can access such functions as Mac OS Guide, Tips, and Experts.

e IMPROVED FILE COPYING.

No more waiting while you copy files! Thanks to OS 8’s rearchitected Finder, you’ll be able to initiate multiple file copies and empty the Trash — and simultaneously be able to open Finder windows and launch applications.

c EXPANDED FILE MENU.

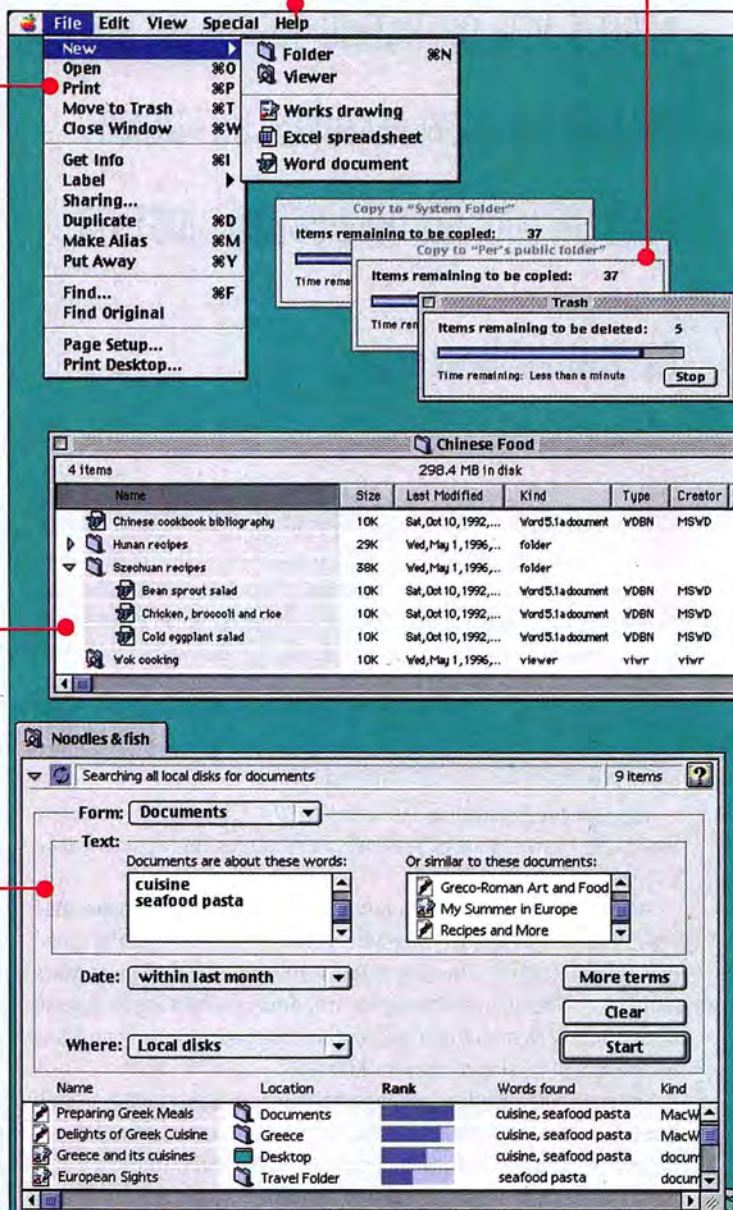
The File menu gets a face-lift in OS 8. You’ll be able to use the File menu’s hierarchical New item to create a new word-processing or spreadsheet document or a document of any other type for which you have installed “stationery.” In addition, Move to Trash and Find Original have been added to the File menu and the Label function, formerly a separate menu on the Finder’s menu bar, has been relocated to the File menu.

b ENHANCED LIST VIEWS.

System 7 gave us list views. System 8 will make them shine. New list-view column options include Type, Creator, and Comments. Not only can you select which columns appear but you can also resize them and arrange them as you like. If text doesn’t fit, it automatically compresses. If it still doesn’t fit, it truncates from the middle of the file’s name.

a INTELLIGENT FIND CAPABILITY.

Finding files in System 8 will boldly go where no system-level Find command has gone before. Using the speedy new V-Twin “information-access-and-indexing” engine, OS 8’s Find function, which will be called Viewers, will be able to search not only filenames and folder names but document contents as well. Users will be able to employ natural language or even example documents instead of convoluted Boolean strings to specify search criteria. The V-Twin engine will rank the results of what it finds according to how closely a document’s characteristics match a specified request. And Viewers will be live. If you save them — they’ll show up on the desktop with a special folder icon — they’ll continuously update in the background, adding and removing files as you create and delete documents.



this problem: It will assign a priority level to each program task contending for processor time; the system will “schedule” tasks in a round-robin fashion, but a high-priority task, such as typing, will preempt a low-priority task, such as printing. Preemptive multitasking will not only make more-efficient use of system resources but will also ensure that when clicking the mouse or typing, users won’t have to wait.

Mac OS 8 will employ preemptive multitasking in a limited fashion. All system functions will be preemptively multitasked, but applications won’t be. This limitation is in the first release of System 8 so that the new OS won’t break today’s applications. According to Apple,

later versions of the OS will fully implement multitasking once the majority of Mac applications are updated to support System 8.

Specifically, the parts of applications that can’t currently be multitasked are user-interface-toolbox routines. They will run in what Apple calls the “co-operative toolbox environment.” As software developers rewrite their applications for System 8, they’ll be able to code many portions of their programs — any parts that don’t directly invoke user-interface routines — as tasks that can be scheduled preemptively. Using this technique, developers will be preparing their applications to support full preemptive multitasking when it arrives.

TIME-SAVING TIPS. System 7’s Apple Guide provides help when you ask for it. In Mac OS 8, help will find you — in the form of tips. If you perform the same operation repeatedly in what the system considers an inefficient way — closing a window by clicking on its close box for example — Mac OS 8 will let you know there’s an easier way. If you prefer not to be bothered, you can turn off automatic tips and instead browse the Tips window. Third-party developers will be able to supply Tips for their applications as well.

CONTEXTUAL MENUS. Contextual menus won’t be new, at least not in concept, to anyone who uses Netscape Navigator. But OS 8 will make them available universally on the Mac. They’ll provide instant access to the most common functions associated with various objects on the desktop (see figure 2).

MULTIPLE-WORKSPACES OPTION. Mac OS 8 will enable various people to use the same Mac, each with an individual desktop setup. These personal configurations will be known as workspaces. The new OS will provide a log-in mechanism for switching among workspaces. Each individual user’s workspace preferences, both for the system and for applications, will be stored in a separate folder. If you need to use someone else’s Mac temporarily and want to give it your look and feel, just copy your workspace folder to that person’s machine and log in — assuming, of course, that that person has the necessary software on the Mac to support your chosen options.

EXPERT ASSISTANCE. A derivative of Apple Guide, Experts will guide you through the series of steps required to perform complex tasks while shielding you from the tasks’ complexity. The Mac OS Setup Expert, for example, will help you configure basic system settings without requiring you to hunt through a maze of control panels.

FLEXIBLE DESKTOP APPEARANCE. Mac OS 8 will let users set not only highlight colors and desktop patterns but also the entire look, or “theme,” of the Mac’s desktop. Apple, so far, has shown three of OS 8’s themes, which are shown here. There will be others, from Apple as well as third parties, but they’re still under wraps. *Toy Story* and *Babylon 5* perhaps?

DESKTOP-PRINTER ICONS. QuickDraw GX let users put printer icons onto the desktop. That capability is now built into System 7.5.3, even for those who don’t run the GX extension. But users who have desktops cluttered with multiple printer icons are looking forward to the day when they can move them off the desktop, into a folder. That day will arrive when OS 8 ships.

POP-UP FOLDER TABS. Although Now Software stole this little bit of Apple’s thunder by including a similar Now Tabs function in version 6.0 of its Now Utilities package, Apple will still make pop-up folder tabs an integral part of the OS 8 Finder. When a user drags a Finder window to the bottom of the screen, it will change into a tab. Clicking on the tab will open the folder’s window; clicking on it again will reduce it back down to a tab. Dragging a file onto a folder’s tab will copy or move the file into the folder.



System 8 will also make more-extensive use of multithreading, in which programs are broken up into segments that can run independently. Apple's most visible use of multithreading will be in the Finder. It will at last be possible to initiate more than one file-copy operation at a time and to continue working in the Finder while copying proceeds in the background.

One final, but key, aspect of improving performance through System 8's new memory model will also be critical to reducing the OS' RAM footprint. Mac OS 8 will come with a new virtual-memory model — one that works. System 7.5's virtual memory is so slow and inefficient that many users opt to leave it switched off. System 8's will be more robust, according to company claims, making it possible for users to work comfortably on a system with only 8 MB of RAM.

With the new memory model, you should rarely see "out of memory" messages. But, since virtual memory extends RAM by using the hard disk to store application routines, the more applications you run at once, the slower your Mac will be. Conversely, installing additional RAM will boost speed, a correlation that is not true in System 7.5. One more thing you should know about OS 8's VM: You can't turn it off. As a result, you'll be hitting your hard disk more frequently under System 8. PowerBook users may want to carry a spare battery.

Stability. Another way in which the Macintosh's current memory-management scheme shows its age is in its lack of process protection. Macs crash — often. When they do, they usually have to be restarted from scratch. That means rebooting the entire system, including all extensions and applications, which can take several minutes.

With System 8's new protected-memory scheme, Macs should crash far less often. And when they do, they won't bring down the entire Mac. If it's part of the OS that crashes, you'll have to restart only the specific system process (the routines for a particular activity) that crashed, instead of having to restart the entire system.

Unfortunately, as with preemptive multitasking, applications won't be able to take advantage of memory protection under OS 8, except in rare circumstances. So when an application crashes, it may bring down other applications. However, you should have to restart only the co-operative toolbox environment and your apps; most of the operating system — including such tasks as maintaining network and online connections and background printing — will continue to run. As with multitasking, developers can rewrite portions of their applications to run in the protected memory space. These portions cannot directly access interface routines, and only time-consuming processes such as applying complex Adobe Photoshop filters will probably be worth the effort to rewrite.

Apple also plans to improve the Mac's stability by eliminating extensions and control panels in their current form. Although these bits of code often perform invaluable services, they modify the OS in nefarious ways that often cause conflicts with applications and with each other. INIT conflicts, as they're affectionately known, are arguably the leading cause of crashes on the Mac.

In System 8, extensions and control panels will become obsolete (see the "What Breaks in System 8" table). Don't worry — it will still be possible for developers to enhance the OS through various mechanisms. In fact, it will get easier. For example, System 8 will provide developers with a Patch Manager, which will offer a documented interface for installing modifications to system software.

Human Interface

System 8 won't just be radically different under the hood. The look and feel of the Mac will also undergo a dramatic overhaul. The ability of users to customize and access data in their work environments will be greatly expanded. You'll even be able to set up a single Mac for multiple users, each with their own personalized look and feel.

SYSTEM 8 AT A GLANCE / new features and interface elements

CATEGORY	FEATURE	BENEFIT
Improved performance	PowerPC-native software	When running PowerPC-native applications, Mac OS 8 will not call any 680x0 emulated code.
	Preemptive multitasking	The Mac will feel more responsive, because Mac OS 8 will be able to "schedule" the use of its resources more efficiently.
	Virtual memory	The new virtual-memory manager will be much faster than the one in System 7.5.x, but you won't be able to turn virtual memory off.
Improved stability	Patch Manager	Your Mac will crash less often, because developers will have a "cleaner" way to enhance the OS.
	Protected memory	When an application on your Mac crashes, you won't have to restart everything.
Scalable interface	Button view	Inexperienced users will have the option of using a simplified At Ease-like interface.
	Customizable desktop	Mac OS 8 will let you choose from various desktop "themes" that will make one Mac's interface look completely different from another's.
	Finder preferences	The system will be able to hide things such as the Trash and the Mac OS folder from users who might use them inappropriately.
	Multiple users	More than one user will be able to set up personal "workspaces" on the same Mac, with different appearances and different levels of access to advanced functions.
Increased ease of use	Viewers	OS 8's Find function will retrieve files based on their contents as well as their names.
	Tips	System 8 will suggest alternative ways to accomplish tasks when you repeatedly use an inefficient approach.
	Experts	Experts will perform complex setup tasks for you automatically, based on responses to a series of "interview" questions.
	Contextual menus	You'll be able to access common commands for manipulating icons or objects within documents by clicking and holding the mouse down over the icons or objects.

FIGURE 2

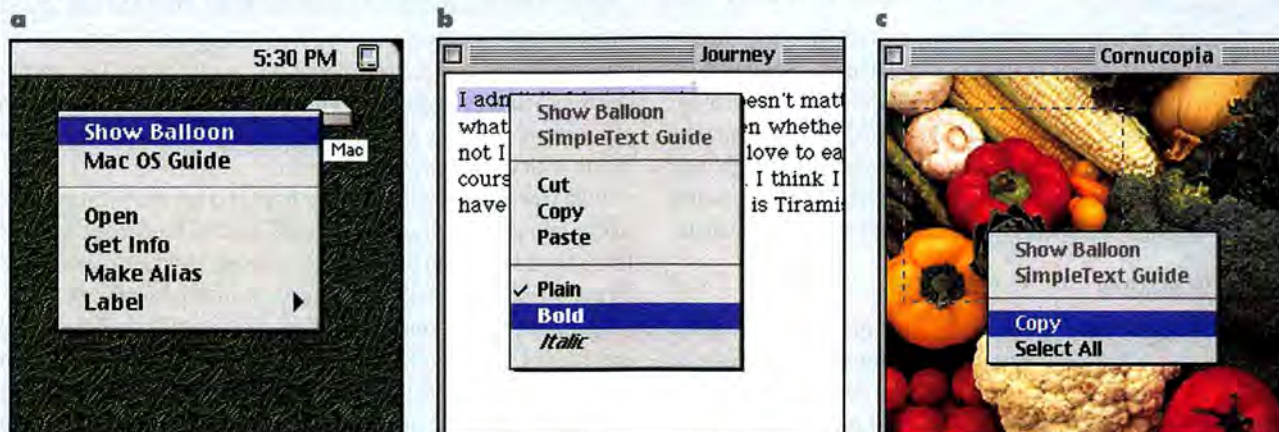
FUNCTION AT YOUR FINGERTIPS

IF YOU'VE USED NETSCAPE NAVIGATOR, you've seen contextual menus. Apple will get on the bandwagon in OS 8. Contextual menus will make common functions — changing the style of a text selection, for example — as easy as clicking on the text itself. No more trips to the menu bar or memorizing keyboard shortcuts for dozens of programs.

Apple will provide contextual menus for objects in the Finder, such as

hard disks. Third-party software vendors will also be able to implement them in their applications.

The examples shown here demonstrate how contextual menus might look for (a) a hard-disk icon in the Finder; (b) selected text in a prototype of an OS 8-savvy SimpleText; and (c) a selected portion of a bitmapped graphic, also in SimpleText.



Customization. Users love to customize their Macs. Several commercial and shareware products let users modify the appearance and color scheme of their menus and buttons. Indeed, one of the most popular, Aaron, can imbue a Mac running System 7 with a bit of OS 8's desktop demeanor.

System 8 will offer expanded opportunities for personal expression. Apple has already unveiled three "themes," or desktop appearances: a basic theme that is a gently extruded version of today's Mac interface; a quirky, colorful theme that will appeal to kids; and a brushed-metal high-tech look for the Bang & Olufsen crowd (see figure 1j). Expect to see additional themes from Apple when OS 8 ships, along with appearance collections from third parties. Screen-saver options will also be a built-in feature of System 8; again, third-party developers will provide alternatives.

Scalable Finder. When the Mac first shipped, with its direct manipulation of icons in place of command-line gibberish, it was unquestionably a trendsetter. But as the Mac has been accepted by an ever broader range of users, some have found the one-Finder-fits-all approach too confining.

Through a series of Finder preferences (see figure 3), a user or system administrator will be able to control the behavior of specific desktop functions in System 8 — for example, whether the Trash or the System Folder (which will be called the Mac OS folder in System 8) is visible, whether a user can erase a disk, whether long or short menus are displayed, and whether users have permission to modify their own Finder preferences.

System 8 will also allow multiple users to create various sets of personal preferences on the same computer. A parent with a home business will be able to set up a Macintosh with full access to all system functions for himself and create a restricted button-view interface for the kids. Apple refers to these setups as workspaces. Each user's workspace preferences will be stored in a separate folder (see figure 1h). A user will log in to access a workspace and log out when

finished, to allow another user to access a different one. One user will not be able to access files that belong to another user's workspace.

Ease of Use. System 8 will also introduce several features designed to make the Finder easier to navigate. Dragging a folder's window to the bottom edge of the desktop, for example, will reduce the window to a tab that can be popped up again by a click on it (see figures 1a and 1l). Clicking on desktop icons and holding down the mouse button will pop up a contextual menu giving instant access to commands related to that object; applications will also be able to take advantage of contextual menus (see figures 1g and 2). The New command, on the File menu, will be hierarchical, enabling users to create a wide variety of new documents — not just new folders — directly from the Finder. Get Info will not only give you volumes of information about a file but it will also display a small preview of its contents.

Tips and Experts. One area Apple is constantly trying to improve is Help. In System 8, Apple Guide and Balloon Help will be augmented by two new forms of user assistance: Tips and Experts. If you've used Microsoft Excel, you've already had a taste of a similar tips system, which Microsoft calls Wizards. Tips (see figure 1f) will alert you when you repeatedly perform an action that could be accomplished more efficiently. For example, if you use a menu command repeatedly to italicize text, a tip will pop up about the keyboard command equivalent. Third parties will also be able to offer Tips under System 8.

Experts (see figure 1i) are more elaborate. They will help perform various system-setup functions — configuring a monitor, for example. But unlike Apple Guide, which guides you through setup functions by telling you what to do, an Experts dialog box will "interview" you, presenting available choices and asking what your preferences are. They will then do the work — a far more humane approach.

Find by Content. In System 7, the Finder finally learned to find things, albeit slowly and one at a time. System 7.5 accelerated the process a bit. The Find capability in System 8 makes Apple's previous efforts look sad. Driven by V-Twin, Apple's code name for a powerful "infor-

mation-access-and-indexing engine" developed by its Advanced Technology Group, Mac OS 8's Find command will be able to search not only filenames and folder names but their contents as well. You won't have to describe your search criteria with convoluted Boolean phrases either; plain English will do fine. You'll even be able to search by example, using one or more documents as reference points for your search. V-Twin will return the results of your request in ranked order, listing documents that correspond most closely to your search criteria first (see figure 1a).

You'll also be able to save a Find request as a folder icon called a Viewer. Whenever a Viewer is opened, it will dynamically update itself to reflect any new, modified, or deleted documents that fit the search criteria. So, if you regularly download large amounts of information from the Internet and frequently search through it for the latest updates on particular topics, you'll have to set up your search only once. Definitely a contender for Best New Feature of System 8.

Integrated Technologies

Three years elapsed between the 1991 release of System 7.0 and the 1994 release of 7.5. If Apple meets its latest estimated release date for Mac OS 8, we're looking at another three years between 7.5 and 8.0.

Apple component-software development, however, moves at a faster clip. Since 7.5 shipped, Apple has completed development on several new technologies: OpenDoc, QuickDraw 3D, QuickTime VR, and

QuickTime Conferencing. Some of these have begun shipping as system enhancements on selected Mac models or as part of a bundle with third-party software. In System 8, all these technologies, along with QuickDraw GX and Apple Remote Access client software, will be fully integrated into the OS.

OpenDoc. OpenDoc, Apple's software-component technology, could have the most far-reaching impact since the original Mac on the way people use their computers.

We've all watched applications grow bigger with each new release. Unfortunately, what makes an application bigger often duplicates the same function in other applications on the same disk. Take spelling checkers. You get one with your word processor, another one with your spreadsheet program, a third with your page-layout program, and a fourth with your drawing application.

With OpenDoc, developers won't have to cram every feature imaginable into their applications. Instead, specific functions can be delivered as discrete components, known as parts, which can be shared by many OpenDoc-savvy applications, also called containers.

Apple has major plans for OpenDoc. The company is already demonstrating Cyberdog, a suite of parts it has developed for performing various Internet-related functions: sending and receiving e-mail and accessing newsgroups as well as FTP and Web sites (see "Walking the Cyberdog," July '96, page 69). Both Cyberdog and OpenDoc will become part of the Mac OS later this year.

WHAT BREAKS IN SYSTEM 8

WHAT BREAKS

All extensions

What qualifies as an extension? Any software that contains an INIT resource (which includes many control panels as well). Most of these display an icon on the screen while your Mac is booting up.

All control panels

Many control panels contain INIT resources, which are no longer supported. But even those that don't will have to be recast as miniapplications. Control panels per se are history.

All hard-disk and CD-ROM drivers

Without new drivers, you won't even be able to access your disk drives.

Most graphics-card drivers

Some third-party PCI-based graphics card drivers may continue to work. In all other cases, new driver software will be required.

All non-GX printer drivers

All printing in Mac OS 8 will be GX-based. The writing is on the wall for printer vendors who have avoided GX — which includes most imagesetter vendors.

Text-input methods for Asian languages

This will have a minimal effect in the U.S., but some versions of the OS localized for 2-byte languages (such as Japanese, Chinese, and Korean) will need new software to use the appropriate keyboards.

PowerTalk

Once touted as one of the crown jewels in Apple's system-software arsenal, PowerTalk will be decommissioned in Mac OS 8.

HOW IT'S GONNA GET FIXED

Apple will provide replacements for extensions that are part of the system and for many third-party extensions that are required by applications, such as Microsoft's OLE Extension. It will be up to third-party developers to provide new versions of utility software that are delivered as extensions, such as Now Toolbox (Now Utilities), Conflict Extension (Conflict Catcher), and Suitcase Extension (Suitcase).

Again, Apple will provide replacement apps for the Mac OS setup- and configuration-related functions now handled by control panels. Third parties will have to rewrite their own. This will include control panels for configuring utility software as well as products such as graphics cards and modems.

Fortunately, Apple plans to provide drivers on the Mac OS 8 installation CD-ROM that will work not only with its own hard-disk and CD-ROM drives but also with a wide range of third-party storage devices. However, if you have a third-party RAID array or driver-level compression or encryption, you'll have to look to third parties for upgrades.

Apple will provide replacement drivers on the OS 8 installation CD-ROM for all Apple graphics hardware supported on PowerPC-based systems, whether it be built-in video or a plug-in graphics card. Apple also plans to ship — on the CD-ROM — replacement drivers for third-party graphics cards, providing, of course, that vendors get them done in time. For PCI graphics cards, current drivers written according to Apple's specs should work under OS 8 without modification.

Don't panic. Even in 7.5, GX contains APIs that enable applications that don't support GX printing to print without problems. And Apple will provide an extension to its LaserWriter GX driver that will give users continued access to LaserWriter 8.x functionality (most notably, PPDs).

Apple's got it covered. Localized versions of Mac OS 8 for 2-byte languages will include replacement input-method software, as will Apple's language kits for these countries. It will be up to third parties, such as JustSystem, which markets the popular Atok input method for Japanese, to rev their software for compatibility.

In place of PowerTalk, Apple will extend its current Cyberdog capability to provide e-mail, catalog, Web-browsing, and newsreader services based on Internet-standard protocols. Users who have set up PowerTalk-based workflow systems will have to retool if they want to upgrade to Mac OS 8.

Apple will also use the OpenDoc/Cyberdog combination to deliver System 8's replacement for PowerTalk. If all goes according to plan, the Finder itself will be an OpenDoc container in the Mac OS release (code-named Gershwin) that will come after OS 8.

QuickDraw GX. Despite its advantages, Apple's advanced graphics technology has languished, chiefly because of its RAM requirements. In Mac OS 8, QuickDraw GX will be the default imaging, typographic, and printing architecture. Integrating GX should encourage developers to adopt its superior typographic capabilities; its extensible printing architecture; and its graphics model, which offers benefits such as graphic-object transparency.

Apple will address the GX memory problem by rewriting GX to load into memory in small single-function segments, rather than in an all-or-nothing multimegabyte mass as it does now. Company officials still have not relented in their refusal to port GX to Windows, however. This failure may continue to stymie its adoption.

Multimedia. Although *Internet* may be the gold-medal buzzword of 1996, *multimedia* takes the silver. Apple has been hard at work developing technologies that make the Mac the multimedia-authoring platform of choice. With System 8, these technologies — including QuickDraw 3D, QuickTime VR, and QuickTime Conferencing — will be fully integrated into the operating system.

QuickDraw 3D is a set of algorithms that will help make 3-D images standard in documents, games, CD-ROMs — and Web pages. QuickTime VR lets developers create virtual worlds through which users can navigate. These can be either real environments, based on photographs of actual places and objects, or artificial ones, created with modeling and rendering tools. QuickTime Conferencing enables users to send video images across a local- or wide-area network.

Taking the Leap

It may be a bit early to be thinking about making the transition to System 8. Its commercial release is, after all, more than a year off. However, there are some things you ought to know when making long-range plans.

The first thing is that Mac OS 8 will run only on PowerPC-based systems. The new OS won't be compatible with Centris, Quadra, and PowerBook 500-series models upgraded with PowerPC processor-upgrade cards. Computers originally designed with 68040 chips and later upgraded with a full PowerPC logic-board replacement, however, will be able to run System 8.

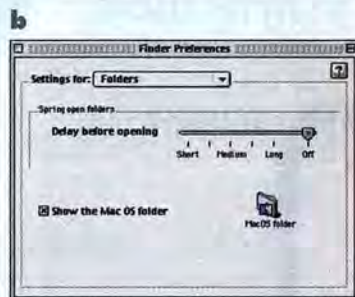
The second thing you should know is that the transition from 7.x to 8.0 will be a bit rocky. As with past system-software upgrades, it's Apple's intention to ensure that today's Mac applications continue to work under System 8. But that may be tougher this time around than with previous OS releases.

To improve performance and stability, Apple had to break several things System 7 relies on (see the "What Breaks in System 8" table). Extensions and control panels, for example, don't work under System 8. All hard-disk drivers and CD-ROM drivers also break. Apple is committed to providing replacement software for the parts of the system that will be made obsolete. The company is also investigating including third-party replacement software on the Mac OS 8 installation CD-ROM. And, for the first time with a new system release, Apple will allow users to keep their old 7.x System Folder around on the same hard disk as their new System 8 folder, providing a safety net for those who have problems when upgrading.

FIGURE 3

THE FLEXIBLE FINDER

SYSTEM 7'S VIEWS CONTROL PANEL gives users several choices for determining how icons and text will appear on the Mac's desktop. System 8 will expand the range of customization options by an order of magnitude. In addition to setting view configurations (■), users (or system administrators) will be able to set a host of other Finder behaviors. Mac OS 8's Finder Preferences dialog box will contain five different dialog boxes — Views, Folders, Menus, Desktop, and Labels — accessible via a pop-up menu, for adjusting the Finder's operation. The Folders dialog box (■), for example, will contain settings for how long the Mac should delay before opening a spring-loaded folder and for whether or not the Mac OS folder (formerly known as the System Folder) is visible. Whether a user sees long or short menus, whether a user can throw files into the Trash or empty the Trash, whether desktop icons appear as large or small icons or as buttons, and whether a user has permission to alter the system configuration profile are other examples of options in the System 8 Finder.



Hit or Missive?

Will Mac OS 8 be a hit — or offer too little and arrive too late? Even the Great Karnak would have a difficult time making that prediction accurately. And not only because he's dead.

At press time, Apple had yet to ship its first solid developer release. And although the company has announced that the final version will be ready a year from now, it proclaimed with equal confidence last year that System 8 would be shipping by now. Until there's a version of the OS third-party developers can work with, it's anyone's guess when System 8 will really ship to customers.

In the meantime, Apple has some work to do to shore up the current Mac OS. With Windows 95 nipping at its heels, mid-1997 is a long wait for a major OS upgrade. Apple will integrate OpenDoc, QuickDraw 3D, and QuickTime Conferencing into its retail release of System 7.5.3 this summer. But the OS won't take advantage of any of these technologies itself — most users probably won't even know they're there.

Fortunately, Apple executives have realized the need to deliver some of Mac OS 8's functionality without waiting for System 8. As we went to press, Apple announced that it was "investigating" the possibility of an interim System 7-based release, code-named Harmony, that does just that. Smart move. If Apple wants the Mac to hold onto customer mind share, the company needs to deliver new OS features that provide immediate benefit. The sooner, the better. ☞

Henry Bortman is MacUser's technical director.

MINI MACS

APPLE'S LATEST
ENTRY-LEVEL MACS
DELIVER POWER,
PERFORMANCE, AND
PCI TO THE MASSES.

Grow Up

BY ANDREW GORE

ONE PROBLEM with the Mac's rapid evolution is that the latest, coolest technology is always the most expensive and the hardest to get. Take PCI.

Introduced a year ago, PCI-based Power Macs have been the most powerful — and the most costly — in the Mac panoply. Not anymore. Apple has unveiled the new Power Mac 5400/120, the first system to incorporate Apple's high-speed PCI bus at a price that fits entry-level budgets.

The bad news is that the 5400 is initially being offered only through education resellers. The good news is that Apple has said future consumer Macs will also use the new low-cost PCI-motherboard design, code-named Alchemy. Although the all-in-one 5400 design may never be offered in the consumer market, the Alchemy architecture is the future of education *and* consumer Macs — and it's a future we strongly endorse.

