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SEPTEMBER 1997

Macworld

Amelio Ousted
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Mac OS 8

WORTH THE WAIT

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Power Computing Announces Free 128MB and 64MB RAM Upgrades

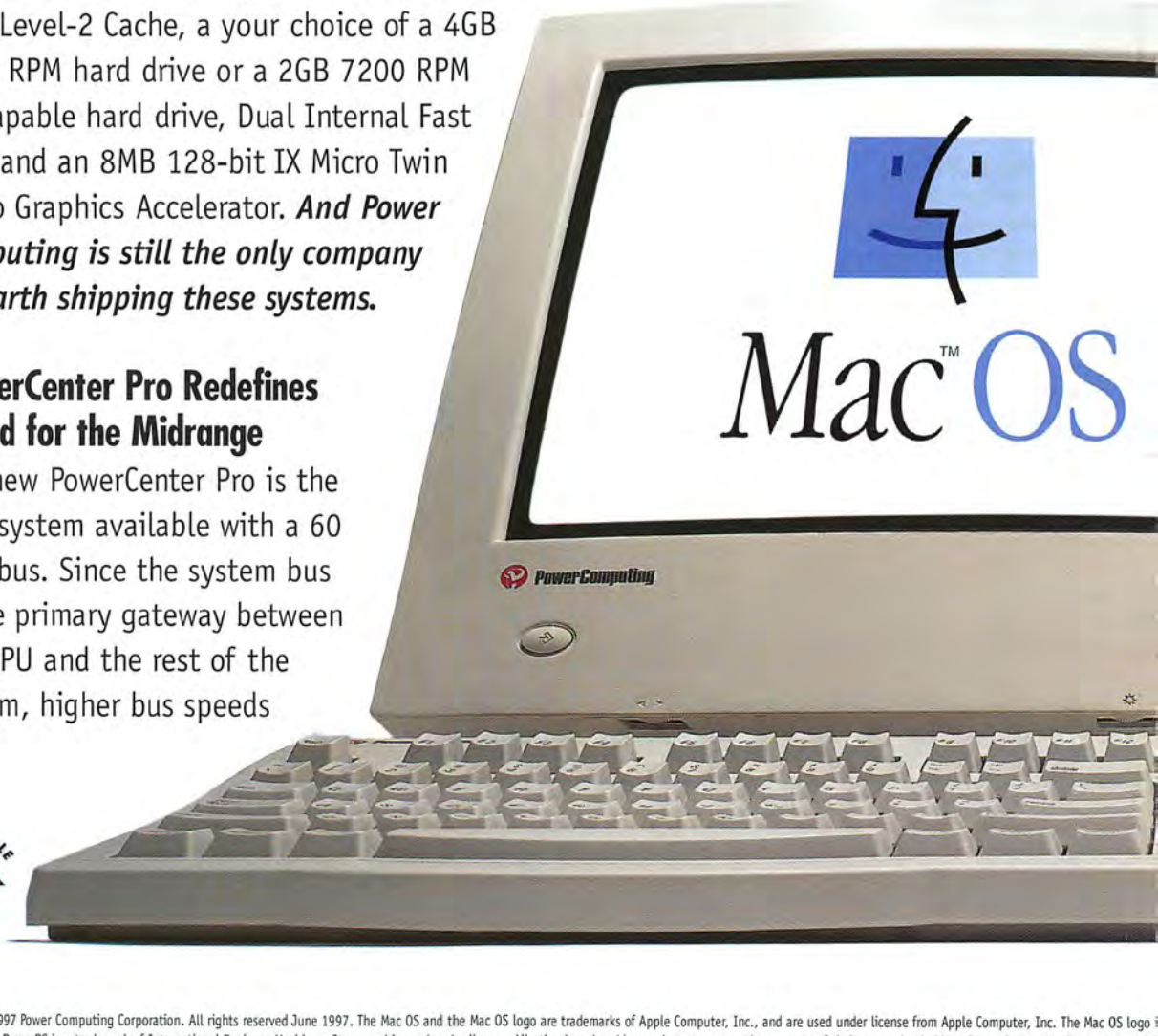
Our new systems have been getting a lot of positive attention. ***Great reviews. Awards. Big Ratings.*** These things go on year-round. But, this summer, we're giving you a special incentive to get your attention. Here it is: ***Buy a PowerTower™ Pro and we'll upgrade it to 128MB RAM, or buy a PowerCenter™ Pro 210 and we'll upgrade it to 64MB RAM, Free!***

PowerTower Pro Systems Get a $500 Price Break

We've taken $500 off the new PowerTower Pro 250 MHz — the fastest single processor system on any planet. And that includes the PC planet as well! The PowerTower Pro 250 runs a PowerPC™ 604e processor, with 1MB Level-2 Cache, a your choice of a 4GB 5400 RPM hard drive or a 2GB 7200 RPM AV-capable hard drive, Dual Internal Fast SCSI and an 8MB 128-bit IX Micro Twin Turbo Graphics Accelerator. ***And Power Computing is still the only company on earth shipping these systems.***

PowerCenter Pro Redefines Speed for the Midrange

The new PowerCenter Pro is the only system available with a 60 MHz bus. Since the system bus is the primary gateway between the CPU and the rest of the system, higher bus speeds



CPU UPGRADEABLE

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M UPGRADES, AND NEW LOW PRICES:
ER PRO AND POWERCENTER PRO 210!

mean greater bandwidth for data transfer. Greater bandwidth means proportionally higher total system speeds, and we all know what that means — ***more Power!*** Couple that with a 180 MHz or 210 MHz PowerPC 604e processor and you get the fastest mid-range system you can buy.

The Critics Rave: These New Systems Are an Unprecedented Value!

Our new systems are hot (and the competition is toast)! The PowerCenter Pro and PowerTower Pro are both winners of *MacWEEK*'s coveted 5-diamond award. The PowerCenter Pro won *Macworld* Editor's Choice for Best Business Office Mac and Desktop Publishing System. The PowerTower Pro is *Macworld*'s Editor's Choice for 3D Graphics, Image Editing and Publishing.

More RAM means over-the-top performance. And with free lifetime tech support, the 30-day money-back love-me-or-I'm-history guarantee, and loads of free software, these systems are an incredible deal.

There's No Deal Like This in Memory

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- Tower Enclosure

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Macromedia Director 5.0

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- 2MB 64-bit Graphics Accelerator Card
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Worth the Wait: Mac OS 8

