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Ultrafast Macs

Zoom!

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Here's Why Power Computing Is The Best Mac OS

Geeks like Jean Bélanger of Metrowerks are our most demanding customers.

Geeks provide the answers, fix problems, and recommend which systems to buy. Geeks understand things like bus speeds and code. They're people like Jean Bélanger (*shown on previous page*) and his team of alpha geeks at Metrowerks (they write the code that other geeks use to write *their* code).

It is because of geeks and their overwhelming endorsements that Power Computing has become the dominant Mac OS systems manufacturer.

Geeks buy a system because of its features.

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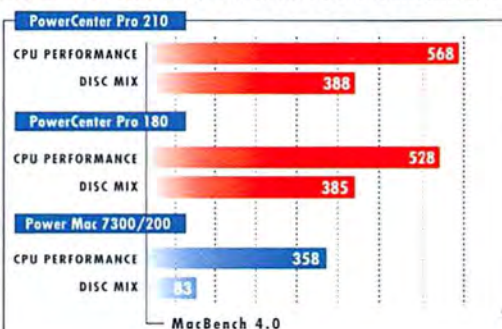
easy to see why we're the fastest-growing computer company in the world. We've been the technology leader since we first began shipping systems. We were first, and we're still the only Mac OS manufacturer to design our systems with:

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- a huge 1 MB level 2 cache
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—MACUSER MAGAZINE

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— MacUser Magazine July, 1996

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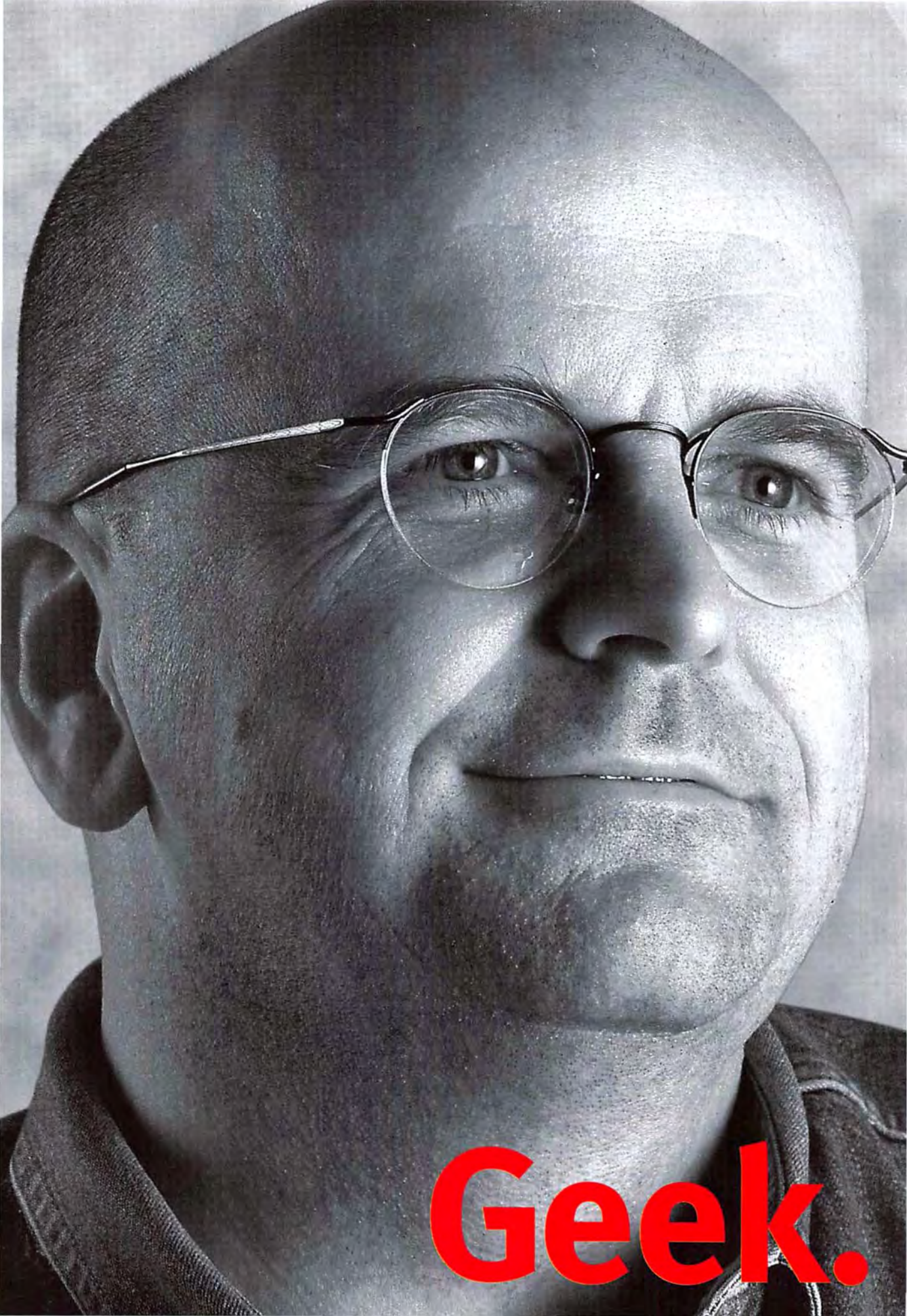
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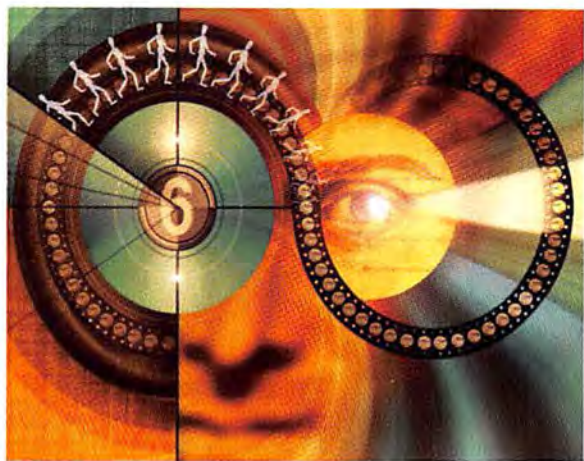
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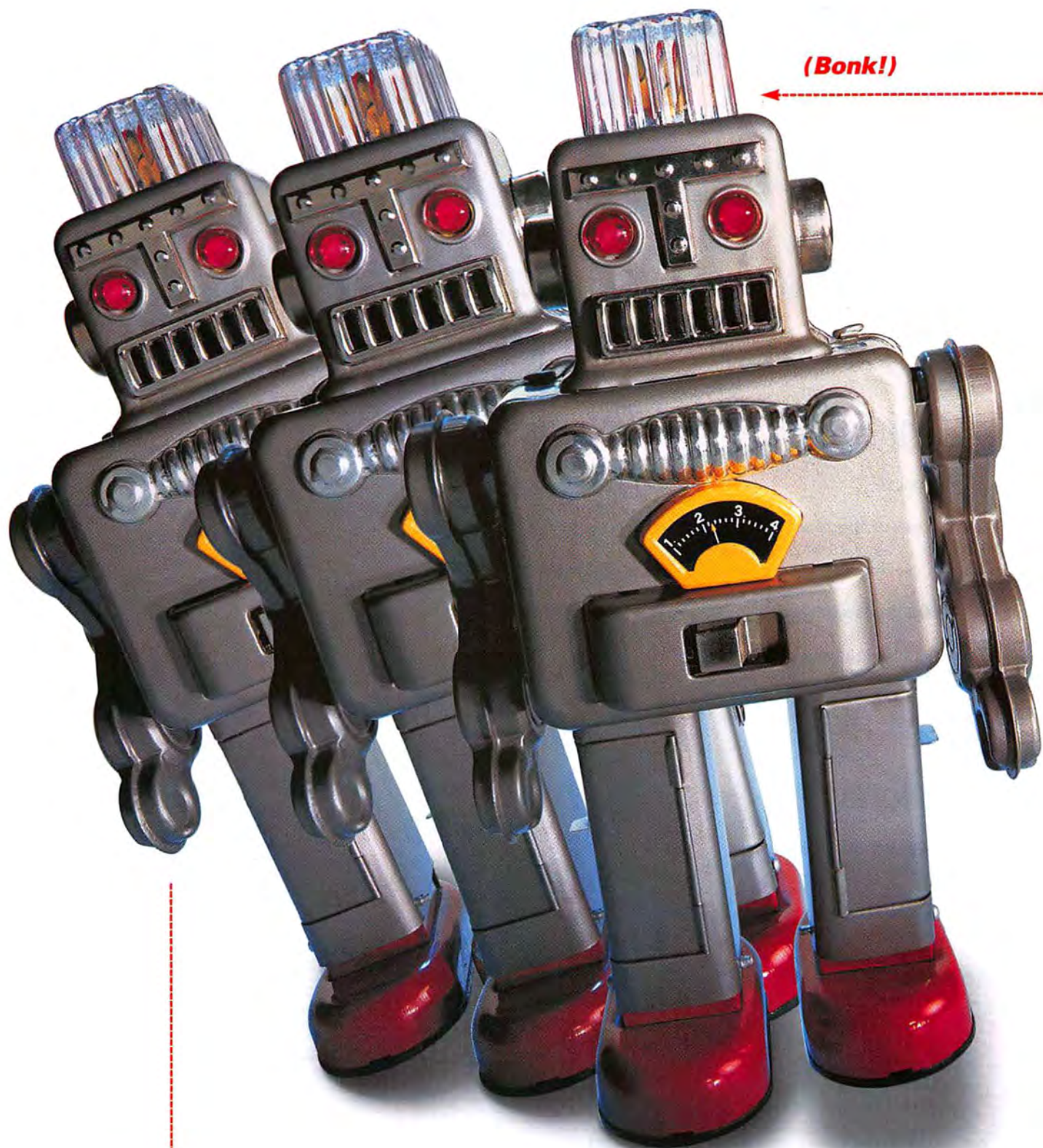


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IDG June 1997, Volume 14, Number 6 Macworld (ISSN 1041-8647) is published monthly by Macworld Communications, Inc. Editorial and business offices: 501 Second St., San Francisco, CA 94107, 415/243-0909. Subscription orders and inquiries should be directed to 800/288-6848 or 303/604-1465. Subscription rates are \$30 for 12 issues, \$60 for 24 issues, and \$90 for 36 issues. Foreign orders must be prepaid in U.S. funds with additional postage. Add \$18 per year for postage for Canada and Mexico subscribers. Add \$69 per year for postage to all other countries. Periodicals postage paid at San Francisco, California, and at additional mailing offices. Postmaster: Send address changes to Macworld, P.O. Box 54529, Boulder, CO 80322-4529. Printed in the U.S.A.

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(Timberrr!)



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Power Macintosh 8600

Warning: Don't try doing any of these things on a Windows PC.

See those things above? They're easy to do on a Mac. Try doing them on a Windows® PC, however, and they're not so easy. Unless, of course, you think it's easy to find extra time. And extra money. You see, a Mac comes with all the perfectly integrated hardware and system software you'll need to do what you want to do. So, right out of the box you'll be exploring the Net,^{*} creating movies and connecting to networks, CD-ROM drives, hard drives and more. Not so with a Windows PC on your desk. Why? Because even if your PC has all the adapter cards and drivers you need (not all of them do),

you may have to spend precious time learning about .DLL files and IRQ settings. And if you want to create multimedia that really moves, you'll have to add even more—most Windows PCs don't come with QuickTime®. No wonder the Mac is rated higher than Windows in ease of use, productivity and overall satisfaction.^{**} And that Macintosh® is used to create 64% of all sites on the World Wide Web.^{***} So, in case you find yourself thinking about buying a Windows PC, think again. You could be in for a shock. To learn more, visit us at www.apple.com.



*You know, of course, that you'll need an Internet service provider to start exploring the Net. **1996 Evans Research study. According to an October 7, 1996, WebWeek study of 33 professional web design firms. ***Web Design Firm: State of the Industry. ETE magazine, February 1997. © 1997 Apple Computer, Inc. All rights reserved. Apple, the Apple logo, AppleScript, AppleLink, ColorSync, Mac, Macintosh, Power Mac, Power Macintosh, QuickDraw and QuickTime are registered trademarks of Apple Computer, Inc. PowerPC is a trademark of International Business Machines Corporation, used under license therefrom. Iomega is a registered trademark and Zip is a trademark of Iomega Corporation. Microsoft and Windows are registered trademarks of Microsoft Corporation.

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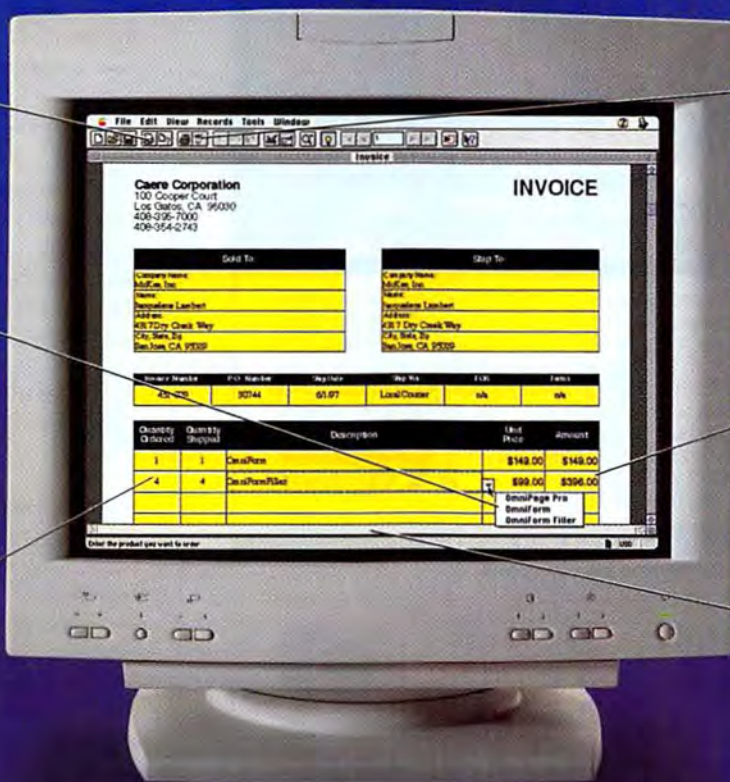
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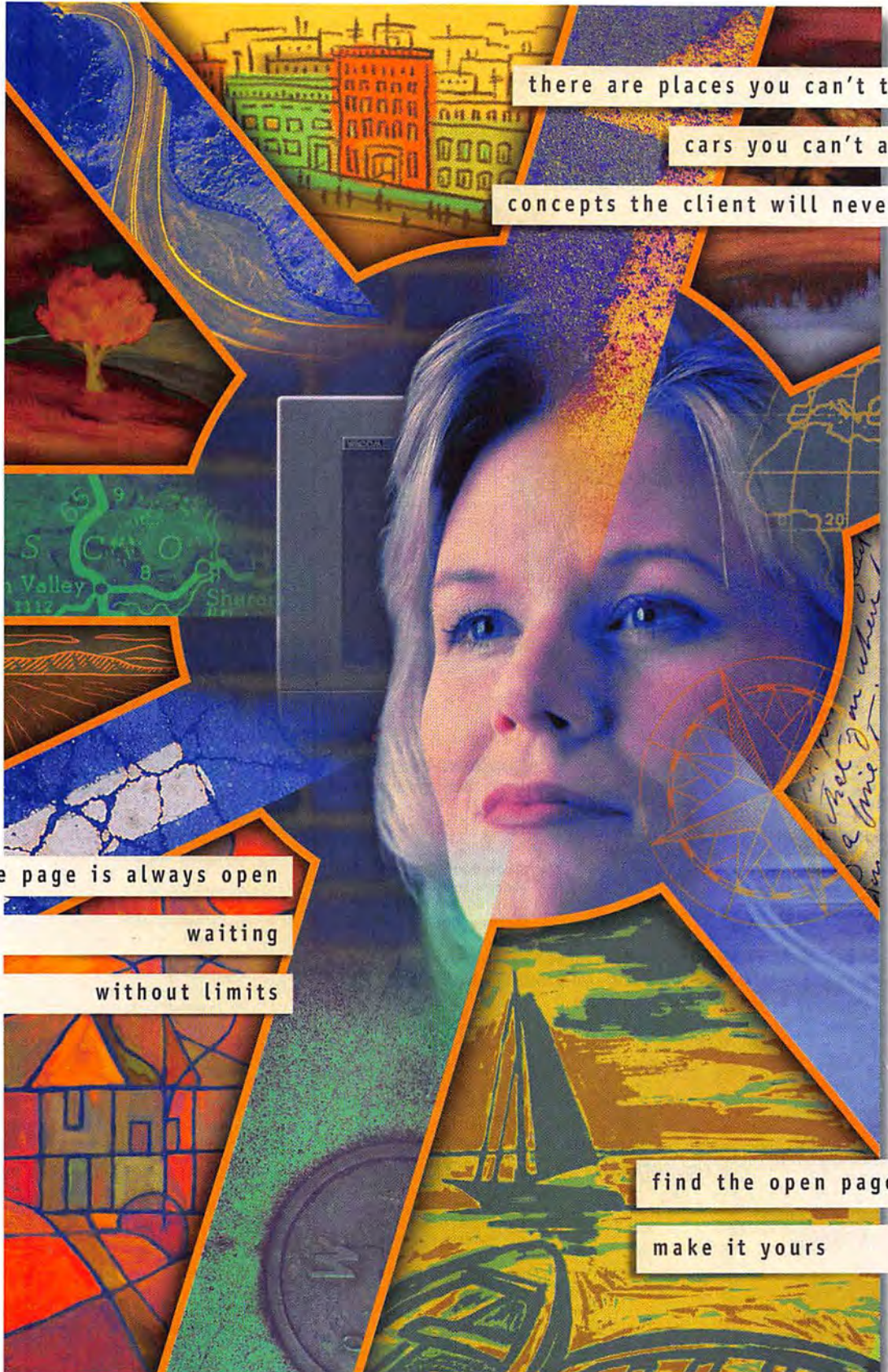
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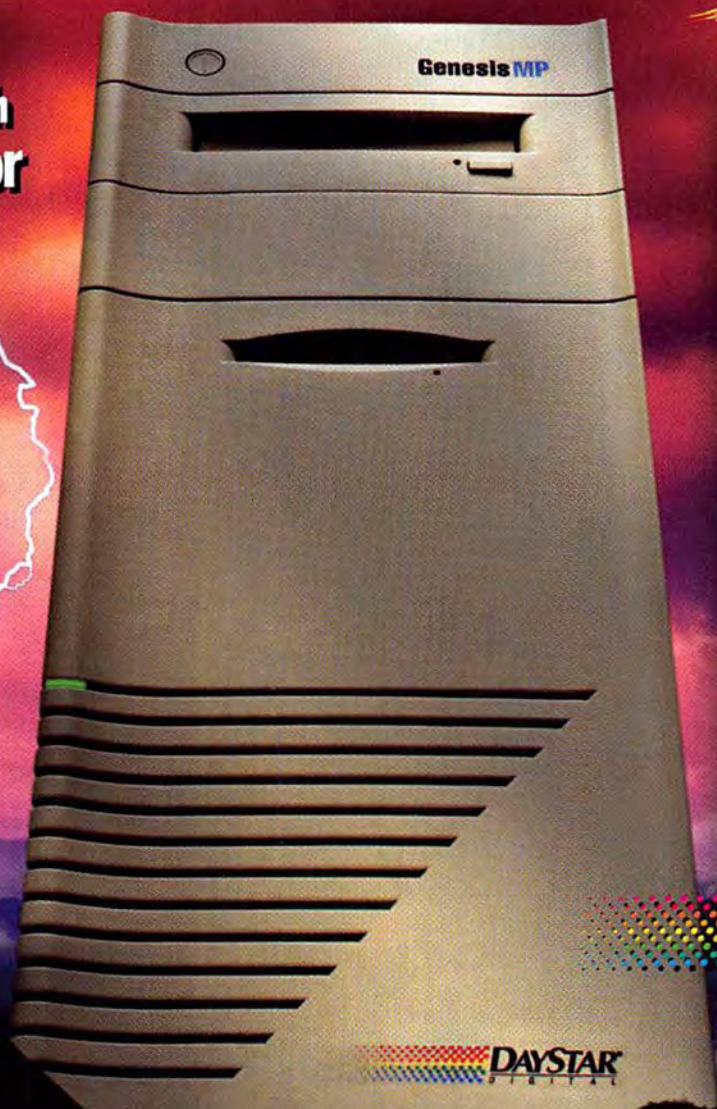
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Letters

A Computer for the Rest of Them

INSTEAD OF THE COMPUTER FOR THE rest of us, Apple has built a computer that the rest of us can't afford and is obviously marketing it to people who don't live in the real world ("The 20th Anniversary Macintosh," March 1997). If Apple wants to win back some of those millions of Windows platform users, it needs to offer better value. Instead of saying to me, "Apple is back," this pricey design is saying that Apple is out of touch with reality. I seem to recall another computer company that set standards and had a whole class of machines named after its models, only to have the clone makers erode its markets dramatically. Has history taught us nothing at all?

DAVID JENNINGS
Rogers, Arkansas

Macs Deserve Their Fair Share

AFTER READING "APPLE SLIPS AGAIN IN PC Market" on Macworld Online (<http://www.macworld.com/daily/daily.988.html>), I wrote to Dataquest to ask why it compared a single company, Apple, with a group of companies making PCs. I recommended that it include the Mac clones and give the public a more accurate representation of the Mac platform's market share versus PC market share.

I believe that the Mac platform has not lost any ground. Perhaps it has even made up some ground. I hope someone can compile the data on Mac-clone sales to give the public a better representation of the Mac market. Perhaps then buyers would not have to think twice about purchasing a Mac-platform machine.

LEE PEREZ
Boston, Massachusetts



Dataquest updated its research two weeks after it issued that first report, placing Apple's 1996 U.S. market share at 6.7 percent, in fifth place. When the clone makers' sales are included, the Mac platform's 1996 U.S. market share increases to 7.8 percent. This raises the platform to fourth place, behind Compaq, Packard Bell, and IBM. See "Clone Vendors Bolster Mac Market" (Macworld Online, <http://www.macworld.com/daily/daily.1040.html>) for more detailed information.—Ed.

That Next Step Is a Doozy

I WAS CONVERTED! IN 1994, I WAS ASKED to consider the Next platform over my then favorite Macintosh for a work project. I switched, for that particular project. Now, several years later, I am waiting for approval to purchase the machines and software for another similar application.

Let me tell you, the Next software and operating system have some benefits over the Mac OS—from little things like

the placement of screen scrolling buttons, to drag and drop from any application (before Mac had it fully in place), to real plug and play. I purchased a 270MB cartridge drive from a Mac software warehouse, received it, opened the box, discarded the software disk and SCSI cable, and plugged it into my Next with its SCSI cable, and I formatted my first 270MB cartridge within 30 seconds. No fuss, no muss. Incidentally, NextStep also recognizes Apple, Unix, and DOS disks and file formats without hesitation.

I am excited.

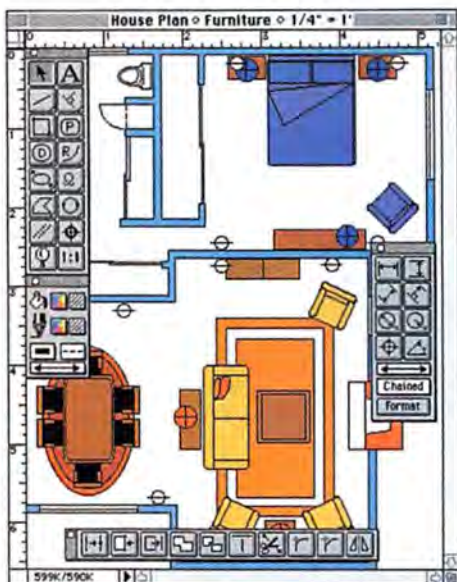
C. MCKENZIE
Jordan Valley, Oregon

FOR THE PAST FIVE YEARS I'VE SEEN Apple beat its loyal customer base to a pulp in what can only be described as aimless, mindless thrashing. The infamous IIvx price drop, spontaneously combusting laptops, OS delays, OS cancellations. . . . The list goes on.

Now Apple buys Next ("What's Next for the Mac OS?" *News*, March 1997). Granted, the Be OS deal was speculative, but Be seems to march to a different beat in much the same way that Apple did when it started, and Be seems to be further along in development. I have to wonder just how much work will need to be done to get the Apple-Next efforts to the same state. And as much as it's nice to see decisions being made, I don't know that Apple can wait a couple of years before its OS develops the ability to be competitive with the likes of Windows NT 4.0—and that's if the company sticks with this chosen game plan.

Then again, maybe this Next deal is a sign of things to come. Maybe it's finally a solid direction to stay with. I'd like to think so.

continues



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LETTERS

CORRECTIONS

- In the April 1997 issue, the *Star Rating for Nisus Writer (Reviews)* was correct as listed in the review, **★★★16.6**, not as it appeared in the table of contents.
- All PowerBook 1400's have a screen size of 11.3 inches (PowerBook Superguide, April 1997).
- In "Mac License Raises Questions," News, May 1997, we misspelled Tina Kenney's name. Additionally, since we published the May 1997 issue, PowerTools has stocked 150MHz and 200MHz CPU cards and is also now offering a \$49 internal/external SCSI cable as an option for its Infiniti Macs (see "Super Mac Values").

Of course I still look at that empty expansion slot in my IICI every once in a while and wonder.

DWIGHT PRIES
Wilton, New Hampshire

From the Desktop to the Silver Screen

THE MARCH 1997 *DESKTOP CRITIC* wrongly accuses screenwriters of being the people who misunderstand the way computers look and feel. In fact, we know computers better than most in Hollywood. We're the ones stuck behind our Macs, typing away, while the rest of the team is off playing with their lights and cameras. A screenplay can only say, "Schwarzenegger copies a disk from the computer." It is the director, production designer, and visual-effects staff who come up with the appearance of the fake operating system. No self-respecting screenwriter would ever write, "Schwarzenegger opens the secret file using a monochrome command-line interface."

In answer to your observation that Windows never seems to save the world, you should know that all the creative types in Hollywood use Macs. It's our preferred method of rescuing humanity.

BRIAN LINDAMOOD
Hollywood, California

A VIRUS CAN SPREAD FROM SIMPLY inserting a disk, but only on a Mac (*The Desktop Critic*, March 1997). Notice how your Mac puts up an icon for the disk shortly after you insert it. The Mac knows

that the disk is there and runs some code to update that status. That code can be patched to spread a virus. That was exactly what happened with the old WDEF virus that infected so many computers under System 6. Fortunately, System 7 was the cure.

DOUG SMITH
Loves Park, Illinois

When Two Plus Two Equals Five

IN YOUR "BEST OF SHOW" PIECE ON Power Computing's new PowerTower Pro 250MP, you write that it is "the Mac market's fastest multiprocessor system" (News, March 1997).

But I was running a 528MHz multiprocessor Mac a year ago! It was a Day-Star Genesis MP 132MHz quad-processor Mac. Today, that same machine is 300MHz faster than the PowerTower Pro 250MP. I've upgraded to an 800MHz Genesis MP by simply replacing the standard processor daughtercard slot with a new Genesis MP processor board holding four 200MHz 604ev chips.

ANDREW RODNEY
Santa Fe, New Mexico

Yes, if you multiply 132MHz by four, you get 528MHz, but that assumes that all four processors actually run full-out and have zero communication overhead. The reality is that four processors run about 2.2 times the speed of one, while two run at about 1.8 times the speed of one. Thus, the quad-processor 132MHz system should be equal to a single-processor system at 290MHz, while the two-processor 250MHz system should be equal to a 450MHz single-processor system—for programs that are multiprocessor-enabled. Programs that are not MP-enabled will run about 5 to 10 percent more slowly—that is, a 132MHz MP system will perform like a 128MHz non-MP system. For more on MP Macs, see the sidebar, "Picking the Right MP Mac," in "Fastest Macs Alive," in this issue.—Ed.

Bookmark Mayhem

I ALSO WENT ON A QUEST FOR A URL manager to help get my bookmarks under control (*Reviews*, March 1997). After reviewing a number of software packages, I settled on one readily available on Mac shareware sites but not reviewed in your article—Alco Blom's URL Man—*continues*

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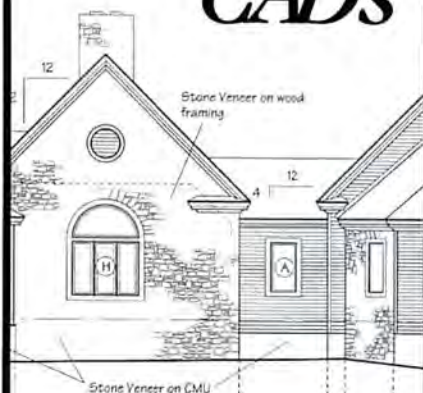
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20 June 1997 MACWORLD

LETTERS

ager (<http://urlmanager.macshareware.com>).

Like Aladdin Systems' CyberFinder, URL Manager uses a Finder-like interface. Unlike CyberFinder, it gives Netscape Navigator users the option of placing bookmark folders directly in the Netscape menu, removing the necessity of switching back and forth between programs. URL Manager has a number of "harvesting" options for gathering URLs from Web pages, bookmark files, and text files; export capabilities; customizable cut and paste options; a small (500K) memory profile; and a price that can't be beat (\$25).

In the month I've had URL Manager, I've not had a single unpleasant surprise from the software. Folks interested in getting a URL manager would be doing themselves a disfavor by not looking at URL Manager.

ERIC WIEBE

Durham, North Carolina

Yes, We Have No Wrist Rests

I'VE BEEN USING A MAC SINCE 1984, PRECEDED by an Apple IIe, a memory typewriter, and a regular typewriter. All told, I've used a keyboard for more than 25 years. Although my monitor is elevated to eye level, and I'm careful about my posture, I sit on a straight-backed dining chair my grandparents acquired around 1920. When my hands are positioned appropriately for touch-typing (fingers over the "home row"), my wrists are straight, both horizontally and vertically, with no stress on any part of my arms. Although I'm apparently way behind the times, I've never had the slightest symptom of any repetitive strain injury.

Perhaps all the hype about RSI is just that—hype—provided to us by marketers who want to sell products, and tort lawyers who want big verdicts.

KEN BECK

Spokane, Washington

It sounds like you're already doing all the right things, so I'd say that you're ahead of the times. But computer-related RSIs are a very real concern, as several unfortunate Macworld editors will attest. Although there are no guarantees either way—you may stay healthy even if you're not careful—it makes good sense to minimize your risk with simple measures like maintaining proper posture and taking frequent breaks. For more information, see "Safer Computing," December 1994.—Franklin Tessler, M.D.

Pricey PowerBook Power

CARY LU WROTE, "THE COST OF A POWERBOOK 165c battery should be no different than for other Macs—\$7 to \$15, as long as you install the battery yourself" (*Letters*, March 1997).

This is wrong. The PRAM battery on the 165c is directly connected to the interconnect board and is not available unless you purchase that board. In Canada, that board costs \$134, around U.S.\$100; it also needs to be installed in the machine, which takes 15 to 20 minutes with testing.

At U.S.\$145, this is not overcharging—it's simply the cost of doing business. The problem is that Apple does not sell just the battery itself, and that cost has to be passed back to the customer. If anyone is overcharging, it's Apple.

I work at an Apple dealer and I hate to see us get painted with a wide brush.

DARRON FROESE

Calgary, Alberta, Canada

You're right—Apple doesn't sell the battery itself, which is why most service outlets quote such a high price. But you can solve the problem cheaply. You should be able to purchase the battery from any well-stocked battery distributor. And as long as you supply the battery, many service outlets will be willing to do the repair for you.—Ed.

It's a Mad, Mad, Mad, Mac World

WITH ALL THE PUBLICITY ABOUT Apple's troubles, I was wondering if and how it was affecting you there at *Macworld*. Despite all the stomach-churning events of the last couple of years, I find it amazing how you guys keep your composure and continue to present frank and unbiased reports and reviews. It is much appreciated. Thanks, *Macworld*, and keep up the great work!

KENNETH LÓPEZ

New York, New York

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

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This EPS image was printed on an inkjet **without** StyleScript



This EPS image was printed on an inkjet **with** StyleScript

See?

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was printed on a
color inkjet printer
without StyleScript



This Encapsulated
PostScript (EPS) image
was printed on a
color inkjet printer
with StyleScript

See for yourself what a startling difference StyleScript makes on an inkjet printer

StyleScript turns your inkjet into a genuine Adobe PostScript printer



If you've been using your inkjet to print EPS graphics, you've probably seen something called the "jaggies". Although your inkjet is a very good quality color printer and very affordably priced, it is not PostScript. This means it will print your photos beautifully but is unable to print EPS clip-art or logos. The printed results will be jagged and certainly not what you were expecting. You need PostScript printing but PostScript printers are very expensive. That's where the StyleScript solution comes in.

StyleScript is a software package that will upgrade your inkjet into a PostScript printer, at a fraction of the cost. With StyleScript installed, you can print *any* image on your inkjet with great results. That's because StyleScript is genuine Adobe Level 2 PostScript software. Your documents will print sharp everytime — no surprises and no "jaggies". The samples above and on the facing page show what a big difference StyleScript will make on your output. And the best part — StyleScript costs less than \$100.

The Benefits of StyleScript

Once you have installed StyleScript, you'll see the improvements in your printed documents right away:

- ◆ EPS clip-art and logos will be crisp and clean
- ◆ PostScript fonts will be sharp at any size or angle
- ◆ color will be more accurate
- ◆ screens/dither patterns will be better looking

Who uses StyleScript?

StyleScript is perfect for anyone who owns an inkjet printer and needs to print sharp looking graphics. That includes:

- ◆ home or education users who want to use EPS clip art on everything from house party invitations to t-shirt graphics
- ◆ graphic designers who want an inexpensive and accurate personal proofing system
- ◆ business users making presentations on paper, transparencies, or film

Supported Printers

StyleScript supports a wide range of inkjet printers from Apple, Epson, and Hewlett-Packard.

**Get StyleScript and see the difference
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Web: www.stylescript.com

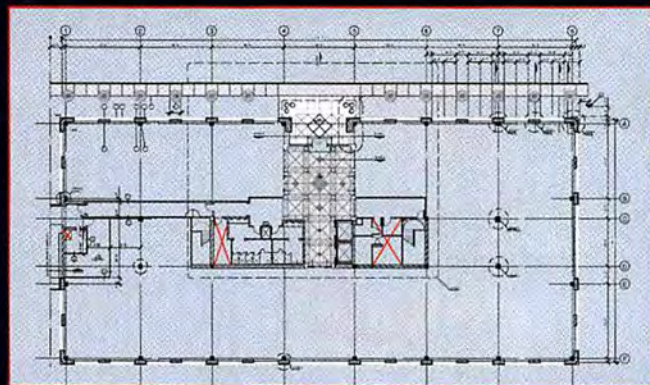
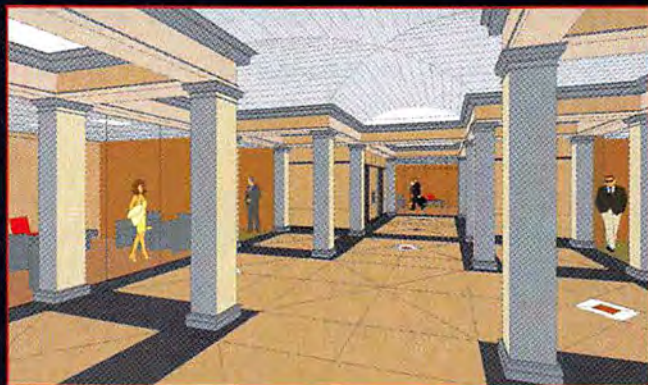
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The Easiest, Most Cost-Effective



Way to Design

—Audience Vote at the Designers CAD Shoot-Out

The general-purpose MiniCad went toe-to-toe against industry-specific CAD programs nearly six times as expensive—and came out on top—at the first-ever Designers CAD Shoot-Out for Architectural CADD Systems. In this advent of “architecture as a spectator sport,” the audience at Boston’s World Trade Center awarded MiniCad 6, fittingly, six first-place awards:

- Most Cost Effective
- Easiest to Use
- Best at Cross-Platform Operation
- Best Floor Plans
- Best Elevations
- Best Sections

MiniCad also placed a close third in the Overall Winner category (garnering 21% of the audience vote compared to Aris 25% and ArchiCad’s 24%), beating out AutoArchitect, Microstation Triforma, AllPlan, Architrion, and DataCAD. Even more impressive: MiniCad was the only software program running on both a Macintosh and a Windows machine during the event. This recent success is not surprising. For years MiniCad has been the top-selling CAD program on the Macintosh, winning industry

awards worldwide. And the reviews for the recently released Windows version have all been emphatic.

To find out more about the CAD Shoot-Out or how professionals in more than 80 countries have used MiniCad—designing everything from a guitar to a zero-gravity manufacturing device; building houses, luxury high rises, shopping centers, and hockey arenas; planning the stage set and lighting for worldwide Metallica tours; even helping reconstruct Shakespeare’s historic Globe Theatre—check out our web page (www.diehlgraphsoft.com) or call 1-800-413-0935.

MiniCad has a suggested retail price of \$795, and it comes with 18 months of free tech support and a 30-day money-back guarantee from participating dealers. MiniCad 6 supports Windows 95, NT, 3.1, and Macintosh OS.

Diehl Graphsoft Inc

Software for Today’s CAD Professional

MiniCad is a trademark of Diehl Graphsoft, Inc.
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Above building designed by David A. Brulink, Herring & Trowbridge Architects.

MiniCad 6 —The only thing small is the price.

Circle 46 on reader service card

State of the Mac

by Adrian Mello

Should Apple Stop Making Computers?

APPLE'S PROSPECTS AS A SOFTWARE-ONLY COMPANY

EVERY TIME APPLE HAS problems, industry watchers exhort it to jettison its hardware business and focus on selling software. You're likely to hear this again in the wake of recent layoffs (see "Amelio Carves a New Apple," *News*, in this issue). Although Apple plans to continue selling both hardware and software, it's still an interesting idea worth exploring.

What makes Apple special is the Macintosh Operating System, often referred to as Apple's crown jewel. It doesn't matter what computer the Mac OS runs on as long as that computer preserves the Mac's legendary ease of use and appeal to creative types. Most of us would concede that the OS is what makes the Mac special, now that we've seen Mac clone companies offer terrific hardware alternatives.

Why should Apple stop selling hardware? Apple is having a difficult time managing the complexity of multiple businesses—it sells computers, software, peripherals, and Newtons. Apple as much as admitted this during the recent restructuring—the professed aim of which was to focus the company on its core businesses, computers and system software.

Another argument is that Apple isn't good at hardware. Granted, Apple makes wonderful computers, but it spends too much money on manufacturing, clueless marketing, and inept forecasting. There are signs, however, that Apple is beginning to fix some of these problems by simplifying its product line, increasing its reliance on industry-standard components, and refocusing its marketing message on product benefits.

The Software-Only Scenario

To evaluate these arguments, you have to consider how much money Apple would make as a software-only company and whether it could complete such a sweep-

ing metamorphosis successfully. A simple exercise in math reveals a lot about what it would mean to Apple to give up its hardware business. Keep in mind that this is highly speculative and is based on my best guesses on certain figures. I've tried to err on the side of optimism—picking numbers for what I believe is a best-case scenario for a software business.

Let's assume that business is brisk and clone companies are making and selling 5 million computers a year. Let's also assume that Apple makes a \$100 licensing fee for every Mac sold. *Macworld's* sources

in revenues a year. Even if a third of all users upgrade annually, that only equals \$900 million in revenue a year.

Smaller but More Profitable

Apple's combined licensing and upgrade business adds up to between \$1 billion and \$1.4 billion a year. Nothing to sneeze at, but a far cry from the \$8 billion Apple is projecting for this year. Software sales produce little revenue compared with selling computers. It's obvious that Apple would be a very different company, with fewer employees and facilities.

Of course, there are nowhere near 5 million clones shipping. It would take at least two years for the current clone makers to build the necessary infrastructure to produce and sell 5 million computers. So at the very least, Apple must continue to sell a lot of computers to sustain the Mac market until Apple completes its transformation into a software company.

If Apple could manage the transition, it might actually be more profitable than it is now. Licensing is a great business with relatively few costs other than research and development. Upgrades are less profitable than clone licenses because of the significantly

higher costs of packaging, distribution, sales, and marketing. However, both licensing and upgrades are more profitable than selling hardware, which has high manufacturing, distribution, and inventory costs.

Again, the real trick is in managing this transition. Apple has to find a way to be more profitable as a hardware company. If Apple can do this, maybe it won't have to surrender its hardware business. I'll explore those options next month. In the meantime, I'd love to hear what you think Apple's strategy should be, at mello@macworld.com. **m**



say the current fee is closer to \$50, but Apple is renegotiating fees upward (see "Apple's Clone Support in Question," *News*, in this issue). For my estimate, I'll stick with the higher fee, which would mean that licensing would produce \$500 million a year in revenue for Apple.

Apple would also make money on system software upgrades. It's difficult to say how many users would upgrade, but let's say that a quarter of the Mac's installed base of 30 million computers would be willing to upgrade the OS once a year at \$80 apiece. That amounts to \$600 million

The Mac OS. It *does*. It *will*. *you can.*

At Apple, we started with one simple goal: to make it easier to do the things you want to do. Over the years, the Macintosh® operating system has helped millions of people do just that, by providing a simple, intuitive approach that makes all aspects of computing easier. But even more impressive than what a Macintosh can help you do today is what it will help you do tomorrow.

It does more than ever.

So what does the future of the Mac OS look like? For a glimpse, check out our newly released Mac OS 7.6. It's faster than ever before—so you can start your Mac, launch applications, save files and print up to 40% faster.



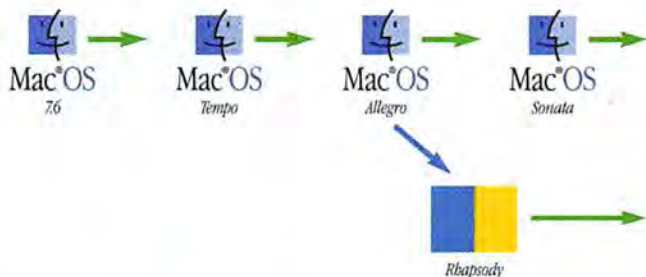
The Mac you buy today won't be obsolete tomorrow. Because Rhapsody will be compatible with all currently shipping Mac OS systems.

Connecting to the Internet is easier too. With the latest version of the Apple® Internet Connection Kit (it includes Netscape Navigator™ 3.0 and other Internet tools), you're one step away from accessing the Net. Or, if you prefer, you can use AOL or our own Apple Cyberdog™—they're included with Mac OS 7.6 along with TCP/IP and PPP.

Mac OS also has the latest version of Apple QuickTime®, the industry standard for multimedia creation and delivery. And it makes upgrading easier: with one CD-ROM and a streamlined installation process.

Intrigued? Then you'll love what comes next. Because we're hard at work on the next version of the Mac OS, code-named Tempo. Right from the start you'll notice a new look, with beveled buttons, icon drop shadows and other 3-D enhancements to the desktop. Tempo will dramatically improve system responsiveness by incorporating multitasking, multi-threaded functionality and native PowerPC™ capabilities directly in the OS. So you can run multiple applications more smoothly, and launch new applications while files are copying in the background. Tempo extends our Internet capabilities with easy

The Mac OS Report. One in a Series.



Apple's complementary operating systems—Mac OS and Rhapsody—allow you to choose the system that best meets your needs. They also allow you to decide when it's time to make the transition.

setup, personal web sharing and built-in Java™. And it will help you be more organized, by reducing on-screen clutter with spring-loaded folders and pop-up windows for frequently used items.

Of course, Tempo also paves the way for further updates to the Mac OS. Because there's much more to come.

It will be the NeXT thing.

When we began defining a new software architecture that would take us into the future, we had two clear objectives: to enhance our traditional strengths, and to create an operating system that would leapfrog the competition, setting standards into the next century.

Enter NeXT.™ By acquiring NeXT Software and adopting their kernel-based architecture, Apple can offer advanced system services such as true multitasking, protected memory and symmetrical multiprocessing. We have also strengthened our position in client-server and Internet/Intranet markets. And NeXT's object-oriented development environment and powerful tools such as WebObjects™ and Enterprise Objects Framework™ give us clear advantages in the creation of new solutions.

Merging NeXT and the Mac OS will create a next-generation OS that will give our competitors something new to catch up to. It will be an OS that helps developers create breakthrough applications by allowing greater experimentation and efficient reuse of code. It will include the best of our graphics technologies, such as ColorSync® and QuickDraw® GX. And we plan to adopt the Adobe® PostScript® imaging model as well. It will fully support the QuickTime Media Layer. It will provide industrial-strength reliability, performance and ease of use. And it will be an ideal platform for publishing, multimedia and Internet applications yet to come.

What is the name of this new OS? Its code name is Rhapsody.

It will be an Apple thing.

Rhapsody will leave other operating systems in the dust. But not Apple customers. To start with, Rhapsody will enhance the general look and feel of today's Mac OS interface. It will support all currently shipping Mac OS-based systems. It will run the vast majority of existing Mac OS applications by hosting the complete Mac OS on the Rhapsody kernel.

In short, Rhapsody will run your existing applications and utilities, read your files, recognize your current fonts and extensions and play your movies and sounds. Rhapsody will deliver the kind of technology you expect from Apple. The kind of technology that appeals to anyone who requires the highest performance for publishing, Internet and multimedia authoring, and scientific and technical work. The kind of technology that appeals to people who like to, well, get things done.

You can.

What does all this mean? It means you can do everything you're used to doing now, plus a few things you might not yet imagine. It means you can buy a Mac today and not worry about its compatibility with Rhapsody tomorrow. It means Rhapsody won't just be a new way to use a *Macintosh*—it will define an entirely new way to use *computers*. You can learn more by visiting us at www.macos.apple.com or by calling 800-538-9696 for information by fax.



The world's most intuitive and easy-to-use operating system will remain just that. With regular system updates and enhancements, the Mac OS will take you well into the future.



The acquisition of NeXT provides Apple with additional strengths in performance, reliability, network management and rapid application development.



Mac OS 7.6 extends Apple's leadership in graphics and multimedia by bringing together the latest versions of Apple QuickTime technologies, collectively known as the QuickTime Media Layer.

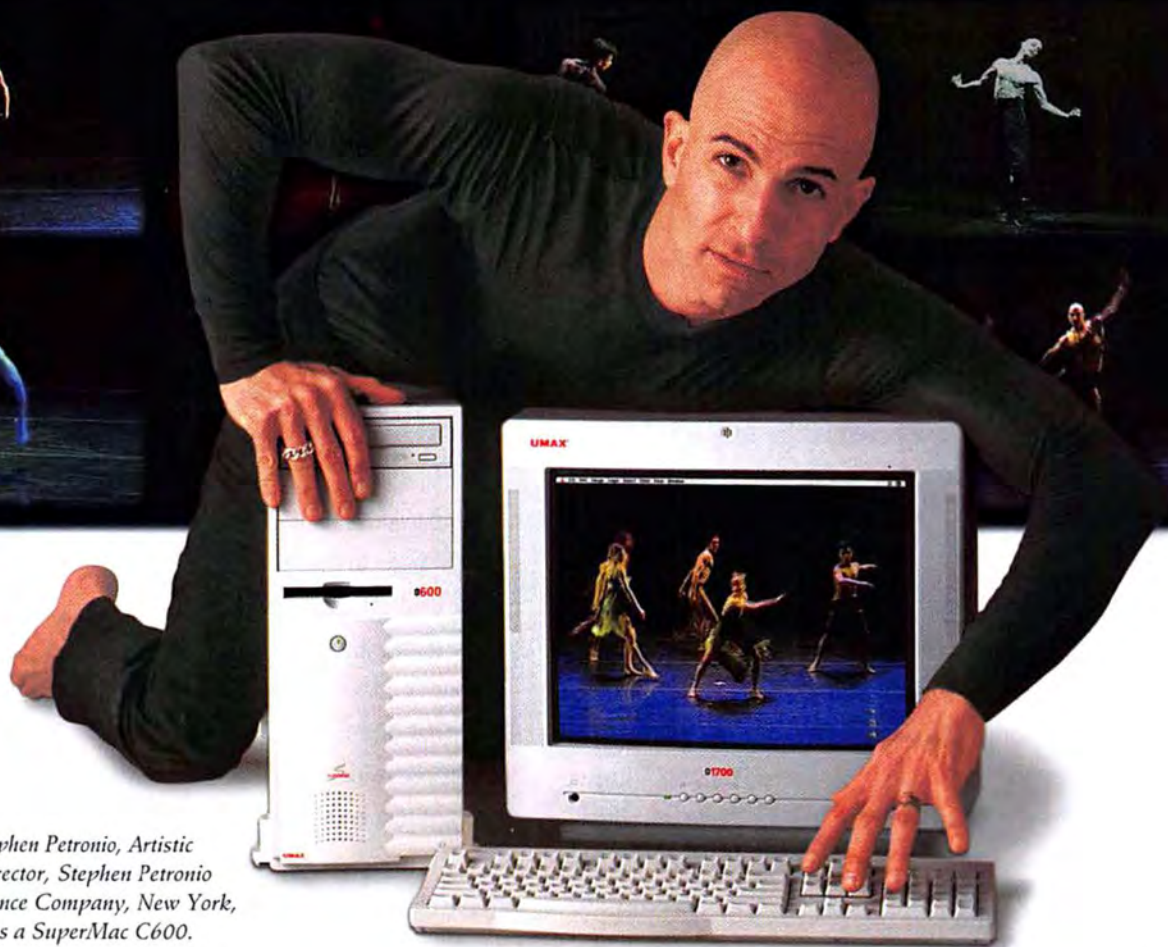


Adobe PostScript

Apple intends to adopt the Adobe® PostScript® imaging model for Rhapsody and transfer the best of our existing graphic technologies, including ColorSync and QuickDraw GX.



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*Stephen Petronio, Artistic
Director, Stephen Petronio
Dance Company, New York,
uses a SuperMac C600.*



You'd be amazed what people are using SuperMac C600 computers for these days. Sure – they're still great for graphics, spreadsheets, word processing and web surfing... but some users have pushed the envelope and applied our cutting-edge technology to expressions you might not expect.



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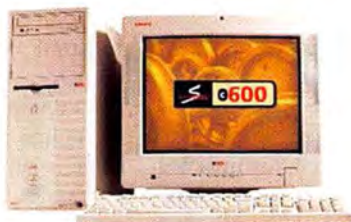
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3

High-Upgradeability



SuperMac J700



SuperMac C600



SuperMac S900



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News

SPECIAL REPORT

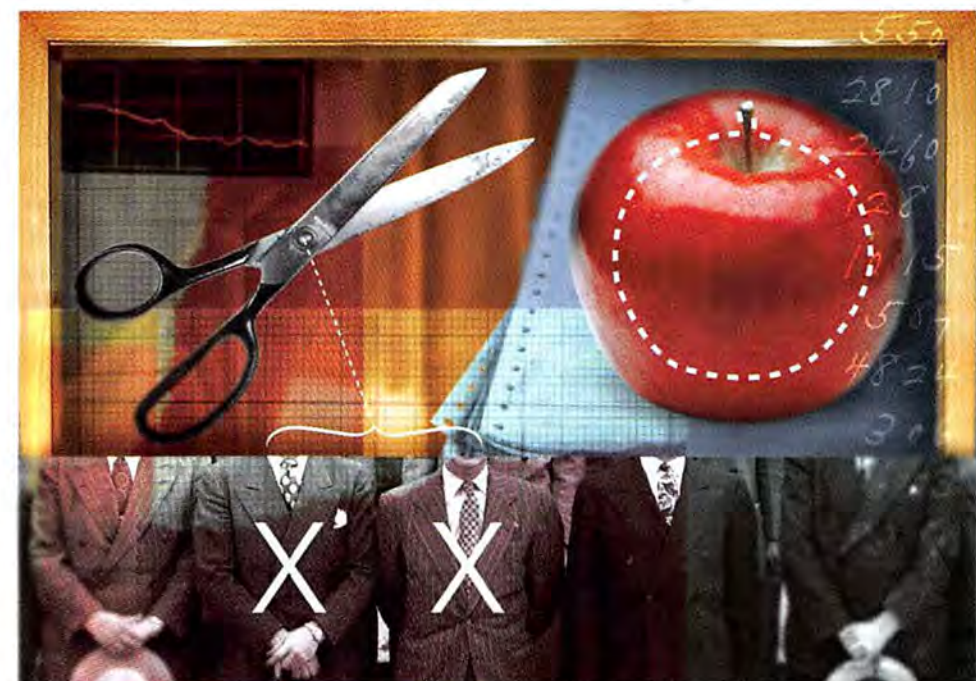
Amelio Carves a New Apple

BUT QUESTIONS REMAIN
IN WAKE OF CUTBACKS

by Stephen Beale

Friday, March 14, loomed like D day in Cupertino as Apple Computer prepared once again to reinvent itself. In February, Apple CEO Gilbert Amelio had announced a restructuring in which multiple divisions were consolidated into a centralized organization. The picture, we were told, would be completed that fateful Friday, when Apple planned to announce massive layoffs and the elimination of major projects. The cuts would be painful, but the result would be a stronger, leaner Apple Computer—an Apple more tightly focused on the Mac OS and Macintosh hardware.

Rumors and speculation swirled through the Macintosh community—and the business press—about the technologies on the chopping block and the scope of the layoffs. There was even talk, fueled by a story in *Fortune* magazine, that Steve Jobs would stage a palace coup, taking back the helm with help from Oracle CEO Larry Ellison.



STUART BRADFORD

One thing was clear—Apple was in serious trouble, and drastic action was needed to right the Mac mother ship. Everyone agreed that time was running out. In a company notorious for its reorganizations du jour, this one had the air of finality about it.

Against this background, Apple's March 14 announcement seemed strangely anticlimactic. Yes, 2700 of 11,000

full-time employees—about 25 percent—lost their jobs, as did 1400 out of 2400 contract or temporary workers. But some analysts had predicted cuts as deep as 40 percent. Yes, several major projects got the ax, including OpenDoc and Open Transport. But the two initiatives that best symbolize Apple's lack of focus—the Newton and Pippin—remain in the fold, at least until Apple

decides what to do with them.

Guerrino De Luca, Apple's new marketing chief, says he is more optimistic about the company's prospects than ever before. "This company has never had a crisper, more on-the-same-page executive team," he says.

But questions remain:

- Is this truly a new Apple?
- Were the company's cuts deep enough?

- Were they the right cuts?
- What is Apple's new component-software strategy? Its workgroup strategy?

- How deep is Apple's commitment to licensing the Mac OS?

In this article and those that follow, *Macworld* provides the answers to these questions—wherever we could discern them in a still-evolving reorganization.

A Leaner Company?

As he announced the layoffs, Amelio said his goal was to streamline Apple's organization, simplify product lines, and discontinue funding for products and technologies "that are not central to our core business strategy."

Apple will certainly be smaller than it was before, now having 9300 employees worldwide compared with 13,400 at the end of February and 17,400 at the end of 1995. But Apple has offered only general indications of where the cuts will be made: 80 percent from manufacturing, marketing, and research and development, with the remainder from sales, distribution, and general administrative functions. About 55 percent of the cuts will come from Apple's U.S. workforce.

continues on page 42

Apple News

WILL APPLE'S SECOND-QUARTER LOSSES BE HIGHER OR LOWER THAN EXPECTED?
WILL ORACLE CEO LARRY ELLISON FOLLOW THROUGH ON HIS TAKEOVER ATTEMPT?
FOR THE LATEST ON ALL THE FAST-BREAKING DEVELOPMENTS IN CUPERTINO, SEE MACWORLD DAILY AT [HTTP://WWW.MACWORLD.COM/DAILY/](http://www.macworld.com/daily/).

online

Internet Access for Cheap

ISPs USE VARIED SCHEMES FOR LOW-COST ACCESS

by Cameron Crotty

Shopping for Internet access is beginning to feel like walking down the midway at a carnival. Garishly costumed peddlers shout service offers, each one more outrageous than the last: "\$19.95 per month for unlimited access," "\$59.95 for unlimited access for the rest of your life," and even "free unlimited access for all!"

The good news is that Internet access has never been cheaper. The bad news is that many of the best offers have a hidden catch. Also, the current unlimited-access plans may spell doom for some smaller ISPs.

Flat-Rate Swan Song According to many in the industry, the market has to change simply because the current unlimited-access pricing plans are not sustainable. "Can flat-fee providers survive? No," says Scott Purcell, president and CEO of Epoch Internet, a backbone company that sells Internet access to corporate customers, as well as to smaller ISPs that resell the service. Purcell argues that the economics of maintaining a bank of modems and other access equipment far outstrips the revenue available from customers paying just under \$20 per month for unlimited access.

Jeff Shafer, media relations manager for Sprint Internet Passport, agrees that the cur-

rent pricing structures won't last. "\$19.95 [per month] was a pricing point that we entered the market with in order to be competitive. It's accepted—it's not magic," he says. "By the end of the year, it won't be the pricing point that you see." Shafer says that many companies, including Sprint, will begin offering premium services—charging users slightly more for faster access and guaranteed connections. "People who want to stay online all day long will [be willing to] pay a premium."

More Ads While it's not clear what the dominant paradigm for Internet access will be, there is certainly no lack of pretenders to the throne. For instance, while the industry is cooling on advertising as a revenue stream for a Web site, there are too many tall promotional dollars floating around for anyone to ignore.

America Online, a huge proponent of flat-fee access, recently agreed to open up its crown jewels—the chat rooms—to advertisers.

Going a step further, BiggerNet (408/283-3703, <http://www.bigger.net>) is offering free unlimited access for a single start-up fee of \$59.95. In exchange, the company's access software puts up a constant advertising banner (411 by 91 pixels on Windows systems). A Macintosh version of the software is expected to be available by the time you read this.

Vendors offering long-distance telephone service outside the traditional phone companies have been around for years, but some are now looking at Internet access as a premium they can offer to attract customers. J3 Communications (800/563-3332, <http://www.j3com.net>), for instance, is offering free unlimited



Internet access (\$25 sign-up fee required) if customers use the company's long-distance service.

The Internet has been described as a wild and woolly frontier where nearly anything can happen. For the next few years, it looks like the same conditions will exist in the Internet-access market.

multimedia

Digital Video Goes Mainstream

PERFORMANCE GAINS WHILE PRICES DROP

by Cathy Abes

Exploiting a trend among film and video producers away from costly proprietary workstations and toward more economical desktop systems, several developers plan to announce new digital-video hardware and software. Spurred by such technologies as QuickTime (future versions of which will have more digital-video support), DVD, and FireWire, Apple's new high-speed multimedia bus, the digital-video market is heating up, with products targeting a wide range of content creators.

FireWire Gets Hot Supported by Microsoft and Intel, FireWire will enable real-time

continues on page 36

Special REPORT

Getting the Net: Right Here, Right Now

56K MODEMS AND ISDN CONNECTIONS ACCELERATE THE INTERNET

"You will" was the promise from AT&T earlier this decade, but a bit more appropriate tag line would have been, "You will wait." *Macworld* surveyed the future of higher-speed Internet access in the United States, and the wait may be over sooner than you think.

56K Modems: Too Soon to Sell?

by Matt Clark

Public beta testing of software on the Internet has become as commonplace as Web addresses on highway billboards. Now, as modem manufacturers and Internet service providers (ISPs) prepare to make the next leap in data communications, it appears that the practice of public beta testing has spilled over into the world of hardware.

By the time you read this, modems theoretically capable of transporting data at 56 Kbps will be on store shelves, but there are several caveats. First, the speed increase will occur only in one direction: going from the ISP to the end user. Second, the new modems will be based on two incompatible technologies, one called k56flex or k56plus from a partnership between Rockwell and Lucent Technologies, and the other, known as x2, from U.S. Robotics. Finally, even as these companies head into the marketplace, both 56K technologies remain largely untested outside controlled laboratory environments and limited field

experiments—despite the fact that as with any modem technology, field conditions dramatically affect real-world performance. In short, while 56K technology holds great promise for faster telecommunications, there are an awful lot of devils left in the details.

A Better Way to Speed . . . in One Direction The 33.6-Kbps speed limit in today's modems is largely a result of the fact that digital data from your computer passes through a phone system designed primarily for analog communication (your voice). The first hurdles come from the number of digital-to-analog conversions required to go from your computer to your ISP. Additional slowdowns can occur due to the very nature of analog data: signals degrade over long distances and especially over older, out-of-date telecom equipment and phone lines.

The Costs of Compatibility While their underlying concept is the same, the x2 and k56plus technologies are completely incompatible. This means that to get in on the promise of 56-Kbps data transfer, the 56-Kbps modem you choose must use the same 56K technology as your ISP; otherwise you're stuck at 33.6 Kbps. U.S. Robotics (U.S.R.) and Rockwell have mounted massive marketing offensives aimed at consumers and ISPs,

hoping to reel in early adopters for their respective flavors of 56K modems and remote-access servers.

According to U.S.R., more than 400 ISPs nationwide, including giants such as America Online and CompuServe, have signed up to support x2 technology. Indeed, at press time, AOL had begun field trials.

Rockwell, on the other hand, claims a list of "hundreds" of mainly smaller, local

ISPs, with no mega-ISPs. Rockwell has an advantage in that many smaller ISPs already use routers from Ascend, which has announced that it will use Rockwell's 56K technology.

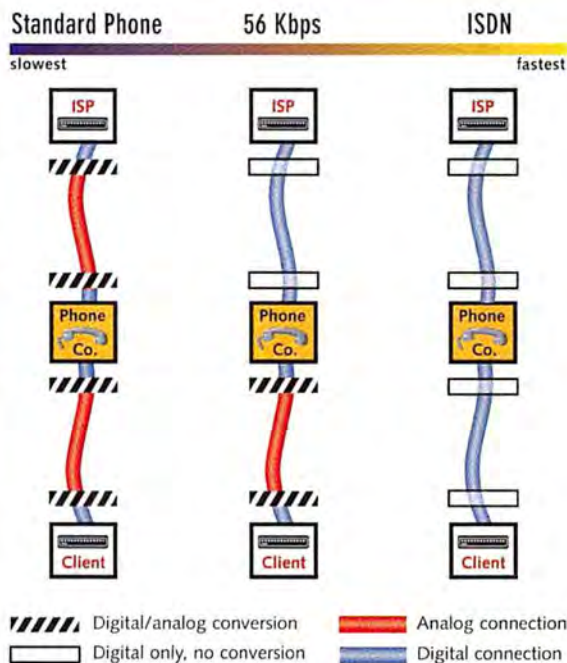
An ISP's decision on which technology to support is an expensive one. Smaller ISPs that rely on stacks of individual modems for Internet connections will be the hardest hit. They will have to pay installation fees and increased month-

Cleaner Connections Mean Faster Speeds

Through a standard phone network, data undergoes four conversions between digital and analog while traveling to and from your Internet service provider (ISP). Analog signals also degrade over distances, introducing noise that slows transmission rates.

The speed bump from 33.6 Kbps to 56 Kbps is a result of the ISP's connecting digitally to your local phone switch. Data traveling from your ISP stays digital for a longer period and avoids two of the previous four digital/analog conversions.