ALCHEMY RULES

Apple's new entry-level Alchemy motherboard design has a tough act to follow: For almost three years, the processor-direct-slot-equipped motherboard that first appeared in the 33-MHz 68040 Quadra 630 — and that was later updated to PowerPC status in the 5200-, 6200-, and 6300-series systems — has ruled the low-cost roost. Our tests demonstrate, however,

that Alchemy totally eclipses its venerable forefather motherboard.

At the heart of Alchemy is a 64-bit-wide 40-MHz system bus that runs throughout the motherboard — connecting not only the processor, the Level-2-cache slot, and the ROM but also the RAM. This, combined with Alchemy's ability to utilize current 603e as well as forthcoming 603ev chips (which will have a top clock rate of 240 MHz), gives the design enough headroom to ensure viability for some time.

Other important changes have arrived with Alchemy: There's 8 MB of RAM soldered to the motherboard (the previous processor-direct-slot-equipped design had no onboard RAM). The new RAM slots are 64 bits wide and require 70-ns or faster DIMMs (the earlier design used slower, 32-bit SIMMs). The 5400 is the first entry-level Mac to use Apple's high-speed GeoPort-capable technology in its two serial ports. The 5400's audio is full 16-bit, 44-kHz stereo with SRS 3D sound enhancement; previous 630-style Macs had 8-bit audio (except for the 6300 — but its 16-bit audio was sampled only at 22 kHz).

In short, Apple has taken its high-end PCI architecture and shrunk it to fit on a 630-style motherboard. And, yes, a 5400 motherboard can fit in any 630-style entry-level Mac. However, at press time, it was unclear whether Apple will offer motherboard upgrades for older systems.



**APPLE POWER MACINTOSH
5400/120** ★★★★★

GOOD NEWS: It's fast, inexpensive, and loaded with features, and it includes a PCI slot.

BAD NEWS: You can buy it only through education resellers, for now.

POWER MAC 5400 / lots of slots in a small package

1 SLIDE-IN MOTHERBOARD

Although the 120-MHz 603e on the 5400/120's motherboard is soldered on, the entire motherboard slides easily out the back and can be replaced when faster chips arrive.

2 PCI-BASED COMMUNICATIONS SLOT

This custom slot can support any modem card — but no Ethernet card — that worked in earlier, 630-style systems. A newly designed 10BASE-T Ethernet card is standard in the 5400/120s sold in the K-12 market.

3 PCI SLOT

Among the 7-inch PCI cards that'll fit in the 5400/120's PCI slot is Apple's own Cyrix 5x86-equipped PC Compatibility Card. PCI cards must be plugged into an L-shaped riser connector that holds the card parallel to the motherboard.



Accessing the motherboard is as easy as sliding open a desk drawer.

4 VIDEO-OUT CONNECTOR

Just above the backup battery is a video-out connector that, with a special ribbon cable and port available from Apple, allows a 5400/120 to use a second monitor.

5 ROM SLOT

Although the motherboard has a ROM card inserted in a special slot, this slot is only for testing. Production units will have two ROM chips soldered into the empty spaces next to this slot.

6 LEVEL-2-CACHE SLOT

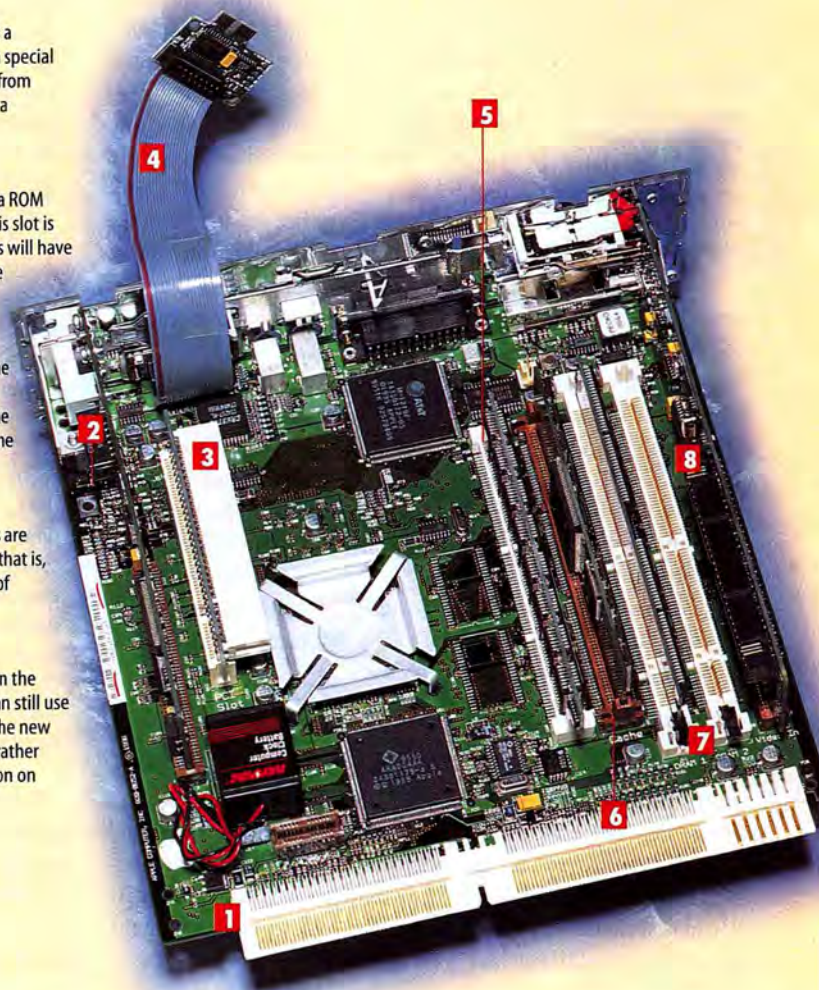
The L2-cache slot is empty on the 5400/120; speed increases noticeably if you add an L2-cache card. Apple offers a 256K L2-cache card for around \$100.

7 DIMM SLOTS

The two 64-bit-wide DIMM slots are independently configurable — that is, they can accommodate DIMMs of various capacities.

8 DIGITAL-VIDEO-IN SLOT

This slot is identical to the slot on the 630-style Macs. Although you can still use an old-style digital-video card, the new cards include a 60-pin DAV slot rather than the 34-pin DVA slot common on older cards.



SLOTS, OLD AND NEW

In downsizing PCI, Apple didn't throw compatibility out the window. The new PCI slot is based on the same design as its bigger brethren's, with one exception — there's space inside the cramped quarters of a 5400 for only a 7-inch PCI card. According to Apple, this won't be a problem, since many Mac PCI cards are already that size or can be easily shrunk from the standard 12-inch form factor to fit the 7-inch space.

On the rest of the motherboard, compatibility also outweighs incompatibility. The TV-tuner slot is unchanged. The Alchemy communications slot can still use the same modem cards that worked in the older 630-style systems. Not so with previous Ethernet cards, however; because the communications slot hooks up to the PCI bus, manufacturers will need to rework their Ethernet cards. The only slot that was significantly altered is the digital-audio-video (DAV) slot on Apple's digital-video-input card. The Alchemy-compatible version of Apple's digital-video card uses the full 60-pin DAV connector; previous models had a 34-pin DVA (Digital Video Analog) audio slot that, as the name suggests, didn't support digital audio. Older DVA-slot-equipped digital-video cards, however, work just fine on the new motherboard.

FAST, FULL-FEATURED, AND FUN

The 5400 also includes a slot for an L2 cache card — and we recommend that you fill it. Our MacBench 3.0 Processor test shows that the L2 cache boosts the 5400's speed by about 30 percent. With an L2 cache installed, the 5400 even edges out the L2-cache-equipped Power Mac 7200/120, the low end of Apple's latest mainstream PCI Macs.

On the MacBench Disk Mix and Graphics Mix tests, the 5400 scored higher than any entry-level Mac yet — on the Graphics Mix test, a 5400 with an L2 cache was almost twice as fast as a 5260/100 without a cache (see the "No Big Deal" sidebar). On the Publishing Disk Mix test, the 5400 fell just a little short of its cheaper cousin, a slippage attributable to the higher-capacity but slower IBM drive Apple ships in the 5400.

However, in comparison to those of the relatively poky 7200/120, the new entry-level Mac's disk and graphics scores fell well short. Here again the 5400 was hampered by a slow drive and by its use of dynamic RAM instead of the faster video RAM, used in the 7200. So, although the 5400 is without a doubt the best of breed for Apple's entry-level education line, it is not likely to steal many sales from mainstream Power Macs.

For \$2,299, the 5400 includes a 120-MHz 603e processor, 16 MB of

RAM, a 1.6-GB Enhanced IDE hard-disk drive, a 4x CD-ROM drive, a digital-video-in card, a display-video-out connector, a 10BASE-T Ethernet card, and an NTSC-video converter that lets the 5400 use a television as a second monitor. Even factoring in the extra \$100 for a cache card — which Apple Marketing has christened the High Performance Module — the 5400 remains a good deal. In comparison, the \$2,025 7200/120 we tested comes with 16 MB of RAM, a 1-GB hard drive, and a 256K L2 cache — but that price doesn't include a monitor, speakers, a digital-video-in card, or the extra 600 MB of storage space the 5400 comes with. (The 7200/120 that's sold in the education market has a 1.2-GB hard drive and 16 MB of RAM and costs \$2,056.)

Also missing from other Power Macs is the 5400's fun factor: The 5400 has the same compact form factor as its 5200-series predecessors, integrating a 15-inch color display into a tilt-and-swivel all-in-one chassis that makes the 5400 look more like an AV monitor than a computer. Although the speakers sound somewhat tinny, the stereo separation coming out of them is terrific, thanks to the SRS 3D sound processing. Also, the flat shadow-mask display is the sharpest Apple has delivered in an all-in-one design and the monitor supports multiple resolutions — 16-bit color at 640 x 480 pixels and 800 x 600 pixels and 8-bit color at 832 x 624 pixels.

THE BOTTOM LINE

In the ever quickening game of Mac OS-system one-upmanship, it's getting harder to declare a winner based strictly on speed. As we went to press, the 5400 represented the most bang you could get for around \$2,300. However, even a month can make a huge difference in a marketplace where processor speed is doubling every year. A 120-MHz 603e may seem slow by this fall, once Motorola begins shipping the 133- or even 166-MHz 603e chips it has on tap.

NO BIG DEAL / the 5260 is penny-wise, cache-stupid

IF EVER THERE WERE a poster child for a Level-2 cache, the new Power Mac 5260/100 is it. The 5260/100 looks to be the last in the line of education Macs based on the Quadra 630 architecture. Like its predecessor, the 5200/75 LC, the 5260/100 takes a PowerPC chip (a 100-MHz 603e) and plugs it into a processor subsystem that offers a 64-bit-wide data path between the CPU, the ROM, and an L2-cache slot. Other than having a faster processor, the motherboard remains virtually identical to that of the old 630-style machines.

Besides the faster processor, the 5260/100's big "improvement" is the departure of a combo slot for both ROM and the L2 cache. As a result, Apple unbundled the L2 cache and sells it for about \$100.


Without the L2 cache, the 5260/100 got a Processor score of only 8.7, 13 percent slower than the cache-equipped 5200/75. With the L2 cache, the Processor score jumps to 13.1. The faster processor is a nice idea, but its speed kick evaporates without an L2 cache. Anyone looking to pick up a 5260 should factor in another \$100 if they want a system that performs as well as the Mac they could have bought a month or two ago.



APPLE POWER MACINTOSH 5260/100 \$\$\$

GOOD NEWS: It's inexpensive, and it has 16 MB of RAM.

BAD NEWS: It's slow without the optional \$100 L2-cache card, and you can buy it only through education resellers, for now.

The potential for processor obsolescence aside, the 5400 is one slick machine. By delivering such a speedy Mac at such a reasonable price, Apple is also keeping its entire line — not just its high-end systems — competitive with the best that PC-clone makers can offer. 

Andrew Gore is the editor of *MacUser*.

INVEST IN CACHE / new Macs benefit from optional Level-2 cache



ONE IMPRESSED US, the other was a bit disappointing, and both performed far better with an optional Level-2 cache card.

Although the 5260 and the 5400 ship without an L2 cache, we also tested them with a 256K cache card. Buy one — it's the best \$100 power boost you'll ever find.

The MacBench 3.0 Processor test measures overall CPU and memory-subsystem speed. The Floating Point test measures calculations common in tasks such as 3-D rendering. The Disk Mix and Graphics Mix tests

emulate how the 12 best-selling Mac applications exercise the hard-drive and display systems. The Publishing Disk Mix test and the Publishing Graphics Mix test emulate Photoshop and QuarkXPress use. All tests were conducted with 16 MB of RAM and with System 7.5.3 or System 7.5 with System Update 2.0 installed (except on the 5200/75, which was tested with System 7.5.1). All MacBench 3.0 scores are relative to those of a Power Mac 6100/60 (with a 250-MB Quantum internal hard drive and with built-in graphics hardware), which is assigned a score of 10.0 in each test.

CONFIGURATION				MACBENCH 3.0 SCORES					
Installed L2 Cache	Processor	Hard-Disk Capacity	Processor	Floating Point	Disk Mix	Publishing Disk Mix	Graphics Mix	Publishing Graphics Mix	
Power Mac 5400/120	256K	603e	1.6 GB*	20.7	19.5	14.0	9.6	17.1	13.4
Power Mac 5400/120	none	603e	1.6 GB*	16.0	17.7	12.4	9.0	12.9	10.6
Power Mac 5260/100	256K	603e	810 MB†	13.1	15.7	12.7	11.1	12.5	12.0
Power Mac 5260/100	none	603e	810 MB†	8.7	14.4	11.5	10.4	9.1	8.5
REFERENCE PRODUCTS									
Power Mac 5200/75 LC	256K	603	1 GB‡	10.0	10.5	13.8	11.4	9.0	9.1
Power Mac 7200/120	256K	601	1 GB‡	19.2	20.7	16.6	15.9	23.9	25.5

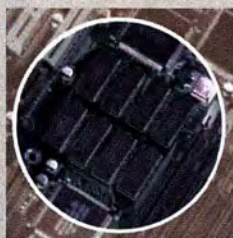
*IBM DJAA-31700 Enhanced IDE †Quantum TRB850A Enhanced IDE ‡Quantum Fireball Enhanced IDE §Quantum Fireball SCSI-2

For years, creative professionals have relied on award-winning UMAX scanners to capture the high quality images they demand as an essential part of their creative solutions. Now, UMAX has come full circle by offering them the ultimate computers on which to realize their vision...



Introducing the SuperMac S900

Designed from the ground up specifically to meet the needs of the design professional. We've kept all the best things you like — the familiarity and ease-of-use of Mac OS and compatibility with all your favorite software — wrapped it all up with the raw power of a 604 150MHz PCI-based design and delivered it at a price that can't be beat. Many unique features of the new S900 have been designed to specifically eliminate performance bottlenecks that have long troubled the market.



1 Interleaved Memory

Every S900 comes standard with 16MB of interleaved memory on the motherboard for fast memory access and best system performance. Others require the purchase of additional DIMMs to implement memory interleaved.

2 Advanced Scalable Processor Design

UMAX's exclusive A.S.P.D. provides easy upgradeability to dual processors or for higher speed processors as they become available. This modular configuration costs less and is far more flexible, allowing programs such as Photoshop to increase its performance up to 80% with the addition of a second processor card.



3 Exclusive PCI-to-PCI Bridge

Not only does the S900 have an amazing 6 PCI slots, it is also the first to enable burst communication between them.



UMAX's exclusive PCI-to-PCI Bridge design enables direct communication between all PCI cards with the greatest performance, no matter which slots they're inserted in, also making it more expandable and easier to configure.

4 E100 I/O & Networking Card

To increase performance even further, UMAX offers the ultimate combination upgrade that gives you both Ultra-Wide SCSI and 100Base-T on one easy-to-install PCI card. The 100Base-T boosts data transfer over networks up to ten times the speed of standard 10Base-T connections. Ultra-Wide SCSI provides 16-bit wide data access at rates up to 40MB/sec. (4 times the speed of regular SCSI)



MODEL	Processor Type	CPU Speed	Hard Drive Capacity	PCI Slots	Onboard RAM	Level2 Cache	CD ROM Drive	Graphics Card	Drive Bays	PRICE*
▶ SuperMac S900L	Tower	604	150 MHz	2 Gbyte	6	16 MB	512 K	8x Speed	4MB VRAM	5 \$ 4395

* Suggested Retail Price

UPGRADE OPTIONS	PRICE*
▶ SuperMac E100 Extended Performance Ultra-Wide SCSI / 100Base-T	\$ 495
▶ SuperMac P150 604-150 ASPD Processor Upgrade	\$ 995

* Suggested Retail Price

S900L BUNDLED SOFTWARE

Conflict Catcher 3.0™ FIVE CD-ROM & HDTool Kit™
 LASANTE Net Doubler™ Mac OS

UMAX
Computer Corporation

FOR MORE INFORMATION CALL:
1-800-232-UMAX

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CIRCLE 141 ON READER SERVICE CARD

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The WEB

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SO YOU WANT TO PUT
YOUR COMPANY —
OR YOUR OWN
SMILING MUG —
ON THE INTERNET?
TO BE A POLISHED
WEB PUBLISHER,
YOU'LL NEED TO
CHOOSE THE RIGHT
TOOLS FOR THE JOB.

BY TONYA ENGST

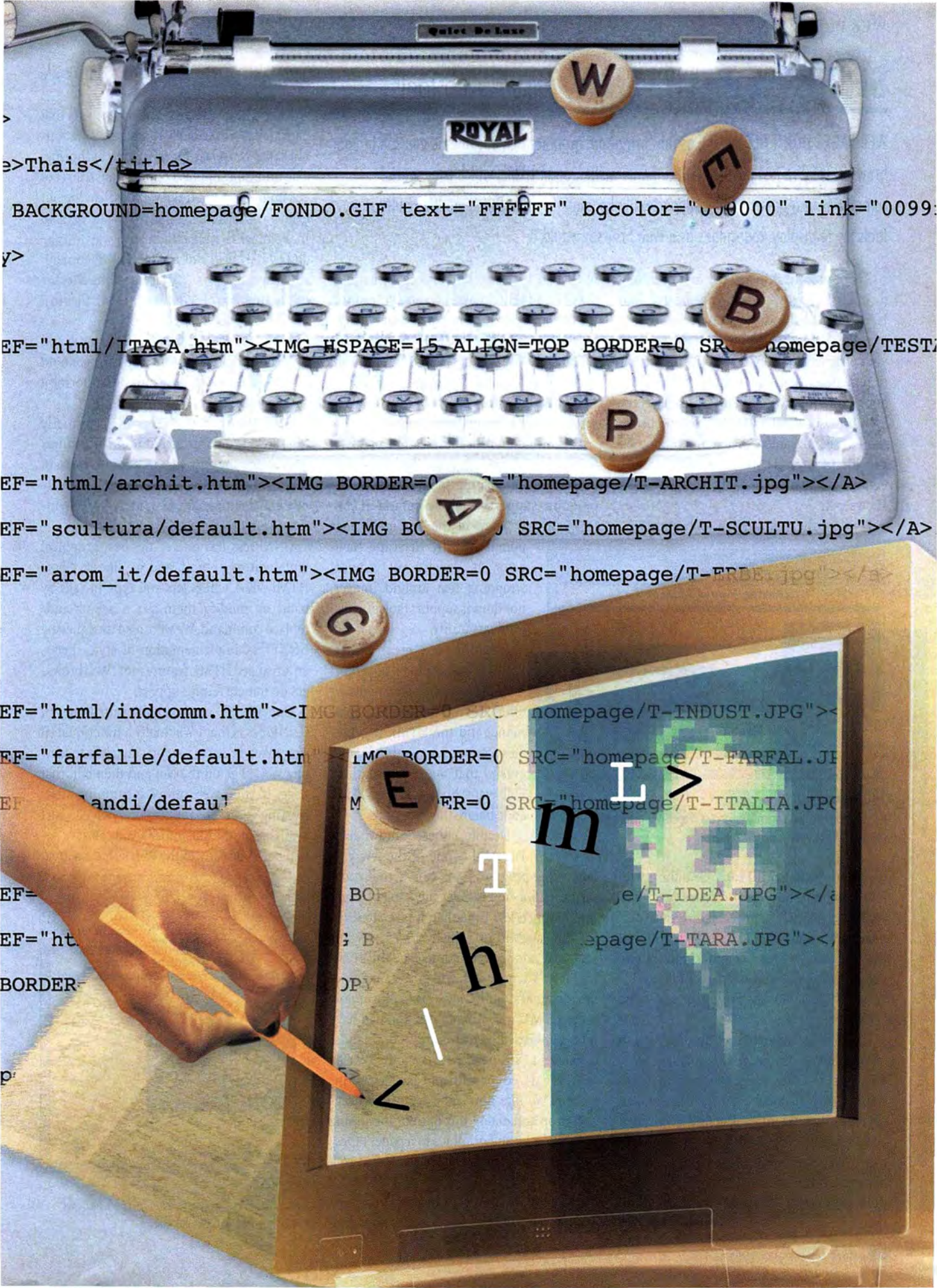
THESE DAYS MORE AND MORE PEOPLE want to make their voices heard on the Web, whether it's via full-blown Web sites for their businesses or personal home pages.

Creating Web pages isn't like creating a document in a word processor and printing it out. The Web is a world of HTML, GIF, JPEG, image maps, and CGIs. (For an introduction to Web geekspeak, see the "Language of the Web" sidebar.)

Assembling the right tools for the job can be challenging — there's no one program that can act as a Swiss-army knife of Web-site creation. Some tools can give you a good idea of what a Web page will look like once it's on the Net, whereas others take you under the hood to fine-tune a page's performance. With a little work, you can assemble a Web workshop that contains *all* the tools you'll need in order to become a consummate Web weaver.

Tonya Engst edits TidBITS (<http://www.tidbits.com/>) and is the coauthor of *Create Your Own Home Page*, 1995. Her home on the Web is at <http://www.tidbits.com/tonya/>.

PHOTO ILLUSTRATION / GIAMPIERO BENVENUTI



SEEING IS BELIEVING / visual Web tools

WEB PAGES DON'T BEGIN LIFE as the formatted, graphics-rich documents you see in your browser. They're just plain-text documents written up in HTML, which uses special commands to represent styles, hypertext links, and graphics. But some Web authoring tools try to display your pages as a Web browser would.

These graphical tools let you edit a fully formatted page, which is transformed into HTML code behind the scenes. Although a WYSIWYG page editor can help you see how your page will look on the Web, it's important to remember that such editors offer only an approximation of the final Web page; every Web browser displays HTML differently, so there's no guarantee that a finely aligned graphic in your HTML page editor will be equally aligned when it's displayed in Browser X.

Perhaps the best-known Web authoring

in URL format. PageMill also easily handles the GIF and JPEG image formats common on the Web, automatically converting images saved in PICT format into GIFs. You can make sections of GIF images transparent within PageMill and can create image-map files as well, although setting up those files on a Web server is still a complicated process.

PageMill supports the creation of fill-in forms via a simple interface that's a big improvement on creating them by hand. The program supports many common HTML tags but only a few of the "extended" tags popularized by Netscape Navigator. It doesn't yet support wrapping text around images, nor does it support tables, which limits its utility.

PageMill is a great layout-prototyping tool, but it falls short in most other departments. It offers no find-and-replace command, and the HTML it generates contains enough idiosyncrasies that many Web authors will want to tweak the HTML code before they post it.

Despite these drawbacks, PageMill is one of the few Web

authoring programs we can actually describe as *fun*. You can get the hang of PageMill in much less time than it takes to learn HTML. PageMill 2.0, which arrives later this year (see "Adobe Responds to PageMill's Critics," July '96, page 28), will correct many of the original's limitations: It will support more HTML, including tables, and will have more sophisticated text-editing commands.

Concept 1's **Tapestry 1.0** is another WYSIWYG HTML editor with an easy, elegant interface. We like how Tapestry offers drag-and-drop and dialog-box options for adding internal links and graphics to a page. Tapestry's external-linking feature also works well — you can optionally set up external links by dragging them from your browser's window to Tapestry's. Unfortunately, you cannot drag

and drop text or graphics once they are placed in a document.

That's the good news. The bad news is that Tapestry is so seriously limited in functionality that it is useless for most Web authoring. The program supports only a small subset of commonly accepted HTML tags, leaving out even basic tags such as headings and lists. To make matters worse, there's no way to type additional tags into a Tapestry document. And Tapestry doesn't offer a spelling checker or the ability to preview your HTML files in a Web browser.

In its current incarnation, Tapestry would be a good choice for users who can't contend with HTML tags and will only be authoring a simple home page.

GNN Hosting's **GNNPress 1.1** (formerly NaviPress) contains a gold mine of features and offers support for an extensive set of HTML tags, but it's held back by a bad interface and documentation written for the Windows version of the software.

GNNPress has one of the best graphical table editors around, and we like its Show HTML view, which lets you type in tags by hand or modify them via a search-and-replace command. We were also intrigued by GNNPress' implementation of style sheets, an advanced HTML feature most Web browsers do not currently support.

One of the most notable attributes of GNNPress is that it's actually a functional (if slow) Web browser — you can use it to view any Web page on the Net and then edit that page. If your Web server is running GNN Hosting's server application (which isn't available for the Macintosh), you can save edited pages directly to the Web site. It's a great



ADOBE PAGEMILL 1.0

An authoring tool that's actually fun to use, PageMill is great for prototyping Web pages.

tool is **Adobe PageMill 1.0**. Web authors who know nothing about HTML can use PageMill's completely visual approach to design Web pages. Even veteran HTML jockeys will find that PageMill is great for quickly designing pages with drag-and-drop techniques instead of by tediously typing or inserting HTML tags.

PageMill feels a lot like a primitive version of PageMaker — you create text and graphic elements in other programs and then assemble those elements in PageMill. You can also type directly into a PageMill document. Once text is in PageMill, you can apply formats that correspond to HTML tags. Making hypertext links is childishly simple: Select the text you want to be linked, type Enter, and then type or paste in the destination address



GNNPRESS 1.1

A gold mine of useful features that's held back by a bad interface and worse documentation.

The Language of the Web / making sense of Web-authoring jargon

The lifeblood of the World Wide Web is HTML, HyperText Markup Language. **HTML** files are written in unformatted plain text (no special characters such as curly quotes and accented letters are allowed, although you can create equivalents by using special HTML codes called *entities*). HTML consists of commands, called **tags**, that you insert into a text document to indicate how the text will appear in a Web browser. For instance, to make a first-level heading, you surround text with a pair of `<h1>` tags, like this: `<h1>Topic One</h1>`.

HTML tags are constantly changing — not all Web browsers support all HTML tags, nor do all Web authoring tools. For example, Netscape Navigator introduced the tags that allow authors to use a color or a pattern as the background for their pages. Initially only Navigator could use these tags, although most browsers and authoring tools (and even the proposal for the next version of HTML) have adopted them.

Among the most popular new sets of tags are **table** tags, which allow authors to embed formatted tables in HTML files. Even though several browsers don't support tables, Web authors love using tables, because they help organize information into columns and rows. Tables can be difficult to tag by hand; fortunately, numerous programs provide visual tools to make table creation easy.

The most recent crop of tags includes **frames**, an extension to HTML

introduced by Netscape Navigator 2.0. Frame tags let you place scrolling Web pages into other pages — but only in browsers that support frames. As of this writing, only Navigator 2.0 and an early version of NCSA Mosaic 3.0 support frames.

Most graphics that appear on Web pages are in one of two formats: **GIF** (Graphics Interchange Format) or **JPEG** (Joint Photographic Experts Group). For more information on Web graphics, see Graphics How-To ("Shrinking Web Graphics"), in this issue.

If you make various "hot spots" on an image on a Web page link to various locations, that image is known as an **image map**. To set up an image map, you create a map file that relates areas in the graphic to the URLs they map to. This map file is processed by a **CGI**, or Common Gateway Interface, script. A CGI is a program that runs on a Web server and acts on information sent to it from a browser. In the case of image maps, a CGI matches where a user has clicked on an image map with the coordinates in the map file and directs the user to the appropriate URL.

CGIs can provide all sorts of behind-the-scenes functions. In particular, they can process **forms**. These days most browsers support forms, interactive pages that offer fill-in windows, pop-up menus, and the like. Many authoring tools make it easy to create a form, but that form won't work correctly unless you pair it with a CGI script on a Web server.

feature, but since it's limited to GNN Hosting's own server software, few people will get a chance to use it.

However, the game will heat up for Page-Mill, Tapestry, and GNNPress later on this year when Netscape ships Netscape Navigator Gold for the Macintosh, a version of its

popular Web browser that will serve as both a browser and a Web authoring tool. Features we expect to see (and are looking forward to) include drag-and-drop support for adding graphics and links, easy editing of pages already posted on the Web, multiple undos, and extensive support for a variety of HTML tags.

HALF AND HALF / hybrid tools

SOME WEB AUTHORING TOOLS strike a balance between being completely visual (à la PageMill, Tapestry, and GNNPress) and displaying nothing but raw HTML tags. These tools display HTML tags while trying to approximate what your page will look like when it's displayed in a Web browser, giving you a view that's half visual and half textual.