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Art showcase CD-ROM

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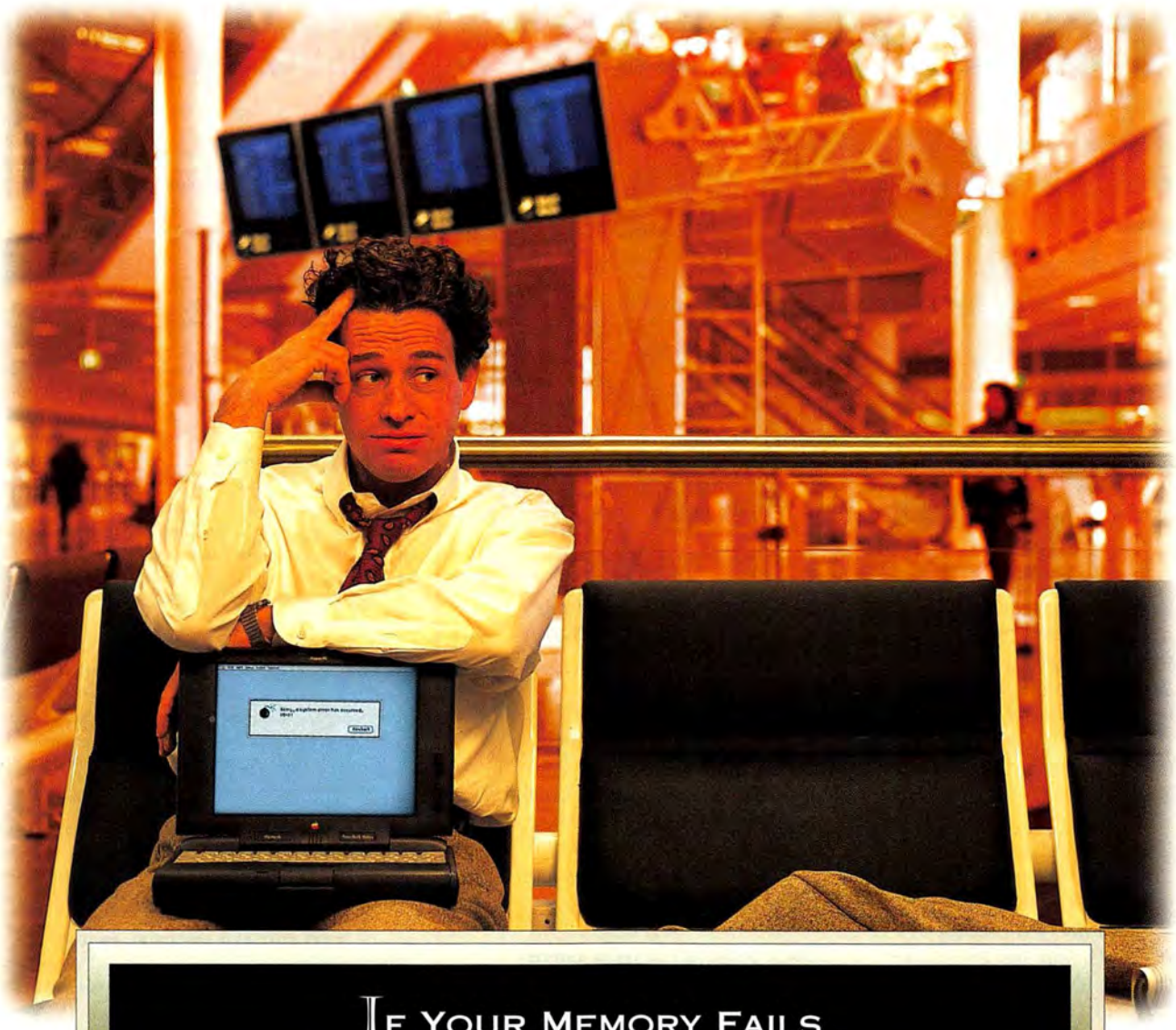

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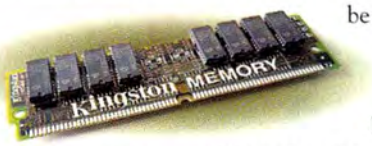

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ASSISTANT CONTENT ENGINEER — Jessica Graves

New OmniPage Pro 7.0 gives you the recognition you deserve.

OmniPage Limited Edition *or OmniPage Lite is the OCR that came with your scanner. They give you basic OCR.*

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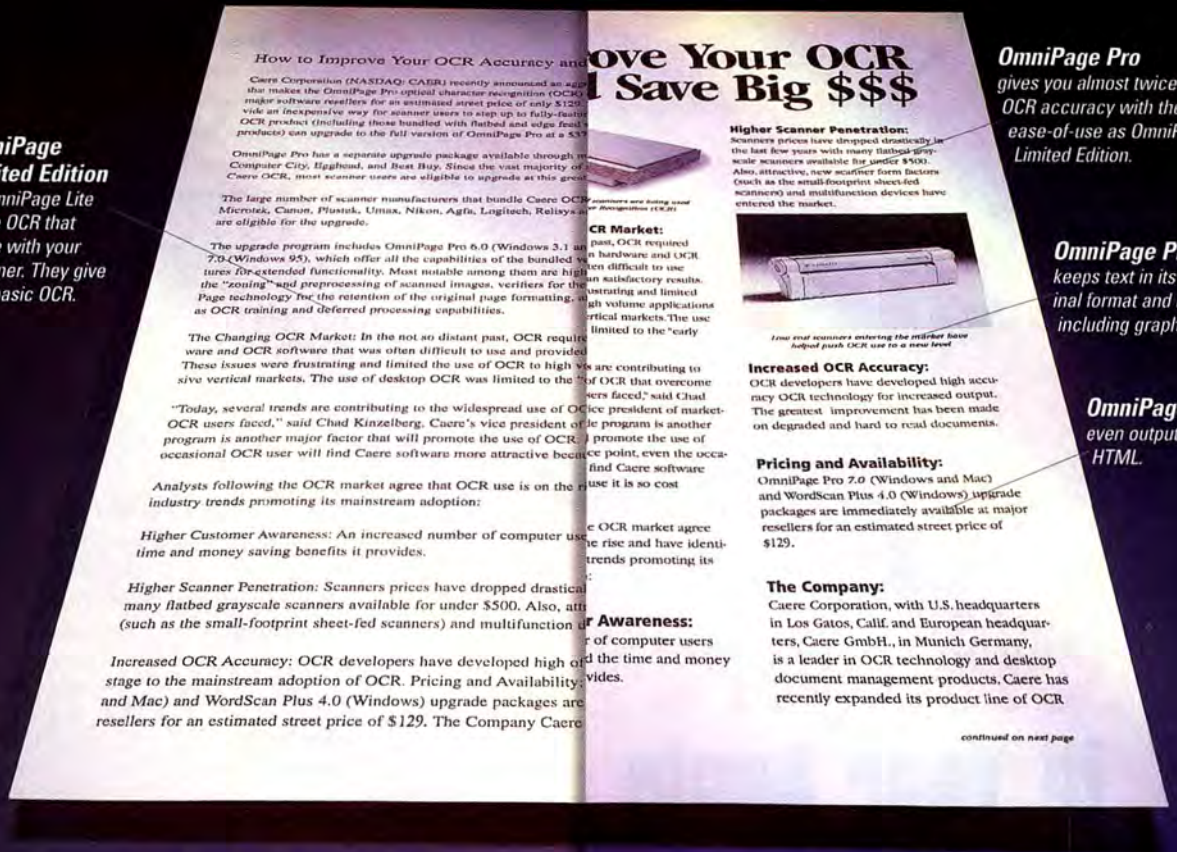

How to Improve Your OCR Accuracy and

Caere Corporation (NASDAQ: CAER) recently announced an aggr
the makes the OmniPage Pro optical character recognition (OCR)
major software resellers for an estimated street price of only $129.
vide an inexpensive way for scanner users to step up to fully-featu
OCR product (including those bundled with flatbed and edge feed
products) can upgrade to the full version of OmniPage Pro at a $3

OmniPage Pro has a separate upgrade package available through m
Computer City, Egghead, and Best Buy. Since the vast majority of
Caere OCR, most scanner users are eligible to upgrade at this great

The large number of scanner manufacturers that bundle Caere OCR
Microtek, Canon, Plustek, Umax, Nikon, Agfa, Logitech, Relisys a
are eligible for the upgrade.

The upgrade program includes OmniPage Pro 6.0 (Windows 3.1 an
7.0 (Windows 95), which offer all the capabilities of the bundled v
tures for extended functionality. Most notable among them are hig
the "zoning" and preprocessing of scanned images, verifiers for the
Page technology for the retention of the original page formatting, a
as OCR training and deferred processing capabilities.