The main advantage with ISDN technology is that your data remains digital through the entire link between you and your ISP. A typical ISDN connection is capable of providing throughput rates that are as high as 128 Kbps before compression.



ly line rates for their new digital lines, as well as purchase remote-access servers, costing between \$15,000 and \$60,000, capable of supporting those connections.

ISPs already equipped with high-speed connections and remote-access servers have an easier choice—maybe. Depending on the ISP's existing equipment, an upgrade costs as little as \$60 per port or as much as a new remote-access server, since some older remote-access servers can't handle upgrades.

When questioned directly, most ISPs said either that they planned to support both versions of 56K or that they hadn't decided which technological path they would take. ISPs were similarly close-mouthed about whether they would pass 56K upgrade costs on to their customers in higher connection fees for higher-speed access. AOL was an exception, stating that it would not charge extra for a 56K connection.

On the desktop side, the lion's share of modem manufacturers appear to be supporting k56plus, including Diamond Multimedia (Supra), Hayes, Boca Research, and Global Village. At press time, Cardinal Communications, Hayes, and Global Village supported x2.

If you purchased a 33.6 modem more than four months ago, expect to pay for an upgrade to 56K; for a more recent purchase, your upgrade will most likely be free. U.S.R. will upgrade any of its brand of modems for \$60, even if upgrading requires a chip-set swap. Hayes (which uses the Rockwell k56plus technology) will upgrade any modem from any manufacturer to a Hayes 56K modem for \$99. New 56K modems should be priced around \$200.

No matter which modem you choose to purchase, first

call your ISP and find out what technology it supports. If you're dead set on buying an x2 modem, U.S.R. claims that it will make switching ISPs painless. While this might be fine for Internet newbies, users with long-standing e-mail addresses might find the prospect of switching too scary. It also becomes expensive, especially for those who need to migrate domain names or pay setup fees or increased monthly rates.

56K Is Here, Sort Of At press time, U.S.R. began shipping x2 modems for PC users, promising a Mac version later this quarter. Most other modems shipping now are 56K-ready. Several ISPs, including America Online, have begun field trials for U.S.R. using prerelease versions of the x2 remote-access central site upgrades. Modem companies using the Rockwell and Lucent chip sets claim they will be shipping by the end of the first quarter of 1997.

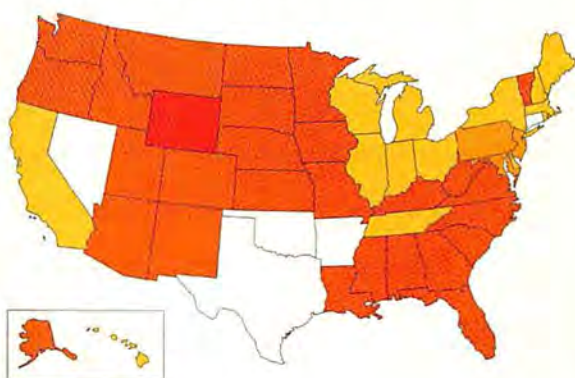
To date, companies involved in 56K have been reluctant to allow independent testing of their technologies, making it difficult to speculate on what kinds of speed increases end users can expect. But as this article was being written, early commentary on U.S.R. modems was beginning to filter into Usenet newsgroups on the Internet. Some users claim to have achieved burst connect rates as high as 46 Kbps.

If you intend to be the first on your block, make sure you partner with an ISP that supports your version of 56K. If you consistently top out at 14.4 on your 33.6 modem, then 56K may not be in your future. At issue is the fact that 56K is unproven in the field.

It's unclear if 56K will improve performance for all users or whether it's just for those who already see connect rates of 28.8 and above. Let the field trials begin!

What ISDN Costs Where

For each state, we selected the most economical residential ISDN rate for a user connected to the Internet for 100 or fewer hours each month on weekdays between 7 a.m. and 7 p.m.



Monthly Rates

□ unavailable ■ \$20-\$40 ■ \$41-\$60 ■ \$61-\$80 ■ \$81-\$100

ISDN Blankets the Nation

by Matt Clark

Time was that when you called your local phone company about ISDN (Integrated Services Digital Network), the most common response was, "What's that?" Today, ISDN is more widely available and easy to set up—but still too expensive for general Internet access.

ISDN's reputation as a configuration nightmare is well earned. Now, many phone companies have entire departments that focus exclusively on ISDN installation and customer service. For instance, Pacific Telesis in California now has an 800 number just for ISDN support.

In addition, many ISDN hardware vendors are working to simplify ISDN setup at the client end, and many take care of the entire installation process for a nominal fee.

The dark side of ISDN appears as you add up the hardware and monthly service

costs to move to the higher, more stable, connection. An initial cash outlay begins with an ISDN terminal adapter (sometimes referred to as an ISDN modem), about \$350. To that, add the installation fee and monthly charges for a basic-rate ISDN line—usually a flat rate in addition to a per-minute charge for prime-time service (see the infographic, "What ISDN Costs Where"). Many ISPs charge a premium for ISDN service. And ISDN is still not available in all areas, due primarily to the expensive nature of central-office switch upgrades.

Even with its pricey bandwidth, ISDN is a great deal for the SOHO market. A single ISDN line provides a decent amount of bandwidth for a small group of users. It also brings the look-and-feel of big business via individual e-mail accounts and a Web presence. But ISDN is a little pricey for your average Web-head. Moving from a \$19.95 all-you-can-surf pricing structure to one where you're shelling out extra cash to your ISP and phone company on each month is just too much for most consumers.

Sneak
PEEK

The Next Generation of Speed Demons

FASTER BUSES, NEW MOTHERBOARD, AND NEW POWERPC 750

what's happened to Mac systems in the last year as IBM and Motorola introduced new versions of the PowerPC 604e and 603e CPUs. But you ain't seen nothing yet. In the next six months, several innovations will cause yet another performance leap.

First CHRP
System Is
Stingingly Fast

by Tova Fliegel

For the most part, users don't care about motherboard designs. And that's as it should be.

You care about the performance, reliability, and cost. How your system gets there is really up to the manufacturer. But Macworld Lab tests of a Motorola Computer Group (800/759-1107, <http://www.mot.com/starmax/>) prototype, based on the Common Hardware Reference Platform (CHRP) and the new motherboard named Viper, show that CHRP-based machines, when they hit this summer, will set a threshold of performance unrivaled in the PC world. These are *Macworld's* first tests of a CHRP-based system using the new G3 PowerPC CPU; this system blew away all others we've tested. When you see this much power, you'll care about what's under the hood.

Key Benefits To date, you've most often heard the CHRP design, created by Apple, IBM, and Motorola and first announced in late 1995, extolled for other benefits it brings to the Macintosh.

Faster, faster, and faster—that's

- CHRP is a key component of the clone makers' strategy, since it helps create a more open platform. The Mac licensees will no longer be using Apple-designed motherboards—whose circuitry is often partially undocumented, requiring the clone makers to turn to Apple for help. This means the clone makers can move at their own pace and not rely on Apple for assistance.

- CHRP uses industry-standard components, so the Mac makers (including Apple) have a wider choice of suppliers, get lower prices, and have less chance of being caught in a parts shortage—problems that Apple's current proprietary designs cause.

- CHRP allows the faster adoption of emerging technologies, such as the Universal Serial Bus, the FireWire high-speed peripheral bus, and the Advanced Graphics Processor slot, as well as existing technologies that would give Mac owners more choices. For example, the CHRP specification supports the PC's ISA bus, which Mac makers could incorporate into their systems so Mac owners can buy any internal PC modems and use them on their Macs, rather than have an external modem cluttering their desktop.

All these benefits promise to introduce greater choice and reintroduce innovation to the Mac platform. In the end,

however, CHRP's key benefit comes down to performance.

Magic Bus Since CHRP runs higher-speed buses than today's Macs do, it bumps up the Mac systems' overall speed. Macworld Lab tested a 266MHz PowerPC G3 CPU on a 66MHz system bus. Bus speed is important because overall system performance is determined by the speed of both the bus and CPU, since the two exchange data: no matter how fast the CPU, data still has to flow through the bus, so a slow bus can bog down processing. Assuming system components are equal, a gener-

improved by about 2 percent.

CPU speed is underreported in these results because the Viper system is so fast that its speeds bumped up against the limits of Macworld Lab's current test suite. CPU speeds have quadrupled in the two years since we created the suite. As a result, disk speed factors in more heavily than it should, becoming a bottleneck in our current CPU analysis. Macworld Lab's new test suite, to be unveiled in our September issue, will show greater differentials in CPU speed so that they more closely match the scale of increase in the FPU results, which are closer to what we expect for a G3-based CHRP system.

In addition, CPU speed is slower than it might otherwise be because the Viper system's on-board graphics circuitry is slower than the IMS Twin Turbo card used in the Umax S900/233 and the PowerTower



Motorola's Viper system

er Pro 250. The Viper's on-board video, which uses the ATI Rage chip, is faster when running 3-D graphics applications, such as games.

You can also expect greater CPU increases with future versions of the G3. The Viper system we tested uses the version of G3 CPU that does not include the direct-to-chip Level 2 cache. Later chips in the series will include direct access to Level 2 cache, which should boost CPU performance even further. (For more on the G3, see "New PowerPC CPU: A Step Ahead," *News*, May 1997.)

Anatomy of the Viper The final Viper system, set to

al rule of thumb is, the lower the ratio of CPU speed to bus speed, the faster the system. Most Macs today use buses that run between 33MHz and 50MHz, so the Motorola 66MHz CHRP prototype with a 266MHz CPU really flew (see the benchmark, "New Technologies Preview Faster Future"). Even though the system we tested wasn't fully optimized—it used a prototype of the CHRP-enabled Mac OS 7.6 and an early version of the G3 CPU—floating-point operations were more than 20 percent faster than on the Power Computing PowerTower Pro 250, while CPU speed

The final Viper system, set to

ship in summer, will use a 250MHz PowerPC 604e and include 512K of EDO Level 2 cache, an internal Zip drive, 10BaseT Ethernet, 4MB of VRAM, and a parallel port. (EDO, or extended data out, is a type of fast RAM commonly used on PCs.) It will come in "lightweight" and "heavyweight" versions, with a 2.5GB or 4GB hard drive, and 32MB or 64MB of RAM. Motorola expects its Viper-based Mac to include PC-style parallel ports, so you can use almost any PC printer. The Mac typically doesn't support such printers, but Motorola plans to include a copy of GDT Softworks' PowerPrint utility, which adds PC-printer support to the Mac.

By the end of the year, Motorola will introduce the follow-on to the Viper, with the code name Cobra. This motherboard will move the video circuitry onto a card and will use a version of the G3 that has a direct high-speed bus to the cache. Otherwise, the Cobra will be identical to its older cousin. Due out in early 1998, the successor to the Cobra, King Cobra, will run an 83MHz system bus and will use synchronous DRAM for even more biting performance.

PowerTower Pro Speed for Everyone

by Galen Gruman

As Motorola and others explore how to exploit the Common Hardware Reference Platform (CHRP) design and the new G3 CPU, Power Computing (512/388-6868, <http://www.powercc.com>) is offering high performance for a moderate price by combining several technologies in a new line of Macs that replaces its PowerCenter line.

Tracing the Performance

The PowerCenter Pro, expected to ship by May 5, is the only Mac available that uses a 60MHz system bus to let the PowerPC CPU run more efficiently. Thus, the PowerCenter Pro 210, which uses a 210MHz PowerPC 604e CPU, is nearly as fast as a PowerTower Pro 225, which uses a 225MHz 604e but only a 45MHz system bus. The greater the difference between a Mac's system bus and CPU

megahertz rating, the more waiting the CPU has to do to let the bus catch up with it. Thus, faster buses can increase the speed of a Mac without needing a faster CPU.

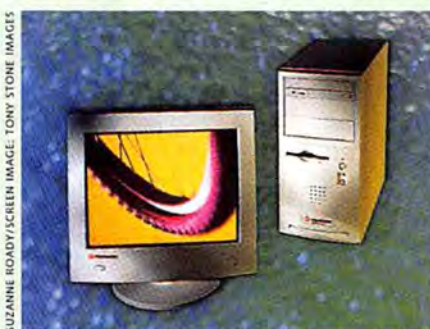
Power Computing modified the Apple Catalyst motherboard (used in Apple's Power Mac 7200) to support 60MHz, up from the Catalyst's normal limit of 50MHz. The buses used in other Mac motherboards can't be modified to run as fast as 60MHz, which is why

mance. (As with most other Macs, the PowerCenter Pro's external bus is SCSI-1.) Power Computing hopes to ship the final PowerCenter Pros with a 10-MBps SCSI-2 bus, depending on whether Apple approves the use of the Mesh SCSI chip for that speed.

Standard Features The PowerCenter Pro also includes the ATI Technologies 3-D video circuitry found in Power Computing's PowerBase systems. That circuitry is upgradable to support MPEG-2, which will be required to use the DVD drives that many expect to replace CD-ROM drives. The PowerCenter Pro has 1MB of cache, which boosts overall system performance, and a 16X CD-ROM drive.

Otherwise, the PowerCenter Pro is much like the PowerCenter line it replaces: it has three PCI slots and comes in a choice of a tower (three free drive bays) or desktop case (no free bays).

Prices are \$2095 for the PowerCenter Pro 180 and \$2395 for the Pro 210.



The PowerCenter Pro

you don't see a PowerTower Pro with a 60MHz bus.

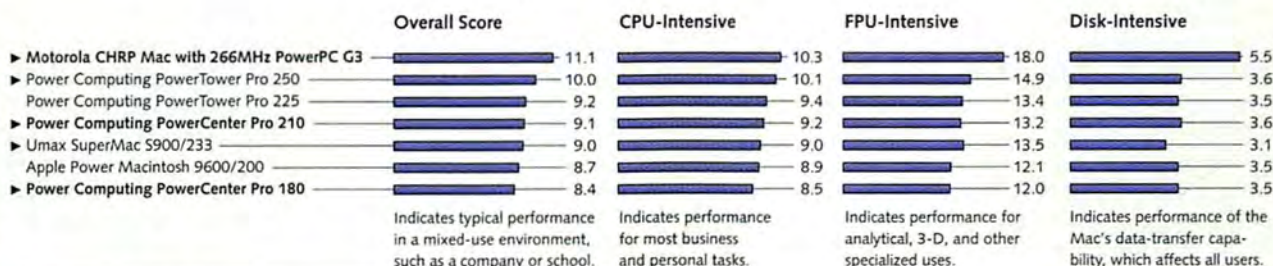
In Macworld Lab's tests, the prototype PowerCenter Pro 210 we received in late March was slowed down by the Mac's relatively poky 5-MBps internal SCSI-1 bus, which lowered hard drive perfor-



New Technologies Preview Faster Future

Using different approaches, Power Computing and Motorola have designed new Mac systems that show how tomorrow's top speeds will surpass today's. Motorola's prototype system uses the Common Hardware Reference Platform (CHRP) design with a 66MHz bus, as well as the new 266MHz PowerPC G3 CPU. One of Power Computing's prototypes takes a 210MHz 604e, while another takes a 180MHz 604e; in both cases, Power Computing uses a 60MHz bus to push the 604e past what today's 225MHz and faster systems and their 45MHz-to-50MHz buses can provide.

Longer bars are better. Results are times as fast as a Centris 650 (Centris 650 = 1.0). Products are listed from fastest overall to slowest overall. Boldface indicates prototypes with enhanced technologies. ► indicates a prototype system (not yet shipping).



Behind Our Tests

For details on our tests, see *Mac Superguide*, January 1997.—Macworld Lab testing supervised by Mark Hurlow

Communicator 4.0 Gets the Message

BY GEOFF DUNCAN

Netscape is taking its browser battle with Microsoft from the virtual streets to the corporate boardroom with Netscape Communicator, an expansive suite of Internet products with a slightly reworked interface and significant groupware capabilities.

Groupware, Not Surfware Our prerelease evaluation focuses on Communicator's major components: a Web browser (Navigator); e-mail (Messenger) and newsgroup (Collabra) software; WYSIWYG HTML authoring tools (Composer); and the Professional Edition's Netscape Calendar, a stand-alone group-scheduling application. Several features have not yet been enabled, including audio- and videoconferencing, administration tools, and a Java-based TN3270 emulator. Also missing are built-in help, support for multiuser configurations, a spelling checker, and support for 680X0 machines.

The Web browser offers collapsible tool bars and some new HTML features, including support for style sheets and Netscape-only HTML extensions for absolute positioning and layers, both of which are meant to work with JavaScript to add more-precise layout and multimedia capabilities.

The facets of Communicator are reasonably well integrated: Composer's HTML-editing features allow you to add HTML to a mail message or newsgroup posting. Messenger lets you respond to a Usenet posting in Collabra, and so forth. Collabra handles not only Usenet newsgroups but also secure private discussions (hosted on in-house Netscape servers, of course). Messenger supports IMAP mail, LDAP directory services, and (with Collabra) decent message filtering.



Communicator lets you embed images and hyperlinks in e-mail and news message windows.

Slow and DIMM-Witted Communicator is designed with memory in mind—lots of memory. The main application wants 14MB of RAM to itself, but also hungrily ingests system memory as it runs. With just a browser window and an empty mail message on screen—no Java, plug-ins, frames, or layers in sight—Communicator can take another 6MB to 8MB of system RAM, for a total of more than 20MB for *lightweight* use.

High memory requirements might be justified if Communicator delivered outstanding features or performance. However, although Navigator's Web-page rendering remains among the best in the business, HTML authoring—whether in Composer or in a message—is frustratingly slow even on a high-end Power Mac. Simple functions like switching windows and selecting text often appear sluggish, and Collabra and Messenger show little of the maturity of products like Eudora or News-Watcher. Running a Java applet within Navigator is still a game of "applet roulette"—and, if anything, it's slower than in previous releases. At first glance it's hard to be excited about Communicator unless you have a powerful Mac, lots of RAM, and a job that requires it.

"DIGITAL VIDEO GOES MAINSTREAM"

continued from page 31

data transfer and connections among as many as 63 devices. Third-party products gearing up to support FireWire include Radius's PhotoDV, which consists of a Radius FireWire card and cable, system software, and an Adobe Photoshop plug-in, and allows still-image capture from digital video; and MotoDV, which does motion capture. JVC is developing a new digital VHS video format as well.

Video Software

Two high-visibility software developers, Macromedia (415/252-2000, <http://www.macromedia.com>) and Specular (413/253-3100, <http://www.specular.com>), are making forays into the digital-video market.

Macromedia's Final Cut, which provides digital-video editing, compositing, and special-effects functions, is designed to compete—at a much lower price—with such proprietary systems as Avid, Scitex, and D-Vision that cost \$6000 to \$10,000. It provides three-point editing and instant playback of cuts, lets you quickly apply and edit transitions, and allows real-time mixing of stereo audio tracks during video playback—all with up to 99 levels of undo. You can attach transitions to clips, bringing them in as a single element. You can easily swap out clips or drag and drop them between the Viewer and Canvas windows and the Timeline. You can resize, reposition, and rotate objects in the Canvas window as well as precisely define motion paths.

Final Cut's Effects Builder lets you modify existing scripts (for any effect—filters, transitions, and particle generators) as well as create new

ones. You can add special effects via an extensible scripting language and can apply them to a time range using unlimited keyframes.

Final Cut, which is being previewed at the National Association of Broadcasters show in early April, is due to ship in the first half of 1998 for the Power Macintosh, Windows 95, and Windows NT. Although pricing has



not been finalized, the company is considering a range of \$1000 to \$3000, depending on the configuration.

Two from Specular Specular is working on a two-pronged approach. The company is about to release a major upgrade to its popular 3-D package, Infini-D, which will include a myriad of digital-video effects. Due in April, Infini-D 4.0 will offer video professionals such features as real-time previews over video, field rendering, NTSC-legal colors, and nonsquare pixels.

Later in the year, Specular will introduce another video-related product, code-named *Alchemy*, geared to video pros who want to incorporate 3-D images into their videos. Specular's "Super StageHands" technology will allow you to type in text and import images and then apply any of a variety of predefined attributes, including camera motions, text effects, particle effects, and lighting. Because the effects are procedural, you will be able to customize them to fit your individual needs.

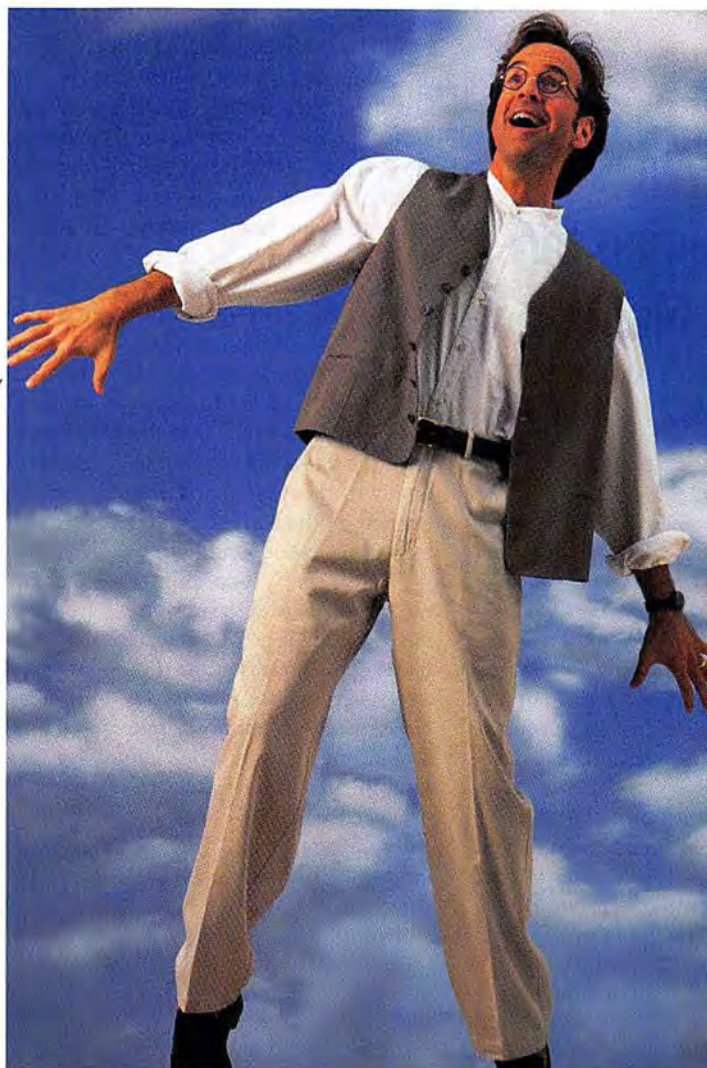
Alchemy's pricing and release date have not been finalized.

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Circle 65 on reader service card

graphics

Digital Imaging for the Masses

CAMERAS AND
PRINTERS LEAD THE WAY

by Stephen Beale

A new era of inexpensive, high-quality digital imaging is upon us. Once the exclusive province of graphics professionals, the technologies used to capture, edit, and print images are moving further on their way to the mass market.

Printers Lead the Way

The trend can be seen in hardware and software products from a diverse group of vendors. The most striking developments appear in a new generation of photographic output devices from Epson (310/782-0770, <http://www.epson.com>); Hewlett-Packard (800/752-0900, <http://www.hp.com>); Alps Electric, USA (408/432-6000, <http://www.alpsusa.com>); and other vendors.

The BJC-4550 from Canon (516/488-6700, <http://www.ccsi.canon.com>) and the Color StyleWriter 2500 from Apple (408/996-1010, <http://www.apple.com>)—both ink-jet printers priced under \$400—offer photographic-output capabilities through add-on packages that include special paper and ink cartridges. New ink-jets give you photographic quality without the inconvenience of switching cartridges.

Epson's Latest This May, Epson plans to ship the Stylus Photo, a \$500 ink-jet designed primarily for photographic output. The printer uses a combination of technologies that provides unprecedented

image quality in an under-\$1000 printer. Some of these technologies also show up in the Stylus Color 600 and 800, general-purpose ink-jets that offer excellent photo quality. But instead of printing only in cyan, yellow, magenta, and black, as do most other ink-jets, the Stylus Photo uses two additional primary colors—a light cyan and a light magenta—making it easier for the printer to simulate continuous tones. It also uses a new frequency-modulated screening technology called AcuPhoto.

While the 720-dpi printer can produce text, it is optimized for photographs. It produces color images at up to 3 pages per minute, about the same speed as monochrome output. In Epson's testing, the printer produced a 10MB color image in 8 minutes, 13 seconds, compared with 9 minutes, 53 seconds for the Stylus Color 800. (No unit was available for Macworld Lab to test and confirm these results.) Replacement ink cartridges will cost \$25 each. Epson plans

to offer an optional \$99 PostScript Level 2 interpreter with Pantone color support about a month after the printer ships.

Hewlett-Packard, Apple's new supplier for ink-jet printers, has introduced a pair of \$299 photo ink-jets for Windows users. The DeskJet 694C and DeskJet 692C offer 5-ppm black-and-white output and 1.7-ppm color output. Don't be surprised to see Apple-branded versions.

Dual Media from Alps Alps has taken a different approach to color output, using a proprietary thermal dry-ink technology in its Micro Dry series of printers. The MD-2010 printer and MD-4000

printer/scanner offer what Alps describes as "photo-realistic" output comparable to prints from the latest photo ink-jets. Its latest printer, the \$749 Masterpiece MD-2300, adds what amounts to a dye-sublimation option, producing impressive continuous-tone images. You can print in a photo-realistic mode with relatively cheap consumables, or in the new photo mode, which uses a separate set of costlier dyes and media.

New Digital Cameras

These printer manufacturers are eyeing the fast-growing digital photography market. Digital cameras, expensive novelties a few years ago, are well on their way to commod-



Apple's new QuickTake 200 digital camera is based on a Fuji design.

ity status. Today's models are cheaper and offer better quality than ever before, and the trend will only continue.

Kodak's DC120 One of the biggest players in this market is Kodak (716/726-7260, <http://www.kodak.com>), whose latest model is the \$999 DC120. Resembling Kodak's DC50 and offering the same 3× zoom capability, the DC120 adds a 1.6-inch LCD preview, higher resolution at 1280 by 960 pixels, and an optional flash synchronizer to minimize red-eye and overexposure. It ships with a version of PictureWorks' PhotoEnhancer that supports the new FlashPix file format.

Apple's QuickTake 200

The QuickTake 150 digital camera from Apple was based on Kodak's DC40. But Apple has left Kodak's embrace to partner with Fuji, and the first offspring of that relationship is the \$599 QuickTake 200, which offers 640-by-480-pixel resolution. Running on four AA batteries, the QuickTake 200 resembles a conventional point-and-shoot camera but includes a built-in LCD for image previews.

The camera stores images on removable 2MB solid-state floppy disk cards (SSFDC), one of which is included in the package. You can store up to 30 images at standard quality or 20 images at high quality. Images are downloaded to the Macintosh through a serial cable included with the camera. For high-speed downloading, an optional adapter allows direct use of the SSFDC media with standard PC Card readers.

The camera is the first to support Apple's QuickTime IC technology, which allows software developers to create applications that take advantage of the camera's features. It is bundled with Apple's Camera Access software along with Adobe PageMill, Adobe Photo Deluxe, and PictureWorks NetCard, which lets you send images by e-mail.

What's Ahead Expect to see more. Digital-photography consultant John Larish predicts that by next year, consumers will be able to pay \$200 for a point-and-shoot camera with 640-by-480 resolution and removable memory; \$500 will get you a camera with a zoom lens. He also projects that 2 million digital cameras will be sold in 1997. However, digital cameras are far from replacing their film counterparts; you'll still get better image quality by scanning slides from a comparably priced 35mm camera.

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graphics

Fractal, MetaTools Keep Busy

PRODUCTS UNVEILED

AS MERGER AWAITS

by Cathy Abes and

Stephen Beale

They may be headed for the altar, but MetaTools (805/566-6200, <http://www.metatools.com>) and Fractal Design (408/430-4000, <http://www.fractal.com>) are not allowing their imminent merger (see "Painter Meets PowerGoo," May 1997) to impede their product rollout plans. Fractal has announced version 5 of Fractal Design Painter, its popular natural-media painting program, while MetaTools has unveiled a series of products that work within its new graphical MetaWorld environment.

A New Coat of Paint Previous versions of Painter supported Adobe Photoshop plug-ins; version 5 adds its own extensible architecture, allowing other companies to create brushes and dynamic floaters for use with the \$449 program. Painter 5 will ship in late May with a variety of new brushes, including image-distorting Goopy Brushes, Super F/X Brushes for such effects as fire or neon, and Photo Brushes that let you do touch-ups. The program features simplified masking and compositing functions, providing 32 alpha channels and better selection capabilities. An enhanced interface lets you tear off tools and brushes and combine them in an unlimited number

of palette arrangements. This is also the first version of Painter to support CMYK color separations, as well as Pantone's Hexachrome six-color printing technology.

More Goo from Kai In the meantime, MetaTools is preparing its second assault on the consumer software market with Kai's Photo Soap, a \$49 photo-retouching program aimed primarily at graphics novices. Along with Kai Krause's trademark out-of-this-world interface, Soap features dedicated tools for common retouching operations. For example, a Heal tool removes scratches by cloning the areas on each side of the brushstroke, while a Red-Eye tool automatically removes red-eye caused by a camera flash. Soap is scheduled to ship May 31 and could prove to be as popular as PowerGoo, the company's first consumer software package. In addition to selling Soap through retail channels, MetaTools will also offer it to scanner and digital camera vendors for bundling with their products.

Around the MetaWorld Soap and PowerGoo are part of the company's new MetaWorld architecture, in which multiple stand-alone programs also become components in a larger graphical environment. For example, you can open and retouch an image in Soap, and then pass it on to PowerGoo for additional transformations. Future product releases include a simple slide presentation package called MetaShow, and a program code-named Sound Dancer that generates real-time 3-D animations in response to music. The company also plans to develop a MetaWorld version of Kai's PowerTools, which, with the next release, will no longer be a Photoshop plug-in.

systems

Apple Takes the CPU Lead

CONSUMER SYSTEMS

FEATURE 275MHZ

AND 300MHZ CPUs

by Macworld Staff

Apple Computer, which has often let its Mac OS licensees take the lead in offering fast new CPUs, will get a jump on the competition with new consumer Macs featuring 275MHz and 300MHz 603e CPUs. These will also be Apple's first consumer systems sold under the Power Macintosh brand; on March 14 the

version with a small-business software bundle, 48MB of RAM, and a 256K cache will cost \$2599. Apple has also announced versions of these systems—with identical model numbers but different configurations and lower pricing—for the education market.

The faster Macs arrive in May. The 6500/275, a \$2999 configuration for what Apple describes as the "nonprofessional creative individual," will include a 512K cache, the Avid Cinema digital-video system, an Apple video-input card, and a TV/FM tuner, but no internal Zip drive. The 6500/300, also priced at \$2999, will ship with 64MB of RAM.

Desktop Systems Apple also plans to release two consumer systems based on the desktop Power Mac 4400, first announced in February (see "More Mac for Your Money," April 1997). The \$1999 version of the 4400/200 will ship in April with 32MB of RAM, a 2GB hard drive, a 12× CD-ROM drive, a 256K cache, a 33.6-Kbps modem, and a small-business software bundle. In May, Apple will ship a \$2399 version of the 4400/200 that



The Power Mac 4400 (left) features a desktop enclosure, while the Power Mac 6500 is a tower system.

company announced that it was dropping the Performa brand (see "Amelio Carves a New Apple," in this section).

Rising from the Ashes Apple plans five configurations of its Power Mac 6500, a new low-end tower series. For \$1999, the 6500/225 is scheduled to ship in April with 32MB of RAM, a 3GB hard drive, a 12× CD-ROM drive, a 33.6-Kbps modem, a 256K cache, and a home software bundle. For \$2299, the 6500/250 is similarly configured except for a 4GB hard drive and internal Zip drive; a

includes a 166MHz DOS compatibility card with 16MB of RAM for the card and 32MB of RAM for the Mac, but no software bundle.

Apple has also announced a series of 603e-based all-in-one systems for the education market. The \$1699 Power Mac 5400/200 and \$1999 Power Mac 5500/225 feature a built-in monitor, an 8× CD-ROM drive, an Ethernet connection, and a 256K cache. The 5500/225 also features 2-D and 3-D graphics acceleration along with video-in and -out capabilities.

Introducing the MessagePad 2000, the only handheld computer you can actually use.

Of all the handheld computers, only the MessagePad 2000 offers sharp, crisp backlighting and a 16-level, high-resolution gray-scale screen that rotates on command. Which means you can always see your work in the best orientation—horizontal or vertical, even upside down. And in the best light. Bright. Or dim.

The MessagePad 2000 gives you more flexibility, thanks to its two PC slots (other handhelds have only one slot). So, for example, you can dedicate one to a wired or wireless modem and use the other for additional memory.

How much can you do in three to six weeks? That's how long a set of AA batteries lasts under normal usage. Note: normal usage here means a lot. Like having backlighting on, using the modem, crunching numbers, writing e-mail, drawing, doodling, whatever.

Built-in software lets you connect directly to a variety of serial, IrDA and LocalTalk printers—unlike most Windows® CE devices, which have to be hooked up to a PC in order to print.

There's fast. And then there's fast. The MessagePad 2000 comes with a screaming 160 MHz RISC processor, which offers up to five times the performance of the 20-40 MHz processors you get with other handheld devices.

The usable area of the MessagePad 2000 screen is up to 56% larger than what you'll find on most Windows CE products. So, instead of having to decipher small sections at a time, you can read the entire width of a fax or Web page.

A built-in microphone and speaker let you record and play back voice dictation. And the MessagePad 2000 is the only handheld computer that lets you record and take notes simultaneously.

The MessagePad 2000 works easily with desktop computers. So you can create documents on the MessagePad 2000, then transfer them to and from Microsoft® Excel or Word on any Windows or Mac® OS-based system. Or you can keep your calendar and address book current by synchronizing them with desktop programs like Microsoft Schedule+ 7.0 or Claris Organizer® 2.0. And it's easy: with Auto Dock, the MessagePad 2000 makes these transfers automatically.

Unlike Windows CE-based devices, MessagePad 2000 is the only handheld computer that lets you exchange data with both Windows and Mac OS-based computers.

The MessagePad 2000 handheld computer offers a real detachable keyboard (not a tiny, finger-cramping version). So you can quickly and easily type e-mail, business letters, project reports. Only your superb writing style—not your aching fingers—will determine the length of your documents.

Of all the handheld computers out there, only one makes it truly easy to be productive on the road. Introducing the MessagePad® 2000. Rather than just letting you view data, the MessagePad 2000 lets you carry out sophisticated tasks with the greatest of ease. For example: you can now write a full-length proposal, insert information downloaded from the Web—even include pricing from your company's Intranet—and then fax or e-mail it to a client. Try that with an ordinary handheld computer. The MessagePad 2000 has more power, more storage, more flexibility. All contained within the most innovative design, optimized for usefulness. Of course, there's only one real way to understand how incredible the new MessagePad 2000 is: try it yourself. For the name of a dealer near you, or to get more information, call 800-909-0260. Or visit us at www.newton.apple.com/useit.



SPECIAL REPORT

"AMELIO CARVES A NEW APPLE"*continued from page 31*

Chief financial officer Fred Anderson says that the job cuts, along with other savings from the restructuring, will reduce expenses by about \$500 million. The total cost of the restructuring will be about \$250 million, of which \$155 million will be charged to Apple's second-quarter earnings.

The Living Dead

Less clear is how the cuts support Apple's realigned business strategy. One gauge of the changes' real effects at Apple is the list of canceled projects. This doesn't tell the whole story, because many canceled projects—20 to 25 by De Luca's count—were never publicly announced. But Apple refuses to identify these projects, so it's impossible to tell if their cancellation truly indicates a tighter focus.

Apple has also pulled the plug on some of its best-known, if little-used, software technologies. Some could be described as the "living dead"—they haven't technically been killed, but the effect is pretty much the same: Apple will no longer fund or will drastically reduce funding for them, and plans no major upgrades. These technologies will be available in the Rhapsody Blue Box, which will run current Mac OS applications, but will not be ported to the Yellow Box, which will run OpenStep programs.

OpenDoc Of all the living-dead technologies, OpenDoc is probably closest to the grave (see "Apple Moves Components to Java," in this section). Apple's component-software architecture will ship as part of Mac OS 7.6 and 8, and OpenDoc applications

will run in the Rhapsody Blue Box. But Apple, looking to Java for component-software functions, plans no major OpenDoc updates and will not port the technology to the Yellow Box. Cyberdog, Apple's OpenDoc-based Internet-access software, has met a similar fate. After the forthcoming version 2.0, Cyberdog development will end.

Open Transport Like OpenDoc, Apple's Open Transport network infrastruc-



ROBERT HOLMGREN

Steve Jobs (left) remains an adviser to Gil Amelio despite rumors of a coup.

ture will run in the Rhapsody Blue Box but not the Yellow Box (see "Apple Paints Its Network Picture," in this section). Instead, Apple will use OpenStep's network services in the Yellow Box. However, unlike OpenDoc, Open Transport will likely be a key Mac OS component for the foreseeable future. Developers who want to offer networking functions in current Mac applications will have no other choice.

Apple also said it will no longer develop its AIX-based Network Server line after version 4.1.5 of the AIX Unix operating system ships by the middle of the year.

GameSprockets Apple has drastically reduced funding for GameSprockets, a software technology introduced last year that makes it easier for programmers to develop Macintosh games. In its March 14 announcement, Apple said it would not upgrade GameSprockets and

would not port the technology to the Yellow Box. However, computer games written under GameSprockets will run in the Blue Box, and Apple has kept a small team of employees to manage the technology. Ironically, GameSprockets was considered a win for Apple, since it helped PC game publishers make more games available for the Mac market, which had not attracted major game developers until recently.



MARCIA LIEBERMAN

In a letter to GameSprockets developers shortly after the announcement, Apple's Chris De Salvo, who describes himself as the GameSprockets technical lead, said that some development work will continue. He also held out the possibility that the technology will be ported to the Yellow Box. "We may not be able to get a one-to-one function-call crossover, but the hope is that we can persuade the powers that be to make sure that the functionality is present," he said. "Rhapsody has the potential to be a really good game platform and I'm going to do everything I can to make sure it lives up to that potential."

QuickTime Stays Apple will continue to develop the QuickTime Media Layer, one of its strongest and most popular software technologies. However, the company has pulled the plug on its Apple

Media Tool authoring software and QuickTime video-conferencing. Apple Media Tool, like the general-purpose Mac OS Tools, has joined the living dead; it will still be offered, but will not receive major updates.

Performa Another canceled product—but in name only—is the Macintosh Performa. Henceforth, Apple will sell its consumer models under the Power Macintosh brand. The change is more than cosmetic, De Luca says: Apple saves considerably by consolidating marketing functions and gaining other efficiencies. Also, by not having separate product groups, Apple may finally be able to focus its technology arsenal more effectively, more often using core technologies across its product lines.

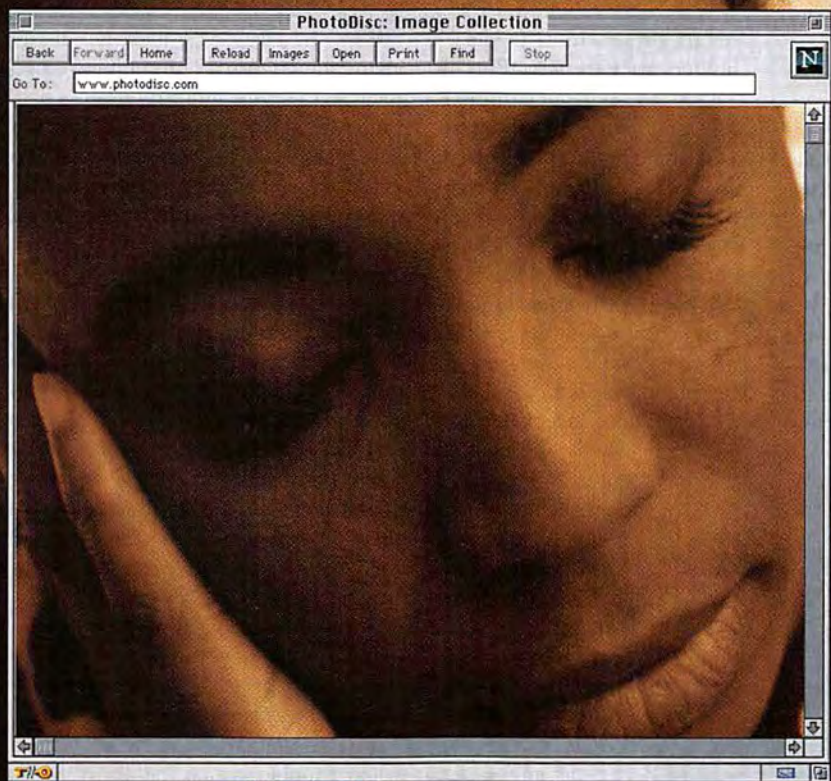
Newton's Reprieve Perhaps the most surprising aspect of the restructuring is that Apple's often-maligned Newton survived. After all, Newton is the most glaring symbol of Apple's departure from its Macintosh core. The reorganization's timing was apparently fortunate for the Newton group: the newly announced eMate 300 notebook computer and MessagePad 2000 personal digital assistant have the look of successful products—especially the eMate. In addition, De Luca says the division itself is a lean operation. Apple reportedly tried to find a buyer for the technology, but apparently is not in a big hurry to dump it.

Newton's poor cousin, the Pippin set-top technology, is in a more precarious position. Apple will not release its own Pippin product, but says it will continue to work with its licensees. Bandai Digital Entertainment, the primary licensee, has already taken the lead in

continues

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developing the technology. Sources close to Apple say the Pippin team has been dramatically cut back.

Licensing During the March 14 layoff announcement, De Luca reaffirmed Apple's commitment to licensing the current Mac OS, but refused to address questions about Rhapsody licensing. Apple has been reexamining its licensing policy with an eye toward raising fees or otherwise making it more difficult for clone vendors to compete with Apple-branded Macintosh systems (see "Apple's Clone Support in Question," in this section).

Will It Work?

At Apple's annual shareholders' meeting in February, Amelio spoke of a "fragmentation" crisis in which Apple "was simply doing too much, moving in too many directions—and not enough of it was profitable." The latest restructuring was intended in part to address this crisis. But Apple also faces a perception

after taking the helm—they would have been seen as bold moves toward a turnaround. But because several key questions remain unresolved, or at least unanswered publicly, industry analysts and Mac developers continue to have doubts whether this reorganization is really the one that will pull Apple out of its roller-coaster ride. Today, it's fair to ask if the changes are too little and too late.

Amelio, rumored to be on shaky ground after a poor keynote performance at Macworld Expo in January, appeared to rebound with a strong presentation to shareholders in February. But on March 14, he found himself rejecting calls from one business magazine that he resign as CEO. "Why would I want to stand aside when we're on the cusp of turning this business around?" he asked.

Two weeks later, Oracle's Larry Ellison told the *San Jose Mercury News* that he was contemplating a bid to lead a \$1.25 billion takeover, after

which he would dump Amelio and the other top managers. In this scenario, which Ellison characterized as a trial balloon, Steve Jobs would sit with Ellison on the company's board. Whether or not this makes sense for Apple, Ellison—one of the wealthiest entrepreneurs in

Silicon Valley—has the resources to make it happen. Jobs, who remains as an adviser to Amelio, described Ellison's plan as "bizarre."

So the turmoil continues, and key questions remain. Apple has once again reinvented itself, but only time will tell if this latest move is a true turnaround or another failed attempt at revitalization.

SPECIAL REPORT

Apple's Clone Support in Question

MAC MAKERS UNNERVED

BY NEW LICENSE POLICY

by Galen Gruman

One consequence of Apple's cost cutting and inward focus has been anxiety among the other Mac makers about the company's commitment to the clone industry, at a time when the clone makers have stabilized the Mac's market share and pushed performance beyond that of PCs for the first time ever—at prices close to a PC's.

Even before Apple's March 14 reorganization, clone makers were worried by what they saw as a tougher line at the company.

The clone makers have never been happy that Apple could dictate what products they shipped and what technologies they could include (Apple certifies each system and its components for compatibility and thus can decide what components are used in clones). But the clone makers began to get truly nervous when Apple started talking about higher license fees, as well as fees tied to system performance (the clone makers' systems typically run faster than Apple's).

Clone Makers' Anxieties

Since the Apple reorganization, the clone makers' concerns have turned into anxiety, at a level *Macworld* has not seen since Apple tried to pull out of Mac licensing two years ago (see "Is Apple Serious about Clones?" *Macworld*, August

1995). Executives at every clone maker described a similar set of concerns to *Macworld*.

By contrast, Apple executives have acted relaxed, claiming that the public angst shown by clone makers is essentially a negotiating ploy as Apple enters its second phase of licensing, one that relies on the Common Hardware Reference Platform (CHRP) rather than on Apple-proprietary motherboards and circuitry.

Conflict of Interest? Apple has moved the group that creates the Mac ROMs, the CHRP OS, and the CHRP specification into the Mac hardware group. Clone makers call this a conflict of interest, since the people who are supposed to support Apple competitors report to the people who design Apple's Macs.

"Closer alignment will only help increase synergies between Apple's engineering groups," says Apple vice president of marketing Guerrino De Luca. He admits that there is no strong separation between Apple's internal projects and external CHRP and OS efforts, but says Apple has not had this in the past, either, so the situation has not worsened for licensees.

The licensees are also concerned that Apple seems intent on continuing to certify—and thus controlling the technologies in—Mac clones, even those based on the supposedly neutral CHRP specification, which is jointly controlled by Apple, IBM Microelectronics, and Motorola's RISC Processor Division. The clone makers want certification ended or moved to a neutral group.

De Luca says that "certification has the objective to ensure compatibility and a Mac OS experience to users—not to block licensees' technologies."

Deemphasis on Licensing? The March 14 reorganization of Apple's licensing team has

continues



One of Apple's goals is to simplify its product line.

crisis: a perception among users, developers, and stockholders that the company has squandered its chances and is on its way to a slow and painful demise.

The reorganization and layoffs might have addressed the fragmentation crisis, but the perception crisis remains. If Amelio had made these changes last year—shortly

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exacerbated the clone makers' fears. The licensing group has been all but disbanded, with most executives losing their jobs and the sole remaining executive reporting to the company's financial arm. Furthermore, on the engineering and marketing side, licensing support is now part of Mac development.

The clone makers fear this will cause the licensing group's mission to change from supporting the clone market to becoming a tax agency charged with maximizing Apple's income from the clone market. De Luca says "cost recovery is secondary, and not necessarily a good way to develop a sustainable proposition."

The clone makers had some concerns about the previous licensing group, which was supportive of the licensing concept but found its resources constrained by Apple management. With that team disbanded, they say they now feel even more concerned.

Speed Penalties? Apple acknowledges that it will raise licensing fees. "The licensing fee should reflect the *full value* of the Mac OS," De Luca says. While no one will confirm what the fees are, sources estimate that the current licenses cost \$50 and that the new license will cost no more than \$100—not a big deal to clone makers. The real concern is over a fee structure that discourages them from competing in specific markets.

According to the clone makers, Apple is proposing to charge a licensing fee based on CPU speed. (Apple won't discuss its contract proposals.) Licensees see this as an attempt to push them into low-margin consumer markets where Apple has been unable to make money, at the expense of the lucrative business and professional markets where Apple has been unable to meet demand and where companies like

Power Computing have made inroads. Furthermore, the clone makers say, the fees would be CPU-speed-specific, so over time the effect would be to automatically increase the fees as faster systems are introduced. De Luca says this is "just one interpretation" of what might happen and no more valid than a scenario in which fees decline as perfor-



Apple will not permit PowerBook clones.

mance increases. He would not discuss what the actual licensing proposals are.

Apple is offering clone makers what De Luca calls "particularly attractive" licensing terms to encourage them to enter new geographic markets in which Apple has been unsuccessful. Apple has for several years encouraged clone makers to target such markets, but licensees have been slow to do so because they don't see much money to be made, at least not initially. (Motorola, for example, sees the China market as a five-year investment worth pursuing so long as it can make money in other markets in the meantime.)

Disadvantaged Platform? Apple is bifurcating the platform, the clone makers say, by developing proprietary designs it will not license to other Mac makers and providing CHRP as the design on which clone

systems will be based. Apple says it is working on its own CHRP-based systems, but also is working on systems that use Apple's own proprietary technologies. Apple is willing to license some of its proprietary technologies to other clone makers, but only after Apple uses them in its own systems, says Phil Schiller, Apple's product marketing manager for desktop systems. "We're not going to give Apple-proprietary technology to others before we use it," he says.

Schiller and De Luca deny Apple has any intention of making CHRP a second-class platform. "The sooner we get the CHRP design, the sooner we get differentiation, which is good for us and good for them," Schiller says. He says Apple wants and expects every Mac maker—including Apple—to innovate on the Mac platform to their best advantage, something the move to CHRP allows by letting licensees design their own hardware.

Apple says it expects CHRP to provide more differentiation among companies, and believes it is appropriate for Apple to give its systems a technology edge. "We view CHRP as a critical step to move from licensing as 'identical copies of what Apple does' to licensing as a way to give customers multiple choices of Mac OS-compatible and different systems," De Luca says.

Licensees say they accept this, but only if the Mac OS and CHRP specification are independent of Apple's Mac business decisions, a separation they doubt exists. An executive at one clone maker proposes that all Mac makers make their

own technologies available to others—for a fee, of course—to encourage the adoption of the best technology across the Mac platform while rewarding the innovators. In fact, that's what happened with the multi-processing technology created by DayStar Digital that Apple and Umax have licensed and use in their own systems.

The licensees are also concerned that Apple has dragged its feet on the CHRP OS and will be slow in supporting technologies that might let the clone makers get an edge over Apple. "We are still completely committed to making CHRP happen. That work has not abated at all," Schiller says. "We are not going to do anything to slow up CHRP work. That's not the kind of advantage we need," he says.

The licensees point to the lack of support in the CHRP OS—now under development—for parallel ports, the FireWire high-speed peripheral bus, ISA slots (which would bring cheap internal PC modems to the Mac), and the Universal Serial Bus. Apple CHRP program manager Mike Bell says that Apple will introduce no technology into CHRP before Apple introduces it into its own designs. The licensees are always free to add such technologies themselves by writing the appropriate extensions to the Mac OS, De Luca says.

The licensees counter that this could result in incompatible hardware and delay the introduction of performance-oriented technologies to the Mac platform. But how Apple will allow licensees to extend the CHRP design and Mac OS while also insisting on a certification process to ensure compatibility remains to be seen.

Notebook Envy Clone makers point to Apple's actions on PowerBooks as evidence that Apple's CHRP effort,

continues

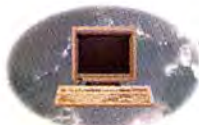
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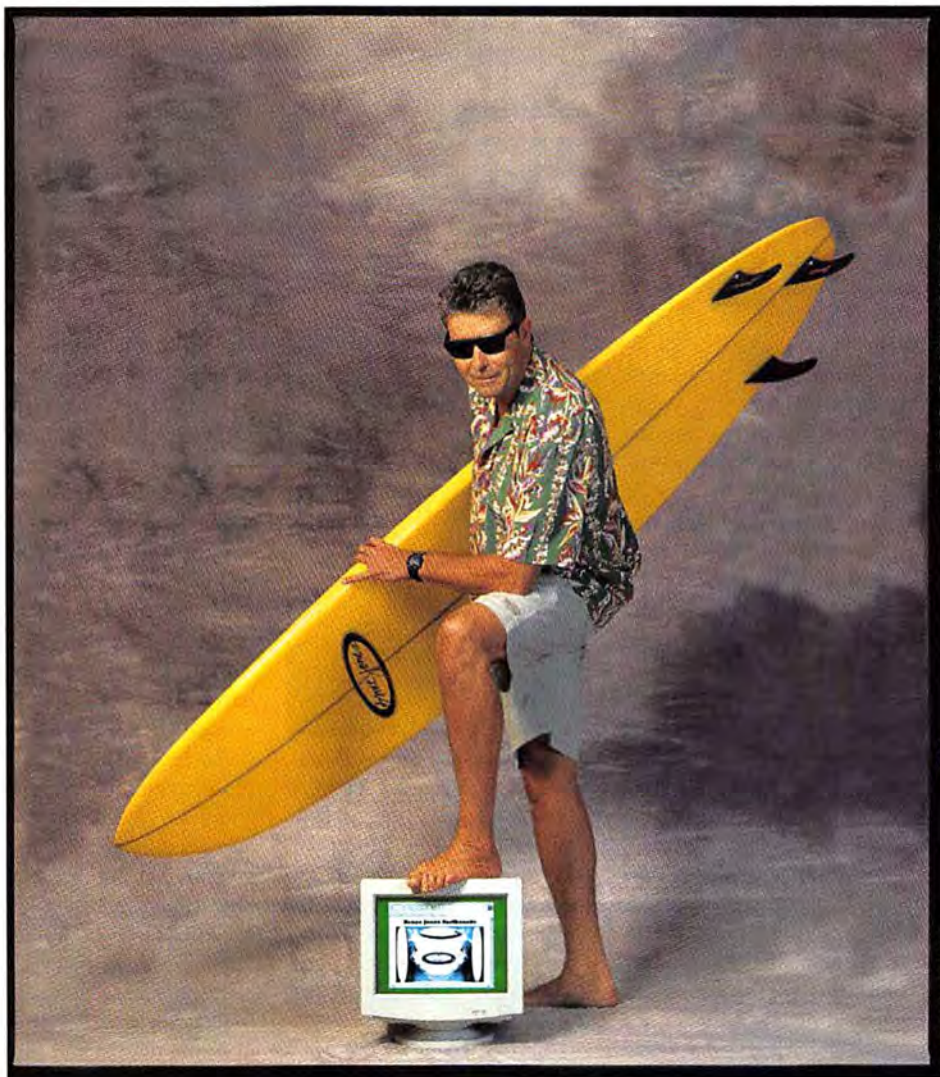
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licensing policies, and OS development are all skewed to give Apple an advantage. Apple refuses to license the current PowerBook designs to other companies, and the CHRP specification—controlled by Apple, IBM Microelectronics, and Motorola—won't define what's needed for a CHRP-based Mac notebook for at least another year. Schiller admits that the CHRP work is slow, since it is done by committee.

De Luca explains the refusal to license the PowerBook as an economic decision: Apple wants to recoup the investment in its notebooks that it could not earn last year because of battery fires and other flaws in the PowerBook 5300. The licensees ask why Apple's quality-control problems should have any bearing on what products they can design this year or next, a question Apple executives have not directly answered.

The PowerBook example goes beyond the CHRP effort or Apple licensing rules. Even if a clone maker created a Mac notebook, there is no Mac OS available to enable power management, PC Card support, and other common notebook features—these features are not standard parts of the Mac OS and thus are not available to the licensees.

Rhapsody Licenses Clone makers have told *Macworld* that Apple would not clearly indicate to them what its stance is on licensing the Rhapsody OS due in mid-1998. De Luca gave *Macworld* a definitive response: "We do intend to license Rhapsody to the current Mac OS licensees and others. The current conversations are focused on Mac OS licensing [Mac OS 8 and CHRP] only; I expect that we will be ready for the Rhapsody discussions later in the year."

Apple public-relations director Laurence Clavère says

the confusion over Apple's licensing plans for Rhapsody stem from continued discussion within Apple over whether and how the company should license the Yellow Box OpenStep portion of Rhapsody for use on PCs. OpenStep runs on PCs and some workstations, and Apple is deciding whether to make a Mac-less Rhapsody available on multiple platforms or to keep OpenStep on non-Mac platforms available in some other way.

Negotiating Plays?

Apple says that the licensees' concerns are part of a negotiating tactic to get better deals from Apple. "I suspect that the things you hear from our licensees are part of a negotia-



Apple's Guerrino De Luca defends the company's licensing strategy.

tion strategy. You know: you leak this or that piece to the press to put some pressure on the other party. This is fine, understood, acceptable, and makes the business a fun thing," De Luca says.

Several licensees tell *Macworld* that they hope Apple is proposing hardball licensing plans as a negotiating ploy, to get them to concede more than they would prefer. They expect the negotiations to get more reasonable by the time this issue appears in mid-April.

Apple sees these concerns as the normal frustration in negotiations over a change

from one strategy to another; in this case, from licensing a set of proprietary designs to licensing just an OS and co-developing an open platform on which everyone can build. "While we want our licensees to have a competitive business proposition and welcome their presence in any market as a means to offer Mac OS customers a choice, we are not in any way establishing an asymmetry where licensees can compete with us and we cannot compete with them," De Luca says.

The clone makers see it as Apple's trying to limit the clone makers because Apple has been unable to develop new Macs and produce them efficiently enough to compete in an open market with the clones. "Apple needs to declare a public position on the strategy. I'd like a sales pitch for the [clone makers]—all we're hearing is the control points. We're not hearing how we all make money and grow the platform together," says Dennis Schneider, vice president and general manager of the commercial products division for the Motorola Computer Group. "I haven't yet seen the passion around licensing. [Instead,] we're hearing too many signs of a plan limiting specific users' choices." Matching views expressed by every licensee, an executive at another company puts it bluntly: "There is not a level playing field here."

Apple's Schiller says the clone makers' fears are unfounded because it's clear within Apple that its and the clone makers' needs are the same. "The model won't fly if we're not all taking steps—Apple and the licensees both—that will grow the market," he says.

One thing is clear: as Apple struggles to reinvent itself so it can lead a resurgent Mac market, it is arguing with its key allies over their fundamental relationship.

SPECIAL REPORT

Apple Paints Its Network Picture

BROAD STROKES BUT

LITTLE FINE DETAIL

by Cameron Crotty

Apple's recent upheaval couldn't have come at a worse time for the company's networking efforts. Open Transport, Apple's latest networking infrastructure, was finally settling into place with good performance and a bright, extensible future. Long overdue projects, such as TCP/IP versions of AppleShare and Apple Remote Access, were at least within shouting distance of shipping.

Then, on March 14, Apple announced that it would reduce funding for Open Transport, base Rhapsody's native networking software on Next's OpenStep, and cancel AIX server development. Now Apple must simultaneously maintain Open Transport for its Mac programs and convince developers to completely rewrite their applications for a new networking infrastructure.

Still Breathing The Next OS may be the next big thing, but the Mac will depend on Open Transport for the foreseeable future. And while Apple's long-term networking strategy is fuzzy, the short term is fairly clear. Apple plans a release of Open Transport to coincide with Mac OS 8 (known as Tempo), which is expected in July. This release will fix bugs and patch security holes, including the Ping o' Death (see "A Ping to Die For," *News*, February 1997).

continues

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Apple will continue to support Open Transport in the Rhapsody Blue Box, which will run current Mac OS applications. But developers looking to take advantage of features in the Rhapsody Yellow Box (including Apple's internal product teams) have their work cut out for them.

"They made [Mac networking developers] rewrite their applications once for Open Transport and then make some more tweaks for Cyberdog [Apple's now-discontinued Internet-access software]," says Chuck Shotton, senior vice president of engineering for StarNine and author of the popular WebStar Internet server software. "[Writing for Rhapsody] makes for three major changes in about as many years."

Also, Apple has yet to clarify the details of its Yellow Box networking strategy. According to company spokespeople, the Blue Box and the Yellow Box will support AppleTalk and some kind of remote access, but no one yet knows precisely how these features will be implemented. AppleShare's migration (both client and server) to Rhapsody is also planned but not fleshed out.

Projects Kept, Projects Cut Apple says that it will continue to focus on TCP/IP—the Internet networking protocol—and also that it will add Novell's IPX networking pro-

tol to the mix, something Apple has been saying for years it would do.

In the near term, Apple will ship AppleShare IP 5.0—most notable for the debut of TCP/IP support—by the time you read this. By July, the company plans to release Apple Remote Access 3.0, which, after years of promises, finally supports the industry-standard Point to Point Protocol.

However, other projects have been cut back. Apple will ship version 4.1.5 of the AIX Unix operating system by the middle of this year, but will no longer develop AIX products. Brinton Baker, Apple's senior director of product marketing for servers, says the company will consolidate its two server lines (Mac-based Workgroup and AIX-based Network servers), and will stop offering AIX when that happens. Customers who want a Unix-based server from Apple will have to wait until Rhapsody appears in 1998 (the Yellow Box is based on Unix, although users won't see that when they work in Rhapsody).

SPECIAL REPORT

Apple Moves Components to Java

OPENDOC BECOMES VICTIM OF CUTBACKS

by Cameron Crotty

When Starbucks comes to town, it doesn't pay to be a local coffee shop. As part of its most recent restructuring, Apple effectively mothballed OpenDoc and endorsed Java as its component software of choice. Some have written this off as

merely another overhyped, underdelivered Apple technology finally put out of its misery, but the demise of OpenDoc is both a testament to the currents moving the software industry and a milestone in the development of the desktop of the future.

An OpenDoc Update According to a prepared statement from Apple, OpenDoc has been put into "maintenance mode," which means that the bugs will get fixed and compatibility with Mac OS releases will be ensured, but no new features will be added. Before the reorganization, the next version of OpenDoc was slated to have several bug-fixes, improved performance in low-memory situations, and a memory-management control panel. Apple will also ship Cyberdog 2.0, its OpenDoc-based Internet-access software, which is currently in beta testing. This will be the last Cyberdog release. After the update, OpenDoc will remain part of the Mac OS and will appear in the Rhapsody Blue Box (the portion of the new OpenStep-based OS that runs Mac OS programs), says Jim Gable, Apple's vice president of platform and technologies marketing.

But OpenDoc is essentially dead. Just before Apple's announcement, IBM said that it would cease development on the Windows and OS/2 versions of OpenDoc that were in its care. A few weeks later, both companies cut off funding to CI Labs, the independent organization charged with validating OpenDoc components (CI Labs subsequently dissolved).

Gable is clear about what Apple is giving up: "If Apple were making money and things were sunny and happy, Apple would not be [cutting OpenDoc]. The bottom line is that Apple was carrying a great deal of the OpenDoc

effort, and [cutting] it was literally something we had to do to reduce expenses."