World Wide Web Weaver 1.1, from Miracle Software, is a simple, useful HTML editor that helps authors think visually while editing HTML tags. For example, text defined as heading level 1 will appear in boldface and at a large type size, just as it would in your Web browser. HTML tags appear in a color and size all their own, so you can quickly tell tags apart from text.

Web Weaver supports several advanced HTML tags, including tables, forms, and frames. Creating forms and tables is an awkward process, but Web Weaver tries its best to offer a graphical preview of those page elements. Web Weaver can check your Web page

to make sure you haven't used an HTML tag incorrectly, and you need not be left behind when new HTML tags arrive on the scene — the program lets you add new tags to the tag checker.

Despite its slightly cramped interface, Web Weaver is a good product for creating individual HTML pages. It's accessible and easy to learn and a good pick for novices who want to learn HTML or for people who create Web pages on an informal basis.

SoftQuad's **HoTMetaL Pro 2.0** is a powerful HTML authoring tool that's hampered by an ugly, hard-to-use interface. Like Web Weaver, HoTMetaL Pro shows tags and text in



WORLD WIDE WEB WEAVER 1.1

A simple HTML editor that's a good pick for novices who want to learn HTML.

different styles and approximates how text will look when it's displayed in a Web browser.

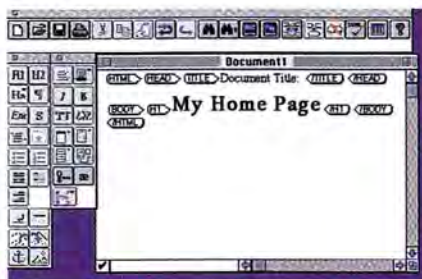
HoTMetaL Pro can preview documents in any installed browser, although the interface is strange. Unlike other Web authoring tools we've seen, HoTMetaL Pro doesn't let you edit HTML tags directly: Tags appear as objects within your document, making it easy to differentiate between tags and document text. However, treating tags as objects means you must use dialog boxes to edit them. HoTMetaL Pro's strong rule-checking feature watches carefully to ensure that authors are creating valid HTML documents, although rule checking can be turned off if it becomes too obtrusive.

When it comes to defining the colors of your Web document, HoTMetaL Pro is very unfriendly: Most Web authoring tools provide you with a color wheel to help select colors, but HoTMetaL Pro forces you to calculate

the hexadecimal RGB value of each color and then type that value in.

Aspiring to be more than a mere text editor, HoTMetaL Pro offers several tools more commonly found in word processors. However, we found its spelling-checker interface mediocre, its thesaurus unimpressive, and its outliner completely inscrutable. The program also offers a sophisticated find-and-replace capability, including a poorly documented pattern-matching feature.

Despite its problems, given how much SoftQuad improved HoTMetaL Pro 2.0 over the out-and-out awful HoTMetaL Pro 1.0, we



HOTMETAL PRO 2.0

Powerful HTML editing with an ugly interface.

can't wait to see if this rate of improvement continues with version 3.0, which should be available soon.

WITHOUT A NET / text tools

TEXT TOOLS REDUCE WEB PAGES to their raw elements: plain text and HTML tags. They make little effort to show you how your documents will appear in a Web browser.

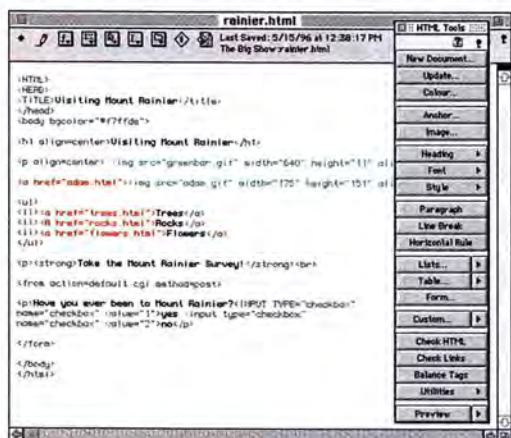
Although editing a Web page in a text editor may not be beautiful, text-based tools offer powerful features most graphical tools lack.

Bare Bones Software's **BBEdit 4.0** is one of the most powerful HTML-editing tools you'll find, and it deserves serious consideration for anyone's HTML toolkit — even if you prefer to do initial page designs in a graphical tool such as PageMill. Included with BBEdit is a set of plug-ins that help create HTML documents; additional plug-ins available on the Internet provide other features such as support for tables.

BBEdit's HTML commands simplify tasks such as setting background colors, configuring links, and adding graphics. Drag-and-drop aficionados will find much to make

them happy — for instance, to create a link to another file in a site, you drag that file's icon from the Finder to the document window.

BBEdit's spelling checker is smart enough not to flag HTML tags as misspelled words, and its sophisticated text-manipulation features can quickly become indispensable. Although learning the grep pattern-matching search-and-replace system can be tricky, we found BBEdit's manual and Apple Guide file to be extremely helpful in explaining how to create complex search patterns. You can search multiple documents at once and organize documents into virtual "groups" for convenient mass searches, a boon to those who must manage and update Web sites. Also useful is a system that allows you to automatically update repeating elements (such as footers or images) on all pages in a Web site. And although BBEdit can't display pages graphically, it can have your Web browser of choice preview them.



BBEDIT 4.0

Offering incredible editing power, BBEdit deserves a place in everyone's HTML toolkit.

some getting used to. Most of the commands do not have keyboard shortcuts, and the process for assigning shortcuts is cumbersome.

In the fast-moving world of Web authoring, the biggest strength of BBEdit may be its adaptability. Since BBEdit's HTML commands are in the form of plug-ins, programmers can quickly update BBEdit when new HTML tags hit the scene.

Although many word processors deal with HTML by taking a native, fully formatted document and translating it into HTML, Nisus Software's **Nisus Writer 4.1** works like a traditional text editor. The word processor and its included HTML macros offer features that make serious HTML coders drool, including multiple undos and pattern-matching search-and-replace. An included macro can approximate how your document will look in a Web browser, although the applied styles are updated only when you run the macro. Nisus Writer's unique ability to select noncontiguous blocks of text makes it possible to select all the text you'd like to give a certain style and then tag it all with a single command.

Nisus Writer isn't a complete solution: The macros don't support an extensive variety of tags (they don't support table tags, for example), and they can't put up dialog boxes that walk you through complex coding situations. You can create your own macros, although it takes time to learn Nisus' macro language. Nisus Writer lacks features such as



NISUS WRITER 4.1

A word processor doubling as a text editor, Nisus Writer is daunting but feature-rich.

the ability to convert graphics to JPEG or GIF format and color wheels for selecting background and text colors.

One other note: Joe Kissell's excellent book *The Nisus Way* (1996) explains Nisus Writer far better than the product's own confusing documentation, and its companion CD-ROM include a 90-day trial version of Nisus Writer and an extended version of Nisus' HTML macros, which include macros for the creation of HTML forms. Novices, note: Nisus Writer can be a daunting application, with a steep learning curve.

THE OLD STANDBYS / word processors

IF YOU WANT TO LEVERAGE YOUR EXISTING KNOWLEDGE or if you're on a tight budget, look no further than your favorite word processor for a main component of your Web workshop. Although any word processor would make a reasonable starter tool, most have recently added HTML-specific features.

Corel's **WordPerfect 3.5** allows you to create an HTML document just as you would a regular WordPerfect document — employing WordPerfect's HTML tool bar, you apply formats that correspond to HTML styles. WordPerfect's bookmark feature (which you normally use to create links within a word-processing document) allows you to embed hypertext links within a document's text. WordPerfect provides a useful environment for laying out pages and works especially well for positioning graphics, working with background colors, and creating tables. Also, the program's word-processing features come in handy for composing text.

Unfortunately, the HTML generated by WordPerfect is so crippled that all but the simplest documents will need to be fixed in a text editor. (You can use WordPerfect as that text editor, but not easily. You must first disable the program's HTML converter and in order to save — and thus preview — an HTML document, you must traverse several dialog boxes.)

WordPerfect owners will find that using their application can be a handy way of translating their documents to the Web, but we can't recommend that anyone buy the product solely for its HTML features.

Users of **Microsoft Word 6** have HTML editing right in their word processor, courtesy of Microsoft's free **Internet Assistant** for **Microsoft Word** plug-in. Internet Assistant extends Word 6 in two ways: It lets you

save Word documents as HTML documents, and it lets you work in HTML mode within the Word environment. When you're in HTML mode, Internet Assistant gives you a special HTML tool bar that offers commands such as for adding hyperlinks to selected text and placing graphics in a document.

On the horizon is a new word-processor-like product that specializes in Web authoring. Code-named **GlobeTrotter**, this product from Akimbo Systems will let you create a document in an environment similar to that offered by Akimbo's word processor, Full-Write. When you are prepared to publish a



WORD 6

The free Internet Assistant plug-in adds an HTML tool bar to Microsoft Word.

document, you can either choose Page Setup and print the document or pick Web Setup and create HTML. Although we were able only to preview an early development version of the product, it appears that GlobeTrotter will generate clean HTML code and should support several higher-end Web authoring features, such as tables.

WEAVING YOUR WEB / site-management tools

WEB AUTHORS DON'T USUALLY CREATE individual Web pages; instead, they create Web sites — groups of linked pages that work together, much as the pages in a magazine work together to form a cohesive whole. When managing a site, you need tools that help with tasks such as efficiently placing documents on a server, updating multiple pages, and visualizing the relationships among pages on the site.

Adobe **SiteMill 1.0** incorporates the functionality of Adobe PageMill and adds site-management features to the mix. SiteMill displays a Web site in a window resembling a Finder list view. If you double-click on a file in this view, the file opens in an editing window that's identical to PageMill's. Dragging a file from the site view to an editing window automatically makes a link to that file.

Within the site view, you can move files from one folder to another without worrying about breaking hypertext links — SiteMill automatically keeps all your links correct. You can also use the site view to get information on a site's structure — it shows data on



ADOBE SITEMILL 1.0

Despite some useful and unique site-management functions, SiteMill is derided by its frustrating interface and high price tag.

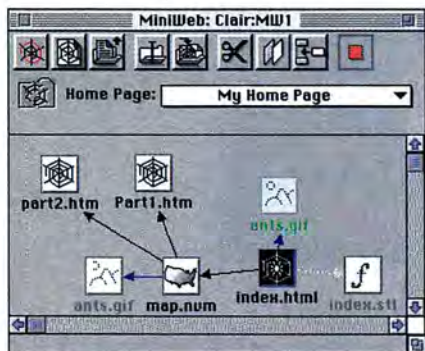
each file, including which pages point to it and which pages it points to.

Although SiteMill's site view may look like a Finder window, it doesn't always act like one. The most frustrating example of non-standard behavior is the inability to select several files at once. Creating a new folder in your Web site's hierarchy and moving a slew



WORDPERFECT 3.5

New HTML functionality doesn't make this word processor a useful authoring tool.



GNNPRESS 1.1

Displaying a site as a "miniweb" gives GNNPress users a graphical overview of a Web site.

of files into it should be a simple click-and-drag procedure, but SiteMill turns it into an interminable process, forcing you to drag one file at a time into the new folder. You also aren't allowed to move an entire folder.

SiteMill lets you see all the external URLs your pages point to and shows which pages point to which URLs. In this view, you can easily change every reference in your Web site if a URL changes, although you have to test for changes yourself; SiteMill cannot verify external URLs for you.

SiteMill would be a welcome addition to most any HTML collection, but not for the price, which is over \$400 more than PageMill's. SiteMill has a few other drawbacks: It has trouble loading information about large sites and reports links to unloaded pages as errors if you load a small portion of a site. SiteMill also doesn't track which files have been changed and doesn't help you upload files to remote Web servers.

We mentioned GNNPress earlier as a WYSIWYG authoring tool, but it also offers site-management features. It can display a Web site as a "miniweb," which graphically displays the relationships among files on a Web site. Within a miniweb, you can create links or rename files, and GNNPress automatically updates files as needed, much as SiteMill does. GNNPress' Check Links command works like a slow spelling checker — it pokes through documents or miniwebs, identifies bad links, and allows you to correct them as you go.

The miniwebs and site-management aspects of GNNPress would be far easier to use if the program offered window-management tools. GNNPress could also use a speed boost — it's disappointingly slow, even on Power Macs.

Microsoft also has plans to enter the site-

THE WORKBENCH / HTML tools compared

	ADOBE PAGEMILL 1.0	ADOBE SITEMILL 1.0	BBEDIT 4.0
Rating	★★★½	★★★	★★★★
WYSIWYG mode	●	●	
Tag edit mode			●
Forms	●	●	●
Tables			●
Entities	●	●	●
Spelling checker			●
Find/Replace			grep
Color picker	●	●	●
Map-file making	●	●	
GIF tools	●	●	
Preview in browser			multiple
Error checking			●
Automation features			●
Site management		●	●
Can be "taught" new tags			
Summary	An appealing, simple visual tool. Excellent support for graphics.	Offers all the features of PageMill plus a few site-management tools; overpriced.	Popular text tool with lots of Web authoring features.
Company	Adobe Systems; 800-628-2320 or 415-961-4400 http://www.adobe.com/	Adobe Systems; 800-628-2320 or 415-961-4400 http://www.adobe.com/	Bare Bones Software; 508-651-3561 http://www.barebones.com/
Price	\$149	\$595	\$119

management game, with a Macintosh version of **FrontPage**, a product currently available only for Windows. FrontPage should match many of SiteMill's features and add

the ability to set up CGIs, or Common Gateway Interface scripts, for elements such as forms and counters without any programming and for a variety of servers.

ON THE NET / shareware tools

WHEN IT COMES TO WEB AUTHORING, the line between freeware and shareware blurs — several of the programs we've discussed can be downloaded from the Internet and used as fully functioning software for a trial period. Even so, there are several noteworthy Web authoring programs available as freeware or shareware.

HTML tables can be hard to create, but Bertil Holmberg's free **TableTool**, a HyperCard stack, makes the process easy. A more sophisticated tool is Sam Choukri's \$5 shareware **TableMaker**. Users of Microsoft Excel can also download the \$7 shareware **XTML Add-In**, by Ken Sayward, or visit Microsoft's Web site to download the free **Internet**

Assistant for Microsoft Excel. Both products add a conversion option to Excel's Tools menu.

Adding background and text colors to HTML documents can be a bit of a pain, especially when your authoring tool of choice doesn't provide you with a color picker. That's why John Cope's **HTML ColorMeister** is a

GNNPRESS 1.1	HOTMETAL PRO 2.0, V3.69	NISUS WRITER 4.1	TAPESTRY 1.0	WORDPERFECT 3.5	WORLD WIDE WEB WEAVER 1.1
⚙️	⚙️	⚙️	⚙️	⚙️	⚙️
●	limited	limited	●	●	limited
●	●	●		●	●
●	●	●			●
●	●			●	●
●	●	●	●	●	●
	●	●		●	
●		grep		●	●
●			●	●	●
●					
●	multiple			●	multiple
●	●				●
	●	●		●	
●		limited			●
		●			
Offers a brilliant but confusing muddle of features.	Text tool with a rigid approach to coding. Incomplete entity support.	A sophisticated macro-driven text tool. Adding tags may prove a steep challenge.	A limited WYSIWYG program for beginners making simple sites.	Offers an adequate visual environment for brainstorming the look of a page.	Text tool with some visual aspects; especially good for learning HTML.
GNN Hosting; 800-879-6882; http://www.gnnhost.com/	SoftQuad; 800-387-2777 or 416-239-4801; http://www.sq.com/	Nisus Software; 800-281-0101 or 619-481-7197; http://www.nisus-soft.com/	Concept 1; 800-292-7085; http://www.concept1.com/	Corel; 800-451-5151; http://www.wordperfect.com/	Miracle Software; 315-265-0930; http://www.northnet.org/best/
\$99	\$195	\$258	\$69	\$329	\$50

godsend, offering a handy color wheel and the ability to generate a skeleton HTML document that includes the tags for a background tile or color and for colored text.

It often makes sense to check your pages for HTML errors, and the free **MacWebLint** is a useful error checker. MacWebLint checks HTML documents and reports on any problems found, by line number, although the error messages can be cryptic and the program's line-numbering scheme is difficult to work with.

For a visual HTML tool that also offers some site-management capabilities, check out **Arachnid**, a free application by Robert McBurney.

BBEdit Lite, from Bare Bones Software, works with a "lite" version of BBEdit's HTML plug-ins package. BBEdit Lite lacks a spelling checker and some of the other features of BBEdit, but you can't complain about the price: BBEdit Lite is free.

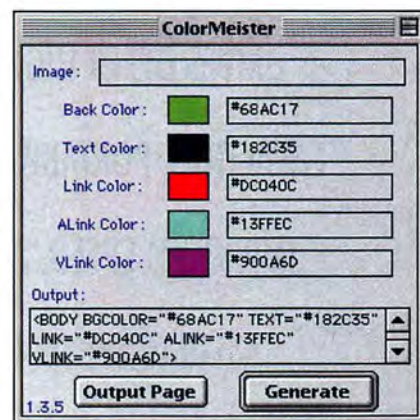
Likewise, SoftQuad offers a free version of HoTMetal Pro called **HoTMetal Free 2.0**.

The free version lacks HoTMetal Pro's spelling checker and thesaurus, and it cannot import word-processing documents, record macros, or print.

If the half-graphical, half-text approach of World Wide Web Weaver interests you, check out Miracle Software's **HTML Web Weaver 2.5.3**. HTML Web Weaver has the same friendly approach as World Wide Web Weaver, but at \$25, it's more affordable.

If your word processor or page-layout program of choice doesn't offer you an HTML-export option, you're not out of luck. Chances are good that the program can export files via Claris XTND filters or via Microsoft's Rich Text Format (RTF). If it can, you can use a third-party translator to convert your word-processing documents into HTML files.

Leonard Rosenthal's **HTML+** is an XTND filter that examines the formatting of a document and automatically assigns HTML tags. HTML+ works with the freeware application **clip2gif** to translate graphics into GIF images, creating the necessary links along the



HTML COLORMEISTER

Pick the colors you like, and they'll automatically be translated into HTML tags.

way. HTML+ outshines the HTML converter that ships as part of Claris' own ClarisWorks 4.0 package. **rtftohtml** is a freeware utility that converts RTF files into raw HTML. rtftohtml is difficult to configure (and to pronounce), but it accomplishes the job quickly and efficiently. ☞

REMOVABLE-MEDIA DRIVES

THE LATEST
REMOVABLE-MEDIA
DRIVES OFFER HIGHER
CAPACITIES, PORTABILITY,
IMPROVED SPEED, AND
ATTRACTIVE PRICES.
MACUSER LABS HELPS
YOU CHOOSE THE DRIVE
THAT'S RIGHT FOR YOU.



IOMEGA JAZ

HOW MANY TIMES have you said to yourself, I need something like a floppy-drive system, but ____? Whether you fill in that blank with *faster, sturdier, with higher capacity*, or even *physically smaller media*, you're left reminiscing about the times when 1.44 MB was a lot of data. Nowadays, about the only thing a 1.44-MB floppy disk is good for is preventing water damage on your coffee table.

Fortunately, a new age in removable-media storage has dawned, and you can find a storage system that can hold hundreds of megabytes of data at a lower price than ever before — even under \$200. We've also seen the introduction of new drive technologies, creating so many choices it can be hard to figure out which one is right for you.

To help you decide among magneto-optical (commonly called optical), magnetic, minidisc, and phase-change drives, we gathered up examples of each type

BY KRISTINA DE NIKE



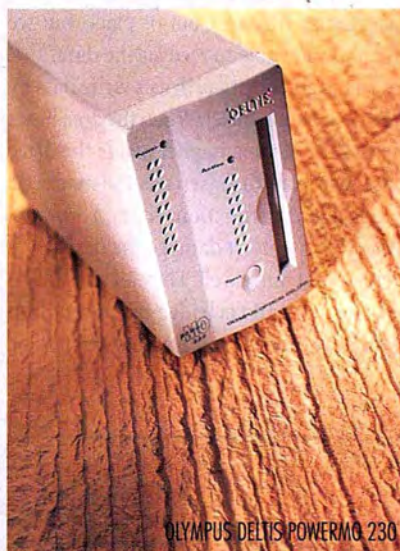
SYQUEST EZ135



FUJITSU DYNAMO 230



SYQUEST 200



OLYMPUS DELTIS POWERMO 230



IOMEGA BERNOLLI 230



SONY MD DATA DRIVE



SYQUEST 270



IOMEGA ZIP



PANASONIC PD DRIVE

and put them through our tests for drive speed, media durability, and system usability. In all, we tested ten drives, covering a broad spectrum of what's available. All the drives we tested have a base price of under \$700 each, and all use rewritable media.

Iomega and SyQuest each offer older drives that use 5.25-inch cartridges holding about 200 MB of data each, but the trend is toward systems that use 3.5-inch cartridges. Iomega has developed the 100-MB Zip and the 1-GB Jaz drives, and SyQuest has developed the 135-MB EZ135 and a 270-MB drive, all of which use 3.5-inch cartridges. We also looked at two 230-MB 3.5-inch optical drives from Fujitsu and Olympus and the 5.25-inch 650-MB optical PD Drive from Panasonic. To round out the field, we tested the Sony MD Data Drive, which plays Sony audio minidisks and writes to 140-MB cartridges that measure just 2.5 inches.

Although each functions differently, all removable-media drives have many things in common besides the removability of the media. Increasing capacity by using additional cartridges is easy and much cheaper than buying a high-capacity hard drive. Cartridges are durable and are easier to transport or store than entire drives. And although no removable-media drive is as fast as a hard drive, there's been a steady improvement in speed as new technologies have been developed.

After examining our results, we picked the drives best for common situations in which you may want to use removable media. So before you launch into reading about what we found in our testing, take a moment to think about what you'll be doing with your drive. Will it serve as a backup device? Do you often send large files to service bureaus? Do you want to increase your desktop storage? Are you looking for something to use for off-site meetings and presentations? Or are you just looking for a drive for every desk in an office? These questions are important, because your answers will be the deciding factors when it's time to make a purchase.

Personal Backups and Archives

You have this recurring nightmare (no, not the one about being naked at the grocery store). In it, your hard drive containing the Most Important Project in the Universe has just crashed. No panic necessary — you've got that backup. You reboot and go to mount the backup cartridge, only to find that someone has stored a commemorative Elvis Impersonators in Graceland refrigerator magnet on top of it. Now, you panic.

A removable-media drive is perfect for backup. But if your backup media are damaged, the backups are useless. Although we weren't able to test how age affects the reliability of a cartridge, we did manage some nightmare battering of our own to see how durable various types of media are. First, we subjected a cartridge from each drive to a heat test at 150 degrees Fahrenheit, the temperature your car may reach on a hot day. Then we baked the cartridges again, but at 185 degrees with a humidity of 95 percent. We also dropped each cartridge from a height of 2.5 feet onto a metal surface multiple times.

The Fujitsu, Olympus, and Sony optical media passed all the tests with flying colors and proved to be the most durable. The only optical cartridge that did not pass our durability tests was the PD cartridge — after the drop tests, the shutter was out of place, but we pushed it back into its groove and were able to recover the data.

Why are optical cartridges so durable? Optical drives write data by heating a substrate layer in the disc, using a laser. When the area heats up to the Curie point (302 degrees), a strong magnet inside the drive placed on the other side of the disc from the laser sets the magnetic polarity of a spot on the disc as a binary function, either a 1 or a 0. Dirt or even small scratches on the disc don't damage the data.

The various SyQuest cartridges did fairly well. They all passed the heat and humidity tests, but one 200-MB cartridge failed the drop test. Still, reports you may have heard about their fragility seem to be exaggerated.



SPEED TESTING / Iomega's Jaz leads the pack

WE CREATED FOUR TESTS that replicate real-world use to see how fast each drive was in various situations. First, we ran our MacBench 3.0 Disk Mix test, which uses a test suite based on popular business applications. Next, we ran our MacBench 3.0 Publishing Disk Mix test, which uses a suite based on desktop-publishing applications, which move data in larger chunks. All MacBench 3.0 Disk Mix scores are relative to that of a Quantum Fireball 1080S hard-disk drive in a Power Mac 6100/60, which is assigned a score of 10.0 in each test.

Our third test was a Finder copy of a 20-MB Photoshop file. And our final test was to back up our test platform's internal hard disk, using Dantz Development's Retrospect 3.0. Our test platform was a Power Mac 7500/100 with 16 MB of RAM and an internal Quantum Fireball 1080S hard drive, running System 7.5.3. For the Retrospect test, we also tested an APS HyperQIC tape drive. The products tested

are ranked in order of overall speed in these charts. For drives that gave us control over write verification through the formatting software, we tested with it on and with it off.

	MACBENCH 3.0 DISK MIX	MACBENCH 3.0 PUBLISHING DISK MIX	FINDER COPY	RETROSPECT 3.0
■ BEST PERFORMER IN EACH TEST				
Iomega Jaz	12.5	10.9	15.2	63.3
Iomega Jaz*	10.4	8.8	20.9	74.2
SyQuest EZ135	8.4	6.6	18.5	63.6
SyQuest 270	9.1	6.9	19.0	72.7
SyQuest 200	6.9	6.3	21.1	89.8
Iomega Bernoulli 230	6.6	4.0	23.5	104.4
Iomega Zip	3.7	4.3	28.1	132.2
Olympus Deltis PowerMO 230*	4.8	3.7	61.5	119.9
Iomega Bernoulli 230*	5.1	3.1	40.4	145.2
Panasonic PD Drive	3.7	3.2	49.9	115.4
Fujitsu DynaMO 230*	4.8	3.0	59.5	141.7
Sony MD Data Drive	.5	.0	140.6	430.7
REFERENCE PRODUCTS				
Quantum (internal) Fireball 1080S	15.2	15.8	†	†
APS HyperQIC	†	†	†	220.0
	SCORE	SCORE	SECONDS	SECONDS
	BETTER	BETTER	SLOWER	SLOWER
*Write verification on. †Not tested.				

PROS AND CONS / removable-media drives and their media

REMOVABLE-MEDIA DRIVES offer lots of convenience, but each drive and the media it uses have strengths and weaknesses you should consider before you invest.

DRIVE	PROS	CONS
Fujitsu DynaMO 230	Durable media. Universal compatibility with other 3.5-inch optical drives.	Slow drive.
Iomega Bernoulli 230	Widespread use in service bureaus.	Media pricey and not durable enough for archiving. Drive too bulky for travel.
Iomega Jaz	Very fast drive. Affordable, high-capacity media.	Media not durable enough for archiving.
Iomega Zip	Widespread use. Affordable system. Drive small enough for travel.	Media not durable enough for archiving. Mediocre drive speed.
Olympus Deltis PowerMO 230	Durable media. Universal compatibility with other 3.5-inch optical drives.	Slow drive, too bulky for travel.
Panasonic PD Drive	Durable, high-capacity media. Drive reads CD-ROMs at 4x speed.	PD cartridges not readable by CD-ROM drives. Not in widespread use. Problems with CorelSCSI! driver. Pricey drive.
Sony MD Data Drive	Truly portable drive. Drive can also read audio minidisks. Durable media.	Uses a proprietary file system. Expensive, painfully slow drive.
SyQuest EZ135	Fast and affordable drive, small enough for travel.	Cartridges don't automatically eject. Media susceptible to dust.
SyQuest 200	Widespread use in service bureaus.	Drive too bulky for travel. Pricey media, susceptible to dust.
SyQuest 270	Fast drive.	Media susceptible to dust.

The flexible plastic inside the Bernoulli 5.25-inch cartridges couldn't stand the heat of our tests, and the cartridges failed when we tried to use them. The Zip cartridge fared better in our heat tests, passing the 150-degree test but failing the 185-degree one.

Although durability is important, so is cost. When you're considering buying a removable-media drive, don't look just at the drive's price tag. For personal backup, you need to consider the amount of data you want to protect. To figure out the total cost, take how much capacity your data fills and multiply it by the number of backup sets you want to create (you don't want to match your capacity 1:1; you should make various sets of backups). Then figure out how many cartridges that data would fill and how much that many cartridges would cost. That figure plus the price of the drive is a better indication of the cost to you.

Tape has been the medium of choice for backup, because it's cheap. You can buy a 120-meter DAT cartridge that can hold 4 GB of uncompressed data for about \$20 — that's half a cent per megabyte. However, tape cartridges don't mount automatically on the Mac's desktop, and the drives are no speed demons. Tape is also delicate and cannot support the same number of writes that any other storage medium can. If you need to go with tape, because of its low cost, decrease your susceptibility to media failure by switching among backup sets.

For most backups, speed isn't crucial, as long as a backup started at the end of the workday is done by morning. In some situations, though, you may back up during the workday, in which case you'll want a fast drive.

To test drive speed, we simulated a backup by using Dantz Development's Retrospect 3.0. We backed up 22 MB of data from an internal disk onto each test medium and compared the drives' speeds with that of an APS HyperQIC tape drive. The fastest drives were the Iomega Jaz and the SyQuest EZ135 drive, but most of the drives were able to finish the backup in less than three minutes. All the drives

except the Sony MD Data Drive were faster than the tape drive.

If you think a Panasonic PD Drive might be ideal for backups, think twice. The PD Drive and its bundled software driver, CorelSCSI!, do not allow Retrospect to erase any media, causing backup attempts to fail. We fixed the problem by switching to a third-party driver, CharisMac's Anubis. If you want to use a PD Drive with Retrospect for backup, you'll need to find a driver that supports PD Drives.