The Changing OCR Market: In the not so distant past, OCR require
ware and OCR software that was often difficult to use and provided
These issues were frustrating and limited the use of OCR to high vo
sive vertical markets. The use of desktop OCR was limited to the

"Today, several trends are contributing to the widespread use of OC
OCR users faced," said Chad Kinzelberg, Caere's vice president of
program is another major factor that will promote the use of OCR.
occasional OCR user will find Caere software more attractive becau

Analysts following the OCR market agree that OCR use is on the ri
industry trends promoting its mainstream adoption:

Higher Customer Awareness: An increased number of computer use
time and money saving benefits it provides.

Higher Scanner Penetration: Scanners prices have dropped drastical
many flatbed grayscale scanners available for under $500. Also, att
(such as the small-footprint sheet-fed scanners) and multifunction d

Increased OCR Accuracy: OCR developers have developed high of
stage to the mainstream adoption of OCR. Pricing and Availability:
and Mac) and WordScan Plus 4.0 (Windows) upgrade packages are
resellers for an estimated street price of $129. The Company Caere

ove Your OCR
l Save Big $$$

Higher Scanner Penetration:
Scanners prices have dropped drastically in the last few years with many flatbed grayscale scanners available for under $500. Also, attractive, new scanner form factors (such as the small-footprint sheet-fed scanners) and multifunction devices have entered the market.

low-end scanners entering the market have helped push OCR use to a new level

CR Market:
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vides.

Increased OCR Accuracy:
OCR developers have developed high accuracy OCR technology for increased output. The greatest improvement has been made on degraded and hard to read documents.

Pricing and Availability:
OmniPage Pro 7.0 (Windows and Mac) and WordScan Plus 4.0 (Windows) upgrade packages are immediately available at major resellers for an estimated street price of $129.

The Company:
Caere Corporation, with U.S. headquarters in Los Gatos, Calif. and European headquarters, Caere GmbH., in Munich Germany, is a leader in OCR technology and desktop document management products. Caere has recently expanded its product line of OCR

continued on next page

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Key Feature Comparison	OmniPage Pro	OmniPage Limited Edition
Caere's fastest and most accurate OCR engine	✔	
AutoOCR Toolbar™ for easy, one-button OCR processing	✔	
Apple Guide gives you on-screen interactive help	✔	
Preserves graphics in output text	✔	
OCR from within your favorite applications	✔	✔
Retains original layout	✔	

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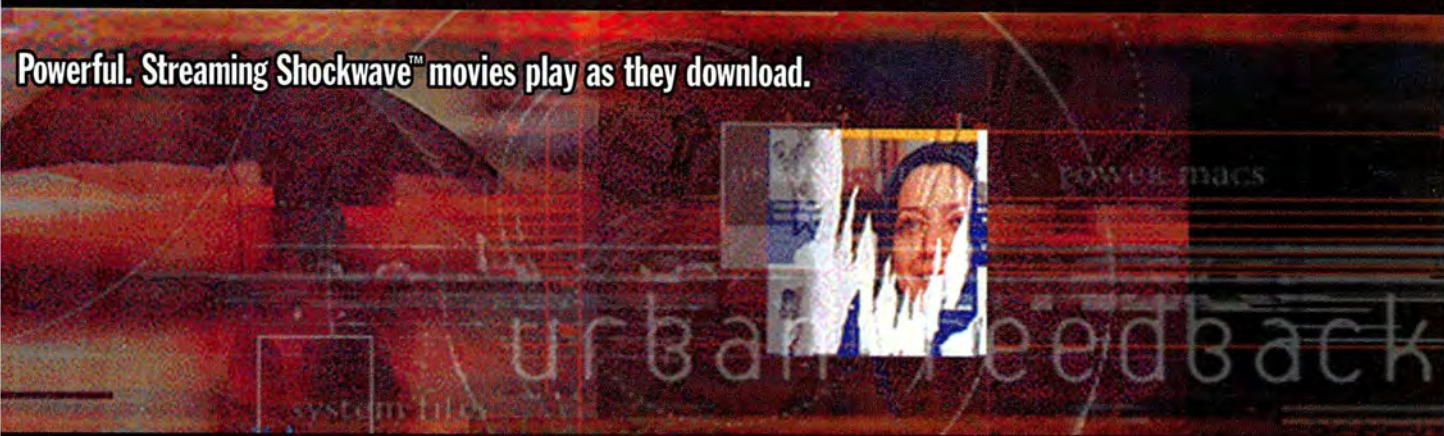