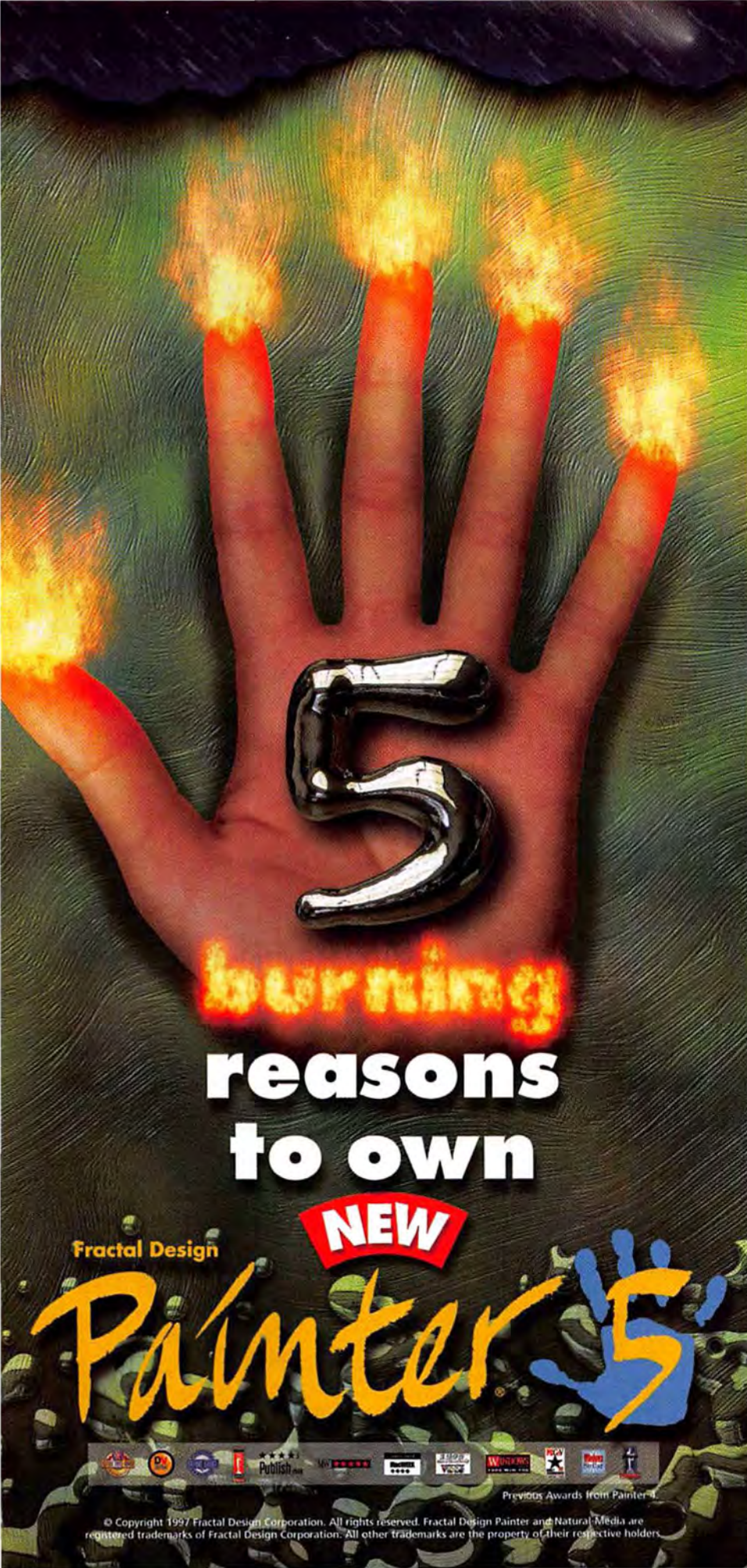
Does Java Deliver? In place of OpenDoc, Apple is proposing Java, the component-software technology developed by Sun Microsystems and the current beneficiary of a wave of industry adoption bordering on religious fervor. At first glance, Java appears to solve many of the same problems OpenDoc addressed, providing developers with reusable objects and a method for those objects to communicate with each other.

But while Java has wider industry adoption, there are serious questions about what technological advantages it provides. "Java and [Microsoft's] ActiveX meet a customer need, but it's not the same need as OpenDoc," says Nisus product manager Joe Kissel. "Java is designed to let developers create applications, while OpenDoc lets users create their own environments." Kissel also has concerns about what Apple gives up in the move to Java. "[In Java] there's no human interface, and the details are still being worked out for drag and drop and embedding."

There aren't any immediate signs that Java's future directions are particularly friendly to the Macintosh platform. Gina Centoni, product manager for Java Beans for JavaSoft, didn't expect Java to pick up some of OpenDoc's more robust features. "We want to maintain a light framework," she says. "Our design center is focused around an NC [network computing] device."

Scott Hebner, manager for application development marketing at IBM, cites the NC idea of a thin software client as a major reason why IBM was turning to Java. "When we started OpenDoc," he says,

continues



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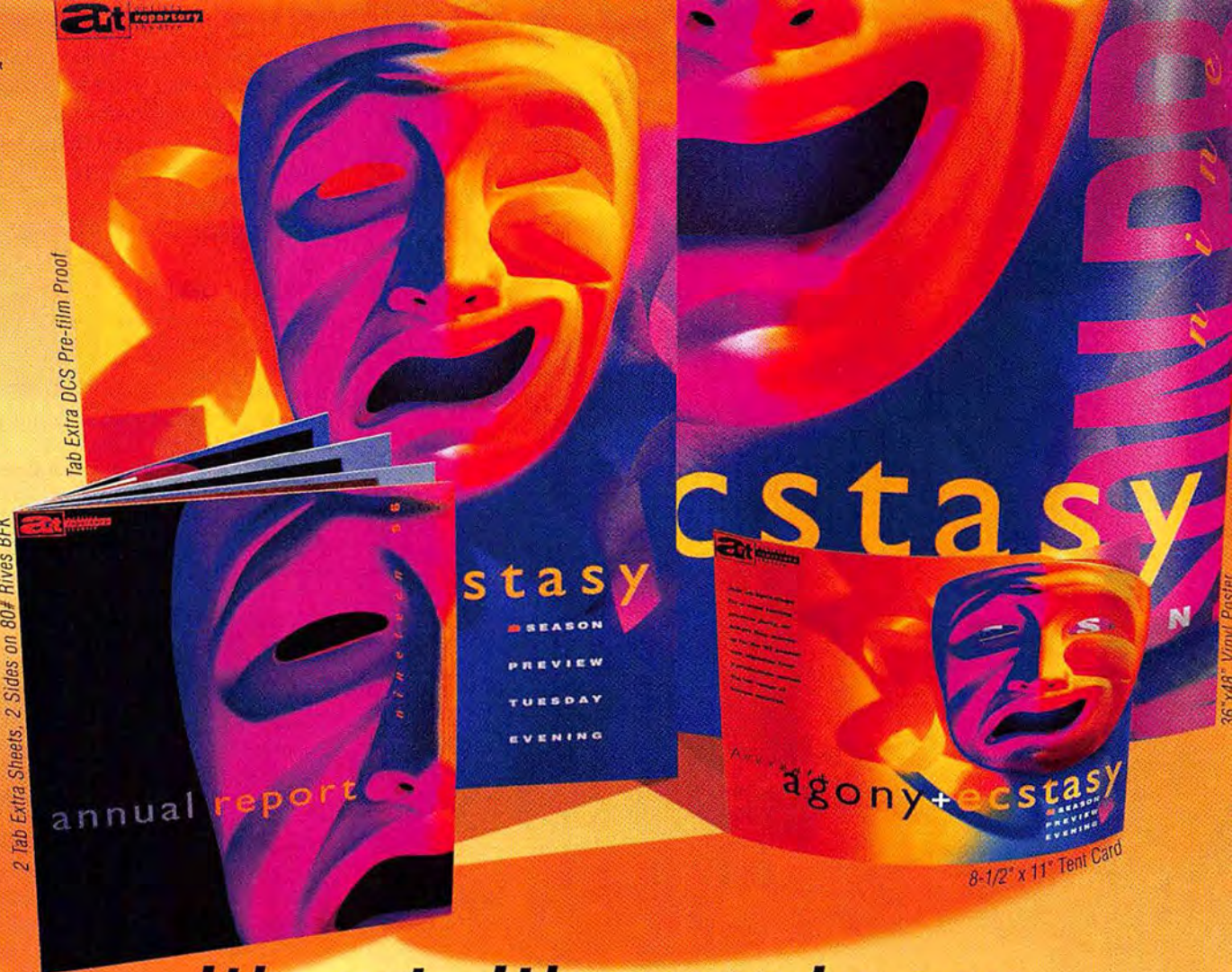
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"people were focused on building desktop applications. Now, people are shifting to network-optimized applications."

The **Silver Lining** Gable disagrees that Apple will be left out of future Java directions. "It's never been a problem for Apple to try to influence future versions of Java," he says. "A lot of [OpenDoc] concepts that we have are going directly into Java Beans."

On the bright side, given Apple's commitment to Java, Macintosh users can almost certainly expect improved compatibility with and performance from Java applets. And perhaps the Macintosh community can look forward to being the beneficiary of an industrywide movement for a change. Says one OpenDoc developer, Kim Cooper of Digital Harbor, "Apple has been self-isolating; Java [buys Apple] admission to the big dance. Maybe Apple can bring their innovation and experience on component architecture—I don't think that anyone can beat them on that."

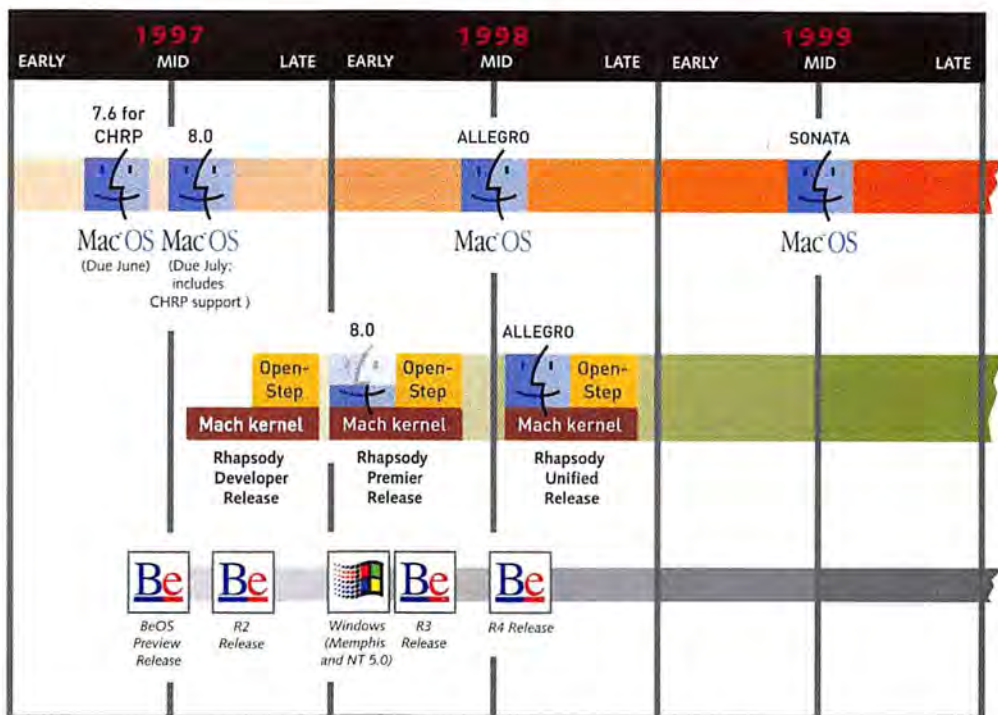
SPECIAL REPORT

Apple Revises OS Release Schedule

ALLEGRO SLIPS TO MID-1998, SONATA TO 1999

by Macworld Staff

As part of its March 14 restructuring announcement, Apple quietly revealed an adjustment to its schedule for releasing future versions of the Mac OS. Meanwhile, Be's plans for its OS continue on track, while Microsoft's next Windows revision faces a delay.



Under Apple's revised OS release schedule, Sonata has moved from 1998 to 1999.

Release dates for Rhapsody, BeOS, and Windows are also shown.

Allegro and Sonata Originally, Apple said it would release Mac OS 8 (formerly known by its code name, Tempo) in July, followed in 1998 by two full system releases—Allegro and Sonata—and one system update. Under the new OS timetable, users next year will see only one major Mac OS release, Allegro, and two system updates. Apple has moved Allegro from early 1998 to a midyear release, but has not set a time frame for shipping the updates, which will include bug-fixes and minor performance enhancements. Sonata will ship in 1999, but Apple won't say whether the upgrade will be ready early or late in the year.

In June, Apple plans to release a special version of Mac OS 7.6 for the Common Hardware Reference Platform (CHRP). Mac OS 8, which ships a month later, will also include CHRP support.

The schedule for the three Rhapsody releases has

not changed. The Developer release is scheduled for mid-1997, Premier for early 1998, and Unified for mid-1998, according to Apple OS marketing chief Jim Gable.

BeOS Timeline Meanwhile, Be has announced its rollout plans for the BeOS, which will be available as an alternative to the Mac OS on systems from Power Computing, Motorola, Umax, and other vendors. The next release of the software, the BeOS Preview Release, will be available in beta for developers in May. A few weeks later, the company plans a public release, which will feature a revised user interface; a faster file system; and support for Unicode, a standard for multilingual computing.

Be marketing director Mark Gonzales says the BeOS Preview will be "roughly equivalent" to Rhapsody Premier, because both will be offered to the general public in addition to developers. The mid-1997 Rhapsody Devel-

oper release will be available only to developers.

Following BeOS Preview will be an R2 release this fall that features changes to the BeOS Media Kit (Be's equivalent to QuickTime) along with revisions based on feedback from users and developers. R2 will also incorporate Fredlabs' VirtualMac software, which lets you run Macintosh applications from within the BeOS. Be plans two software releases in 1998: R3 in March or April and R4 in late summer or early fall.

Window Pains Microsoft is having its own difficulties meeting its OS rollout schedule. In March, Microsoft posted a product bulletin on Memphis—the code name for the next version of Windows 95—indicating that it would slip from a mid-1997 release to later in the year.

Some Microsoft-watchers expect a further delay until the first quarter of 1998, when Windows NT 5.0 is also slated for release.

New Products

THE LATEST MACINTOSH RELEASES

Edited by Keith Mitchell

COMMUNICATIONS

The Need for Speed

Impatient Internauts can boost their modem connections to 56 Kbps with an upgrade from Hayes (770/441-1617, <http://www.hayes.com>). The upgrade is free for customers who have purchased Optima 33.6- or 28.8-Kbps or Accura 33.6- or 28.8-Kbps modems between February 1 and April 15, 1997. Owners of other Hayes models can upgrade for \$89. Hayes will also convert other manufacturers' modems to 56 Kbps for \$99. The offer is good until June 30, 1997.

DISPLAY

Fit and Trim Monitor

Is that bulky CRT display crowding you out? ViewSonic (909/869-7976, <http://www.viewsonic.com>) is giving you a new way to save space on your desktop. The VP 140 ViewPanel active matrix LCD monitor is only 2.5 inches deep and provides a 14-inch-diagonal viewable area. The \$2499 monitor displays resolutions up to 1024 by 768. It weighs 12.1 pounds.



ViewSonic VP 140

GRAPHICS

Stir Up Your Web Site

While it can be fun creating fancy buttons, bars, and banners for your Web page, it can also take time. The web.Stir Artikit from Letraset USA (201/845-6100, <http://www.letraset.com>) features more than 500 images for Web authors. Four \$80 packages are available: Banners and Bars, Buttons and Bullets, Backgrounds and Dividers, and Images and Icons. A package of all four costs \$160.



Three D Graphics Texture Creator

Photo-Realistic Textures

Tired of your textures? A new texture-creation tool is now available from Three D Graphics (310/553-3313, <http://www.threedgraphics.com>). The \$130 Texture Creator includes 200 editable textures and lets you control such characteristics as lighting and opacity.

MULTIMEDIA

Spring Cleaning

Terran Interactive (408/278-9025, <http://www.terran-int.com>) supports Progressive Networks' new RealMedia Architecture in the latest version of its \$359 Media Cleaner Pro 2.0. Media Cleaner allows Web authors to easily optimize and compress high-quality RealMedia movies for delivery over the Internet. Current owners of Movie

Cleaner can upgrade for \$99 until June 1, 1997. After that, the upgrade will cost \$129.

Easy Export

The new MPEG Exporter from Astarte (612/483-5338, <http://www.astarte.de>) is a QuickTime extension that allows users to convert any QuickTime movie to MPEG format. It is available for free download from http://www.astarte.de/mpeg_exporter/, and from Macworld Online at <http://www.macworld.com/software/>.

Music Made Simple

Creating customized soundtracks for your multimedia projects doesn't have to be complicated. Smart-Sound For Multimedia 1.5 from Sonic Desktop Software (818/718-9999, <http://www.sonicdesktop.com>) is designed for users who aren't experienced with sound-editing programs. The \$179 package has added Web enhancements such as RealAudio support. Current owners can upgrade for \$35.

NETWORKING

Cross-Platform PC Cards

Whether you have a PowerBook or a PC laptop, Dayna (801/269-7200, <http://www.dayna.com>) will let you use the same Type II PC Card for high-speed data and fax connections. Dayna's newly updated CommuNICards come in three versions: a 10BaseT Ethernet adapter for \$109, a 33.6-Kbps data and fax modem for \$189, and one that combines both capabilities for \$349.

ONLINE

Internet On-Ramp

Users who need multiuser Internet access may find WebRamp Entré, from Ramp Networks (408/988-5353, <http://www.rampnet.com>), the route to take. The \$849 package includes four 10BaseT and two analog ports, and allows voice, fax, and up to 253 Internet connections to coexist on a single ISDN line.

X Marks the Spot

WebX, a \$495 WebStar plug-in from MacXperts (804/353-7122, <http://www.macxperts.com>), lets you connect a Mac OS Web server to any Oracle 7 database. The plug-in generates HTML pages from Oracle stored procedures when the database is queried.

FileMaker, Meet the Web

Web Broadcasting (415/329-9676, <http://www.macweb.com>) has released two Web-server plug-ins for FileMaker Pro 3.0. Web FM 3.0, \$245, links FileMaker to the Web or an intranet so developers can build databases that use a browser interface. PICT FM, \$125, enables PICT-to-JPEG conversion of images stored or referenced in FileMaker fields.

Shrinking GIFs

The main offender in Web-page download time is graphics. A Smaller GIF by Pedagogy Software (250/638-8606, <http://www.peda.com>) compresses animated GIFs by various methods. The program is available via download for \$22.

STORAGE

PowerBook Overdrive

VST Technologies (508/263-9700, <http://www.vsttech.com>) has announced three storage products for the PowerBook 3400. The \$350 VST Zip 100 plugs into the expansion bay and functions like an external Zip drive. The \$500 DynaMO magneto-optical uses 128MB or 230MB cartridges. A 1.2GB expansion-bay hard drive is available for \$600.

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Reviews

Color Laser Printers

APPLE AND IBM PRODUCTS
DIFFER GREATLY DESPITE
IDENTICAL ENGINES

COLOR LASER PRINTING IS MORE affordable than it was a year ago, but high-quality color laser output is still luxury-priced, as evidenced by the two latest offerings from Apple and IBM. Actually, Apple's newest Color LaserWriter isn't really new. The 12/660 PS differs from its predecessor, the 12/600 PS, in only two respects: it comes with a standard 16MB of RAM instead of 12MB, and it's nearly \$1000 cheaper. Although the lower price and additional RAM are welcome improvements, the 12/660 offers middle-of-the-road performance compared with the IBM Network Color Printer, an impressive newcomer in the color laser market. The IBM is dramatically faster than the Apple, offers built-in print spooling, and comes with an internal hard drive. Unfortunately, it's also nearly \$3000 more than the Apple printer.

Engine by Canon

Both of these printers offer true 600-dpi resolution and a maximum print speed of 3 color pages per minute (12 ppm on monochrome jobs). In fact, the two printers are built around the same Canon HX LBP Print engine. They're also both geared toward cross-platform network use, equipped with LocalTalk, Ethernet, and parallel ports that support printing

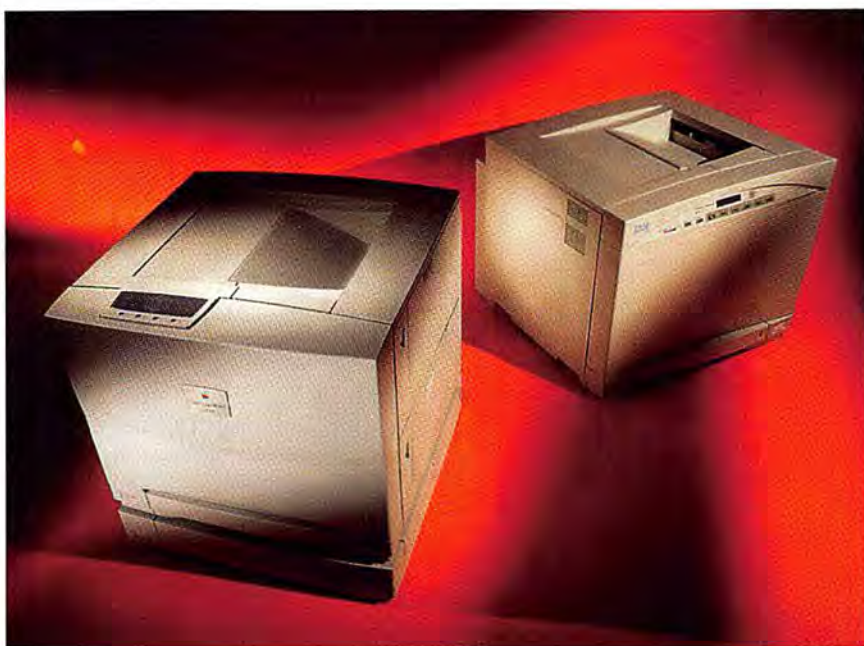
from Macintosh, PC, and Unix machines.

As with all color laser printers, setup of these products is a bit arduous. You have to install a fuser oil bottle, a photoconductor cartridge, a toner disposal box, and four separate color toner cartridges (which cost \$139 each and have to be replaced every 4000 pages or so). The color-coded cylindrical cartridges aren't difficult to load, though I wasn't overimpressed with the durability of the hardware. The protective sliding door on one of the cartridges failed to close when I removed it from the Apple printer, leaving my hands covered with cyan dust. And on the IBM model, I managed to break off

a small spring-loaded arm that clamps over the toner disposal box while I was checking for a paper jam.

As for the software, the Apple package is straightforward and easy to install. The IBM ships with a CD containing a more elaborate suite of printing utilities, but its files are poorly organized—all of them, including those for Mac, have DOS-style names that provide little or no clue as to their function. The Mac documentation—what little of it there is—feels like an afterthought.

The front panel of the Color LaserWriter is equipped with an informative display that uses illuminated icons to noti-



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fy you of problems. However, like all Apple printers, the Color LaserWriter offers no hardware controls on the panel; you have to configure the system using the accompanying software. The IBM offers a more sophisticated control panel, with eight buttons, four indicators, and a two-line LCD display. Using this control panel, you can adjust printer settings, toggle the various print queues on and off, and run diagnostic tests. I found the control panel menu structure easy to navigate and thought it was convenient to access these features from the printer itself.

Given the fact that the two printers are equipped with identical print engines, it's not surprising that their output quality is similar. Both produce sharp, vibrant output with razor-sharp text and deeply saturated color. In our Adobe Photoshop tests, the IBM produced slightly better results, with cleaner detail in high-contrast areas and more balanced color overall.

When printing a complex Adobe Illustrator file, the Apple rendered smoother gradients, while the IBM had noticeable banding problems. On the other hand, the Apple output looked slightly out of registration, leaving tiny white gaps between areas of color. The two printers produced nearly identical text output, though the IBM did a smoother, sharper job on a color logo embedded in our test Microsoft Word document.

The RISC Factor: IBM's Advantage

Despite their identical print engines, the IBM blew the Color LaserWriter out of the water in most of our speed tests—particularly on PostScript-intensive jobs—thanks to its superior EFI Fiery controller, driven by a 100MHz RISC processor. In its base configuration, the

IBM printed our Illustrator test file more than 2.5 times faster than the Apple, completing the job in 123 seconds, compared with 317 seconds. Likewise, the Apple took 271 seconds to output a QuarkXPress layout that the IBM processed in just over 108 seconds. Other tests yielded comparable results between the two printers; the IBM did just slightly better on a large Photoshop file, while the Apple edged out the IBM on the Word test.

The IBM also delivered far more impressive results when we looked at CPU release times—the time it takes for the printer to return control of the Mac to you after you send a print job. Overall, in its default configuration, the IBM was twice as fast as the 12/660 PS at releasing the CPU when spooling a job. (And when we upgraded the IBM to 32MB of RAM, its CPU release times were three times faster than the 12/660 PS's, even after we upgraded the Apple's RAM to 28MB—the closest available configuration to the IBM's 32MB upgrade.)

We got even better results with the IBM when we upgraded its driver software (Adobe's PS Printer 8.3.1) to Apple's LaserWriter 8.4.1, the driver shipped with the 12/660 PS. The IBM's printing speed increased by about 10 percent in spot tests, and its average CPU release times improved by about 60 percent.

If you upgrade the IBM to at least 32MB of RAM, you can use its built-in print-spooling features. When print spooling is activated, three different print queues appear in the Chooser: Normally you route your jobs to the Print queue, but you can send them to the Hold queue to store them for future printing; printing to the Direct queue allows you to bypass the printer's internal hard drive

and leapfrog over other jobs in the queue. Finally, there is the Printed Queue, which stores up to 99 of your most recently printed jobs on the printer's internal hard drive. The print-spooling features are useful for workgroups, but the setup isn't particularly intuitive.

The Last Word

If you can afford a \$9000 printer, the IBM's speed and output won't disappoint you—despite its lack of good Mac documentation. However, the smartest thing to do is pass on both of these printers and shop around for a better deal. Tektronix and Xerox both sell lower-priced printers that offer equally outstanding color output (see "Color Laser Values," *Macworld*, November 1996).—JOSEPH SCHORR

Color LaserWriter 12/660 PS

RATING: ★★ ★/6.7 **PROS:** High-quality output; easy software setup. **CONS:** Slow processor; no print-spooling features. **COMPANY:** Apple Computer (408/996-1010, <http://www.imaging.apple.com>). **COMPANY'S ESTIMATE:** **PRICE:** \$6100 (16MB base configuration).

IBM Network Color Printer

RATING: ★★ ★/6.9 **PROS:** Fast EFI Fiery controller; internal hard drive; built-in print spooling. **CONS:** Weak Mac documentation; confusing software installation; can't use print spooling without 32MB RAM upgrade. **COMPANY:** IBM (404/238-1234, <http://www.printers.ibm.com>). **LIST PRICE:** \$8999 (16MB base configuration).



Same Engine, Dramatically Different Speed Results

Best result in test. Shorter bars are better. Times are in seconds. Printers are shown in order of overall performance.

	RAM	Short Multi- font Memo	Long Single- Font Report	Spreadsheet	Illustration	Bitmapped Photograph	QuarkXPress Newsletter	Web Browser
IBM Network Color Printer ^A	32MB	65	142	71	121	226	92	89
IBM Network Color Printer ^B	16MB	66	142	71	123	270	108	93
IBM Network Color Printer ^C	32MB	70	147	75	128	392	106	91
Apple Color LaserWriter 12/660 PS ^D	28MB	81	130	102	295	273	256	116
Apple Color LaserWriter 12/660 PS ^B	16MB	81	130	126	317	274	271	133

^A Spooling to internal disk disabled. ^B Standard shipping configuration. ^C Spooling to internal disk enabled. ^D Closest configuration to the IBM's 32MB upgrade.

Behind Our Tests

Both printers were connected via the Ethernet port and tested with their bundled print driver. Macworld Lab performed all tests using a Power Mac 7500/100 running System 7.5.5 with 32MB of RAM, a 256K

Level 2 cache, disk cache set to 1024K, virtual memory and RAM disk disabled, and AppleTalk and ATM 3.9 enabled.—Macworld Lab testing supervised by Jeff Sacilotto

Font-Management Tools

ADOBE TYPE MANAGER AND TYPE REUNION NOW OFFERED AS DELUXE PLATTER

ADOBE TYPE MANAGER AND Adobe Type Reunion once had pretty simple goals: ATM's was to display and print PostScript fonts at any size using font outline data, and ATR's was to shorten the Font menu by grouping fonts and displaying styles in a submenu. Not anymore. Both utilities have been substantially revamped and released as Deluxe versions (4.0 and 2.0, available separately or as a \$149.99 bundle) that put them on a par with the competition.



Drag-and-Drop Font Management Adobe Type Manager Deluxe lets you create font sets from a list of suitcases.

ATM Deluxe not only scales fonts for display and printing, like its predecessor (see "The Right Tools for the Job," April 1996), but now offers font management along the lines of Symantec's Suitcase and Alsoft's MasterJuggler Pro (see *Reviews*, September 1996). These new capabilities let you group font suitcases into sets and open only the fonts you need for a particular project, speeding up performance and keeping your Font menu brief.

Management Potential

ATM Deluxe begins by scanning your hard drive for PostScript and TrueType fonts, which it adds to its database. Creating font sets is easy: you simply drag suitcase icons from ATM's font list or the Finder into a new folder. You can then activate the entire set or individual suitcases. (The program automatically activates fonts that are needed in a document even if you've deactivated them.) You can also export sets and use them

on another computer running ATM.

Among ATM's other new talents is font substitution (borrowed from the discontinued SuperATM): if you open a document that calls for a font you don't have, ATM uses a generic font, plus the metrics in its database of Adobe font outlines, to create a facsimile of it. The program also lets you create Multiple Master font variations with custom widths, weights, and other design options. A new antialiasing feature smooths the edges of Type 1 fonts for better on-screen readability.

You can view and print font samples in a variety of sizes; unfortunately, you can't customize the sample paragraph or change the point size. Rascal Software's theTypeBook does a better job of displaying and printing samples (see *Reviews*, June 1995). And while ATM provides information on damaged font files, another Rascal product, theFONdler (see *Reviews*, April 1996) shows more detailed diagnostics.

ATM also lacks some of the features of Symantec's Suitcase—font compression, font-ID export, AppleScript support, and the ability to create sets for specific programs—but it offers things you won't find in Suitcase, including anti-aliased screen fonts, font substitution, and Multiple Master variations. The two programs also take different approaches to font management. For example, Suitcase encourages you to organize your fonts into folders and use the folders to create sets, while ATM Deluxe has you create sets from suitcases in a list. I found ATM's font list an easy way to create sets; others might prefer Suitcase's get-organized-first approach.

ATM Deluxe allows users to access fonts that are shared over a network, albeit awkwardly: if you don't lock font suitcases to prevent them from being modified by the program due to ID conflicts, only one user at a time can access the shared fonts.

I do have two complaints: the manual is clear but short on details, and although the Report command shows a suitcase's location, the one-line listing isn't always long enough to show the entire folder path.

Reunion Retooled

The new, Power Mac-native ATR also deserves its Deluxe designation. Like earlier versions, ATR Deluxe shortens font menus by grouping fonts into families; submenus show style and weight variations. This feature is indispensable if you use Multiple Master fonts, which can have dozens of variations. Even handier is an option that lets you rename fonts, including Multiple Master fonts.

Several new features put ATR Deluxe in the same class as Impossible Software's TypeTamer (see "The Right Tools for the Job," April 1996). For example, you can put the most recently used fonts at the top of the Font menu for easy access. And ATR Deluxe ties into ATM Deluxe by reading ATM's font sets; inactive fonts are grayed out in the Font menu, but a menu choice lets you open ATM and activate them. Unlike TypeTamer, ATR doesn't let you press a letter key to find a font name, display a pop-up character set, or scan a document and list its fonts. ATR also lacks a real manual, relying instead on a Read Me addendum.

The Last Word

Minor complaints aside, Adobe Type Manager Deluxe does a solid job of managing fonts, and offers features such as font substitution and antialiasing as well. Unfortunately, nothing in Adobe Type Reunion Deluxe—although this version sports some excellent enhancements—is compelling enough that I can recommend it over other font-menu managers.—ERFERT FENTON

Adobe Type Manager Deluxe 4.0

RATING: ★★★★★/7.5 **PROS:** Easy drag-and-drop set creation; font substitution; font autoactivation; antialiased display. **CONS:** Minor bugs; skimpy documentation. **COMPANY:** Adobe Systems (408/536-6000, <http://www.adobe.com>). **LIST PRICE:** \$99.95.

Adobe Type Reunion Deluxe 2.0

RATING: ★★ ★/6.8 **PROS:** Groups recently used fonts for easy access; can change font names. **CONS:** Minimal manual; no keystroke access to font names in menu. **COMPANY:** Adobe Systems (408/536-6000, <http://www.adobe.com>). **LIST PRICE:** \$60.

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InterJet

ALL-IN-ONE OFFICE INTERNET CONNECTION

SETTING UP A PERSONAL Internet connection may be child's play, but putting an entire office on the Internet is still a royal pain. You have to mess with the router configuration, IP addresses, e-mail serving, and security. Getting all the parts working can take days out of your schedule and years off your life.

Enter Whistle Communications' InterJet, a toaster-size box that has absolutely everything you need to get your office on the Internet. Designed for lightweight sites that don't need CGI's (Common Gateway Interfaces), this easy-to-use network device connects to your LAN on one side and either a regular phone line or an ISDN terminal adapter (TA) on the other. After the initial setup, which takes just a few minutes, you're ready to go with automatic dialing, dynamic bandwidth allocation to 128 Kbps, dynamic IP addressing, and e-mail serving, along with both internal and external Web servers and a security firewall. The entire ensemble is very Mac-friendly, but it supports Windows machines equally well.

The InterJet box contains a dedicated computer, a built-in battery backup, 8MB or 16MB of RAM, and a 1GB or 2GB hard disk (depending on the configuration). On the back are serial, modem, and Ethernet ports, including a four-port Ethernet hub. The front has an LCD display, function keys, and a ten-key numeric pad. The internal Intel 486 CPU runs BSD Unix, but fear not—you'll never know that Unix lives within, because Whistle has gone to great lengths to eliminate any need for Unix incantations.

Easy Setup

After plugging in all the cables (every imaginable cable is supplied) and making sure you have a good phone connection, you're ready to run the InterJet's self-configuration program. This feature requires that your Internet service provider give you a special configuration code and dial-in phone number; the InterJet only works with certain ISPs (Netcom and a few others), from whom you actually purchase the product. For self-configuration, you

key into the front panel a 24-digit ID number and telephone number supplied by your ISP. The InterJet then calls the ISP using its built-in 33.6-Kbps modem, configures itself, and is ready to go. If you've connected an ISDN TA to the InterJet's serial port, it automatically configures and tests the TA for you, too.

After initial setup, you're ready to configure one or more computers on your LAN to be administrative consoles for the InterJet. The supplied Mac installation disk locates the InterJet on your LAN, installs any necessary system software, sets



ROBERT PERKY

the appropriate TCP/IP values, and loads Netscape Navigator. Navigator then starts up automatically, displaying the InterJet's Web-based administrative interface.

Setting up the other computers on your LAN is even easier. If you already have TCP/IP installed, you just set each computer to use dynamic IP addressing; the InterJet automatically assigns IP addresses for you. Otherwise, you can use the InterJet's setup disk to load Open Transport and Navigator.

Feature City

The InterJet's other features are a cornucopia of Internet functionality, all administered using the Web-based point-and-click console interface. The shared Web-surfing server acts as both a security firewall between your LAN and the Internet and an automatic dial-up. You specify how long a connection should remain open with no traffic before the

InterJet automatically disconnects. With ISDN's subsecond dialing, you appear to have a dedicated connection.

The built-in e-mail server handles both internal LAN mail (using POP3 and SMTP) and external Internet e-mail using your company's unique domain name. You specify how frequently the InterJet should connect to the Internet to transfer incoming and outgoing mail.

In addition to setting up an intranet, you can set up an external Web site maintained on your InterJet and automatically uploaded to your ISP's dedicated Web server whenever you make changes. The InterJet also functions as a Mac and Windows file server. You use the Chooser to mount AppleShare virtual disks from the InterJet to access its bundled software: Eudora Light, Claris Home Page, Microsoft Word Internet Assistant, and various utilities. You can also use the AppleShare interface to maintain your Web pages on the InterJet's hard disk.

In my tests, the InterJet performed well over both modem and ISDN connections. I was able to get the full 115 Kbps throughput my Motorola BitSurfr Pro ISDN TA supports. (Whistle says a planned Ethernet-to-Ethernet version of the InterJet will support high-speed T1 and frame-relay Internet connections.) And the InterJet's built-in battery backup lets it ride out brief power fluctuations and outages. It can also perform a controlled shutdown during a sustained power outage and automatically restart once continuous power returns.

The Last Word

The InterJet is a rare combination of elegant design and solid engineering, and its excellent support for both Mac and PC networks puts it over the top. You can spend a lot of time and money rolling your own office Internet connection, or you can let the InterJet take care of everything for you.—MEL BECKMAN

RATING: ★★★★★/8.6 **PROS:** One-step configuration; Web-based administration; dynamic IP addressing; integrated AppleTalk file server. **CONS:** Only works with specific ISPs. **COMPANY:** Whistle Communications (415/577-7000, <http://www.whistle.com>). **COMPANY'S ESTIMATED PRICE:** InterJet 100 (8MB of RAM, 1GB hard drive) \$1995; InterJet 120 (16MB of RAM, 2GB hard drive) \$2395.

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Spelling Checkers

ONLINE ARMY KNIFE SLIPS PAST SPELLTOOLS, SPELLSWELL PLUS

ADD-ON SPELLING CHECKERS are useful when you're working in a program that doesn't have one built in; they let you maintain a single customized dictionary, they add glossaries and other handy features, and they're accessible from any application. Joining the popular stand-alone Spell Catcher from Casady & Greene (see *Reviews*, December 1996) are JEM Software's Online Army Knife (OAK) 1.2, Working Software's Spellswell Plus 2.1.1, and Newer Technology's SpellTools 1.2.1. OAK is clearly the best

that it lets you store URLs in a separate, editable Internet dictionary (all three can be set to ignore HTML tags).

OAK tries to be much more than just a spelling checker, piling on a grammar dictionary, a built-in text editor reminiscent of SimpleText, a quick-launch utility, a Crossword Wizard, and the ability to play System 7 sounds and QuickTime movies. These extras are nice, but OAK might have been stronger if it remained focused on text processing rather than taking a kitchen-sink approach. An installer program would help, as would a more sober approach in the manual; it tries to be chatty but often careens over the line into giddiness.

Like OAK, SpellTools works best if you add it to your Startup Items folder. But unlike OAK, which appears in every application, SpellTools lets you choose which programs display its floating palette, by dragging the program icons onto the SpellTools icon.

From the palette you can run the spelling checker, have the selection read to you using the Mac's text-to-speech capability, insert boilerplate text from a pop-up menu, and apply Text Tools (for example, change case, get a word count, and find and replace within the selection).

Spellswell's claim to fame is that it works with programs that support the Word Services Apple events suite. And like all the spelling checkers tested here, it can inspect the contents of the Clipboard. Unfortunately, Spellswell just isn't compelling; it works, but not as conveniently or quickly as OAK or SpellTools. And of the three, only Spellswell lacks a glossary feature.

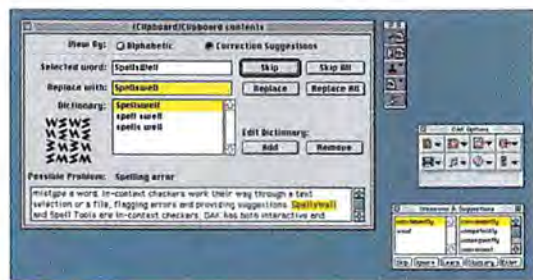
Precision Triumphs Over Size

I tested the programs—along with Spell Catcher and ClarisWorks' built-in spelling checker for comparison—against 100 unusual but correctly spelled words. Online Army Knife fared the best of the three, even though its 67,000-word dictionary is the smallest; it failed to recog-

nize only 19 words, including *brushfire*, *recuse*, and *snuggly*. With about 68,000 words in its main dictionary, SpellTools flubbed 21 words—*acerbic*, *feisty*, *omnivore*, and *rictus*, to name a few. And despite having the largest dictionary (93,000 words), Spellswell didn't live up to its name; it missed a whopping 46 words, including *airfare*, *coworker*, *preachy*, *punditry*, *synergy*, and *teleconference*. ClarisWorks' spelling checker missed only 15 words and seemed to contain more modern words than the others, though it did miss *gigabyte*. (Spell Catcher missed 14 words, but I've been adding to its dictionaries for five years.)

The Last Word

If you're like most people, the spelling checker built into your word processing program is all you need. But if you insist on perfect spelling in *all* your documents, such as e-mail messages, you need an add-on spelling checker. I found Spellswell Plus to be long in the tooth, inflexible, and inaccurate. SpellTools fared a little better, but the best of the bunch is the speedy Online Army Knife. In spite of some rough spots, such as an occasionally clumsy user interface, it edges out the more established Spell Catcher in some areas. With a little more work, OAK could be the one to beat.—TOM NEGRINO



Can You Spell "Interface"? Taking up varying amounts of screen real estate are Spellswell (the large dialog box), Online Army Knife in interactive mode (the two floating windows on the right), and SpellTools (the tiny vertical palette).

of the three, the inexpensive SpellTools holds its own, and the venerable but inaccurate Spellswell Plus trails the pack.

Spelling Strategies

Spelling checkers can take two approaches. Interactive checkers look over your shoulder as you type, beeping at you when you spell a word incorrectly. In-context checkers—Spellswell and SpellTools, for example—work their way through a text selection or file, flagging errors and making suggestions. OAK supports both interactive and in-context approaches, along with a batch mode that simply lists the misspelled words in a selection. All three suggest alternatives to misspelled words and let you add unrecognized words to dictionaries, but only OAK makes phonetic suggestions (if you type *filasifur*, OAK suggests *philosopher*) and fixes simple transpositions like *teh* without user intervention. OAK is also unique in

Online Army Knife 1.2

RATING: ★★ ★/6.6 **PROS:** Very fast; Internet-savvy; good batch checking. **CONS:** No installer program; mediocre manual. **COMPANY:** JEM Software (303/422-4766, <http://www.arielpub.com/jem.html>). **LIST PRICE:** \$69.95.

Spellswell Plus 2.1.1

RATING: ★ ★/4.8 **PROS:** Inexpensive; good integration with Apple event-enabled programs. **CONS:** Inadequate dictionary; no glossary; no interactive checking. **COMPANY:** Working Software (408/423-5696, <http://www.working.com>). **DIRECT PRICE:** \$14.95.

SpellTools 1.2.1

RATING: ★ ★ ★/6.0 **PROS:** Inexpensive; easy to use; nice glossary and text-manipulation features. **CONS:** No interactive checking. **COMPANY:** Newer Technology (316/943-0222, <http://www.newertech.com>). **LIST PRICE:** \$19.95.



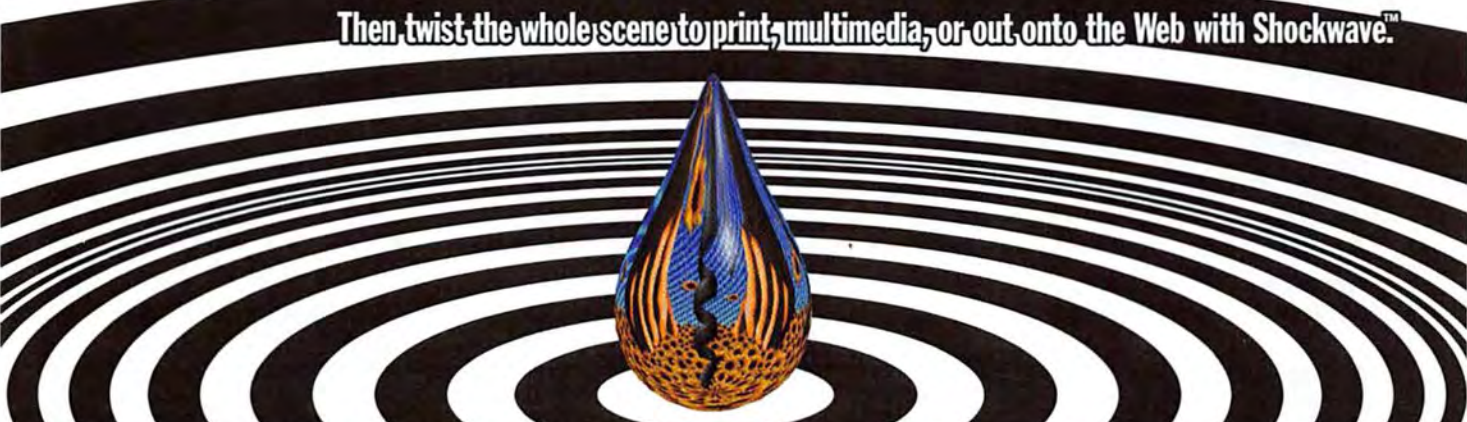
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Scanning Suites

EPAPER, VIEWOFFICE MISS THE MARK

SCANNING REQUIRES MORE THAN hardware: you need programs to process the photos, drawings, and other items you feed into your desktop scanner. NewSoft's ViewOffice PowerSuite and Second Glance's ePaper 1.5 are all-in-one scanning utilities that handle a variety of scanning-related tasks—OCR, image editing, and archiving—via a unified interface. Although both packages offer a handful of useful scanning utilities, neither is capable of delivering on all its promises.

Scan It In, File It Away

At the heart of the six modules that make up the ViewOffice suite is PrestoPage-Manager, the in-box for your scanned material. You scan images from any TWAIN-compliant scanner into Page-



In Good Form ePaper's markup tools let you fill in and annotate scanned-in forms with a variety of tools, including a rubber stamp that lets you place a date-stamped message across the page.

Manager, and they appear as thumbnails in PageManager's main window, the Desktop, where you can sort your scans and group them into folders.

ePaper provides even more elaborate document management. When you scan a document using the eScan module, even before the scan is completed you can assign it a name and keywords to index it for future searches. ePaper has a glitzier interface than PageManager, but its filing system is also less intuitive.

Both suites include low-budget OCR packages that simply aren't powerful enough to deliver consistent, effective results. PageManager's built-in OCR engine produced far too many errors on

anything other than flawless scans of perfect, single-column text. WordLinx, a second bundled OCR program, fared just as poorly. TextBridge 3.0, the program that ships with ePaper, provides faster and more accurate OCR than the ViewOffice programs, but it's still vastly inferior to a full-fledged OCR program.

I was pleasantly surprised by ViewOffice's PrestoBizCard module, which allows you to scan business cards into the appropriate fields of a built-in contact database. BizCard did a fairly good job of organizing the information correctly, even with a variety of business cards with different configurations.

Marking It Up

Both ViewOffice and ePaper allow you to scan a form, use a variety of markup and annotation tools to fill it out on screen, and then print or fax the finished document. Unfortunately, the results are universally disappointing.

All the tools in ViewOffice's PrestoForms module are clunky and limited; you can't set a default text style, font, or size for markup text, for example. Even worse, you can't change the color of text or the attributes of lines and arrows once you've created them. Printing out forms after they've been processed with PrestoForms yields poor results; annotations don't show up where you expect, and even high-resolution scans appear mottled.

eMarkup has a better set of tools than PrestoForms for marking up documents and adding annotations: a bracket tool and a great rubber-stamp tool that can overlay up to 31 different messages, such as "Paid" or "Received," on your scanned documents, along with the current date. Unfortunately, eMarkup doesn't allow you to set *any* preferences, and it crashed my system several times. eMarkup doesn't make it very easy to fill out scanned forms, either. Frankly, it's easier to roll a form into an old electric typewriter than it is to use either of these programs for the same purpose.

Graphics Tools

The ViewOffice suite contains a good set of inexpensive image-editing tools for working with color scans (ePaper, on the

other hand, doesn't provide any image-editing software at all). Primarily, you get a full copy of Microspot's simple but powerful Adobe Photoshop clone, PhotoFix (inexplicably called ImageFolio on screen). Although PhotoFix lacks Photoshop's more sophisticated features—layers and channels, for example—it's equipped with a strong set of tools that let you resize images, balance colors, and retouch details.

In a less practical vein, the suite also contains a special edition of MetaTools' Kai's Power Goo, the just-for-fun graphics program that lets you distort, swirl, and smudge photos to create hilariously grotesque pictures. Hardly a productivity tool, but quite entertaining.

The Last Word

The ViewOffice suite has a few duds, but PhotoFix and PowerGoo alone are worth the suite's price, assuming you don't already own Photoshop. Although ePaper offers slightly better OCR and markup tools, it's more than twice the price; it has no photo-retouching features; and it ships with a sloppy, incomplete manual that is filled with spelling errors, redundancies, and inaccuracies. If you're really serious about OCR, though, your best bet is to forgo both of these packages (which offer little more than the bundles that already come with low-priced scanners) and invest in one good OCR program, such as Caere's OmniPage Pro (see review in this issue) or Xerox's full-scale product, TextBridge Pro. Weak OCR is worse than none at all.—JOSEPH SCHORR

ePaper 1.5

RATING: ★★/3.8 **PROS:** Good markup tools; can catalog scans as they're created. **CONS:** No preferences for markup tools; buggy interface; terrible documentation. **COMPANY:** Second Glance Software (360/692-3694, <http://www.secondglance.com>). **LIST PRICE:** \$169.

ViewOffice PowerSuite

RATING: ★★★/5.0 **PROS:** Inexpensive; solid image-editing tools; business-card scanning capabilities. **CONS:** Weak annotation tools; unimpressive OCR features; poor forms performance. **COMPANY:** NewSoft (510/445-8600; <http://www.tophat.com>). **LIST PRICE:** \$79.

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Front Office 1.6 LE

A BAD TEMP WOULDN'T GARBLE MESSAGES THIS BADLY

THE IDEA BEHIND STF Technologies' Front Office 1.6 LE is a sound one: set up your Macintosh and a voice-enabled modem as a telephone answering machine, so a small office can sound as if it's big enough for an expensive proprietary voice-mail system. You can create voice mailboxes for up to ten employees (or family members) for only \$59 and run the whole shebang on a 68040-based Mac that's gathering dust.

As telephony applications go, Front Office 1.6 LE is comparatively easy to configure, provided you follow the manual's directions explicitly. Setup could be far more intuitive—for instance, an Add Mailbox command would be less threatening to most users than the cryptic Edit Database—and an automatic setup wizard would be a delight. Nonetheless, I've seen much worse.

Trouble Ahead

No, the problem with this software is that it simply doesn't take messages properly: the version I initially received clipped off the ends of the recordings and couldn't recognize when an incoming caller hung up the phone, tying up the line for almost a minute after a message ended. When I mentioned these glitches to STF, I received a couple of updated versions, both of which made the problems worse, not better. Telephony software that can't take messages is roughly the equivalent of a word processing application that intermittently deletes words. (The so-called patched version is numbered 1.6.2; STF plans to ship it by the time you read this—with far more quality-assurance testing conducted, one hopes.)

I'm the first one to admit that getting a computer, a fax modem, and telephony software to interact with the telephone system is only a shade simpler than successfully logging on to America Online at dinnertime. Oddly enough, Front Office has this capability all worked out when it comes to recording outgoing messages. All you have to do is set up your voice-enabled fax modem (I used a Comstar XT SVT from Zoom Telephonics, one of a handful of STF-recommended modems),

go to the Edit Database command, and start adapting the sample setup to your company's specifications.

There are two applications in Front Office. Front Desk Manager lets you set up answering-machine mailboxes, while Front Desk Clerk allows you to retrieve or forward messages. Recording an outgoing message is as simple as clicking on the icon marked Record, one of four symbols that Front Office's interface borrows from a typical cassette player.



Confusing Cover-Up When setting up outgoing messages, Front Office LE gives you space in which to write your script. Unfortunately, the dialog box covers up the hierarchy of mailboxes you've built, and it can't be moved, forcing you to memorize or write down the list of employees and their corresponding mailboxes.

To record, you can either use your handset or the microphone that comes with the fax modem. Either way, when you click on the Record icon, the dial tone stops; you control the phone, the software, the modem, and the computer from there. In theory, an incoming call should be able to do the same thing, but in reality it doesn't.

The List Goes On . . .

Front Office has other issues, too. The window that shows the hierarchy of mailboxes can't be expanded, so you can't see more than five mailboxes at once—you must scroll. When you're recording an outgoing message, you get a handy text box for writing a script, but it hides the mailbox hierarchy and can't be moved (see "Confusing Cover-Up"). As a result, you have to memorize the mailbox assignments of each employee (or family mem-

ber) to make sure you record the correct "Press 1 to speak to . . ." sequence.

And although Front Office lets you set up passwords for accessing mailboxes—which is good—the passwords must have at least four characters, a standard limitation of voice-mail systems. Unfortunately, if you type fewer than four characters, the software doesn't warn you that you've typed an illegal password. As a result, you can't access that mailbox, and it must be deleted and re-created.

Front Office is not completely without merit. Linked with STF's own fax software, Faxstf (see *Reviews*, October 1996), Front Office can accept incoming faxes as well as voice messages. Unlike with most competing voice-mail applications,

you can actually intercept an incoming call from voice mail, much as you can pick up the phone when your standard answering machine is recording. Setup is relatively painless, too, as long as you carefully follow the manual when setting up mailboxes. Unfortunately, these few perks are easily outweighed by the software's inability to perform its basic task—message recording—properly.

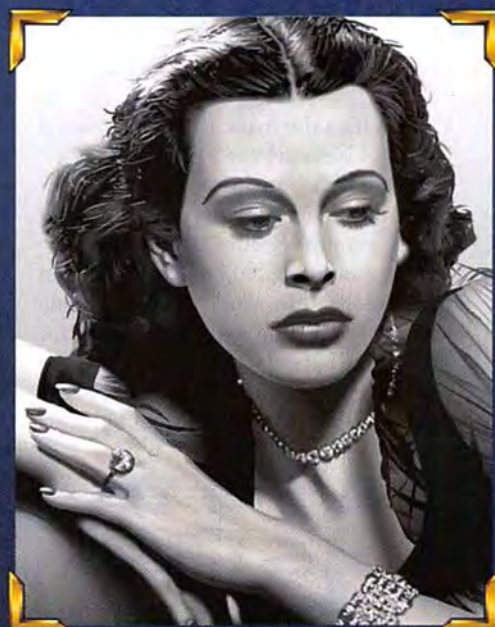
The Last Word

As we found in our last telephony feature (see "Your Mac Is Ringing," November 1996), Mac voice-mail software is

a disappointing breed. Front Office LE 1.6 is no exception, actually failing even to take messages properly. As the feature mentioned, Cypress Research's Voice Messenger offers a slight advantage over Front Office for multi-user voice mail—and Diamond Multimedia's SupraSonic VoiceMail works well for single users—but neither offers enough additional benefits to make the switch to Mac-based voice mail worthwhile. For now, stick with your answering machine or a proprietary, non-Macintosh voice-mail system.—HOWARD BALDWIN

RATING: ★★/3.0 **PROS:** Easy to record outgoing messages; value-priced. **CONS:** Clips messages short, rendering them useless; interface lacks usability. **COMPANY:** STF Technologies (816/220-0100, <http://www.stfinc.com>). **LIST PRICE:** \$59.

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Media-Management Tools

CUMULUS 3.0 AND FETCH 1.5 TAME CLIP-MEDIA FILES

ORGANIZING A LIBRARY OF DIGITAL stock photography and clip art can be a nightmare, especially if you've accumulated thousands, or even tens of thousands, of files. Media-management programs can rescue you from the frustration of repeatedly sifting through stacks of CD-ROMs and archive disks, letting you browse, search, preview, and retrieve your digital files. Two such programs, Canto Cumulus and Extensis Fetch, were recently updated; Canto has given Cumulus Desktop 3.0 an improved interface and more-flexible display options, while Fetch 1.5—which Extensis recently acquired from Adobe—has gained PowerPC-native speed. Though both programs offer fast, intuitive tools for managing your media, Cumulus is the more flexible of the two, with better features for locating and retrieving files.

Drag In, Drag Out

Creating a catalog of files is a simple drag-and-drop affair with either program; you just drag a file, volume, or folder to Cumulus's Catalog window or Fetch's Gallery window. Both programs recognize a multitude of file formats and let you add custom filters. You can also selectively turn off file filters in either program so that the catalogs include only files of the types you choose. But Cumulus's enhanced file filters are more powerful than those in Fetch; for example, they let you extract information about the fonts used in a cataloged Adobe PageMaker document or up to 32K of text from an Acrobat PDF file.

Once your images are cataloged, you can display them as thumbnails or in a list view that you can sort by several criteria, such as file name or type. Cumulus lets you choose between three thumbnail sizes and rotate the thumbnails from landscape to portrait orientation; Fetch's Gallery window displays thumbnails in only one size, and they can't be rotated. Both programs can display full-size previews of cataloged images in all the standard graphic formats, as well as previews of sound and movie files. And both let you share your catalogs over a network. (For high-speed network image browsing,

Canto offers the five-client, server-based Cumulus Network for \$1995.)

Although both programs store detailed information about each cataloged item, Cumulus's Record Information window is more detailed and easier to read than Fetch's Info window. Fetch simply lists the file path of a cataloged item, for example, whereas Cumulus displays the path as a pop-up menu that lets you go directly to the item from the window.



Search Me Fetch's best feature: it lets you save and name sets of search criteria. You can find saved searches easily under the Search menu.

Moving images from a Cumulus or Fetch catalog to other applications is just as easy as the initial cataloging process. You can drag a thumbnail to the desktop to copy the original file, and plug-ins included with both programs let you drag files directly into QuarkXPress and PageMaker. (The \$595 Desktop Plus version of Cumulus also lets you display catalogs over the Web using the accompanying Cumulus Internet Image Server and a royalty-free browser plug-in.)

The Search Is On

If you judge a media-management program by its search engine, Cumulus is the clear winner over Fetch: Fetch allows you to search for files by only 4 criteria, compared with 15 for Cumulus. Searches are also easier to set up in Cumulus, which lets you define a search by typing only the first letter or two of each criterion. Fetch forces you to define each search using pop-up menus, but it does let you save a search definition and add it to the Search menu for future use (see "Search Me"). You can save search definitions in

Cumulus, too, but you have to load the saved search criteria before doing so.

Previous versions of Cumulus used keywords to organize catalog entries (see *Reviews*, August 1996). Version 3.0 uses a more intuitive drag-and-drop system of categories. Dropping a thumbnail into a category folder attaches it to that category. You can drag a group of cataloged items into a folder to categorize multiple items simultaneously, or drag multiple category folders onto a thumbnail to attach several categories to a file in one step. You can also double-click on a category folder to display only the items linked to that category, or drag the folder to the Find window to perform multiple-category searches. Dragging a category folder to the desktop creates a new folder in the Finder and automatically copies all the images in that category to the folder.

Fetch uses keywords to organize items into catalogs, a clunky system compared with Cumulus's categories. For example, to search by keyword you have to type it into the Find window; you can't use drag-and-drop shortcuts. The keyword functions are the weakest part of Fetch's otherwise polished interface.

The Last Word

Fetch has some outstanding features, but its search engine, browser, and keyword functions lack Cumulus's flexibility and ease of use. For the same price, Cumulus Desktop offers a superior interface and more powerful control over your media catalogs.—JOSEPH SCHORR

Cumulus Desktop 3.0

RATING: ★★★★★/7.6 **PROS:** Strong categorization system; rich search functions; choice of thumbnail size. **CONS:** Clumsy system for saving search criteria. **COMPANY:** Canto Software (415/905-0300, <http://www.canto-software.com>). **LIST PRICE:** \$99.95.

Fetch 1.5

RATING: ★★☆☆/6.8 **PROS:** Lets you define and save search criteria; numerous keyboard shortcuts. **CONS:** Supports only one size of thumbnail; limited search functions; poorly implemented keyword feature. **COMPANY:** Extensis (503/274-2020, <http://www.extensis.com>). **LIST PRICE:** \$99.95.

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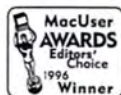
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Reviews

Now Contact and Up-to-Date 3.6.5

INFO MANAGERS GET CONNECTED TO THE NET

NOW CONTACT AND NOW UP-to-Date haven't changed radically since the last time *Macworld* reviewed them (see *Reviews*, November 1995), but Internet users will welcome the changes. The most notable improvement is the ability to attach e-mail addresses and Web-page URLs to your contacts and events by dragging them from your browser or mail program.

Version 3.6.5 offers Internet preferences where you select which e-mail program and Web browser you use. (Unlike with version 3.6, you're no longer limited to using Netscape Navigator—you can

Now Contact is QuickMerge, which lets you import contact data into templates in Microsoft Word or Corel's WordPerfect. QuickMerge uses Apple events to quickly combine a selected group of contacts. Version 3.6.5 also includes Now Up-to-Date Web Publisher, which lets you publish calendars and address books on the Web (see *Reviews*, December 1996).

Although Now leads the PIM market with this bundle, it could still benefit from improvements to its calendar and contact functions. You still can't conveniently group events, to-do's, and contacts, as you can with Now's own TouchBase and DateBook Pro products. And though you can create a Call item in Now Up-to-Date, you can't actually dial a contact there; you must go to Now Contact or to one of the program's extensions. Other useful features still missing include event templates and indicators in the Year view of which days contain events.

Since version 3.5, the bundle has gained synchronization with the Newton 2.X operating system via the \$39.95 Now Synchronize utility. New purchasers of Now Contact and Up-to-Date receive a coupon for a free copy of the upcoming version of Synchronize, which will offer contact, calendar, and memo synchronization with the U.S. Robotics Pilot (see *Reviews*, April 1996).

The Last Word

Now Contact and Now Up-to-Date have been top contenders in the PIM market for years, and recent updates of competing products, such as Claris Organizer and Symantec's Act, haven't come close to dislodging them from their superior position. Now's PIM combo is especially compelling if you need to share calendars or contacts over a network or the Internet, but even for the single user the combination of Now Contact and Now Up-to-Date has no peer.—TOM NEGRINO



Casting the Net Now Contact's new QuickNet lets you use the Web to search for a variety of information about your contacts.

now use Claris Eudora Pro, and Microsoft's Internet Explorer, among others.) Now Contact also lets you automatically add a log entry in your contact notes when you send e-mail. Because Contact and Public Event servers now can use TCP/IP as well as AppleTalk, you can share calendars and contacts over the Internet.

Now Contact's QuickNet feature lets you use the Web to search for contact information simply by opening a contact and choosing a search from the Web Services menu. You can search for the contact's e-mail address, phone numbers, and zip code, and even display a street map of the contact's address (these Web Services are plug-ins, and Now expects to add more). QuickNet launches your Web browser and jumps to Now Software's Web site, where it performs the search, calling on common Internet search engines such as Infoseek and Big Yellow. Once you find the information you're searching for, you can paste it back into Now Contact.

The other major improvement to

RATING: ★★★★★/8.6 **PROS:** Good Internet integration; great calendars and contact sharing. **CONS:** Still missing projects and busy-day indicators in year view. **COMPANY:** Now Software (503/274-2800, <http://www.nowsoft.com>). **LIST PRICE:** \$99.95.