So which drive is best for making personal backups? If you perform backups at the end of each workday and you want a cheap, high-capacity system, get a tape drive. If you want to archive files and want reliable media, an optical system is the way to go. If you perform backups during your workday, we suggest that you pick a drive with a good combination of price and performance such as the Jaz.

Transporting Large Files

Although the Internet and e-mail are great, you'll get a severe tongue-lashing from the digital Miss Manners if you attempt to send a high-resolution CMYK EPS file over the Internet to your service bureau. In this situation, you'll want to use your removable-media drive as a cyber-Sherpa: to take files to a bureau for formatting and printing. For this you need a drive fast enough to copy large files quickly and cartridges durable enough to survive a trip. But most important, your service bureau must have a drive that can read your cartridges.

The 5.25-inch SyQuest 200-MB and Iomega Bernoulli 230-MB drives have a long, well-established history of use at service bureaus — for this reason alone, these two drives are worth looking at. The SyQuest drive is faster than the Bernoulli drive. If you use the carrying case that comes with each SyQuest cartridge, transportation should be no problem.

Although the 5.25-inch cartridge format is still entrenched, the future will bring smaller cartridges and faster drives. Iomega is putting its eggs into the 3.5-inch basket with its Jaz and Zip drives. For those who are worried that they won't be able to find a bureau that has a

Zip drive, Iomega plans to provide a toll-free number you can call to find the closest service provider that has a Zip on hand.

When you send files away, you run the risk of not getting your cartridges back, so the cost of a cartridge is worth considering. The 5.25-inch Bernoulli and SyQuest drives are commonplace, but their cartridges are expensive, roughly \$70 to \$90 each. Zip cartridges are the most affordable, costing \$20 per 100-MB cartridge, and their use is becoming more widespread. Jaz drives have the best prices, but they're relatively new and may not be as readily available as Zip, Bernoulli, and SyQuest drives.

A Second Drive

Another advantage of a removable-media drive is unlimited capacity — when one cartridge fills up, you just insert another. However, if you want to use the drive as an adjunct to your primary hard drive, you need a removable-media drive that has the speed of a hard drive but is also easy to use. To test each drive's speed for everyday use, we ran the MacBench 3.0 Disk Mix and Publishing Disk Mix tests on our contestants.

The fastest removable-media drives were the Iomega Jaz, the SyQuest EZ135, and the SyQuest 270. The SyQuest drives use the same type of read/write heads as a conventional hard drive and can therefore achieve close to hard-drive speeds. The Jaz drive uses a similar technology.

Iomega's Bernoulli and Zip drives, on the other hand, use the slower Bernoulli effect to read media. Each cartridge contains two disks coated with magnetic material. As the disks spin, the resulting variation in air pressure pulls the surface of the disks toward the read/write heads, and a read or write occurs. The speed of drives using this technology isn't as great as that of any SyQuest drive or the Jaz.

Optical cartridges provide high capacity and durability, but for office work, you'll feel as though you'll die of old age before the next file save is done. During a write, an optical drive's laser makes three passes over the disc: an erase pass, a write pass, and a write-verification pass. This series of passes causes optical drives' speed to suffer.

If a drive is on your desk all the time, it should be as easy to use as a floppy drive and should behave predictably. To test each drive's usability, we tabulated a score for each one's features and ease of use.

USABILITY AND DURABILITY

IT USED TO BE that your choice of a removable-media drive was restricted to a Bernoulli, a magneto-optical, or a SyQuest drive. But times have changed. Not only have phase-change, minidisc, and other new drives joined the fray but you also have a wide choice of cartridge capacity.

To rate each system's usability, we compiled a score based on the drive's

	Fujitsu DynaMO 230	Iomega Bernoulli 230
Est. street price (drive/cartridge)	\$500/\$30	\$550/\$90
Diameter of storage medium	3.5 in.	5.25 in.
Formatted capacity of storage medium	214.7 MB	217.8 MB
Price per MB (medium only)	\$.14	\$.41
Durability of storage medium	+	-
Usability	+	+
Company	Fujitsu San Jose, CA 800-626-4686 408-432-1300	Iomega Roy, UT 800-697-8833 801-778-1000

The Iomega Jaz and the SyQuest 270 scored high marks, edging out the SyQuest EZ135. The EZ135 requires the extra step of pushing a button and flipping a switch when you want to change cartridges.

Overall, the drive we suggest for use as a secondary storage device on your desk is the Jaz. It's the fastest of any of the drives we tested, and it has an attractive price. If you're looking for something even more affordable, take a look at the Zip or the EZ135.

On the Road Again

If you need a way to transfer data to and from your PowerBook while you're on the road, not just the media but also the drive itself must be portable and durable. The most-portable SCSI drives that use removable media are the Sony MD Data Drive and the Zip. Either can be used for backup or for transferring data to another computer.

The Sony drive is the only one we tested that is truly portable. It can run off either lithium ion or alkaline batteries, and it doubles as a

TRENDS / new mechanisms, new choices

IF NONE OF THE removable-media systems we looked at fit your needs, don't fret: New systems using new technologies are on the way. The key

SYQUEST SYJET. SyQuest once ruled the realm of removable-media systems; nowadays, it's struggling just to keep up. Its next entry into the fray appears to be a formidable one, however — it's faster (a little), and the system has higher capacity (a lot) than Iomega's Jaz. The under-\$600 SyJET will use removable cartridges with 650-MB (\$65) and 1.3-GB (\$100) capacities when it ships, late this summer. One drawback it shares with the Jaz: If you're now using an older SyQuest system, the SyJET will not be able to read your current cartridges. SyQuest Technology: 800-245-2278 or 510-226-4000.

NOMAI MULTIMEDIA CARTRIDGE DRIVE. Compared to the Iomega Jaz and the SyQuest SyJET, Nomai's latest system looks decidedly underwhelming. Like its two main competitors, the Nomai system uses 3.5-inch cartridges that can be read only by Nomai drives; unlike them, its cartridges are limited to 540 MB apiece. Nomai plans to release cartridges soon that can hold up to 680 MB of data. Whoopee. According to Nomai, companies such as Maxell and Memorex will be producing MCD cartridges. Nomai: 407-367-1216.

PINNACLE APEX. The Apex is a 5.25-inch, 4.6-GB optical-cartridge system that achieves its high capacity partly by writing to sections of optical discs that are usually reserved for ISO specifications. Because the Apex technology is proprietary, you can use only discs supplied by Pinnacle; they cost around \$199 each. The Apex drive itself has a list price of \$1,695 — if you can find one: Although Pinnacle announced the Apex a year ago, it has yet to ship it in significant volume. Pinnacle Micro: 714-789-3000.

to each technology's success — and perhaps the deciding factor for you — is how widely each will be accepted.

/ everything you need to know about removable-media drives

features — or lack thereof. We also noted how easy it was to remove or insert media as well as how each drive behaved when we performed particular tasks, such as trying to eject a cartridge from the drive while the cartridge was still mounted on the desktop.

Once we were finished testing usability, we put the cartridges through

our durability tests. We baked them at high temperatures, dropped them onto a metal surface, and baked them some more with the humidity turned up to 95 percent. When we were finished, we examined the media and compiled scores, which are reflected in our Outstanding, Acceptable, and Poor ratings.

Iomega Jaz	Iomega Zip	Olympus Deltis PowerMO 230	Panasonic PD Drive	Sony MD Data Drive	SyQuest EZ135	SyQuest 200	SyQuest 270
\$599/\$100	\$199/\$20	\$500/\$30	\$649/\$60	\$699/\$25	\$199/\$20	\$350/\$70	\$350/\$60
3.5 in.	3.5 in.	3.5 in.	5.25 in.	2.5 in.	3.5 in.	5.25 in.	3.5 in.
1,018.6 MB	94.1 MB	215.7 MB	631.8 MB	134.5 MB	125.8 MB	188.1 MB	253.3 MB
\$.10	\$.21	\$.14	\$.10	\$.19	\$.16	\$.37	\$.24
●	●	+	+	+	●	●	●
+	+	+	●	—	●	●	+
Iomega Roy, UT	Iomega Roy, UT	Olympus Irvine, CA	Panasonic Secaucus, NJ	Sony San Jose, CA	SyQuest Fremont, CA	SyQuest Fremont, CA	SyQuest Fremont, CA
800-697-8833	800-697-8833	800-347-4027	800-742-8086	800-352-7669	800-245-2278	800-245-2278	800-245-2278
801-778-1000	801-778-1000	516-844-5000	201-392-4601	408-432-0190	510-226-4000	510-226-4000	510-226-4000

Walkman for those who can find their favorite albums on minidisc. The sound quality is pretty good, and a portable stereo will be one less thing you have to pack.

Despite its portability, the Sony drive has some serious drawbacks. It uses a proprietary file system, not the Mac's hierarchical file system, so it has to translate all the HFS calls into MD File calls, which *really* slows it down. The cartridge looks like a Mac volume, but you can't use it as a boot or Retrospect volume (you can get around the problem with Retrospect by creating a special file on the cartridge and getting Retrospect to save your data to this backup file).

If you're hesitant to get a Sony drive, because it's slow, uses a non-standard file system, and has a high price, consider getting a Zip. The Zip drive is small enough to fit in a briefcase; the cartridges are cheap to replace, should you lose one; and a cartridge's capacity is high enough to hold a full multimedia presentation.

A Drive on Every Desk

If you're an office manager and you're planning to purchase drives for the whole office, you'll want affordable drives and sturdy media. The systems should also be easy to use, since you don't want to spend the first month running around showing people how to eject cartridges.

If 100-MB cartridges offer high enough capacity, getting Zip drives is a viable solution. The drive price is low, and Iomega has put together a user-friendly package. One word of caution: The included floppy disk contains the installer but not the formatting and driver software. The installer looks for the formatter and the driver extension on the Zip Tools cartridge, which ships with the drive. In their haste to use the drive, many people reformat the Zip Tools cartridge, forever losing their only copy of the Zip formatting and driver software. For those who need more storage capacity per cartridge, Iomega's Jaz drive uses higher-capacity cartridges and is just as easy to use as the Zip. Note, though, that the Jaz software is packaged the same way as the Zip's.

Another option is to standardize on Panasonic PD Drives, especially if several people in the office don't have CD-ROM drives. A PD

(phase-change dual) drive reads from and writes to 650-MB cartridges and can double as a quad-speed CD-ROM drive. A PD cartridge cannot be read by a CD-ROM drive, however. And with only a handful of vendors selling PD Drives, you could find yourself with a cartridge containing data and no drive to read it.

What Else Is There?

You've figured it out; you know which drive you want. How do you go about selecting a vendor?

You probably want a good warranty, and here removable-media drives have an advantage over hard drives: If a drive fails, your data is still intact. When the vendor sends you a replacement, you're ready to go, without the hassle of recovering data from backup storage.

The usability of bundled software varies with the vendor. It must include an extension for mounting cartridges. With any of these drives, if you want to get the fastest speeds, make sure the software gives you control over write verification. A verification pass makes a write quite a bit slower, although if data security is important, the extra time is justifiable.

The Final Analysis

All the manufacturers making removable-media drives want theirs to be the next floppy drive. Each of the drives we tested has strengths and weaknesses; each fills a niche, but none fulfills every storage need. The real winner is the consumer. Competition encourages innovation, such as with the Jaz and PD Drive, and good pricing — the EZ135, for example. With all these developments and choices, there's never been a better time to buy a removable-media drive. ☺

Kristina De Nike, who also managed the testing for this report, is a MacUser Labs senior project leader. She's made a pledge to use her new Zip drive for making frequent backups.



MacBench 3.0 is available online from Ziff-Davis Benchmark Operation (ZDBop), accessible via MacUserWeb. See How to Reach Us for instructions on accessing MacUserWeb.

QUICK LABS



Latest Apple StyleWriter • Two Hard Drives and a Removable • Low-Cost Mag and Two Look-Alike Panasonic Monitors

IN GENERAL, HARDWARE PURCHASES can put a serious dent in the wallet. In this month's Quick Labs, however, two of the products reviewed can be had for less than \$500. Apple's new color inkjet printer is a solid value if you're looking for a home-office printer, although there's room for improvement in text quality. And Mag InnoVision's new 15-inch monitor combines low cost with a high degree of software-based control. Also representing a good value, at slightly more than \$500, is APS' new high-capacity hard drive, which boasts the company's trademark case design as well as this month's top rating.



Coming to brighten up home-office printouts is the latest Apple color inkjet printer, the Color StyleWriter 2500. The \$399 Color StyleWriter 2500 offers a maximum resolution of 720 x 360 dpi and double the color-printing speeds of its predecessor, the Color StyleWriter 2400.

The 2500 comes with a serial cable and built-in LocalTalk. For those who'd prefer to use Ethernet, the \$189 StyleWriter EtherTalk kit is available separately. The printer comes bundled with PowerPC-native QuickDraw drivers and PowerPC-native QuickDraw GX drivers as well as the Apple Color Printing CD. The CD-ROM is chock-full of useful Mindscape applications, such as CardShop Plus, Calendars and More, and

Nothing this month strikes your fancy? Be sure to check out Quick Labs in next month's issue. Whether you're a savvy business user, graphics pro, educator, or college student, you can count on expert advice from *MacUser* — each and every month — to keep you in the know on the latest printers, monitors, and storage products in the Mac universe.

If you can't wait for next month and want to look up products we've reviewed in the past, check out our World Wide Web site at <http://www.zdnet.com/macuser/>. You'll find an index of mouse ratings from the past two years of *MacUser*.

ONE NEW COLOR INKJET PRINTER

StickerShop Plus. The CD-ROM also contains 12 TrueType fonts from Bitstream. The 2500 has three resolution modes: Best (720 x 360 dpi), Normal (360 dpi), and Draft (180 dpi). The printing software automatically chooses the optimal ink density for the type of paper you specify in the Print dialog box. Its use of two ink tanks (one for cyan, magenta, and yellow and the other for black) allows the Color StyleWriter 2500 to print fast, but you'll have to replace the whole color cartridge if you run out of one color, even if you have plenty of the others.

The 2500's color output was impressive when we printed on Apple's special coated paper. The text, however, wasn't as sharp as what we've

seen from other inkjet printers. You can print on plain paper, but unless you're partial to oversaturated, curling pages with sloppy text, we recommend using the coated premium stock.

To test for speed and output quality, we printed several pages of text, line art, and color graphics. We timed the printer as it produced a variety of documents, from simple files that print quickly to complex files that take longer to complete, and weighted the results to reflect everyday usage. We used documents that represent a workgroup environment in order to reflect real-life conditions.

REVIEWER AND TESTER / JIM GALBRAITH

+ / OUTSTANDING ● / ACCEPTABLE - / POOR	ESTIMATED STREET PRICE	COLOR OR MONOCHROME	TECHNOLOGY	MAXIMUM RESOLUTION	WARRANTY	TEXT QUALITY	GRAPHICS QUALITY	PAPER HANDLING	SUPPORT	COMMENTS	PAGES PER MINUTE
+++ Apple Color StyleWriter 2500	\$399	color	inkjet	720 x 360 dpi	1 year	-	+	●	●	Nice graphics. Subpar text quality. Great software bundle.	0 1.5 3.0

TWO NEW HARD DRIVES AND A NEW MAGNETO-OPTICAL DRIVE



We've seen quite a few APS drives here in Quick Labs, which means we've seen the same case design for some time now. Don't get us wrong — the fact that the case design hasn't changed is a good thing. The APS case (like the one used for the \$599 APS Micropolis 2GB drive we review this month) has everything you need: active termination, good footprint, feet for laying the drive on its base or its side, and sturdiness.

Not to be outdone by APS, the \$1,250 CMS

Platinum 4000 (pictured) has a postmodern-looking design that's sure to catch your eye. Like the APS drive, it has a strong case and built-in feet, but its footprint is slightly larger. Don't let the name fool you: It's black, not platinum, but the 4000 does refer to the 4-GB capacity of the drive. Even though the Platinum 4000's throughput is narrow, the drive has SCSI-2 connectors. Make sure you have the right cables — the unit we received didn't.

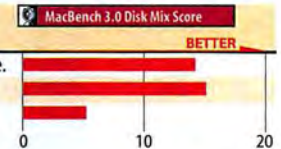
The \$2,590 MicroNet Advantage 2.6-GB

Magneto Optical Drive is the first removable-media drive we've reviewed here in Quick Labs. The drive uses 5.25-inch magneto-optical media with a capacity of 2 GB. It's by no means the fastest drive in the world, but the high capacity and durability of the media make the system ideal for archiving.

All MacBench 3.0 Disk Mix scores are relative to that of a 250-MB Quantum internal drive in a Power Mac 6100/60, which has a score of 10.

REVIEWER / ROMAN LOYOLA TESTER / RICK OLDANO

+ / OUTSTANDING ● / ACCEPTABLE - / POOR			ESTIMATED STREET PRICE	WIDE SCSI	FORMATTED CAPACITY	PRICE PER MEGABYTE	WARRANTY	CASE	SOFTWARE/MANUALS	SUPPORT	COMMENTS	MacBench 3.0 Disk Mix Score
+++	APS	Micropolis 2GB	\$599	no	1,920.4 MB	\$31	5 years	+	●	+	A great drive for standard desktop use.	10
+++	CMS Enhancements	Platinum 4000	\$1,250	no	3,931.1 MB	\$32	5 years	+	●	●	Stealthy-looking case design.	10
+++	MicroNet	Advantage 2.6-GB Magneto Optical Drive	\$2,590	no	2,131.0 MB	\$82	1 year	●	●	●	Big, heavy case; 5.25-inch media.	10



THREE NEW MONITORS



This month's monitor roundup is a reflection of the growing preponderance of built-in on-screen controls. The trio of monitors we tested offer a balance of good price and ease of use and are excellent for general use.

The 15-inch Mag InnoVision DX15T (pictured) combines a Sony Trinitron tube with on-screen controls. The monitor has good image quality, and the on-screen controls are easy to navigate; the buttons on the front are a bit small for large fingers, though. The brightness and contrast settings can be adjusted by use of the on-screen controls or simply with the knobs on the front of the monitor.

The Panasonic PanaSync/Pro P17 and the

PanaSync S17 look identical and even have similar on-screen controls. The PanaSync/Pro P17 has more to offer, with a few extra control options, a finer dot pitch, and 1,600-x-1,200-pixel resolution. The PanaSync/Pro P17 also has BNC connections on the back, giving you the option of hooking up another computer to the display easily. Both the PanaSync S17 and the Mag InnoVision DX15T have built-in signal cables.

All three of the monitors performed adequately in our tests. The DX15T's smaller screen size helped it outdo the Panasonic monitors.

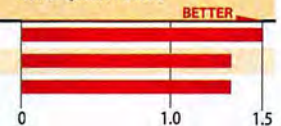
Of the three monitors we tested, only the

Mag InnoVision DX15T shipped with a Mac adapter. Mac adapters are optional on the Panasonic monitors. When you order any monitor, don't forget to ask for a Mac adapter — otherwise, your monitor can do nothing else but serve as a really big paperweight. If you need to buy a Mac adapter, you can get one at your friendly neighborhood computer store for less than \$20.

The image-quality scores reflect the results of our tests for image sharpness, focus, brightness, uniformity, pincushioning, color range, and color accuracy and vibrancy. A score of 1.0 or better is considered acceptable.

REVIEWER / MARTIN WONG TESTER / BRIAN FIKES

+ / OUTSTANDING ● / ACCEPTABLE - / POOR			ESTIMATED STREET PRICE	SCREEN SIZE	MAXIMUM RESOLUTION	WARRANTY	MANUALS	SUPPORT	CONTROLS	COMMENTS	IMAGE-QUALITY SCORE
+++	Mag	InnoVision DX15T	\$499	15 in.	1,152 x 870 pixels	2 years	●	●	+	Button controls work well but are small.	1.0
+++	Panasonic	PanaSync S17	\$949	17 in.	1,152 x 870 pixels	3 years	●	+	+	Macintosh adapter isn't standard hardware.	1.0
+++	Panasonic	PanaSync/Pro P17	\$1,049	17 in.	1,600 x 1,200 pixels	3 years	●	+	+	Macintosh adapter isn't standard hardware.	1.0



LISTING IS ALPHABETICAL WITHIN GROUPS OF EQUAL MOUSE RATINGS.

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DESKTOPmedia

Augment Photoshop with an image compositor — Live Picture or xRes — for faster, more flexible manipulation of large images.



By Ben Long

Immense Imaging

THE MANTRA OF MOST Photoshop users is “More RAM” — especially when they use Photoshop to edit large and complex images. Many Photoshop operations can be agonizingly slow on very large, full-color images such as posters, backdrops for film or video sets, and high-resolution color spreads for books or magazines. And even if you work on images that are only 15 to 20 MB in size, once you’ve layered six or seven of them in Photoshop and added a few layer masks in between, you’ll find yourself doing more waiting than working.

In Photoshop situations such as these, buying enough RAM to make a difference can be prohibitively expensive. Fortunately, there’s a cheaper way to speed things up: by performing many of your image-processing steps in either of two new image-compositing applications: Live Picture 2.5 (\$995), from Live Picture (800-724-7900 or 408-464-4200), and xRes 2.0 (\$699), from Macromedia (800-326-2128 or 415-252-2000).

Users who create collages and composites will find that Live Picture and xRes offer not only speed improvements but also environments tailored to multilayered work. Of course, there are a lot of things to learn about these

Photoshop cousins. Follow along as we help you figure out which program best fits your needs and show you how to get the most out of whichever one you choose.

DOING THE FILE SHUFFLE

The first step in integrating Live Picture or xRes into your work flow is moving images into these applications. Because they can’t work efficiently with Photoshop, PICT or TIFF files, you’ll need to convert such files into the appropriate format, either Live Picture’s IVUE or xRes’ LRG.

Converting images into these formats can take a bit of time. Live Picture is relatively speedy, converting a 30-MB TIFF file into IVUE format in just 2.5 minutes. The same conversion in xRes took 11 minutes. However, unlike Live Picture, xRes does have a batch-processing utility, so you may want to convert all the files in a composition at one time. Both programs can output TIFF or EPS images when you’re finished.

TIPS

- Use xRes’ batch-conversion module before you start to work. This will save you the hassle of waiting for each image to convert into LRG.

- Use Live Picture’s Photoshop-export filter for converting Photoshop images directly into IVUE format.

- Register your copy of Live Picture. If you do, you’ll receive a Photoshop Acquire module, FastEdit IVUE, from Total Integration, which lets you open portions of an IVUE file within Photoshop. This is great for removing an overlooked dust mark or scratch before you build your final image.

LAYERING

If you’re creating composite images with lots of different elements, you may find the Photoshop-like palette in xRes the easiest tool to use. The xRes Layers palette lets you change the stacking order of layers as well as hide and delete layers, exactly as you can in Photoshop. If you’re comfortable with the numerical controls in QuarkXPress, on the other hand, you may feel more at home in Live Picture; it offers precise numeric controls for positioning, resizing, rotating, and skewing layers.

You’ll use layering for more than just composite work in Live Picture, however; operations such as color correction, sharpening, blurring, and distorting involve creating special kinds of layers in your document. You

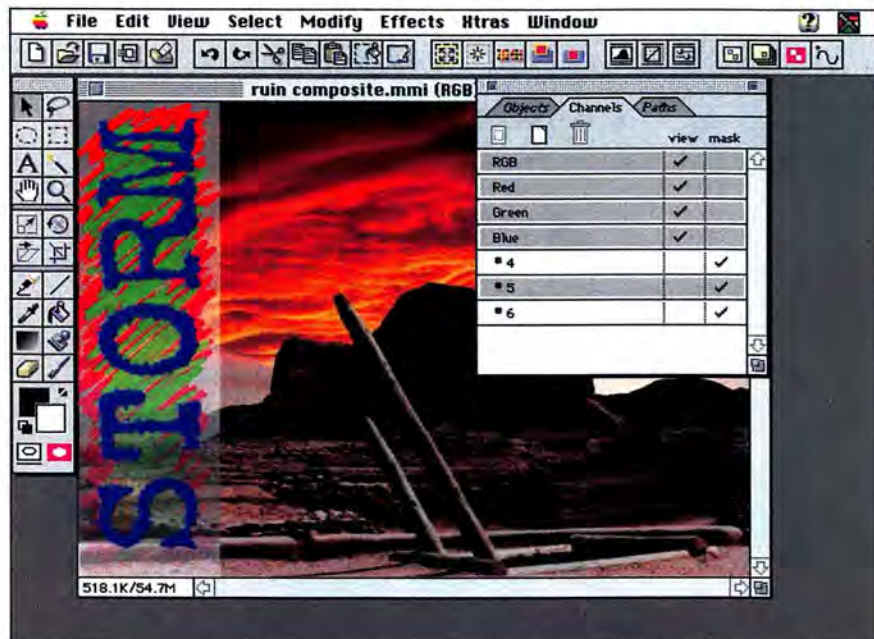


figure 1 / Layering in xRes: xRes lets you have multiple masks per layer — in xRes parlance, Objects — that you can use to clip out parts of a layer. You can also paint on multiple masks or add, subtract, or multiply masks within or between layers.

apply and control a layer's effect by brushing in the effect, using Live Picture's brush and gradient tools. This approach gives you the flexibility to alter images easily.

TIPS

- In xRes, handles for resizing an image don't appear if they're outside the canvas; to get around this limitation, add a few inches to your document. Because xRes can work with very large canvas sizes without doing extra calculations for the larger image area, you don't need to worry about the program slowing down.
- Try using the numeric controls in Live Picture to get precise sizes and positions for layers rather than moving the layers by hand. This can prevent seams from appearing in the final composition.
- If you add an EPS layer in Live Picture, make sure your final output format is an EPS DCS file. If you don't save in EPS DCS format, Live Picture will use the low-resolution EPS preview rather than the high-resolution data in the final image.

MASKING

Masking tools make it possible to seamlessly blend one image into another. The ability to mask out areas based on color or user-defined selections is essential to any compositing work. If you find yourself trying to create detailed masks, either xRes' or Live Picture's

tools will be able to save you time, and they offer capabilities not found in Photoshop's masking arsenal.

Besides offering the standard selection tools, Photoshop allows you to create masks by selecting a range of colors. xRes and Live Picture offer a similar kind of masking that you may find more flexible than Photoshop's tools.

In many instances, xRes' Mask palette does a better job of generating masks than Photoshop's Color Range command, because you have more control over color range and feathering than you do in Photoshop. xRes' Mask palette lets you select up to seven colors to create a mask by using controls for color "tolerance" and feathering. You can use a brush to create a mask based on any combination of

the seven colors or allow xRes to create it by using the Auto mask command. We found that brushing worked better than the Auto mask command, in that the brush lets you vary the colors and tolerance of the color selections as you build the mask.

Live Picture does a remarkable job of creating detailed masks. For example, it can easily separate fine details such as hair from a background image, using a Silhouette layer. Silhouette layers act like a mask, letting you import an image and define the inside and outside of the silhouette by painting over colors with the silhouette brush, which automatically finds all similar colors in the image.

TIPS

- In xRes, remember to turn on the appropriate mask channel for the layer you are editing. You can have multiple masks per layer, so you must explicitly turn on the mask channel you want to work on.
- Live Picture's Silhouette layers can be created only in a separate mode. Be sure to set your zoom level and hide any layers you don't want included in a Silhouette before you get started.

CORRECTING COLORS

xRes and Live Picture offer unique ways to apply color corrections — with a brush. Both programs also offer Photoshop-like color-correction tools such as Levels and Curves dialog boxes, but the tools' real flexibility comes in selectively applying color corrections to certain parts of an image, such as the subject's lips in a portrait or a river in a landscape photograph.

Color-correcting a selected region in Photoshop requires building a mask and then using the Curves dialog box to make your adjustment. Instead of making you go through

Still Need Photoshop?

FOR EDITING PIXELS, you'll still need Photoshop. In fact, Photoshop works best for any work on images smaller than 10 MB. Here are some of the features Photoshop offers that we recommend you rely on.

- **Color correction.** Photoshop offers the fastest method for global color correction, thanks to the video-lookup-table animation. Because Photoshop hooks directly into the video output, the Levels or Curves dialog boxes give you instantaneous previews of color changes.
- **Dust and scratch cleanup.** Although xRes can directly edit pixels in its direct mode, it can't match Photoshop's speed. If you need to clean up a scan, Photoshop is still the best tool for this tedious but necessary job.
- **Printing.** Live Picture lacks a Print command, and xRes lacks printing-specific controls such as dot gain. We have our quibbles about Photoshop's separation engine, but the engine is tested and solid and we still rely on it for our printing needs.
- **Duotones.** If you want to print an image with custom inks to get a sepia-tone look or if your client wants a specific Pantone color, Photoshop is the only tool for the job. Live Picture and xRes can re-create such effects with CMYK but not with custom inks.

this two-stage process, xRes lets you apply several types of color correction with a brush. For example, you can add contrast to a part of an image simply by brushing with the Contrast brush or you can paint color into an area with the Tint brush. xRes stores each of the brush strokes as an operation, making it possible to add contrast or tints with a 1-pixel or 1,000-pixel brush without suffering any speed penalty.

For jobs where flexibility is the key or in which you anticipate a lot of changes, Live Picture's selective color correction may work best for you. The program's Color Correction layers allow you to darken, lighten, saturate, or completely change existing colors in your composition. You can additionally colorize or tint your composition, using a Colorize layer. Any effects in a Color Correction layer apply to all the layers underneath, unless you limit the effect by creating or copying a stencil. Although this approach doesn't do away with the need to use masks, it does give you the flexibility to alter the color at any point in the process.