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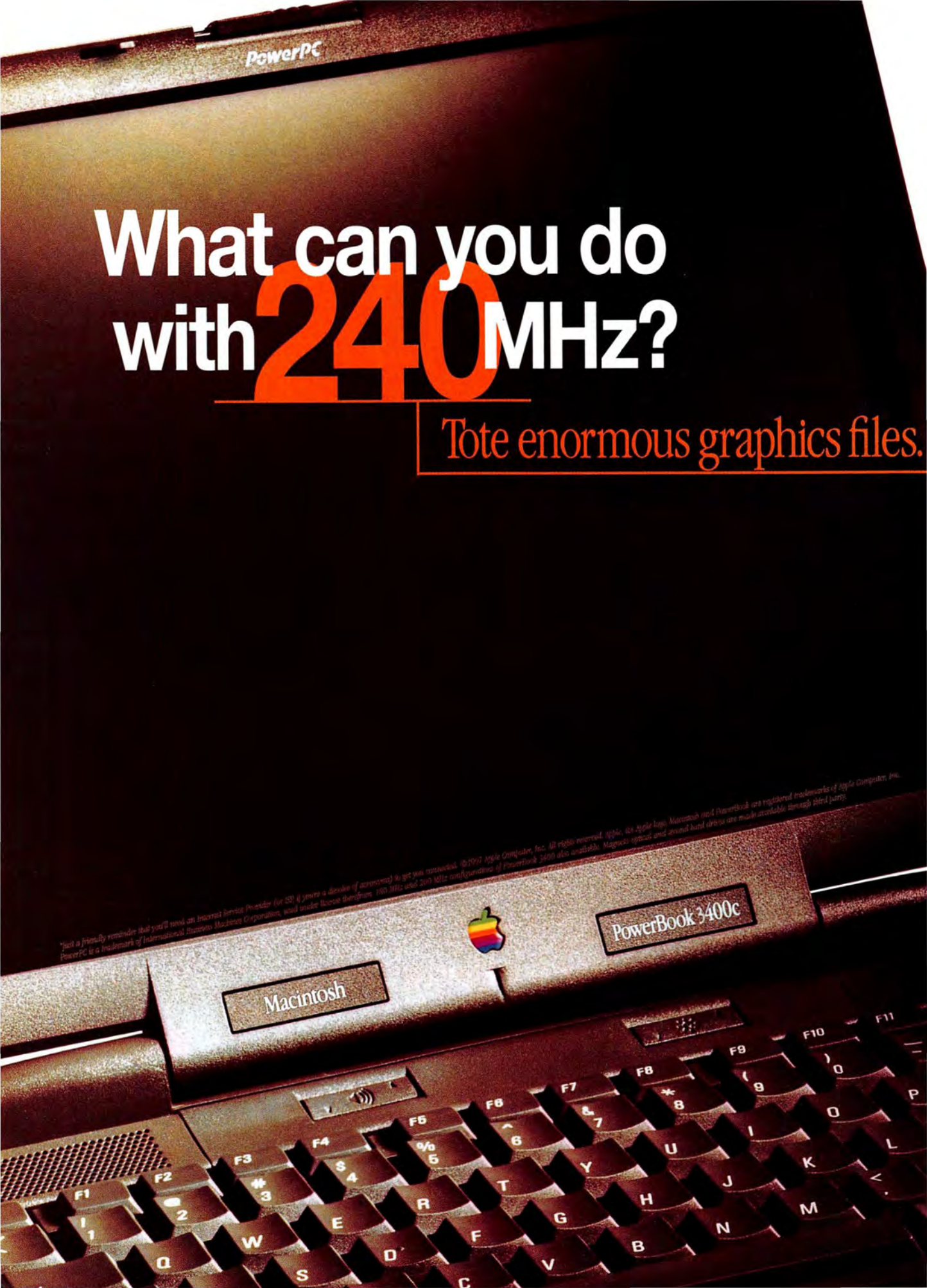
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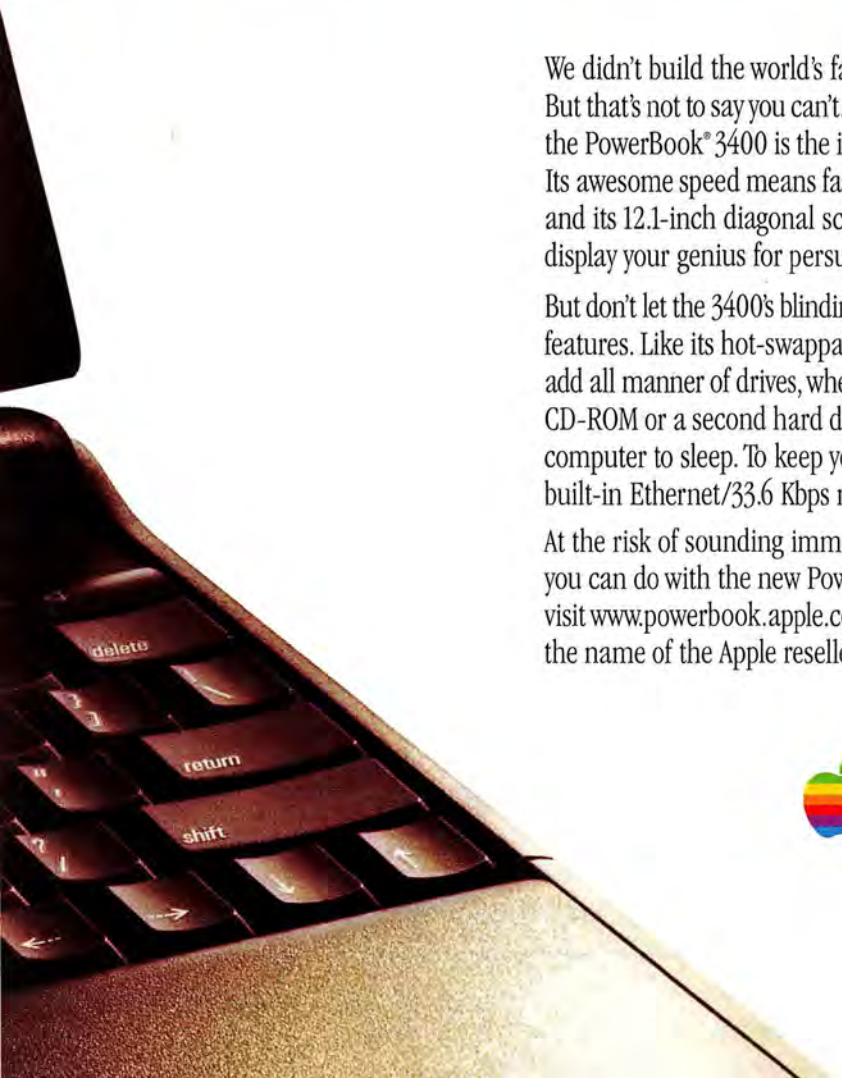

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SEPTEMBER 1997

Letters

If an Apple Tree Falls in the Forest . . .

REGARDING THE JUNE 1997 *STATE OF the Mac* column on Apple's future: If Apple were to make its hardware side even marginally profitable, there would be no reason to phase it out; why eliminate a good thing? Second, I believe that Apple defines the standard the clone makers must live up to; that is, Apple really is good at hardware.

I do agree that Apple has poor marketing; compared with the flood of bright advertisements for "Intel Inside," Apple's ads are weak, ineffective, and sparse. Rather than resort to eliminating the hardware side, Apple needs to focus on effective advertising and marketing.

For example, most Wintel supporters are convinced that the Pentium line is the ultimate processor, but I've seen articles in your publication and in others that show the Apple PowerPC to be faster than the Pentium or Pentium II. Apple is evidently reluctant to disseminate this fact. Since Apple's software is superb, its machines are good, and the two platforms' prices are now comparable, the only thing lacking is getting the word out. With better advertising, Apple could regain and hold a sizable market share, and could even push its way back to the forefront of the personal computer industry.

JOHN P. GOETZ
via Macworld Online

Apple: Doing the Right Thing

I THINK APPLE HAS BECOME TOO DIvergent and made the decision to license its operating system too late. But I also think that any organization that has been on a downward slide for too long requires drastic changes ("Amelio Carves a New Apple," *News*, June 1997). While I'm sure this is not a happy time for those who will no longer be working at Apple, one undeniable fact must be acknowledged: the management and staff at Apple simply weren't operating in a successful manner anymore. Business endeavors can be likened to war, and Apple hasn't been winning. When an organization is not winning, changing personnel is often integral to changing plans.

Apple has some unique strengths that have allowed it to achieve a significant level of success in the face of what are commonly acknowledged as industry standards. Reprioritizing its energies and efforts based on those strengths is Apple's best course of action. I'm reminded of a quote that seems appropriate here: "The definition of stupidity is doing the same thing you've always done and expecting different results."

Apple's playing it smart.

MATTHEW HARDY
Baltimore, Maryland

A History Lesson about Clones

THREE MONTHS AGO I SENT YOU the following message: "I am happy to see Power Computing doing well, but hype, speed, and a sharp price come with an additional tag. Very often that tag does not show up until history is recorded. Apple, apart from some PowerBook hiccups, can claim a very good track record of dependable machines. I'd rather have a machine with three stars that keep on shining than one with four that fade out after a moment's use. It is your responsibility to give sufficient attention to dependability and consumer satisfaction."

Today I read "Mac Clones: Probing the Risks" (June 1997). It was exactly what I was waiting for. Thank you! And I'm happy to report that I am positively impressed with the quality of the clones.

JAAP FEENSTRA
Rae-Edzo, Northwest Territories, Canada

The Computer for a Few of Us

IF THE KIND OF ASTUTE SUMMATION of Apple's pricing structure stated by David Jennings is widely expounded and accepted, there won't be any Apples for any of us (*Letters*, June 97). It is almost axiomatic that the more Apple does right, the louder the criticisms against the company. This continues to plague Apple no matter what it does.

Apple's 20th-anniversary Mac "special" is just that—a special for the people who are not in the "real world," which is where Mr. Jennings has inadvertently placed himself. Hasn't he seen the extraordinary bargains that Apple has recently announced? Even the high-end PowerBooks are cheap compared with other

continues

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CORRECTIONS

- *The PowerBook 2400c CPU is not soldered on the motherboard. It resides on a daughterboard, making upgrades practical ("New Apple Subnotebook Fills Gap," News, July 1997).*
- *Adobe will not bundle its tracing program, Streamline, with Illustrator 7 ("Illustrator's New Face," June 1997).*

machines out there. Give credit where it's due and stop crying "The sky is falling."