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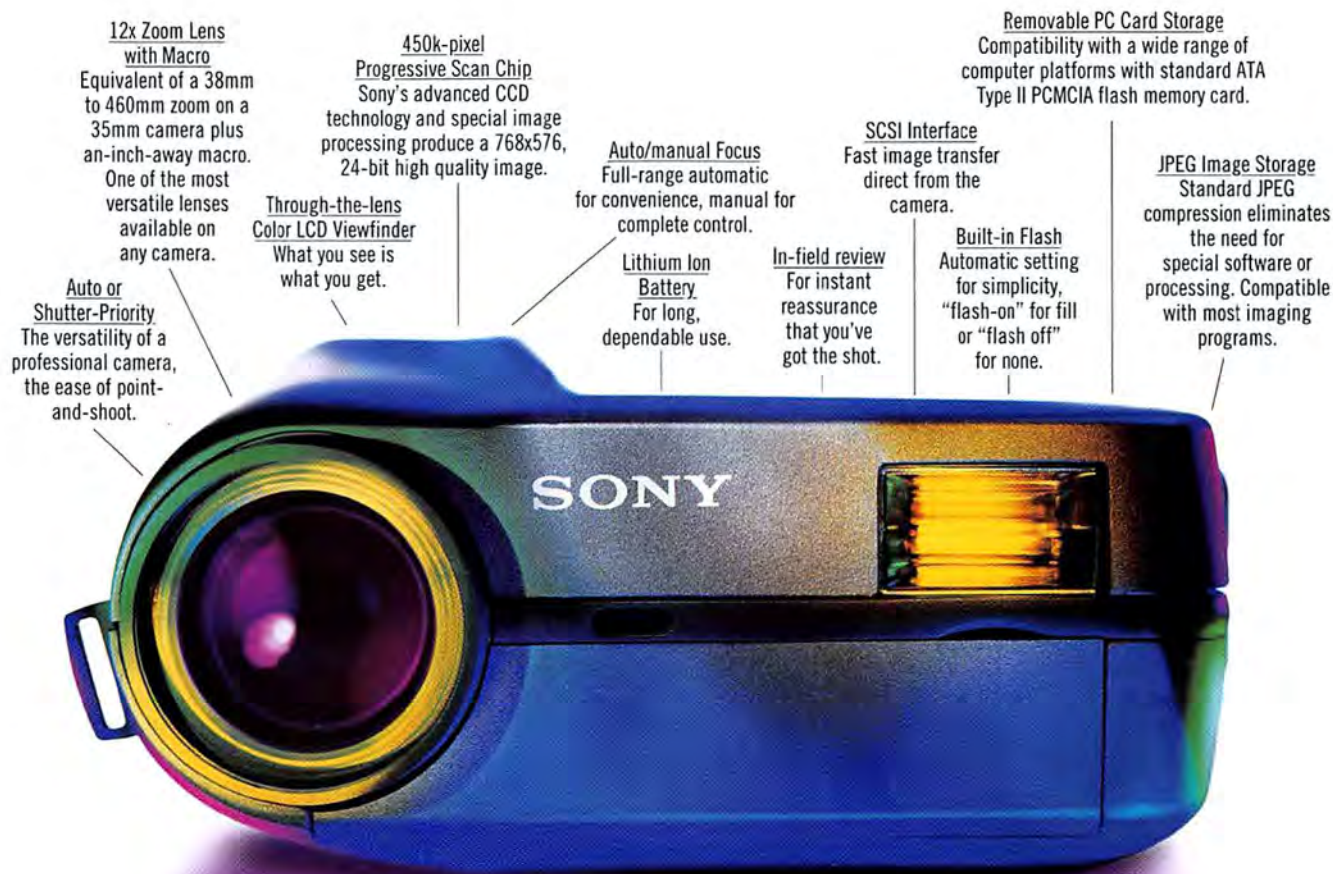
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MAE 3.0

MAC-IN-THE-BOX FOR UNIX
WORKSTATIONS

ON A MIXED NETWORK OF UNIX machines and Macs, Apple's Macintosh Application Environment (MAE) lets Unix users work effortlessly on Mac-originated files and lets Macintosh users take their first hesitant Unix steps. MAE creates a virtual Macintosh running in its own window on the graphical-interface Unix desktops of Solaris-based Sun Sparcstations or Hewlett-Packard 700-series workstations running HP-UX, much the same way that Insignia Solutions' SoftWindows creates a virtual PC on a Mac.

Installing MAE, however, is not a trivial exercise for a Macintosh user with no Unix background (security details and implementing the flexible-licensing system will be unfamiliar), and installing other applications into MAE sometimes requires juggling the Mac System Folder inside the Unix root directory. Once it's set up, MAE runs reasonably fast and proved more crash-proof than a real Mac—you can even plug in and unplug peripherals while it's running!

Although MAE makes the whole system's hard-drive volumes appear—in the Macintosh window—like Mac drives, MAE's integration with Unix is delightful. You can look up a Unix file using familiar Mac folders and double-click on it, and the Unix file opens within the appropriate Unix application in a Unix graphical X Window. Just as you would on a Mac, you use the Chooser for AppleTalk networking and printer selection; MAE offers an additional Chooser option of a "default lpr" command for printing to a Unix-driven network laser printer.

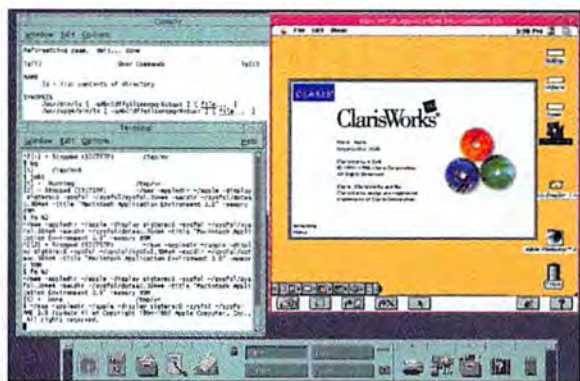
MAE's performance is also quite respectable. Using Wolfram Research's Mathematica, Microsoft Excel, and Adobe Photoshop, MAE's computation-intensive functions are similar to those of a Power Macintosh 6100, and the numerical evaluation of modest files of Mathematica expressions was nearly instant (although typically three to four times slower than the same evaluation in native Solaris Mathematica on the same system). Where MAE does feel a bit sluggish is in file-handling and interface operations; you get fast recalculations but less-than-snappy file open-

ing and scrolling within large spreadsheets and documents.

Version 3.0 incorporates System 7.5.3 functionality, and since the MAE group is part of the Rhapsody Blue Box development team, it's fairly safe to assume that 7.6-ready and further updates could be in the works. The addition of System 7.5.3 capability means that MAE now sports the latest versions of PC Exchange and Easy Open for easy handling of DOS and Windows files, and that the bottom of the Mac screen sports a Control Strip. AppleScript is also implemented in MAE 3.0—it's possible to write short AppleScripts to automate back-and-forth file handling from Mac to Unix.

The Last Word

If you have a Sparcstation or comparable HP workstation, MAE gives you a modern Mac with tons of memory for the



Give 'Em the Works ClarisWorks, in a demo version, is part of the MAE package and runs here in its own window on the Unix desktop.

price of a used, bare-bones Mac IIci. On mixed Mac and Unix networks, MAE 3.0 is one of the most versatile Unix utilities you could want.—CHARLES SEITER

RATING: ★★★★★/7.2 **PROS:** Fast, crash-proof Mac emulation. **CONS:** Documentation assumes Unix background; not compatible with all Unix workstations. **COMPANY:** Apple Computer (408/996-1010, <http://www.mae.apple.com>). **LIST PRICE:** \$459.

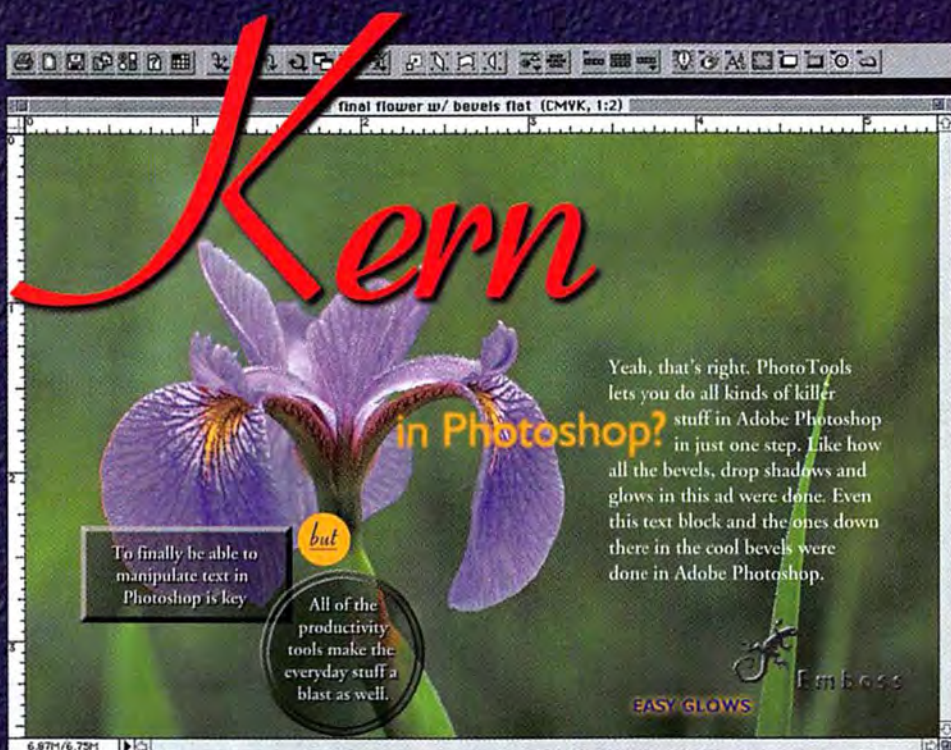
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DataShuttle 256

SUPERFAST ISDN FILE TRANSFERS

FOR PREPRESS GRAPHICS HOUSES transferring large multimedia files to and from clients, modems are a frustrating technology. At the current maximum data rate, a 50MB TIFF file requires more than four hours to move, and poor analog connections often cut speed by 25 percent or more. An ISDN line provides a means of escape: its 128-Kbps transfer speed can move a 50MB file in less than an hour, and its reliability ensures that the transfer won't be degraded or interrupted by a poor connection. What could be better than that?

How about two ISDN lines? RNS's DataShuttle 256 lets you combine two ISDN lines into a single 256-Kbps data pipe through which you can pump files at 2MB a minute, moving that 50MB file in about a half hour. You can install up to five DataShuttles on a single Mac, and run up to 20 simultaneous 64-Kbps data transfers to different locations. In addition to offering fast file transfers, the DataShuttle lets you run other network services—such as TCP/IP, ARA, and Timbuktu—over one of the ISDN lines.

The DataShuttle consists of a NuBus or PCI board and software: RNS's FileMover Pro, Shuttle ISDN Tool, and Shuttle Port. FileMover performs the fast file transfers, while the other two tools let you run modem-based applications over ISDN. Unlike most current ISDN gear, the DataShuttle lacks built-in ISDN NT1 (Network Terminator) devices for each port. You must supply them—at a cost of about \$150 each.

The DataShuttle user guide provides clear setup and operation instructions. You're required to supply the correct ISDN Service Profile Identifier (SPID) values for each line. Other ISDN devices automatically configure these values based on the ISDN phone numbers; with two ISDN ports to configure per board, the DataShuttle should offer this feature. If you have the correct SPIDs and hit no other snags, the DataShuttle can be up and running in minutes. Unfortunately, the user guide lacks troubleshooting information, making problem diagnosis difficult for inexperienced users.

Running FileMover Pro is straightforward, although there must be a DataShuttle at the remote end to receive files.

A built-in directory lets you store commonly called numbers, and a single click automatically dials up the quantity of calls necessary for the bandwidth you choose. After you create a list of files to move, transfers can proceed in the background while you use other applications. You can also specify that calls be disconnected when your transfer is complete.

DataShuttle performs its intended job of transferring large files very well. I consistently achieved its rated 256-Kbps (about 31K per second) throughput. But the FileMover Pro software has one major inconvenience: you can only push files to a remote location—there's no way to select remote files and receive them into your system, and thus you can't leave files for clients to pick up at their convenience.

The Last Word

The DataShuttle's two-line ISDN capability gives eight times the throughput of fast modems and twice the throughput of single-line ISDN, perfect if you have to



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move large multimedia files in a hurry. You can run up to five boards in one Mac, allowing you to set up an ISDN service bureau for multiple simultaneous transfers. The DataShuttle 256 is a powerhouse among file-transfer tools.—MEL BECKMAN

RATING: ★★/6.5 **PROS:** Fast; up to five DataShuttles can be installed per Mac. **CONS:** NT1's not included; documentation lacks troubleshooting information; not autoconfiguring; can't retrieve files from a remote system. **COMPANY:** RNS (805/968-4262, <http://www.rns.com>). **LIST PRICE:** \$1395.

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Mailing-List Servers

LETTERRIP AND LISTSTAR MANAGE MAILING LISTS WITH EASE

THE WEB'S UBIQUITY NOTWITHSTANDING, the most popular use of the Internet is still e-mail; organizations can use it not only for one-on-one communications, but also to broadcast announcements, send automated responses, and allow interactive discussions. Macintosh users who want to manage such electronic mailing lists now have two excellent products to choose from: StarNine Technologies' powerful, sophisticated ListStar 1.1 and the simpler, less expensive LetterRip 1.0.2 from Fog City Software.

Both products are easy to install and configure; actually making the list server functional is a little more difficult, however, because you have to specify list rules and subscriber addresses. LetterRip's simple interface makes that process relative-

administration a true Mac experience.

If you need more control over your mailing list, you may need to forgo simplicity for customizability. ListStar adds time-based services for digests, reporting, and automated administration. Customizable rules give you almost unlimited control over searching message contents and generating custom messages. And because the program supports AppleScript, you can add such features as paging and server maintenance. Power users may notice the lack of certain advanced functions, but overall ListStar excels at sophisticated mailing-list processing.

Of course, list servers must not only process mail but deliver it quickly and reliably. On a 200MHz 603e-based Performa 6400, LetterRip processed and delivered hundreds of outgoing messages per minute. StarNine recommends configuring ListStar to forward mail via another SMTP host; with this configuration, ListStar was also able to process hundreds of messages per minute.



Easy Configuration You can configure digests in LetterRip with just a few mouse-clicks.

ly quick and easy, while ListStar offers a range of options that can be a bit overwhelming at first.

Both products are adept at functions such as generating digests; providing moderated and private lists; and managing subscriptions, enclosures, and bounced messages. Both can either deliver e-mail directly to destination SMTP servers or use a relay host for delivery, and both support a virtually unlimited number of lists.

When it comes to managing these features, LetterRip balances flexibility with ease of use. Four simple dialog boxes present the program's options and offer all the customization most people will need. Digests are easy to configure, and the administration application lets you configure multiple list servers remotely over TCP/IP. In spite of some minor interface inadequacies—you can't assign multiple subscriber lists, for example—LetterRip succeeds in making mailing-list

The Last Word

LetterRip is an inexpensive, easy-to-use mailing-list server that will meet most users' needs, while ListStar's industrial-strength tools are geared toward more-demanding environments that need custom mail processing. Between the two, they leave no doubt that the Macintosh is a viable list-serving platform.—J.W. DAVIS

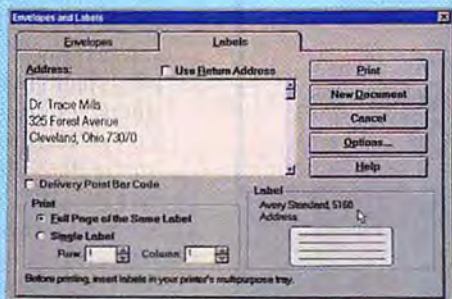
LetterRip 1.0.2

RATING: ★★★★★/8.8 **PROS:** Easy to configure; excellent performance; good value. **CONS:** Not as customizable as ListStar. **COMPANY:** Fog City Software (408/454-1405, <http://www.fogcity.com>). **LIST PRICE:** \$295.

ListStar 1.1

RATING: ★★★★★/8.3 **PROS:** Powerful; excellent performance. **CONS:** A bit overwhelming for novices; lacks some advanced features. **COMPANY:** StarNine Technologies (510/649-4949, <http://www.starnine.com>). **COMPANY'S ESTIMATED PRICE:** \$499.

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Reviews

MCA S600C

DOCUMENT SCANNING, WITH COLOR

DOCUMENT SCANNING WITH A flatbed scanner is a tedious, repetitive chore. Sheetfed scanners can help, but they usually have limited resolution and fall short when capturing graphics. Mitsubishi's MCA S600C scanner bridges that gap, combining proficient medium-speed document scanning with exquisite color capabilities.

The S600C is about the size of a compact ink-jet printer. It supports 64-level halftone, 256-level gray scale, and—unlike competing vertical sheetfed scan-



ARNOLD TOEBO

ners, including the Visioneer PaperPort Vx (see *Reviews*, March 1996)—16.7-million-color scanning modes. The S600C offers an optical resolution of 300 by 600 dpi, with interpolation up to 2400 dpi. A built-in sheet feeder holds 10 pages and feeds up to 6 pages per minute.

Setup is straightforward. The dual-SCSI (both 25- and 50-pin) self-terminating connectors eliminate worries about having the right SCSI cable or terminator. After installing the bundled software, you're ready to scan using any of the supplied applications—ColorIt 2.0 for image editing, Presto 1.0 for page management, Xerox TextBridge 3.0 for OCR—or Adobe Photoshop, via a TWAIN plugin. The TWAIN interface provides basic scanning capabilities: image-resolution and -quality controls, auto-exposure, color inversion, color matching, and sharpening. A descreening option eliminates moiré patterns.

For document management, Presto is functional but unsophisticated—with considerably less integration and polish than Visioneer's PaperPort software—but it does provide an icon-oriented desktop environment that lets you arrange, stack, perform OCR on, print, fax, file, and

e-mail documents using drag-and-drop manipulation. (For more details on Presto, see the review of the ViewOffice scanning suite in this issue.)

TextBridge 3.0 provides a streamlined environment for batch OCR processing. In fully automatic mode, TextBridge reads pages one at a time from the sheet feeder and appends the recognized text to a word processing file in the format of your choice. You can also save image files for each page—useful for follow-on cleanup work. Verify mode displays each page after scanning and lets you interact with the OCR process, making corrections or substitutions as necessary. TextBridge does a fair job of capturing document formatting, including tabs, indentations, and fonts.

The S600C's color scanning capabilities are in the same league as those of low-cost flatbed scanners, without the distortion or scan lines typically associated with sheetfed scanners. Images are clear and properly color-balanced, thanks to a built-in white-stripe calibration bar. The scanner's only deficiency is an inability to align small art pieces easily.

The S600C comes with a brief printed installation manual and a quick-start guide, but all detailed documentation is on the software CD in PDF format.

The Last Word

The S600C provides a reliable sheet feeder, accurate OCR software, and decent document-management software, making it a good fit for medium-volume document-archiving operations. Its color-scanning abilities and bundled image-processing software let it pinch-hit as an art scanner as well—all at a price \$70 less than the PaperPort Vx's.

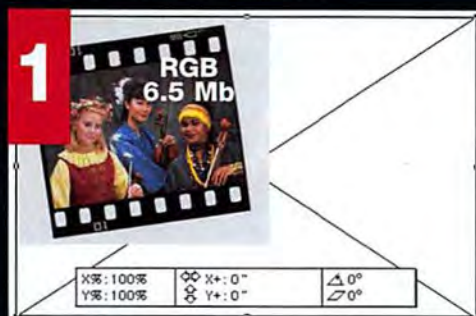
If your needs are limited to monochrome and gray-scale images, and you value top-notch speed and accuracy, the PaperPort Vx remains the cream of the crop. But if you want color capability, or you're watching the bottom line, the S600C is your best bet.—MEL BECKMAN

RATING: ★★★★★/7.1 **PROS:** 24-bit color scans; 10-sheet feeder; bundled image-editing and OCR software; inexpensive. **CONS:** Skimpily documentation; small art scans difficult to align. **COMPANY:** Mitsubishi Chemical America (408/954-8484; <http://www.mitsubishi-infostorage.com>). **LIST PRICE:** \$299.

Unbelievable Simplicity

Don't be concerned about the resolution, size, horizontality and color correction and mode. Just import images in the Quark image box from a Photo CD disk or from a raw scan. Position them however you want using QuarkXPress's tools. For each, send orders with the processing options to the IPM.

I import my pictures in my QuarkXPress document's image boxes



TIFF, EPS, JPEG or Photo CD ImagePac; RGB, YCC, grayscale or CMYK. This image was scanned from a 35 mm original in RGB raw mode at 100% size on a PowerLook 2000 flatbed scanner at its optical resolution of 1000 dpi.

I position them using the XPress tools and I select processing options using the binuscan Xtension



The client XTension writes the "order list" then sends it to the IPM for processing. It includes the values entered in the QuarkXPress "measurement bar" plus the processing and output options set in the XTension's user interface.

Phenomenal Productivity

A catalog with hundreds of images that may require several people a week's worth of work can be processed and ready to output in just a few hours. Processing can take place overnight, even on a low-end desktop computer, with little RAM.

After processing, the new recalculated images are re-imported in the desired color mode with the right amount of pixels... automatically



From a single RGB file, those CMYK, grayscale or CMYK-BW processed images will output at a blazing speed, due to their optimization.

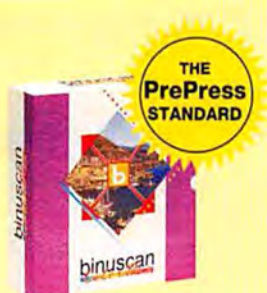
Astonishing Quality

Each processing algorithm uses state-of-the-art technology. Even when the IPM is used only to resize images previously color corrected and separated, the screen preview is recalculated with colors and a sharpness that are truly impressive. No more surprises on the color proof!

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THE SERVER APPLICATION

"binuscan IPM" (Image Processing Machine) works in the background, using the processor only when it's free. It recalculates a new image based on the original and a list of orders generated by a client application. This "order list" contains all the user's output preferences, including (but not limited to) CMYK separation specs, automatic color correction instructions, and sharpening levels, as well as any other modifications made to the image (crop, flip, rotate, resize, etc.) by the client application. binuscan achieves an impressive high and consistent quality every time because the IPM bases its processing algorithms on an individual histogram analysis of every image.

THE CLIENT APPLICATION

Many client applications can be used to generate "order list" text files and save them into the IPM's "TO DO" folder for processing. binuscan's open architecture allows third party developers to write custom client applications. The binuscan ColorPro package includes the binuscan IPM plus client applications to acquire images from scanners or Photo CDs and binuscan JobManager[®] (a Quark XTension) which works as described to the left.

THE PERSONAL TOUCH

binuscan ColorCorrect is a utility included with the IPM which allows you to create ghost effects or "sepia effects" and harmonize the images on your page. This utility will perform color adjustments to processed images by writing PostScript functions to the image file. Modifications are written then updated in your page layout in seconds, no matter how large the files are. Every modification can be reverted with the same ease and in the same manner.

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3-D Visualization Tools

3D WALKAROUND AND WALKTHROUGH PRO: OLD PRO OUTPACES CHALLENGER

NAVIGATING A 3-D MODEL IS A great way for interior designers and architects to evaluate projects. The undisputed visualization champion is Virtus WalkThrough Pro 2.6; the challenger is 3D WalkAround 1.0, part of Abracadata's inexpensive Design Your Own Home series. Both let you construct a model using drawing tools, then walk through it in an adjacent 3-D window. But WalkThrough Pro is a true 3-D program suitable for modeling a wide range of environments; 3D WalkAround is really a 2-D drawing program with some 3-D elements grafted onto it, a conceptual compromise that limits it to simple space-planning applications.

WalkThrough Pro's design views are windows into a 3-D world. For example, when you drag a rectangle, you extrude a box that appears instantly in the 3-D view. Although less adept than other architectural modelers, WalkThrough is versatile enough to produce furnishings and complicated structures. It includes a library of more than 500 objects and, like 3D WalkAround, offers textures you can apply to objects. But WalkThrough Pro also lets you use imported PICT and JPEG files for texturing and QuickTime movies for animated effects.

In contrast, 3D WalkAround gives you a single drawing window suitable only for 2-D floor plans. Most of its tools draw 2-D lines that are invisible in the 3-D view, and because there's no extrusion tool, you can't build objects from 2-D outlines. You furnish WalkAround's rooms from libraries containing more than 600 objects, but some objects can be unwieldy, and if you combine them using the Group command, they vanish from the 3-D view.

3D WalkAround is a competent visualization tool, but movement through a scene isn't as smooth as in WalkThrough Pro. It also lacks a location indicator in the plan view, so traversing even a small house feels like negotiating a maze.

And 3D WalkAround produces only 2-D plans in PICT format; WalkThrough Pro exports model data in DXF and VRML formats, records visualizations as QuickTime movies, and includes a player utility that lets others experience your



Walking Aimlessly It's easy to get lost in 3D WalkAround's 3-D view (top). As you traverse a WalkThrough Pro scene (bottom), however, the Observer—indicated by the cursor—moves with you.

designs. Most important, the instability I noted in version 2.0 (see *Reviews*, April 1995) appears to have been exorcised.

The Last Word

Although unsuitable for architectural projects, 3D WalkAround is adequate for simple space planning. WalkThrough Pro remains the best product for quickly and intuitively visualizing architectural designs, and its VRML fluency makes it a good choice for building interactive 3-D Web sites.—CARLOS DOMINGO MARTINEZ

3D WalkAround 1.0

RATING: ★★/4.8 **PROS:** Inexpensive 3-D walk-throughs; acceptable 2-D planning. **CONS:** Severely limited design environment. **COMPANY:** Abracadata (541/342-3030, <http://www.abracadata.com>). **LIST PRICE:** \$99.99.

WalkThrough Pro 2.6

RATING: ★★★★★/7.5 **PROS:** Well-conceived 3-D design environment; excellent walk-through implementation. **CONS:** Relatively limited modeling capabilities. **COMPANY:** Virtus (919/467-9700, <http://www.virtus.com>). **LIST PRICE:** \$495.



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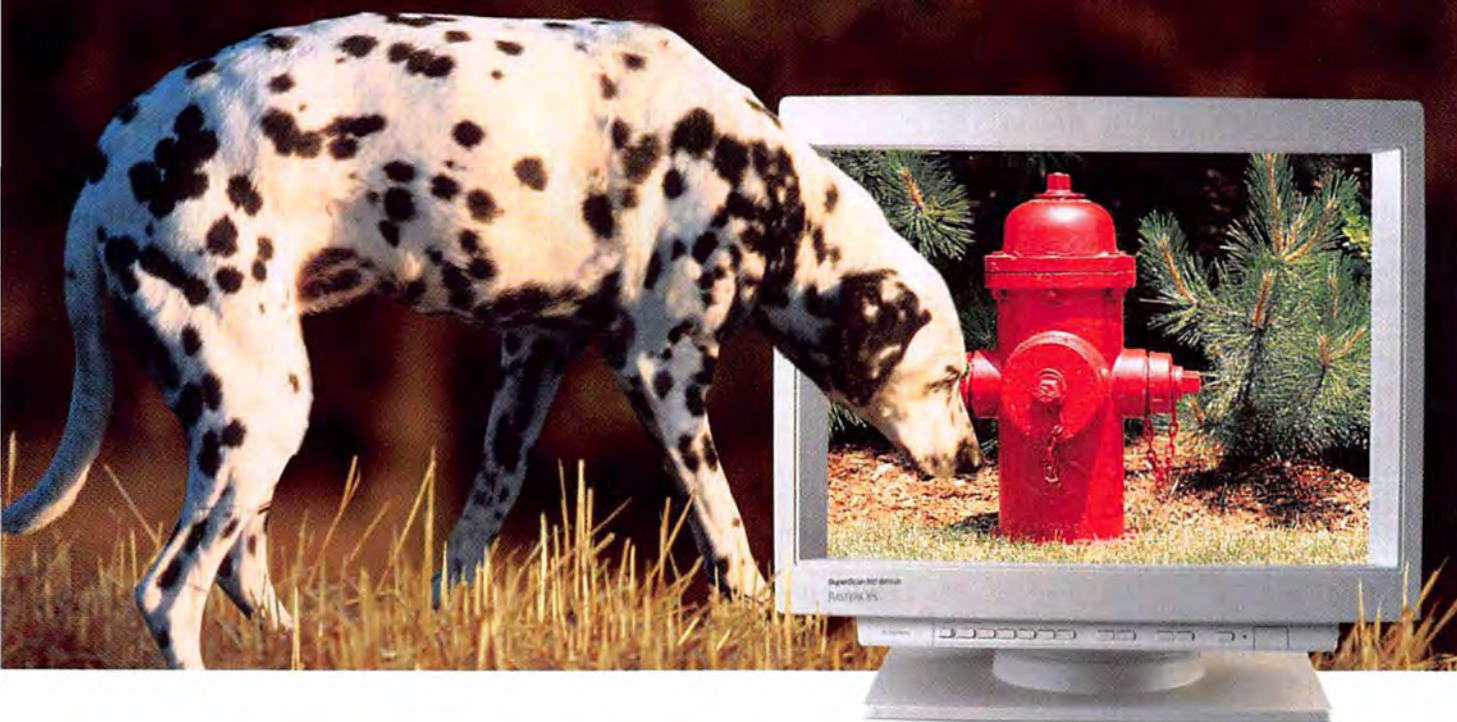
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OmniPage Pro 7.0

OCR PACKAGE GETS IMPROVED
INTERFACE, BUT NOT ACCURACY

OF ALL THE FEATURES TOUTED by optical character recognition programs, accuracy is arguably the most important. But while the latest OCR programs live up to their claims, you have to start with decent-quality originals. Case in point: the new version of Caere's OmniPage Pro. Version 7.0 has a spiffy new interface that makes it easier than ever to use; just don't expect perfect—or speedy—results.

OmniPage Pro 7.0 retains the simple AutoOCR tool bar of version 6.0 (see *Reviews*, June 1996): when you click on the Auto button, OmniPage scans or loads the image, decides which elements are text and which are graphics, performs OCR, and saves the results. That's handy, but you'll get better results if you tell the program what areas to treat as text or graphics and what areas to ignore rather than letting OmniPage decide for you.

In previous versions, this manual tweaking meant drawing a box around each element you wanted to perform OCR on—a tricky process even for the most dexterous



It's Tool Time Pre-OCR tweaking is a breeze with OmniPage Pro's new Tools and Zone Info palettes.

of us. Two new palettes, Tools and Zone Info, simplify this potentially laborious process. The new Polygon tool lets you define odd-shaped areas, and a joining tool combines several blocks of text or graphics into one (see "It's Tool Time"). Another new tool, Exclude, lets you omit a portion of the image without having to draw blocks around everything but the unwanted item, as you had to do in version 6.0. An eraser tool zaps noise, the random dots, blotches, and bars that confuse the OCR engine.

Version 7.0 also adds two new windows: Thumbnail View makes it easy to navigate, reorder, and delete pages in a multiple-page document, while Text View supplements the scanned Image View. Another new feature,

Smart Windows, automatically moves palettes out of your way and resizes windows depending on which window is active.

Like its competitor, Xerox's TextBridge Professional (see *Reviews*, June 1996), OmniPage installs a miniapplication under the Apple menu; Direct Input gives you access to OmniPage from any application. Unfortunately, version 7.0 still can't scan graphics via Direct Input, as TextBridge Pro can.

As for increased speed and accuracy, neither was apparent in my tests. In fact, OmniPage Pro 7.0 actually seemed slower than version 6.0—an observation I had ample time to reflect upon as the program churned away on my documents.

The Last Word Despite its disappointments, OmniPage Pro 7.0 is still a solid product, and the trade-up price is only \$129 if you own Calera WordScan or an earlier version of OmniPage. If you already have version 6.0, though, there's not much reason to upgrade unless you're frustrated by its lack of tools.—SUZANNE COURTEAU

RATING: ★★★★★/7.2 **PROS:** Better interface and tools. **CONS:** Still no graphics support via Direct Input; no improvements in accuracy. **COMPANY:** Caere (408/395-7000, <http://www.caere.com>). **LIST PRICE:** \$499.

NoHands Mouse

FOOT-OPERATED MOUSE OFFERS
HANDS-FREE ALTERNATIVE

UN'TIL NOW, THERE WEREN'T MANY options for people who couldn't use—or didn't like—desktop pointing devices (see "Smart Input," May 1996). The NoHands Mouse, a new foot-operated pointing device from Hunter Digital, offers an innovative, if pricey, alternative to traditional mice and trackballs.

Looking more like a high-tech foot massager than an input device, the NoHands Mouse consists of two shiny black plastic pedals with movable footrests; their flat surfaces are ribbed to prevent your feet from slipping. The clicks pedal replaces the mouse button by clicking when you press down with your toe or heel; the cursor pedal lets you control the cursor by tilting your foot in any direction. The mouse connects to the Mac's ADB port with a long cable that's ample for most installations. A Y-connector at the end of the cord lets you hook up a spare mouse or trackball, a good idea if you share your Mac or sometimes need to use your computer while standing.

Like many pointing devices on the market, the NoHands Mouse ships with a



control panel that lets you customize its operation for different software applications. You can program the clicks pedal to click once or twice, click-lock, or generate simple keyboard sequences when you press down with your foot. And since the toe and heel ends can be programmed independently, you get the same functionality as with a two-button mouse. The software also lets you adjust the cursor pedal's sensitivity in 16 gradations.

Although the NoHands Mouse is at least as intuitive as a standard mouse, it still takes time to learn to use your feet without straining. A simple tutorial program helps get you started up the learning curve, but it

took me a couple of days to become comfortable with the NoHands Mouse, and even then I had some difficulty controlling lateral movement of the cursor to select text or navigate hierarchical menus. People can perform delicate tasks (including painting and writing) with their feet, so with practice it should be possible to use the NoHands Mouse for fine work. Hunter Digital offers a 30-day trial period, so you can return the mouse for a refund if you're not satisfied for any reason.

The Last Word Although a foot-operated mouse may help prevent disorders such as carpal tunnel syndrome by freeing your hands and wrists, there's no guarantee that your ankles and feet will remain healthy. The NoHands Mouse also costs two to three times more than even the most expensive mice and trackballs. But if you need to use a computer, and you can't use a traditional pointing device, the NoHands Mouse may be a godsend.—FRANKLIN TESSLER, M.D.

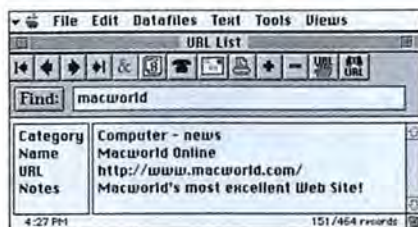
RATING: ★★★★★/6.6 **PROS:** Intuitive; frees hands. **CONS:** Expensive; lateral cursor motion difficult to control. **COMPANY:** Hunter Digital (310/471-5852, <http://www.footmouse.com>). **COMPANY'S ESTIMATED PRICE:** \$199.95.

InfoGenie 2.0

INFO MANAGER ADDS LINKS TO WEB BROWSERS

ALMOST TWO YEARS HAVE PASSED since the release of InfoGenie 1.0, an easy-to-use information manager that supports both field-based and free-form file formats (see *Reviews*, November 1995). InfoGenie 2.0 adds several welcome enhancements, although it's a less-compelling upgrade than its version number might suggest.

InfoGenie's most significant new feature will appeal to people who have trouble keeping track of pages on the World Wide Web. Whenever you open a data file that contains the fields Name, URL, and Notes—spelled exactly that way—two specialized icons appear in InfoGenie's tool bar (see "Web Directory"). The Grab URL button automatically copies the current page's title and URL from your Web browser and pastes them into the corresponding fields in the data file. (InfoGenie works with versions 2.0 and higher of Netscape Navigator and Microsoft Internet Explorer.) The View URL button points your browser to the page specified by the URL field in the current record. For some odd reason, nei-



Web Directory The two buttons on the right-hand side of the tool bar let you import URLs from Web pages and point your browser to the site listed in the current record.

ther function works unless your browser application is already running; InfoGenie can't launch your browser for you.

InfoGenie 2.0 sports a variety of other, less significant changes. You can now import comma-delimited files in addition to tab-delimited text, and the menus have been rearranged to make them a bit more logical. InfoGenie even lets you import data using Visioneer's PaperPort scanners (see *Reviews*, March 1996). InfoGenie 2.0 also supports AppleScript, an important addition for a small but vocal set of users.

Unfortunately, several annoying deficiencies persist in the new release. For example, InfoGenie still doesn't support numeric fields, so you can't check to make sure that entered data falls within a certain

range, and there's no way to search its database without launching the program. InfoGenie's spartan list view doesn't let you use colored text or backgrounds, and there's still no easy way to mark records for later retrieval. Finally, given InfoGenie's role as a contact manager, it's surprising that the program doesn't automatically recognize e-mail addresses—you should be able to launch your e-mail client simply by clicking on a person's electronic address.

The Last Word If you're already using InfoGenie, the \$24.95 upgrade is a worthwhile investment, particularly if you spend time on the Web. New users primarily interested in a PIM for contact management may prefer a dedicated program like Now Software's Now Contact and Up-to-Date bundle (see review in this issue) or Claris Organizer (see *Reviews*, January 1997). For lightweight, general-purpose information handling, though, InfoGenie is certainly worth considering.—FRANKLIN TESSLER

RATING: ★★/5.7 **PROS:** Easy to use; manages Web URLs. **CONS:** Only one field type; doesn't recognize e-mail addresses; limited list view. **COMPANY:** Casady & Greene (408/484-9228, <http://www.casadyg.com>). **LIST PRICE:** \$79.95.

Sony GDM-W900

WIDE-SCREEN MONITOR FOR THE COLOR CONNOISSEUR

REINFORCING THE OLD AXIOM that bigger is better, the Sony GDM-W900 represents the best in desktop-monitor technology. Its 16:10 aspect ratio and magnificent color fidelity usher in a new class of high-end displays. The 16:9 aspect ratio of most vendors' so-called two-page displays (measuring 19, 20, and 21 inches diagonally) rarely allows full-size viewing of those two pages. The GDM-W900, on the other hand, offers true two-page display area—an unbeatable benefit for those involved in prepress or high-end graphics, or who simply require the space of two monitors side by side. Sony also bundles LightSource's ColorTron Color System for calibration and color matching, creating a total package designed with high-end color in mind. As you might expect, the GDM-W900 isn't cheap. At an estimated price of \$4999, it's well outside the impulse zone for most users.

The GDM-W900's primary benefit is space—and lots of it. The monitor measures 24 inches diagonally, with a viewable image size of 22 inches, and supports resolutions



from 640 by 480 up to 1920 by 1200. The GDM-W900's wider aspect ratio enables a true two-page display—full-size viewing of two 8½-by-11-inch documents, with space left over for your application interface. Best of all, the GDM-W900 extends your desktop without requiring an extension to your desk: it's just slightly wider and deeper than a standard 21-inch display.

To evaluate the GDM-W900, I viewed standard Macworld Lab test images. The GDM-W900's color fidelity, brightness, and contrast were stunning, and its crisp images simulated the appearance of a transparency on a light box. Sony employs a blue filter, which it claims is responsible for the

increase in color fidelity and contrast. The display looked bright and crisp without appearing washed-out. Text appeared crisp and graphics maintained outstanding color and contrast on the two-page QuarkXPress test image, and I was delighted at the ability to display the spread full-size.

The GDM-W900 can run off the internal video on later-model Power Macs, but to harness the full benefit of the increased aspect ratio you need to invest in an Integrated Micro Solutions or Number Nine video card designed for use with the wider display. Sony sells the IMS TwinTurbo 128M8S card for \$899; the Number Nine Imagine 128-8M card sells for \$799.

The Last Word For those who demand only the best—and can afford it—the GDM-W900 provides excellent color, contrast, and brightness, and its increased aspect ratio makes way for improved efficiency by eliminating the need to scroll across two-page spreads.—MATT CLARK

RATING: ★★★★★/8.9 **PROS:** Outstanding color quality; full-size viewing of two letter-size pages; compact footprint. **CONS:** Expensive. **COMPANY:** Sony Electronics (408/955-5142, <http://www.sony.com/technology>). **COMPANY'S ESTIMATED PRICE:** \$4999.

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Circle 288 on reader service card

RunShare 2.1

APPLETALK NETWORK TOOL REVS UP
FILE TRANSFERS

THE LAST TIME WE LOOKED AT RunShare, a system extension that accelerates file transfers (see *Reviews*, February 1995), AppleTalk was nowhere near fulfilling the promise of 10-Mbps Ethernet. RunShare doubled AppleTalk's throughput, and we were happy. Now that we have 100-Mbps Ethernet and AppleTalk is still hardly faster than a 10BaseT network, RunShare comes to the rescue again with more features and even more speed. Asante's NetDoubler (see *Reviews*, December 1996) is cheaper and has a performance edge—it lets you use TCP/IP instead of AppleTalk—but RunShare bundled with Farallon's 100BaseT Ethernet card is a quick ticket to a zippier network.

RunShare accelerates Finder copies across both local and wide area networks. Version 2.1 adds speed improvements, support for PCI Power Macs, speedier opening and saving of remote files from certain applications, and accelerated printing. The PCI support lets RunShare enhance performance across 100BaseT networks, something plain AppleTalk can't do.

You buy RunShare with a specific number of licenses, and each install subtracts one license from the installation floppy. This sort of copy protection seems unnecessarily complicated, but installation is otherwise quick and painless. A control panel lets you turn on and off Finder copies, application file operations (from Photoshop, Illustrator, and QuarkXPress), and print serving. Print-server acceleration requires the \$1799 RunShare GSA, a server-only version of RunShare for AppleShare, Color Central, and Print Central print spoolers.

The fast CPUs now available in Apple systems, combined with the prevalence of Ethernet, ensure that RunShare will work well on any modern Mac. RunShare's performance boost is obvious the first time you copy a large file across the network to another RunShare-enhanced Mac: in live tests on a 100BaseT LAN (see "File-Transfer Speedster"), RunShare speeded file copying almost fourfold over native AppleTalk. You see the largest speedup when pushing—copying files from a local machine to a remote one—rather than pulling (RunShare's performance is identical in both scenarios, but the Finder runs slowest when pushing files). Similar improvements are apparent when you open large graphics files in QuarkXPress.

File-Transfer Speedster

Shorter bars are better. Times are in seconds.



Test configuration: Performa 6400/200, System 7.5.5, Open Transport 1.2.2, 64MB RAM, Asanté 100BaseT PCI Ethernet adapter.

The Last Word The bane of graphics professionals everywhere is waiting for files to move from one station to the next in a production environment. RunShare cuts that transfer time in half on 10BaseT LANs and by three quarters on 100BaseT LANs, making it one of the few ways you can reap the benefits of upgrading your LAN to 100BaseT.—MEL BECKMAN

RATING: ★★★★★/7.5 **PROS:** Speeds Finder copies and document opening; accelerates LAN and WAN file transfers; optional print-spooling acceleration. **CONS:** Annoying copy protection. **COMPANY:** RUN (201/529-4600, <http://www.runusa.com>). **LIST PRICE:** \$399 for 2 users, \$749 for 5 users, \$2499 for 25 users.

CommuniGate 2.8

MULTIMEDIA MESSAGING SUITE NO
LONGER SILENT ON MIME

SETTING UP AND MANAGING E-mail is more daunting than ever now that the Internet is involved: users want to exchange mail with other users anywhere in the world, send formatted text and graphics, and access message archives while checking new messages. Stalker addresses these needs in CommuniGate 2.8, the latest upgrade to its suite of modular e-mail components. Joining the original CommuniGate suite (see *Reviews*, April 1996)—a LAN mail client; a server extension that runs in the background; and plug-in gateways to POP, SMTP, UUCP, fax, printer, and pager services—are additional gateways for mailing lists, IMAP, and file processing. CommuniGate's sensible but no-frills user interface is unchanged, as are the excellent diagnostic logging capabilities. If your messaging needs transcend normal LAN e-mail, you'll love CommuniGate's range of delivery options.

The new IMAP gateway lets traveling users access their office mailboxes over the Internet via an IMAP-capable client. Unlike traditional POP mail retrieval, in which



Enhanced E-Mail CommuniGate's e-mail client supports MIME-formatted messages, so you can format text and embed graphics.

mail is stored on the computer running the client application, IMAP stores mail on the server; that way, users can choose which messages to download and still have access to previously read and archived messages. A new file-processing gateway lets Mac applications send and receive e-mail by writing and reading files in selected in- and out-box folders, while a list-processing gateway lets you create and manage mailing lists and e-mail discussion groups.

Version 2.8 also lets you moderate discussion groups and automatically generate digests. It adds message filtering and MIME support so you can format text and embed graphics in messages. Most important, CommuniGate is fast and reliable; in sev-

eral weeks of intensive use on an ISP backbone, it flawlessly processed hundreds of messages a day.

Stalker distributes CommuniGate only from its Web site. You download each module, and Stalker supplies activation keys when you purchase a license. Once the program is installed—a manual process that cries out for a simple installer—its well-illustrated online documentation explains how to register users and configure gateway modules. But while you can read and print formatted manuals, the documentation is spread across 15 files and lacks an index.

The Last Word CommuniGate 2.8 adds IMAP and MIME to its versatile suite of gateways while retaining the ability to interoperate with Internet e-mail clients and servers. Its attractive pricing and comprehensive feature set make it a tough act to follow.—MEL BECKMAN

RATING: ★★★★★/8.1 **PROS:** Inexpensive; integrated, modular design; multimedia gateways; IMAP support. **CONS:** Incomplete documentation; no installer. **COMPANY:** Stalker Software (415/383-7164, <http://www.stalker.com>). **LIST PRICE:** Free for 5 users; 25 users \$200; 200 users \$600; gateway modules \$100 each (LAN gateway included in base package).

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Other straightforward editing features include full tabs, colored text, search and replace, AppleGuide help, text to speech, word count, justification control, and full line-spacing. Most people only use about 3% of the text-editing features found in their traditional word processors. Now, you no longer need to lug around all that stuff! With component technology and WAV, if you need extra text-handling features, simply plug them in later.

*WAV installs complete with OpenDoc, Cyberdog (Net Browser, E-mail, Net Search, CyberButton, Net Management), C100™ Components LEXI & C-TextBox, and Apple Live Objects Essentials (QuickTime™ Viewer, Image Viewer, 3DMF Viewer, Apple Draw, Apple Audio).



Freakin' Awesome
rating, Mac Addict
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1997
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Circle 24 on reader service card

SpeechPrompter

PROMPTER SOFTWARE MAKES INDEX CARDS LOOK GOOD

SOFTWARE THAT SMOOTHLY scrolls text as you deliver your speech—what a great idea. Unfortunately, SpeechPrompter's implementation is as bad as the idea is good. The software's jerky scrolling, mismatched interface, and illogical keyboard commands make it virtually impossible to use.

SpeechPrompter's worst problem is its main feature: scrolling. In theory, you adjust scrolling speed during a speech. In practice, the speed slider doesn't work at all, and clicking the Faster or Slower button takes so long to produce a change that the manual warns, "Don't be impatient and click twice on the button!" You can pause scrolling by pressing the F6 key. Unfortunately, older PowerBooks don't even have F-keys. The manual also apologizes for jerky scrolling and attributes it to the limitations of today's personal computers. But what about word processors? They suffer from no such limitations.

Additional flaws include SpeechPrompter's menuless interface, lack of an installer, and nonexistent editing capabilities. The display, composed of several fonts and 20



SpaceWaster SpeechPrompter is geared for older, 400-pixel-tall PowerBook screens; if your monitor is any larger, the bottom of the screen is a black void.

irregularly shaped, unevenly spaced buttons, is distracting and difficult to use. There's no installer, so you must manually decompress and assemble the contents of the three floppies. Once the program's installed, black-and-white and color versions are available.

Beware—you have to write speeches in a word processor, save them as text files, and import them into SpeechPrompter. The program doesn't permit text formatting of any kind (font, size, style)—New York plain text is all you get, making it impossible to mark passages for emphasis. The program presents each sentence as a separate paragraph

block, so periods within sentences (such as "4 p.m.") create awkward breaks. Nor can you edit your speech in SpeechPrompter. Woe unto the speechmaker who's told, just before going on, to shorten the talk.

To the software's credit, SpeechPrompter's color version includes a neat feature that displays graphics for your audience on a second monitor at predetermined moments in the speech. Unfortunately, the text scrolling stops dead on the speaker's display as the program processes each new graphic, even on a 150MHz, 604-based Power Mac. Furthermore, this feature was designed for the 400-pixel-tall screens found on older PowerBooks; if your main display is any larger, the external monitor's graphics are chopped off in the middle.

The Last Word SpeechPrompter is slow, illogically designed, and hard to use. If you make speeches, you'd be well advised to avoid SpeechPrompter in favor of a low-tech but 100 percent reliable prompter system: index cards.—DAVID POGUE

RATING: ★/2.6 **PROS:** Good idea. **CONS:** Unusably slow and jerky; confusing interface; illogical keyboard assignments. **COMPANY:** Orator Company (619/420-9150, <http://www.the-orator.com>). **PRICE:** \$89.95.

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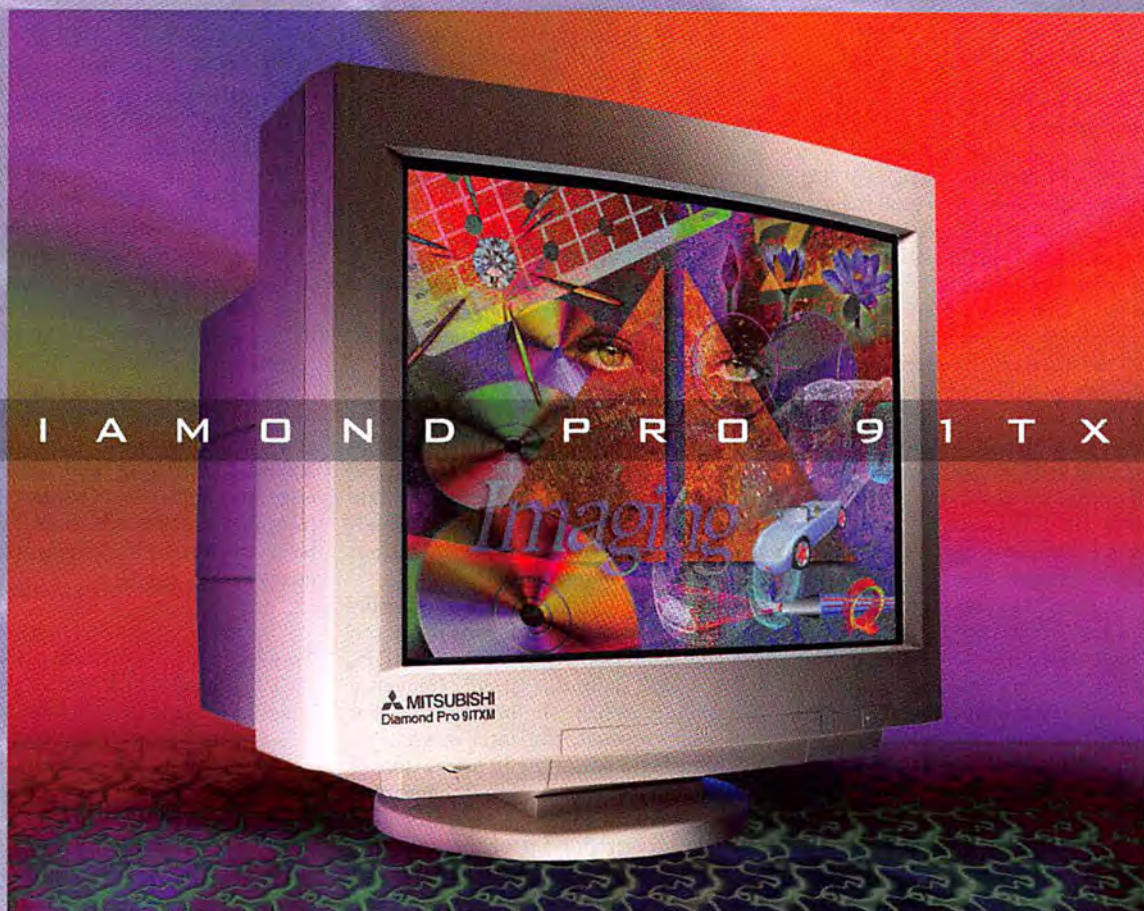
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* DVI: Diagonal viewable image

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FM Radio 1.1

YOU'RE BETTER OFF BUYING A
CHEAP BOOM BOX

LA CIE'S FM RADIO 1.1.4 DOES WHAT it purports to—it allows you to listen to FM stations in high-quality stereo on your Mac—but that's not enough to justify its price tag. Until La Cie adds features that take advantage of the Mac's capabilities, anyone interested in listening to the airwaves is better off buying an inexpensive portable radio.

The FM Radio is a small, plain box that connects to your Mac (and draws its power) via your Mac's ADB port, with a pass-through connector for other devices. By connecting the FM Radio to your Mac's microphone port, you can listen to the FM Radio through the Mac's internal speaker (if your Mac lacks a microphone port, you can attach external speakers or headphones—they'll produce far superior sound). A 6-foot antenna wire completes the package, but unfortunately the antenna is hardwired to the unit, so you can't replace it with something better should your reception leave a bit to be desired.

The FM Radio's software allows you to change frequencies, establish presets,



Stereo Setup Modeled after the AppleCD Audio Player, FM Radio offers basic radio setup options, but no innovative features.

toggle between radio and CD, and adjust volume, treble, and balance (see "Stereo Setup"). Once you enter your preferred settings and preset stations, you can rely instead on a convenient control-strip module for switching between preset stations and changing volume.

Designating preset stations is more difficult than it should be. Using the slider, you tune the radio from 87.5MHz to 108MHz, but you can't jump to a specific frequency by typing it. When you find a station that you want to preset, you enter its name or call letters into one of the 50 preset slots. If you don't name each station, it appears as "No name"—no big deal, until you realize that the preset pop-up menu lists only

names, not frequencies, and you're left staring at a bunch of unnamed options.

The FM Radio also features an automatic station search button that finds the next strong signal, often just static. Why didn't La Cie take advantage of the Mac's power to offer a really cool and convenient feature—like taking your location from the Map control panel and cross-referencing it to FCC information in order to program the presets automatically with your local stations? Or including a VCR-like application you could program to record broadcasts unattended?

The Last Word La Cie's FM Radio isn't a bad product. Its biggest flaw is that you can't listen to the radio if your Mac is turned off. It lives up to all of its promises, but simply doesn't offer any unique computer-enhanced features that could have set it apart from an inexpensive boom box.—OWEN W. LINZMAYER

RATING: ★★ ★/5.1 **PROS:** Good sound quality; pass-through ADB; convenient control-strip module. **CONS:** No computer-enhanced features; assigning presets is cumbersome; doesn't work when Mac is off. **COMPANY:** La Cie (503/520-9000, <http://www.lacie.com>). **LIST PRICE:** \$49.95.

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Starry Night Deluxe 2.0

PHOTO-REALISTIC SKY SIMULATOR FOR SERIOUS AND CASUAL STARGAZING

STARRY NIGHT DELUXE 2.0 LETS you reproduce astronomical events that happened thousands of years ago, plan for next year's solar eclipse, or just see what's "up" tonight—all with amazing accuracy. Many desktop sky-simulation programs can simply show you where the Moon is on a particular night, but with this powerful program you can time the disappearance of a bright star behind the moving edge of the Moon to within a minute, reproduce the 2 B.C. conjunction of Jupiter and Venus to within a few minutes and a tiny fraction of a degree, and see Venus pass in front of the Sun, as Captain Cook saw it from Tahiti in 1769.

Starry Night is as beautiful as it is powerful. In its photo-realistic representations of the planets and moons, the stars really look like stars, and trees on Earth's horizon cast moving shadows as the Sun moves across the sky. You can see the planets rotate or zoom by as the Hubble Space Telescope would see them, or from any position on any planet or major moon in the solar system—even from any point in interplanetary space (see "Moons over Mars"). I've seen



Moons over Mars Seen from its low-orbiting moon Phobos, Mars fills the night sky. Its other moon, Deimos, is about to set behind Mars.

the midnight sun from the North Polar Cap of Mars, and I've seen Pluto from its moon, Charon. I've ridden comet Hale-Bopp as it passed Earth, watching Earth grow bigger and then recede in the distance. The program's ease of use encourages idle celestial tourism and late nights exploring the solar system—just note that its performance can be sluggish on a IIcx or earlier machine.

Starry Night's database includes 15 million stars; 13,000 star clusters, nebulae, and

galaxies (the brightest hundred of which are represented by color photographs); and the planets and major moons. Surprisingly, there are no asteroids and only three comets (though you can add as many as you wish), and it doesn't print ephemerides—tables of planet positions or other data—as do other major sky simulators. (Sienna Software is preparing to release an update that adds four asteroids, along with links to a searchable Web site, <http://www.livesky.com>.) The sophisticated Orbit Editor lets you create a moon, asteroid, comet, or satellite and put it in any orbit you choose using graphical or numerical methods. You can even rework the solar system to your liking or create an entirely new one.

The Last Word Both a serious tool and a delightful sky simulator, Starry Night is giving other Macintosh astronomy programs serious competition. I've seen them all, and this one is truly amazing. If you own a Macintosh and enjoy astronomy, you must get Starry Night.—JOHN MOSLEY

RATING: ★★★★★/8.2 **PROS:** Accurate; visually stunning. **CONS:** Slow on early Macs; doesn't print ephemerides. **COMPANY:** Sienna Software (416/926-2174, <http://www.siennasoft.com>). **LIST PRICE:** \$89.95.

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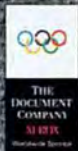
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Abuse

NEW LIFE FOR AN OLD GAME GENRE

THESE DAYS, IT SEEMS THAT MUCH of a game's appeal hinges on its groundbreaking gimmicks. As a result, game developers are exhibiting a strange sort of tunnel vision: each new release battles to include the newest and coolest technology, often at the expense of real entertainment. Although Bungie—and game developer Crack dot Com—may not be riding technology's cutting edge with Abuse, they show that there is plenty of excitement left in an old genre.

Abuse's story line is simple: you're trapped in a maximum-security prison where all the inmates have been subjected to an experimental drug named Abuse. You must face down the mutants to save the outside world from infection. Luckily, the game is much more exciting than its premise.

Plot aside, Abuse's game play is fun and addictive. You use a variety of weapons to blast your way through the infected hordes to save humanity. My personal favorites are the death sabre and napalm, both of which fill the air with mutant howls.

Abuse's action isn't strictly limited to carnage and killing—many levels require



Ambush! Don't you hate it when mutants start erupting from the wall? Hope you've got plenty of ammo, Sparky.

ingenuity to get through difficult spots where firepower alone is not enough. An assortment of switches, teleporters, and hidden rooms keep you on the lookout, even as the mutants swarm in.

Crack dot Com's attention to detail adds to Abuse's fun. Sounds are a disconcerting collection of howls, screams, clanks, and blasts; graphics create an oppressive feeling, layering dingy corridors and polluted skylines, giving Abuse an eerie sense of claustrophobia and chaos.

Abuse adds some features missing from the old style of two-dimensional side-scroller games. The most stunning departure from the formula is the ability to aim Abuse's weapon using the mouse. This

innovation allows you to run, jump, and hose the room with multidirectional missile blasts, all at the same time.

Also notable is Abuse's network play, which allows up to eight players to toast one another. Unfortunately, all players' Macs must be physically connected—modem and Internet links aren't offered. If you're looking for an additional challenge, Abuse includes a level editor that lets you create your own tortures, although using the quirky editor may prove torturous in its own right until you get the hang of it.

The Last Word Although Abuse is a simple 2-D side-scroller—much like the games many of us grew up on—Crack dot Com has successfully incorporated many innovative elements into a classic genre. Abuse may seem antiquated to the younger gamer or the jaded old-timer, but it's got the talent to carry off a revival without seeming passé.—DANIEL MADAR

RATING: ★★/6.9 **PROS:** Ability to aim weapon independently; tough spots require some thought; improves on a venerable game genre. **CONS:** Unwieldy level editor; limited networking options. **COMPANY:** Bungie Software (312/563-6200, <http://www.bungie.com>). **COMPANY'S ESTIMATED PRICE:** \$39.99.

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Software

BUSINESS

- ★★★★/8.9 **Analytica**, Decisioneering, 303/534-1515, \$795. Financial-modeling tool helps you assess business decisions. *Mar 97, p. 72*
- ★★/4.2 **Ascend 4.0**, Franklin Quest, 801/975-1176, \$99.95. Information manager isn't competitive with other PIMs. *Apr 97, p. 72*
- ★★★★/7.9 **Big Business 2.0**, Big Software, 408/725-7200, \$199 to \$999. Business app integrates sales, marketing, ordering, and accounting. *Jan 97, p. 64*

- ★★★★/8.1 **Claris Organizer 2.0**, Claris, 408/727-8227, \$69. Solid upgrade is worth the wait. *Jan 97, p. 62*
- ★★★/5.4 **Day-Timer Organizer 2.1**, Day-Timer Technologies, 415/572-6260, \$79.95. All-in-one PIM improved, but not perfect. *Mar 97, p. 72*
- ★★★★/7.1 **Kiplinger TaxCut '96**, Block Financial, 617/428-1119, \$29 to \$39. Tax software offers friendly interview process. *Mar 97, p. 56*
- ★★★★/7.7 **MacnTax Deluxe '96**, Intuit, 520/295-3110, \$44.95. CD-ROM includes comprehensive state tax modules. *Mar 97, p. 56*
- ★★★/6.9 **Mariner Write 1.3**, Mariner Software, 502/222-6695, \$69.95. Word processor stresses speed and elegance. *Mar 97, p. 63*
- ★★★★/8.5 **MYOB Accounting 7**, BestWare, 201/586-2200, \$89.95 to \$139.95. Entry-level accounting package combines ease of use and power. *May 97, p. 69*
- ★★★★/8.9 **Personal RecordKeeper 4.0**, Nolo Press, 510/549-1976, \$49.95. Database helps you keep tabs on personal information. *Mar 97, p. 83*
- ★★★★/7.6 **PowerBuilder 5.0**, PowerSoft, 508/287-1500, \$2995. Key cross-platform database tool puts Mac's SQL skills on par with Unix and NT. *Apr 97, p. 70*
- ★★★/6.9 **Quicken Business Law Partner 2.0**, Parsons Technology, 319/395-9626, \$49. Suffices if you want to get the job done with a minimum of fuss. *Feb 97, p. 84*
- ★★★★/8.7 **Quicken Deluxe 7.0**, Intuit, 520/295-3220, \$59.95. Indispensable financial manager. *Feb 97, p. 64*
- ★★★★/7.4 **Scripter 2.0**, Main Event Software, 202/298-9595, \$199. Easy way to make CGI's work on a Mac-based Web site. *Apr 97, p. 74*
- ★★★★/7.6 **Small Business Legal Pro Deluxe 2.0**, Nolo Press, 510/549-1976, \$59.95. A great value if you want to be fully informed. *Feb 97, p. 84*
- ★★★/5.1 **TakeNote 1.0**, Academix Software, 415/493-3003, \$79.95. Reference tool goes halfway to replacing the familiar index card. *Jan 97, p. 88*
- ★★★★/7.1 **Timeslips 4.0**, Timeslips, 214/248-9232, \$299.95. Time-tracking and -billing package is unnecessarily complex. *Jan 97, p. 86*

GRAPHICS

- ★★★★/7.1 **Adobe Illustrator 6.0.1**, Adobe Systems, 415/961-4400, \$595. Efficient, well-organized

drawing program doesn't surpass FreeHand 5.5. *Jan 97, p. 112*

- ★★★/5.7 **Canvas 5.0**, Deneba, 305/596-5644, \$599.95. Midrange graphics program has professional price. *Jan 97, p. 112*
- ★★/4.8 **Chromatica**, Chroma Graphics, 415/375-1100, \$149.95. Handy but limited Photoshop plug-in. *Feb 97, p. 80*
- ★★★★/7.0 **ColorWeb 1.0**, Pantone, 201/935-5500, \$29.95. Simple, inexpensive color picker and swatch book move to the Web. *May 97, p. 84*
- ★★/4.6 **CorelDraw 6 Suite**, Corel, 613/728-8200, \$595. Graphics suite lacks solid image-editing and drawing programs. *Jan 97, p. 112*
- ★★★★/6.3 **DesignWorkshop 1.5**, Artifice, 541/345-7421, \$595. Low-end modeler offers excellent modeling tools. *Apr 97, p. 74*
- ★★★★/8.9 **Detailer**, Fractal Design, 408/430-4000, \$449. Wonderful imaging tool lets you paint directly on 3-D models. *Feb 97, p. 72*
- ★★★★/8.6 **Expression 1.0**, Fractal Design, 408/688-5300, \$449. Object-oriented natural-media drawing arrives—at last. *Mar 97, p. 50*
- ★★★★/8.1 **Extreme 3D 2.0**, Macromedia, 415/252-2000, \$399. Great 3-D design program for print, animation, Web, and multimedia. *Apr 97, p. 70*
- ★★★★/8.7 **FreeHand 7**, Macromedia, 415/252-2000, \$399. Near-perfect draw program. *Feb 97, p. 56*
- ★★★★/7.9 **FreeHand Graphics Studio 7**, Macromedia, 415/252-2000, \$449. Suite provides professional-level power at an affordable price. *Feb 97, p. 56*
- ★★★★/8.3 **Full Pixel Search 2.0**, Avian Systems, 201/568-9494, \$295. Image-analysis program finds a pixel in a haystack. *Mar 97, p. 84*
- ★★★★/7.9 **Infini-D 3.5**, Specular, 413/253-3100, \$649. Approachable, practical mix of 3-D design ingredients. *Jan 97, p. 70*
- ★★★★/8.3 **Kai's Power Goo**, MetaTools, 805/566-6200, \$49.95. Family image-editing software that pros will use. *Jan 97, p. 84*
- ★★★★/8.1 **Macromedia FreeHand 5.5**, Macromedia, 415/252-2000, \$595. Draw program outperforms all competitors. *Jan 97, p. 112*. **Editors' Choice** for best illustration software.
- ★★★★/8.3 **Photoshop 4.0**, Adobe Systems, 415/961-4400, \$895. New version cements image editing.