TIPS

- Instead of building masks in xRes to alter contrast or saturation in a specific area, use xRes brushes for much faster results.
- Use Live Picture's Color Correction layers on jobs that may involve a lot of client-requested changes. You can save a lot of time by using Live Picture's layer approach.

PAINTING

For those who find themselves painting on large canvases, both Live Picture and xRes offer unique, infinitely large brushes that are not part of Photoshop's arsenal. The speed of both program's brushes makes them ideal for creating large works of original art.

Behind the Imaging Curtain

TO COMPREHEND THE DEGREE of difference these programs can make in your work process, you first need to understand how their approach differs from Photoshop's.

Photoshop is the consummate pixel-editing program. Every change you make to an image in Photoshop, whether you're applying a filter or increasing the contrast, makes Photoshop calculate the results pixel by pixel for the whole image — and you have to wait. If you're editing an 8-x-10-inch image at a resolution of 300 dpi, Photoshop must process 27.5 MB of data. Of course, you want a fast undo, so Photoshop must keep two copies in RAM. Add in several layers and paint on a floating selection, and you'll find that Photoshop requires upwards of 200 MB of RAM to work efficiently — much more RAM than many of us can afford.

xRes and Live Picture are cut from a different cloth. Rather than calculating effects on and processing each pixel in an image as you work, these programs simply show you a preview of the part of the image that fits in the current window and store in a list all the changes you make to the image. So, for example, as you scroll or zoom to a new part of the image, the programs process the list of changes and apply them to the portion of the image you're currently viewing. When you're finished editing your image in xRes or Live Picture, you tell the program to apply the operations at a specific size and resolution to create a final image.



figure 2 / Silhouetting in Live Picture: A Silhouette layer lets you select the inside and outside colors of a silhouette by painting. We've painted out a simple blue sky to replace it with something more dramatic.

xRes is the superior large-image painter, with a comprehensive set of natural-media brushes that can paint at unlimited sizes. Following the lead of Fractal Design Painter, xRes provides oil, charcoal, watercolor, pencil, and crayon brushes as well as an assortment of paper textures that show through as you paint. You can start with broad strokes and then zoom in to do fine-detail work.

Live Picture offers only basic airbrushing and smearing tools, but we really like the results achieved with Live Picture's unique distortion brushes. The program's few textured brushes, which include Fibre and Granite, lack the sophistication of xRes' brushes. The distortion brushes, however, let you selectively distort areas of an image, pushing and pulling pixels.

TIP

- Although much faster than Photoshop, xRes can still slow to a crawl when you pan across and zoom in on an image containing a lot of brush strokes. Use the Render Objects command in the Objects palette to render the brush strokes into a layer, and xRes will regain a lot of its speed. Live Picture optimizes the distortion effects when you build the final image, yielding sharp results not possible with Painter or Photoshop.

Demanding Duties

Whether you choose xRes for its familiar interface or Live Picture for its unique silhouetting and color-correction tools, you can create large, multilayered images faster than you can with Photoshop. The layering tools in xRes work just as they do in Photoshop, so you should be up and running easily. We also found the natural painting tools useful for creating very large originals. Live Picture, despite its unique interface, offers good controls for color-correcting selected areas of an image and for easily creating accurate masks with the silhouetting layers. No program can solve every artistic challenge associated with immense images, but with xRes and Live Picture in your arsenal, you may find yourself invoking your muse instead of blowing a fuse. ☐

Ben Long is a San Francisco-based writer who creates both analog and digital collage artwork and likes clarinets.

Shrinking Web Graphics

Keep Web graphics small to maximize your audience and minimize its frustration.

MOST OF US COMPLAIN about how slow the World Wide Web is, but viewing and downloading files from the Web could speed up considerably if authors of Web graphics made their files smaller — not smaller dimensions (although that helps too), but smaller file sizes. File size directly relates to download speed; the general guideline is that every kilobyte of data takes approximately one second to download over the average Web viewer's modem. Computer-graphics designers generally haven't had to think about transmission time; consequently, most of the file formats required by the Web are understandably foreign, even to experienced digital artists.

If you're authoring graphics destined for the Web, two file formats are supported by 90 percent of the browsers with which your audience will be viewing your pages: JPEG (Joint Photographic Experts Group) and GIF (Graphic Interchange Format). Remembering what the acronyms stand for helps explain which file format is best suited for which type of image: JPEG is best for photographs, and GIF is best for graphics.

Both file formats support impressive compression for slimming files. Plus, there are a few tips and tricks that can make JPEG and GIF files even smaller, to make them easier and faster to read, without affecting image quality. Let's look at the effect of file-format conversion on three types of images — a photograph, a graphic, and a hybrid collage. The original 353-x-251-pixel images were saved in the PICT file format at 72 dpi. Because these examples were designed for on-screen viewing, their distinctions may not be obvious in print. To see the full effect, go to http://www.zdnet.com/macuser/mu_0896/dtm/howto.html.

Digital designer Lynda Weinman is author of *Designing Web Graphics*. For more information about Web graphics and file-size management, check out Lynda's Homegurr! Page at <http://www.lynda.com/>.



STEP BY STEP

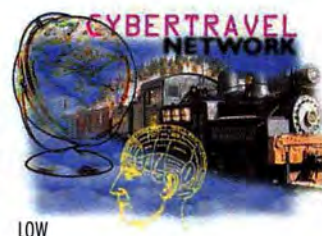
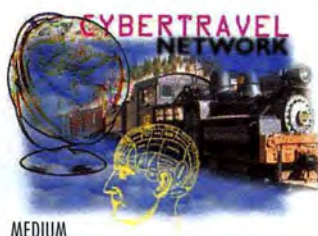
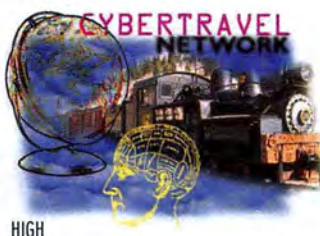
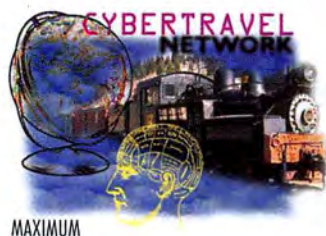
1. USE THE RIGHT JPEG SETTING FOR PHOTOGRAPHS. Most Web designers prepare images in Adobe Photoshop before incorporating them into their Web pages. Photoshop lets you save images in the JPEG file format at quality settings of Maximum, High, Medium, or Low. The trick to making small Web graphics is shaving off as many kilobytes as possible. In this example, the original PICT file was 221K; the file sizes after JPEG compression were 63K (Maximum), 44K (High), 31K (Medium), and 26K (Low). Don't assume that the Maximum setting will give you the best-looking image. Notice that it's still perfectly acceptable at the Low quality setting — and at half the size. The rule of thumb with JPEG is, Don't make assumptions. Test the image at different compression settings to judge

the image quality, and always try the lowest-possible setting.

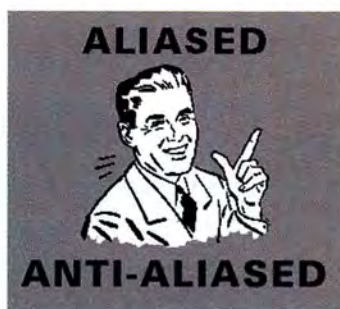
2. USE GIF INSTEAD OF JPEG FOR GRAPHICS. The JPEG format was designed to compress photographic images with subtle gradients. When it encounters large areas of flat colors, it *increases* the file's size and *adds* unsightly artifacts. GIF compression is quite different from that of JPEG, so it works better with flat color, making GIF the ideal file format for illustrations, cartoons, logos (without large drop shadows or glows), and the like. Better yet, the same graphic saved as a GIF file (8K) is smaller than when it's saved as a JPEG file (22K), and the GIF looks better too.

3. USE GIF FOR TRANSPARENT EFFECTS IN PHOTOGRAPHS. Because the GIF format also supports transparency, there are times when you'll want

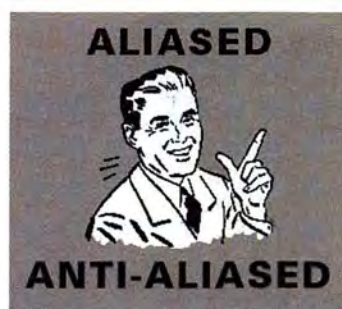
1. USE THE RIGHT JPEG SETTING FOR PHOTOGRAPHS



2. USE GIF INSTEAD OF JPEG FOR GRAPHICS

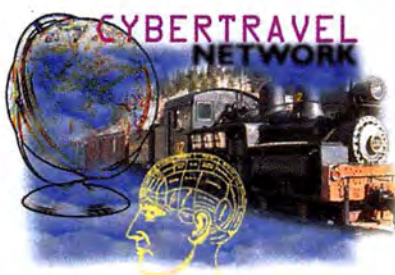


GIF

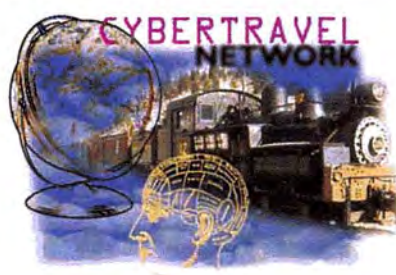


JPEG

3. USE GIF FOR TRANSPARENT EFFECTS IN PHOTOGRAPHS

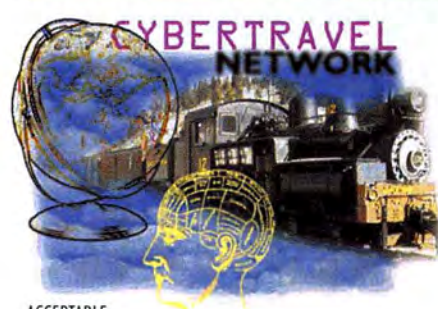


256 COLORS



64 COLORS

4. TURN OFF DITHERING FOR SMALLER FILES



ACCEPTABLE



UNACCEPTABLE

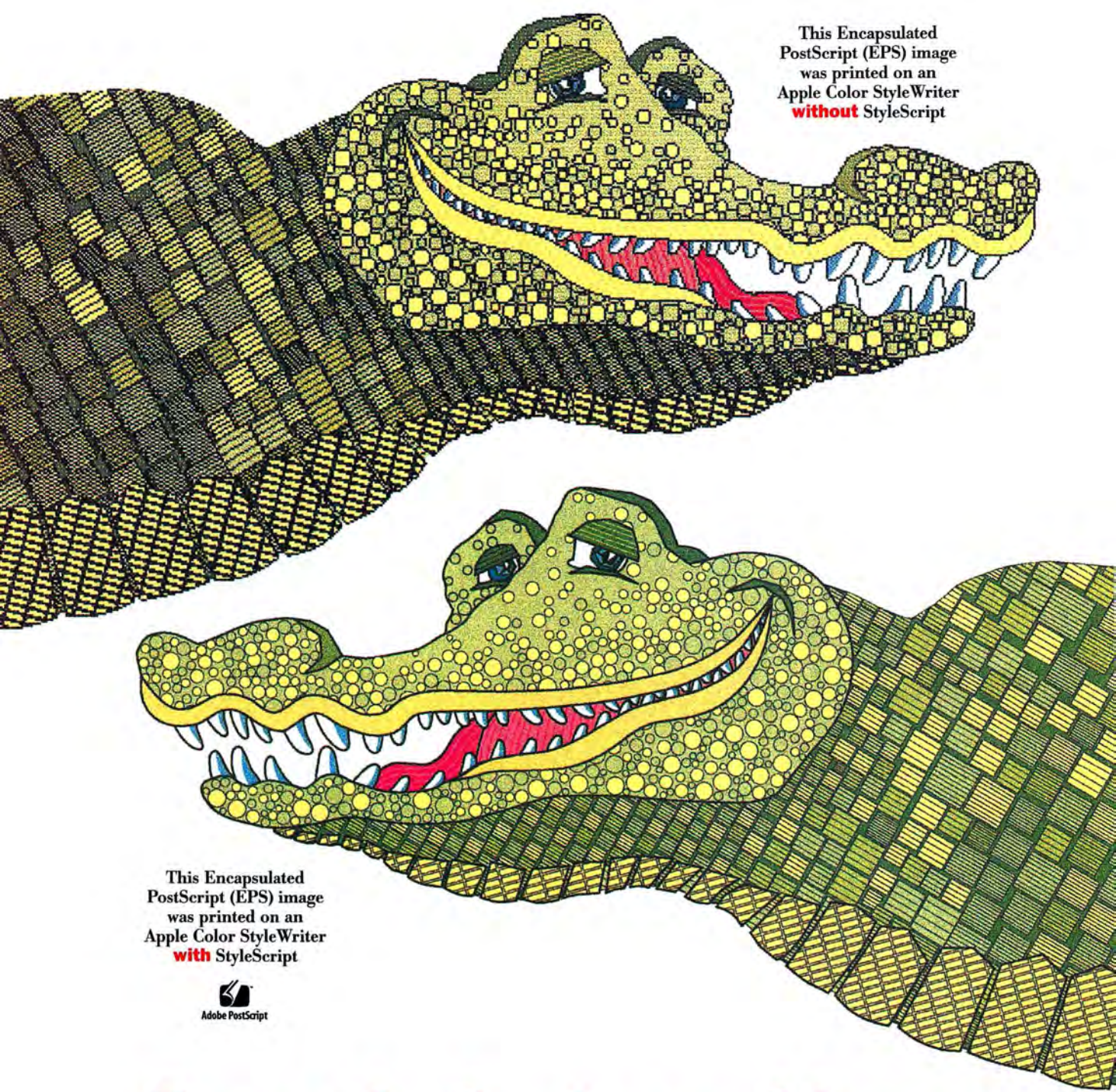
to use it for photographic images — for example, to create a mask around an irregularly shaped graphic. A Transparent GIF (a GIF89a, for the technically inclined) can also be used for animation on the Web (Netscape Navigator and Microsoft Explorer each support this feature), so GIF has some added appeal besides its compression capabilities.

If you plan to save a photograph as a GIF, you need to learn a few more memory-saving tips. GIFs, by definition, have to be converted to 256 colors. Converting a Photoshop document to 256 colors involves changing Mode to Index Color. When you save a photograph in Photoshop as Indexed Color, the settings generally default to a color depth of 8 bits. You can save lots of kilobytes by selecting a different bit

depth. With the default Indexed Color settings of Resolution: 8 bits/pixel (256 colors), Palette: Adaptive, and Dither: Diffusion, the initial conversion yielded a file size of 56K. Converting the same image using 6 bits per pixel (64 colors) generated a file size of 41K.

4. TURN OFF DITHERING FOR SMALLER FILES. It's possible to shave off even more if you *do not* dither during the conversion process. Dithering introduces noise into the image, which GIF doesn't handle well (remember, it's optimized for areas of flat color). But be careful: Not using dithering can yield unacceptable results, such as a photo that contains a subtle gradient glow. In this case, the lack of dithering caused banding; the lower image quality negates the benefits of file-size savings.

This Encapsulated
PostScript (EPS) image
was printed on an
Apple Color StyleWriter
without StyleScript



This Encapsulated
PostScript (EPS) image
was printed on an
Apple Color StyleWriter
with StyleScript



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as EPS files into PageMaker and printed on an Apple
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DCS: Don't Convert Senselessly

The DCS format made a lot of sense five years ago. Does it still work today?

THESE DAYS IT'S EASY to believe that the basics of desktop prepress technology have been conquered — now we can go on with the bold, the beautiful, the emerging. Then along comes a crop of newly emboldened, highly creative people to whom the phrase *don't do that* sounds like some expression in the Klingon language — it doesn't mean anything. Common wisdom about what works is challenged in the name of creating product differentiation, innovative design, and efficient production. Unfortunately, just because something *can* be done doesn't mean it *should* be — at least not without understanding the implications and consequences.

Recent experience suggests that we'd better revisit that time-honored technique, Desktop Color Separation (DCS). Why? Because emerging methods of production may require you to think twice before using it. DCS was first implemented by CyberResearch for its CyberChrome color separations, back when Adobe Photoshop was still in development by the Knoll brothers. When DCS was created, there were no CMYK TIFFs. DCS allows the placement of a master file (in EPS format) that contains the following: an image preview for on-screen viewing, low-resolution PostScript data for composite proofing, and links to four pre-separated high-resolution files (also EPS) containing CMYK data.

DCS was slow to take off: The CyberChrome page descriptions required postprocessing to swap in the high-resolution data for making final separations. But DCS gained popularity when Photoshop was imbued with DCS functionality and when QuarkXPress (version 2.0a, if memory serves) gained the ability to swap in high-resolution data for separations.

In many production environments, DCS makes an efficient file-format choice. The master file contains only low-resolution output data. Because this low-resolution file is small, workstations on which design and proofing — but not separations — occur can be equipped with lower-capacity hard drives. Less data means faster processing and lighter

network traffic loads. It's hard to argue with these benefits, so many companies have designed their file-handling procedures around the DCS format.

The problem now is that many companies are attempting to implement production workflows to permit the republishing of content on alternative media. Although material printed on a traditional press may still be the primary (and most commercially viable) product, the World Wide Web, CD-ROM, interactive cable, and digital printing presses now present additional opportunities to extend the market for the product. All of these alternatives have their own particular image requirements — ones that may make it difficult to convert DCS images into formats they can use.

To DCS and Back — Again

Take printing on a digital press such as the Xeikon as one example. This device is an attractive choice for printing on demand or producing custom material. Digital presses do not use color separations — they require composite data, much as any laser printer does. Thus DCS images must either be converted back to a composite file or handled with something along the lines of Total Integration's SmartXT, a QuarkXPress XTension that automates the conversion of a DCS file to a composite one at print time.

Either way, a time penalty is exacted during the conversion. For jobs that contain only a few images, that delay is tolerable. But for textbooks, catalogs, and other documents that contain many images, it's economically impractical to convert everything — it simply takes too long to fit within most production deadlines. Something has to give. Either more time has to be allotted (and more expense if you're asking your service provider to do the work), or you must be prepared to submit composite images for the output.

Additionally, problems occur when DCS

images are included in pages that may themselves be turned into DCS files. (A real-world example is the teacher's edition of a textbook that uses student-edition pages as illustrations.) Attempting to create separations from nested DCS files will fail, because the nested links to the high-resolution data will be overlooked. There may also be serious problems with attempts to do page impositions when DCS files are nested.



Here are some "don't do that" tips for using DCS:

- **DON'T** submit DCS files when composites are required for output.
- **DON'T** nest DCS files within other DCS files.
- **DON'T** rename DCS files after they have been created, because links to the high-resolution data depend on the filenames.
- **DON'T** use the DCS format when your final output is a computer screen — DCS files are CMYK, but the monitor is RGB — until we have more-robust color-management systems, that is.
- **DON'T** forget to discuss with your service provider the new ideas you have for enhancing your workflow. Although your ideas may make sense in your own environment, there may be compelling reasons down the production line not to implement them. Remember, you may be fluent in Klingon, but the rest of us have to translate it into PostScript. ☞

Bob Schaffel is emerging-technologies consultant for R. R. Donnelley & Sons. Chuck Weger is a graphic-arts consultant and a partner in Genex Media, a company specializing in new media and Web design.

The Muppets Go Digital

MUPPETS STORMED THE SCENE at *Sesame Street* back in the late '60s, and we knew that children's television — and early childhood education — had changed. Activision, in cooperation with Jim Henson Productions, has set its sights on expanding a new children's medium: CD-ROM. The Muppet Treasure Island game is the visually stunning result not only of many different artistic talents but also of a new multimedia-development tool, mTropolis.

Activision turned to mFactory's mTropolis and its unique object-oriented programming system to create Bembo, Bristol, the ship *Hispaniola*, and the Island, the four worlds in Muppet Treasure Island. mTropolis lets developers create a single template for a character's habits and behavior. This template can then be shared throughout the development process — a feature that allowed separate programmers

to create the four different worlds independently and that minimized costly and time-consuming programming repetition. This ability to share behaviors is, according to Activision's Mark Loparco, "an idea whose time has come."

mTropolis is just the underpinnings of the Muppet Treasure Island game. The real success of the title is in the graphically rich backdrops and the ability to interact with the Muppets. The Muppets were filmed against a blue screen. Activision then employed Flint, a high-end compositing application running on an SGI workstation, to seamlessly merge the characters with the background. Finally, the team at Activision used a five-step process to reduce the palette to 256 colors and integrate the video of the Muppets into the mTropolis environment. / Rebecca Olson

WHAT:

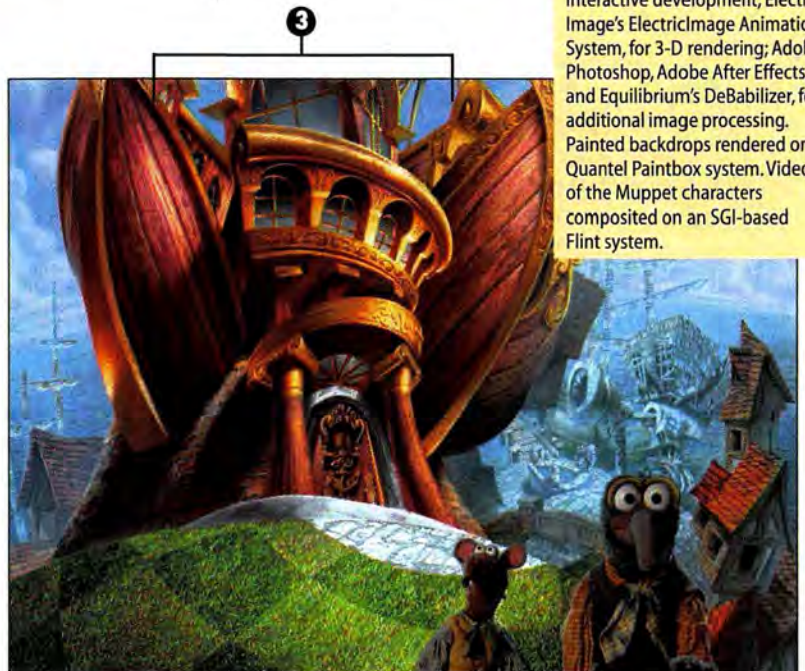
Muppet Treasure Island

COMPANY:

Activision (in cooperation with Jim Henson Productions), 800-477-3650 or 310-479-5644.

TOOLS:

mFactory mTropolis, for the run-time environment and for interactive development; Electric Image's ElectricImage Animation System, for 3-D rendering; Adobe Photoshop, Adobe After Effects, and Equilibrium's DeBabilizer, for additional image processing. Painted backdrops rendered on a Quantel Paintbox system. Video of the Muppet characters composited on an SGI-based Flint system.



1. THE CHARACTERS. The player assumes the role of Hawkins, a non-gender-specific character. With the help of Stevenson the Parrot, a new Muppet character, Hawkins gathers clues that open the doors to the four worlds. Along the way, Hawkins and Stevenson meet many other Muppets, including Kermit, Miss Piggy, Fozzie, Beaker, Gonzo, and Rizzo. Gonzo and Rizzo appear throughout the adventure to assist Hawkins. The scenes demonstrate how seamlessly the Muppets were composited into the 256-color backdrop.

2. HELP. Stevenson the Parrot, a help figure designed to guide players, carries a wealth of gadgets under his wing to assist Hawkins in navigating from world to world. As Stevenson moves through the four worlds, his actions remain the same, thanks to the template created by Activision in mTropolis. In most scenes, Stevenson appears as a small figure in the background, ready to assist Hawkins. When a player clicks on him, he appears in the foreground at a larger size and offers assistance.

3. NAVIGATION. The way in which a player moves through the worlds is similar to that of other CD-ROM games. As you pass the cursor over the edge of the screen, it changes to indicate directions in which you can move. There are also hot spots, such as doorways and gangplanks, that take you into other scenes. Some places are more difficult to get to than others. For instance, you cannot enter Squire Trelawney's Mansion, shown here, unless you first succeed in other areas of the game.

COOL TOOLS

Browsers Round Up Images

NEW BROWSERS HAVE recently made the scene. No, we're not talking about the latest jump points for journeys through cyberspace. ImageAXS, from Digital Collections (DCI), and TeleScope, from North Plains Systems, are for browsing, cataloging, and retrieving collections of images, sounds, and QuickTime movies from a database.

ImageAXS. ▼ DCI's ImageAXS is designed as a personal browser. It lets users annotate cataloged files with searchable descriptions, keywords, and several customizable fields. ImageAXS can keep track of files on off-line as well as online volumes. When acquiring files for cataloging, it can automatically

extract all supported file types from any folder or disk volume. Users can create as many "collections" (catalogs) as they like. The program has no built-in multiuser capability, however. \$149; bulk discounts available. 800-449-6220 or 510-814-7200.

TeleScope. North Plains Systems has pointed TeleScope at high-end users. Built around a SQL database (it ships with Butler SQL but can also be used with Oracle and Sybase database products), TeleScope allows groups of users to access files in various formats from a server. TeleScope supports a wide variety of file formats, including QuarkXPress and FreeHand native formats as well as

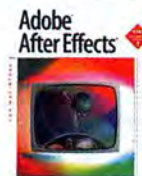
VRML. Via an open plug-in architecture known as I-Piece Technology, the application list can expand to support additional formats. TeleScope's support of Macintosh Drag and Drop simplifies the importing and exporting of files. \$1,000 (ten-user license); TeleScope Viewer, \$250 per user. Windows client software will become available later this year. 905-272-9186. / Henry Bortman



Fine Print

Adobe Teaches Techniques

LEARNING TO USE software often involves more than reading manuals and getting acquainted with the tools. Often, creating the look you desire in an illustration or video means learning techniques through long hours of familiarization with the program. Adobe has taken its expertise and that of various artists and updated the Classroom in a Book series for Adobe Illustrator 6.0 and Adobe After Effects 3.0. * The second edition of **Adobe Illustrator** contains new lessons that teach the ins and outs of the Path Pattern feature and Ink Pen effects available in Illustrator 6.0. It comes with a CD-ROM of lessons. \$45. * **Adobe After Effects** covers a broad range of techniques, from creating a traveling matte by animating mask shapes to using the latest warping filters and transitions. This book



demonstrates otherwise hidden digital-video-editing techniques appropriate for CD-ROM developers and broadcast professionals. It comes with a CD-ROM of lessons. \$50. 800-428-5331. / Sean J. Safreed

Bunches of Backgrounds

WEB WEAVERS and multimedia masters who can never get enough of backgrounds and buttons will appreciate the latest crop of CD-based texture-art releases. Texture Farm and PhotoDisc have each released multiple collections.

Texture Farm's Terra Firma,



Terra Incognita, Terra Botanica, and **Terra Geologica** CD-ROMs contain digitally enhanced images of sand, foliage, flowers, water, mountains, and other natural sights. 100+ Photo CD images in five sizes — 72K to 18 MB — per CD-ROM. \$99.95 per volume; multivolume discounts available. 415-284-6180.

PhotoDisc has introduced eight new offbeat photographic background CD-ROMs whose images range from hairy bellies, broken eggs, and raw meat on the **Wackgrounds** ◀ disc to cracked windows, rusting metal, and crumbling masonry on the **Industrial Sidestreets** disc. Each CD-ROM contains one hundred 28-MB TIFF images. \$149 per volume. 800-428-3472 or 206-441-9355.

Jawai Interactive's multimedia-focused CD-ROM **Screen Caffeine**



Pro ▲ provides over 100 digital textures, each with four variations and an example of its use in buttons or other interface elements. Includes Lingo code for manipulating the sample buttons. \$149. 800-600-6706 or 512-469-0502.

Image Club's **Photogear Volume 10** CD-ROM, Texturework, comprises 29 strikingly rich but natural-looking textures hand-painted in acrylic and soap on Masonite. Three resolutions of up to 2,390 x 3,060 pixels. \$59. 800-661-9410 or 403-262-8008.