Apple should be congratulated for its recent executive decisions, and now it's time to get behind the company. History shows that misplaced and wrongly directed criticisms can lead to disastrous results, and leave us all worse off. Spare us from having to live in a Windows-only world.

ROBIN J. WILLCOURT
Reno, Nevada

Apple is now taking orders for the Twentieth-Anniversary Macintosh, priced at $7500. While still not a bargain, that's better than the $9000 price tag originally expected. Plus, ordering one of these machines is the only way you can get toll-free tech support from Apple—three years' worth is included with the package.—Ed.

The Latest, but Not the Greatest

ALTHOUGH YOUR "THE BEST PERsonal Printers" article is thorough and editorially well considered, a couple of the conclusions do not appear to correlate (June 1997). You "can't recommend the LaserJet 6MP," yet you would "recommend a third printer instead: HP's LaserJet 5MP, a solid, four-star printer." Unless there are differences other than print processing speed (the 6MP's 8 pages per minute and Printer Command Language 6 versus the 5MP's 6 ppm and PCL5) that have come to light since the 6MP has developed a history in the marketplace, I don't understand the relative ranking. Is PCL6 not the enhancement of PCL5 one would expect? Is the industrial-design spec for the 6MP a cheapened version of the 5MP? What exactly are the merits of the 5MP not found in the 6MP?

J. H. KEEN
Toronto, Ontario, Canada

The HP LaserJet 6MP is a solid, three-star product—don't get me wrong. It's just that despite the speed bump and PCL6, the LaserJet 6MP isn't the standout among the competition that the LaserJet 5MP was in our September 1996 "Personal Laser Printers" article. If you can still find a 5MP for sale—new or used in good condition—it could be a very attractive printer indeed. If I were in the market for an inexpensive personal laser and didn't need PCL6, I'd definitely go for a 5MP.—Ed.

No RSI? Be Thankful

YOUR READER KEN BECK WROTE about the possible hype potential of the repetitive strain injury (RSI) and carpal-tunnel disorder cases in this country and how it would be easy to assume it was created for profit (*Letters*, June 1997). I thought the same idea five years ago, until I was diagnosed with RSI in late 1993. I still have not recovered from its crippling effects. I was a Mac expert for a large telecom company here in Southern California and lost my career. I cannot type for more than 30 minutes a day.

I did not think it would happen to me because RSIs only happened to those on the front line: the copywriters, secretaries, and customer-service representatives who were out to collect workers' compensation or get a couple of days off. Now I realize that there are more frontline workers injured with RSI than even the statistics show, because many fear losing their jobs if they report the problem. My heart goes out to them. Since I reported my injuries my life changed 180 degrees.

Mr. Beck is one of the lucky ones.

JAMES BRUCE
Laguna Beach, California

Luckily, it is possible to use your Mac without typing a single word. Check out The Desktop Critic *in the August 1995 issue of* Macworld. *Most of the products mentioned in the article have been updated, but the information is still valid.—Ed.*

Up to Speed with Macworld Lab

WHEN WILL YOUR POWER MAC SYStem-performance comparisons use a Power Mac such as the 7500/100 as the comparison system rather than the Centris 650?

CHRIS SANTANA
Andover, Massachusetts

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Good timing. We've just introduced our new benchmark methodology, called SpeedMark, which uses the Power Mac 7100/80 instead of the Centris. See Mac Superguide, *in this issue.—Ed.*

Closing the Door on OpenDoc

ONE OF THE THINGS THAT MAKE Apple unique is its capacity to think, create, and develop innovative technologies. That's the reason Apple should not kill OpenDoc ("Apple Moves Components to Java," *News*, June 1997).

OpenDoc is a wonderful technology, an innovative and efficient approach to personal computing. The chance of working on documents and objects independent of applications, and the interoperability between the documents and the services supplied by the system, make it an advanced technology and, above all, a true Macintosh technology. It's a perfect system for manipulating ideas and information. OpenDoc should live!

DAVIDE VIGNATI
via Macworld Online, Italy

OpenDoc is a closed issue. Apple has no plans to revive it at this time. But don't despair. While it's true that OpenDoc's hard-core document-centric interface metaphor will not survive, a good bit of OpenDoc's spirit will live on in Rhapsody, Apple's next-generation OS. The Yellow Box, the part of Rhapsody that's based on Next's OpenStep APIs, will also support some embedding of applications, although the details aren't clear.

The Yellow Box is also completely object-oriented, making it easy for developers to create applications by assembling code objects. Also, many services (such as Internet access) will be available globally as part of the system software, and the Yellow Box's extensibility will make it easier to add more global services.—Ed.

Reading Microsoft's Tea Leaves

BRAVO TO DAVID POGUE FOR HIS column "Why Windows Is Doomed" (*The Desktop Critic*, June 1997). For too long the news media, in all their forms, have misrepresented Apple Computer to the general population. Story after story has described Apple's slow demise, and yet here it is, not the powerhouse we all would hope for, but alive and kicking. The simple fact is that the media can do far more damage to Apple through misrepresentation than Apple can do to itself.

Without exception, Windows has enjoyed high praise from the news media. No matter how bad a Microsoft program may be, or even if it fails altogether, it will receive glorious reviews. It is just another example of how biased media can change public perception.

The great irony is that many newspaper and magazine companies in fact use Macs to do layout. Where would these companies be if it weren't for the Mac to help them?

Perhaps in the future the Mac will receive some actual praise from the news media. However, until then, loyal Macintosh users must simply hunker down under the storm of bad publicity.

MARK LUKES
Ogden, Utah

IT'S ABOUT TIME SOMEONE TURNED the tables on the Windows-centric critics who proclaim the Mac to be dead. I thought I was the only one who realized that Microsoft will continue to splinter its market share with each new OS release.

I predict this scenario: The Memphis release of Windows will slip to next summer. Apple's newly focused marketing finally will get customers' attention. Apple will come to a fair agreement with the clone makers. The first CHRP boxes will start rolling out of the factories, and the number of boxes using the Mac OS will increase dramatically.

STEVE CORSELLO
Essex, Connecticut

I hope you're right, Steve—but even then, you know what the popular business press will say, don't you? "Microsoft Aims for Perfection, Delays Windows" . . . "New Apple Marketing Suckers Helpless Users" . . . and "Mac OS Sales Rise Dramatically, Delaying Apple's Inevitable Demise"!—David Pogue m

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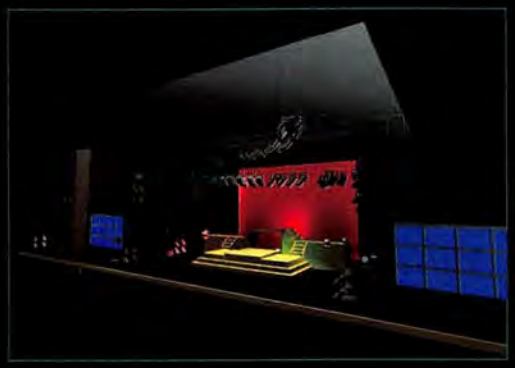