REAL PRODUCTS REAL RATINGS

Reviews you can trust: Unlike other publications, Macworld rates only final shipping products, not prototypes. What we review is what you can actually buy. Outstanding ★★★★★ = 9.0–10.0 Very Good ★★★★ = 7.0–8.9 Good ★★★ = 5.0–6.9 Flawed ★★ = 3.0–4.9 Unacceptable ★ = 0–2.9

Star Ratings

tor's position as the top product. Feb 97, p. 132

★★★★★/5.7 **PhotoTools 1.0**, Extensis, 503/274-2020, \$99.95. Useful Photoshop plug-in. Feb 97, p. 80

★★★★★/8.1 **Poser 2.0**, Fractal Design, 408/430-4100, \$249. Human models in 3-D (clothing optional). Mar 97, p. 76

★★★/4.4 **PowerPac 1**, Auto F/X, 603/875-4400, \$249. Macros for Photoshop are useful but restrictive. Feb 97, p. 80

★★★★★/8.2 **PowerCADD 3.0**, Engineered Software, 910/299-4843, \$795. Fast, pro-level drafting program gets some refinements. Jan 97, p. 74

★★★★★/8.9 **ScanPrepPro 3.1**, ImageXpress, 770/564-9924, \$695. Photoshop plug-in puts image processing on autopilot. Mar 97, p. 80

★★★★★/6.5 **Stencil It 1.0**, Kaetron Software, 713/298-1500, \$99. Low-cost program is good for charts, but not for art. Jan 97, p. 72

★★★★★/7.4 **TurboCAD 2D/3D 3.0**, IMSI, 415/257-3000, \$149. Nearly high-end CAD program with educational software price. Dec 96, p. 61

★★★★★/8.7 **xRes 3**, Macromedia, 415/252-2000, \$399. Ho-hum image editor. Feb 97, p. 56

INTERNET/NETWORKING

★★★★★/6.5 **3-D Website Builder**, Virtus, 919/467-9700, \$159. VRML authoring program is straightforward but limited. Feb 97, p. 82

★★★★★/6.6 **ActionLine 1.1**, Interactive Media, 415/948-0745, \$99. Beginners can add pizzazz to Web pages without Java programming. Apr 97, p. 76

★★★★★/7.7 **Adobe PageMill 2.0**, Adobe Systems, 408/536-6000, \$149. WYSIWYG approach to Web design is appealing and efficient. Feb 97, p. 58

★★★★★/7.0 **Bolero**, EveryWare Development, 905/819-1173, \$995 to \$4995. Best tool for gathering demographics from your Web site; expensive. Apr 97, p. 68

★★★★★/7.0 **Claris Home Page 2.0**, Claris, 408/727-8227, \$99. Web authoring tool is great for building small to medium-size sites. May 97, p. 56

★★★★★/7.8 **CyberFinder 2.0**, Aladdin Systems, 408/761-6200, \$30. Unobtrusive, small, and incredibly stable URL manager. Mar 97, p. 58

★★★★★/7.0 **CyberPress 1.0**, Extensis, 503/274-2020, \$149. QuarkXPress-to-HTML conversion on a budget. Mar 97, p. 78

★★★★★/7.3 **Dave 1.0**, Thursby Software Systems, 817/478-5070, \$179. Painless Mac file sharing on Windows networks. May 97, p. 72

★★★/6.8 **DigiPhone 1.0**, Third Planet Publishing, 972/733-3005, \$39.95. Make low-cost calls over the Internet. Jan 97, p. 68

★★★★★/7.0 **DragNet 1.1.4**, OnBase Technology, 714/830-5682, \$39.95. While good for managing huge URL lists, software is a RAM hog. Mar 97, p. 58

★★★/5.3 **FileMaker Pro CGI**, Claris, 408/987-7000, free. Slow and inflexible FileMaker Pro Web publishing tool. Apr 97, p. 114

★★★★★/7.6 **FirstClass 3.5**, SoftArc, 905/415-7000, \$495. To create a complete e-mail community, this package is the way to go. Mar 97, p. 48

★★★★★/7.5 **Frontier 4.1**, UserLand Software, <http://www.scripting.com/frontier>, free. Fast and powerful scripting environment requires advanced programming knowledge. Jan 97, p. 152. **Editors' Choice** for best search tools.

★★★/4.1 **Globetrotter 1.1**, Akimbo Systems, 617/776-5500, \$99. Web tool avoids HTML but has stability problems. Apr 97, p. 66

★★★/4.2 **HoTMetal Pro 3.0**, SoftQuad, 416/544-9000, \$159. Dramatically improved Web editor is powerful but still quirky. Feb 97, p. 58

★★★/6.8 **HTML Grinder 3.04**, Matterform Media, 505/983-4189, \$149. Tools automate site-management chores. Mar 97, p. 76

★★★/4.9 **Insta.html 1.0**, Trailer Parc Technologies, 415/248-1350, \$179. Overpriced plug-in has trouble with FreeHand-to-Web conversion. May 97, p. 82

★★★★★/7.7 **InterMapper 1.0.1**, Dartmouth College, 603/646-2643, \$795. World-class network management. Jan 97, p. 83

★★★★★/7.3 **Internet Phone 3.0.1**, VocalTec, 201/768-9400, \$49.95. Novices may like this software that lets you make low-cost calls over the Internet. Jan 97, p. 68

★★★★★/7.2 **Lasso 1.1**, Blue World Communications, 206/313-1051, \$299. Lasso successfully ties FileMaker Pro databases to the Web. Apr 97, p. 114. **Editors' Choice** for best Web databases.

★★★/6.5 **Lasso Lite 1.0.6**, Blue World Communications, 206/313-1051, free. FileMaker Pro Web publishing tool is fast and free. Apr 97, p. 114

★★★/6.8 **MacSOUP 2.1**, Stefan Kurth, stk@kagi.com, \$20. Strong offline e-mail and news reader; that's all it handles, though. Jan 97, p. 152

★★★/6.7 **Marionet 1.1.1**, Allegiant Technologies, 619/587-0500, \$149. Flexible scripting and search tool for authoring environments, but it requires significant programming knowledge. Jan 97, p. 152

★★★★★/7.0 **NetCloak 2.1**, Maxum Development, 630/830-1113, \$195. Quirky WebStar add-on is a must-buy. Jan 97, p. 66

★★★/6.5 **NetForms 2.0**, Maxum Development, 630/830-1113, \$195. WebStar add-on fills gaps in server software. Jan 97, p. 66

★★★★★/7.1 **NetObjects Fusion 1.0**, NetObjects, 415/482-3200, \$695. Delivers precise positioning of Web page elements; no spelling checker. May 97, p. 60

★★★★★/7.1 **NewsHopper 1.2**, SW15 Software, <http://www.demon.co.uk/sw15/>, \$59. Powerful, scriptable reader, but can't be scheduled and handles only Usenet news. Jan 97, p. 152

★★★/6.9 **PageSpinner 1.2.2**, Optima System, <http://www.algonet.se/~optima/pagespinner.html>, \$25. Great tool for creating Web pages—especially for novice users. Mar 97, p. 54

★★★/6.9 **Phantom 1.1**, Maxum Development, 708/830-1262, \$395. Wonderful Web robot for the Mac is server-friendly, but also expensive and useful primarily for Webmasters. Jan 97, p. 152

★★★/6.0 **Quarterdeck Mail 4.0**, StarNine Technologies, 510/649-4949, \$395 server; \$245, 5-user pack. Cost-effective, all-in-one e-mail solution. Mar 97, p. 48

★★★/6.6 **QuickMail Pro 1.0**, CE Software, 515/221-1801, \$69.95 to \$3449.95. E-mail system has a good basic feature set. Mar 97, p. 48

★★★/3.6 **QuickSite 1.0**, DeltaPoint, 408/648-4000, \$99.95. Clunky interface hobbles potential Web-design powerhouse. Mar 97, p. 68

★★★/6.5 **ROFM 4.1**, Russell Owen, <http://rowen.astro.washington.edu>, free. Web publishing free-ware with more features, but needs modification. Apr 97, p. 114

★★★★★/8.0 **Surfboard 1.0**, Abbott Systems, 914/747-3116, \$39. Intuitive URL manager looks like a TV's remote control. Mar 97, p. 58

★★★★★/7.3 **Tango for FileMaker Pro 2.1.1**, EveryWare Development, 905/819-1173, \$349. No faster way to Web-enable a FileMaker Pro database. Apr 97, p. 114. **Editors' Choice** for best Web databases.

★★★/6.9 **TCP/IP Scripting Addition**, Mango Tree Software, 617/327-8663, \$49. Tool for AppleScript

provides access to TCP/IP commands. Jan 97, p. 152

★★★★★/7.2 **Timbuktu Pro 3.0**, Farallon Communications, 510/814-5000, \$139. Network access tool extends its reach. Jan 97, p. 69

★★★★★/7.2 **Visual Cafe 1.0**, Symantec, 541/334-6054, \$199.95. Faster, easier Java coding, great for creating applets from scratch. May 97, p. 67

★★★★★/7.2 **Visual Page 1.0**, Symantec, 541/334-6054, \$99.95. Web authoring tool has polished features and is easy to use. May 97, p. 56

★★★★★/5.8 **WebArranger 2.0**, CE Software, 515/221-1801, \$79. Powerful bookmark manager handles large quantities of information. Jan 97, p. 152

★/2.6 **Web Buddy 1.0**, DataViz, 203/268-0030, \$50. Offline Web browser makes it easy to set up a schedule but is a memory hog. Jan 97, p. 152

★★★★★/7.0 **Web-FM 3.0**, Web Broadcasting, 415/329-9676, \$245. FileMaker Pro Web integration tool is strong and fast but hard to learn. Apr 97, p. 114

★★★★★/7.2 **Web-Motion 1.0**, Terran Interactive, 408/278-9025, \$99.95. Web-savvy plug-in for first-rate compression utility. Jan 97, p. 81

★★★★★/8.2 **Web Quick 1.2.1**, Europa Software, 503/417-2900, \$49.95. Convenient URL manager follows your trail as you browse. Mar 97, p. 58

★★★/6.7 **Web Squirrel 1.06**, Eastgate Systems, 617/924-9044, \$49. RAM-hungry URL manager is a powerful organizer. Mar 97, p. 58

★★★★★/7.7 **WebStar 2.0**, StarNine Technologies, 510/649-4949, \$795. Web server is better, stronger, faster. Apr 97, p. 62

★★★/4.4 **WebWhacker 1.0.8**, Forefront Group, 713/961-1101, \$70. Clean, simple interface, but offline Web browser lacks scripting and scheduling. Jan 97, p. 152

★★★/6.8 **World Wide Web Weaver 2.0.2**, Miracle Software, 315/265-0930, \$89. Web authoring tool is particularly good at editing existing pages. Mar 97, p. 54

MEDIA

★★★★★/6.2 **Acrobat 3.0**, Adobe Systems, 408/536-6000, \$295 to \$1595. New features still limit use of this portable document program. Apr 97, p. 52

★★★★★/8.2 **AD-1 Pro Audio Analyzer 2.0**, Intelligent Devices, 410/744-3044, \$349 to \$449. Audio meters for the discriminating producer. Dec 96, p. 84

★★★★★/7.1 **Adobe Persuasion 4.0**, Adobe Systems, 408/536-6000, \$395. Presentation application makes the leap to the Web. Mar 97, p. 52

★★★★★/8.5 **Aurorix 2.0**, DigiEffects, 415/841-9901, \$289. From aged film to earthquakes, Aurorix's 26 usable effects are creatively designed. May 97, p. 118. **Editors' Choice** for best After Effects plug-ins.

★★★★★/8.1 **Berserk 1.3**, DigiEffects, 415/841-9901, \$289. This After Effects plug-in has great fog, blizzard, laser, and star-field effects. May 97, p. 118. **Editors' Choice** for best After Effects plug-ins.

★★★★★/7.7 **Boris Effects 2.1 MP**, Artel Software, 617/451-9900, \$350 to \$695. Best Adobe Premiere and Media 100 plug-in; adds motion graphics, keying, and transition effects. May 97, p. 118. **Editors' Choice** for best Premiere and Media 100 plug-ins.

★★★/6.8 **ClickWorks 1.0.2**, Pitango, 617/280-7163, \$985. Presentation program is a solid choice. Feb 97, p. 74

★★★★★/7.5 **Cyclonist 1.0**, DigiEffects, 415/841-9901, \$495. This particle-generation specialist is a complex After Effects plug-in. May 97, p. 118

★★★/6.7 **Digital Chisel://HTML 2.1.3**, Pierian Spring Software, 503/222-2044, \$109 to \$995. Multimedia authoring doesn't make it on

continues

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Circle 105 on reader service card

Star Ratings

the Web. Jan 97, p. 78

★★★/6.4 **Dynamic Effects 1.0**, Gryphon Software, 619/536-8815, \$119. A solid but uninspiring filter plug-in collection for Adobe Premiere. May 97, p. 118

★★★/8.3 **Final Effects AP 1.0**, MetaTools, 805/566-6200, \$199. Ideal for Adobe Premiere-based particle generation and distortion. May 97, p. 118

★★★/8.2 **HoloDozo 1.0**, M.M.M. Software, holodozo@mmmssoft.com, \$149. Novel Adobe Premiere plug-in has a clever interface, uses QuickDraw 3D. May 97, p. 118

★★★/8.9 **KPT Final Effects 3.0.1**, MetaTools, 805/566-6200, \$695. This superb effects collection works with Adobe After Effects. May 97, p. 118

★★★/8.9 **Lens Flare Pack 1.5**, Knoll Software, 415/453-2471, \$129. This After Effects plug-in generates unmatched lens flare effects. May 97, p. 118. **Editors' Choice** for best After Effects plug-ins.

★★★/6.7 **LightWave 3D 5.0**, NewTek, 303/448-9700, \$1495. Pro-level animation program lacks interface elegance. May 97, p. 74

★★★/7.4 **Movie Cleaner Pro 1.2.1**, Terran Interactive, 408/278-9025, \$189.95. First-rate movie compression utility is a must-have. Jan 97, p. 81

★★★/7.2 **MovieFlo' 2.0.2**, The Valis Group, 415/435-5404, \$699. Image-distortion software for pros. Jan 97, p. 92

★★★/5.5 **MovieStar 1.5**, Intelligence at Large, 215/387-6002, \$149.95. Easy QuickTime moviemaking and animation for the Internet. Feb 97, p. 92

★★★/5.4 **MovieTools 1.5**, McQ Productions, 415/348-1344, \$195. Simple, precise QuickTime movie processing. Apr 97, p. 72

★★★/7.3 **mTropolis 1.1**, mFactory, 415/548-0600, \$1195. Sophisticated authoring environment is a terrific tool for game developers. Feb 97, p. 74

★★★/6.6 **Nisus Writer 5.0**, Nisus Software, 619/481-1477, \$249. Renegade word processor is long on innovation, short on basics. Apr 97, p. 56

★★★/6.8 **PageMaker 6.5**, Adobe Systems, 408/536-6000, \$895 (estimated). Even with a wealth of new features, still can't beat QuarkXPress. May 97, p. 48

★★★/8.0 **QuarkImmedia 1.0**, Quark, 303/894-8888, \$995. An easy move from print to multimedia. Dec 96, p. 57

★★★/7.8 **QX-Tools 2.0**, Extensis, 503/274-2020, \$99.95. Winning collection of XTensions gets even better. Mar 97, p. 65

★★★/8.4 **Studio Effects 1.0**, MetaTools, 805/566-6200, \$695. Adobe After Effects plug-ins include 3-D particle generator and great spotlight effects. May 97, p. 118

★★★/7.0 **SuperCard 3.0**, Allegiant Technologies, 619/587-0500, \$329 (estimated). Veteran authoring tool gets a cool Web plug-in; a few Web-related bugs. May 97, p. 58

★★★/6.4 **TransFX 1.0**, DigiEffects, 415/841-9901, \$45. Inexpensive and fun transition collection for Adobe Premiere. May 97, p. 118

★★★/7.5 **TypeCaster 2.0**, Xaos Tools, 415/538-7000, \$199. 3-D text plug-in renders beautiful text that you can animate. May 97, p. 118

★★★/6.8 **Ultimate for Macintosh 2.0**, Ultimate, 818/993-8007, \$1495. Complex, costly plug-in does an unmatched job of keying. May 97, p. 118

★★★/6.3 **UniQorn 1.2**, SoftPress Systems, 415/331-4820, \$895. Easily turns print into Java-powered Web pages; features still a bit sluggish. Apr 97, p. 58

★★★/8.8 **Video SpiceRack 1.0**, Pixélan Software, 360/647-0112, \$179. Novel plug-in collection has

more than 300 transition and effect gradients. May 97, p. 118

UTILITIES

★★★/6.7 **After Dark 4.0**, Berkeley Systems, 510/540-5535, \$30 to \$40. Glitzy, but not necessarily better, than previous versions. Feb 97, p. 76

★★★/7.5 **Audiotracer 1.0**, Optical Media, 408/376-3511, \$99. CD-R mastering program designed for creating audio CDs. Apr 97, p. 76

★★★/6.0 **Burn It 1.0**, Synchrony Softcorp, 213/340-4100, \$29.95. Inexpensive but flawed security suite. Apr 97, p. 69

★★★/7.6 **CanOpener 3.5**, Abbott Systems, 914/747-4171, \$65. Reliably recovers text and graphics from damaged files. Feb 97, p. 88

★★/4.9 **DiskWorks 3.0.2**, MicroNet Technology, 714/453-6100, \$299. Disappointing hard-drive formatter has an awkward interface. Dec 96, p. 62

★★★/6.1 **Dr. Solomon's Anti-Virus Toolkit 7.6.1**, S&S International, 617/273-7400, \$85. Antivirus utility can check DOS disks. Dec 96, p. 60

★★/1.8 **Executor 2.0**, Abacus Research & Development, 505/766-9115, \$249. Mac emulator for PCs falls far, far short. Feb 97, p. 78

★★★/7.0 **Hard Disk Toolkit 2.0.1**, FWB, 415/463-3500, \$199. Reliable hard-drive formatter can actually tweak a drive to run faster. Dec 96, p. 62

★★/3.8 **Internet Voice Mail 3.0**, VocalTec, 201/768-9400, \$29.95. Internet Voice Mail has limited functionality and is full of bugs. May 97, p. 80

★★★/6.8 **KeyQuencer 2.0**, Binary Software, 310/449-1481, \$39.95 direct. Macro program for speed addicts and control freaks. Dec 96, p. 59

★★★/7.5 **MATLAB Statistics Toolbox 2.0**, The MathWorks, 508/647-7000, \$395. Statistical analysis tool on steroids. Dec 96, p. 77

★★★/9.3 **MATLAB Wavelet Toolbox 1.0**, The MathWorks, 508/647-7000, \$895. Powerful wavelet-analysis tool. Dec 96, p. 77

★★★/7.7 **McAfee VirusScan 2.0**, McAfee Associates, 408/988-3832, \$65. World-class virus protection has little impact on Mac's performance. Dec 96, p. 60

★★★/6.4 **Now Utilities 6.5**, Now Software, 503/274-2810, \$89.95. Incremental feature upgrades are no substitute for stability. Mar 97, p. 74

★★★/8.2 **QuickKeys 3.5**, CE Software, 515/224-1995, \$119. QuickKeys exists to make macros easier. Dec 96, p. 59

★★★/8.6 **RAM Doubler 2.0**, Connectix, 415/571-5100, \$99. Control panel now triples your RAM. Dec 96, p. 67

★★★/6.4 **SAM 4.5**, Symantec, 408/253-9600, \$69.95. Industrial-strength virus protection. Feb 97, p. 86

★★★/7.2 **Speed Doubler 2.0.1**, Connectix, 415/571-5100, \$99. Upgrade boosts network transfer times, same speed as prior versions. May 97, p. 52

★★★/7.8 **Spell Catcher 1.5.6**, Casady & Greene, 408/484-9228, \$59.95. Resurrected Thunder 7 is still much more than a spelling checker. Dec 96, p. 73

★★/4.0 **Startup Manager 7.0**, Now Software, 503/274-2810, \$55. Extension-management tool simply can't compare to the competition. Mar 97, p. 61

★/2.7 **StellarFax 1.1**, TechPool, 216/291-1922, \$249. Sends inferior-quality faxes faster. Feb 97, p. 90

★★/4.6 **Turbo Toolkit 1.0**, FWB Software, 415/463-3500, \$79. Disk utility offers minor speed-up. Mar 97, p. 74

★★★/8.8 **Virex 5.7**, Datawatch, 508/988-9700, \$99. Great virus-detection features, checks downloaded Internet files for viruses. May 97, p. 78

★★★/8.0 **Wingz 2.1.1**, Investment Intelligence Systems Group, 913/663-4472, \$399. Powerful

programming tool disguised as a spreadsheet. May 97, p. 71

★★★/6.5 **Working Papers**, Dominion Software, 617/332-1144, \$199.95. Manage your documents with OCR program and document organizer. Feb 97, p. 94

Hardware

DIGITAL CAMERAS

★★/3.9 **Casio QV-100**, Casio, 201/361-5400, \$599. Camera produces poor-quality images with blown highlights. Mar 97, p. 112

★★★/5.8 **Casio QV-10A**, Casio, 201/361-5400, \$399. Blown highlights and color cast problems mar images from camera. Mar 97, p. 112

★★★/6.6 **D-200L**, Olympus Image Systems, 516/844-5000, \$599. Digital camera offers good image quality and a built-in flash. Mar 97, p. 112

★★/4.6 **DC20**, Kodak, 716/724-4000, \$350. Pint-size camera contains no extras whatsoever. Mar 97, p. 112

★★★/6.8 **DC50**, Kodak, 716/724-4000, \$979. Good color, expandability, and an excellent zoom lens set the DC50 apart. Mar 97, p. 112. **Editors' Choice** for best entry-level digital cameras.

★★★/6.0 **Epson PhotoPC**, Epson, 310/782-0770, \$499. Digital camera's viewfinder doesn't show the whole image. Mar 97, p. 112

★★★/7.1 **Fuji DS-7**, Fuji Photo Film, 914/789-8100, \$699. Camera makes framing and reviewing photographs child's play. Mar 97, p. 112. **Editors' Choice** for best entry-level digital cameras.

★★★/7.9 **PDC-2000-40**, Polaroid, 716/256-4436, \$3695. Digital camera is difficult to use and not inexpensive, but extremely high-quality images. Mar 97, p. 112. **Editors' Choice** for best entry-level digital cameras.

★★★/6.2 **QuickTake 150**, Apple Computer, 408/996-1010, \$739. Oversized camera quickly downloads images. Mar 97, p. 112

★★★/5.8 **RDC-2**, Ricoh, 702/352-1600, \$999. Fair-to-middling image quality detracts from this camera's extras. Mar 97, p. 112

MISCELLANEOUS HARDWARE

★★★/8.5 **AlphaSmart Pro 2.1**, Intelligent Peripheral Devices, 408/252-9400, \$269. Intelligent keyboard works as stand-alone input device. Mar 97, p. 82

★★★/7.0 **Apex**, Pinnacle Micro, 714/789-3000, \$1995. King-size magneto-optical drive offers respectable speeds. Apr 97, p. 54

★★★/7.5 **DynaTek CDM 4001**, DynaTek Automation Systems, 902/832-3000, \$2889. Hard drive/CD-R combo unit simplifies CD-ROM mastering. Mar 97, p. 78

★★★/7.8 **Pilot**, Palm Computing, 415/237-6000, \$249 to \$299. Pocket PDA is small, swift, and sweet. Apr 97, p. 48

★★/4.7 **Pippin @World**, Bandai Digital Entertainment, 310/404-1600, \$499.99; \$69.99 for keyboard. Costly Internet-connection and games device has poor image quality. May 97, p. 64

★★★/7.8 **Sagem Planet ISDN GeoPort Adapter**, Sagem, 408/446-8693, \$395. ISDN terminal adapter breaks serial port speed barrier. Mar 97, p. 66

★★★/7.0 **Supra Simple Internet 33.6 1.0**, Diamond Multimedia, 360/604-1400, \$159.95. Modem makes Internet access quick and easy. Jan 97, p. 90

★★★/6.4 **WebRamp**, Trancell Systems, 408/988-

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Circle 4 on reader service card

Star Ratings

5353, \$899. ISDN router is easy to use, but missing some features. *Mar 97, p. 70*

- ★★★/6.8 **WebTV Internet Terminal**, Sony, 888/772-7669, \$349.95; \$79.95 for keyboard. Expensive, easy-to-use Internet-connection device has nice interface. *May 97, p. 64*

MODEMS/NETWORKS

- ★★★★/8.8 **4-Sight Fax 4.0**, 4-Sight Technologies, 515/221-3000, \$795 for 10 users. Flexible, reliable faxing on your network. *Apr 97, p. 57*
- ★★★/4.8 **MultiModemZDXV**, Multi-Tech Systems, 612/785-3500, \$269. Expensive average-performing 33.6-Kbps modem, no Mac software. *Apr 97, p. 123*
- ★★★/5.3 **MV.34MA**, Boca Research, 561/997-6227, \$236. Cheap 33.6-Kbps modem offers fast, easy internet hookup. *Apr 97, p. 123*
- ★★★★/8.3 **Network Server 700/200**, Apple Computer, 408/996-1010, \$11,800. Server offers networking horsepower and high-speed I/O. *May 97, p. 54*
- ★★★/6.6 **Quicktel II-C 33X-ASP-C-M**, Logicode Technology, 805/383-2500, \$319. Fast 33.6-Kbps modem with innovative design, but a bit expensive. *Apr 97, p. 123*
- ★★★/4.5 **SmartLink 3334AV**, Archtek America, 818/912-9800, \$209. Poorly performing, reasonably priced 33.6-Kbps modem. *Apr 97, p. 123*
- ★/2.7 **SmartOne 336FLXMac**, Best Data Products, 818/773-9600, \$179. Inexpensive 33.6-Kbps modem is one of the slowest. *Apr 97, p. 123*
- ★★★★/7.1 **Sportster 28.8/33.6 Faxmodem**, U.S. Robotics, 847/676-7010, \$179 (estimated price). Affordable 33.6-Kbps modem offers best performance. *Apr 97, p. 123*. **Editors' Choice** for best 33.6-Kbps fax modems.
- ★★★/6.7 **SupraSonic 336V+**, Diamond Multimedia Systems, 360/604-1400, \$249 (estimated price). Full-featured 33.6-Kbps modem isn't cheap but is really fast. *Apr 97, p. 123*
- ★★★/6.5 **TelePort Internet Edition 33.6**, Global Village Communication, 408/523-1000, \$169 (estimated price). Fast 33.6-Kbps modem includes flash ROM and CCL scripts. *Apr 97, p. 123*
- ★★★★/8.2 **Workgroup Server 8550/200**, Apple Computer, 408/996-1010, \$4200. An affordable 200MHz medium-duty Internet server that's easy to use. *May 97, p. 54*
- ★★★/4.9 **Zoom V.34X Plus**, Zoom Telephonics, 617/423-1072, \$199. Average-performing 33.6-Kbps modem with a seven-year warranty. *Apr 97, p. 123*

PRINTERS

- ★★★/6.9 **Apple Color StyleWriter 1500**, Apple Computer, 408/996-1010, \$249. Lackluster performance and image quality mark this color ink-jet. *Feb 97, p. 140*
- ★★★★/7.5 **Apple Color StyleWriter 2500**, Apple Computer, 408/996-1010, \$349. Relatively fast color ink-jet has fair image quality. *Feb 97, p. 140*
- ★★★★/7.3 **BJC-4550**, Canon Computer Systems, 714/438-3000, \$499. Ink-jet produces beautiful images with optional photo ink kit. *Feb 97, p. 140*
- ★★★/6.5 **Canon CLBP 360PS**, Canon USA, 516/328-5000, \$12,500. Color laser printer had good text output, but other tests were mediocre. *Nov 96, p. 157*
- ★★★/6.7 **Color LaserWriter 12/600 PS**, Apple Com-

puter, 408/996-1010, \$6989 (estimated). Slow speed but excellent text output. *Nov 96, p. 157*

- ★★★★/7.8 **DeskJet 870Cse**, Hewlett-Packard, 408/246-4300, \$499. Outstanding color ink-jet for inexpensive office printing. *Feb 97, p. 140*. **Editors' Choice** for best office printer.
- ★★★/6.9 **DeskJet 1600CM**, Hewlett-Packard, 408/246-4300, \$1999. Expensive ink-jet printer offers good speed and crisp text. *Feb 97, p. 140*
- ★★★/5.9 **DeskWriter 600**, Hewlett-Packard, 408/246-4300, \$199. Decent speed and average print quality at a nice price. *Feb 97, p. 140*
- ★★★★/7.2 **DeskWriter 680c**, Hewlett-Packard, 408/246-4300, \$279. Color ink-jet offers above-average image quality. *Feb 97, p. 140*
- ★★★/5.1 **HP Color LaserJet 5M**, Hewlett-Packard, 408/246-4300, \$9195. Inferior output; slow; messy consumables. *Nov 96, p. 157*
- ★★★/6.6 **magicolor CX/32**, QMS, 334/633-4300, \$7999. Unexceptional output for this color laser printer. *Nov 96, p. 157*
- ★★★/5.4 **MD-2010**, Alps Electric, 408/432-6000, \$499. Low-end color printer is slow, with poor-quality output. *Feb 97, p. 140*
- ★★★★/7.0 **Optra C**, Lexmark International, 606/232-2000, \$6849. This color laser printer has easy-to-use controls; good text and graphics output. *Nov 96, p. 157*
- ★★★★/7.9 **Phaser 350**, Tektronix, 503/682-7377, \$3495. Solid-ink printer delivers laser-quality output. *Nov 96, p. 67*
- ★★★/7.6 **Phaser 550**, Tektronix, 503/685-3067, \$6995. Fastest color laser printer tested; superior output; true 1200-dpi resolution. *Nov 96, p. 157*. **Editors' Choice** for best color laser printers.
- ★★★/7.8 **Stylus Color 500**, Epson America, 310/782-0770, \$279. Good price, output, and speed, but this color ink-jet is messy. *Feb 97, p. 140*. **Editors' Choice** for best home printer.
- ★★★/5.7 **TruPhoto**, Panasonic Interactive Media, 408/653-1888, \$479.95. Digital photo printer offers instant snapshots, delayed gratification. *Apr 97, p. 64*
- ★★★/7.2 **XPrint 4915 Plus**, Xerox, 716/442-4028, \$4995. Top-notch graphic output; a great color laser printer value. *Nov 96, p. 157*. **Editors' Choice** for best color laser printers.
- ★★★/6.9 **XPrint 4925 Plus**, Xerox, 716/442-4028, \$8995. Color laser printer's graphics results are among the best, but speed was unimpressive. *Nov 96, p. 157*

SCANNERS

- ★★★★/7.5 **Agfa StudioStar**, Agfa, 508/658-5600, \$989. Graphics pros will treasure scanner's high-quality scans and powerful software. *Feb 97, p. 62*
- ★★★/4.8 **Apple Color OneScanner 1200/30**, Apple Computer, 408/996-1010, \$799. A big disappointment; offers little advantage over its lower-priced predecessor. *Feb 97, p. 62*
- ★★★/3.3 **ArtiScan Z1-1200**, Tamarack Technologies, 714/744-3979, \$699. Slow, unimpressive, noisy scanner can scan at 600 dpi and 30-bit. *Mar 97, p. 131*
- ★★★/3.7 **ArtiScan Z1-600**, Tamarack Technologies, 714/744-3979, \$499. Slow, unimpressive machine rumbles while scanning. *Mar 97, p. 131*
- ★★★/5.1 **Color OneScanner 600/27**, Apple Computer, 408/996-1010, \$549 (estimated). Sleek and compact, but can't compete with less-expensive models. *Mar 97, p. 131*
- ★★★★/8.4 **Epson Expression 636**, Epson America, 800/922-8911, \$899 as tested. Low-cost color scanner gets the nod for all-around use.

Feb 97, p. 62

- ★★★/4.9 **HP ScanJet 5p**, Hewlett-Packard, 800/722-6538, \$530. Attractive scanner marred by mediocre image quality and software. *Apr 97, p. 50*
- ★★/3.8 **ImageReader Elite**, Info, 408/538-2500, \$399. Small, inexpensive scanner delivers mediocre performance. *Mar 97, p. 131*
- ★★★/3.8 **ImageReader FB**, Info, 408/538-2500, \$549. Painfully slow scanner with anemic software and awkward case design. *Mar 97, p. 131*
- ★★★/3.8 **ScanAce II**, PacificImage Electronics, 310/214-5281, \$899. Bulky scanner performed well in color, gray-scale, and resolution tests. *Mar 97, p. 131*
- ★★★/4.9 **ScanJet 4P**, Hewlett-Packard, 208/323/2551, \$615. Outstanding color fidelity, but large, heavy scanner has weak software. *Mar 97, p. 131*
- ★★★/3.8 **ScanMaker E3**, Microtek Lab, 310/297-5000, \$329 (estimated). Inexpensive, but disappointing speed, color, and gray-scale test results. *Mar 97, p. 131*
- ★★★/3.7 **ScanMaker E6**, Microtek Lab, 310/297-5000, \$599. 30-bit color, but otherwise no better than the ScanMaker E3. *Mar 97, p. 131*
- ★★★/5.9 **ScanTouch 110**, Nikon Electronic Imaging, 516/547-4355, \$299 (estimated). A relatively fast scanner, with good color fidelity and an attractive price. *Mar 97, p. 131*
- ★★★/5.3 **ScanTouch 210**, Nikon Electronic Imaging, 516/547-4355, \$699 (estimated). Slower and more expensive than the ScanTouch 110, but 600 dpi. *Mar 97, p. 131*
- ★★★★/7.1 **SilverScanner Pro**, La Cie, 503/520-9000, \$499. Great low-cost scanner with compact design, and good software. *Mar 97, p. 131*. **Editors' Choice** for best low-end scanners.
- ★★★/6.9 **SnapScan**, Agfa, 508/658-5600, \$389 (estimated). Quiet, fast scanner has good scanning software. *Mar 97, p. 131*
- ★★★/6.6 **Vista-S12E**, Umax Technologies, 510/651-4000, \$649. Fast, with minimal image noise, but the Vista S-6E is a better choice. *Mar 97, p. 131*
- ★★★/8.4 **Vista-S6E**, Umax Technologies, 510/651-4000, \$345 (estimated). Inexpensive scanner did well on most of our tests, has good software. *Mar 97, p. 131*. **Editors' Choice** for best low-end scanners.

STORAGE

- ★★★/5.7 **APS Q3200**, APS Technologies, 816/483-1600, \$400 to \$480. At 5400 rpm, this 3GB hard drive is not fast, but it is nicely priced. *May 97, p. 127*
- ★★★/6.4 **Barracuda 4LP**, Club Mac, 714/768-8130, \$789 to \$849. An ordinary-looking case masks a 7200-rpm, 2GB drive that screams. *May 97, p. 127*
- ★★★/5.7 **D2**, La Cie, 503/520-9000, \$399. 2GB hard drive with some thoughtful touches is average in speed. *May 97, p. 127*
- ★★★/6.5 **DCS 2150**, Direct Connections, 612/937-6283, \$825. 2GB drive is a speed demon, whether connected internally or externally. *May 97, p. 127*
- ★★★/5.7 **DisKover 2100W**, Optima Technology, 714/476-0515, \$560. 2GB hard drive is an easy all-in-one solution. *May 97, p. 127*
- ★★★/5.4 **Fireball TM 21**, Quantum, 408/894-4000, \$320. 2GB, 5400-rpm hard drive with clear installation instructions. *May 97, p. 127*
- ★★★/5.7 **Fireball TM 32**, Quantum, 408/894-4000, \$433. 3GB, 5400-rpm internal hard drive with clear installation instructions. *May 97, p. 127*
- ★★★/6.1 **Hammer 2050iS Ultra**, StreamLogic, 818/701-8400, \$919. Great performance, but pricey for a 2GB internal drive. *May 97, p. 127*

- ★★★/6.0 PDI 2100WAV, ProDirect, 612/941-1805, \$699. 2GB drive is fast with a SCSI card, but average on the external bus. *May 97, p. 127*
- ★★★★/7.5 PDI 3800, ProDirect, 612/941-1805, \$899. Big, fast, nicely priced 3.8GB hard drive. *May 97, p. 127*. **Editors' Choice** for best 2GB to 3GB hard drives.
- ★★★/6.1 Seagate ST32171W, Seagate, 408/438-6550, NP. An OEM drive tested for comparison, this 7200 rpm drive is fast. *May 97, p. 127*
- ★★★★/7.6 SyJet, SyQuest, 510/226-4000, \$399 to \$499. Removable-media drive that's faster than Jaz; easy setup. *May 97, p. 51*
- ★★★/5.2 Tempest 3.2, Club Mac, 714/768-8130, \$399 to \$459. 5400-rpm, 3GB drive that pales next to the competition. *May 97, p. 127*
- ★★★/5.9 Tsunami, La Cie, 503/520-9000, \$499. Snazzy case, but 3GB hard drive's not that fast. *May 97, p. 127*

VIDEO/DISPLAY

- ★★★/6.3 Diamond Pro 91TXM, Mitsubishi Electronics America, 714/220-2500, \$1699. Pricey for an average product, with below-average image quality. *Jan 97, p. 125*
- ★★★/6.1 G200, IBM, 914/766-1900, \$1469. Easy to use, but below-average image quality. *Jan 97, p. 125*
- ★★★★/7.6 G810, ViewSonic, 909/869-7976, \$1595. A great price for a top pick in both usability and image quality. *Jan 97, p. 125*. **Editors' Choice** for best two-page monitors.
- ★★★/6.7 Multigraph 445Xi, Nokia Display Products, 415/331-4244, \$1899. A little pricey for a monitor that offers only medium image quality. *Jan 97, p. 125*
- ★★★/6.7 Multiple Scan 20, Apple Computer, 408/996-1010, \$2149. Good overall image quality, but pricey for its category. *Jan 97, p. 125*
- ★★★/6.6 MX21F-M, Mag InnoVision, 714/751-2008, \$1699. Average price for average usability and image-quality scores. *Jan 97, p. 125*
- ★★/4.7 P201, IBM, 914/766-1900, \$2635. Poor image quality and hard to use. *Jan 97, p. 125*
- ★★★/6.2 PanaSync S21, Panasonic, 201/348-7000, \$1899. Good controls, but a little expensive for below-average image quality. *Jan 97, p. 125*
- ★★★/5.8 PrecisionView 21, Radius, 408/541-6100, \$2749. Overpriced for only average test scores and a one-year warranty. *Jan 97, p. 125*
- ★★★/6.9 Pro P810, ViewSonic, 909/869-7976, \$1745. Superb image quality, but costlier than its sibling, the G810. *Jan 97, p. 125*
- ★★★★/7.4 RasterOps SuperScan Mc20, Hitachi NSA, 617/461-8300, \$1599. Good bargain for an overall good performer. *Jan 97, p. 125*
- ★★★/6.6 RasterOps SuperScan Mc801HR, Hitachi NSA, 617/461-8300, \$2199. A bit costly for only above-average image quality, mediocre controls. *Jan 97, p. 125*
- ★★★/6.4 SyncMaster 21 GLs, Samsung Electronic America, 201/971-0400, \$1959. Expensive unit for overall average performance. *Jan 97, p. 125*
- ★★★/5.6 Ultra 20-M, Princeton Graphic Systems, 714/751-8405, \$1249. Inexpensive, but you get what you pay for—not high quality. *Jan 97, p. 125*
- ★★★/6.4 VisionMaster 21, Iiyama North America, 215/957-6543, \$1945. Overall, a good unit, but not good enough to justify the price. *Jan 97, p. 125*
- ★★★★/8.3 VisionMaster Pro 21, Iiyama North America, 215/957-6543, \$1995. Top overall image quality with clear on-screen controls. *Jan 97, p. 125*. **Editors' Choice** for best two-page monitors. **m**

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Mac Superguide

MACWORLD SELECTS THE BEST MAC OS SYSTEMS

Looking for a new Macintosh but confused about which of all the new models to buy? Look no further. Each month, the *Mac Superguide* section provides *Macworld's* picks for the best Mac OS systems. Typically we recommend three top choices: an Editors' Choice winner and two runners-up. Occasionally we'll have more or fewer top choices in categories with unusually competitive—or uncompetitive—options.

You'll also find *Macworld* Star Ratings and Macworld Lab performance benchmarks for all Mac OS systems shipping as we went to press in late March 1997. You may read about other Mac models in *Macworld* and elsewhere, but those are prototypes not yet available—the only systems rated here are those you can actually buy.

For Mac systems reviewed earlier, the summaries below include the issue date and page number of the article. In some cases, such as faster versions of existing Macs, there is no full review and thus no cross-reference. New systems are indicated in the benchmark by the ► icon.

Star Ratings and Editors' Choice designations may have changed since previous issues, based on the current lineup of systems and any price changes; the winners listed here are the current ones.

Prices from Apple, Motorola, and Umax are company-estimated street prices; actual price may vary from the company estimates. APS, DayStar, Power Computing, and PowerTools sell direct, so the prices listed here are the ones you would actually pay. Unless otherwise noted, all systems include a keyboard and mouse, but not a monitor or modem. DayStar systems do not include a hard drive, RAM, keyboard, or mouse, although we add their cost in determining the prices reported here.

For price comparisons, figure on spending about \$800 for a 17-inch monitor and, if they're needed, \$175 for a modem, \$100 for an extended keyboard, \$50 for a mouse, \$400 for a 2GB hard drive, \$175 for 2MB of VRAM, and \$100 for 16MB of RAM.

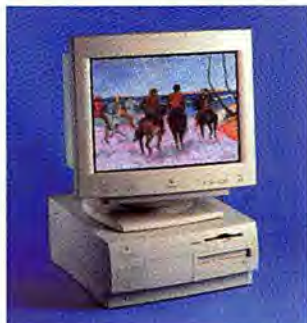
OFFICE SYSTEM

EDITORS' CHOICE

★★★★7.3 **Power Macintosh 7300/180** Apple's new desktop finally does it right: strong performance, competitive price, easy expansion, and no unneeded extras. It's nice to see Apple has learned the value lessons that the clone competition has been trying to teach. Apple Computer (408/996-1010): \$2399, 16MB RAM, 256K cache, 2MB VRAM (4MB maximum), 2.0GB hard drive, 12x CD, 1 free drive bay, 3 PCI slots. May 97, p. 100

★★★★7.1 **SuperMac J700/180** Similar to Apple's Power Mac 7300/180, the J700/180 has one more PCI slot, one more free drive bay, and more cache than the 7300. But it costs more than the 7300. Umax Computer (510/226-6886): \$2499, 16MB RAM, 512K cache, 2MB VRAM (4MB maximum), 2.1GB hard drive, 6.7x CD, 2 free drive bays, 4 PCI slots. May 97, p. 100

★★★★7.0 **PowerCenter 150** A great price, plus more expansion than Apple's Power Mac 7300/180, make the soon-to-be-discontinued PowerCenter 150 tower the ideal general-purpose office Mac for people on a budget. Power Computing (512/388-6868): \$1495, 16MB RAM, 512K cache, 2MB VRAM (4MB



Apple's Power Macintosh 7300/180 effectively combines price, performance, and upgradability.

maximum), 1.0GB hard drive, 8x CD, 3 free drive bays, 3 PCI slots. A desktop version with no free drive bays costs \$1695. May 97, p. 100

PORTABLE SYSTEM

EDITORS' CHOICE

★★★★7.6 **PowerBook 3400c/200** The new 3400c/200 is almost twice as fast as a top-of-the-line Pentium portable yet costs just \$500 more. A built-in modem and Ethernet port eliminates an expensive PC Card modem/Ethernet combo. However, the 3400c isn't perfect: it doesn't support multiple monitors and its CPU isn't upgradable. And the high price puts it out of reach for many people. Apple Computer (408/996-1010): \$5495, 16MB RAM, 2.0GB hard drive, 6x CD, 12.1-inch active matrix LCD, 1 drive bay, 2 PC Card slots. May 97, p. 50

★★★7.4 **PowerBook 1400cs/117** Apple's midrange notebook accommodates an optional CD-ROM drive. The result is a better system than the old 5300 series, but it's no barn burner. The large LCD panel is nice, even though it's passive matrix. Apple Computer (408/996-1010): \$2495, 12MB RAM, 750MB hard drive, optional 6x CD, 11.3-inch passive-matrix LCD, 1 drive bay, 2 PC Card slots (\$3500 model 1400c/117 has active-matrix LCD and 1.0GB hard drive). Jan 97, p. 58

SMALL-OFFICE/HOME-OFFICE SYSTEM

EDITORS' CHOICE

★★★★7.4 **PowerBase 200** Pro-level performance that costs less than Apple's Performa 6400/200, plus a strong selection of features and greater expansion capability, make this tower system a great buy for consultants and small businesses. Power Computing (512/388-6868): \$1495, 16MB RAM, 256K cache, 2MB VRAM (4MB maximum), 1.2GB hard drive, 8x CD, 3 free drive bays, 3 PCI slots. May 97, p. 100



Apple's speedy PowerBook 3400c/200 has outstanding performance, and a high price tag.

★★★★7.1 **Performa 6400/200** An affordable, good performer with limited internal expansion. It has a unique TV tuner slot. Apple Computer (408/996-1010): \$1799, 16MB RAM, 256K cache, 1MB VRAM (1MB maximum), 2.4GB drive, 8x CD, 1 free drive bay, two 7-inch PCI slots, TV/FM tuner slot, 28.8-Kbps modem. May 97, p. 100

EDUCATION SYSTEM

EDITORS' CHOICE

★★★★7.4 **PowerBase 180** It's fast, cheap, and expandable, with 3-D video acceleration. This tower is a great buy for cash-strapped schools and students. Power Computing (512/388-6868): \$1295, 16MB RAM, 256K cache, 2MB VRAM (4MB maximum), 1.2GB hard drive, 8x CD, 3 free drive bays, 3 PCI slots. May 97, p. 100

EDITORS' CHOICE

★★★★7.1 **Power Macintosh 5400/180** This all-in-one Mac—available only to schools—eliminates the need for cables. Rich in features—including a good monitor—and moderate in speed, the 5400 is a good classroom Mac. Apple Computer (408/996-1010): \$1999, 16MB RAM, 1MB VRAM (1MB maximum), 1.6GB hard drive, 8x CD, no free drive bays, 7-inch PCI slot, TV/FM tuner slot, Ethernet card, internal stereo speakers, monitor included. May 97, p. 100

REAL PRODUCTS REAL RATINGS

Reviews you can trust: Unlike other publications, *Macworld* rates only final shipping products, not prototypes. What we review is what you can actually buy.
Outstanding ★★★★★ = 9.0–10.0 Very Good ★★★★ = 7.0–8.9 Good ★★★ = 5.0–6.9 Flawed ★★ = 3.0–4.9 Unacceptable ★ = 0–2.9

IMAGE-EDITING AND 3-D GRAPHICS SYSTEM

EDITORS' CHOICE

★★★★/8.2 **PowerTower Pro 225** This expandable tower is great for all-around image editing and 3-D graphics. Although a multiprocessor-based Mac is faster for certain key operations, the PowerTower Pro 225 is faster and cheaper overall. Power Computing (512/388-6868): \$3695, 32MB RAM, 1MB cache, 8MB VRAM (8MB maximum), 2.0GB hard drive, 16x CD, 6 free drive bays, 6 PCI slots. Jun 97, p. 108

EDITORS' CHOICE

★★★★/7.5 **Genesis LT 400+** The new, affordable LT 400+ is swift in multiprocessor (MP)-enabled programs. Photoshop users who use MP-accelerated filters all day will love it. DayStar Digital (770/967-2077): \$5499, 16MB RAM, 512K cache, 4MB VRAM (4MB maximum), 2.0GB hard drive, 8x CD, 2 free drive bays, 6 PCI slots. Jan 97, p. 108

★★★★/7.5 **Genesis MP 800+** The ultimate Mac system speeds through multiprocessor (MP)-enabled programs such as Adobe Photoshop. And the tower has room for all the extras. DayStar Digital

(770/967-2077): \$12,314, 16MB RAM, 512K cache, 4MB VRAM (4MB maximum), 2.0GB hard drive, 8x CD, 7 free drive bays, 6 PCI slots. Jun 97, p. 108

PUBLISHING AND DESIGN SYSTEM

EDITORS' CHOICE

★★★★/8.2 **PowerTower Pro 225** The fastest single-CPU Mac is the best for publishing pros—at a low price. Power Computing (512/388-6868): \$3695, 32MB RAM, 1MB cache, 8MB VRAM (8MB maximum), 2.0GB hard drive, 16x CD, 6 free drive bays, 6 PCI slots. Jun 97, p. 108

EDITORS' CHOICE

★★★★/8.0 **SuperMac S900/225** Nearly as fast as Power Computing's PowerTower Pro 225, but with fewer free drive bays. The S900/225 is a solid second choice. Umax Computer (510/226-6886): \$3899, 32MB RAM, 512K cache, 8MB VRAM (8MB maximum), 2.1GB hard drive, 8x CD, 4 free drive bays, 6 PCI slots. Jun 97, p. 108

★★★★/7.9 **PowerTower Pro 200** Publishing pros will love this Mac. And for \$500 less than a similar PowerTower Pro 225, it's a much better price/performance



DayStar's Genesis LT 400+ is an affordable Mac that's ideal for image editing and 3-D graphics.

deal. Power Computing (512/388-6868): \$3195, 32MB RAM, 1MB cache, 8MB VRAM (8MB maximum), 2.0GB hard drive, 16x CD, 6 free drive bays, 6 PCI slots. Jun 97, p. 108

MULTIMEDIA AND VIDEO CREATION SYSTEM

EDITORS' CHOICE

★★★★/7.5 **Genesis MP 800+** The ultimate Mac speeds through multiprocessor (MP)-enabled programs such as

Adobe Premiere and After Effects. Its oversize toner case lets you add a huge number of drives. DayStar Digital (770/967-2077): \$10,714, 16MB RAM, 512K cache, 4MB VRAM (4MB maximum), 2.0GB hard drive, 8x CD, 7 free drive bays, 6 PCI slots. Jun 97, p. 108

WEB AND INTRANET SERVER SYSTEM

EDITORS' CHOICE

★★★★/7.9 **PowerTower Pro 200** The second-fastest single-CPU Macintosh offers the high performance that's needed for Web serving at an attractive price. Power Computing (512/388-6868): \$3195, 32MB RAM, 1MB cache, 8MB VRAM (8MB maximum), 2.0GB hard drive, 16x CD, 6 free drive bays, 6 PCI slots. Jun 97, p. 108

EDITORS' CHOICE

★★★★/7.8 **SuperMac S900/200** This speedy machine has plenty of expansion opportunities. It makes a good departmental or Web server. Umax Computer (510/226-6886): \$3399, 32MB RAM, 512K cache, 4MB VRAM (4MB maximum), 2.1GB hard drive, 8x CD, 4 free drive bays, 6 PCI slots. Jun 97, p. 108 **m**



Every Shipping Mac Tested and Rated

► New this issue. **Editors' Choice winners in red.** Longer bars are better. Core results are times as fast as a Centris 650 (Centris 650 = 1.0). Multiprocessor results are times as fast as a Power Mac 9500/150 (9500 = 1.0). Only shipping systems are tested and rated.

Core Mac Performance	Star Rating*	Core Mac Performance	Star Rating*
Apple Computer			
Performa 6360	4.0 ★★/5.3	StarMax 4000 MT604e-160	6.9 ★★/6.7
Performa 6400/180	4.0 ★★/6.8	StarMax 4000 DT604e-200	7.7 ★★/6.7
Performa 6400/200	5.6 ★★/7.1	StarMax 4000 MT604e-200	7.7 ★★/6.7
PowerBook 1400c/117**	2.7 ★★/6.4	Power Computing	
PowerBook 1400cs/117**	2.8 ★★/6.4	PowerBase 180	5.4 ★★/7.4
PowerBook 1400c/133	3.5 ★★/6.6	PowerBase 200	5.8 ★★/7.4
PowerBook 3400c/200	5.5 ★★/7.6	PowerBase 240	6.4 ★★/7.7
Power Macintosh 4400/200	5.5 ★★/6.5	PowerCenter 150	5.6 ★★/7.0
Power Macintosh 5260/120***	2.6 ★★/5.5	PowerTower Pro 200	8.5 ★★/7.9
Power Macintosh 5400/180***	4.3 ★★/7.1	PowerTower Pro 225	9.2 ★★/8.2
Power Macintosh 6400/200***	4.5 ★★/6.4	PowerTools	
Power Macintosh 7300/180	7.2 ★★/7.3	Infiniti 4200 Pro	8.2 ★★/6.9
► Power Macintosh 7300/200	7.7 ★★/7.6	Umax Computer	
Power Macintosh 9600/200	8.1 ★★/8.0	SuperMac C500/180	5.2 ★★/5.9
APS Technologies		SuperMac C600/200	5.8 ★★/6.2
MPower 603e180	4.5 ★★/6.4	SuperMac C600/240	6.3 ★★/6.5
MPower 603e200	5.7 ★★/6.7	SuperMac J700/180	7.3 ★★/7.1
MPower 603e240	6.6 ★★/6.9	► SuperMac S900/180DP	6.7 ★★/7.1
MPower 604e200	7.3 ★★/6.7	SuperMac S900/200	8.3 ★★/7.8
DayStar Digital		► SuperMac S900/200DP	7.3 ★★/7.3
Genesis LT 400+	7.7 ★★/7.5	SuperMac S900/225	8.8 ★★/8.0
Genesis MP 400+	7.7 ★★/7.5		
Genesis MP 720+	7.3 ★★/7.4	Multiprocessor Performance	Star Rating*
► Genesis MP 800+	7.8 ★★/7.5	DayStar Genesis LT 400+	2.1 ★★/7.5
Motorola Computer Group		DayStar Genesis MP 400+	2.1 ★★/7.5
StarMax 3000 DT603e-180	5.4 ★★/6.2	DayStar Genesis MP 720+	2.6 ★★/7.4
StarMax 3000 MT603e-180	5.4 ★★/6.2	► DayStar Genesis MP 800+	2.8 ★★/7.5
StarMax 3000 DT603e-200	5.8 ★★/6.5	► SuperMac S900/180DP	1.8 ★★/7.1
StarMax 3000 MT603e-200	5.8 ★★/6.5	► SuperMac S900/200DP	2.0 ★★/7.3
StarMax 3000 MT603e-240	6.8 ★★/6.8		
StarMax 4000 DT604e-160	6.6 ★★/6.7		

*Based on features, implementation, innovation, performance, reliability, ease of use, and value. (See Star Ratings section for full explanation.) **Had less than 32MB of RAM, so some tests were conducted with virtual memory, which slows performance. ***Available only to educational institutions.

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MACINTOSH SYSTEMS TO THE MAX

BY GALEN GRUMAN AND CHARLES SEITER

Rock climbing features a standard maneuver called a *dynamic traverse*: it requires the climber to keep moving across the face of a steep surface, because stopping would result in a loss of momentum and lead to a sudden unpleasant drop. In mid-1997 we get to watch Apple Computer and its clone-maker allies execute a dynamic traverse across a slippery slope of falling prices, rising CPU speeds, and increasing competition.

At the rate the Mac market is changing, the challenge facing these companies is daunting. They have to convince you that at these price points, 200MHz PowerPC 604e-based systems are worth buying, when you know that 250MHz systems will be widely available in months and that these days the price premium attached to the fastest systems lasts for

only a short while after their introduction.

It's a little trickier lately to decide which system is right for you: just as you're unpacking your latest Mac hardware buy, you read about another system at twice the speed and half the price—a frustrating experience. You probably won't buy a fast Mac today and find a twice-as-fast newcomer at half the price soon after. But be warned: although 250MHz 604e systems will soon be shipping, 300MHz 604e systems are likely to ship this summer at prices similar to those of today's first 250MHz systems. Later this year, you'll also see pricey systems based on the 533MHz Exponential X704 PowerPC-compatible CPU. (However, the engineering investment—a faster-than-50MHz system bus and special cooling requirements—needed to fully exploit the X704's potential may limit its use to specialty systems.)

Real Systems, Right Now

X704-level performance is crucial if you're generating the sequel to *Toy Story*, or doing fluid-dynamics calculations on weather prediction or oil-well drill-bit design. If you're just doing word processing and running Quicken, the systems in



The Most Zip Your best bets for a fast Mac are, in order of recommendation, the Power Tower Pro 200 (center), SuperMac S900/200 (left), and Power Mac 9600/200 (right).

this feature have power you will barely begin to tap. For daily life dominated by Microsoft Office, casual America Online use, or educational CD-ROMs, the current crop of value Macs make more sense than the current fastest 604e systems, much less the upcoming multiprocessing "home supercomputers" (see "Super Mac Values," *Macworld*, May 1997).

But plenty of mainstream Mac applications call for the performance of the ready-right-now systems in the table, "The Right Options: What the Fastest Macs Offer"—Web serving, multimedia creation, desktop publishing, and image editing are just a few.

What Fast Macs Offer

All these fast systems can be described in a few points:

- a 200MHz or faster 604e CPU

- plenty of RAM (usually 32MB), plus at least 512K of cache in almost every case
- plenty of video RAM (8MB is fast becoming typical)

- plenty of PCI slots (typically six)
- a big hard drive (2GB or 4GB)
- a fast CD-ROM drive (8× is typical, although 12× and 16× drives are starting to appear)
- Ethernet included

The most familiar system configuration is an assortment of slots (for easy upgrading) on a motherboard, with a slot for a CPU card, slots for RAM and VRAM, and slots for PCI cards.

While the performance of these systems is impressive, the performance *range* from vendor to vendor at a given price point, say \$3000, is tough to assess without a stopwatch—the differences in speed often are not that noticeable in day-to-

day operations, although for time-intensive work such as image editing you may see some perceptible differences.

How the Macs Differ

Mac makers pay less than you do for components, obviously, and it is in the components that they differentiate themselves. Take Apple's models, for example: the 7300/200, 8600/200, and 9600/200 are set at \$500 intervals, with retail price points of \$2799, \$3299, and \$3799, respectively. But you can't buy an 8600/200 and get to the hardware specs of the 9600/200 for just \$500: the hard-drive upgrade alone from 2GB to 4GB would cost more than \$400, not to mention the \$450 cost of replacing the 8600's 2MB video card with the 9600's 4MB model.

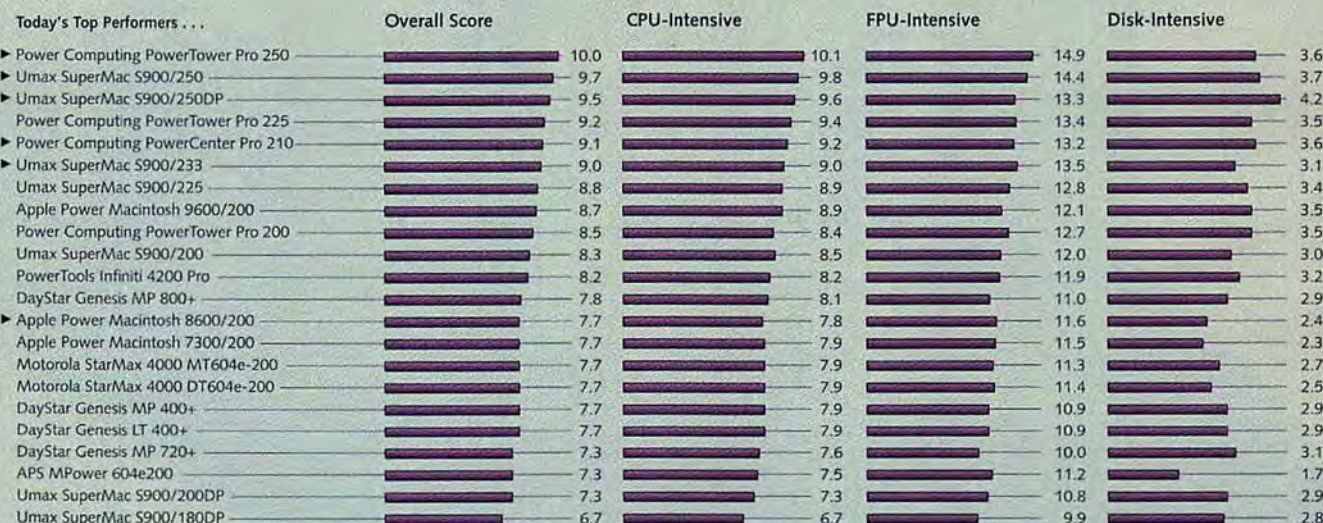
If you have high-end, graphics-intensive, big-monitor uses for your Mac, the



Speed Demons Get Even Faster

In just a year, what were the fastest Macs around have become middle-of-the-road performers. Today's fast Macs start at 200MHz for single-CPU systems and will soon reach 250MHz, while multiprocessing systems start at 180MHz and are also headed for 250MHz. For more details on the PowerCenter Pro 225 and Motorola CHRP-based prototypes, see *News*, in this issue.

Longer bars are better. Results are times as fast as a Centris 650 (Centris 650 = 1.0). Products are listed from fastest overall to slowest overall. ► indicates a prototype system (not yet shipping).