Statmedia/Artsbeats' **WebTools** ▼ CD-ROM is a Webmaster's bonanza, containing hundreds of backgrounds, bars, buttons, and icons — and even sounds. Its

backgrounds are compact and seamlessly tiled, ideal for Web pages. \$89. 800-444-9392 or 541-863-4429. / Henry Bortman



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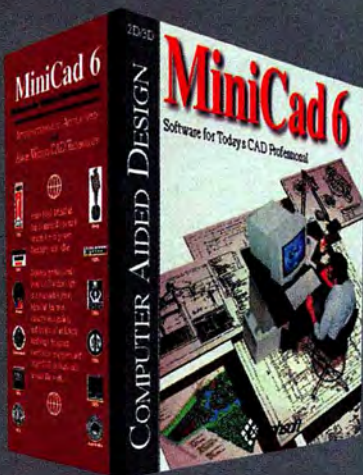
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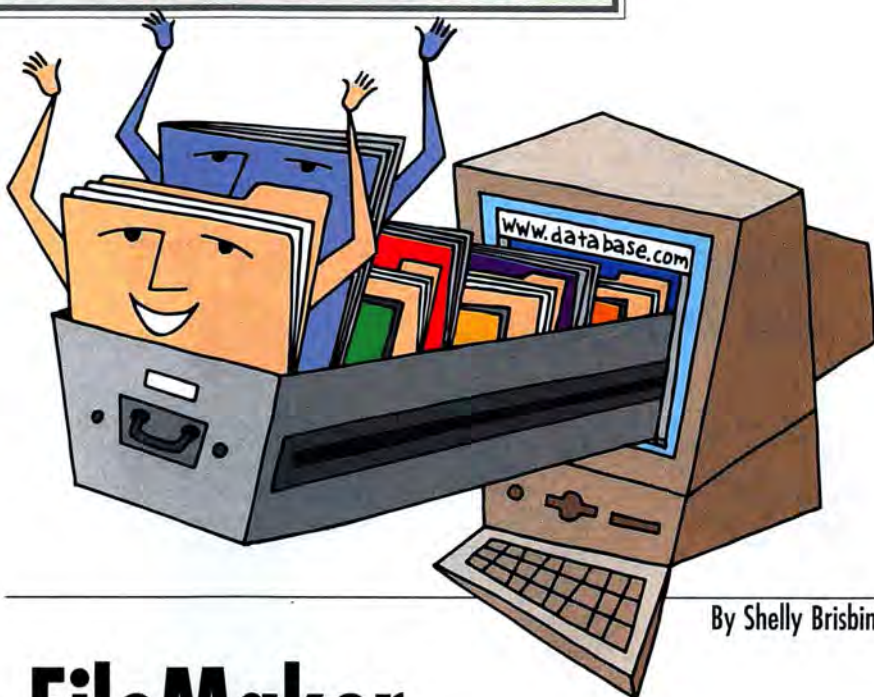
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NETWORKING

Add some interactive
zing to your Web
site by linking it to a
FileMaker Pro database.



By Shelly Brisbin

World Wide FileMaker

BEHIND EVERY searchable, fill-out-a-form-and-get-something-back Web site is a database — but not necessarily a high-end, client/server database. In fact, if your Web site is running on a Mac-based Web server, you can link it to a Claris FileMaker Pro database with less trouble than you might think. Following is some guidance to lead you through the five main steps: planning what information you should share, finding a CGI (Common Gateway Interface) application, creating HTML forms, modifying your database, and tuning performance.

1. Prepare to Share

To figure out which fields you should include in your database, first determine what information you want to acquire and share over the Web. Then decide if there's additional information you want to keep track of internally. Mocking up Web pages (and FileMaker layouts for the internal information) will help you with this process. As you plan, remember that it's hard to make repeating fields work with a CGI application; you're better off redesigning your database with a relational structure.

You also need to decide whether to let users add and update records. If, for example,

you use FileMaker to create a guest book for your Web site, users will be adding records to the database. If you keep a sales database on the Web, allowing customers to order products and review their purchase history, you'll need to let them update some of the information in their records. Finally, if you're providing a product catalog, you may want users only to search for and sort records.

2. Seek a CGI Application

To extend the capabilities of your Web server so it can talk to your database, you need a CGI application (see "Gateway to Web Success," July '96, page 97). You can also share a FileMaker database over the Internet without a CGI application; however, this is a slower, less secure method that requires all users to have the FileMaker Pro 3.0 application.

Commercial and freeware CGI applications that support FileMaker Pro are available on the Internet; all those currently available support record modification as well as searching. The two leading general-purpose CGI applications for FileMaker are WEB FM (\$195), from Web Broadcasting (415-329-9676 or <http://macweb.com/webfm/>), and ROFM CGI (free), from Russell Owen ([\[www.washington.edu/\]\(http://www.washington.edu/\)\). In addition, Claris \(800-544-8554 or 408-727-8227; <http://www2.claris.com/filemaker/cgi.html>\) offers a free CGI application called Claris FileMaker CGI, which offers less sophisticated search capabilities; as with ROFM CGI, the source code for the Claris CGI application is free.](http://rowen.astro</p></div><div data-bbox=)

If you want to share documents rather than database contents over the Web, check out MacSite Searcher (\$295), from Blue World Communications (206-313-1051; <http://www.blueworld.com/>).

Which CGI application you choose will depend partly on the FileMaker features you plan to use. CGI applications support specific operations such as sort, add/modify, and find. For *MacUser's* online database of reviews (<http://www.zdnet.com/macuser/reviews.html>), we used WEB FM, because it offers the most commands — including variations of the Find command that allow users to find reviews of products meeting multiple conditions, such as "company name = Broderbund" and "category = children's software."

With your database plans in mind, check out each CGI application's Web site to see if the features you need are supported. Then try one or more out on your Web server (Web

Broadcasting allows you to download a WEB FM demo, and the other two general-purpose products are freeware). Each package has documentation and sample databases.

3. Fine-Tune Some Forms

CGI application packages are also a handy source for cribbing the next element of your FileMaker/Web connection: HTML forms. These are the Web pages that connect users to your database information. At the very least,

you'll need a search page that contains a form for entering keywords and a button for submitting the request to your database. You'll also need to create or copy a search-results page that displays a listing of records the user's search retrieves. If you have made fields within each record available, a third page will let the user drill down to individual records. Your HTML form will not contain the actual contents of each database record or possible search result but rather a path that directs the

CGI application's output to the page. Your search and results pages should include navigation aids (buttons and/or links) that can return users to the previous page or to help screens you've provided. All the CGI applications mentioned give examples of these basic types of pages, which you can modify in any HTML editor (for information on HTML authoring tools, see "The Web Author's Workshop," in this issue), and the tutorial on the Claris Web site offers an especially good section on HTML form tags.

4. Fiddle with Fields

With HTML pages designed and linked to your home page, it's time to modify your database. CGI applications use FileMaker calculation fields to retrieve and deliver data to a user's Web browser. You need a new calculation field for each database operation you enable. The field contains HTML code the CGI application merges with the HTML forms you've designed. Each time the database is searched, the calculation field generates and passes on a new chunk of HTML to display the results of the search on the search-results page (see the "Instant Web Pages" sidebar).

The simplest database requires two new calculation fields. The first delivers a list of all records found to match a keyword search. The second calculation generates the HTML to display the contents of an individual record (for the specific item the user selects in the list generated by the first search). You need some knowledge of FileMaker calculations to create these fields, but CGI-application writers usually include a sample database.

In addition to calculation fields, you'll also need to give each database record a unique serial number, if it doesn't already have one. CGI applications use serial numbers to identify individual records in communicating with a database.

5. Make It Speedy

With your calculation fields created, it's time to look at speed of database response. The attractive backgrounds and layouts you may have added to your database for print or on-screen presentation will only slow you down on the Web. Although graphic elements won't appear on the Web, their presence in a layout can slow the finding and sorting of database records. Switch your database to a text-only layout before loading it onto your Web server.

Next, you need to index each searchable field. Version 3.0 of FileMaker Pro does not

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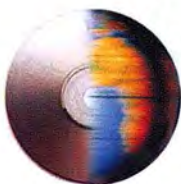
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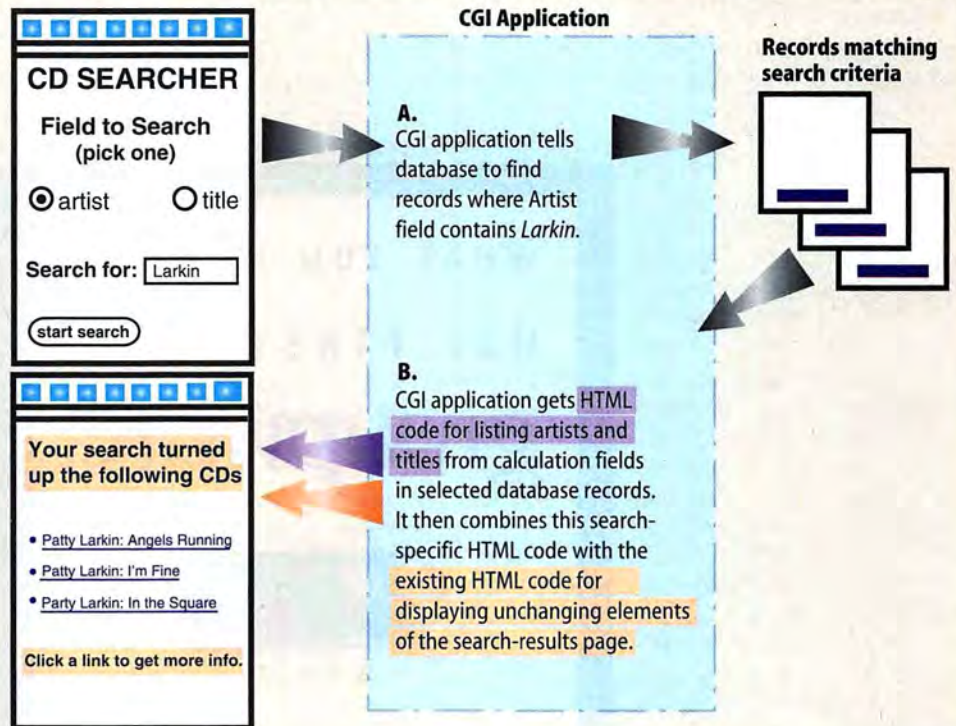
automatically index fields, as previous versions of the program did. If you don't index them, your database searches will be unbearably slow. On the other hand, you should index only fields you intend to have users search, because indexing causes files to balloon rapidly, making them once again slow to sort.

Putting It All Together

Getting your FileMaker database onto the Web won't happen overnight. You'll need to spend some time with your CGI application's documentation as you follow the steps described here, and you'll want to test your database extensively before you put it on a "live" Web server. But once you're out there sharing a database with the world, you won't want to turn back.

MacUser Associate Editor Shelly Brisbin opted not to put the database containing her CD collection on her Web site, although she was sorely tempted.

Instant Web Pages / generating HTML to display searched-for data on the fly



A new Web page is needed for database-search results, but where does the HTML code for such pages come from? In FileMaker Pro databases, calculation fields can generate the code for displaying data from a search-results page; the CGI application then merges this code with that for displaying a page's unchanging elements.

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CIRCLE 121 ON READER SERVICE CARD

Taming the Net

Use the Finder, a PIM, or the Web itself to manage your online life.

YOU SHOULDN'T HAVE TO use separate tools for managing your Web bookmarks, e-mail contacts, telephone numbers, and snail-mail addresses. In fact, you shouldn't even have to shift gears mentally to access the Internet. Although this ideal hasn't been fully realized, there are tools available that can help get you closer to this goal, whether you're a desktop person, a PIM person, or a Web-head.

The Net on Your Desktop. For some, the Mac desktop is the perfect metaphor for managing Web links and contacts. If that's you, check out CyberFinder, from Aladdin (<http://www.aladdinsys.com/>). You'll find plenty of bookmark managers on the Net, but CyberFinder does the best job of integrating URLs into the familiar Macintosh way of doing things. Drop the \$30 product into your System Folder. Now, when you hold down the Shift key, the Finder's New Folder command becomes New URL and lets you save a Net address (e-mail, Web site, and the like) in a file. When you double-click on the file, your Web browser or e-mail client opens and takes the express to your new URL. You can also grab a URL by selecting it in any application and typing a key combination.

Once you've set up some URL files, try this: Create aliases to the ones you use most often, and drop them into your Apple Menu Items folder. Voilà: live addresses of people you e-mail frequently or a live wire to Apple's FTP site for downloading system updates, all under the rainbow Apple. What the heck — put a link to http://www2.whitehouse.gov/WH/Mail/html/Mail_President.html in there, and assign a red phone icon to it.

Like most good link-management tools, CyberFinder uses Peter Lewis' free Internet Config (<ftp://ftp.share.com/pub/internet-configuration/>). If you've already set up Net

preferences and helper applications here, the trip from desktop file to browser or e-mail client will be a snap. If not, you'll get IC when you install CyberFinder and the preferences you choose will work with any other IC-compatible applications you have.



The Net in Your PIM. Do you use a PIM (personal information manager) or contact manager to organize your work activity? Then you're one of the PIM People and you probably want the Net to plug into your contact database. Two companies are building the plugs.

WebArranger, from CE Software (<http://www.cesoft.com/>), is a full-fledged PIM that lets you manage URLs as if they were phone numbers, with an auto-dialing equivalent: When you choose a URL, the link opens. WebArranger's automated "agents" notify you if a favorite Web page has changed since you last visited it. (See "Untangling the Web," March '96, page 26, for more on WebArranger.)

Now Up-to-Date and Now Contact, from Now Software (<http://www.nowsoft.com/>), have been upgraded to handle URLs, and the company's new Now Up-to-Date Web Publisher software can put your company's public calendar onto a local Web page.

You can drag and drop events or schedules,

names or directories from Web pages to Now Up-to-Date and Contact and later click to open the links. You can also use Contact to send e-mail to large distribution lists.

Your Custom Web Interface. If the Finder or a PIM doesn't address your organizational needs, you might try using HTML pages themselves to manage information.

If you can afford the RAM, put an alias to your Web browser into your Startup Items folder and set the default URL to a site that's updated frequently. It's like having the local paper delivered to your desktop when you start up the Mac each morning, especially if your local paper's on the World Wide Web.

Take the next step by creating an HTML page on your hard disk that contains links you use frequently. You can start from scratch or modify your browser's bookmarks.html file (System Folder:Preferences: Netscape if you use Navigator). When opened with a browser, your bookmark file displays links and headings. You can rename and edit the bookmarks.html file with a word processor, changing bookmarks or organization to include sites you use for reference or that you visit daily. Then, add the Alta Vista search form to your page, by pasting in the HTML code you'll find at <http://www.altavista.digital.com/cgi-bin/query?pg=tips>. Using this new page as your browser's default file will open it when you launch the browser.

Don't Know a Site from a .snd?

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HANDS ON

System 7.5.3 may be a real bug killer, but its System Folder looks like an anthill of trouble. Let us help you separate the workers from the drones.



By Ted Landau

System 7.5.3 Cleanup

IT'S BEEN A BUMPY RIDE this past year for Mac users trying to track what should and shouldn't be in their System Folders. Besieged by a continuous barrage of system-software updates, you may well be stymied as you try to tell whether you have the latest and correct version of everything you need.

Now, finally, comes System 7.5 Update 2.0 to the rescue. It can update any Mac to System 7.5.3, as long as the Mac already has System 7.5 or later. And it provides a laundry list of bug fixes. You should see fewer Type 11 error messages and "out of memory" messages, if you've been plagued by them (if you

actually experience *more* system errors and crashes after installing 7.5.3, see the "Installing 7.5.3" sidebar). Similarly, this update will alleviate problems you may have had with Apple Guide.

But there's a dark side to this update: It foists on you the most confusing array of control panels and extensions that Apple has ever crammed into your System Folder. Weighing in at 14 floppy disks, this update not only delivers an overwhelming quantity of new System Folder items but it also gives them such arcane names as SystemAV and OpenTptAppleTalkLib. Even Mac gurus can be found

scratching their heads as they puzzle over exactly what these new files do.

For those who not only want to understand the clutter but also reduce it right from the start, here's our guide to clearing up the mysteries of the System 7.5.3 System Folder.

Open Transport

This is the big one — Apple's new networking software, which you'll use for everything from connecting to the Internet to printing to a network printer.

Most likely you won't want to do without Open Transport, so you'll need to hang onto its related items in the System Folder. Those that make up the backbone of Open Transport are Open Tpt AppleTalk Library, Open Tpt Internet Library, and Open Transport Library — and, if you have a Power Mac, OpenTptAppleTalkLib, OpenTptInternetLib, and OpenTransportLib. Also part of Open Transport are the control panels TCP/IP and AppleTalk and the files Serial (Built-In), Ethernet (Built-In), and Open Transport Guide Additions.

As much as you may like Open Transport, don't be too eager to throw out the System Folder items for the networking software it

Installing 7.5.3 / proceed with caution

YOU MAY THINK we're making a mountain out of an anthill by urging caution when you install System 7.5.3, but careful installation may help you avoid such serious problems as a Mac that won't boot up. Your safest bet is to follow these steps:

1. Before you install System 7.5 Update 2.0, do a "clean" install of your present system software — System 7.5 or System 7.5.2. If you have System 7.5.1, which has no clean install, do a clean install of System 7.5.
2. Install any Apple software you use that wasn't included in the clean install, such as AppleVision software.
3. Now for the update. With extensions *on*, run an Easy Install of System 7.5 Update 2.0. The Update's Installer should correctly install only the new or updated files you need and trash existing files that are now obsolete. This is the first installer that also correctly updates extensions that have been disabled by startup managers, such as Apple's Extensions Manager.
4. Use the Custom Install option if you need any other 7.5.3 components that didn't get installed.
5. Finally, find the preferences files and third-party software you want to keep and move them from the old System Folder to the new, "clean" one.

If you encounter problems, they're probably due to extension conflicts or incompatible applications.

supersedes — Classic AppleTalk. (Both sets of System Folder items get installed when you perform an Easy Install of 7.5.3 on all but 68000, 68020, and PCI-based Macs.) You may still need Classic AppleTalk and its related files — such as the MacTCP and Network control panels — in case you have trouble with Open Transport or need to use software that's incompatible with Open Transport. You can opt to remove one set of networking software or the other, but it's easier to leave them both in your system and switch between them, using Network Software Selector, a utility that comes with System 7.5.3.

Should you decide you do want to remove either Classic AppleTalk or Open Transport, there's one complication: invisible files. At least some of the System Folder items related to the networking software are invisible when that software is inactive. To trash invisible files, you need to have a special utility such as DiskTop or you can follow these steps: First, activate the networking software you want to delete, by using Network Software Selector (in the Apple Extras folder), and restart. Then drag the network-related items from the System Folder to the Trash (you'll have to trash these items manually rather than use the 7.5.3 installer's Custom Remove option). Make the other networking system active, using Network Software Selector, and restart.

Shared Libraries

Another type of item you'll find among the crowd in the 7.5.3 System Folder is shared-library files. They save RAM space, by eliminating the need to load the code shared by more than one application into memory multiple times. They're useful, but there may be some you don't need. Here's how to tell what to keep and what to trash without fear:

You can identify most shared libraries by looking for files that end in either the word *Library* (indicating 680x0 code) or *Lib* (indicating PowerPC-native code). The key extension for using all these files is the Shared Library Manager. You'll also need the Shared Library Manager PPC if you have a PowerPC-based machine. If you use Open Transport, its shared-library files need to remain. However, you won't need ObjectSupportLib and AppleScriptLib unless you use AppleScript on a Power Mac. ThreadsLib is no longer necessary at all if you have System 7.5.3. (For a complete list of files you can trash, have a look at the "Friend or Fodder" table.)

A bit of advice: Don't rely on Balloon Help

Friend or Fodder? / expendable System Folder items

PURPOSE	FILE OR FOLDER	REASON TO TRASH IT
Acceleration	Graphics Accelerator	This is needed only on PCI-based Macs that use ATI video cards.
AppleScript	AppleScriptLib ObjectSupportLib	You'll need these only if you use AppleScript on a Power Mac.
Color printing	ColorSync ColorSync Profiles folder any extension ending in CMM	If you don't need to print in color, you can trash these items.
Desktop printing	Desktop Printer Extension Desktop Printer Spooler Desktop PrintMonitor	If you don't want to use the desktop-printer system, remove each of these items.
Foreign languages	WorldScript Power Adapter	If you don't use an Apple Foreign Language Kit, you can get rid of this.
Miscellaneous	7.5.2 Printing Fix Apple Multimedia Tuner Display Enabler Finder Update PowerPC Finder Update SCSI Manager Serial DMA Sound Manager	Each of these items is obsolete or has been rolled into System 7.5.3.
Networking	Ethernet Compatibility	This is needed only on PCI-based Macs that use Novell NetWare.
Talking Mac	MacinTalk 2 or 3 Speech Speech Manager Voices Folder	Remove these unless you want your Mac to talk to you.
Video input	Apple Video Player	You don't need this unless you have a Mac with video input or a Mac with a TV tuner.

Even though you may have just loaded System 7.5.3, it's not too soon to start pruning the System Folder. It probably contains items you'll never use. The ones on this list are either so specific that most Mac users won't need them or they're obsolete. See the article for more detail on some of the items.

for guidance about what shared library files do. It's clueless about these files, giving you entirely wrong information in some cases.

AV Features

A valuable new item in the 7.5.3 System Folder of PCI-based Macs is the Monitors & Sound control panel. It's a vast improvement over the control panel it replaces — Sound & Displays. That loser of a control panel was clunky, bug-ridden, and confusing to almost everyone who grappled with it.

By contrast, Monitors & Sound is much easier to use, and you don't need to have as many extensions installed to use it. Specifically, you don't have to have AppleScript or AVSetup, although you do need the SystemAV extension. (It's a good idea to keep AppleScript installed, though, since many applications may use it.)

Another AV-related item, Apple Video Player, can be trashed unless you have a machine with video input (such as a Power Macintosh 7500 or 8500) or one that has a TV

tuner (such as a Power Macintosh 5300). If you do use this program, make sure you also have the Video Startup extension installed, or it won't work.

Printing

There are also several optional printing-related items in the new System Folder, including the desktop-printer extensions. These extensions can facilitate printing, but if you want to ignore this technology, you can trash the Desktop Printer Extension, Desktop Printer Spooler, and Desktop PrintMonitor files.

No Rest for the Weary

Once you've followed these tips to get a leaner System Folder, relax and enjoy your smoother-running Mac. But don't get too relaxed. Brace yourself for the release of Apple's next system — Copland — and even more changes that will keep you busy as a bee. ☞

Ted Landau, author of Sad Macs, Bombs, and Other Disasters, has more System 7.5.3 tips at his Web site (<http://www.oakland.edu/~landau/sadmacs/>).

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**See You
Online!**

By Bob LeVitus and Christopher Breen

Help Folder

A song for my father, finding Internet tools, and doubling your RAM pleasure.

Close to the Source

Q. In your answer to a problem you titled "Bookmark Muck" in the May '96 Help Folder (page 123), Chris credited '70s pop group Three Dog Night for the song "One." Although you got the lyrics right, I would have preferred it if you had instead mentioned the author and original performer of the song, Harry Nilsson. Why my interest in this particular topic, you wonder?

Zak Nilsson
via the Internet

CHRIS: Zak, in order to avoid the kind of creeping "People-ization" found in so many of today's computer publications, we try not to duplicate our pop-culture references. The truth is that I didn't want to use up my one allotted allusion to your eminently talented father in a non-"lime and coconut" context. "Coconut" holds a tender spot in my heart: I often sing it around the Breen cabaña when a member of the family is feeling poorly.

They Shall Provide

Q. I'm trying to switch from AOL to MCI for Internet access. I have Netscape Navigator but no software for dialing the provider. I need help locating all the pieces to get back online.

Theo Lotz
via AOL

CHRIS: Most large ISPs (Internet service providers) equip their users with some kind of sign-up kit: a disk or two with an installer, basic software, and instructions. It sounds like your ISP provided you with less than zero.

BOB: The first thing to do is call your ISP and ask for your Macintosh sign-up kit.

CHRIS: If you get a response such as "What's a Macintosh?" or "Is that for Windows 3.1 or Windows 95," we respectfully suggest you find a different provider.

BOB: Assuming you stay with your ISP, request some software and documentation. You should receive a PPP (Point-to-Point Protocol) control panel or a less desirable SLIP (Serial Line Interface Protocol) control panel, along with a few Internet tools: usually at least a Web browser and FTP client software. It's the PPP or SLIP software that does the dialing. Based on instructions from your provider, you'll need to configure the MacTCP or TCP/IP control panel that's already in your System Folder.

CHRIS: If MCI can't provide that much for you, it falls out of the "good provider" category. Check with Mac-using friends or with your local user group — most cities now have a choice of providers that understand and even specialize in connections for Mac users.

BOB: Here's one last hint: Some providers have chosen to support the Mac by giving new customers a copy of Adam Engst's excellent book *The Internet Starter Kit for Mac* (Indianapolis: Hayden Books, 1995). Adam has included several hundred pages of great information and a disk full of the best Internet shareware. The book is a great resource, even if your provider treats you right.

Virtual Memory Versus RAM Doubler

Q. Can I use RAM Doubler to double my real memory (17 MB) and my virtual memory (a dedicated 60-MB hard-disk partition)?

Bill Pav
via the Internet

CHRIS: No way. The programs don't work in tandem — you can use either RAM Doubler or Apple's virtual memory, not both.

BOB: Besides, the programs work differently. One of the marvels of RAM Doubler is that, unlike System 7's built-in virtual-memory scheme, it doesn't use a permanent swap file — a portion of your hard disk that's reserved for virtual memory.

CHRIS: In other words, RAM Doubler requires



Tips / A Little Light Hacking

Say Chees!

Concerned that Goldilocks or someone like her has been sitting at your Mac while you've been out for a walk in the forest? If you own a Connectix QuickCam and have AppleScript installed, you can create a script to take a picture of the person sitting at your Mac whenever your Mac starts up. Here's how:

Copy Scott Gruby's PhotoCapture shareware utility from the QuickCam registration bonus CD-ROM to your hard disk, or download the utility from your favorite online site. Enter the following script in AppleScript's Script Editor:

```
tell application
  "PhotoCapture"
  Capture to Clipboard
  Capture to File "Macintosh
    Disk:images:Startup.PICT"
quit
end tell
```

Note: Substitute the name of your hard disk for *Macintosh Disk*. You can name the picture file anything you like.

When you run the script, AppleScript will prompt you for the location of PhotoCapture. In Script Editor, save the script as an application and place it in the Startup Items folder inside your System Folder. Create a folder called Images at the root level of your hard disk.

Now when you want to see who was at the Mac when it was last started, open the Images folder and double-click on the enclosed Startup.PICT file.

Matt Ferson
via the Internet

WRITE TO HELP FOLDER/TIPS

c/o MacUser
950 Tower Lane, 18th Floor
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very little space on your hard disk. And when it does need space to perform its magic, RAM Doubler grabs a small chunk temporarily and then releases it as soon as the space is no longer needed. You'll never even notice it happening, and if you use RAM Doubler, you can reclaim that 60-MB partition.

BOB: So put that partition to better use — store some data on it!

CHRIS: In your case, using RAM Doubler will create a net loss of virtual memory: You'll have only 34 MB of RAM (your 17 megabytes plus 17 "virtual" megabytes). If you really must, for whatever reason, have 60 MB of virtual memory available to you, you'll have no choice but to use the slower, more-disk-hogging, built-in System 7 Virtual Memory.

Mac Technology: As Seen on TV

Q. How did the Performa in the Apple TV advertisement wake the boy in the morning, and how can I get my Mac to do that?

Martin Cutler
via eWorld (may it rest in peace)

CHRIS: For those of you who've missed it, the commercial in question features a Performa switching itself on in the morning and rudely awakening a kid by blasting him with video, music, and voices.

BOB: It's all possible with just a few bucks' worth of hardware and software.

CHRIS: The first step depends on the Performa model. If your model is in the 200, 500, 600, 5200, 6200, or 6300 series, you can use System 7.5's Auto Power On/Off control panel to start up your Mac at a time you choose. Other Mac models can be started this way as well, but rather than present you with an exhaustive list, I'll simply recommend this: Double-click on the Auto Power On/Off control panel.

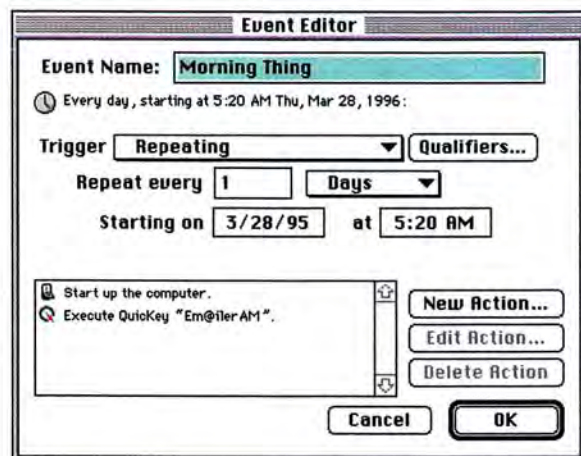


figure 1/ Here, a PowerKey wakes up a Mac and executes a QuickKeys macro that gets e-mail with Claris EMailer.

Tips / Saving Money

PowerBook SCSI Cable

At around \$40, a PowerBook HDI-30 SCSI cable is mighty expensive. And if you want to dock your PowerBook to another Mac, you need yet another pricey cable. Why pay the price when companies such as APS (800-677-3294 or 816-290-4109) and Interex (316-524-4747) offer cheaper, all-in-one solutions for those who have spare SCSI cables lying around (and who among us doesn't)?

For around \$25, you can pick up an HDI-to-SCSI docking adapter. This little beauty, when connected to a 25-to-50-pin SCSI cable, turns the old cable into a 50-pin-to-HDI-30 cable that can be used to connect your PowerBook to external SCSI devices. With the flip of a switch, your "new" cable can also be used to dock your portable to another Mac.

D. Howell
via AOL

Cheaper Speaker

Finding a good set of computer speakers is time-consuming, expensive, and perhaps unnecessary — especially if you already have a boom box or stereo receiver. Sure, you could run a cable from your Mac to the receiver across the room, but why not employ that inputless boom box sitting on your desk instead?

If the control panel doesn't work with your Mac model, a terse dialog box will let you know.

Those with noncompliant Macs can still get there but will need a PowerKey or PowerKey Pro (see figure 1), from Sophisticated Circuits (800-827-4669) — they cost around \$100 (less for PowerKey, more for Pro). They're spiffy hardware/software combinations that let you turn your Mac (and several peripherals) on and off at scheduled times.