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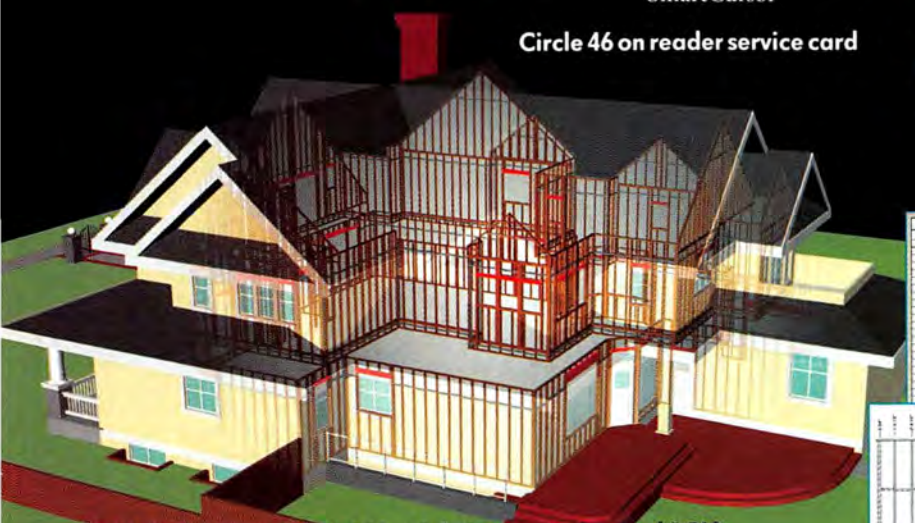

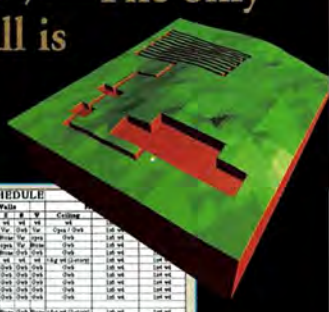

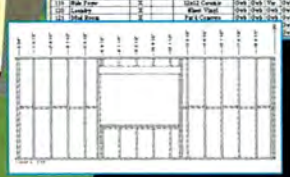

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Amelio Ousted

Uncertainty on Management, Profitability

by Galen Gruman and Tova Fliegel

Apple Computer took yet another abrupt turn in its quest for financial stability as Gil Amelio was ousted July 9 from his post as chairman and CEO, after nearly a year and a half of trying to revitalize the troubled Macintosh maker.

The resignation came as Apple's board decided Amelio's performance was inadequate, and a week before Apple planned to announce its third fiscal quarter's financial results. Those results were expected to be worse than originally planned because of supply problems that prevented Apple from shipping many of its new Power Macintoshes.

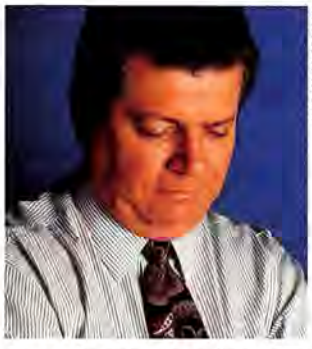
Until a new CEO is named, Fred Anderson, executive vice president and chief financial officer, assumes additional responsibilities for day-to-day operations.

Ellen Hancock, Apple's executive vice president of technology, also resigned. In January, she had said she would remain at Apple as long as Amelio did. Her responsibilities go to Avie Tevanian, senior vice president of software engineering, and Jon Rubinstein, senior vice president of hardware engineering.

Steve Jobs also assumes an expanded role as adviser to the board on product strategy, marketing and sales, and business partnerships. However, he will have no role in Apple's negotiations with Mac OS licensees, who have accused Apple of using the release of Mac OS 8 to force a new and more costly licensing deal (see "Possible Hope in Licensing Fracas," *News*, in this issue).

Forced Exit Although Apple's public announcement billed the departure as a joint decision, Anderson said in a press conference that the "board of Apple is not happy with Apple's financial performance." He credited Amelio for reducing Apple's breakeven point and improving product quality, but said, "The fact is that we're not yet on a growth path and we haven't returned the company to sustainable profitability. Apple's board wants to get Apple back on a sustainable growth path."

Anderson said Apple is honoring Amelio's employment contract, which likely includes a hefty severance package. According to a Securities and Exchange Commission document detailing terms of his contract, Amelio will be paid $8 million to $12 million if he is fired "without cause" or resigns "for good reason."



MARCIA LIEBERMAN

Gil Amelio resigned as Apple CEO after the board of directors expressed dissatisfaction with the company's financial performance.

Within Apple, employees complained increasingly in recent months that Amelio was out of touch and uninvolved. Many said they were unsurprised at his departure, which had been rumored for several days before the July 9 announcement.

However, the lack of connection appeared to go both ways. For much of his tenure, many of Amelio's attempts to change Apple's contentious culture seemed to go unheeded by midlevel managers, resulting in a schism over how Apple could end years of failed product initiatives, poor forecasting, and insular thinking.

Pieter Hartsook, a longtime industry analyst, said it was unlikely that Amelio stepped down voluntarily.

"A good time for Gil [to leave] would have been at the release of Rhapsody Premiere," the first version of the new Mac OS, due in early 1998, Hartsook said. "Then he could say that he'd accomplished what he set out to do and that Apple was in pretty good shape. But the fact that he's exiting now means that he's failed in completing the restructuring. . . . That's why I don't think this is mutual."

Hartsook also noted that now may not be the best time for Apple to lose its CEO, since a new CEO will likely want to initiate yet another restructuring. "The last thing Apple needs is a disruption that takes Apple's focus off getting products out the door," he said. "Think about Amelio's first hundred days: basically nothing got done."

Profits on Hold But Hartsook pointed out that Wall Street analysts, the board of directors, and Apple employees have expressed a lack of confidence in Amelio in recent months as reflected by the plunge in Apple's stock price, which hit an 11-year low in early July.

continues

Apple had been predicting a financial turnaround by the end of its fiscal year, which closes September 30. But at the July 9 press conference, Anderson said, "We are out of the business of predicting when the company will return to profitability."

Losses Expected During the week of July 7, First Call, which collects composite estimates from industry analysts, reported that it expected Apple to show a $70 million loss in its third-quarter results, which were to be announced on July 16. Some analysts predicted losses as high as $400 million, and *Macworld* estimated a loss of about $150 million to $200 million. This follows a $708 million second-quarter loss. (See Macworld Daily at *www.macworld.com/daily/* for updated coverage of Apple's financial results and management changes.)

Anderson refused to speculate on potential replacements for Amelio and would not say whether Jobs had been offered the position.

Anderson and Jobs are part of a search team charged with finding a new CEO for Apple. Also involved in the search are Apple board members A. C. Markkula, Jr., and Edgar S. Woolard, Jr. Markkula is an Apple founder who has been instrumental in picking every Apple CEO. Woolard is chairman of the board of the chemical company E. I. du Pont de Nemours.

Rescue Plan? Anderson said that there were no plans to put Apple up for sale. But *Macworld* has learned that at least one major computer manufacturer is considering a contingency plan to partner with one or more other companies to purchase a majority of Apple's stock. They would then fire the current board of directors, which has been criticized as being out of touch and lacking experience in the personal computer business, and hire a new board and CEO.

Under this scenario, the Mac OS group would probably become an independent subsidiary on the model of Apple's Claris subsidiary. Apple would focus on delivering a strong Mac OS and stop trying to limit the efforts of Mac OS licensees to innovate and expand the market. Apple's computer business would be secondary, competing on an equal footing with other Mac makers.

By having an experienced PC executive at the helm, Apple Computer, in this scenario, would be more competitive in its product offerings and more responsive to market and customer demands. And even if Apple failed as a hardware company, the Mac OS would continue, supported by licensing fees from a broad set of Macintosh manufacturers who would capture Apple's existing customers and possibly expand into new markets.