Indicates typical performance in a mixed-use environment, such as a company or school.

Indicates performance for most business and personal tasks.

Indicates performance for analytical, 3-D, and other specialized uses.

Indicates performance of the Mac's data-transfer capability, which affects all users.



Top-Speed Towers . . . If you're looking for a fast Mac in a tower, you'll find plenty of choices, including DayStar's line of Genesis multiprocessor Macs (above, left) and Apple's PowerMac 9600/200 (above, right).



. . . and Dynamic Desktops For 200MHz power on the desktop, check out Apple's Power Mac 7600/200, Apple's fastest desktop machine (above, top), and Motorola's StarMax 4000 DT604e-200 (above, bottom).

most cost-effective strategy is to buy a high-end Mac like the 9600/200, especially when a model with a marginally faster CPU appears (in this case, a 233MHz 9600/233), forcing the company to drop the prices of its suddenly slower systems. The moral: buy the former fastest Mac when a slightly faster model comes out.

If you look beyond Apple, you'll see that systems from Power Computing and Umax Computer have essentially duplicated (and enhanced) the hardware-element list of the 9600/200, but for the same price they'll give you 225MHz instead of 200MHz.

The clone makers also tend to offer more expansion than Apple does, and often a little more oomph for each of the basic components: RAM, cache, hard drive, and video card. While Apple's new 8600 and 9600 closed many of the gaps between Apple's Macs and the other companies' Macs, Apple has not yet achieved parity or superiority in the combination of features, performance, and price.

Speed Demons Step-by-Step

With so many models to choose from—Macworld Lab tested ten single-CPU shipping models with 200MHz and faster 604e's, as well as preproduction versions of five new ones coming out this spring—it's hard to keep track of what each company offers. The table, "The Right

Options: What the Fastest Macs Offer," gives you the lowdown on each system's features, and the rest of this section gives you our evaluation of each shipping model. If you're interested in a multiprocessor (MP) Mac for use in image editing and multimedia creation, rely on our evaluations of the four shipping MP systems in the sidebar, "Picking the Right MP Mac."

Apple Power Mac 8600 and 9600 If nothing else, Apple Computer (<http://www.apple.com>) knows how to demonstrate the range of potential in a single CPU at one speed. As Macworld Lab tests show, Apple has fine-tuned the original design of the 9500/200, using a bigger cache to produce a nearly 20 percent improvement in speed with the same CPU at the same megahertz rating: the Power Mac 9600/200 is 13 percent faster than the 8600/200. (Apple has also announced a 233MHz version of the 9600 but has yet to ship it.)

In light of the 9600's faster design, one Apple decision seems very curious: another speed boost could be achieved with a 1MB cache, but the flagship 9600 has a soldered-on 512K cache. What makes this even more puzzling is that the 8600 model, at a lower price than the 9600, has an upgradable 256K cache. And both the 8600 and 9600 systems are oriented toward maximum upgradability—so why the soldered cache in the 9600's?

Where Apple distinguishes itself in these two towers is that both offer easy expansion, thanks to a new case design. The 8600 also has an internal Zip drive and video-input and -output ports that should be popular with its intended multimedia-oriented buyers. You can add an internal Zip drive to the 9600 by buying the drive and getting the bezel appropriate for your Mac's case (Apple's cases have unique shapes, requiring special bezels for the Zip drive); mail-order sellers are your best bets, since most stores don't carry such Mac-specific configurations.

The 8600 and 9600 are appealing in many ways, with the 9600 offering top performance and the 8600 the hardware that's sure to attract multimedia creators. Apple's recently lowered prices also make these systems more competitive with other companies' Macs. Both systems are fine choices, even though you still can get better deals from Power Computing and Umax Computer, if not the same panache. Note that the 8600/200 was not shipping when we went to press in early April, so we cannot yet recommend it.

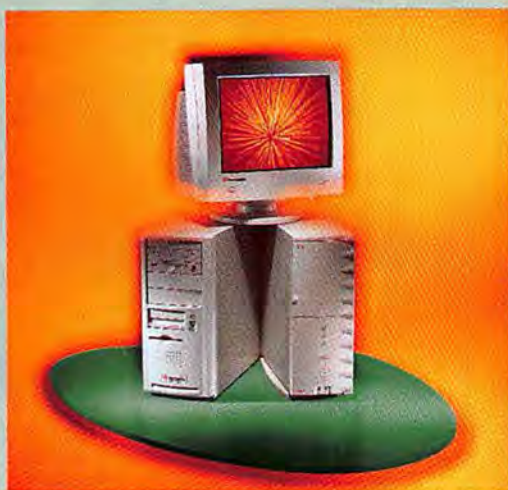
Apple Power Mac 7300/200 Apple's slowest 200MHz system is its only desktop configuration at this speed. Tower cases have almost displaced the desktop design, but some people prefer a desktop because it's a great base for a 17-inch monitor and because it keeps all the drives easily accessible.

Picking the Right MP Mac

An oddity a year ago, multiprocessing (MP) is going mainstream, with four Mac makers now offering MP systems. Do you need MP, and if so, whose system is best?

MP's Real Speed If one fast CPU makes your Mac scream, two must really turn up the volume, right? Well, sometimes. Two CPUs do not let a Mac run twice as fast as one. In fact, sometimes a dual-CPU Mac runs slower than a single-CPU Mac.

The Mac OS was never designed for MP, and so neither were Mac programs. DayStar Digital (<http://www.daystar.com>) found a way to let the Mac run several CPUs at once, and Apple adopted that technology into the Mac OS. To use it, programs must be specially written to have their tasks dividable among two or four CPUs. In the DayStar scheme, the main CPU handles the Finder, some parts of the MP-enabled program currently running, and the coordination of the mul-



Newcomers Although DayStar created the multiprocessor Mac with its Genesis MP, Power Computing and Umax now offer competing systems: the PowerTower Pro MP (left) and S900 DP, respectively.

tiples CPUs' work; the other CPUs handle the other parts of the program.

That coordination effort plus the need to handle the Finder limit the speedup you get from mul-

tiples CPUs, and in tasks that are not MP-enabled they can slightly degrade performance. A good rule of thumb: a dual-CPU Mac runs MP programs about 1.8 times as fast as a same-

megahertz single-CPU Mac and a four-CPU Mac runs MP programs about 2.2 times as fast as a same-megahertz single-CPU Mac.

When the Rhapsody OS ships in mid-1998, programs written to run in its OpenStep portion will be able to run without the overhead that slows down MP on the current Mac OS. Called symmetrical multiprocessing, the native MP support that Rhapsody will have should allow speedup of close to 3.6 times in a four-CPU system. Plus all programs, including the OS itself, will be MP-enabled in OpenStep.

But until Rhapsody ships, you can still get a lot better performance for some tasks using today's MP—Macworld Lab has shown some Adobe Photoshop filters running eight or more times as fast on a four-CPU Mac as on a single-CPU Mac. That's why an MP system is a good deal for photo retouchers, animators, and others for whom speed is critical and

whose programs take advantage of MP.

Who Offers MP DayStar and Umax are the only companies that were shipping MP systems as *Macworld* went to press.

DayStar has four systems: the four-CPU Genesis MP 800+ and MP 720+, and the two-CPU Genesis MP 400+ and LT 400+. All use 200MHz PowerPC 604e's, except for the MP 720+, which uses 180MHz 604e's (the MP 720+ will be discontinued later this spring). The MP systems have a cavernous tower case that can hold 7 internal hard drives, 6 PCI cards, and 12 DIMMs—and that has the power supply to drive all of this. The LT system's smaller tower has 2 drive bays and 8 DIMM slots.

Umax offers the SuperMac S900/180DP, which is its standard S900/180 with a DayStar nPower dual-CPU card instead of the regular single-CPU card. Umax also offers the S900/200DP, which uses

Like the 8600, the 7300/200 offers just three PCI slots. Unlike the 9600, it has an upgradable cache (go figure). Because it's got a desktop case, internal drive expansion is limited, but there's plenty of room for RAM, and the flip-out case makes adding RAM, replacing cache, and adding cards a snap.

The 7300/200 makes a solid power system for business users who want speed, a good price, and moderate expansion.

Power Computing PowerTower Pro Both the PowerTower Pro 225 and PowerTower Pro 200 from Power Computing (<http://www.powercc.com>) are the fastest systems available at their current prices. A 250MHz model, a prototype of which we also tested, should be available by the time you read this.

The PowerTower Pro 225 is pricey compared with the Pro 200—it would

take special circumstances to justify the \$500 retail price boost in going from an overall speed of 8.5 to 9.2 in Macworld Lab's tests, an 8 percent improvement for a 16 percent jump in price. Yet *pricey* is a relative term: the Pro 225 is still the lowest-priced system at its speed.

The PowerTower Pros offer the best price/performance value of all the systems reviewed here, although they're not as easily expandable as Apple's towers, since their case design requires more work to add components. Still, they offer significantly more drive bays than competing systems. Plus, you can have your PowerTower Pro custom-configured with a Zip drive, Jaz drive, internal RAID system, or digital-video card—a major advantage of Power Computing's direct sales.

In mid-April, Power Computing plans to announce a new 210MHz sys-

tem, the PowerCenter Pro, that should outpace the 225MHz PowerTower Pro. The speed comes from the PowerCenter Pro's 60MHz bus, versus the PowerTower Pro's 50MHz bus. But the PowerTower Pro is more expandable. (See *News* in this issue for more details.)

Umax SuperMac S900 In many respects, Umax Computer's (<http://www.supermac.com>) performance-oriented towers challenge Apple's 9600 series and Power Computing's PowerTower Pro series head-on for the title of high-end champ. The SuperMac line has 200MHz and 225MHz versions available today, and 233MHz and 250MHz versions are due in April.

The S900's offer more drive expansion than Apple's competing systems, but less than Power Computing's. Umax offers less cache than Power Computing,

the second CPU slot found in all J700 and S900 models. Umax plans to ship the SuperMac S900/250DP later this spring, based on its forthcoming 250MHz S900 model.

The second slot takes special CPU cards (not the ones used in Apple, DayStar, and Power Computing systems nor in Umax's primary CPU-card slot). If you have a SuperMac S900/225, for example, you could buy a second

225MHz CPU card and turn that S900/225 into an S900/225DP. But at press time, Umax was offering only 150MHz second-CPU cards, which work only in its discontinued J700/150 desktop and S900/150 tower Macs. Faster cards are promised later this year.

The Umax approach should make it cheaper to add a second CPU than to replace the existing one. Umax's Web site lists the 150MHz second-CPU card

at \$800, although I found it for \$1000 in a recent MacZone catalog. Replacing the current CPU card with a DayStar nPower dual-CPU card would cost \$1499 for the dual-180MHz 360+ version and \$1799 for the dual-200MHz 400+ version. (The nPower cards work in Apple's Power Mac 7300, 7500, 7600, 8500, 8600, 9500, and 9600, and in Umax's SuperMac S900 systems. DayStar has not certified the cards for use

in the Umax SuperMac J700 or in Power Computing's PowerCenter, PowerTower, or PowerTower Pro systems because of concerns about power supply and heat flow.)

Apple's forthcoming Power Mac 9600/200MP will use the nPower 400+ card, while Power Computing has promised dual-225MHz and dual-250MHz versions of the PowerTower Pro using its own MP design. Both

should ship this spring.

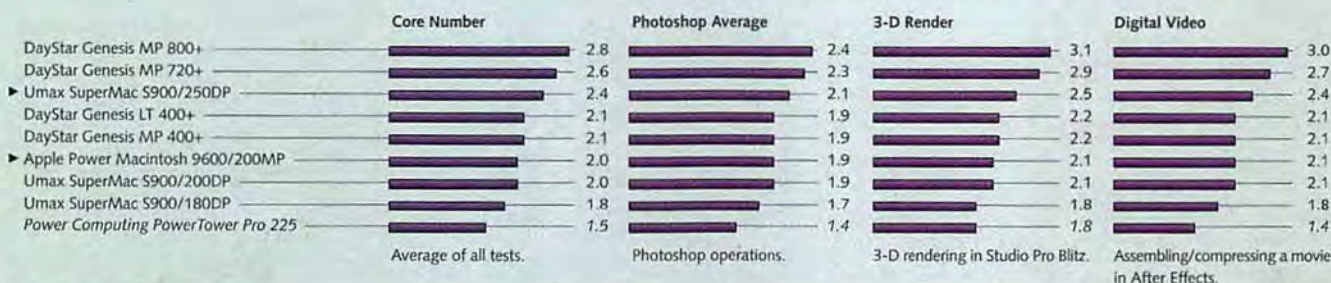
The Last Word In the meantime, DayStar essentially owns the Mac MP business, since it has its systems ready today, in well-designed cases with plenty of expansion. If you need an MP Mac, the LT 400+ is the best all-around choice. Go for the MP 800+ only if you do the tasks that really benefit from four CPUs (see "Pinnacles of Power," *Macworld*, December 1996).—GALEN GRUMAN



Multiprocessor Macs Target Their Speed

It's a common misunderstanding that a Mac with more than one CPU has that much more speed than a single-CPU Mac. The truth is that only certain tasks are accelerated by multiple CPUs, but in those cases, the acceleration can be tremendous.

Longer bars are better. Results are times as fast as a Power Mac 9500/150 (9500 = 1.0). Products are listed from fastest overall to slowest overall. ▶ indicates a prototype system (not yet shipping). Italics indicate a single-CPU Mac, included for comparison.



Behind Our Tests

The core number is generated by averaging test results from various MP-enabled applications. We used more than 40 operations in Adobe Photoshop 3.0.5, ranging from common operations such as adjusting the color balance, resizing, and unsharping to the more obscure filters such as Ripple Distortion; we performed 3-D rendering in Strata Studio Pro Blitz 1.75+, which is the only multiprocessor-aware 3-D application; and we assembled/compressed a movie in Adobe After Effects 3.1.—Macworld Lab testing supervised by Mark Hurlow

but the same as Apple on the 9600 and more than on the 8600. Like the PowerTower Pro, the SuperMac S900 series offers a fast video card with up to 8MB of VRAM. Less flashy in appearance than the Apple systems and both a tad slower and a tad more expensive than the Power Computing systems, the S900 is a solid second choice for most users.

Motorola StarMax 4000 Both Power Computing and Umax base their high-speed Macs on the same Tsunami motherboard design that Apple uses in the 9600, but Motorola Computer Group (<http://www.mot.com/starmax/>) uses a wholly different design. That design—the Tanzania motherboard—has a slower system bus (40MHz, versus a variable-speed bus that can hit 50MHz on the Tsunami), which prevents the PowerPC from keeping up with its same-megahertz

competitors. That's why the two StarMax 4000 systems—one desktop and one tower—trail most other 200MHz Macs.

The desktop model (the DT604e-200) offers three PCI slots versus the tower MT604e-200's five, and there are more drive bays in the tower than in the desktop. Otherwise, the two systems offer the same capabilities.

Those capabilities include the least SCSI support of a high-speed Mac: the StarMax 4000 has one SCSI bus (not two, as Apple, Power Computing, and Umax offer), which limits the total number of devices—internal and external—to 7, rather than the 14 available in dual-bus systems. For most people, 7 devices is a lot, so that's not so bad, but be aware that the SCSI bus on the StarMax is plain old SCSI-1, which maxes out data transfer at 5 MBps. The internal SCSI bus on com-

peting dual-bus systems maxes out at 10 MBps, making them more suited for performance-oriented work like image editing than the StarMax.

Finally, the StarMax does not offer an upgradable CPU, so you can't replace the CPU later with a faster version. (Of course, with that poky 40MHz bus, the StarMax can't really support faster CPUs.) Although most people trade up their systems rather than accelerate them, the minor cost of making a system upgradable is worth the potential it offers.

In a nutshell, these systems are capable, but offer no compelling advantages over competitors—except price, for which the StarMax is extremely competitive. You get less, but you pay less.

APS MPower 604e200 The high-end Mac from APS Technologies (<http://www.apstech.com>) is based on the Motoro-

The Right Options: What the Fastest Macs Offer

Company	Product	Star Rating ^a	Price ^c	SPEED-RELATED FEATURES				MEMORY		
				Number of 604e CPUs	CPU Speed	Cache	Bus Speed	32MB	16MB	RAM Slots
Apple Computer (408/996-1010)	Power Macintosh 9600/233	not shipping	\$4299	1	233MHz	512K ^d	46.6MHz	●		12
	Power Macintosh 9600/200MP	not shipping	\$4799	2	200MHz	512K ^d	50MHz	●		12
	Power Macintosh 9600/200	★★★★/8.0	\$3799	1	200MHz	512K ^d	50MHz	●		12
	Power Macintosh 8600/200	not shipping	\$3299	1	200MHz	256K	50MHz	●		8
	Power Macintosh 7300/200	★★★★/7.4	\$2799	1	200MHz	256K	50MHz	●		8
APS Technologies (816/483-1600)	MPower 604e200	★★★★/6.7	\$2599	1	200MHz	512K	40MHz	24MB		3 ^f
EDITORS' CHOICE										
DayStar Digital ^h (770/967-2077)	Genesis MP 800+	★★★★/7.5	\$12,314	4	200MHz	512K	50MHz		●	12
	Genesis MP 720+	★★★★/7.4	\$10,714	4	180MHz	512K	45MHz		●	12
	Genesis MP 400+	★★★★/7.5	\$6199	2	200MHz	512K	50MHz		●	12
	Genesis LT 400+	★★★★/7.5	\$5499	2	200MHz	512K	50MHz		●	8
Motorola Computer Group (800/759-1107)	StarMax 4000 MT604e-200	★★★★/6.7	\$2695	1	200MHz	512K	40MHz	●		3 ^f
	StarMax 4000 DT604e-200	★★★★/6.7	\$2495	1	200MHz	512K	40MHz		●	3 ^f
Power Computing ^h (512/388-6868)	PowerTower Pro 250MP	not shipping	\$4699	2	250MHz	1MB	50MHz	●		8
	PowerTower Pro 250	not shipping	\$4495	1	250MHz	1MB	50MHz	●		8
	PowerTower Pro 225MP	not shipping	\$4695	2	225MHz	1MB	45MHz	●		8
	EDITORS' CHOICE									
	PowerTower Pro 225	★★★★/8.2	\$3695	1	225MHz	1MB	45MHz	●		8
	EDITORS' CHOICE									
PowerTools ^h (512/891-0646)	PowerTower Pro 200	★★★★/7.9	\$3195	1	200MHz	1MB	50MHz	●		8
	PowerCenter Pro 210	not shipping	\$2395	1	210MHz	1MB	60MHz	●		8
	Infiniti 4200 Pro	★★★★/6.9	\$2449	1	200MHz	512K	40MHz	24MB		3 ^f
Umax Computer (510/226-6886)	SuperMac S900/250DP	not shipping	NA	2	250MHz	512K	50MHz	●		8
	SuperMac S900/250	not shipping	\$4899	1	250MHz	512K	50MHz	●		8
	SuperMac S900/233	not shipping	\$4199	1	233MHz	512K	46.6MHz	●		8
	EDITORS' CHOICE									
	SuperMac S900/225	★★★★/8.0	\$3899	1	225MHz	512K	45MHz	●		8
	SuperMac S900/200DP	★★★★/7.3	\$4499	2	200MHz	512K	50MHz	●		8
	EDITORS' CHOICE									
	SuperMac S900/200	★★★★/7.8	\$3399	1	200MHz	512K	50MHz	●		8
	SuperMac S900/180DP	★★★★/7.1	\$3899	2	180MHz	512K	51.4MHz	●		8

● = yes. NA = not available. ^a All systems include one ADB, two serial, one external SCSI-1, two 16-bit stereo I/O, and one Mac video port unless otherwise noted. ^b Based on features, implementation, are company estimates; APS, DayStar, Power Computing, and PowerTools prices are direct. ^c All systems without on-board video come with a PCI video card installed. ^d Not upgradable. ^e Uses 3.3-volt ^f Offers 3-D acceleration. ^h Low-profile desktop configurations (no free drive bays) available for \$100 less.

la StarMax systems, and so it shares the same limitations. APS's system was slower than Motorola's, due to different peripheral components—specifically, slower hard drives.

PowerTools Infiniti 4200 Pro Another system based on the StarMax design, the Infiniti 4200 is faster than Motorola's systems, thanks to use of faster drives and video RAM. PowerTools' price is the lowest (although not much lower than APS's or Motorola's), and the company will custom-configure your system or let you buy a bare-bones version; you can then add whatever you want to. If you want inter-

nal SCSI, PowerTools offers a \$49 internal/external SCSI cable.

The Last Word

Given that several systems cluster near the top for performance, your buying decision will come down to two other factors: features and prices.

• The PowerTower Pro 200 offers the best price/performance ratio of the set, with throughput near the top of the pack, the most internal expansion, and a great price of \$3195. For most power users, this tower is the best bet. The Pro 225 model is the pick for those who need more per-

formance—such as most content creators—and its \$3695 price is reasonable.

• The Apple Power Macintosh 7300/200 is arguably the best deal Apple has ever offered. Forced by the clone makers to design computers for a competitive world, Apple has responded with a \$2799 system that gives solid performance and has an easily upgraded design for people who prefer desktop cases.

• On the horizon, the \$3299 Apple Power Mac 8600/200 looks to be a strong system for multimedia creators, at a good price to boot, but since it wasn't shipping at press time, we can't recommend it—

VIDEO DISPLAY		STORAGE					EXPANSION ^A					COMMUNICATIONS		
VRAM	On-board	Free Bays	Hard Drive		CD-ROM Drive		Zip Drive	Internal Bus					Modem	Ethernet
(standard/ maximum)	Circuitry ^D		1.0GB- 1.9GB	2.0GB- 4.0GB	12x-16x	8x		Case	PCI Slots	SCSI-2	SCSI-1	EIDE		
4MB/4MB		2		4.0GB	12x			tower	6	●				●
4MB/4MB		2		4.0GB	12x			tower	6	●				●
4MB/4MB		2		4.0GB	12x			tower	6	●				●
2MB/4MB	●	1		2.0GB	12x		●	tower	3	●				●
2MB/4MB	●	1		2.0GB	12x			desktop	3	●				●
2MB/4MB	● ^C	5		2.5GB	12x			tower	5		●	●		
4MB/4MB		7		2.0GB		●		tower	6	●				●
4MB/4MB		7		2.0GB		●		tower	6	●				●
4MB/4MB		7		2.0GB		●		tower	6	●				●
4MB/4MB		2		2.0GB		●		tower	6	●				●
2MB/4MB	●	3		2.5GB		●		tower	5		●	●		
2MB/4MB	●	1	1.2GB			●		desktop	3		●	●		
8MB/8MB		6		2.0GB	16x		option	tower	6	●				●
8MB/8MB		6		2.0GB	16x		option	tower	6	●				●
8MB/8MB		6		2.0GB	16x		option	tower	6	●				●
8MB/8MB		6		2.0GB	16x		option	tower	6	●				●
8MB/8MB		6		2.0GB	16x		option	tower	6	●				●
2MB/4MB	● ^I	4		2.0GB	16x		option	tower ^J	3		●			●
2MB/4MB	● ^C	4		2.5GB		●		tower	5		●	●		
8MB/8MB		4		2.1GB		●	●	tower	6	●				100BaseT
8MB/8MB		4		2.1GB		●	●	tower	6	●				100BaseT
8MB/8MB		4		2.1GB		●		tower	6	●				●
8MB/8MB		4		2.1GB		●		tower	6	●				●
4MB/4MB		4		2.1GB		●		tower	6	●				●
4MB/4MB		4		2.1GB		●		tower	6	●				●
4MB/4MB		4		2.1GB		●		tower	6	●				●

innovation, performance, reliability, ease of use, and value. (See Star Ratings section for full explanation.) ^C Apple, Motorola, and Umax prices. DIMMs, which are not compatible with other Macs' 5V DIMM slots. ^C Has only a VGA video connector. ^I Other configurations are available.

yet. Ditto for the new PowerCenter Pro 210 system from Power Computing: this looks like a killer mainstream Mac.

Of the others, you won't be disappointed with a SuperMac S900, even if it's not as flashy as an Apple system or quite as value-oriented as a Power Computing system. The S900's solid design, good performance, and good price are nothing to sneeze at. But we recommend that you stay away from the StarMax-based systems, since they use less-powerful technology and are less upgradable.

If you're evaluating your choice by the kind of work you do or the environ-

ment you're in, check out our Editors' Choice winners.

It's great to see so many Macs from Apple and a variety of Macintosh clone vendors running both faster and cheaper than Intel-based systems. And even more speed aimed at Mac stronghold markets in publishing and multimedia is just around the corner. **m**

Executive editor GALEN GRUMAN has covered and reviewed Power Macs since before they first shipped. Contributing editor CHARLES SEITER has years of experience doing industrial-strength engineering on the fastest Macs of the day.

EDITORS' CHOICE

Image-Editing and 3-D Graphics System

★★★★/8.2 PowerTower Pro 225 A low price, great performance, strong expandability, and the ability to have it custom-configured make this a top image-editing and 3-D rendering platform. **Company:** Power Computing (512/388-6868, <http://www.powercc.com>). **Direct price:** \$3695.

★★★★/7.5 Genesis LT 400+ This multi-processor system packs a lot of power in a fairly small package, offering a strong performance boost to MP-enabled programs like Adobe Photoshop and After Effects. **Company:** DayStar Digital (770/967-2077, <http://www.daystar.com>). **Direct price:** \$5499.

Publishing and Design System

★★★★/8.2 PowerTower Pro 225 A low price, great performance, strong expandability, and the ability to have it custom-configured make this a top publishing and design platform. **Company:** Power Computing (512/388-6868, <http://www.powercc.com>). **Direct price:** \$3695.

★★★★/8.0 SuperMac S900/225 Performance and easy upgrading plus a good price make this system worth a serious look. **Company:** Umax Computer (510/226-6886, <http://www.supermac.com>). **Company's estimated price:** \$3899.

Multimedia and Video Creation System

★★★★/7.5 Genesis MP 800+ The ultimate Mac speeds through MP-enabled programs and has cavernous expansion capacity. **Company:** DayStar Digital (770/967-2077, <http://www.daystar.com>). **Direct price:** \$12,314.

Web and Intranet Server System

★★★★/8.0 PowerTower Pro 200 A low price and strong performance make this a more-than-capable server system for departmental intranets and moderate-use Web sites. **Company:** Power Computing (512/388-6868, <http://www.powercc.com>). **Direct price:** \$3195.

★★★★/7.8 SuperMac S900/200 A little slower and a little pricier than the PowerTower Pro, the S900/200 delivers a good price/performance ratio. **Company:** Umax Computer (510/226-6886, <http://www.supermac.com>). **Company's estimated price:** \$3399.

REAL PRODUCTS REAL RATINGS

Reviews you can trust Unlike other publications, Macworld rates only final shipping products, not prototypes. What we review is what you can actually buy.

HIGH-PERFORMANCE THAT



DOESN'T BREAK THE BANK!

Some computer manufacturers make you break the bank to get outstanding Mac OS-compatible performance. At APS we designed our **M•POWER** line of personal computers to deliver truly exceptional performance that doesn't set you back an arm and a leg, and we do it without scrimping on quality or flexibility. In fact, APS **M•POWER** systems represent the best Mac OS-compatible computing value available today in terms of price, performance, quality construction, peripheral options, warranty* and support. From our economy 603e180, to the awesome 604e200, you can get just the system that meets your needs at a price that makes sense, and feel secure that you'll get the service and support you expect with APS **M•POWER** Mac OS-compatible computers

*when you take advantage of our optional 5 year extended service contract.

APS M•POWER 604e200™ comes with these appointments: 200MHz Motorola® PowerPC 604e processor • 2.5GB hard drive • 12X CD-ROM • 24MB of DRAM & 512K L2 Cache • 2MB of VRAM • Tower enclosure w/5 PCI slots • 2 year limited warranty. Now **\$1899*MacWEEK**

APS M•POWER 603e240™ comes with these appointments: 240MHz Motorola® PowerPC 603e processor • 2.5GB hard drive • 12X CD-ROM • 24MB of DRAM & 256K L2 Cache • 1MB of VRAM • Tower enclosure w/5 PCI slots • 2 year limited warranty. Just **\$1799*MacWEEK**

APS M•POWER 603e200™ comes with these appointments: 200MHz Motorola® PowerPC 603e processor • 1.2GB hard drive • 12X CD-ROM • 16MB of DRAM & 256K L2 Cache • 1MB of VRAM • Desktop enclosure w/3 PCI slots • 2 year limited warranty. Only **\$1499*MacWEEK**

APS M•POWER 603e180™ comes with these appointments: 180MHz Motorola® PowerPC 603e processor • 1.2GB hard drive • 12X CD-ROM • 16MB of DRAM • 1MB of VRAM • Desktop enclosure w/3 PCI slots • 2 year limited warranty. Just **\$1199*MacWEEK**

STANDARD EQUIPMENT: All M•POWER systems are generously outfitted with a floppy drive, ADB keyboard, ADB mouse, printer port, modem port, ADB port, SVGA monitor port (supporting 14", 15", 17" & 21" monitors), 2 PS/2 ports, SCSI port, IDE bus, ATAPI bus, 16-bit sound output port, rear headphone jack and a microphone jack to make computing much more enjoyable. All M•POWER systems are ready to grow with you – the M•POWER 603e180 and the 603e200 desktop systems have four internal bays, while the M•POWER 603e240 and the 604e200 tower systems have eight internal bays. These features and many more make the APS M•POWER systems the best value in Mac OS computing.

*Monitors are not included. Filling all available drive bays may exceed power limitations.

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See pages 170-171 in this issue for more information about M•POWER Systems and APS peripherals.





Mac Clones: Probing the Risks

When you're shopping for a Mac, naturally you want to know who gives you the most Mac for your MacBuck. The six clone manufacturers offer as much power and expandability as Apple does, at lower prices. This is the promise of Apple's Mac OS-licensing program: that Macintosh users can finally enjoy the diversity of price and choice that PC users enjoy.

But what about the disadvantages? When IBM allowed its PC to be cloned, its laissez-faire attitude opened up a Pandora's box-like plethora of peripheral and software incompatibilities. By buying a Mac clone, are you opening yourself up to the same configuration headaches? Clones have been shipping long enough for us to see how they react in the real world of operating-system upgrades, application updates, and rapidly advancing peripherals. The consensus: a Mac by any other name runs just as rosily.

Discussions with Apple and its licensees, and a survey of users on the Internet, reveal an astonishing lack of dissent (in an environment infamous for dissent). We also surveyed visitors to our Web site and found that, while compatibility was not a problem, quality assurance and tech support could use some improvement (see the sidebar "Readers Respond: The Problem Isn't Compatibility"). To test compatibility ourselves, though, Macworld Lab tested six PCI expansion cards in four popular categories in machines from Apple (408/996-1010, <http://www.info.apple.com>) and three clone manufacturers (see the table, "No Bones about Clones: PCI Cards Pass the Test").

The results? Everything worked . . . but the clones weren't always as easy to get up and running as an Apple Mac. With the clones, we encountered design issues that hinder the physical installation of PCI cards, and we unearthed a couple of obscure conflicts (see the sidebar "Six Glitches to

Can you really **trust** a Mac clone?
Macworld Lab investigates

Avoid"). While it's important to be aware of these issues and whether they affect you, don't blow these problems out of proportion. Our results show that Apple's tight rein on the hardware spec has resulted in much cleaner clones than initially appeared in the PC world. Besides, Apple itself has released Macs with greater compatibility issues—just ask anyone saddled with the Mac IIx's quirky, nonstandard subsystems. Nevertheless, you should read on to see if any of these issues affect the work you do.

Test Cases: Hardware Glitches

Macworld Lab has no separate standard for testing Mac clones—without looking at the case, the tester doesn't know which company's computer is being tested. Indeed, in our PCI tests, the cases made the only significant difference, as we discuss below.

We installed cards from four product categories—graphics acceleration, SCSI, Ethernet, and DOS compatibility—in a Power Mac 9500/200 from Apple, a Power Tower Pro 200 from Power Computing (512/388-6868, <http://www.powercc.com>), a



SuperMac S900L/200 from Umax Computer (408/327-8700, <http://www.supermac.com>), and a StarMax 3000/200 from Motorola Computer Group (800/759-1107, <http://www.motorola.com>). (We did not test machines from APS Technologies [816/483-1600, <http://www.apstech.com>] because it uses the same motherboards as Motorola, and we did not test machines from DayStar Digital [770/967-2077, <http://www.daystar.com>] because it uses a proprietary API for high-end multiprocessing.) Using the Power Mac 9500/200 as a baseline, we ran objective and subjective performance tests to see if each model's results were commensurate with its processor speed, and to confirm that performance was glitch-free.

Even before testing performance, we discovered our first glitches, all of which stemmed from the case design. For instance, while we had no trouble installing a Farallon Communications (<http://www.farallon.com>) network adapter, the bezel on Dayna Communications' DaynaPort adapter posed a problem. This bezel protrudes slightly from the Dayna card's metal rail. The bezel fits perfectly

in the access port on the back of a Mac, but the clones all had slightly narrower openings in their cases. As a result, we had some difficulty initially installing the DaynaPort in any of the clones.

In fact, we ran into trouble installing any PCI card in the PowerTower Pro and SuperMac S900L, due to their PC-style case design. To install a PCI card in either of these machines, you must lay the box on its side and remove the bottom plate of the case. We had a tough time lining up any card so it fit snugly both in the PCI slot and through the access door at the rear of the computer.

At least RAM and VRAM slots in the clones are more easily accessible than those hidden in the nether regions of Apple's Power Mac 8500 and 9500 (it would be almost impossible for them *not* to be). However, the clones' slots are not as easy to get to as the ones in the more sensibly structured Power Mac 7500, 8600, and 9600.

Internal expansion is not an everyday operation for most users, but these boxes should still plug as well as they play. Novices might damage a PCI card or the

motherboard when trying to cram the card into the slot. The safe alternative is paying a computer dealer to install a PCI card, but we think that's a high price for what is a simple end-user procedure in an Apple Mac. We can't deem this a major compatibility issue.

Once installed, the cards performed flawlessly in all units. Neither a Twin Turbo graphics card from Integrated Micro Solutions (<http://www.integratedmicro.com>) nor an XclaimVR video card from ATI Technologies (<http://www.atitech.com>) revealed any significant difference in graphics performance among computers, whether we were scrolling through a Microsoft Excel spreadsheet or playing back a QuickTime movie. SCSI performance with a PowerDomain 2940UW SCSI card from Adaptec (<http://www.adaptec.com>), which we tested by performing a 40MB Finder copy and opening a 20MB Adobe Photoshop file, was similarly consistent.

The results of our networking tests, including a 20MB network file transfer, a Photoshop install, and a Claris FileMaker Pro database access over a network, were

Readers Respond: The Problem Isn't Compatibility

What really bugs people about the clones they've bought? It's not how compatible their computers are, it's the customer service they receive. We asked visitors to the *Macworld* Web site to relay their ex-

periences with their computers, both clones and Apple-branded Macs. The overwhelming response from 823 users was one of satisfaction. Some 90 to 94 percent of respondents were satisfied or somewhat satisfied with their clones. Overall, a majority of users were also satisfied with their service; these results ranged

from 70.7 percent for Power Computing to 87.1 percent for Umax Computer.

This is encouraging, because in a survey where someone chooses to respond (that is, a self-selected rather than random universe of respondents), you're more likely to hear from people with a beef than from those who

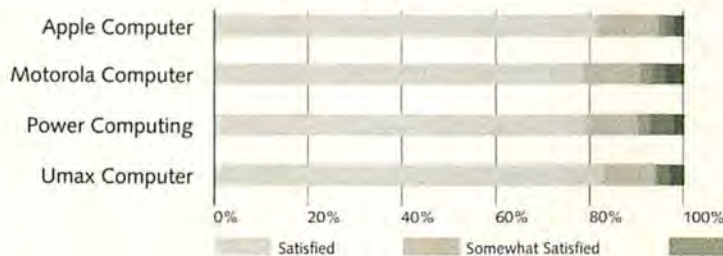
are happy. More than 83 percent of buyers said they would buy again from the same company (because they have been selling clones for a shorter period of time, there were insufficient results for APS Technologies and PowerTools).

Of those who were unsatisfied or somewhat unsatisfied with their purchase (from 2.9 percent for Umax to 7.6 percent for Power Computing), most of these readers had experienced problems with faulty parts, long tech-support waits, incorrect di-

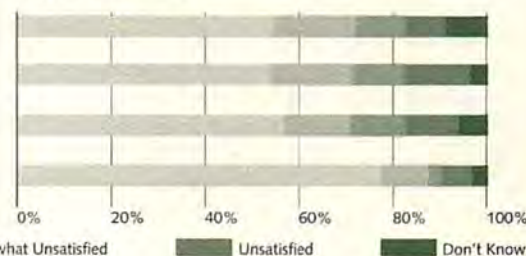
agnosis of problems, and slow or nonexistent repairs. More readers were unsatisfied with their service (ranging from 9.7 for Umax to 25 percent for Motorola). Most of the other discontent stemmed from faulty storage devices, although some readers reported occasional problems relating to printers, modems, and monitors.—HOWARD BALDWIN

These results are from responses received online between March 4 and March 21, 1997. The survey did not allow repeat entries. If you want to respond go to <http://www.macworld.com>.

Purchase Satisfaction



Service Satisfaction



more of the same for both the Fast EtherTX-10/100 adapter from Farallon Communications (<http://www.farallon.com>) and the DaynaPort Blue Streak adapter from Dayna Communications (<http://www.dayna.com>). From all standpoints, these two cards and the clones were 100 percent compatible. (The only difference was that you have to install the drivers for the Dayna adapter manually, while the drivers for the Farallon adapter install automatically.)

Software Glitches to Avoid

Our final test was of an OrangePC 400 DOS-compatibility card from Orange Micro (<http://www.orangemicro.com>). As shipped, it worked perfectly in all units but one: the StarMax 3000. The reason? The OrangePC 400 was expecting to find SCSI CD-ROM and hard drives, since those are normally found on Macintoshes, and choked on Motorola's internal EIDE devices. A quick call to Orange Micro, though, revealed that the fix was already available on the company's Web site. We downloaded the new software, and sure enough, the card performed as well in the StarMax as in other clones.

Although we encountered this problem only in Motorola's StarMax, this isn't as much a clone-compatibility issue as a peripherals issue. Not only do Apple's own low-end desktop computers feature internal EIDE devices that would trigger the same conflict, but Apple designed the motherboard (aka Tanzania) that Motorola uses in its StarMax line. While developers can no longer assume SCSI storage in Power Macs, the fact is that few PCI cards interact with the other internal peripheral buses. If you need one that does, though, ask the card vendor about EIDE compatibility before committing to a Mac OS system that either lacks internal SCSI or includes both SCSI and EIDE buses but ships with EIDE devices as standard equipment.

Random Compatibility Glitches

Even the most thorough testing won't uncover every problem. Surveying clone vendors, we discovered a variety of mishaps. One vendor encountered a conflict between one of its power supplies and an ADB dongle used to copy-protect high-end software. Using a different power supply solved the problem.

In another case-design problem, you can't install a VideoVision PCI card from

Six Glitches to Avoid

Here are a few problems we encountered, along with solutions where applicable.

1 PCI Cards versus Clone Cases

Some clones, such as the Power Computing PowerTower Pro and Umax Super-Mac S900L, require you to remove the bottom of their cases and diligently jockey PCI cards to line up with both the slot and the back of the case. Be patient, and never try to force the card. If you're having trouble, get help from a pro. Also, narrow PCI-card access ports on the backs of clones can make it hard to install cards with bezels tooled for Apple Macs, such as the DaynaPort Blue Streak. Again, the answer is patience and a firm but never forceful hand.

2 Radius VideoVision versus Umax Clones

The Radius VideoVision PCI card won't fit in a Umax clone when the VideoVision's daughtercard is attached. A special connector that allows a Umax clone to accommodate the VideoVision card is available from Radius.

3 Umax S900 versus Non-PCI 2.1-Compliant Cards

Cards that don't support PCI bridge chips will work only in certain slots in a Umax S900L. Details are available from Umax. Affected cards include the Radius Thunder series of video cards, and PC compatibility cards from Apple and Reply.

4 OrangePC 400 versus EIDE

Older versions of Orange Micro's software for its PC 400 cards are incompatible with EIDE devices, such as the CD-ROM and hard drives in Motorola StarMax and APS MPower clones. The fix: download new software from Orange Micro's Web site (<http://www.orangemicro.com>).

5 APS EIDE Drivers versus Iomega SCSI Jaz Drives

Older versions of APS's EIDE driver software clash with some Iomega Jaz drives. Driver updates are available at APS's Web site. When possible, standardize on a single driver-software package to avert conflicts.

6 Cross-Platform Networking Software versus Hardware

Some cross-platform networking software only supports built-in Ethernet controllers, but there are no Ethernet controllers in Power Computing PowerBases, Umax C500's and C600's, Apple Performas, or any Motorola or APS model. Also, no Mac or clone can use card-only options such as Token Ring or fast Ethernet adapters with such software. Check with vendors when buying Mac OS computers for your current network or designing a new network to include Macs or clones.

Radius (<http://www.radius.com>) in a Umax clone because the card has a daughtercard that takes up too much space. How did this happen? The Umax designers followed the PCI 2.1 specification, which forbids components being added around the edges of the card; however, the VideoVision card-with-daughtercard design meets the ISA standard that is confusingly included in the PCI spec. Radius offers a Umax-engineered ISA edge-connector as a workaround, and future Umax clones will not have this limitation.

The Umax S900L-series clones are more finicky about cards than other models because although the PCI 2.1 standard requires that cards be able to communicate through PCI bridge chips, the S900's are the first Mac OS systems to use such chips. Thus, cards that are not fully PCI 2.1-compliant may work only in certain slots in a Umax clone. Umax maintains a list of such cards, along with the special conditions for their use.

Power Computing discovered a timing problem that occurs on some Power-

Base computers with SCSI hard drives when external SCSI devices are connected. Affected units usually hang during the start-up process. An initial SCSI Manager Update 1.0 failed to address the problem, and at press time Power Computing was still working on a revised fix.

There is one important compatibility issue for users of networking software such as Novell's (<http://www.novell.com>) MacIPX, Thursby Software Systems' (<http://www.thursby.com>) TSSnet (implementing DECnet and LAT networking protocols), and Digital Equipment Corporation's (<http://www.dec.com>) PathWorks (which incorporates Thursby's DECnet for the Mac), as well as Insignia Solutions' (<http://www.insignia.com>) SoftWindows software for running Windows on a Mac. These programs don't directly support PCI-based networking hardware. Instead, the Mac OS includes a compatibility library that tricks them into treating a built-in Ethernet controller as a NuBus Ethernet device. That's dandy . . . if you have a computer with a built-in Ethernet controller. If you don't—or if you need to address card-based options such as Token Ring, fast Ethernet, FDDI, or ATM—



Crunch Time for Clones In order to preserve compatibility, Apple rigorously tests clones using its Mac OS Certification Environment (MCE). The test suite exercises all Mac OS toolbox calls to confirm that the clone can handle all parts of the Mac OS.

you're out of luck until software developers upgrade their products for PCI.

While the lack of a built-in Ethernet controller is not a problem specific to Mac clones—Apple's Performas don't have them, either—it applies to a significant number of clones, including Power Computing's PowerBase series, Umax's C600 and C500 lines, and all of Motorola's and APS's units. If you're purchasing a Mac OS machine for use on a cross-plat-

form network, check with your network software vendor before you buy.

Certainly, the occasional problems have cropped up, some more crucial than others. Overall, however, the biggest surprise has been the lack of surprises. If it runs on a Mac, it runs on a clone. For the most part, glitches big and small are being addressed quickly, and if you find one, chances are it's already under scrutiny.

Take, for example, the problem that System 7.5.5 wouldn't run on Tanzania-based clones from Motorola and APS. While this may have looked like a compatibility glitch, it didn't surprise Motorola, APS, or Apple. Although the release dates were close, development of System 7.5.5 was frozen long before the Tanzania was designed—or Apple's own PowerBook 1400, for that matter. Thus, the products were neither designed to work together nor tested with each other. (That's right: it wasn't a bug, it was a feature.) System 7.6 now fully supports the Tanzania and PowerBook 1400.

How Apple Avoided Problems

That Apple has sidestepped the confusion that plagued the PC world isn't just

No Bones about Clones: PCI Cards Pass the Test

Worried about clone compatibility? Don't be. We tested PCI cards from four crucial product categories in an Apple Macintosh 9500/200 and three clones. As you can see, we ran into some glitches, but they were attributable more to the cards than to the clones.

Company	Product	Suggested Retail Price	Phone	Category	Comments
Adaptec	PowerDomain 2940UW	\$349	408/945-8600	SCSI	Performance results for SCSI acceleration were consistent among the clones and the Apple Mac.
ATI Technologies	Xclaim VR	\$269 (2MB RAM), \$349 (4MB RAM)	905/882-2600	graphics	Performance results for the tests with both this and the Twin Turbo graphics card were consistent whether the card was in a clone or an Apple Mac.
Dayna Communications	DaynaPort Blue Streak	\$199	801/269-7200	networking	Required installing a special driver for the clones. The opening for the PCI card on the clones is narrower than on an Apple Macintosh, so the bezel on the DaynaPort adapter protrudes slightly from the back of the machine.
Farallon Communications	Fast EtherTX-10/100	\$199	510/814-5000	networking	Unlike the Dayna card, the Farallon card automatically installed hardware drivers.
Integrated Micro Solutions	Twin Turbo	\$499 (4MB RAM), \$899 (8MB RAM)	408/369-8282	graphics	Performance results for the tests with both this and the ATI graphics card were consistent whether the card was in a clone or an Apple Mac.
Orange Micro	OrangePC 400	\$566 (8MB RAM), \$736 (16MB RAM)	714/779-2772	DOS compatibility	The PC 400 initially did not run on the Motorola StarMax 3000, which uses EIDE internally rather than SCSI; a software upgrade, available from the Orange Micro Web site, solved the problem.

a matter of luck. It's a matter of design. The Apple clone never falls far from the tree, because Apple provides licensees with ROM code, documentation, specifications, and schematics, and grants them authorization to buy parts from an approved vendor list. Apple doesn't completely dictate the design of another company's product, of course, but it does provide strict, detailed parameters within which licensees must work to earn Apple's official seal of approval for Macintosh compatibility: Mac OS Certification.

To that end, Apple also supplies the Mac OS Certification Environment (MCE), a test suite that exercises all Mac OS toolbox calls, as well as individual hardware components (see "Crunch Time for Clones"). Every Mac clone must be able to run this gauntlet without breaking before Apple gives its blessing. The licensees don't stop at the MCE tests, of course. Their own processes include internal lab compatibility testing with a wide range of software and peripherals, as well as OEM and channel testing for direct corroboration of their lab results; developer seeding for specific application testing; and user beta testing to mimic real-world conditions.

Once the licensee's testing is done, the model gets shipped to Apple, which does its own "black box" testing: it treats the unit as a generic Mac, making no other assumptions about its components or capabilities. Apple's technical team subjects the clone to a two-week barrage of tests that focus on those things not covered by MCE, such as third-party-software performance and multiple-peripheral interaction, to make sure the clone is indistinguishable in operation from the real MacCoy. Mac OS Certification comes only when the clone passes this final evaluation.

What Will CHRP Bring?

Ironically, we can attribute this compatibility directly to the fact that Apple has maintained complete control of the Macintosh platform from day one. This exclusionary tactic, though long attacked by Apple's critics, has always been touted by Apple as a Mac advantage. Now it reveals a hitherto unseen benefit: because Apple waited until the Mac platform was well defined and robust before opening it up to third parties, the Mac is actually better suited to cloning than its competitor.

That doesn't mean everything is warm and fuzzy between Apple and its

licensees. Strict control has its downside. Under the current license, Apple decides what specific configurations a licensee can ship. Apple's reins are still tight enough to chafe, leaving licensees chomping at the bit for the freedom of the far more flexible Common Hardware Reference Platform (CHRP) specification, which allows Macs to be built with components already common in PCs (as opposed to parts proprietary to Macs). CHRP allows licensees considerable leeway in the choice of components and overall hardware design for Mac OS machines. The possibilities for innovation are various and enticing, but where does that leave compatibility?



Too Tight a Squeeze One problem we discovered: you can't install a VideoVision PCI card from Radius in a Umax clone because the daughtercard takes up too much space. Radius and Umax have collaborated on a workaround to solve this.

Apple's certification team doesn't seem too concerned, noting that the CHRP specification and the CHRP version of the Mac OS were built from the ground up to accommodate just such flexibility. Their biggest concern is the increase in the volume of products and licensees, and how they can best accommodate that in the certification process. They are still weighing several ways of testing CHRP machines.

While licensees acknowledge a greater margin for error in the design process with CHRP machines, and the need for more extensive testing, none consider that a serious problem. In fact, they're confident that CHRP will meet the current Mac OS platform's level of stability, if not surpass it.

We're not convinced that the technical challenges posed by the new platform

can be dismissed so easily. The CHRP version of the Mac OS communicates with motherboard components through a hardware abstraction layer (HAL). This HAL is a sort of universal translator, interpreting OS commands to any number of equivalents for a host of components. Even with an approved list of parts, that's an immense number of variables for the HAL to anticipate.

On the other hand, we're willing to be proved wrong: the new Macs will use components that have already been tested in a variety of PC and workstation configurations, as opposed to Apple-specific components that come and go with the vagaries of Apple design. We've seen Apple make smooth hardware migrations before. We may be seeing just the sort of technology transition Apple does best.

The Last Word

Today's Mac clones are as compatible as we can expect them to be, if not more so. There are a few problems, but the worst of them—physically aligning PCI cards in some models—is still much easier to handle than the PC's nightmarish IRQ conflicts and *config.sys* files. We'd give any of these clones full consideration when looking for the Mac that best suits our needs. Plus, having seen what these licensees have accomplished under current strictures, we

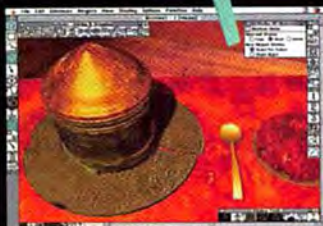
can't wait to see what they do with CHRP.

There's a rich irony in the success of Mac clones, given Apple's long history of staunch opposition to them. It's not just their admirable level of compatibility; the real irony is that it's Apple's complete control over hardware and software development for so many years that has enabled Apple to achieve that compatibility.

Whether Apple has pulled off this coup in time to rescue its dwindling market share remains to be seen. However, Mac enthusiasts can take pride in the fact that, from a technical standpoint, Apple has soundly beaten the PC clone industry at its own game. ■

PETER M STOLLER divides his limited clock cycles between Mac consulting and coauthoring a musical. Attempts to cope by cloning himself have thus far failed due to compatibility problems.

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We needed a flexible 3D modeling tool that would allow us to recreate all of the architectural elements of the kingdom, as well as many of the more organic free-form type objects. We had no dimensioned drawings to work from; all of our modeling was done intuitively using sketches, drawings and photographs from numerous reference books of the period. form•Z handled all of these tasks amazingly well allowing us to model all of the rooms and objects that are featured in the game in a record time period.

France Israel, rendering
Chung Ma Son, 3D modeling



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Add as many **layers** as you need, work with floating point **precision** using simultaneous **graphic** and **numeric** input. If you're unhappy with your new design, **unlimited** **undos** are always at your fingertips.

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When you're done modeling, you can use **RenderZone's** state of the art shader technology to produce your photo realistic images at impressive speeds. Or you can transfer your models smoothly into your favorite animation program, using **form•Z's** extensive import/export formats. Flexibility of this caliber has made **form•Z** the most effective modeling complement to many popular animation programs.

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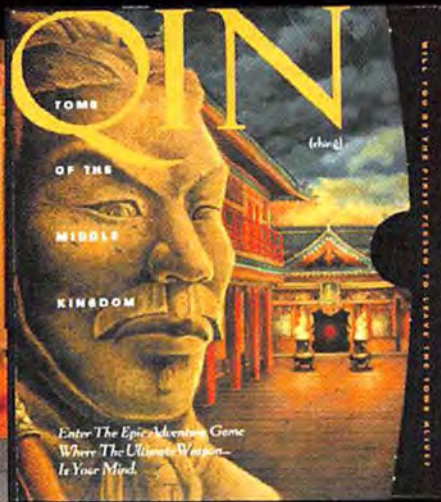
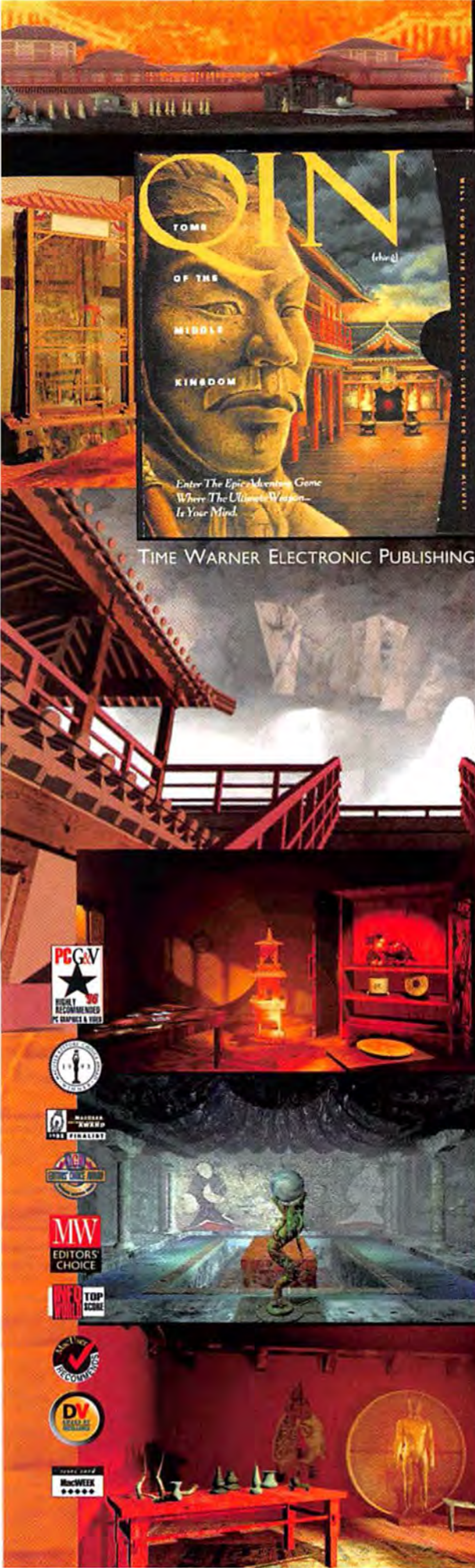


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by Suzanne Courteau

The Best Personal PRINTERS

You work at home, or in a small office or department. You want a printer that's networkable, has enough memory to crank out big reports or complex graphics, and is sturdy enough to last several years. And, oh yes, you don't want to spend a lot of money, either.

Have you always been this demanding? No matter, because somewhere between the \$200 bottom-of-the-line ink-jet printer and the \$4000 top-of-the-line workgroup model, there's a printer with your name on it. But first you have to solve a little problem: Which of the printers and printer technologies is the right choice for your needs? Will a high-quality ink-jet printer suffice, or do you need a laser printer? Is PostScript necessary? And is buying a low-end workgroup printer today overkill—even though your office may expand in another year or so?

To help you decide how much printer your office needs, Macworld Lab compared the output quality and print speeds of two high-end, office-quality ink-jets; two personal laser printers; and two low-end workgroup laser printers. We wanted to see if an ink-jet printer would suffice as a low-cost, color-capable alternative to a personal laser printer. And we wanted to know whether an inexpensive personal laser printer had enough guts to function as a printer for an entire department, or if a heftier workgroup laser was required. We also considered the cost of consumables (ink-jet cartridges, toner cartridges, and paper, among other items) and networking capabilities. Some of our results were as we expected—but we found a few surprises, too.

Top-notch Laser and

Ink-Jet Options, Plus

Tips on Optimizing

Their Performance



Top-Quality Prints

With our output-quality tests, we ranked each printer on how it handled text and graphics. All the laser printers we tested received perfect scores in the subjective testing for their text output. On the other hand, the only ink-jet printer to get an above-average score for text was the Epson Stylus Color 800 (<http://www.epson.com>). The Epson performed fairly well when printing text on high-quality, coated paper. But when it came to printing text on plain paper—the kind you'd most often use for text documents—the Epson earned below-average marks.

The laser printers also produced the best results in our Adobe Illustrator test, in which we output an EPS (Encapsulated PostScript) graphic. It's also worth noting that when printing on plain paper, the Hewlett-Packard DeskJet 870Cse (<http://www.hp.com>) and the Epson Stylus Color 800 ink-jets scored almost as well as several laser printers.

The prints we made of photographic images from Adobe Photoshop were surprisingly impressive for ink-jets. In this test, the Epson Stylus Color 800, using its best-quality print mode and outputting to coated paper, produced the most stunning results of all, with rich color and realistic detail. On the other hand, when the same printer output the Photoshop image in gray scale on coated paper, the results came in last on our quality scale.

Do You Really Need PostScript?

If you need to print or publish letters, reports, or other documents for your business, you've got to look your best. And that means you'll probably need PostScript, the printer description language developed by Adobe Systems that

Personal Printers: The Best Output at the Right Price

Company	Product	Star Rating ^A	List Price/ Company's Estimated Street Price	Phone
Ink-Jet Printers				
EDITORS' CHOICE				
Epson America	Stylus Color 800	★★★★★/9.1	NP/\$449	310/782-0770
Hewlett-Packard	DeskJet 870Cse	★★★★/7.8	\$599/\$499	408/246-4300
Personal Laser Printers				
Apple Computer	Personal LaserWriter 4/600 PS	★★★/5.2	NP/\$899	408/996-1010
Hewlett-Packard	LaserJet 6MP	★★★/6.0	\$1149/\$950	408/246-4300
Workgroup Laser Printers				
Apple Computer	LaserWriter 12/640 PS	★★★/6.0	NP/\$1599	408/996-1010
Hewlett-Packard	LaserJet 5M	★★★/6.2	\$2229/\$1799	408/246-4300

NP = Not provided. NA = Not applicable. ^A Based on features, implementation, innovation, performance, reliability, ease of use, and 870Cse. ^B Comes with free Apple LaserWriter Bridge 2.0 software, which allows sharing over Ethernet networks.

precisely defines how documents will look when printed.

Because they're geared to be simple and low-cost, ink-jet printers lack PostScript. As a result, when printed on an ink-jet, many Adobe Illustrator and Macromedia FreeHand documents—particularly those with text or EPS graphics such as clip art—can't compare in quality to what you'd get from a laser printer. Even the cheapest laser printer does a vastly better job with text and most graphics than an ink-jet printer does.

You could hedge your bets by adding PostScript to an ink-jet printer, however. GDT Softworks' (604/291-9121, <http://www.gdt.com>) \$149 StyleScript 3.5 utility, for example, adds Adobe PostScript to

Apple StyleWriters, HP DeskJets, and Epson's Stylus Color 500 (Epson plans to release a \$99 PostScript option for the 800 later this year). But is it worth the extra money and effort? In some cases, yes. Adding PostScript to an ink-jet printer would reduce the banding we noticed on some of the graphic images—but it wouldn't enable the ink-jets to produce laser-crisp text output on plain paper, since liquid ink-jet inks are more likely to be absorbed by poorer-quality paper.

You might be tempted to further hedge your bets and save some money by buying a less-expensive PC printer and connecting to it via GDT's PowerPrint. GDT's product is an excellent solution if you have a Mac and must print to an established PC-printer network. It's *not* a way to save money by equipping yourself with a less-expensive PC printer: the hassles of setting up a PC printer, combined with the slower performance of working through the PowerPrint adapter, negates any initial cost savings. Stick with a printer designed for use with Macs.

How Fast Do You Want to Go?

A printer's speed is just as important as its print quality. Not surprisingly, the fastest printers in our roundup were the entry-level workgroup laser printers, the 12-pages-per-minute HP LaserJet 5M and Apple LaserWriter 12/640 PS (<http://www.apple.com>). If you don't want to



Neatness Counts The connection ports and plugs on an Apple LaserWriter 4/600 PS are neatly tucked behind a hinged panel, giving the personal laser printer a sleek look.



Easy Access HP's printers scored well for easy upgradability. Remove two screws and slide off the LaserJet 5M's side panel; loosen the last screw, pop open a metal flap, and snap in more RAM.

Resolution (in dpi)	Standard/ Maximum RAM	Speed (in ppm) Monochrome/Color	Network Connections	Comments
1400 × 720	NA	7/5	LocalTalk, parallel ^a	Fast speed for an ink-jet, but a little noisy; produces outstanding photographic images.
^c	NA	7/2	LocalTalk, parallel	Good speed and image quality, but overall is surpassed by newer printers.
600 × 600	2MB/6MB	4/NA	LocalTalk ^d	Has no off switch; a tiny, 100-sheet paper tray; and a nonstandard memory upgrade; is expensive.
600 × 600	3MB/35MB	8/NA	LocalTalk, parallel (2 ports), Infrared	Installation and memory upgrades are a breeze; HP's printer software is the best we've seen.
600 × 600	4MB/64MB	12/NA	LocalTalk, parallel, Ethernet	Offers good speed and image quality for the price; easy-to-install RAM upgrades.
600 × 600	6MB/52MB	12/NA	LocalTalk, parallel, Ethernet, BNC	As with the LaserJet 6MP, memory upgrades are easy and software is tops; well-thought-out front-panel design.

value. (See Star Ratings section for full explanation.) ^a \$149 LocalTalk and \$499 Ethernet adapters available. ^c 600 × 600 dpi in black and white and Best; Normal-mode color resulting is 300 × 300 for the

spend the money on a workgroup printer, your next-best option in terms of speed is the personal laser printers. They're certainly inexpensive—both the Apple Personal LaserWriter 4/600 PS and the HP LaserJet 6MP carry a street price of less than \$1000. But you get what you pay for when it comes to speed: none of the personal laser printers would ever be mistaken for a hot rod. Apple's Personal LaserWriter 4/600 PS is a poky 4 ppm, and HP's LaserJet 6MP manages 8—twice the speed of the 4/600 PS (yet it costs only \$51 more).

Laser printers handle their own processing, while ink-jet printers depend on the kindness of your Mac's CPU. As a

result, a laser printer frees your Mac much faster than an ink-jet printer can. The exception to the rule is the Epson Stylus Color 800. In our speed tests, the Epson printer was faster than the Personal LaserWriter 4/600 PS and nearly surpassed the LaserJet 6MP.

The Cost of Consumables

Laser printers may cost more than ink-jets, but the expense of ink-jet consumables can add up quickly. For example, 15 sheets of Epson's glossy ink-jet paper costs \$28—that's \$20 more than what you'd pay for 500 sheets of plain laser-printer paper. Consider, too, the price of an ink cartridge versus that of a laser

printer toner cartridge. You'll pay about \$75 for a LaserJet toner cartridge capable of printing 4000 pages. By comparison, if you printed 4000 black-and-white pages with the Epson Stylus Color 800, you'd spend roughly \$112 just on ink.