BOB: Next, you need some sound files and/or QuickTime movies. To create your own video or sound files, you'll probably need Hyper-

Card, Macromedia Director, Allegiant's SuperCard, or Adobe Premiere.

CHRIS: Now, on with the show! A movie will play automatically at startup if you name it Startup Movie and place it at the root level of your System Folder. Sound files work differently — to get them to play at startup, just toss them into the System Folder's Startup Items folder.

If you want a more complex morning ritual, you'll need some sort of macro program to script all the



The Wano-Tech fx Wave lets you use your boom box as an external speaker for your Mac.

I discovered a wonderful gadget called the Wano-Tech fx Wave at my local Target store. This device (see photo) plugs into my Mac's speaker jack and allows me to "broadcast" the Mac's sound in full stereo over any FM frequency in the 88- to 105-MHz range. At \$19.95, it's a steal! It requires two AAA batteries and broadcasts reliably at a range of 3 meters.

Alex Rampell
via AOL

events that occur once your Mac comes to life. PowerKey Pro includes a "lite" version of the excellent commercial macro program QuickKeys. The other option is to use System 7.5's built-in AppleScript.

BOB: If you have these tools in your arsenal, you can make your Performa turn itself on at 7 A.M. and do just about anything you like after that.

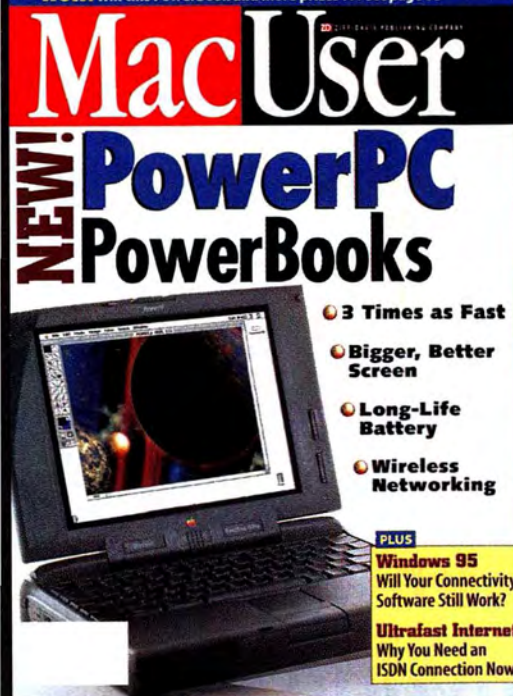
Although the commercial's use of technology is a bit frivolous, there are many cool ways the technology *can* be used. For example, I use PowerKey Pro to wake my Macintosh up an hour before I get out of bed. My Macintosh then runs a Claris EMailer session automatically and uses CompuServe Information Manager to download messages from my favorite online forums. When I walk into my office, my Macintosh is all warmed up and my mail has been retrieved from three online services before I lay a single finger onto the keyboard. Neat! ☺

Bob LeVitus is director of evangelism for Power Computing. Christopher Breen recently coauthored The Macintosh Bible Guide to Games, published by Peachpit Press.

M You can find the shareware and freeware programs that are referenced in this article on MacUser's Web page (<http://www.zdnet.com/macuser/>). You can also find them in the MacUser and ZD Net/Mac areas on CompuServe. See How to Reach Us for instructions on accessing ZD Net/Mac.

Mac User

WOW! Win this PowerBook and more prizes... see page 66



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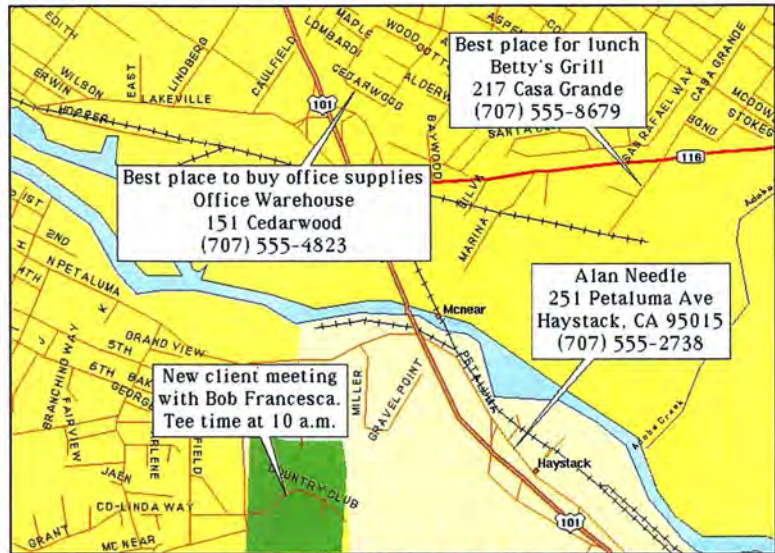
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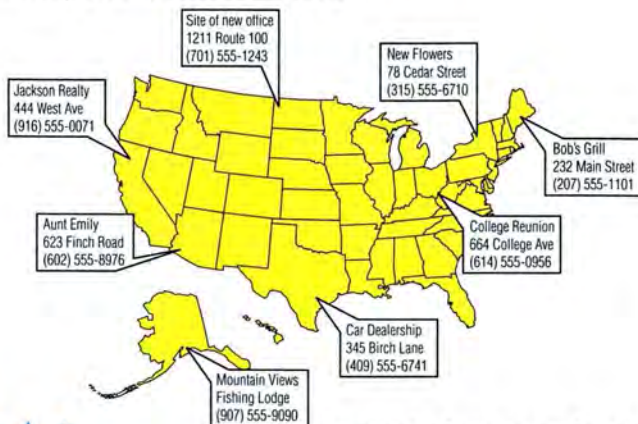
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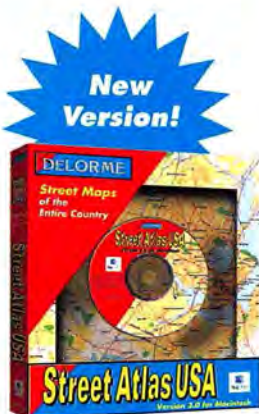


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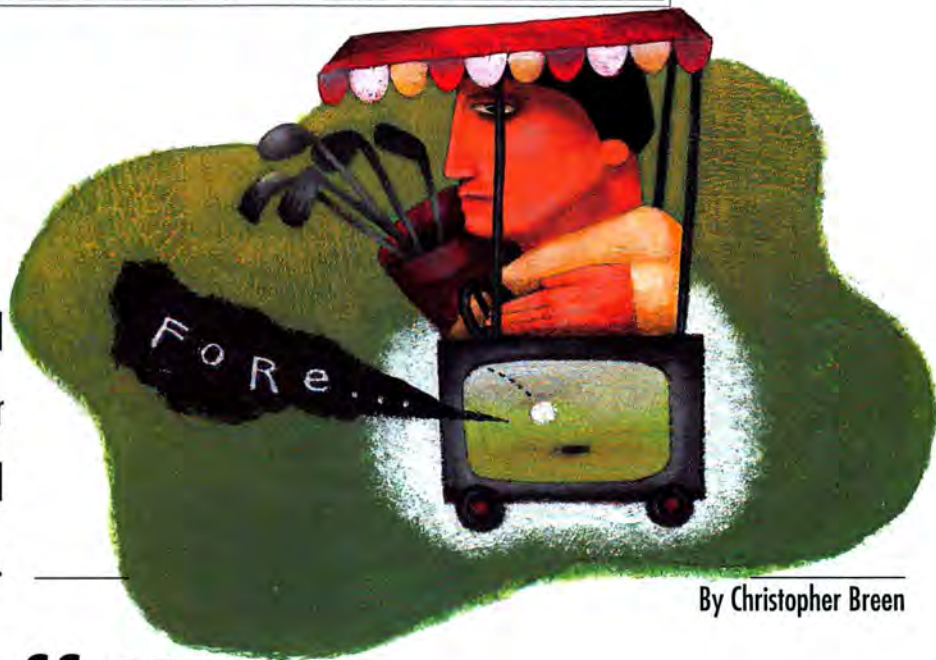


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By Christopher Breen

The Tee'd Off Mac

BEFORE WE BEGIN, I should probably mention that I'm one of the least skilled golfing enthusiasts on the planet. I generally warn fellow golfers not to cross my path on the links if Kevlar isn't a major component of their wardrobe. But I may have to drop

Addressing the Ball

Before stepping up to the first tee, it's good to know the rules of the game and some basic techniques. Fortunately, several virtual golf instructors await those with CD-ROM drives and a will to learn.

SportWare Golf ▼ (★★★★; \$39.95 list), from HarperCollins Interactive (800-424-6234 or 212-207-7000), is a grab bag of golfing goodies. This CD-ROM features not only tips on technique, etiquette, and the basics of play but also a history of the game, a guide

to many popular clubs (the kind you swing), and a guide to many popular clubs (the places where you swing).

Your SportWare host is Jim McLean — the 1994 PGA Teacher of the Year — who dispenses solid advice for all levels of golfers through a combination of QuickTime movies and illustrative slide shows. Duffers looking for practical tips will want to go straight to the Practice Tee section, where Jim guides you through the Long Game, the Short Game, and Course Management (practice methods and calming techniques for the hotheaded).

SportWare Golf has something for every golfer — there's even a copy of McLean's *The Putter's Pocket Companion* in the box. The only bogey in the product is that some of the multimedia aspects

of the CD-ROM don't work as well as they could. Pages that claim to have menus don't, and it's not always easy to figure out where you're supposed to click.

Also worth checking out is **Golf Tips: Breaking 100** (★★★★; \$59.95 list), from DiAMAR Interactive (800-234-2627 or 206-340-5975). Although this CD-ROM lacks the rich interface and multimedia gewgaws of SportWare Golf, it more than compensates with serious instruction.

The program contains four major areas — 5-Day Lesson, Analyze Your Trouble, Build Your Own Workshop, and Play the Hole. The 5-Day Lesson painstakingly leads you through pictorial lessons (with some QuickTime supplements) encompassing the nuances of grip, stance, and swing; driving; fairway and trouble shots; chips and wedges and negotiating sand; and putting. The program includes instruction from pros Adam Schriber and Patti McGowan.

If you'd rather not take the five-day course, move to Analyze Your Trouble or Build Your Own Workshop. In these areas, you can design a set of lessons appropriate to your needs. The fourth component, Play the Hole, is a gimmicky QuickTime VR module that has you hack through a single hole by using the techniques you've learned. One time through Play the Hole is plenty. Then, head for some real holes — for which Golf Tips includes three actual golf balls (with logo, of course).

We've now heard from the instructors, but where is the voice from the circuit? Fear not, the biggest moneymaker in professional golf is available for consultation in the two-volume **Lower Your Score With Tom Kite** (★★★★; \$40 estimated street), from Intellimedia Sports (800-269-2101 or 404-262-0000).

Kite and Bob Rotella — a sports psychology consultant — guide you through the technical and



mental aspects of driving and putting in the Full Swing and Putting volume and address the more esoteric aspects of the short game and trouble shots in the Shot Making volume. Each CD-ROM set (two discs per set) features short QuickTime clinics on specific aspects of the game. Although the presentation rambles at times and diagrams might have been more effective than some of the movie sequences, Kite brings an insider's perspective that's missing from the other two packages.

Tournaments and Tours

Now that you've got your skills down, how about paying homage to one of golf's greatest courses? I'm speaking of the Augusta National Golf Club, home of the Masters tournament. **The Masters** (★★★★; \$39.95 list) — assembled by the Tokyo Broadcasting System and Creative Multimedia (503-241-4351) — is a loving look at a golf shrine, its classic tournament, and the fearless golfers who've battled its unforgiving greens. The CD-ROM sports a history of each tournament and is chock-full of trivia, statistics, and player history.

For information on other tournaments, check out some golf sites on the Web. My favorites are **GolfWeb** (<http://www.golfweb.com/>) and **The Golf Circuit** (<http://www.sdgolf.com/>). In addition to tournament information, both sites offer tips from the pros, classified ads, travel information, and guides to equipment.

around the U.S. PGA Tour Golf III contains three championship courses, with no option for adding more, whereas Links Pro offers just two courses, with the option to play on separate, add-on courses such as Pebble Beach (\$39.95 list) and Firestone Country Club (\$29.95 list).

Since no one has yet designed a joystick in the form of a golf club, you must control both games by using the mouse. The idea is simple, although the execution can be tricky. After you've selected a club — based on your own infallible instincts or on the advice of the game's caddy — you click and hold the mouse to begin your backswing. When you think you've reached the apex of your swing, you let go of the mouse button and the club arcs downward. At the right moment (as shown by the game's stroke meter), click the mouse button again and watch the ball fly to its appointed destination — or somewhere less ideal if things go awry.

The two games are similar in several ways — both have caddies who make questionable club decisions, both offer flybys of the courses, and both make you dress in clothing that in other walks of life would be laughable. LINKS Pro has the edge over PGA Tour Golf in a few important areas. To begin with, LINKS Pro is networkable — you can play against seven real-life players across a network or via modem. LINKS Pro also lets you choose your clubs with voice commands, opt for a female identity as a virtual player, and speed things up by copying the game to your hard disk. Don't get me wrong; PGA Tour Golf III is great — but the trophy goes to LINKS Pro CD.

The 19th Hole

OK, I know what you're thinking. Golf is supposed to be an activity where one sucks in great lungfuls of untainted oxygen while sharpening one's powers of

concentration. Why practice such a patently out-of-doors activity in-of-doors? Well, in addition to avoiding bad weather and obscene green fees, there's a third advantage very close to the heart of rank beginners such as myself: There's absolutely no danger of driving your Titleist through the plate-glass window of the nearest townhouse. ☹



Play the Course

When all you need is a quick golf fix, try **LINKS Pro CD** (★★★★; \$69.95 list), from Access Software (800-800-4880 or 801-359-2900), and **PGA Tour Golf III** (★★★★; \$49.95 list), from Electronic Arts (800-245-4525 or 415-571-7171).

Both games place you on a variety of famous golf courses

The Two Dads

BY RIK MYSLEWSKI AND JIM SHATZ-AKIN

RIK: Quick! How many wolves weigh as much as a moose?

JIM: You've been playing the pan-balance game in Soleil Software's **Zurk's Alaskan Trek**, right?

RIK: OK, I admit it. Trek still has some of the interface clumsiness of the two earlier Zurk titles and the story-writing mode is a yawner, but it's a winner of a sequel overall — especially the clever animation module.

JIM: Kids'-software sequels have movie sequels beat, 'cause software sequels often do improve on the original.

RIK: I'd put **Winnie the Pooh and the Honey Tree** in the minor-improvement category.

JIM: Hey, compared to the loathsome Lion King entry in **Disney Interactive's Animated StoryBook** series, Pooh's a veritable *Citizen Kane*.

RIK: It *does* feature four sweet Pooh songs...

JIM: ...and the games aren't totally witless like Lion King's.

RIK: Still, it's a shame to saddle our beloved bear with repetitive, uninspired content.

JIM: A more successful sequel is Virgin Sound and Vision's **Get Ready for School, Charlie Brown!**

RIK: It's not a *true* sequel. Although it stars the Peanuts gang, it's unrelated to the lame Snoopy-infested Image-Smith titles.

JIM: Right. But Get Ready's word games and comic-strip-enhanced kids' dictionary finally give the ol' Blockhead a reason to live.

RIK: Of course, the toughest sequel challenge is outdoing a well-deserved smash.

JIM: It can be done, though. Take **Elroy Hits the Pavement**, from Headbone Interactive.

RIK: Like Elroy Goes Bugzker, it's mostly just for fun, but the puzzles are more elaborate and there's more-substantive educational content than before.

JIM: Plus, it offers longer play than the original Elroy title and is just as funny — for kids and grown-ups.

RIK: Movie execs, take heed...

Disney's Animated StoryBook: Winnie the Pooh and the Honey Tree ★★★

Ages: 3 – 8.

Price: \$35 estimated street (CD-ROM).

Younger players will enjoy the fun songs and sweet story. Older players will quickly tire of the limited animations and rote games.

Company: Disney Interactive, Burbank, CA; 800-688-1520 or 818-543-4300.

Reader Service: Circle #430.

Get Ready for School, Charlie Brown! ★★★

Ages: 4 – 8.

Price: \$29.95 list (CD-ROM).

Repetitive character responses get dull fast, but comic strips and illustrated dictionary enliven tired game ideas such as Hangman and Concentration.

Company: Virgin Sound and Vision, Los Angeles, CA; 800-814-3530 or 310-246-4666.

Reader Service: Circle #432.

Elroy Hits the Pavement ★★★

Ages: 8 and up.

Price: \$29.95 list (CD-ROM).

Solve puzzles to help smart-alecky Elroy and his gal-pal Syd rescue the dognapped Blue and thwart a canine caper by the M.U.C.K. criminal syndicate.

Company: Headbone Interactive, Seattle, WA; 800-267-4709 or 206-323-0073.

Reader Service: Circle #431.

Zurk's Alaskan Trek ★★★

Ages: 6 – 10.

Price: \$32.50 estimated street (CD-ROM).

Story-writing tool is flat, but other modules — including the guide to Alaska's flora and fauna, scriptable animal animations, and the pan-balance game — succeed.

Company: Soleil Software, Palo Alto, CA; 800-501-0110 or 415-494-0114.

Reader Service: Circle #433.



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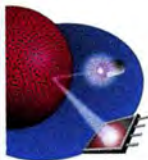
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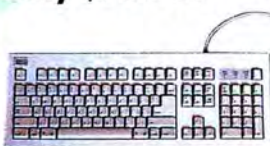
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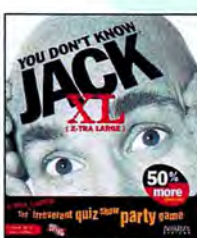
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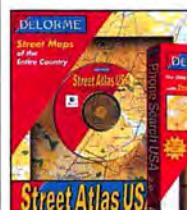
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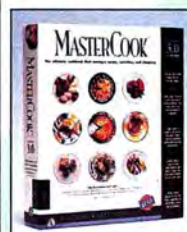
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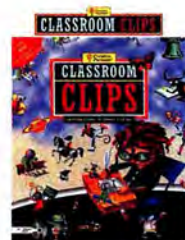
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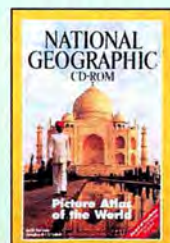
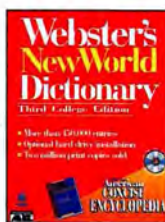
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The Game Room

BY BOB LEVITUS

YOU CAN GET CARRIED AWAY to a different universe in any of this month's selection of games. The worlds in all three games are unique, but I recommend only one without reservation.

Total Distortion

For years now, I've been anticipating the release of *Total Distortion*, rumored to be the killer CD-ROM title. The idea — an adventure game in which you make your own music videos — was innovative. And, in fact, a prerelease version won several awards. Unfortunately, it doesn't live up to its reputation.

In *Total Distortion*, you portray a music-video director sent to a strange world where hard-rock music dominates. Your goal is to find and videotape the rock-star inhabitants, edit music videos, and then cut deals with earthling TV producers. The funnest part of the game is experiencing its rock-and-roll world — the Distortion Dimension. You get to raid the kitchen; find clues in over

40 books; and destroy the Guitar Warrior with your electric guitar. Also to the game's credit are animation, sound, and graphics that are usually interesting and occasionally exceptional.

The problem for me was that despite all the game has going for it, it still isn't much fun. That's because one of the most important parts of the game — creating music videos — is a tedious task. You have to sit in front of a virtual video sequencer for a long time, choosing sound and video clips for many tracks of a video. This is especially a problem because in order to do well in the game, you must create many videos, and they must be long or they won't sell.

If you love adventure games and like video sequencing, you might find *Total Distortion* worthwhile. Otherwise, save your money.

GAME POINT

All of this month's games can be fun, but two have serious drawbacks. *Total Distortion* lets you explore an unusual world of rock and roll, but its most unique feature is also its most tedious — video sequencing. *Connections* has video clips full of interesting trivia but doesn't offer enough plot to keep you engaged. The one game in this month's batch that will keep you enthralled is *X-Wing Collector's CD-ROM*, one of the best flight sims available.

Total Distortion

Price: \$40 (estimated street).

Company: Pop Rocket, San Francisco, CA; 800-355-5958 or 415-731-9112.

Reader Service: Circle #434.

Connections

Price: \$45 (estimated street).

Company: Discovery Channel Multimedia; 800-678-3343 or 317-579-0413.

Reader Service: Circle #435.

X-Wing Collector's CD-ROM

Price: \$45 (estimated street).

Company: LucasArts Entertainment; San Rafael, CA; 800-985-8227 or 415-472-3400.

Reader Service: Circle #436.

spots. The hot spots reveal clues or the actual items (seven on each of five levels) you collect to win the game. Throughout the game, each time you find a hidden object, a video from the TV series plays that tells you some interesting facts about that object.

If beautifully rendered scenes and some entertaining video clips are enough to keep you entertained while you poke around for hidden objects, you may enjoy this game. But for me, that's not enough. The problem with *Connections* is that there isn't any depth to the story line or complexity to the virtual world you've stepped into — it's a set of random sites with random items.

Although the video clips are worthwhile if you haven't seen the TV show, they alone do not make an interesting game. Alas, the videos also have a flaw: You can't stop them once they start playing, no matter where you click or what key you press. Because of the structure of the game, you'll have to watch some videos over and over.

X-Wing Collector's CD-ROM

Let's depart from the lands of slow-paced exploration and thoughtful clue finding to plunge into an outer-space war zone. *X-Wing* (shown above) ranks among the best of the flight-sim games, along with such stellar titles as *Wing Commander III* and *FA/18 Hornet*. Why? Because there's so much to it: 120 missions; four spacecraft — A-Wing, B-Wing, X-Wing, and Y-Wing — each with its own strengths and weaknesses in battle and a multitude of futuristic weapons and targeting systems.

The feel of flying is also first-rate — as smooth as glass. If you don't already own a joystick, though, factor in that cost. Using a mouse to fly will only frustrate you, because you'll

have so little control.

About the only other part of the game that isn't up to snuff is the music — it's tinny, more suited to *Super Mario Brothers* than the other elements of this otherwise well-crafted game.

Be prepared for a game that's difficult. You do get a warm-up — a pilot proving ground I found almost as enjoyable as the game itself — but once you leave, expect no mercy. You must be proficient at using almost every key on the keyboard to control some aspect of flight or communications. In addition to flying your craft and firing at enemies, you



must also keep your lasers, shields, and engines recharged.

Winning a battle is as much a matter of careful management of these three systems as it is a matter of having good reflexes. You also have to learn the idiosyncrasies of each fighter craft to be successful in this game. For example, you need to take into account that A-Wings are fast and maneuverable but have weak shields and limited weapons. B-Wings, on the other hand, are slow but armed to the teeth.

The challenging battle, responsive flying, and nice graphics make this a game that should appeal to *Star Wars* fans as well as those who think Luke Skywalker is a total wuss.

Bob LeVitus is a MacUser contributing editor and Power Computing's director of evangelism.

The Tip-Off

X-Wing

Divert energy from lasers and shields to your engines when you need to travel faster; then, even though it slows you down, set lasers and shields to maximum recharge before you enter a battle.





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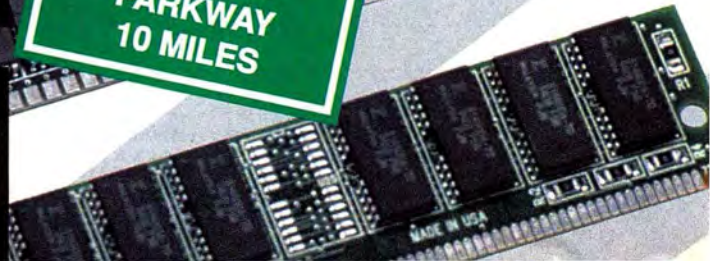
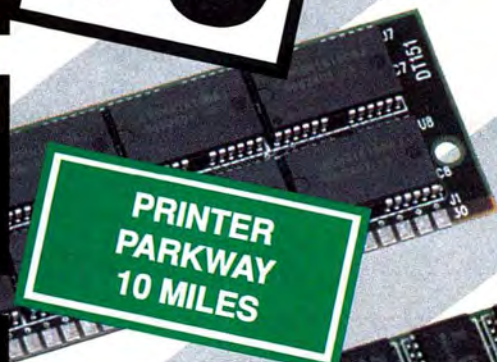
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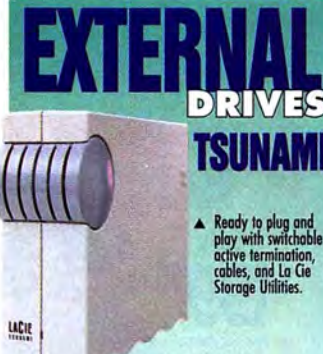


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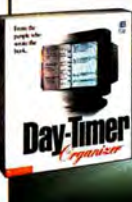


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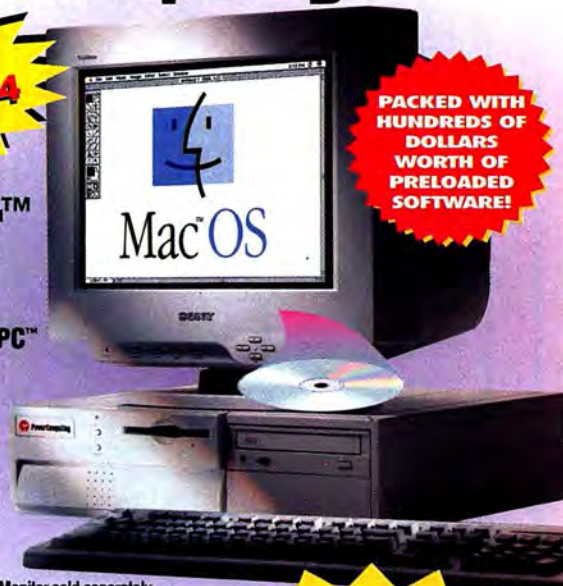


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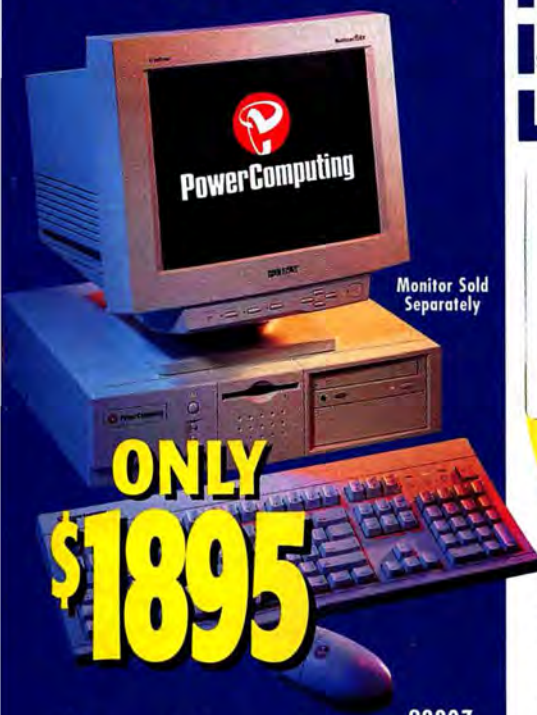
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Quantum



7200 rpm PERFORMANCE, 5400 rpm PRICE APS MS 2000

- ✓ 7.31MB/sec. sust. write, 4.54MB/sec. sust. read
- ✓ 5400 rpm mechanism
- ✓ Performs like a 7200 rpm drive
- ✓ 5-year warranty

\$469⁹⁵
Internal configuration
MICROPOLIS



That's right, this incredible drive has the performance you'd expect from a 7200 rpm mechanism but with a 5400 rpm drive's price - and reliability! The APS MS 2000 formats to 2047MB, delivers sustained reads at up to 4.54 MB/sec. and sustained writes at up to 7.31 MB/sec, has an average access time of 20ms and average seek of 9.6ms.

1.2GB OF POWERBOOK STORAGE APS I 1.2

- ✓ Uses IBM's No-ID™ technology to increase capacity by reducing overhead
- ✓ 1.2GB capacity lets SCSI PowerBooks run today's storage-intensive applications
- ✓ SCSI-2 interface

At 4900 rpm, the APS I 1.2 drive gives you the performance you need from your PowerBook. It uses IBM's No-ID sector formatting technology to increase capacity by reducing drive overhead as well as MR heads to pack 1.2GB into a 2.5" 17mm form factor drive.

IBM

APS DESKTOP DRIVES			
Model	Capacity/Awards	Internal	SR2000
APS Q 840	811MB LARS ****	\$189 ⁹⁵	\$259 ⁹⁵
Quantum 840 Trailblazer			
APS Q 1280	1222MB LARS ****	269 ⁹⁵	369 ⁹⁵
Quantum Fireball II 1280			
APS I 2160	2063MB LARS ****	479 ⁹⁵	579 ⁹⁵
IBM Ultrastar ES			
APS MS 2000	2000MB LARS ****	469 ⁹⁵	569 ⁹⁵
Micropolis 4421			
APS ST 4200	4094MB LARS ****	889 ⁹⁵	989 ⁹⁵
Seagate ST 15230N			



These products are performance-matched for optimal performance in the PowerPC environment.