Sales Changes Amelio's resignation came at a time when Apple seemed poised for major changes in its business. In addition to a possible truce with Mac OS licensees and this summer's final shipment of the Mac OS for the Common Hardware Reference Platform, industry sources say that Apple will soon begin selling systems directly in areas where it previously relied on resellers.

For example, Education Access, once Apple's largest reseller of Macs to schools, switched to selling Power Computing and IBM computers after learning that Apple intended to offer systems to schools directly. m

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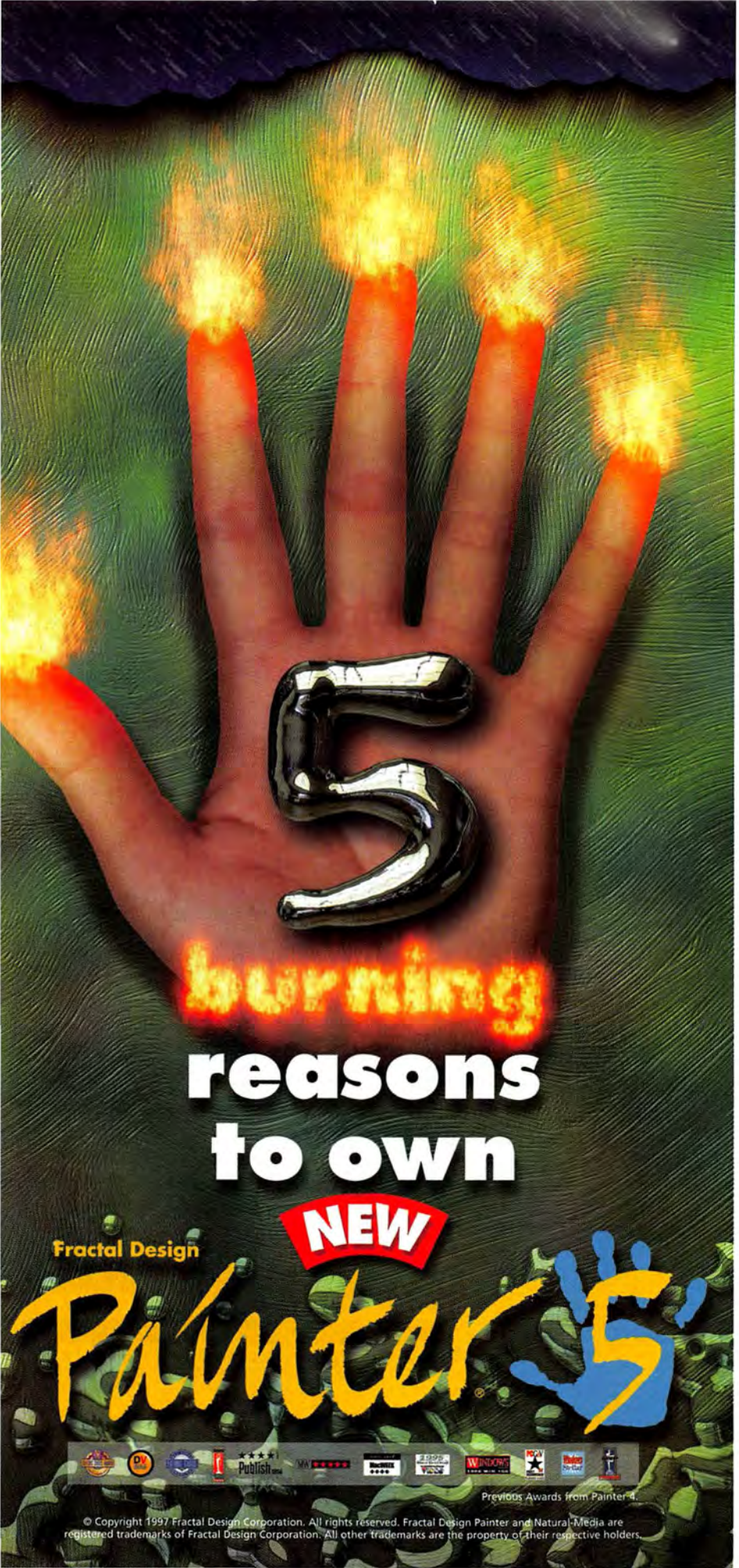

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PREVIEW OF CHRP MOTHERBOARDS SHOWS KEY ADVANTAGES

by Galen Gruman

RICHARD TUSCHMAN

Promised for nearly three years, the Common Hardware Reference Platform (CHRP) is now close to reality, with systems poised for release over the next few months—perhaps as early as September—from Motorola Computer Group (800/759-1107, *www.mot.com/starmax/*), Power Computing (512/388-6868, *www.powercc.com*), Tatung RISC Systems International (*www.tatung.com.tw*), Umax Computer (510/226-6886, *www.supermac.com*), and others. Tatung plans to ship systems only in the Far East, Germany, and perhaps other northern European countries; the other companies will ship their systems in the United States, Canada, and perhaps other countries.

CHRP will allow faster system-bus speeds, which will boost system performance. But CHRP is about more than just speed. It's about less-expensive, more-capable Macs. It achieves this through an architecture that takes the approach of a PC—common, inexpensive parts available from multiple suppliers using a standard basic design that everyone knows—and adds to it the Mac-specific technologies that Mac owners expect and exploit in their current systems. CHRP enables the first truly open Macs.

As Cheap as PCs With the use of standard components and designs, Tatung officials say they can create and sell Macs at the same prices as PCs—a first. Other Mac makers expect similarly dramatic savings. For example, CHRP motherboards fit into a standard case size called ATX, and thus in standard PC cases.

Although the Mac OS license is much more expensive than Microsoft's Windows 95 license (two to four

times as much, according to sources), IBM Microelectronics and Motorola Semiconductor have kept the prices of PowerPC CPUs significantly below those of Pentiums. According to several Mac makers, this means the overall cost is roughly a wash, even when you factor in the extra circuitry required on Macs for SCSI (an option on most PCs) and ADB.

Adding PC Technologies Motorola Computer Group and Umax Computer provided *Macworld* with two prototype CHRP motherboards that show the technologies in place—and the flexibility offered by an open architecture. Both companies' prototypes have extended traditional Mac features with PC capabilities, as seen in the sidebar "Up Close: What Two Open Mac Designs Offer."

For example, the Motorola system includes a parallel port that accommodates standard PC printers, while the Umax system has an ISA slot that lets you use a standard internal PC modem rather than a box hanging off the back of your Macintosh. Note that these are prototype systems, and what the companies actually ship to customers may differ.

continues on page 46

EXPO ALERT!

MACWORLD EXPO COMES TO BOSTON AUGUST 5 THROUGH 8, AND *MACWORLD* WILL BE THERE TO COVER THE HOTTEST NEW HARDWARE AND SOFTWARE FOR THE MACINTOSH. GET THE LATEST NEWS—AND OUR BEST OF SHOW PRODUCT PICKS—FROM MACWORLD DAILY AT *WWW.MACWORLD.COM/DAILY/*.

ROBERT PERRY

Sharp's VE-LC1 digital camera features a rotating lens and 2.5-inch LCD.

graphics

New Digital Cameras Join the Crowd

TOSHIBA AND SHARP AMONG ENTRANTS

by Andrea Dudrow

Digital cameras are appearing faster than baby rabbits. Toshiba (714/583-3000, *www.toshiba.com*), Panasonic (201/348-7000, *www.panasonic.com*), Yashica (908/560-0060, *www.contaxcameras.com*), Sharp (201/529-8200, *www.sharp-usa.com*), and Sony (201/930-1000, *www.sony.com*) are the latest vendors to offer entries in this increasingly crowded market.