The Network Advantage

For an office environment, how your printer networks is just as important as having PostScript support. Ink-jet printers connect to a single machine via a serial cable. If you share your Mac on a LocalTalk or Ethernet network, then others can share your printer. Of the two network types, Ethernet is faster and more efficient. You can upgrade the Sty-

FOUR WAYS TO INCREASE YOUR PRINTER'S SPEED

PERSONAL LASER PRINTERS AND their ink-jet counterparts aren't nearly as fast as workgroup printers. But there are ways to improve their performance.

USE THE LATEST DRIVER

Download the LaserWriter 8.4.1 driver for free from Apple's Web site (<http://imaging.apple.com>) and select it as your default printer driver. Immediately, you'll see a performance boost. Macworld Lab tests show that installing LaserWriter 8.4.1 not only speeds

printing, but also shortens the time spent waiting for the Mac after sending a job to the printer. Some documents printed with LaserWriter 8.4.1 were processed nearly three times faster than those we printed using the default driver that shipped with each printer.

USE 300-DPI MODE

You'll see an immediate speed increase—up to 37 percent faster on the HP LaserJet 6MP, for instance. For most text documents, 300 dpi is all you need anyway.

And you can always bump the resolution back to 600 dpi for those jobs that need it (note that you can't change the default resolution on either Apple printer).

SWITCH PRINT-QUALITY SETTINGS

Ink-jet owners can change the print-quality settings from best (the slowest) to normal or even economy mode. Keep in mind that printing at high-quality settings on an ink-jet printer often produces output that doesn't look notice-

ably better than it would printed at a medium or normal setting.

ADD MORE MEMORY

The speed benefits aren't as dramatic as upgrading to LaserWriter 8.4.1, but they are noticeable. And extra RAM enables special features on some printers: by adding an 8MB SIMM to the LaserWriter 12/640 PS, for instance, you can take advantage of Apple's PhotoGrade image-enhancement technology and duplexing option (sold separately).



The Fastest Output: How Print Speeds Compare

In a comparison of top-performing ink-jet printers, personal laser printers, and low-end workgroup printers, Macworld Lab timed each printer's speed with a variety of file types. We further timed the laser printers with both LaserWriter Driver 8.4 and the driver included with the printer. Each laser printer was tested over a LocalTalk connection with both LaserWriter driver 8.4 and the driver included with the installation software; ink-jet printers were tested in both their best-quality mode and their default setting.

Best result in test. Shorter bars are better. Times are in seconds.

	DPI	LaserWriter Driver	Short Multi-font Memo	Long Single-Font Report	Spreadsheet	Illustration	Bitmapped Photograph	Newsletter	Web Browser
Ink-Jet Printers									
Epson Stylus Color 800	Default	NA	27.0	158.0	152.4	68.4	61.6	41.5	64.3
Epson Stylus Color 800	Best	NA	91.9	158.3	264.0	225.4	252.0	141.4	204.5
HP DeskJet 870Cse	Default	NA	48.9	125.1	179.2	160.3	178.1	96.6	147.3
HP DeskJet 870Cse	Best	NA	80.0	182.9	368.5	269.0	332.1	170.2	282.0
Personal Laser Printers									
Apple LaserWriter 4/600 PS	600	8.4	68.4	173.2	132.6	306.9	477.5	78.3	118.2
Apple LaserWriter 4/600 PS	600	8.3.4	104.8	173.0	129.1	318.2	486.2	102.8	117.5
HP LaserJet 6MP	600	8.4	37.4	92.2	77.3	120.0	347.4	47.9	60.6
HP LaserJet 6MP	600	8.3.1	65.8	93.7	80.5	132.2	362.6	69.4	61.3
Workgroup Laser Printers									
Apple LaserWriter 12/640 PS	600	8.4	33.7	72.6	64.6	79.5	335.0	42.7	44.6
HP LaserJet 5M	600	8.4	36.7	62.2	53.4	54.6	323.4	33.6	34.1
HP LaserJet 5M	600	8.3.1	50.5	64.9	59.0	62.8	343.5	56.7	36.2

NA = Not applicable.

Behind Our Tests

Macworld Lab tested the speed of each printer using a series of test files that are representative of typical office-oriented jobs, including a ten-page Microsoft Word text-only document using one font; a two-page text-only Word file with multiple fonts, sizes, and styles; a Microsoft Excel spreadsheet; a ClarisWorks newsletter with multiple fonts plus PICT and EPS graphics; a Netscape Navigator Web page; an Adobe Illustrator-

generated graphic; and a full-color photograph scanned in Adobe Photoshop. All tests were performed on a Power Macintosh 7500/100 running System 7.5.5, with 32MB of RAM, a 256K cache, a 17-inch Apple monitor set to 256 colors, a disk cache set to 1024K, virtual memory and RAM disk disabled, and Adobe Type Manager 3.9 enabled.—Macworld Lab testing supervised by Jeff Sacilotto

lus Color 800 to support both LocalTalk (an additional \$149) and Ethernet (\$499) networks.

Laser printers come LocalTalk-ready, so in their case it's just a question of adding Ethernet support. The Personal LaserWriter 4/600 PS comes with Apple's LaserWriter Bridge 2.0, which enables you to share the printer over an Ethernet network, but Apple offers no direct Ethernet networking option. HP offers Ethernet support for the LaserJet 6MP via the addition of the \$349 JetDirect EX Plus adapter card. GDT Softworks' PowerNexus connects LocalTalk devices to Ethernet networks for only \$249.

The problem with these add-on solutions is that while they enable you to attach your printer to an Ethernet network, they don't provide any of the speed benefits of Ethernet. Why? Because they're LocalTalk-to-EtherTalk adapters, the speed of your pipeline—Macintosh to network to printer—is constrained by the slowest part; in this case, the LocalTalk printer.

Once you begin looking at workgroup laser printers in the \$1300-and-up price range, Ethernet support—like PostScript and higher print speeds—is a standard feature. For example, both the LaserWriter 12/640 PS and the LaserJet

5M come equipped with Ethernet, so with an Ethernet-equipped Macintosh you'd have one fast printer. The cost of one of these low-end workgroup printers is more money than what you'd spend if you added Ethernet and PostScript to a personal laser printer. But with the LaserWriter 12/640 PS and the LaserJet 5M, you also get faster print speeds, higher paper-tray capacities, and more memory.

The Last Word

Two criteria stand out when deciding on a personal printer for business: output quality and speed. For professional-looking output, PostScript is mandatory; for professional-level speed, 8 ppm is the bare minimum. And because it's your business, price is a concern as well.

Even though they're inexpensive laser printers, I can't recommend the LaserJet 6MP or the LaserWriter 4/600 PS. Slow print speeds and slow LocalTalk configurations, especially in comparison with color ink-jet's rising star, doom this product category to has-been.

For any office setup of more than one person, a low-end workgroup printer—with Ethernet, PostScript, and larger paper trays—is, despite a higher initial cost, the economical choice in the long run.

And for your best bet in a low-end

workgroup laser printer, you could go with either the LaserWriter 12/640 PS or the LaserJet 5M—both solid if unremarkable products—but I'd recommend a third printer instead: HP's LaserJet 5MP, a solid, 4-star printer (see "Personal Laser Printers," *Macworld*, September 1996). For your office color companion, the Epson Stylus Color 800, with its low price, quick printing, and lovely color, is a compelling and unbeatable choice. **m**

Associate editor SUZANNE COURTEAU covers printer technologies for *Macworld*.

EDITORS' CHOICE

★★★★★/9.1 Epson Stylus Color 800 It's fast, it produces great color, and it's cheap. With the upcoming PostScript option, it'll mop the floor with existing low-end laser printers.
Company: Epson America (310/782-0770; <http://www.epson.com>). **Company's estimated price:** \$449.

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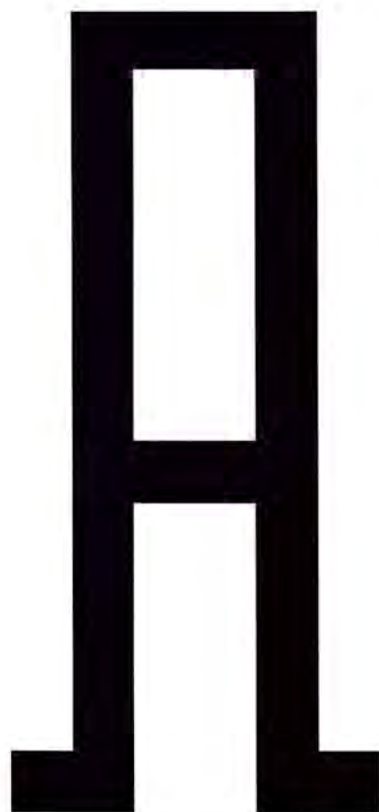
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Illustrator's

New Face

Quickly master version 7's dramatically new interface with these expert tips



by Deke McClelland

DOBE ILLUSTRATOR 7 IS NOT WHAT YOU'D CALL A revolutionary upgrade. Imagine if Illustrator 6 suddenly took on the look and feel of Adobe's popular image editor, Photoshop, and you have a pretty fair idea of what Illustrator 7 is like: very few new features, yet a substantial change in interface. Oh, and for the first time in recorded history, Adobe will simultaneously ship the same version of Illustrator for both the Macintosh and Windows platforms.

Is that *you* I hear yawning? Are you one of those people who doesn't care about cross-platform consistency? Could it be you aren't attracted to an upgrade that does the same thing as its predecessor, just in a less familiar way?

In truth, I suspect that some graphic artists will opt to ignore Illustrator 7 and

stick with their present version. But I won't be among them. Although still in beta as I write this, version 7 looks to be the most straightforward release of Illustrator in the past five years, not only because it closely resembles Photoshop—an application that I and most other artists spend more time in—but also because version 7 just plain makes more sense. Adobe has done a solid job of housecleaning, and added a handful of efficiency enhancements to boot. Give yourself a week to adjust, and you'll be working faster in tomorrow's Illustrator than you are in today's.

Family Resemblance Works

Scheduled to ship by the late spring of 1997, Illustrator 7 promises to mark the completion of the first successful professional graphics suite. Although companies like Macromedia and Corel have made stabs at creating suites of their own, their attempts so far have involved little more than sticking unrelated applications in the same box and adding a sprinkle of drag-and-drop support.

In contrast, the upcoming Illustrator 7 is designed to mimic the behavior of Photoshop 4 so deftly that it's often difficult to tell the two programs apart. They share common commands, palettes, tools, and even keyboard shortcuts (see the sidebar "If You Know Photoshop, Illus-



If You Know Photoshop, Illustrator 7 Makes More Sense

Although Illustrator 7 and Photoshop 4 serve very different functions—vector-based drawing on one hand versus pixel-based image editing on the other—they bear such striking on-screen similarity that you might initially mistake one for the other.

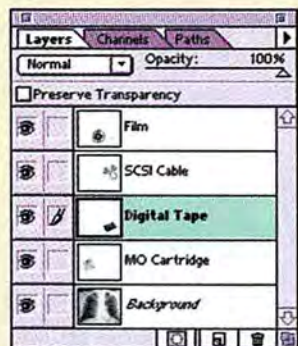
But the purpose of this resemblance is to illuminate, not confuse.

Just as the uniform interface guidelines provided by the Macintosh Operating System help to establish a familiar and predictable working environment, Adobe's cross-product homogeneity makes for a smoother workflow with fewer surprises. The two programs are governed by one set of rules.

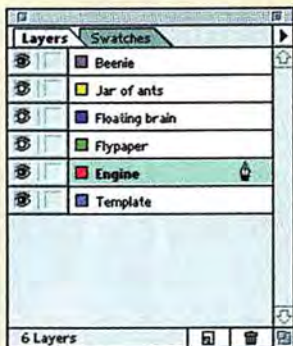
LAYERS AND GRIDS

I doubt anyone will object to the new Layers palette, which looks and works similarly to Photoshop's. Both programs let you create, hide, activate, and reorder layers in the same manner. Illustrator loses the thumbnails and opacity controls. But it gives you better control over the location of a new layer, allows you to view layers in different modes, and lets you dim imported images for use as tracing templates. And for those who appreciate a little consistency, grids and guides work identically in the two programs.

Photoshop 4



Illustrator 7

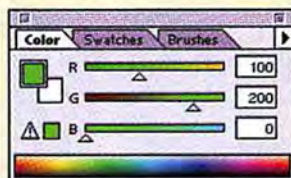


COLORS

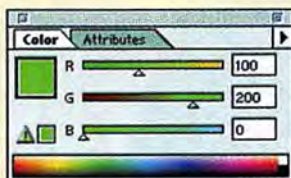
Photoshop's job is to color pixels, while Illustrator attaches two color attributes to each object: fill and stroke. Despite this fundamental difference, the new draw program finds common ground. To the probable dismay of Illustrator purists, the once-ubiquitous Paint Style palette has been chopped into several pieces. As in Photoshop, you now define your colors in one palette (top screens); store them for future use in another, called Swatches (bottom screens); and create gradients in a third. (A fourth palette accommodates strokes.)

Also taking a cue from Photoshop, Illustrator lets you quickly switch between fill and stroke by pressing the X key, and reset the default colors by pressing D. And though it's been a long time coming, Illustrator 7 finally supports the RGB and HSB color models.

Photoshop 4



Illustrator 7



trator 7 Makes More Sense"). You won't find them bundled together, but after you learn to use one program, the other will seem like family.

The Look The physical similarities between Illustrator and Photoshop are mostly a matter of palettes. For several years Illustrator and Macromedia FreeHand have battled to see which could do the best job of cluttering your screen with randomly sized palettes and ancillary toolboxes. In Illustrator 7 there's a single toolbox on the left side of the screen and a column of palettes (all the same width) on the right, with lots of space in between, giving you plenty of room to work.

Each palette may include multiple panels, and the palettes snap into alignment, just as in Photoshop. You can even attach one palette to the bottom of another, a trick lifted from FreeHand. Only one

palette varies from the norm: the free-floating Tab Ruler stretches to fit your text block. It's all so tidy, you'd swear it had been engineered by a team of programming elves.

The Feel Getting up and running with Illustrator 7 reminds me of my first week with Windows 95. I was initially frustrated until I stopped trying to use Windows 95 like the old Windows and started using it like its archetype, the Mac. Likewise, Illustrator 7 makes more sense if you bring your Photoshop experience to bear. This is especially important when working from the keyboard. To zoom in, press ⌘-plus sign (+); to bring the selected object to the front of a layer, press ⌘-shift-right bracket (]); to fill the screen with your artwork, press the F key. (For more, see the table, "Expert Shortcuts to Get You Up to Speed Fast.")

A longtime Illustrator user might grumble that these shortcuts fly in the face of tradition, but the clever Photoshop user recognizes a well-thumbed page out of the old playbook.

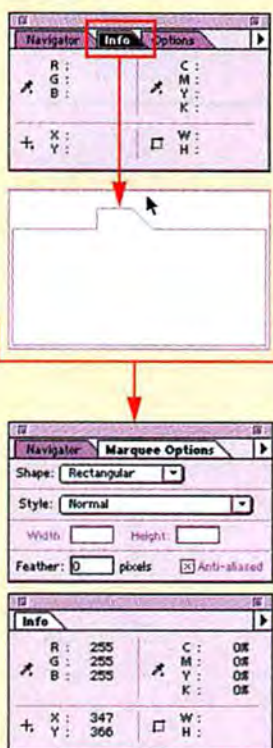
My favorite change to the interface is the new ability to select tools from the keyboard, again à la Photoshop. Where FreeHand lets you select several of its tools by pressing number keys (which correspond to the tools' location in the toolbox), Illustrator and Photoshop assign more meaningful letter shortcuts. Press T to select the type tool, press P for the pen. Best of all, press X to switch between assigning a color to the fill or to the stroke of a selection. Every icon in the toolbox gets a key; learn to use them and you can't help but work faster.

To ease Illustrator's transition to the Windows side, Adobe changed another

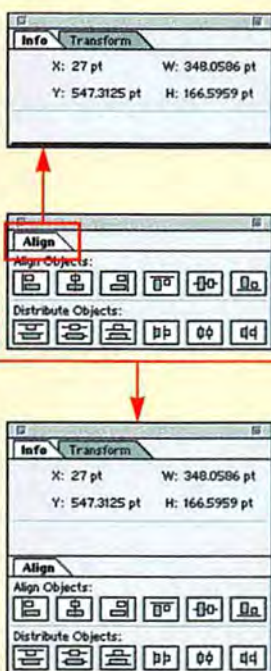
TABBED PALETTES

Following Photoshop's lead, Illustrator 7 has adopted tabbed palettes. You can click on a tab to reveal another panel of options, or drag a tab (top left) out of a palette to create a new palette (bottom left). Both programs let you hide all palettes by pressing the tab key, or hide everything but the toolbox by pressing shift-tab. If you press shift-return after entering a value into any palette, Illustrator applies the value but leaves it highlighted, so you can change your mind and enter a new value. But the best trick comes not from Photoshop but from FreeHand: Illustrator lets you drag a tab top onto the bottom of a palette (top right) to "dock" two palettes together (bottom right).

Photoshop 4



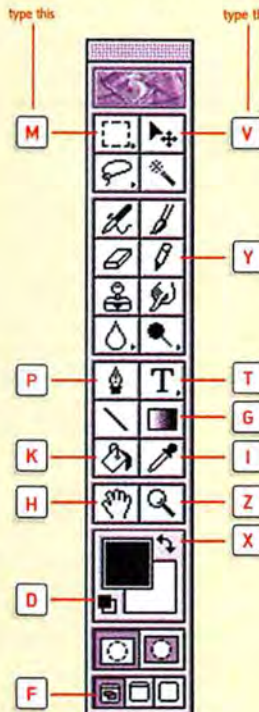
Illustrator 7



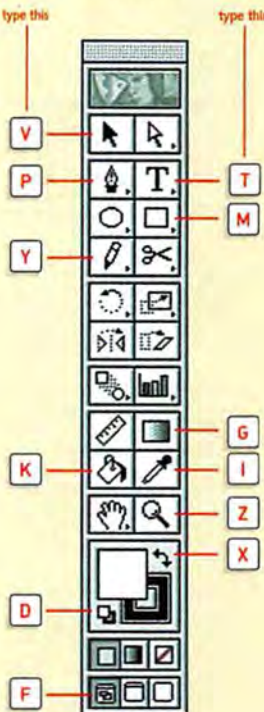
KEYBOARD SHORTCUTS

Illustrator and Photoshop exploit keyboard shortcuts more than most graphics applications. Artists who use them learn that a little key can be a powerful ally, permitting you to keep your cursor and attention inside the illustration without hunting around for icons and commands. Realizing that too many memorized shortcuts can junk up your brain, Illustrator 7 lets you free up a few brain cells by having its interface mimic Photoshop wherever possible. For the first time, you can activate a tool or icon by pressing a key, and tools that have counterparts in Photoshop share the same keys (as shown below). Mutual navigation, selection, and file-management functions are also standardized.

Photoshop 4



Illustrator 7



group of keyboard shortcuts. Because of the PC's lack of a fourth modifier key, Adobe struck any key equivalent that involved the control key. (Control-clicking now brings up a context-sensitive pop-up menu.)

If you can't cope with the shift away from the control key or you miss stone-cold-dead shortcuts like ⌘ -control-U, which used to cycle the unit of measure, you can select a preference check box to bring all the control-key shortcuts back. That said, I recommend you try to wean yourself off the old ways; I doubt this preference setting will find its way into Illustrator 8.

The Imagery Look and feel is only half the battle in creating a bridge to Photoshop. The other half is supporting the images that Photoshop creates. Illustrator 6 did a fine job of recognizing

image file formats such as TIFF and JPEG, but it invariably parsed the images. This meant integrating the pixels into Illustrator's native PostScript file format, converting the colors to CMYK, and ballooning the size of the saved documents to absolutely outrageous proportions.

Illustrator 7 has wisely revamped its image support. Although image support didn't work altogether reliably in the beta version I used, Adobe assures me that you'll be able to place any image format and maintain a link to a file on disk. The result will be smaller and more manageable files. Illustrator 7 also supports RGB images, converting them to CMYK only when printing color separations.

Finally, the autotrace tool now manages to trace color images, a far cry from the old black-and-white limitation. Unfortunately, the tool is still limited to

creating one path at a time, and the controls are quite unsatisfactory. To appease its critics, Adobe plans to bundle its stand-alone tracing program, Streamline, with all copies of Illustrator 7.

Features under the Microscope

When I put the words *features* and *Illustrator 7* together in the presence of an Adobe representative, he said something like, "You have to realize, this is a *huge* improvement on the Windows side" (which last stalled out at Illustrator 4.1). In other words, it's pretty slim pickings on the Macintosh.

This is not to say that new features don't exist. They're just so minor that they normally would register as distant blips on the radar. But if you calibrate your brain at a higher level of sensitivity, you'll discover the following:

Expert Shortcuts to Get You Up to Speed Fast

If you spend a lot of time pressing keyboard shortcuts inside Illustrator, prepare for a shock. As many as 75 percent of the shortcuts have changed. Ah, if only it were as easy to clear the old shortcuts out of your brain and add the new ones as it is to wipe and load RAM. The

crack technicians here at Macworld Lab are hard at work on a pill that will teach you how to use Illustrator 7 and seven other major apps in an hour. But until it's finished, this table will have to do. It lists shortcuts for 30 crucial operations that Adobe has altered or added in Illustrator 7 (for the extended version of the table with a couple hundred shortcuts, see Macworld Online, <http://www.macworld.com/pages/june.97/articlelinks/illustrator.html>). A bullet (•) in the right-hand column indicates a shortcut shared by Illustrator 7 and Photoshop 4.

Operation	Illustrator 6 Shortcut	Illustrator 7 Shortcut	Shared by Illustrator 7 and Photoshop 4
Apply palette value but keep value active	none	shift-return	•
Average selected points	⌘-L	⌘-option-J	
Average and join points	⌘-option-J or ⌘-option-L	⌘-shift-option-J	
Bring object to front	⌘-plus sign (+)	⌘-shift-right bracket (])	•
Delete active layer or swatch without warning	none	option-click on Trash icon in palette	•
Display Move dialog box	⌘-shift-M or option-click on arrow-tool icon	double-click on arrow-tool icon	
Display or hide Info palette	⌘-control-I	press F8 key	•
Display Paragraph palette	⌘-shift-P	⌘-M	
Force-justify paragraph	⌘-shift-B	⌘-shift-F	
Hide all layers but one	none	option-click on eyeball icon in Layers palette	•
Hide all palettes except toolbox	none	shift-tab	•
Hide points around selected objects	⌘-shift-H	⌘-H	•
Highlight value inside last-used palette	none	⌘-tilde (~)	
Lock selected objects	⌘-1	⌘-L or ⌘-2	
Make fill or stroke transparent	none	press the slash (/) key	
Mask selected objects	none	⌘-7	
Repeat last filter	⌘-shift-E	⌘-E	
Repeat last Pathfinder operation	none	⌘-4	
Revert to last saved illustration	none	press F12 key	•
Scale proportionally from Transform palette	change Scale value	change W or H value, press ⌘-return	
Send object backward	none	⌘-left bracket ([)	•
Show or hide grid	none	⌘-quote (")	•
Switch color models	none	shift-click on bar at bottom of Color palette	•
Switch focus between fill and stroke	none	press the X key	•
Switch to artwork (keyline) mode	⌘-E	⌘-Y or ⌘-click on eyeball icon in Layers palette	
Select color list to pick color by typing name	none	⌘-option-click in Swatches palette	
Transform pattern fill within shape	press P key while dragging with transformation tool	press tilde (~) while dragging with transformation tool	
Ungroup selected objects	⌘-U	⌘-shift-G	•
View illustration at actual size	⌘-H	⌘-1	•
Zoom in	⌘-right bracket (])	⌘-plus sign (+)	•

Illustrator and Photoshop Still Differ

WHILE ILLUSTRATOR 7 AND PHOTOSHOP 4 SING SOME DULCET HARMONIES, A FEW AREAS OF DISCORD REMAIN.

Navigation Photoshop lets you magnify an image to any percentage; Illustrator is locked into a handful of presets. Illustrator lets you save views; Photoshop does not. Photoshop offers a

constant thumbnail view of the image; not so in Illustrator. There's no reason that all these features shouldn't be in both programs.

Transformations Photoshop relies on commands to scale and rotate images; Illustrator relies on tools and a palette. Photoshop's approach is ultimately more flexible, letting

you flip images quickly and apply different kinds of transformations at once. If we're in the mood for compromise, I say settle on commands (with a free-floating origin) for the real-time controls and stick with the palette for the numerical stuff.

Text Where text is concerned, it would take less time to list the similarities between

the two programs than the differences. It may never be possible to close the gap entirely, but Photoshop needs to give some earnest attention to the most basic text functions such as mixing typefaces and sizes within a text block.

Masking Although Illustrator's masks are analogous to Photoshop's clipping groups,

the two couldn't be implemented more differently. In Illustrator, the mask is in front of its contents; in Photoshop, the mask is in back and on a separate layer. Again, I have to come down on the side of Photoshop.

Color Matching Illustrator relies on ColorSync, Photoshop combines the Gamma control panel with its own internal color management. Despite your best efforts, you can almost guarantee that a CMYK document saved from Illustrator will look different when rasterized in Photoshop. OK, color management is a tricky issue, but is it too much to ask that these two programs agree?

Vertical Text You know we're talking about a modest upgrade when Japanese text—you can now create text in vertical columns, flowing from right to left, both inside text blocks and along paths—ranks as the most significant new feature. In truth, Adobe wants to create a single text engine for folks on both sides of the Pacific. If you typeset Japanese documents, it'll come in handy. Otherwise, it's more of an occasional special-effects tool.

Reshape Curve Tool The new reshape tool stretches open paths with respect to one or two stationary endpoints. The endpoints act as anchors, and you drag the path to lever it in different directions (see "Blend and Stretch"). It's an interesting new curve-editing model, and it may come in handy for modifying blends, but the tool needs fleshing out before it's likely to attract wide use.

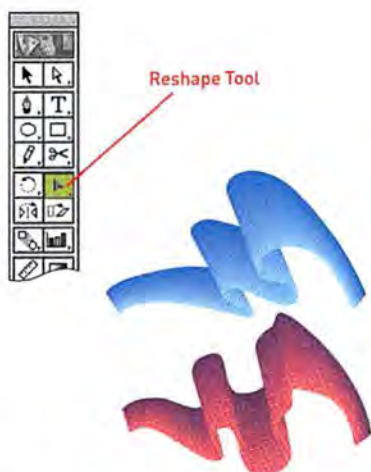
Drag-and-Drop Colors You can now drag and drop colors between palettes, or from palettes onto objects. The feature isn't nearly as broadly implemented as it is in FreeHand, but it does make life easier. For example, to define a tile pattern, you only have to drag a collection of objects and drop them into the new Swatches palette—much, much easier.

Grids Who would have thought it'd take Illustrator ten years to implement a feature included with the first version of MacDraw? But grids are finally here, and they work every bit as well as they do in Photoshop, FreeHand, or any other program. Tip: The grid is always displayed

in back of your objects, so you can use it to quickly distinguish white shapes from transparent ones.

Visible Origin Point Illustrator 7 displays the transformation origin, which is the center point about which shapes are scaled and rotated. This permits you to drag the origin to a new location and watch it snap to anchor points. It's minor, but helpful.

URL Objects Illustrator 7 lets you assign a URL to any object in your illustration.



Blend and Stretch Illustrator 7 remains the only drawing program that lacks editable blends. However, if the blend is made up of open paths, the new reshape tool lets you stretch it. After creating the blue blend, I selected all the paths and dragged the left endpoint of the outer path with the reshape tool. The result is the modified version of the blend, shown in red.

tration. If you're interested in creating an Adobe Acrobat document or a GIFF image map, this is a significant addition. Otherwise, it's not.

The Last Word

I can't say I'm bursting with joy at the prospect of Illustrator 7. The product demands mental retooling in return for one of the most miniature feature upgrades I've ever encountered. If I were to tally its capabilities without judging their implementation, I have no doubt it would trail FreeHand and CorelDraw.

Nonetheless, for Illustrator loyalists, version 7 makes a clear—if not terribly exciting—case for upgrading. First, Adobe is acknowledging the deficits of version 6 by enhancing its image support and adding productivity boosters such as toolbox shortcuts. Second, the interface is streamlined with the needs of Photoshop users foremost in mind. (In fact, if you use Photoshop and you're newly in the market for a draw program, it's likely you'll find Illustrator easier to learn than its competition.) And third, there's no discounting cross-platform support. Mac artists need to be able to communicate with users on the other side of the platform gulf, and version 7 is the first Illustrator that enables you to do so reliably. **m**

Contributing editor DEKE MCCLELLAND (<http://www.dekemc.com>) wrote *Real World Illustrator 7* (Peachpit Press, 1997) and an online Illustrator course for <http://www.digitalthink.com>.

MACWORLD

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BAYSIDE EXPOSITION CENTER

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UNLEASH THE POWER

Attending MACWORLD Expo/Boston is the best way to reap the full benefits of Macintosh computing. The product offerings at retail stores are no match for the breadth of choice you'll find at MACWORLD Expo. Catalogs may offer variety, but no opportunity to see demonstrations or ask questions. Only MACWORLD Expo lets you experience the full scope of Mac computing, with thousands of solutions for: • Web site design and Internet navigation • publishing, entertainment and multimedia • networking, enterprise-wide connectivity, and intranets • education, R&D, research • business and telecommuting

The Mac universe is 60 million users strong. Exchange information with over 50,000 of the most innovative, ingenious, and committed users at MACWORLD Expo/Boston. Network at special interest areas and pavilions that are open to all attendees. Learn from the experts... share experiences with your peers... keep abreast of trends in more than 80 conference sessions, including NEW half-day tutorials. MACWORLD Expo opens your mind to new horizons accessible only through your Mac.

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**Conference:
AUGUST 5-8, 1997**

**Exhibits:
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BOSTON

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HERE'S A PREVIEW OF THE 10 SEPARATE CONFERENCE TRACKS & INDIVIDUAL SESSIONS:

A. The Macworld Magazine Track

Macworld's editors, columnists, and featured guests present living pages of the magazine's hottest topics.

- The New-Generation Mac • Rhapsody in Blue: The NeXT Mac • Macworld Magazine's Best of Show • Illustrator/Freehand/Canvas/CorelDraw Shootout!
- Become Your Own Troubleshooting Guru
- The Best of Macworld's MacSecrets

B. The Design/Art/Prepress Track

Top graphic arts industry professionals share their expertise and experience — plus their best tips to provide you with an insight into the future of breakthrough technologies. [See also Half-Day Tutorials for additional sessions on these topics.]

- Web Graphics Mentors • Bringing Concepts to Life through Imaging • Kai's Killer Tips and Tricks • Color Correction in Photoshop • Digital Photography • The Digital Ad Agency • Advanced Imaging for Professionals • From the Screen to the Printed Page • Vectors and/or Pixels

C. The Web Master/Web Creativity Track

The Macintosh is the premiere vehicle for the creation of content on the Web. Get a leg up on the Web (and your competition) with this full track of sessions designed to help you cruise, serve, and populate the 'net. Give your business the Macintosh/Web advantage! [See also Half-Day Tutorials for additional sessions on these topics.]

- Choosing a Web Server • Choosing/Using Tools for the Coolest Web Site • Web Databases • VRML: Get Your Avatar On-line! • The Power of PUSH: Webcasting/Web Broadcasting • Electronic Commerce on a Mac Web Site • Web Objects • Web Page Navigation and Content Structure • Building Interactivity into Your Web Site

D. NEW! The Creating Content Track

The increasing power of the Mac — coupled with the global reach of the World Wide Web — offers unparalleled opportunities for creating entertainment and other compelling content. In these sessions designed specifically for digital content creators, designers, video producers, filmmakers, and multimedia professionals, you can learn from the pros and have fun while you're doing it! [See also Half-Day Tutorials for additional sessions on these topics.]

- Developing Interactive Games • Video for the Web • The 3 Ts of 3D: Trends, Tools, Techniques • Interface by Design • Multimedia Authoring in a World of Hybrid Media • DTV Production Update • Designing Rich Content in a Low Bandwidth World

E. The Operating System/Connectivity Track

The unique power of the Macintosh lives in its Operating System and Extensions. Learn how to harness that power, extend and protect it with third-party additions, manage your computer for better productivity, and build fast, easy-to-use networks for printing and sharing files and using the Internet.

- Essential Network Management Tools in a Cross-Platform World • Justifying Macs in a PC Environment • Virus Protection, Security, and Privacy • Network Operating Systems and the Mac • Apple Extensions Explained • Supporting High-Speed and High-Utilization Networks • TCP/IP Report

F. The Small Office/Home Office (SOHO) Track

Never before has it been easier — or more fun! — to launch and operate a small company, a home-based business, or a home office for telecommuting. Hear experts share their insights on how YOU can increase productivity and slash costs!

- Using the Latest and Greatest to Run Your Small Business • The Internet for Small Business • Small Business Success Secrets • Marketing Your Small Business with Your Mac

G. The Tools Workshops

Intensive training sessions on some of the most popular Macintosh tools, presented in a totally non-biased format by the award-winning staff of MacAcademy.

- Mastering the Macintosh: Intermediate to Advanced • Claris Works • Adobe PageMill • Adobe Photoshop • QuarkXPress • Macromedia Director

H. The Educators Track

An excellent opportunity for educators, administrators, and students to show and be shown new and classic examples of how the Macintosh positively shines as a teaching tool — in these sessions presented for educators, by educators.

- Maximizing the Mac in Education • Maintaining Sanity and Productivity Within your Computer Lab • Solving Your Classroom Computer Nightmares • Building a Curriculum-Based Intranet • Cool Computer Curriculum Projects! • The Internet for Educators

I. The Special Interest Group Track

Sessions for "birds of a feather" looking to compare Mac notes with others in a similar setting — to solve special problems, to see how colleagues across the continent are getting more mileage out of the Mac, and to develop an invaluable "user network."

- Macs in the Law Office • Macs in Science and Technology • MACWORLD Expo User Group Extravaganza (MUSE)

J. The You-Asked-For-It Track

A combination of perennial MACWORLD Expo favorites, plus brand-new topics in response to your special requests, with up-to-the-minute market developments. For starters:

- On-line Survival Guide • Mobile Computing on Macs: Tips for Road Warriors! • Beginner Java • Beyond Beginner Java • Getting Started with HTML • Customizing Your Mac • Resolving System Conflicts • Audio, Sound, and Music Tools

New!

HALF-DAY TUTORIALS

Tuesday, August 5th

By popular demand! The opportunity for you to enjoy an in-depth learning experience on Macintosh topics of vital interest — presented by some of MACWORLD Expo's highest-rated speakers!

- **Designing Web Graphics**
- **How to Build Your Own Web Site**
- **Film School in a Box**
- **How to Integrate Macs and PCs in a Single Business Environment**
- **A Beginner's Guide to the Internet**
- **Enterprise Security**
- **Remote LAN Access: Strategies and Solutions**
- **Mega-Design Dynamos!**
- **Creative Layout Techniques**
- **Create Your Own Web Page**
- **Photoshop: Channels and Layers**
- **Building a Mac-Based Intranet**
- **Intermediate Internet: Searching the Web**
- **Zen and the Art of Integrating Your School's Mac Network**

Open to conference attendees only. Limited seating available. Two tutorials per person.

**For a complete
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information**

call 800-645-EXPO

or see <http://www.mha.com/macworldexpo/>

DYNAMIC



Maximize your learning experience at MACWORLD Expo/Boston with three outstanding keynote sessions on Wednesday, August 6:

Apple will share its latest updates and insights... Guy Kawasaki will showcase the hottest and (coolest) new products... and a panel of Macintosh insiders will dig and delve for everything you'll need to know about Macintosh clones!

Keynotes: Wednesday, August 6, 9:00 a.m. – 12:30 p.m.

The Castle at the Boston Park Plaza Hotel, Columbus Ave., Boston

Keynotes are open to conference attendees only, have limited seating and are on a first-come, first-served basis.



SPECIAL FEATURES

- **The Net Zone...**
a high-profile showcase for Internet hardware and software. *Sponsored by **boston.com***
- **Business Solutions Pavilion...**
fosters the burgeoning market for Mac business applications.
- **Developer Greenhouse...**
the hottest products from over 25 innovative developers.
- **Education Pavilion...**
featuring software, Internet tools and multimedia for schools and home learning.

Special Interests

- **Developer Central...** where software developers creating the next wave of Mac applications can find the tools and solutions they need. Seminars taught by the world's most advanced Mac techies add value to the product selection.
- **UGWUMP...** User Group Welcoming/Unwinding/ Meeting Place is the "people connection" for Mac users. Come here to meet, relax, trade ideas and learn about joining or starting a user group and more!

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MADE EASY

Hotel	Single/Double
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Boston Marriott Long Wharf 296 State St., Boston, MA 02109	\$251/272
Boston Park Plaza Hotel 64 Arlington St., Boston, MA 02116	\$160/180
The Charles Hotel at Harvard Square One Bennett St., Cambridge, MA 02138	\$275/275
Colonnade Hotel 120 Huntington Ave., Boston, MA 02116	\$195/220
The Copley Plaza 138 St. James Ave., Boston, MA 02116	\$206/227
Doubletree Guest Suites 400 Soldiers Field Road, Boston, MA 02134	\$189/189
Four Seasons Hotel, Boston 200 Boylston St., Boston, MA 02116	\$295/325
Harborside Hyatt Conference Ctr. & Hotel 101 Harborside Dr., Boston, MA 02128	\$185/210
Holiday Inn Government Center 5 Blossom St., Boston, MA 02114	\$169/189
Hyatt Regency Cambridge 575 Memorial Dr., Cambridge, MA 02139	\$170/190
Le Meridien 250 Franklin St., Boston, MA 02110	\$244/260
The Lenox Hotel 710 Boylston St., Boston, MA 02116	\$173/193
Logan Airport Ramada 75 Service Rd., E. Boston, MA 02128	\$139/159
Omni Parker House 60 School St., Boston, MA 02108	\$170/190
Radisson Hotel Boston 200 Stuart St., Boston, MA 02116	\$170/180
The Regal Bostonian Faneuil Hall Marketplace, Boston, MA 02109	\$285/285
Ritz-Carlton Hotel 15 Arlington St., Boston, MA 02117	\$260/295
Royal Sonesta Hotel 5 Cambridge Pkwy., Cambridge, MA 02142	\$185/185
Sheraton Boston Hotel & Towers 39 Dalton St., Boston, MA 02199	\$174/190
Swissôtel One Ave. de Lafayette, Boston, MA 02111	\$180/190
The Westin Hotel Copley Place, Boston 10 Huntington Ave., Boston, MA 02116	\$199/219

Macworld EXPO

MACWORLD Expo/Boston

World Trade Center &
Bayside Expo Center

Conference Hours

August 5: 8:30 a.m. - 4:30 p.m. (Tutorials)
August 6: 9:00 a.m. - 5:15 p.m.
August 7: 11:30 a.m. - 5:15 p.m.
August 8: 11:30 a.m. - 2:15 p.m.

Keynotes (Conference attendees only)

The Castle at the Boston Park Plaza
Columbus Avenue, Boston
August 6: 9:00 a.m. - 12:30 p.m.

Exhibit Hours

August 6-7: 10:00 a.m. - 6:00 p.m.
August 8: 10:00 a.m. - 4:00 p.m.

On-site

Registration Hours

August 5: 7:00 a.m. - 3:00 p.m.
August 6-7: 8:00 a.m. - 6:00 p.m.
August 8: 8:00 a.m. - 4:00 p.m.

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Hotel availability is limited and on a first-come, first-served basis. A credit card is required to make any hotel, air or car reservation. Additionally, a non-refundable hotel deposit of one night plus 9.7% Massachusetts state and local taxes will be billed to your credit card at time of booking. Air tickets are to be paid in full at time of booking.

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U.S. Attendees:

Badges will be mailed after July 21.

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We're committed to ensuring that our physically challenged attendees receive all the services they need to make their visit productive. Call us at 800-945-3313 for more details on the services we offer.

Half-Day Tutorial Codes: (Tuesday, August 5, limit two per person)

CODE 8:30 a.m. - 11:30 a.m.

- T1. Designing Web Graphics
- T2. How to Set Up Your Web Site
- T3. Film School in a Box
- T4. How to Integrate Macs and PCs in a Single Business Environment
- T5. A Beginner's Guide to the Internet
- T6. Enterprise Security
- T7. Remote LAN Access: Strategies and Solutions

CODE 1:30 p.m. - 4:30 p.m.

- T11. Mega-Design Dynamics!
- T12. Create Your Own Web Page
- T13. Photoshop: Channels & Layers
- T14. Building a Mac-based Intranet
- T15. Intermediate Internet: Searching the Web
- T16. Zen and the Art of Integrating Your School's Mac Network
- T17. Creative Layout Techniques

For more information
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MACWORLD Expo/Boston • August 5-8, 1997 • Bayside Expo Center & World Trade Center

1. REGISTRATION SELECTION AND FEES

Please choose your package and fill out the form completely. Incomplete forms will be returned. Please use one form per person; make photocopies for additional people.

Package One \$170

Half-day Tutorials, Conference Sessions, Exhibits and Keynote Sessions. Pre-Register by July 7 (\$195 at the door).

All Tutorial, Conference and Keynote sessions have limited seating and are on a space-available basis.

Please circle the half-day tutorials you plan to attend. One tutorial per time slot please. Refer to tutorial listing on adjacent page.

8:30-11:30:

1:30-4:30:

T1 T2 T3 T4 T5 T6 T7 T11 T12 T13 T14 T15 T16 T17

Package Two \$25

Admission to Exhibits only.

Pre-Register by July 7 (\$40 cash only at the door).

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• **Confirmation** of your registration will be sent to you once registration is received. Pre-registration deadline is July 7, 1997.

• **U.S. Badges:** will be mailed after July 21.

• **International Badges:** (including Canada) will be held on-site at either of the Pre-Registered Attendee Counters: in the West Lobby of the Bayside Expo Center or in the Registration Area, upper level of the World Trade Center.

• **Registration Hours:** August 5, 7:00 a.m. - 3:00 p.m.; August 6-7, 8:00 a.m. - 6:00 p.m. and August 8, 8:00 a.m. - 4:00 p.m.

□ Please check here if you are disabled and require special services. Simply attach a written description of your needs.

Conditions and Policies: Payment must accompany form for registration to be complete. Purchase orders not accepted. Registration forms received after July 7 will be returned unprocessed. After this date you must register on-site. This form cannot be used for on-site registration. All registration fees are non-refundable and credentials are non-transferable. A \$20 fee will be charged for all returned checks.

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First Name															M.I.		Last Name														
Title																															
Company																															
Street Address (please include apt. #, suite, mail stop, etc.)																															
P.O. Box (if applicable)																															
City															State/Province										Zip Code/Postal Code						
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3. ATTENDEE PROFILE

MUST BE FILLED OUT TO PROCESS YOUR BADGE.

WHAT IS YOUR INDUSTRY? (Check One Only)

- ☐ 1. Accounting/Finance
- ☐ 2. Aerospace
- ☐ 3. Architecture/Construction/Process Industries
- ☐ 4. Art/Design/Creative Services
- ☐ 5. Arts & Entertainment
- ☐ 6. Computer Reseller/VAR/VAD/Service
- ☐ 7. Consulting
- ☐ 8. Education
- ☐ 9. Engineering/R&D
- ☐ 10. Government/Military
- ☐ 11. Health/Medical Services
- ☐ 12. Legal Services
- ☐ 13. Manufacturing (Computer Industry)
- ☐ 14. Manufacturing (Non-Computer Industry)
- ☐ 15. Marketing/Sales/PR/Communications
- ☐ 16. Printing/Publishing
- ☐ 17. Transportation
- ☐ 18. Utilities
- ☐ 19. Other

WHAT IS YOUR JOB FUNCTION? (Check One Only)

- ☐ 20. Art Director/Graphics

- ☐ 21. Consultant
- ☐ 22. Controller/Treasurer/Accounting/CFO
- ☐ 23. Corporate Executive
- ☐ 24. DP/IS Management/CIO
- ☐ 25. Editorial/Writing
- ☐ 26. Educator
- ☐ 27. Engineering/Scientific/R&D
- ☐ 28. Human Resources
- ☐ 29. Management/Department Head
- ☐ 30. Marketing/Sales
- ☐ 31. Network Management
- ☐ 32. Professional (Lawyer, Doctor, etc.)
- ☐ 33. Programming/Analysis
- ☐ 34. Purchasing
- ☐ 35. Software Developer
- ☐ 36. Training
- ☐ 37. Other

WHAT IS THE SIZE OF YOUR ORGANIZATION?

- ☐ 38. Under 50
- ☐ 39. 50-99
- ☐ 40. 100-499
- ☐ 41. 500-999
- ☐ 42. 1000 & Over

WHICH PERSONAL COMPUTERS DO YOU USE?

- ☐ 43. Macintosh Powerbook Series/Duo Series
- ☐ 44. Macintosh II Series
- ☐ 45. Macintosh Performa Series
- ☐ 46. Macintosh Centris Series
- ☐ 47. Macintosh Quadra Series
- ☐ 48. Macintosh Workgroup Series
- ☐ 49. PowerMac
- ☐ 50. Newton
- ☐ 51. Mac clone
- ☐ 52. IBM PC or compatible desktop
- ☐ 53. IBM Laptop/Notebook
- ☐ 54. Other

HOW MANY MACINTOSH COMPUTERS ARE USED IN YOUR ORGANIZATION?

- ☐ 55. 0
- ☐ 56. 1-10
- ☐ 57. 11-25
- ☐ 58. 26-50
- ☐ 59. 51-100
- ☐ 60. 101-500
- ☐ 61. 501+

ARE THE COMPUTERS AT YOUR ORGANIZATION NETWORKED?

- ☐ 62. Yes
- ☐ 63. No

WHICH APPLICATIONS DO YOU OR YOUR ORGANIZATION UTILIZE? (Check all that apply)

- ☐ 64. Accounting/Finance
- ☐ 65. Agenda Manager/Scheduler
- ☐ 66. CAD/CAM
- ☐ 67. CASE Tools
- ☐ 68. Database
- ☐ 69. Desktop Publishing
- ☐ 70. Digital Video
- ☐ 71. Education
- ☐ 72. Graphics
- ☐ 73. Multimedia
- ☐ 74. Project Management
- ☐ 75. Spreadsheet
- ☐ 76. Word Processing

WHICH (IF ANY) OF THESE SERVICES DOES YOUR ORGANIZATION UTILIZE? (Check all that apply)

- ☐ 77. America On-line
- ☐ 78. AT&T
- ☐ 79. CompuServe
- ☐ 80. Netscape
- ☐ 81. Prodigy
- ☐ 82. Other

4. PAYMENT METHOD

□ Check enclosed (make payable to MACWORLD Expo). Enclose check and form in an envelope.

□ Master Card

□ Visa

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Account Number

Expiration Date

If card holder is other than registrant, please print card holder's name below:

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Payment must accompany form for registration to be complete.

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REGISTER NOW!

Use either ONE of the following methods to register with this form:



Mail to: MACWORLD Expo/Boston
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OR



Fax to: 617.440.0359.
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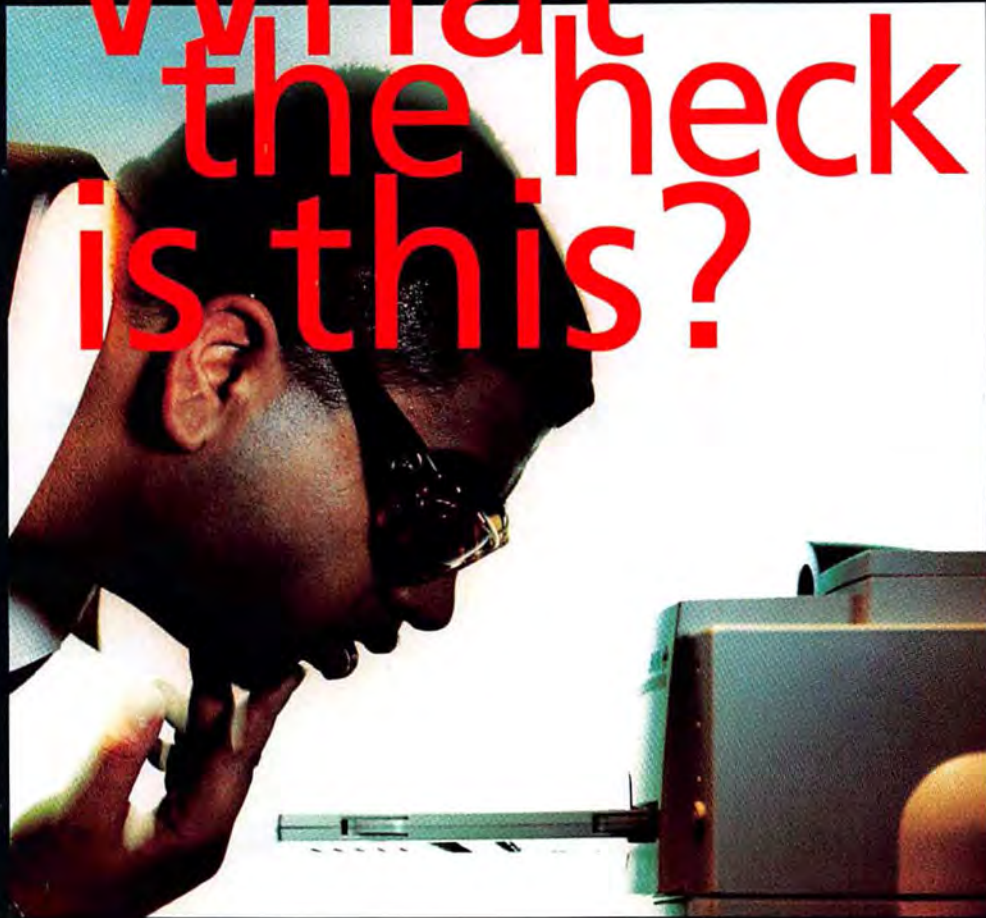


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<http://www.mha.com/macworldexpo/>
For more information, call: 800.645.EXPO
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EXCEL'S NUMBER-CRUNCHING SHORTCUTS EXPOSED

by Joseph Schorr

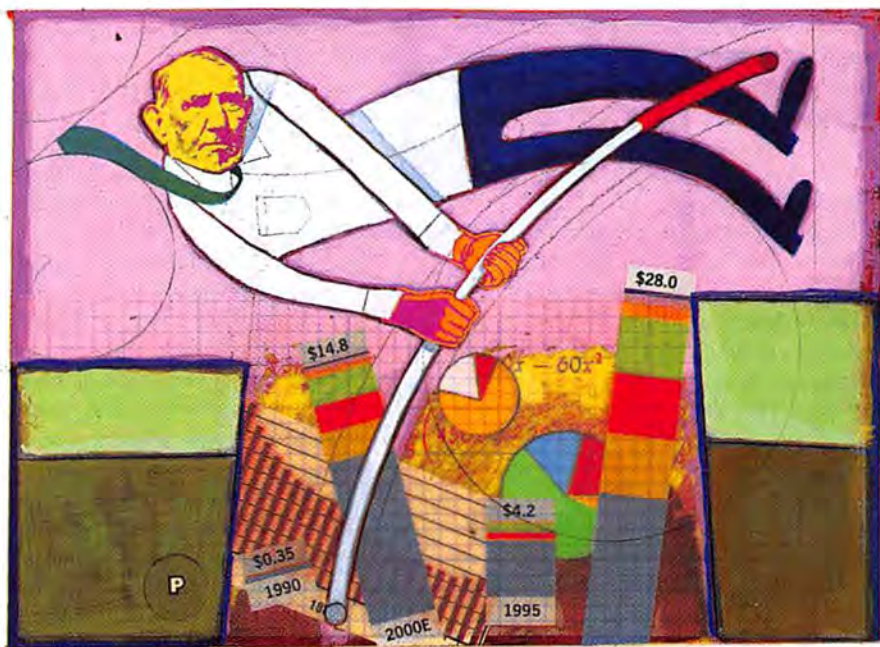
Do terms like *exponential smoothing* and *Fourier analysis* make your blood run cold? Don't worry—this column isn't about *that* kind of number crunching. I have no intention of introducing you to Microsoft Excel's powerful Covariance tool or explaining how easily it can generate standard deviation, kurtosis, and skewness reports—as if normal people know what those are.

On the other hand, there's a lot more to using Excel than plugging a column of numbers into a worksheet and clicking on the Sum button. Here, then, are some less-than-obvious shortcuts that deserve a place on the Can't Live Without list of Excel novices and power users alike.

Cell Hopping

Open a new Excel spreadsheet and you're confronted by a matrix of 67,108,864 cells (that's 4,194,304 cells per worksheet, with 16 worksheets in a default workbook). Once you start filling those cells with data, you may find yourself hammering away endlessly on the tab key or relentlessly scrolling around to navigate your work—unless you know these high-speed cell-hopping tricks.

First of all, don't waste time tabbing through empty cells. Hold down the \mathbb{H} key (or the control key) when pressing the up, down, left, or right arrow keys to leapfrog empty cells and move directly to



the next nonadjacent *filled* cell in a row or column. This allows you to jump from one block of data to another several thousand cells away with a single keystroke. (When you use these keystrokes *within* a block of data, you jump to the *edge* of the current block.)

Other big time-savers: Pressing the home key takes you to the top of the worksheet, without moving the insertion point. \mathbb{H} -home teleports you to the first cell of the current worksheet, and \mathbb{H} -end zips you down to the last cell of the entire worksheet. If your work is spread across

several worksheets, use option-left arrow and option-right arrow to move from sheet to sheet without clicking on the sheet tabs at the bottom of the screen.

Speaking of worksheets, did you know you can select multiple *worksheets* by shift-clicking the worksheet tabs at the bottom of the screen? By selecting multiple sheets in this manner, you can delete a whole set of worksheets simultaneously, instead of one at a time. Or you can turn off gridlines in an entire workbook instead of on a sheet-by-sheet basis.

continues

Microsoft Bar Exam

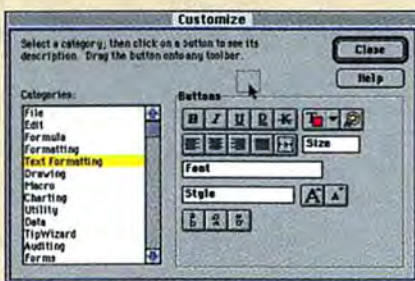
Much to the chagrin of many Microsoft Office users, Excel's tool bars *don't* behave exactly like Word's. In Word 6, you can customize tool bars simply by \mathbb{A} -dragging buttons from tool

bar to tool bar. You can also remove buttons completely by \mathbb{A} -dragging them into a document window, and duplicate them by option-dragging them to another location on a tool bar. None of those tricks work with Excel—unless you know these secrets.

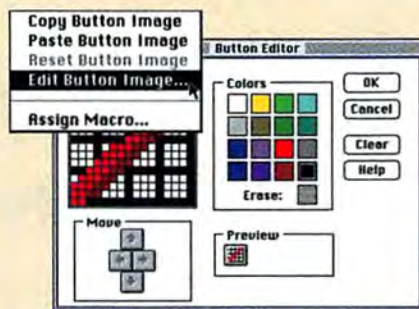
1. To do drag-and-drop tool-bar editing, you first have to choose the Toolbars command, located under the View menu (or control-click on any tool bar to select it from the pop-up Toolbar Shortcuts menu). Once the Toolbars dialog box is open, you can \mathbb{A} -drag and option-drag buttons to customize the tool bars.



2. If you want to add buttons that aren't on the currently displayed tool bars, click on the Customize button. This gives you access to all the buttons available in Excel—whether or not they appear on your current tool bars. Click on a category from the field on the left to display the related buttons, then drag them into place.



3. Editing a button is also trickier in Excel than in Word. Again, with the Toolbars dialog box open, hold down the control key and click on a button in a tool bar to reveal the Button Shortcuts pop-up menu. You'll find otherwise hidden commands that let you copy, paste, and edit buttons and assign macros to your own custom buttons.

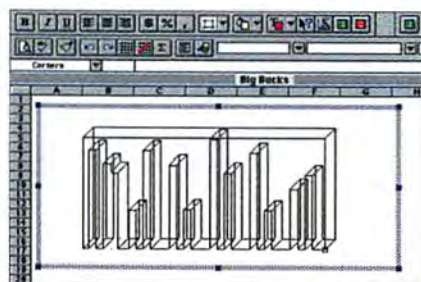


And you can perform searches and check spelling on a whole workbook at once (normally, Excel restricts Find and Replace operations and spelling checks to the currently active worksheet).

Faster Charting

Here's a tip that can revolutionize your chart-making efforts: instead of repeatedly tweaking Excel's built-in chart formats to suit your taste, create and save your *own* custom chart styles as AutoFormats, and make one of them the program's default chart style.

First, create a chart and change its attributes—colors, styles, fonts, and so on—so that it looks just the way you want. When you're done, choose Options from the Tools menu and click on the Chart tab. Click on the Use the Current Chart button and give your chart



3-D Preview Preview the effects when you rotate a 3-D chart *before* you release the mouse button by holding down the \mathbb{A} key. Instead of a blank, rotating frame you'll see all the bars (or pie slices) within the chart as you rotate it.

style a name. From now on, *your* chart style will be the one Excel chooses every time you use the Charting Wizard to graph your data. (Each time you follow this process to save a chart style, Excel stores your custom design as an AutoFormat chart that you can select using the AutoFormats dialog box.)

Once you've followed the steps above, you're finally ready for this most glorious of Excel secrets: one-key instant charting. Select the data you want to chart, then press F11 and watch as Excel automatically switches to a new worksheet and creates a new chart according to your exact specifications.

Of course, once you've set up custom charts of this sort, you might want to share them with the rest of the office, or provide them to your staff so you can all format charts consistently. To do this, copy the Excel Chart AutoFormats (5) file stored in the Excel Startup Folder (5) (which is in the Preferences folder within the System Folder) and distribute the file to the other users.

Keystrokes of Genius

Finally, here are a few last irresistible Excel secrets.

If you want to copy the formatting of one cell to another, you don't have to bother with Excel's Format Painter button. Instead, just use control-C to copy formats and control-V to paste them.

Press F10 on an extended keyboard and you have instant keyboard access to

all of Excel's menus. Once you've activated the menu bar by hitting F10, you can move to any menu by typing the letter underlined in the Menu name—Windows style. To access the Options command, for example, you press F10, then

	North	West	South
1	654	5565	981
2	548	4485	819
3	224	1265	336
4	8465	83675	126875
5	3221	31235	48315

	North	West	South
1	654	5565	981
2	548	4485	819
3	224	1265	336
4	8465	83675	126875
5	3221	31235	48315

Name That Range After selecting a range of cells, click in the Name box to assign it a name (top). Once you've named your cells, you can jump to them using the Name pop-up menu (bottom).

T (for the Tools menu), and then O (for Options). You can also use the arrow keys to move up and down menus or from menu to menu. **m**

Contributing editor JOSEPH SCHORR is coauthor of the newly released *Macworld Mac Secrets*, fourth edition (IDG Books Worldwide, 1997).

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Tips, Tricks, and Shortcuts

by Lon Poole

Wrangling a herd of extensions, control panels, and other such items is easier with Extensions Manager 4.0 (in Mac OS 7.6) than with earlier versions because version 4.0 can bunch items into packages. You can enable and disable whole packages as quickly as single items. The trouble is, Extensions Manager 4.0 doesn't let you change the composition of packages or create new ones. But Gregory Lawhorn of Paso Robles, California, and other readers discovered that you can work around this limitation with Apple's free ResEdit program.

You simply use ResEdit to open the vers resource 2 of an item you want in a package, enter the package name in the text-entry box labeled Long Version String (see "Editing Extensions Manager 4.0 Packages"), and save your changes. Repeat this process with each item you want in the package, using copy and paste to make sure each item has exactly the same package name. To remove an item from a package, change or delete the package name in its vers resource 2 and then save changes.

If an item doesn't have a vers resource 2, duplicate the item's vers resource 1 with ResEdit's Duplicate command; change the duplicate's ID to 2 with ResEdit's Get Resource Info command; and then enter the package name in the new vers resource 2's Long Version String box.

If an item doesn't have any vers resources, you can either copy a vers resource 2 from another item in the same package or create a new vers resource with the Create New Resource command, and change its ID to 2. After saving all your changes and closing all the windows in ResEdit, open Extensions Man-

ager and you'll see the results instantly.

You can also use ResEdit to edit the item description that Extensions Manager 4.0 displays when you extend its window to show item information. The place to enter an item's Extensions Manager description is in the item's CCI™ resource 128, as shown in "Editing Extensions Manager 4.0 Packages." Many items lack a CCI™ resource 128, which originated with Conflict Catcher from Casady & Greene (408/484-9228, <http://www.casadyg.com>), but you can create one with ResEdit's Create New Resource com-

mand. If you create the resource, be sure to type capital letters for the first three characters and a trademark symbol (™; press option-2) for the fourth character.



mand. If you create the resource, be sure to type capital letters for the first three characters and a trademark symbol (™; press option-2) for the fourth character.

After creating a new CCI™ resource 128, close it and use the Open Using Template command to open it with the TEXT resource template for easier editing. Incidentally, if an item doesn't have a CCI™ resource 128, Extensions Manager 4.0 looks for a description in three other places: in a private database; in the item's hfdv -5696 resource, which con-

Pasting into a Layer

Q While I have adjusted to the new aspects of Adobe Photoshop 4.0 with relative ease, the manner in which the program now handles pasting selections annoys me. I find it particularly awkward when I need to paste a selection into a layer mask, which I did quite frequently with version 3. Is there an easy way to paste a selection into the layer mask itself without its resulting in a new layer?

NATHAN CROSS
Chattanooga, Tennessee

A Option-click the layer mask thumbnail to view only the mask, and then paste. Alternatively, you could use the Channels palette to select the mask channel and make it visible, and then paste.

Disk Driver Compatibility

Q My dealer told me System 7.5.5 is not compatible with the old disk driver software installed on my hard drive by Drive 7 Lite. He thinks that is why my hard disk failed twice recently. Sounds plausible, so I bought and reformatted my disk with Hard Disk Toolkit Personal Edition from FWB Software (415/463-3500, <http://www.fwb.com>). We shall see. The question is, are there millions of hard disks out there with ticking drivers, and what should everyone do about it?

JOHN ANGER
Calgary, Alberta, Canada

continues

A Before upgrading your system software, it's wise to update the driver software on your hard drives with a compatible version of the disk utility application from the drive manufacturer. For an Apple drive on a Mac with an IDE drive, or on any Power Mac (but not on a 680X0 Mac with a PowerPC upgrade and no IDE drive), you update the driver with Drive Setup. On other Macs, use Apple HD SC Setup. You can't update a PowerBook 150's disk driver software because it's in ROM (read-only memory). Apple includes Drive Setup and Apple HD SC Setup in the Disk Tools folder or the floppy of the installation CD, and in floppies for major Mac OS revisions such as 7.6 and 7.5.3. Use the latest version, or use the version that was the latest when the

system version you're installing was first released. For example, for System 7.5.5 you would use Drive Setup or Apple HD SC Setup from a Mac OS 7.6 or System 7.5.3 installation package.

You can't use Apple HD SC Setup or Drive Setup on a non-Apple drive, or on an Apple drive on which you have installed a non-Apple driver such as FWB's Hard Disk ToolKit, Drive 7 (no longer sold), or SCSI Director Pro (Transsoft; 805/897-3350, <http://www.transsoft.net>). Check with the maker of the drive-formatting software included with the drive to find out whether you have a version of the driver that's compatible with the system version you're about to install.