APS HIGH-PERFORMANCE DRIVES			
Model	Capacity/Awards	Internal	SR2000
APS MS 2.0	1955MB LARS ****	\$549 ⁹⁵	\$649 ⁹⁵
Micropolis 4221			
Fast/Wide or AV available for an additional \$100.00			
APS Q 2.0	2050MB LARS ****	699 ⁹⁵	799 ⁹⁵
Quantum Atlas XP32150			
Fast/Wide available for an additional \$100.00			
APS MS 4.0	4064MB LARS ****	899 ⁹⁵	999 ⁹⁵
Micropolis 3243			
Fast/Wide or AV available for an additional \$100.00			
APS Q 4.0	4101MB LARS ****	899 ⁹⁵	999 ⁹⁵
Quantum Atlas XP3430			
Fast/Wide available for an additional \$100.00			
APS MS 9.0	8669MB LARS ****	1899 ⁹⁵	2099 ⁹⁵
Micropolis 1991			
AV available for an additional \$100.00			

POWERBOOK DRIVES			
Model	Capacity/Features	Drive Type	Internal
APS PB 230 MO	217MB	IDE	\$399 ⁹⁵
Fujitsu			
APS Q 1.08	1037MB	Fast ATA2	429 ⁹⁵
Quantum Europa	3800 rpm		
APS I 1.2	1200MB	SCSI-2	699 ⁹⁵
IBM Travelstar DPBS-21215	4900 rpm		

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READ/WRITE CD-R

APS CD-R **JUST \$799⁹⁵** External configuration

- ✓ Uses CD media with 100-year shelf life
- ✓ Random access gives you fast retrieval

At the lowest price ever for 2x CD-R technology, the APS CD-R is a fantastic value for authoring, mastering or backing up to CDs. CD-R media costs less than 2¢ per MB and has an estimated 100-year shelf life. The APS CD-R has a giant 1MB cache buffer and supports all popular CD formats specified in the Orange Book Part II. The APS CD-R comes with a FREE copy of the award-winning TOAST CD-ROM Pro recording software.



A \$500 value - FREE

650MB MAGNETO-OPTICAL & 4X CD-ROM! SAVE A SCSI ID & SAVE A BUNDLE!

\$499⁹⁵ External configuration



APS PD-4

The new APS PD4 is the most versatile drive available for your Mac. Combining a fast 4X CD-ROM player with re-writable 650MB optical cartridge drive, the APS PD4 saves a SCSI address while performing these two important desktop functions.

APS HyperQIC™

- ✓ 4GB native capacity!
- ✓ Uses standard TR-4 and QIC-Wide 3080XLF cartridges
- ✓ Automatically optimizes data transfer



MacWEEK

GREAT PRICE \$499⁹⁵ External configuration



The APS HyperQIC has a price tag hundreds of dollars lower than a DAT, yet it offers you the same capacity and similar transfer rates. APS HyperQIC gives you up to 8GB of capacity with software data compression.

APS QIC & DAT BACKUP SYSTEMS

Model	Capacity/Awards	Internal	SR2000
APS HyperQIC™	8GB **** MacWEEK LABS	N/A	\$499 ⁹⁵
Travan 4 Conner QIC 3095 Mech.	****		
APS HyperDAT®	8GB **** MacWEEK LABS	849 ⁹⁵	899 ⁹⁵
DDS-2 Compression Mech.			
APS HyperDAT® Pro 8GB	**** MacWEEK LABS	1049 ⁹⁵	1099 ⁹⁵
DDS-2 High Speed Mech.			

APS REMOVABLE DRIVES

Model	Capacity/Awards	Internal	External
APS SQ 5200	194MB **** MacWEEK LABS	N/A	\$349 ⁹⁵

To receive an automated fax listing of all APS documents, call 800-374-5802 from any touch-tone telephone.

Then call 816-920-4150 from a fax machine with a handset or fax modem and follow the instructions.

APS MO DRIVES

Model	Capacity/Features	Awards	SR2000
APS 230MB MO	Up to 217MB	**** MacWEEK LABS	\$449 ⁹⁵
APS 2.6GB MO	4MB cache		1799 ⁹⁵

APS MEDIA SALE

	3M	SyQuest®
90M DAT tape	\$8 ⁴⁵	SQ-400 (44MB) \$39 ⁹⁵
DAT cleaner	10 ⁴⁵	SQ-800 (88MB) 51 ⁹⁵
PD 650 media	45 ⁹⁵	SQ-310 (105MB) 54 ⁹⁵
230 MO cartridge	31 ⁹⁵	SQ-327 (270MB) 61 ⁹⁵
		SQ-2000 (200MB) 81 ⁹⁵
	105299 74Min. CD-R Media	7 ⁹⁵

APS CD-ROM DRIVES

Model	Internal	SR2000
APS T 3701	6.7X-speed CD-ROM	\$249 ⁹⁵ \$299 ⁹⁵
APS PD4	4X CD-ROM/Optical	N/A 499 ⁹⁵
APS CD-R	Recordable CD-ROM	N/A 799 ⁹⁵
APS CD-R Pro	4X4 performance CD-R	N/A 1799 ⁹⁵

- 30-day money-back guarantee on all APS brand products. Your risk is the cost of shipping.
- Drive-for-Drive Repair or Replacement Warranty. APS will, at its discretion, replace or repair products found to be defective according to the terms of the product's warranty.
- Refused orders subject to 20% restocking fee.
- Listed capacities are formatted.
- Actual data compression and tape capacity vary greatly depending on the type of data recorded, other system parameters and environment.
- Prices and specifications are subject to change without notice.
- All hard drives from APS Technologies come preformatted with Apple's System 7.0.1 software, and APS Technologies' APS PowerTools SCSI formatter/hard disk partitioner. You may need to install system software appropriate to your machine before use.
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200MB
Removable



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EZ Drive

S198 2001

\$197



135MB

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S198 2001 EZ 135MB Drive with cartridge.....

\$197



\$329

C104 1801



C104 1801 5.25" ClubMac 200MB Cartridge not included.....

\$329

GENUINE SYQUEST CARTRIDGES

Part Number	Media	Qty 1	Qty 10	Qty 20	Part Number	Media	Qty 1	Qty 10	Qty 20
S198 1013	105MB	\$35ea	\$34ea	\$33ea	S198 1010	44MB	\$40ea	\$39ea	\$38ea
S198 1014	270MB	\$57ea	\$56ea	\$55ea	S198 1011	88MB	\$44ea	\$43ea	\$42ea
S198 2001	135MB	\$19ea	\$18ea	\$18ea	S198 1012	200MB	\$69ea	\$68ea	\$67ea



\$329

270MB

C104 1801



C104 1801 3.5" ClubMac 270MB Cartridge not included.....

\$329

C104 1803 3.5" ClubMac 105MB Cartridge not included.....

\$149

All SyQuest drives include Charismatic Anubis formatting software, necessary cables for "plug-and-play" and documentation. All SyQuest drives include a 30Day Money Back Guarantee and TWO Year Warranty. All SyQuest cartridges include a FIVE Year Warranty (warranty after the first year is handled by SyQuest).

CLUBMAC HARD DRIVE STORAGE



850MB

Internal Trailblazer C104 0002

\$189

\$269

Internal Fireball C104 0001

1280MB

Quantum

Part No. Internal Part No. External

850MB Trailblazer 11ms	C104 0002	\$189	C104 0052	\$249
1280MB Fireball 12ms	C104 0001	\$269	C104 0051	\$329
2170MB Saturn 8.5ms	C104 0011	\$479	C104 0061	\$539
2150MB Atlas 8.6ms	C104 0004	\$699	C104 0054	\$759
4300MB Atlas 8.6ms	C104 0005	\$899	C104 0055	\$959



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7200 RPM • 1024K CACHE

4.3GB

Internal Atlas C104 0005

\$899



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CLUBMAC CD-ROM DRIVES

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\$169

4.4X

C104 1700



C104 1400	ClubMac DUAL-Speed CD-ROM Drive.....	\$79
C104 1700	ClubMac 4.4X CD-ROM Drive.....	\$169
C104 1750	ClubMac EIGHT-Speed CD-ROM Drive.....	\$299
N024 1070	NEC MultiSpin 4Xc 7 Disc Changer.....	\$339



CLUBMAC TAPE BACKUP

CLUBMAC TAPE BACKUP DRIVES

C104 0901

\$429

4-8GB

TWO Year Warranty



BUNDLED WITH Retrospect v3.0 Backup Software



C104 0901	4-8 GB MiniSCSI w/o cartridge.....	\$429
C104 1300	2 GB ThunderDAT.....	\$749
C104 1301	4-8 GB CompressionDAT.....	\$899
C104 1302	4-8 GB PerformanceDAT.....	\$1079



REMOVABLE STORAGE



iomega Jaz Drive

1.0GB



\$599.99

i404 1015	iomega Jaz Cartridges (1GB Single) ..	\$119.99
i404 1017	Jaz Cartridges (1GB 5 pack) ..	\$479.99

Includes One Cartridge!

i404 1014

iomega Zip Drive

Includes One 100MB Cartridge!

100MB



i404 1006	iomega Zip Cartridges (100MB) ..	\$19.99
i404 1011	Zip Cartridges (3 pack) ..	\$49.99
i404 1010	Zip Cartridges (10 pack) ..	\$149.99



\$199.99

i404 1010

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- ClubMac hard drives include all cables, cards, leads, and brackets necessary for use with the Macintosh you specify. ClubMac formats all hard drives and installs Apple System 7.1 software, Charismatic Anubis, and PowerNerve I.E.
- External drives include a Double Shielded, twisted pair 25-50 SCSI cable.
- ClubMac honors all original equipment manufacturers warranties. ClubMac will repair or replace drives at its discretion. Drives returned within first 30 days of purchase are replaced with a new unit.
- All ClubMac hard drives include a 30 day money back guarantee. Your risk is the cost of shipping.

MONITORS & GRAPHIC CARDS

radius

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Introducing... the highest resolution PCI board available for the Macintosh - The ThunderPower 1920. This new generation of PCI cards is the result of years of experience accelerating QuickDraw for the Macintosh Platform.

NEW PRODUCT

- 1920 x 1440 resolution
- the highest available
- Adobe Photoshop and Illustrator acceleration
- Hardware Pan and Zoom
- On the fly Resolution and Bit Depth Switching
- New software for Thunder Dynamic Desktop™ - Double the performance

Radius PrecisionColor 8/1600 PCI Card (R013 1069) \$349
Radius Thunder 30/1600 PCI Card (R013 1071) \$999
Radius ThunderColor 30/1152 PCI Card (R013 1072) \$1599

Radius PrecisionView 21 Display

- FEATURES**
- Resolution up to 1600 x 1200
 - 21" 25mm high performance Diamond/Triton display
 - Color management support for AGFA FotoTune 1.0 & 2.0, Apple ColorSync 1 & 2, EFiColor, and Kodak Precision
 - 30mm Dot Pitch
 - Energy Star Compliant



Radius PrecisionView 21 Display System (R016 1032) \$2399

Radius PressView 21SR Display System

- FEATURES**
- 21" 25mm high performance Diamond/Triton display
 - Light-absorbing "Stealth" coat eliminate the reflection from users
 - Includes ProSense Display Calibrator, ColorShield™ Hood and Display management software 1.6.5
 - Color management support for AGFA FotoTune 1.0 & 2.0, Apple ColorSync 1 & 2, EFiColor, and Kodak Precision



Radius PressView 21SR Display System (R016 1034) \$3299
Radius PressView 17SR Display System (R016 1031) \$1999

MultiScan 175FI

- FEATURES**
- 16.0" Viewable image size
 - .25 mm Aperture Grille Pitch
 - Max Macintosh Resolution: 1024 x 768 75Hz
 - On screen display of digital screen controls
 - Macintosh Adapter included
 - 3 Year Warranty parts and 2 Year CRT

SONY



Sony MultiScan 175FI (S106 1018) \$915
Sony MultiScan 175EI (S106 1019) \$1024

21" MultiSync XE21

- FEATURES**
- 21" diagonal flat square technology
 - 13.8" Viewable image size
 - Mac Res: 640 x 480 NI 1024 x 768 NI
 - Fine 0.28mm dot pitch
 - Monitor Manager
 - AccuColor Digital controls
 - Energy star compliant for true energy savings



NEC 21" XE21 (N026 1010) \$1699
NEC 21" XP21 (N026 1011) \$1999

17" MultiSync XV17+

- Large Screen performance at an affordable price**
- Perfect entry level business, small office/home office, home education/entertainment
 - 17" diagonal flat square display
 - 15.6" Viewable image size
 - Mac Res: 1024 x 768 NI
 - PC Res: 1280 x 1024 NI
 - Fine 0.28mm dot pitch
 - FullScreen capability
 - On-Screen Manager



NEC 17" XV17+ (N026 1032) \$799
NEC 15" XV15+ (N026 1031) \$469

PRINTERS

EPSON Stylus COLOR Pro

- Incredible 720 dpi color printing, optimized with special coated paper
- True black laser quality text
- Pantone Matching
- Postscript upgradeable
- Text print speed up to 3ppm, color 1ppm
- Cross-platform compatibility
- TWO Year Limited Warranty



EP047 1019 \$499

Stylus COLOR Pro XL

- Prints up to 12.5" x 18" full bleed in Photo Quality color
- 720 x 720 dpi photo quality with Microdot technology
- True black laser quality text
- Pantone Matching
- Postscript upgradeable
- Network option available
- Text print speed up to 3ppm, color 1ppm
- Cross-platform compatibility



EP047 1022 \$1799

SCANNERS

AGFA Arcus II

- Single pass, High speed scanner
- 600 x 1200 dpi resolution
- 36-bit color scanning
- Transparency Module
- Includes: Adobe Photoshop, AGFA FotoLook scanning software FotoTune LE for color management



A055 1001 Agfa Arcus II Desktop Professional Scanner \$1995
A055 1011 Agfa StudioScan IISI \$699

EPSON ES1200C Pro

- 600 dpi optical resolution, and up to 4800 dpi (via interpolation)
- 30-bit color scanning
- Pro Package includes: Adobe Photoshop, Scanlastic, KAI's PowerTools, SCSI cable



EP045 1003 ES1200C Pro-MAC Color Scanner Full Package \$1179
EP045 1007 ES1200C LE-MAC Color Scanner w/Scanlastic \$949
EP045 1013 ES1000C LE-MAC Color Scanner \$735

PERIPHERALS

WACOM ARTZ II 6"x8" GRAPHICS TABLET

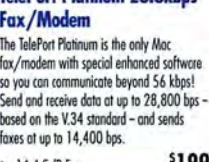
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W010 1028 \$298

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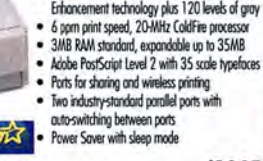
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- Power Saver with sleep mode



HP047 1030 HP LaserJet 5MP Printer \$1045

HP DeskJet 855CXI InkJet Printer

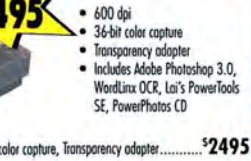
- FEATURES**
- COLOR PRINTER
 - Dual I/O for either PC or Mac connect
 - Black print speed up to 7ppm
 - Color print speed up to 3ppm
 - Handles plain and special papers, transparency film, and envelopes



HP047 1065 HP DeskJet 855CXI InkJet Printer \$499

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- Transparency adapter
- Includes Adobe Photoshop 3.0, WordLine OCR, Kai's PowerTools SE, PowerPhotos CD



U010 1052 Powerlook II 36-bit color capture, transparency adapter \$2495
U010 1055 Vista S12Mac 33-bit color capture, 600 x 122 dpi \$799

U-Robotics 28.8 Sportster

- FEATURES**
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Comes with full featured Incat Software & 1 disk
This drive features packet recording, compatible with Retrospect CD-R driver kit.

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Comes with Pinnacle CD Creator Software & 2 disks

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All CD Drives include external drive, cable, & driver software.

NEC 4X 200ms	\$169
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NEC 6X 150ms	\$325
Plexor 6X 145ms	\$349
Toshiba 6.7X 120ms	\$295
Philips 8X 195ms	\$299
Plexor 8X 145ms	\$469
Toshiba 8X 145ms	\$429

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Pioneer 4X DRM-1804X	18Disk	300ms	\$1899

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NEC 4X	\$899
Sony 4X	\$959
Pioneer 4.4X	\$1199
Plexor 4.5X	\$1659
Teac 6X	\$1439
NEC 6X	\$1659
Plexor 6X	\$1899
Toshiba 6.7X	\$1499
Toshiba 8X	\$1999
Plexor 8X	\$2519



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All Optical Drives include external drive, cable, driver software, and 1 FREE cartridge.

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650MB PD ROM combination optical & 4XCD	\$509
2.6Gig Pinnacle Micro	\$1429
2.6Gig Maxoptix	\$1999
2.6Gig Hewlett Packard	\$2219

MEDIA

Tapes		2-4	5-9	10-29
QW3080	[QW3080]	\$32	\$27	\$25
4mm 90M	[DAT90M]	\$15	\$10	\$8
4mm 120M	[DAT120M]	\$27	\$22	\$20
8mm 112M	[DAT112M8MM]	\$15	\$10	\$8
8mm 160M	[DAT160M8MM]	\$23	\$18	\$16
Optical Disks		2-4	5-9	10+
128MB	[OP128]	\$21	\$17	\$15
230MB	[OP230]	\$21	\$17	\$15
650MB 512K	[VBR5B2]	\$51	\$47	\$45
650MB 1024K	[VBR5B4]	\$51	\$47	\$45
1.3GB 512K	[VBR5E2]	\$59	\$55	\$53
1.3GB 1024K	[VBR5E4]	\$59	\$55	\$53
2.6GB 512K	[OC2.6G1G512]	\$87	\$83	\$81
2.6GB 1024K	[OC2.6G1G1024]	\$87	\$83	\$81

SyQuest		44MB	88MB	100MB	135MB	200MB	270MB
44MB	[SQ400]	\$44	\$40	\$38			
88MB	[SQ800]	\$48	\$44	\$42			
100MB	[SQ310]	\$56	\$52	\$50			
135MB	[EZDISK]	\$26	\$22	\$20			
200MB	[SQ2000]	\$72	\$68	\$66			
270MB	[SQ327]	\$58	\$54	\$52			

Nomai (Syquest compatible)		44MB	88MB	100MB	135MB	200MB	270MB
44MB	[N450U]	\$34	\$30	\$28			
88MB	[N900U]	\$38	\$34	\$32			

Iomega		100MB ZIP	1Gig JAZ
100MB ZIP	[ZIP100C]	\$23	\$18
1Gig JAZ	[JAZC-1GIG]	\$99	\$95

Cleaning Cartridges		4mm	8mm
4mm	[DAT4MMCLEAN]	\$20	\$15
8mm	[DAT8MMCLEAN]	\$29	\$24

Miscellaneous		650MB PD disks	540MB MCD
650MB PD disks	[LMR650A]	\$58	\$54
540MB MCD	[MCD540P]	\$62	\$59

HARD DRIVE SPECIALS

		Internal	External
2 Gig	5400rpm	\$440	\$499
2 Gig	7200rpm	\$529	\$589
4 Gig	7200rpm	\$839	\$899
9 Gig	5400rpm	\$1720	\$1820
18 Gig (Dual 9 Gig external)		\$3525	

SCSI HARD DRIVES

SCSI	Speed	RPM	Brand	Model	Wty	Int	Ext
1050MB	9ms	5400	Seagate	ST31051N	3	\$350	\$410
1080MB	11ms	5400	Seagate	ST51080N	3	\$255	\$315
1280MB	12ms	5400	Quantum	FB1280S	3	\$265	\$325
2050MB	8.5ms	7200	Micropolis	MC4221	5	\$545	\$605
2050MB	8.5ms	7200	Micropolis	MC4221AV	5	\$605	\$665
2147MB	9ms	5400	Micropolis	MC4421	5	\$469	\$529
2147MB	9ms	5400	Seagate	ST32155N	5	\$555	\$615
2147MB	8ms	7200	Seagate	ST32550N	5	\$675	\$735
2150MB	8ms	7200	Quantum	XP32150	5	\$635	\$695
4290MB	8ms	7200	Seagate	ST51550N	5	\$999	\$1059
4294MB	8.9ms	7200	Micropolis	MC3243	5	\$859	\$919
4294MB	8.9ms	7200	Micropolis	MC3243AV	5	\$949	\$1009
4300MB	8.6ms	7200	Quantum	XP34300	5	\$889	\$949
9091MB	12ms	5400	Micropolis	MC1991	5	\$1749	\$1849
9091MB	12ms	5400	Micropolis	MC1991AV	5	\$1865	\$1965
9080MB	11ms	5400	Seagate	ST410800N	5	\$1889	\$1989

WIDE SCSI

2050MB	8.9ms	7200	Micropolis	MC4221W	5	\$629	\$735
2050MB	8.9ms	7200	Micropolis	MC4221WAV	5	\$690	\$800
2147MB	8ms	7200	Seagate	ST32550W	5	\$745	\$855
2150MB	8ms	7200	Quantum	XP32150W	5	\$679	\$789
4294MB	8.9ms	7200	Micropolis	MC3243W	5	\$949	\$1059
4294MB	8.5ms	7200	Micropolis	MC3243WAV	5	\$1035	\$1145
4294MB	8ms	7200	Seagate	ST51550W	5	\$1069	\$1179
4300MB	8.6ms	7200	Quantum	XP34300W	5	\$955	\$1065
9080MB	11ms	5400	Seagate	ST410800W	5	\$1999	\$2149
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9100MB	12ms	5400	Micropolis	MC1991WAV	5	\$1955	\$2105

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A2940MUW PCI, supports Ultra Wide SCSI, 15 Wide SCSI		\$299
ATTO		
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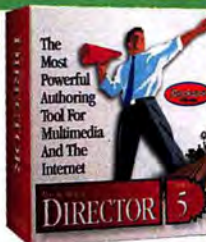
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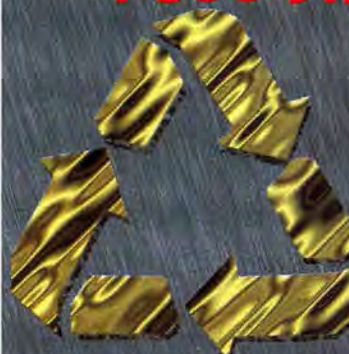
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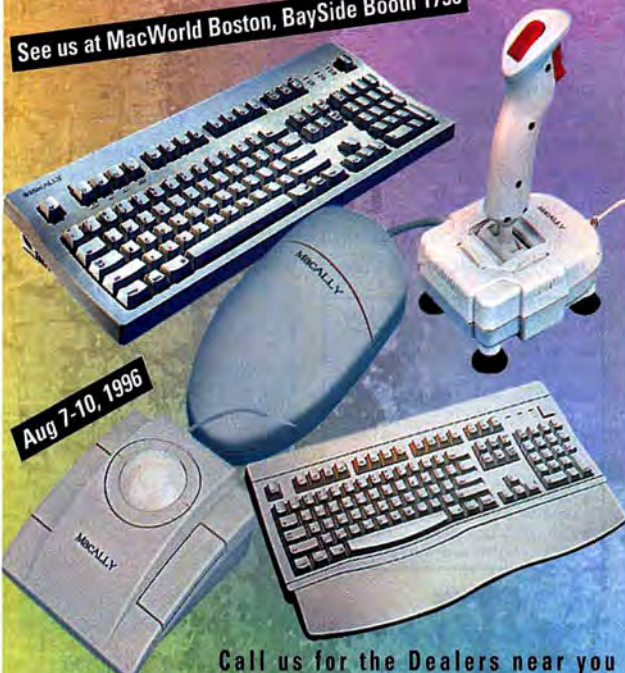
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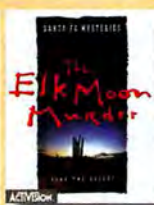
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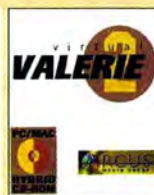
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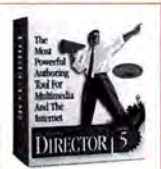
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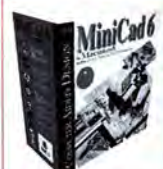
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ANDY IHNATKO

E-Mail from Elvis

IT SURPRISED ME TOO, but it turns out that AT&T wasn't lying in those commercials: This Internet thing is so miraculous that it is indeed possible to exchange e-mail with the dead. Elvis is doing well and complains that if it weren't for the blatant cheating of the team of Jack Benny and George Burns, he and Jimi Hendrix would have swept the All-Afterlife Contract Bridge Tournament this year. Babe Ruth apologizes to Red Sox fans everywhere but adamantly refuses to lift The Curse, and Ben Franklin has been posting on comp.sys.mac.comm almost daily with his problems getting Open Transport to run on his PowerBook 170.

All these private e-mail messages and public Usenet postings are real. See the return addresses: elvisp@uu.net, benfrank1776@aol.com, dababe@yankees.com? I hope that eliminates any lingering doubts. Why, I even have copies of each of these messages right here on my hard disk, along with a public posting from George Lucas revealing that the next *Star Wars* film will follow the plot of *The Bridges of Madison County* rather closely.

That last one I didn't have the guts to actually post, but I could have, as I did the others — unfortunately, forging (or “spoofing”) e-mail and Usenet postings is trivially easy.

For better or worse, the mainstreaming of e-mail has arrived with a misguided trust in e-mail security. Perhaps that's because there's yet to be a Chernobyl of spoofing — an incident so hairy and so attention-grabbing that every system administrator is immediately directed to ensure that it never happens again. For the most part, spooferers have seemed content with the odd prank or two or with engaging in cowardly Usenet slander under the name and address of some innocent party.

Nonetheless, the danger is real, and our own innocence about e-mail is what makes

us so vulnerable. If you were to receive a letter in the U.S. Mail from the president calling upon you to arm yourself and mass upon the Canadian border awaiting orders to invade, it would probably occur to you that *anyone* could put down 1600 Pennsylvania Avenue as



a return address. But if the message were sent via e-mail, there would be that momentary confusion. I mean, *silicon* was involved. That stuff ensures that my microwave popcorn is cooked to perfection at the touch of a button, so any message it transmits *must* be more secure than one sent on a piece of paper, right?

Tampering Techniques

If anything, such a message is far less so. In the far-gone days of my misspent youth, I forged e-mail on occasion (I hasten to point out that this fell under the umbrella of Exploring the Many Wonderful Undocumented Features of RPI's UNIX System). That was nearly a decade ago, but those same simple techniques still work. And if they don't work on a particular system, there are a dozen others that will — from tampering with UNIX mail software to using standard software to spoof a message's source-routing info to doing a simple Web search for an 18-line program that will return a list of vulnerable mail and news servers. It's a simple crime to commit and a complex one to solve; a clever spoofer can plant forgeries in such a way that only a team

of a dozen system administrators poring over reams of activity logs could trace the message.

We do have a couple valuable weapons on our side: rampant paranoia and the stupidity of the unsavory element of society. Before your boss's angry and out-of-the-blue termination notice causes you to reply with a message in which the word *orifice* is prominently featured, check the message header (which most mail readers hide unless you specifically ask to see it). If your cyber pink slip was transmitted from Boston to New York by way of Delaware, Murmansk, and Kyzyl, you might be looking at a forgery. Your system administrator might be able to spot strange anomalies in the message header that you'd never notice. Check the time stamps to see if they match up with the sender's most likely working hours. Look for oddball characters in the user-name portion of the sender's address (andyi287aa@world.std.com); some spoofing techniques require that the address be unique.

Also, check the “organization” line and trust, for instance, that Bill Gates knows there's only one *f* in *Microsoft*. Your only *bulletproof* protection, unfortunately, is to encrypt all your e-mail with PGP software (slide on over to http://www.eff.org/pub/Net_info/Tools/Crypto/ for your copy) and publish your “public key” — encourage your circle of pals to do the same. Unlike most other popular encryption schemes, PGP offers *two-way* security; if the receiver decrypts your message with your public key, then that person can rest assured that only a sender who knows the *private* key — you — could have encrypted it.

Still and all, your second-best defense will always be a healthy and mature skepticism in the face of Truly Suspicious-Sounding E-Mail; your finger should be poised over the panic button whenever people invite you to send them your password or credit-card numbers. The *best* defense, of course, is to have a tortuous Ellis Island name such as mine. Oh, the nightmares I've dodged thanks to poorly forged letters signed *Andy Ikhanko* . . .

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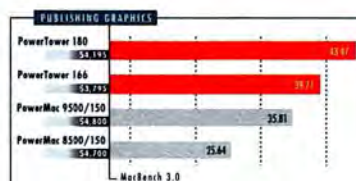
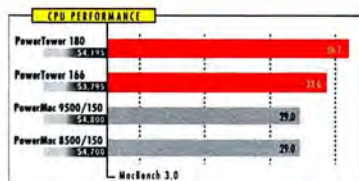
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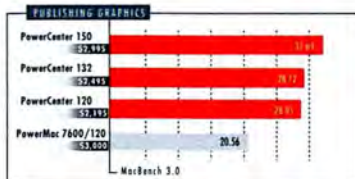
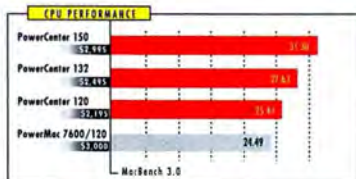


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