It's also a good idea to use Apple's Disk First Aid program to verify the condition of, and if necessary repair, the vital but hidden directory on each of your hard drive volumes before upgrading the system software. I also recommend using Disk First Aid after a crash to repair any resulting directory damage, which if left unfixed could cause additional crashes and more damage (call me paranoid). Apple includes Disk First Aid with system software installation CDs and floppies.

Drive Setup, Apple HD SC Setup, and Disk First Aid are in the Apple Software section of the Macworld Online software library at <http://www.macworld.com/indexsoftware/AppleSoftware.html>. You can also get them by browsing through the Utilities folder in the Apple Software Updates section on <http://www.info.apple.com>, or by using keyword *AppleComputer* on America Online, or Go word *APL.SUP* or *APLWW* on CompuServe.

tings, but Apple's free LaserWriter Bridge software will. It allows you to have a primary network connection to Ethernet simultaneously with a secondary network connection for accessing LocalTalk printers. After installing LaserWriter Bridge, you set your primary network connection by selecting EtherTalk in the Network control panel. Then establish a secondary network connection by turning on the LaserWriter Bridge control panel. LaserWriter Bridge version 2.1, which is compatible with Open Transport 1.1 and later versions as well as with classic networking, is available from the Apple Software section of the Macworld Online software library, as well as from Apple's online software library.

You can't use Apple's LaserWriter Bridge to make LocalTalk devices other than printers (such as LocalTalk Macs with file sharing turned on) available on an Ethernet network. Nor does LaserWriter Bridge allow Macs on a LocalTalk network to access devices connected to an Ethernet network. In those cases, you can use Apple's LocalTalk Bridge software (\$175-\$199), which establishes a two-way bridge between LocalTalk and Ethernet networks.

LaserWriter Bridge and LocalTalk Bridge also work with Token Ring as the primary network instead of Ethernet.

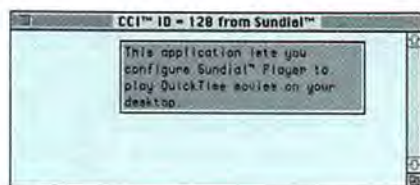
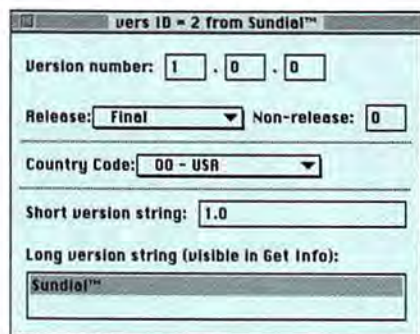
Color-Coded Excel

TIP Suppose, as a teacher, you want to use Microsoft Excel to assign verbal grades such as *Pass* or *Fail* based on numeric scores, and you want to display the verbal grades in different colors. Furthermore, you want to be able to recalculate the grades by changing a named cutoff score, so you don't have to revise a lot of formulas.

It's easy enough to specify different colors for positive, negative, and zero values in custom Excel number formats. You can also override those default criteria by defining your own value ranges. For example, the following format displays the word *Pass* in green for values greater than or equal to 0.75, and displays the word *Fail* in red for values less than that.

[Green]>=0.75"Pass";[Red]<0.75"Fail"

Unfortunately, Excel allows you to define a value range only with a numeric constant. You can't use a named value to



Editing Extensions Manager 4.0 Packages You can change the package and the description that Mac OS 7.6's Extensions Manager 4.0 uses for an extension, control panel, or other item (top). Use ResEdit to enter the package name in the text-entry box labeled Long Version String in the item's vers resource 2 (middle). Edit the description by using ResEdit's Open Using Template command to open the item's CCI™ resource 128 with the TEXT template (bottom). To be safe, use ResEdit only on copies of items.

Simultaneous Ethernet and LocalTalk

Q My company has a small network with a 7100/80, a Umax C600, and a Umax S900. To share files we change the Connect Via setting in the AppleTalk control panel to Ethernet, and to print to a laser printer we change that setting to a LocalTalk port. Will installing PowerTalk on all three machines allow us to share files and print without constantly changing the AppleTalk control panel?

RODGER MESCHKE
Lansing, Michigan

A PowerTalk won't let you share files over Ethernet and print over LocalTalk without changing AppleTalk set-

define a value range in a format, as in the following nonworking example:

```
[Green][>=PassingScore]"Pass";[Red][<PassingScore]"Fail"
```

You could use a formula to calculate the grade, as in the following example;

this does not allow you to assign the nice highlighting colors:

```
=IF(A1>=PassingScore,"Pass","Fail")
```

To work around the formatting limitations, you can use a named cutoff score in a formula that calculates a code num-

ber instead of a grade, and use a custom number format to display a colorized grade according to the calculated code number. Here's an example formula for calculating a code number:

```
=IF(A1>= PassingScore,1,0)
```

Based on the code number calculated by that formula, the following format displays the word *Pass* in green or the word *Fail* in red:

```
[Green][=1]"Pass";[Red][=0]"Fail"
```

Now you can recalibrate grades on the fly by modifying the PassingScore value, and the grades are color-coded.

STEVEN LUH

Quezon City, Philippines

Edge Effects in Photoshop

Here's an easy way to give photos great-looking painted-edge effects with Adobe Photoshop, contributed by Patrick Besong of Snow Shoe, Pennsylvania.

1 Take a piece of whiteboard (preferably the size of your photo) and paint the desired effect on it with black paint and a 2-inch brush. Keep the paint somewhat dry to bring out the brush marks. Scan this black image and save it as a PICT file. In Photoshop, open that file and your photo. Select and copy the newly scanned edge effect.



2 Bring the photo to the front, click the Quick Mask Mode button at the bottom right of the toolbox palette, and paste the copied edge effect. The pasted edge effect shows up in red in the quick mask. Adjust the size of the effect as necessary using the Scale command (in Photoshop 4.0 it's in the Transform submenu of the Layer menu; in earlier versions it's in the Effects submenu of the Image menu). Now turn off the Quick Mask by clicking the Standard Mode button at the bottom left of the toolbox, and the area around the edge effect becomes selected. (If the edge effect becomes selected instead, choose Invert from the Select menu.)



3 Finally, select a background color (generally white) and press the delete key to make the selected area that color.

Note that you can use Photoshop painting tools to edit the scanned edge effect after pasting it into the Quick Mask. You can even forgo pasting a scanned edge effect, and paint one directly in the Quick Mask (try using the custom brushes in the Assorted Brushes file that comes with Photoshop 3.0 and later).



Full-Screen Navigator

TIP Several people in my office travel the Web while on the road. With the small screen size of their 500-series PowerBooks, they have trouble seeing our company's database even in the largest possible Netscape Navigator window. But Netscape put a great little hidden trick in Navigator. Press control-option-A and Netscape switches to a full screen mode, eliminating the menu bar, the title bar, and the bottom status bar. The PowerBook users see more of the Lasso-powered HTML-database Web pages without scrolling. This trick is also great on my 21-inch monitor when I want to overwhelm my foolish Windows 95 work buddies.

ROBERT M. TOUPS, JR.

New York, New York

Another shortcut on a PowerBook or other keyboard without a page down key: scroll down a page at a time by pressing the spacebar.—L.P.

LON POOLE answers readers' questions and selects reader-submitted tips for this monthly column. His latest book is *Macworld Mac OS 7.6 Bible*, fourth edition (IDG Books Worldwide, 1997).

Shareware mentioned in *Quick Tips* is available from Macworld Online (<http://www.macworld.com>) or America Online (keyword *Macworld*).

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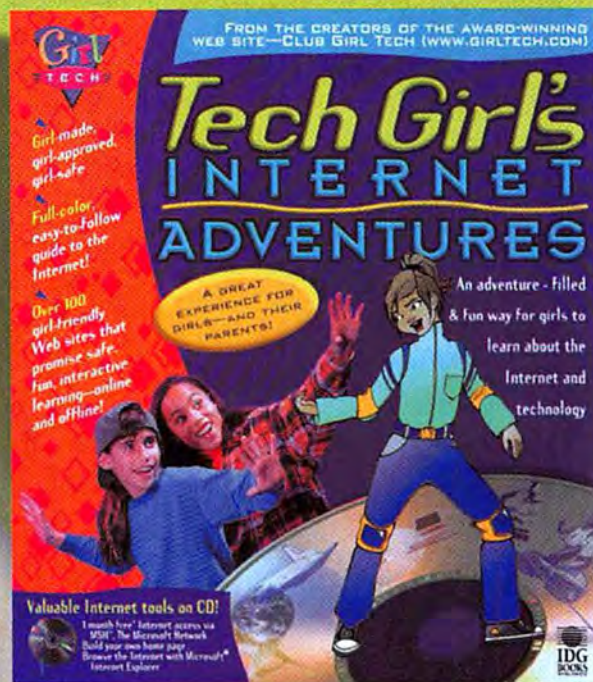
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Director 6 Secrets

INSIDE THE LATEST AUTHORIZING POWERHOUSE

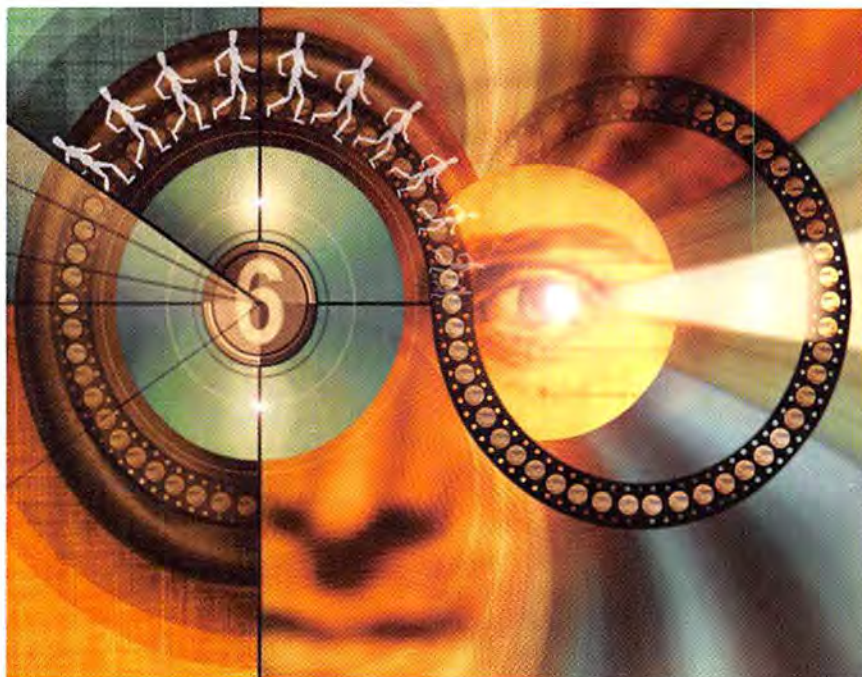
by Jim Heid

There's a new Director on the set—or there soon will be. Macromedia is on the verge of shipping Director 6, the latest version of its flagship authoring program. Director 6 sports new features and interface enhancements that make the program a more efficient place to work—and a bit easier to learn than its sometimes cantankerous predecessors. Director 6 allows for more sophisticated animation and stronger ties between CD-ROMs and the Web. And a new version of Shockwave lets media elements download as a project plays back, making high-quality animation and CD-ROM-like interactivity for the Web more practical. (For examples and more information, visit <http://www.heidsite.com>.)

Adjusting to New Surroundings

For Director veterans, upgrading to 6 is like breaking in a new pair of shoes: you're going to get a few blisters. Try these two blister-reduction measures.

Restore Director 5's Score Director 6's streamlined Score window may be easier for newcomers to master. But if you prefer 5's hieroglyphic Score window, optimized for creating animation rather than creating interactivity, choose Score from the Preferences submenu (File menu), and check the Director 5-style Score Display box in the Score Preferences dialog box.



Select Sprites the Director 5 Way

In Director 5, selecting a sprite on the Stage highlighted only the current frame in the Score window. In 6, your selection highlights all frames where the sprite appears. This makes it easier to move a stationary (not animated) sprite to a new location on the stage. If you miss the old way, choose Sprite from the Preferences submenu, and in the Stage Selection area of the Sprite Preferences dialog box click on Current Frame Only (or press option while selecting a sprite on the Stage).

Better Animation

Director has always been a fine program for doing flip book-style animation. Director 6 enhances the animation environment in several ways, including synchronizing animation with a soundtrack (see "Cue Me Up").

Unlocking Keyframes It's far easier to animate sprites and work with their keyframes in Director 6 than in version 5. To have a sprite move across the Stage, position the Score's playback head at the

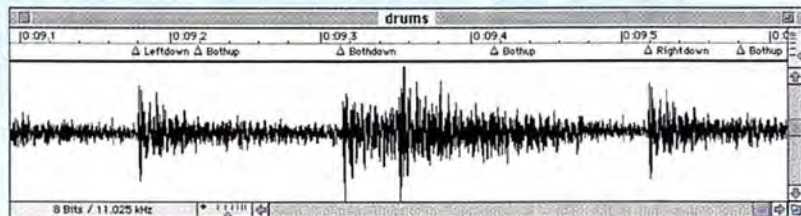
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Cue Me Up

YOU CAN SYNCHRONIZE animation or scene changes with the contents of an audio file or QuickTime movie by using Director along with Macromedia's SoundEdit 16 audio editor. In this example, a cartoon drummer pounds the skins in sync with a drum track.

Creating Cue Points

In SoundEdit 16, click at the location where you want the cue point, and then choose Cue Point from the Insert menu. Give the cue point a name. Repeat for each cue point you need. Here, I used the label names Leftdown, Rightdown, Bothdown, and Bothup to mark the points where the left or right drumstick should hit the drums, where both should hit them, and where both should go up.



Creating Cast Members

These are the four cast members that are displayed in sync with the cue points. They have the same names as the cue points themselves.



Bothup



Rightdown



Bothdown



Leftdown

Synchronizing the Media

After importing the sound or QuickTime movie into Director, you can use the new Lingo message `cuePassed` to synchronize elements with those cue points. This movie script changes the cast member that appears in Score channel 4 to correspond with the name of the current cue. When the current cue is Leftdown, the cast member named Leftdown appears. When the current cue is Bothup, the cast member named Bothup appears. The `updateStage` command redraws the Stage immediately.

You can also use the Score window's Tempo channel to synchronize with cue points. In the Tempo channel, double-click on the frame where you want the playback head to wait for a cue point, and then use the Tempo dialog box to specify the cue point.



last frame in which the sprite appears. Choose Insert Keyframe from the Insert menu, and then drag the sprite to its final location. You're done. Want that sprite to take a more complex path, perhaps to change direction or bounce off the edge of the screen? Position the playback head partway through the sprite's span, choose

Insert Keyframe again, and then move the sprite. Now try resizing the sprite's span in the Score window. As you drag, Director proportionally adjusts the keyframes to make the animation faster (if you make the span smaller) or slower (if you make it larger). You can also drag a keyframe within the sprite span to

change the speed with which the sprite moves between keyframes.

On the Mark Creating a bullet-point presentation or a project consisting of numerous screens? In the Score window, create markers to denote the start of each screen. Then, in the Sprite Preferences dialog box, make sure the Terminate At Markers box is checked. Now when you select the cast members for a given screen and drag them into the Score window, each sprite's span will automatically end at the marker for the next screen. You won't need to resize each sprite manually.

Watch Your Behavior

Implementing interactivity in Director always used to mean writing Lingo scripts from scratch. Director 6 provides an alternative: *behaviors*, special cast members that are attached to sprites or frames that enable them to respond to events—for example, when a user clicks on this sprite, play frame 20. You use the Behavior Inspector to create behaviors, and Director 6 comes with a library of canned behaviors for creating common interface elements, such as navigation buttons.

Learn the Lingo When you create a behavior with the Behavior Inspector, Director actually writes a Lingo script (specifically, a Score script). You can click on the Behavior Inspector's script button to see the script and learn a bit about how Lingo works.

Reusing Behaviors Once you create a behavior for a sprite, you can attach that behavior to several sprites. Say you create a behavior that plays a sound when a user clicks on a sprite; to make another sprite act the same way, drag the behavior from the cast to a selected sprite on the Stage or to a sprite in the Score window.

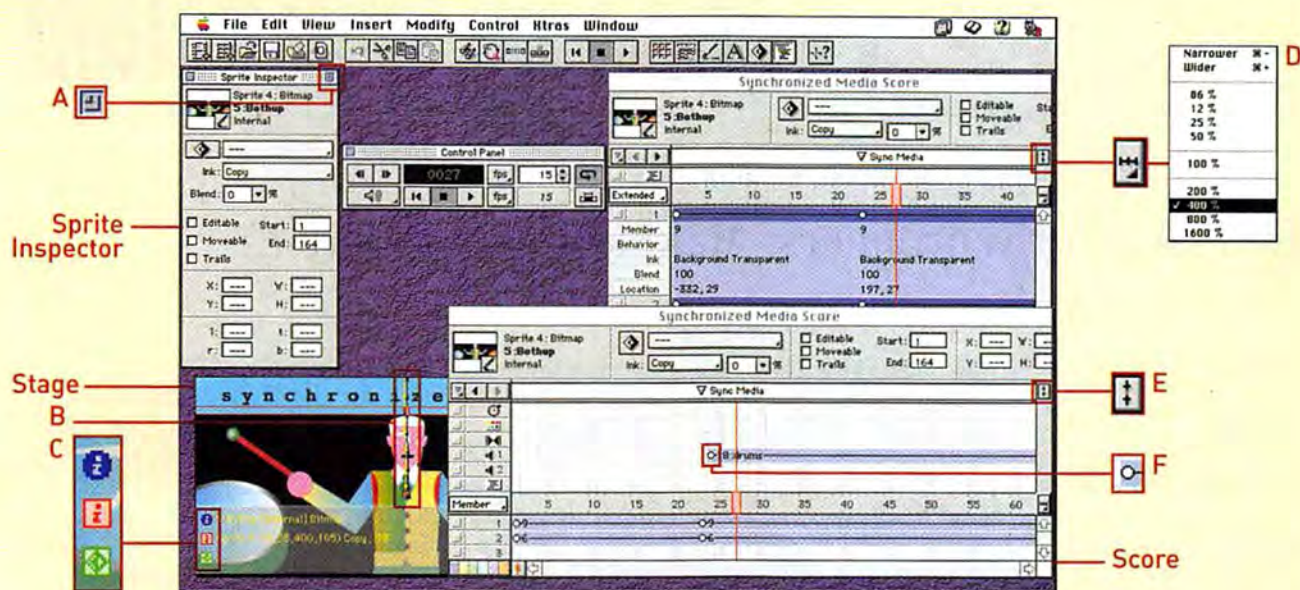
The Web Connection

For Web developers, Director 6's streaming is a significant enhancement. You can create Shockwave projects that download progressively: once a certain number of frames have downloaded, the project begins playing as the remainder trickles in from a Web server.

Start the Stream Streaming is normally turned off. To activate it, choose Playback from the Modify menu's Movie submenu and click on the Use Media As Available button. In the Pre-Fetch box, specify the number of frames to

Working Faster in Director 6

MANY OF DIRECTOR 6's productivity-boosting user-interface enhancements enable you to manipulate elements directly on the Stage and cut down on trips to the Score window.



Sprite Inspector New palette provides one-stop access for viewing and modifying sprite properties.

A. Clicking on the zoom box changes the size and orientation of the Inspector Palette.

Stage Shows editable animation paths and sprite information.

B. To display and work with animation keyframes directly on the Stage, choose Show Paths from the View menu's Sprite Overlay submenu. To move an existing keyframe, drag it. To turn an existing frame (denoted by the smaller dot) into a keyframe, press option and then drag it.

C. To display information about a sprite on the Stage, choose Show Info from the Sprite Overlay submenu. To open the Castmember Properties dialog box for a given sprite, click on the "i" icon to the

left of the information. Use the Sprite Overlay submenu's Settings command to fine-tune how and when sprite paths and information appear.

Score By choosing New Window from the Window menu, you can open multiple independently zoomable and scrollable views of the Score window. You can also drag and drop elements from one Score window to another.

D. To zoom in or out on a Score window, click on this button to get the Zoom pop-up menu.

E. To hide the effects channels, click on this button.

F. The new Score represents sprite keyframes with small circles. You can move one by dragging it, and duplicate one by option-dragging it. To edit a sprite's frames individually (as in Director 5), select the sprite and choose Edit Sprite Frames from the Edit menu.

be downloaded before playback begins.

Develop with Streaming in Mind Elements download in the order in which they appear in the Score. To make the most of streaming's benefits, structure a project so that the scenes a user is most likely to access first appear early in the Score. In a game, for instance, arrange the levels of difficulty in Score order. You might precede Level 1 with a help screen so it's available to beginners as soon as possible. For projects with less-predictable structures, the best way to determine the order for various scenes is to watch users work with the project while it's under construction.

Consider creating a short introductory scene with just a few cast members;

one might be a brief sound effect or music clip. This will come in quickly and keep viewers' eyes and ears occupied while more of the project downloads.

CD-ROM and Web Integration

Director 6 also makes it much easier to create CD-ROMs that retrieve content from the Web (for more on Web-CD integration, see *Media*, April 1996). The Import dialog box has a Network button that lets you import a Web element. To link to a Web-based file, choose the Link to External File option in the Import dialog box's pop-up menu, and then specify the URL. When the project runs, Director will import the linked object.

Lingo sports a variety of new Web-related elements. A [gotoNetPage](#) com-

mand opens a URL in a Web browser. You can assign a URLs to cast members using the new **URL of member** command. Any Lingo keyword that accepts a file name now accepts a URL.

Director 6's enhanced Web awareness helps break down the barriers between CD-ROM titles and Web-based content. Director 6's polished user interface lowers the barriers that drove Director beginners to distraction. There are easier authoring programs, but there isn't another program that provides Director's combination of performance, power, and forward-looking technology. **m**

JIM HEID's latest book is *HTML & Web Publishing Secrets* (IDG Books Worldwide, 1997).

Photoshop's Eyedroppers: Making Images Match

by Steve Roth

"Make that look like this!" That is a command I'm forever wanting to hurl at my computer. I've got one image—say, a fire engine—with the right color, and another that's close (a kid's wagon), and I want them to look the same.

I'm happy to say that Adobe Photoshop has the tools for the job, though they're hidden in a fiendishly clever way. The eyedropper tools in the Levels and Curves dialog boxes are just what you want. (Don't confuse these with the eyedropper tool in the tool palette, which selects the foreground and background color.) The Levels and Curves eyedroppers are designed to make one pixel the same color as another pixel, and to adjust the whole image containing the changed pixel to conform to that change.

When you use these tools to change a red pixel in an image to orange, you're adding yellow to the whole image, giving it a yellow cast. Let's say you have an image of snow that has a blue cast; if you change one snow pixel to pure white, you're removing blue, so the whole image moves toward yellow.

Here's the quick run-through. In either the Levels or Curves dialog box, double-click on one of the eyedroppers (there are three—highlight, midpoint, and shadow),

and choose a target color. You can do that in the color picker that appears, or you can click on a color in any open image. Now click in the image you want to change; the point where you click transforms to the target color. All the other

colors in the image warp, so to speak, to conform to that color change.

It takes a while to learn how to use the eyedroppers (three primary uses are outlined in the accompanying sidebars) and to learn when

they just *won't* work. However, they are among the most magical and flexible tools Photoshop has to offer. **m**

STEVE ROTH is president of Thunder Lizard Productions in Seattle (<http://www.thunderlizard.com>).

Setting the Shadow and Highlight Points

A BASIC OPERATION when correcting images for press is setting highlight and shadow points (the lightest and darkest parts of the image that still contain detail and variation) that aren't solid black or white. The black and white eyedropper tools are designed for just this function.

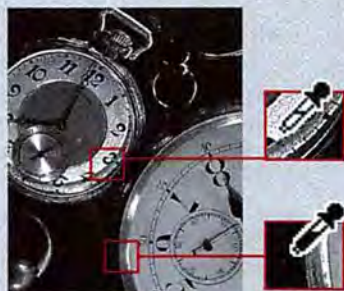
1. Set target values for your highlights and shadows; double-click on each eyedropper and specify the value. The highlight should be the lightest gray your press can reproduce without blowing out to white; the shadow should be the darkest gray your press can reproduce without clogging up to black. The table at right lists values for different paper stocks, both in percentage of black and on an RGB scale of 0 to 255. (For gray-scale images, I prefer to specify RGB—entering the same number for each color.)

Settings for Highlight and Shadow Points

Paper	Highlight (% black/RGB value)	Shadow (% black/RGB value)
Stock		
Newsprint	12/225	88/30
Uncoated	10/230	92/20
Coated	5/243	95/12

You should be able to ask your printer for values, but printers often don't know them and are likely to guess conservatively. Conservative numbers translate into flat (low-contrast) prints. You can often use a wider range of values than your printer gives you (set highlights a bit lighter, shadows a bit darker). The press people must take extra care to prevent clogged-up shadows and washed-out highlights. But your images will have more snap and contrast.

2. Click on the white eyedropper once. Now click on the lightest area in the image that should still have some gray in it. That area changes to the target value, and the rest of the image changes proportionally. Repeat this step with the black eyedropper, clicking on the darkest area that's not pure black.



Use the white and black eyedroppers to set the highlight and shadow points.



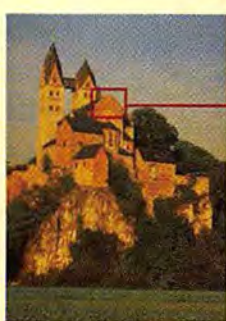
The corrected image has better shadow and highlight detail.

Matching Colors between Images

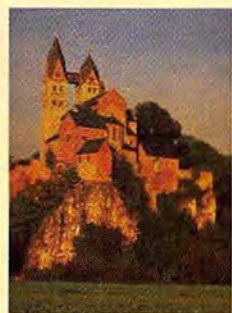
MATCHING COLORS ACROSS IMAGES is the iffiest technique for the eyedroppers in Levels and Curves because it often involves big changes to an image, and the eyedroppers are designed for smaller changes. However, it's also the most impressive maneuver, when it works. A classic example is a series of photographs shot in the late afternoon of a cloudy day, as the sun declines. Both the amount of light and the nature of the light change; so if you put two of the images side by side on a page, they look very different. You can sometimes solve this problem by choosing an important color in one image and adjusting a similar color in the other image to match.



This image is the source for the target color.



The original image clashes.



The changed image is more compatible.

From a design standpoint, for instance, it would be difficult to put the top image and bottom left image together on a spread. The light and color values are too dissimilar (cover the bottom right-hand image to see the clash more clearly). The eyedropper tools in Levels and Curves can make these more compatible with very little work (cover the bottom left-hand image to see how eyedropper changes make the images look better together).

Set the Target Color

The colors in the top image are strong; this is the image to match. To set the target color, first double-click on the gray eyedropper (this brings up the color-picker dialog box), then click on the area of the image you want to match. Click on OK to close the dialog box.

Apply the Target Color

The image on the left is the image that should change. To apply the new color, use the gray eyedropper to click on an area that you want to be similar to the target color; here it's the red brick. (These two colors are fairly similar already, which should give the best results.)

You Get a Revised Color Palette

After you click on an area, it changes to match the target color, and the rest of the image changes commensurately. The subtle changes to the bottom right-hand image's color palette (note the sky and bricks) make it more harmonious with the top image.

Adjusting Midtones to Remove a Color Cast

ONE OF THE TRICKIEST JOBS with color images is removing color casts created by a scanner. The gray eyedropper tool makes it easy. When you scan an image, scan a 50 percent gray swatch or a black-to-white gray wedge (shown here) in the same pass (both are available from graphic-arts supply stores). Bringing the midtone grays in the wedge back to neutral often resolves all the color-cast problems. With some scanners, though, the color casts are different in the shadows, midtones, and highlights. If your image has that problem, you need to neutralize all three areas individually, using the black, gray, and white eyedroppers.

The scan at left shows a distinct red cast that was not in the original. It's especially visible in the fog and in the gray wedge that was scanned with the image. The goal is to make it a neutral gray—composed of equal amounts of red, green, and blue.

With the target color for the gray eyedropper set to a medium, neutral gray (128R, 128G, 128B), click in the middle of the gray wedge. Neutralizing the gray removes the color cast from the whole image automatically.



This scan has a reddish cast.



After neutralizing the gray.

Graphics Workshop

Using KPT Bryce to Simulate the Great Wall of China

by Cathy Abes

ARTIST Jack Harris, a digital artist based in Delaware, divides his time between his design firm, Harris Design, and his

illustration studio, Visual Logic. You can view his work on his Web site, <http://www.harrisdesign.com/vlogic>.

HOW IT WAS DONE To create this road and wall reminiscent of the Great Wall of China, Harris needed to base the geometry on gray-scale imagery so he could vary the height of the wall and road to match the surrounding topography. He considered using Knoll Software's CyberMesh, a Photoshop plug-in that converts gray-scale images into 3-D height maps determined by lighter and darker grays. But CyberMesh creates large DXF files, which are relatively slow to render. So he turned to KPT Bryce, which is fine-tuned for landscape creation and yields smaller, faster-rendering files.

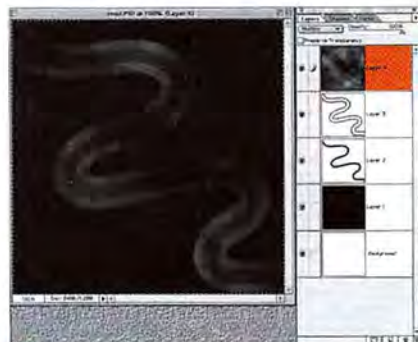
After drawing the road and walls in Illustrator, Harris softened the edges and added texture in Photoshop.

When he brought the road and walls into Bryce as one element, he discovered that Bryce's extreme sensitivity to light and dark grays resulted in too much variation in height—making the walls look mountainous. Bringing in the road and walls as separate elements provided much more subtlety and control, enabling him to vary their heights independently. The final step involved aligning the road and walls, which turned out to be even more challenging.

TOOLS **Hardware:** Power Computing PowerTower 180 with 196MB of RAM and a 2.1GB hard drive; 17-inch Apple Multiple Scan 17 Display; Wacom UD-1212 graphics tablet. **Software:** Adobe Illustrator 6.0; Adobe Photoshop 3.05; KPT Bryce 2.1. **m**



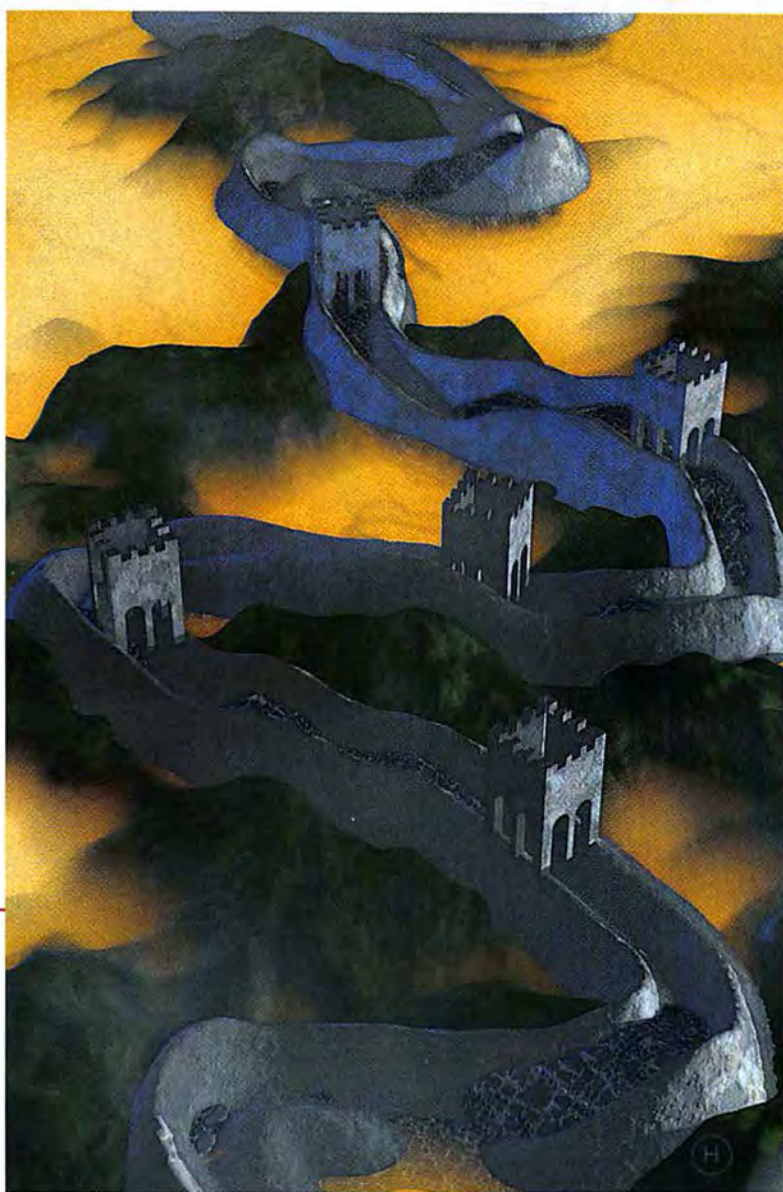
1 In Illustrator, Harris drew the road with a 12-point brush and outlined it with an 18-point stroke to create the walls. He made the road 75 percent black and the walls 50 percent black.



2 In Photoshop, he applied Gaussian Blur to the road layer using a 4-pixel radius. On a new layer, he used the Cloud filter, in Multiply mode, to create randomly contrasting areas that looked hand-painted.



3 Bringing the road and walls into Bryce as a single element didn't give Harris the control he needed. Not only was the road too high relative to the walls, but he wasn't able to change the height or texture of one without affecting the other.



7 In Overhead view, Harris began the alignment process by locking the background plane to prevent it from moving, and choosing Align All. He did the rest of the aligning manually.



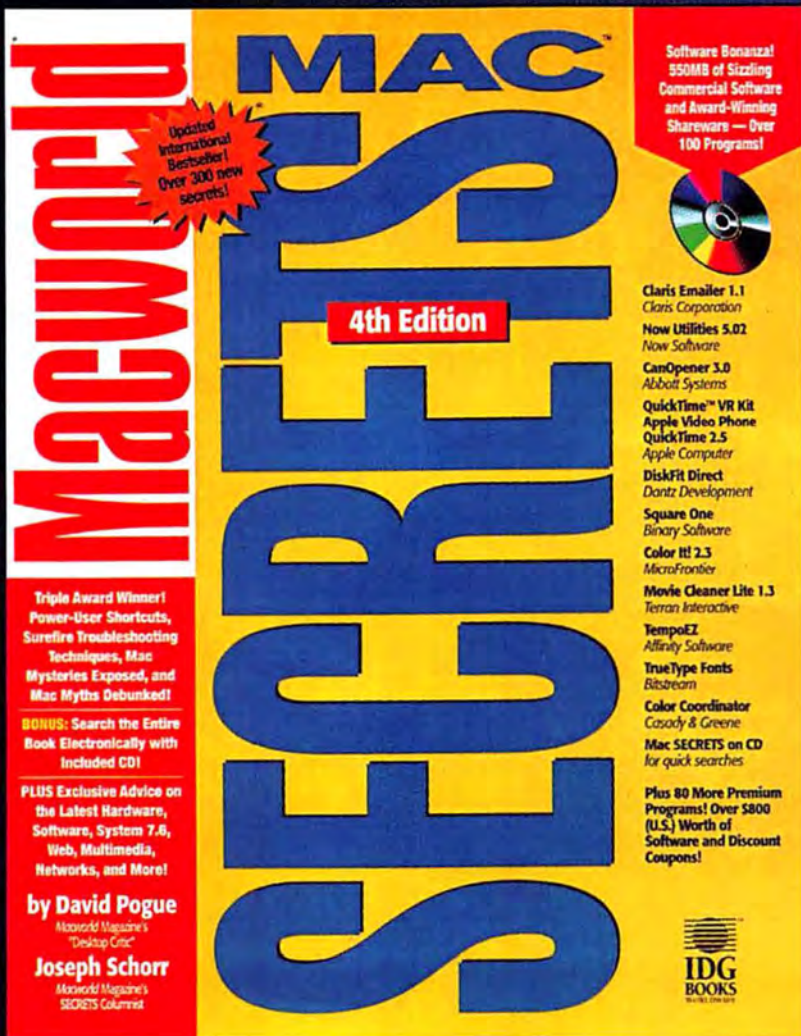
6 The last step, and one of the most challenging, was aligning the road and the walls in Bryce. This unaligned version shows obvious gaps between the road and the walls.



4 Instead, he hid the wall layer in Photoshop, merged the layers, and pasted the road into Bryce's Terrain Editor. There, he moved up the bottom of the Clipping Bracket until just the road was visible. Then he moved the top of the bracket down to flatten the road's peaks.



5 Back in Photoshop, Harris hid the road layer. Then he merged the layers and brought the walls into Bryce, following the same steps he'd used to import the road.



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1b. Which of the following do you plan to purchase in the next 12 months? (Check all that apply.)

	Purchase Involvement	Plan to Buy
Desktops/PowerBooks	<input type="radio"/>	<input type="radio"/>
Monitors	<input type="radio"/>	<input type="radio"/>
Printers	<input type="radio"/>	<input type="radio"/>
Storage Devices	<input type="radio"/>	<input type="radio"/>
Networking/Data Communications	<input type="radio"/>	<input type="radio"/>
Internet/Intranet products/services	<input type="radio"/>	<input type="radio"/>
Software: business/productivity	<input type="radio"/>	<input type="radio"/>
graphics/design	<input type="radio"/>	<input type="radio"/>
interactive publishing/multimedia	<input type="radio"/>	<input type="radio"/>
entertainment	<input type="radio"/>	<input type="radio"/>
education	<input type="radio"/>	<input type="radio"/>
other software	<input type="radio"/>	<input type="radio"/>
Any other products	<input type="radio"/>	<input type="radio"/>

2. Are you employed, and involved in purchase decisions for 5 or more Macs? ☐ Yes (1) ☐ No (2)

3. What's Your Opinion?

What are your main frustrations in making Mac-related purchase decisions?

- ☐ 1. Lack of expertise in assessing products
- ☐ 2. Difficulty in installing or using products
- ☐ 3. Too many choices
- ☐ 4. Not enough choices
- ☐ 5. Unclear needs
- ☐ 6. Concern that cheaper, better products are about to come out
- ☐ 7. Other (please specify) _____

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- 957 Utilities
- 958 Clip Art & Fonts
- 959 Memory
- 960 Draw/Paint/DTP Software
- 961 Image-Editing Software
- 962 Other Graphics Software

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6 7 8 9 10	151 152 153 154 155	296 297 298 299 300	466 467 468 469 470	536 537 538 539 540
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61 62 63 64 65	206 207 208 209 210	451 452 453 454 455	521 522 523 524 525	591 592 593 594 595
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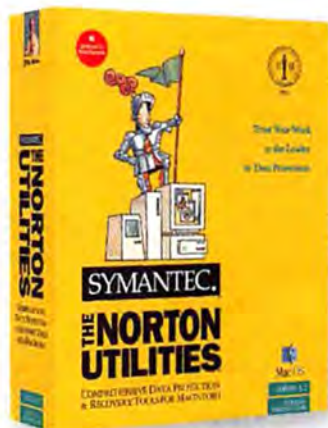
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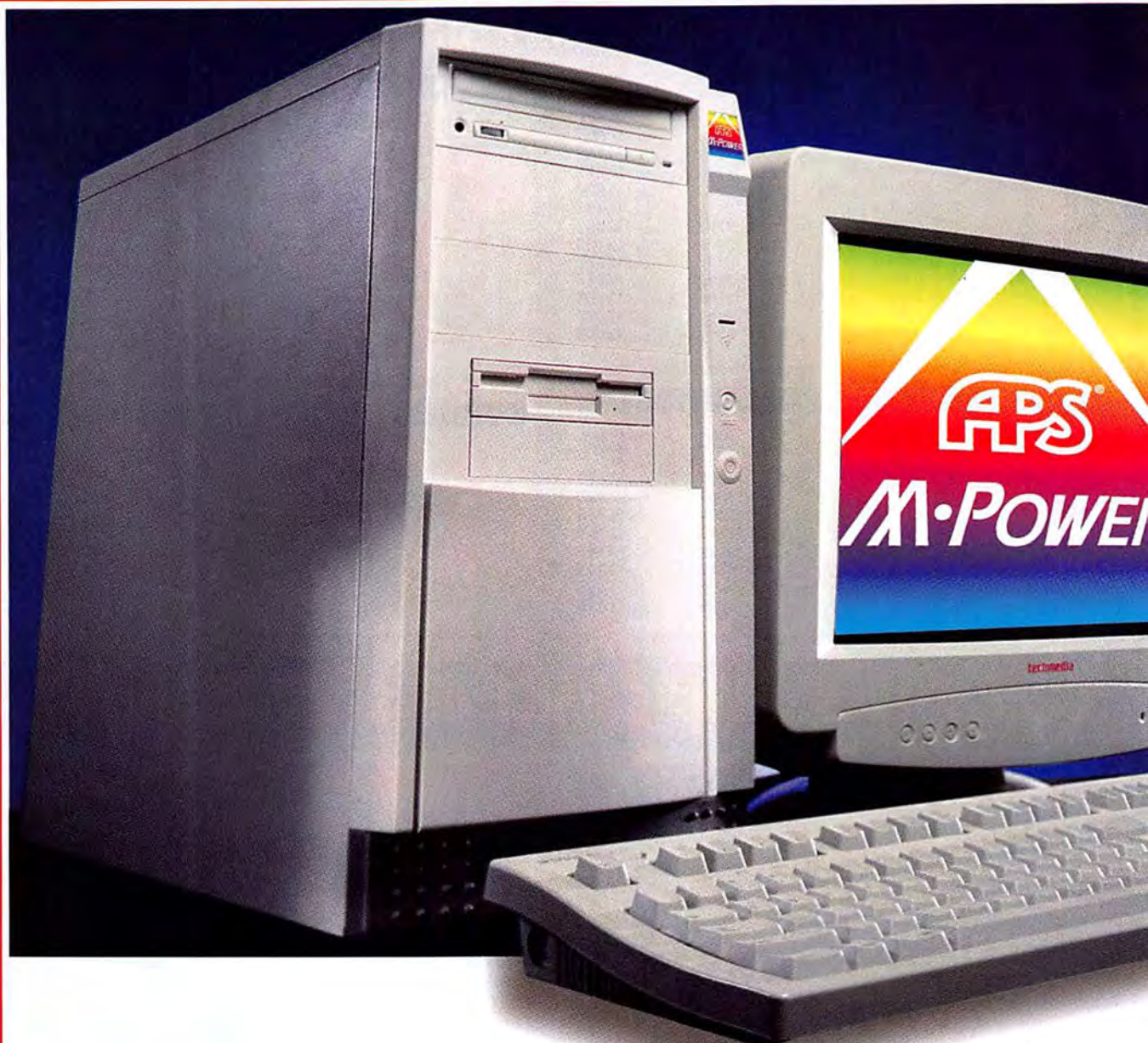
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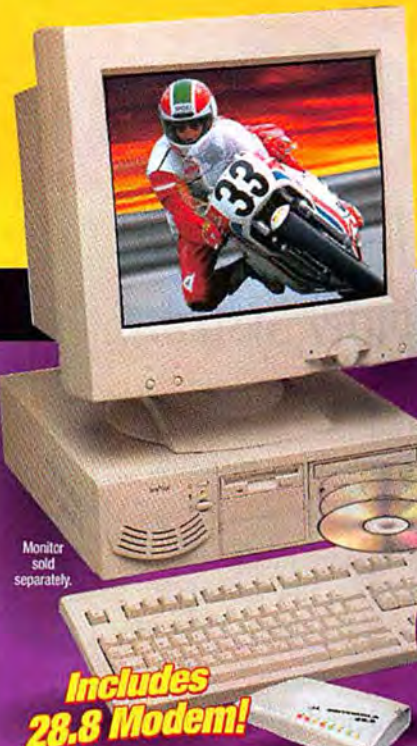
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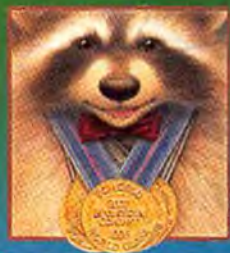
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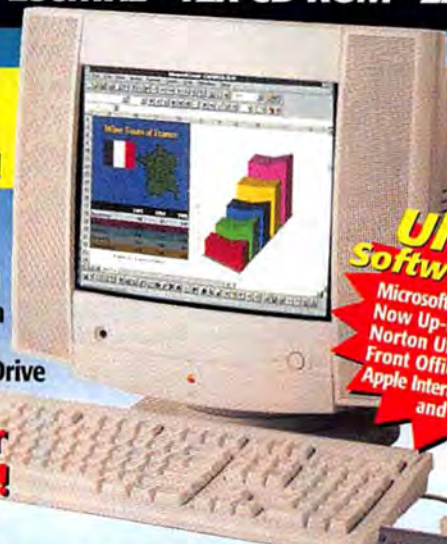
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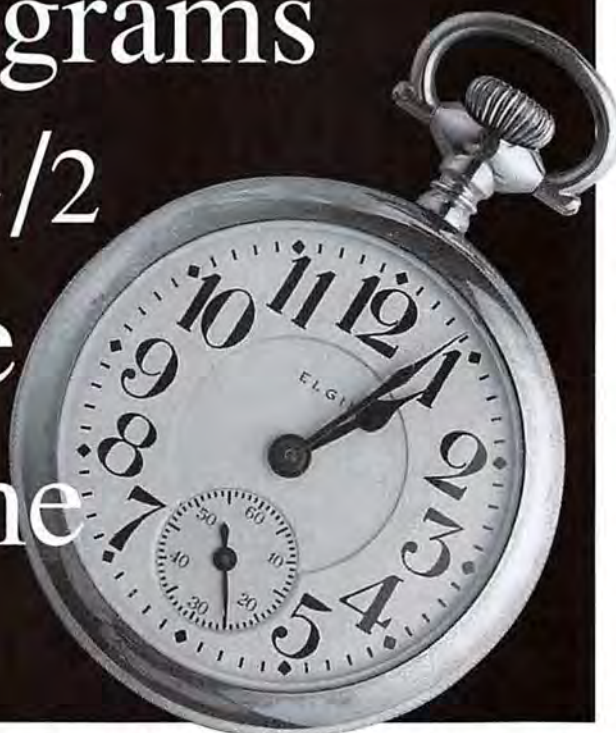
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2.0GB	Atlas 7200 RPM	8ms	11.0 MB/Sec.	F&W SCSI 2	555	630
4.5GB	Atlas 7200 RPM	7.5ms	-	Ultra SCSI 3	825	885
4.5GB	Atlas II 7200 RPM	7.5ms	12.5 MB/Sec.	F&W Ultra SCSI 3	875	935
9.1GB	Atlas II 7200 RPM	7.5ms	-	Ultra SCSI 3	1395	1465
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535MB	Quantum	8ms	(5400RPM, 512K Buffer)	Fast SCSI 2	N/A	229
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2.1GB	Fireball TM	10.5ms	-	Ultra SCSI 3	275	335
3.2GB	Fireball TM	10.5ms	-	Ultra SCSI 3	375	435

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4.3GB	UltraStar 2 ES 34300 (5400 RPM)	8.5ms	-	Ultra SCSI 3	595	655
4.3GB	UltraStar 2 ES 34300W	8.5ms	16.2 MB/Sec.	F&W Ultra SCSI 3	645	720
4.5GB	UltraStar 2 XP 34550 (7200 RPM)	8.5ms	-	Ultra SCSI 3	865	925
4.5GB	UltraStar 2 XP 34550W	8.5ms	16.2 MB/Sec.	F&W Ultra SCSI 3	895	970
9.1GB	UltraStar 2 XP 39100W	7.5ms	-	Ultra SCSI 3	1595	1665
9.1GB	UltraStar 2 XP Wide 39100W	7.5ms	15 MB/Sec.	F&W Ultra SCSI 3	1695	1770

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4.5GB	Microp. Tomahawk 4345W 7.9ms	7.9ms	-	F&W Ultra SCSI 3	870	945
4.5GB	Microp. Tomahawk 4345WAV 7.9ms 2MB CACHE -	7.9ms	-	F&W Ultra SCSI 3	940	1010
8.7GB	Microp. Tomahawk 3387W 7.9ms 16.4 MB/Sec.	7.9ms	-	F&W Ultra SCSI 3	1395	1455
9.1GB	Microp. Tomahawk 3387	7.9ms	-	Ultra SCSI 3	1325	1385
9.1GB	Microp. Tomahawk 3391AV 7.9ms 2MB CACHE -	7.9ms	-	Ultra SCSI 3	1425	1485
9.1GB	Microp. Tomahawk 3391W 7.9ms	7.9ms	-	F&W Ultra SCSI 3	1425	1499
9.1GB	Microp. Tomahawk 3391WAV 7.9ms 2MB CACHE -	7.9ms	-	F&W Ultra SCSI 3	1495	1570

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2.5GB	Barracuda ST32171W	8ms	17.6 MB/Sec.	F&W Ultra SCSI 3	670	745
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4.5GB	Barracuda LP ST34371W	7.5ms	17.6 MB/Sec.	F&W Ultra SCSI 3	945	1015
9.1GB	Barracuda 19171N	7.5ms	-	Ultra SCSI 3	1695	1755
9.1GB	Barracuda 19171W	7.5ms	18 MB/Sec.	F&W Ultra SCSI 3	1795	1870
4.5GB	Cheetah ST34501W	7.5ms	(10,000 RPM)	F&W Ultra SCSI 3	1365	1440
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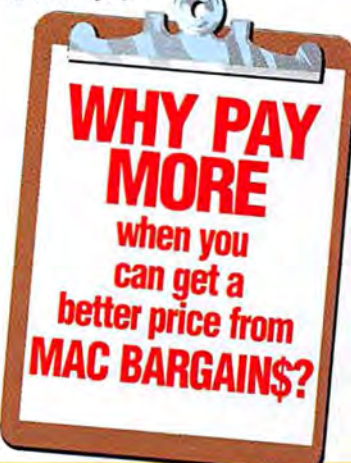
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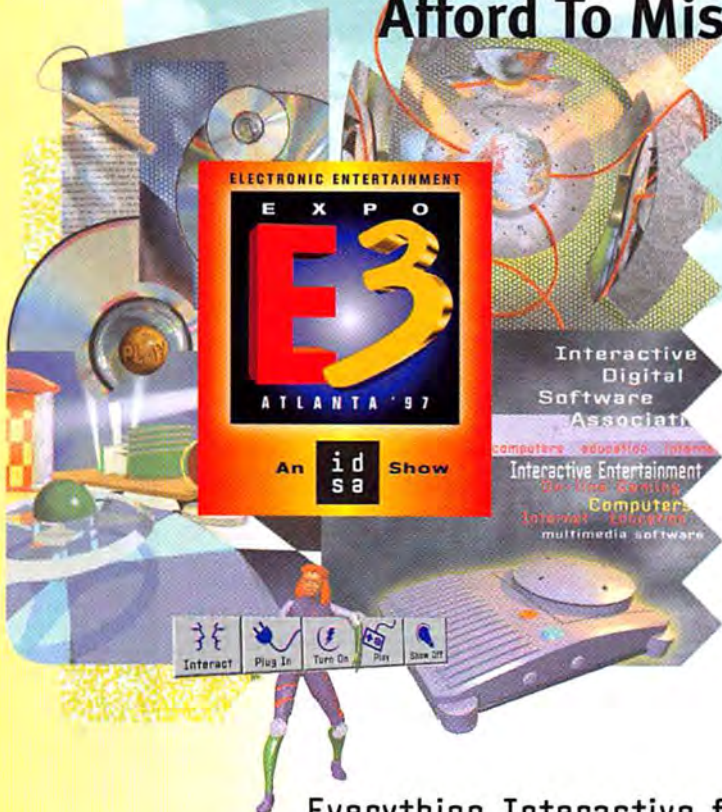


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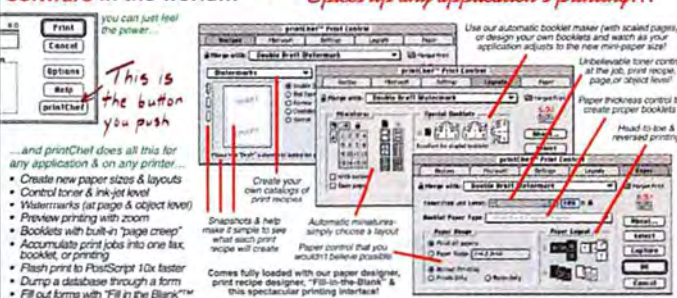
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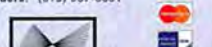
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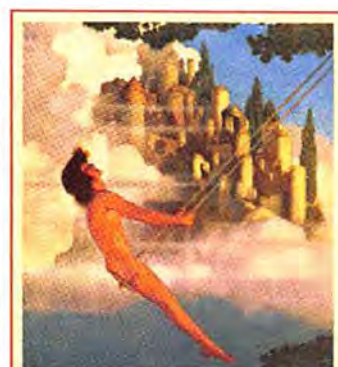
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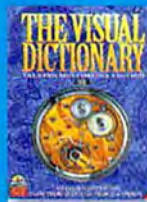
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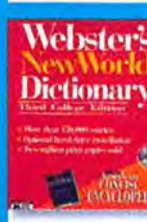
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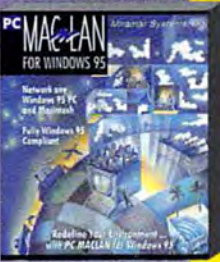
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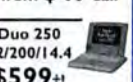
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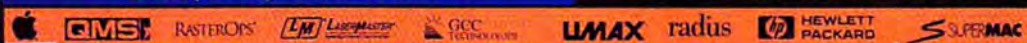
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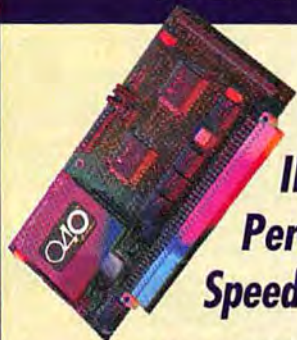
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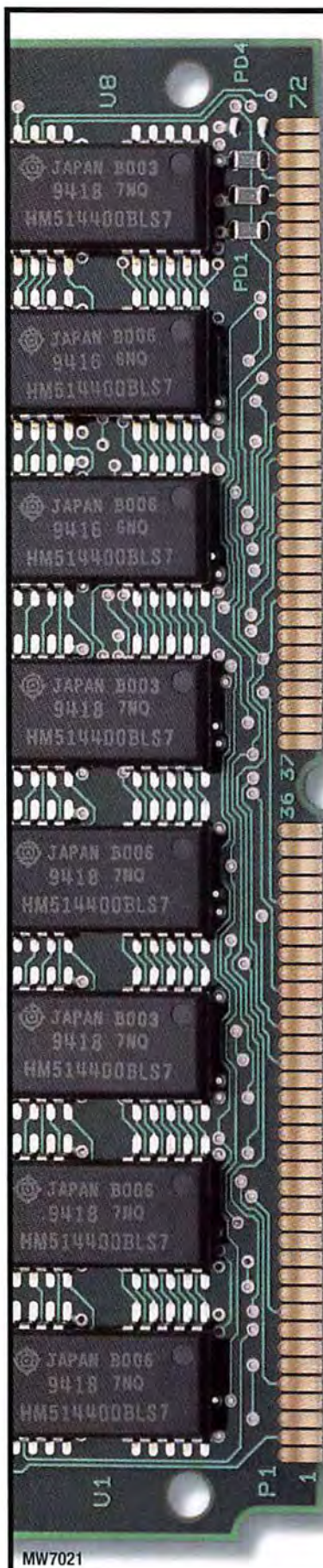
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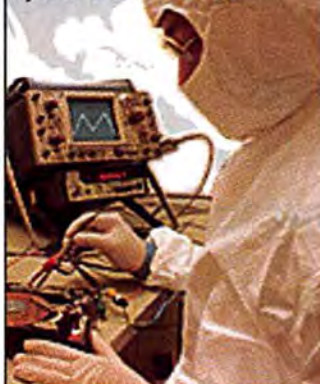
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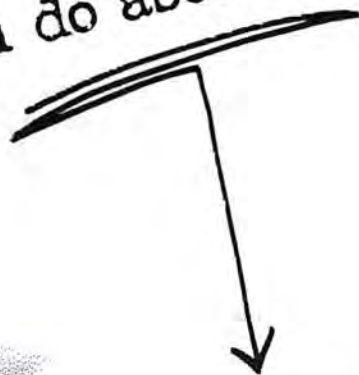
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Zenith, and others have either closed their PC divisions or are hemorrhaging money in the millions. And it's only going to get worse. IDC predicts that "the 1997 growth rate will be less than half that of both 1994 and 1995," and *BusinessWeek* says sales growth could stall completely as early as 1998. Fewer people are buying Windows software, too; the SPA's 1996 data shows an 18 percent drop in sales of Windows programs.

Without the steadily increasing torrent of cash, there can be no steadily increasing torrent of Windows.

Internet to Quash Windows Sales

What really keeps Bill Gates up nights, though, is the Internet. The bigger it gets, the more irrelevant Windows becomes.

NCs (network computers) are cheap machines whose software and data sit in a central location (the Internet or a company server), eliminating the hassles of upgrades, conflicts, and backups. IDC expects NCs to multiply at a rate of 86 percent per year through 2001.

And not one NC will ever need a copy of Windows.

The real ugliness will begin, though, when Intel itself turns its back on Microsoft. Because PC sales are dropping off, Intel will eventually be forced to support NC computing. "If Intel does not aggressively participate in the Internet appliance business," says IDC, "it will miss the greatest growth opportunities in the decade ahead. The leading PC suppliers will not wait for Intel for very long."

Trust me on this: you don't want to be in the same room with Bill Gates when Intel stops doing Windows.

Windows Too Expensive, Say Users

IDC predicts that in the coming years, "users will increase their focus on total cost of ownership [TCO]." In English: Money counts. Unfortunately, when you include the costs of training, upgrading, and troubleshooting, Windows 95 PCs are among the most expensive on earth. As Intel's own Web site puts it, "Gartner Group has estimated an annual TCO of \$13,187 per year [per Windows PC]."

As this horrific truth spreads, more companies will question why they're throwing away such outrageous sums. Especially when they're buying less and

less productivity: tests by *Byte* and *InfoWorld* show that the aging Pentium chip's speed and capabilities are falling further behind those of rival chips. It's only a matter of time before PC buyers replace their Wintel boxes with machines the Gartner Group says have far lower TCOs, such as NCs—or Macs.

Can Microsoft Be Saved?

The cold, hard numbers tell the story. Plummeting sales, flawed and expensive technology, a splintered and resentful customer base—the Windows ship is steaming toward an iceberg. Without Windows, Microsoft loses the inside advantage it has writing Windows *applications*. And when that happens, Microsoft's hyperinflated stock price will crash; the *Wall Street Journal* will begin running "Customers Dump Windows" articles; and the great tide of public opinion will turn to any company that's got superior technology to fill the void.

Aren't statistics great? **m**

Contributing editor DAVID POGUE cowrote the guide to the Net-bizarre and cyber-hilarious, *The Weird Wide Web* (IDG Books Worldwide, 1997).

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The Desktop Critic

by David Pogue

Why Windows Is Doomed

THE PRESS SAYS APPLE'S DEAD? TWO CAN PLAY THAT GAME.

IF THEY WEREN'T SO UNFAIR, the exaggerated headlines tolling Apple's troubles would be downright hilarious. Computer stores have a slow Christmas? "Apple Battered; Fans Lose Faith." Some VP departs over an ego tussle? "Apple Brain Drain Escalates." Apple creates an absolutely amazing laptop/desktop/palmtop computer? "New Apple Machine Is Too Little, Too Late."

Meanwhile, Windows 95 is a technological mess. Plug-and-play doesn't work right, multimedia requires hours of fiddling, maintenance is a horror. And no wonder—no single operating system could possibly work flawlessly on machines from dozens of unsupervised clone makers. "Windows must work with a plethora of hardware, each device made by a company fighting to differentiate itself," says *Fortune* columnist Stewart Alsop. "[That's] a less than artful way to make an operating system that works smoothly and intuitively."

Yet where are the *Windows* doomsayers?

Right here. In this purely intellectual exercise, I'll use exactly the same reporting standards we've seen applied to Apple. The statistics you're about to read are real (for sources, visit <http://www.macworld.com> and see the June issue). Only the conclusions are twisted.

Or are they?

Windows Market Splintered; Trouble Seen Ahead

Market share is everything. Big market share attracts software companies, and the platform prospers. The Software Publishers Association (SPA) puts Windows' share at 67 percent.

Ah, but "Windows" is several different products running different software on different computers. Windows 3.1, Windows 95, Windows NT, Windows CE—individually, each holds a market share not nearly as dazzling as the total.

According to research firm International Data Corporation (IDC), the fastest-growing operating system of all is the corporate-oriented, headline-grabbing success story known as Windows NT. This superstar's 1996 market share? Try 3 percent. "NT's shiny image is beginning to tarnish," says *Information Week*, "through problems with underlying technology, licensing squabbles, and mixed messages from Microsoft on which operating system to implement where."

Windows 3.1, on the other hand, has an enormous market share. But according to *PC Week*, Microsoft plans to dis-

continue Win 3.1 this summer. Which leaves Windows 95—whose installed market share, according to the SPA, is a mere 18 percent.

Suddenly Apple's 16 percent installed base doesn't look so bad.

Windows Upgrade Strategy Fails

Microsoft's business plan is simple: sell Windows installed on each PC, then sell an upgrade every other year.

Microsoft has sold only 46 million copies of Windows 95, a stunning 27 percent fewer than forecast. Meanwhile,

according to IDC, 13 million people—despite \$200 million worth of ads—ignored Windows 95 last year, deliberately buying Windows 3.1 instead. "Microsoft is always saying, 'You've got to upgrade,'" says IDC's OS analyst Dan Kusnetzky. "But today's businesses want a platform that runs reliably and isn't going to change." Microsoft's upgrade-forever strategy, in other words, "won't fly for a long period of time."

"Microsoft keeps making new operating systems to fix its old mistakes," agrees Alsop. "Few of the programs designed to work on previous versions of the operating system really work on the current version, forcing [upgrading] customers to replace their old software"—and hardware.

If Windows users don't buy into the upgrade-treadmill concept, Windows can't keep flying high. And with each new version of Windows, Microsoft splinters the PC market further. Suppose that, five years from now, there are six incompatible versions of Windows, each with a fraction of the market; software companies' decisions about which platform to write for won't be quite so automatic.

PC Boom Over; Windows Crashes

Microsoft got rich by selling Windows on each new PC. This strategy worked great during the PC boom of the early nineties.

But the ride is over. "The industry as a whole is headed for a second straight year of declining growth," says IDC; PC sales growth in 1996 was down a frightening 35 percent from 1995. PC manufacturers, the primary source of Windows sales, are dropping like flies: Acer, Blackship, Canon, DEC, Packard Bell, Tandy,

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