New from Toshiba Toshiba's $499 PDR-2 offers 640-by-480-pixel resolution and is one of the first digital cameras to use CMOS (complementary metal-oxide semiconductor) image sensors, a less costly alternative to CCDs.

It stores images on matchbook-size Solid State Floppy Disk Cards (SSFDCs); a 2MB SSFDC included in the package can hold up to 24 high-quality or 48 standard-quality images. You can transfer images to your Mac if you own a PC Card reader. For users without PC Card readers, Toshiba plans to offer an adapter that allows use of SSFDC media in a standard floppy drive. The PDR-2 ships with Sierra Imaging's ImageExpert and Live Picture's LivePix, but unlike many cameras does not include an LCD preview.

Yashica's KC 600 Yashica has announced the $599 KC 600, which includes an LCD preview and 2MB CompactFlash PC Card. You can store 8 high-quality or 21 normal-quality images at 640-by-480-pixel resolution, or 80 economy-mode images at 320-by-240-pixel resolution. A burst mode lets you take 4 pictures in 1 second. The camera transfers images to the Mac via a serial connection or PC Card slot and includes a cable that lets you view your images on a TV. The KC 600 ships with MGI PhotoSuite SE software.

Two from Panasonic Panasonic's entries are the KXL-600A and the LCD-equipped KXL-601A. The cameras ship with a 2MB CompactFlash storage card, which holds 24 high-quality images at 640-by-480-pixel resolution or 96 standard-quality images at 320 by 240 pixels. The $458 KXL-600A and $658 KXL-601A both include a Mac interface kit with a serial cable. To save battery power, the cameras go into sleep mode after 30 seconds of nonuse and power down after a minute. They ship with Panasonic's own image-editing software.

Sharp's Rotating Lens Sharp's $750 VE-LC1 features 640-by-480-pixel resolution, a relatively large 2.5-inch LCD panel, and a rotating lens that lets you take pictures of yourself. An IrDA port permits wireless image transfer to IrDA-equipped Macs, such as the PowerBook 3400. Otherwise you can use an included serial cable. The package also includes a 4MB CompactFlash PC Card that stores 60 normal-mode or 120 economy-mode images. The 7.4-ounce camera ships with EasyPhoto image-transfer software.

Back to the Floppy Sony's new $599 MVD-FD5 and $799 MVD-FD7 store up to

continues

Macworld Takes Top Award for Copland Coverage

Macworld magazine has received the Computer Press Award for best individual news story or series, for our print and online coverage of Apple's decision last summer to cancel development of the Copland operating system. The awards, presented June 17 in New York, are sponsored by the Computer Press Association, a national organization of journalists. The awards represent the highest honors in computer publishing.

It's just the latest in a series of recent awards for *Macworld*'s editorial coverage. Earlier this year, Macworld Online received the prestigious Jesse H. Neal Editorial Achievement Award from the American Society of Business Press Editors (ASBPE) for best use of new media. The Western Publications Association honored the September 1996 *Macworld* with a Maggie Award for best magazine in the computers and telecommunications/consumer category. And *Macworld*'s July 1996 issue took third place for best news section, over 100,000 circulation, in the national American Society of Business Press Awards sponsored by the ASBPE West and Midwest chapters. The same issue won first place for best news section in regional ASBPE awards sponsored by the group's West and Midwest chapters.

40 images at 640-by-480-pixel resolution on a standard 3.5-inch floppy disk. Powered by a rechargeable lithium ion battery, both can capture up to 500 images between charges. They also include a 2.5-inch LCD and ship with ArcSoft PhotoStudio. The MVD-FD7 features a 10× zoom lens.

multimedia

QTVR Gets Ready for Prime Time

NEW AUTHORING TOOLS INTRODUCED

by Stephen Beale

Apple's (408/996-1010, *www.apple.com*) QuickTime VR (QTVR) technology, until recently the province of a few pioneering multimedia developers, is stepping into the limelight. PictureWorks (510/855-2001, *www.pictureworks.com*), Live Picture (408/438-9610, *www.livepicture.com*), and Panimation (407/599-9697, *www.panimation.com*) have introduced inexpensive software packages that make it easier to create QTVR panoramas. Be Here (408/399-1905, *www.behere.com*) has reduced the original asking price of its Portal S1 panoramic camera, albeit to a still-costly $9995. And thanks to a new application programming interface (API) in QTVR 2.0, developers of graphics software can add QTVR authoring capabilities with minimal hassle. Still, Apple can't rest on its QTVR laurels because several competing technologies have emerged.

A QTVR panorama gives you the illusion of being in the center of a virtual environment; scrolling with the mouse or cursor keys offers a 360-degree view of the scene. To create the panoramas, you shoot a series of photographs from the center of the environment you want to replicate; you can also create panoramas consisting entirely of computer-generated images. Either way, you need a QTVR authoring tool to stitch the individual images into the full panorama and save it in QTVR format. Panoramas can also include object movies that let you view objects from different sides.

KEVIN CANDLAND

Be Here's Portal S1 can capture a complete QTVR panorama in one shot.

New Software Apple offers free software that converts panoramic PICT images created in other programs into QTVR movies. However, creating the panoramas themselves is a time-consuming task. The new authoring programs—PictureWorks' $100 Spin Panorama, Live Picture's $100 PhotoVista, and Panimation's $169 Nodester—make it much easier to stitch the images into QTVR movies or panoramic stills saved in PICT or JPEG formats. With their simple interfaces and low price tags, they promise to bring QTVR authoring capabilities to a much broader market. They are especially useful in conjunction with digital cameras.

With each product, you begin by taking a series of photographs, rotating the camera clockwise so that each shot slightly overlaps the previous one. You then import these images in sequence to create the panorama. Spin provides tools that simplify the stitching process: after you identify common reference points in adjacent images, the program causes these points to overlap, binding the right side of one image to the left side of the next. PhotoVista and Nodester automate this process, aligning and stitching the images with a single command. You also have the option of manually fine-tuning the stitch. All three programs include blending functions that minimize lighting differences between adjacent photos. However, none can produce an object movie.

Nodester includes a simple built-in image editor, allowing you to perform basic image enhancements without using a separate program. A rapid-fire mode lets you capture a series of images using a digital camera tethered to the computer; the software then automatically composes the images into a complete panorama.

Spin and Nodester support QTVR only. PhotoVista supports QTVR plus Live Picture's own RealVR format, which was developed by Eric Chen, a member of the original QTVR programming team. Live Picture is currently working on an enhanced version of PhotoVista, to be introduced later this year, that will allow designers to add a variety of media elements to the panoramas, including FlashPix images.

Competing Formats RealVR is one of several technologies that have emerged to compete with QTVR. Its major advantage is file size: a RealVR panorama generally consumes much less data than the equivalent QTVR movie. The format consists of a JPEG image packaged within a VRML file; to view the panoramas you need to download a VRML extension from the Live Picture Web site.

Other QTVR competitors include SurroundVideo from Black Diamond (603/430-7777, *www.bdiamond.com*), SmoothMove from Infinite Pictures (503/221-2449, *www.smoothmove.com*), Ipix from Interactive Pictures (423/690-5600, *www.ipix.com*), and Tornado from NetVR (206/702-9525, *www.netvr.com*). SmoothMove is PC-only technology. SurroundVideo is PC-only on

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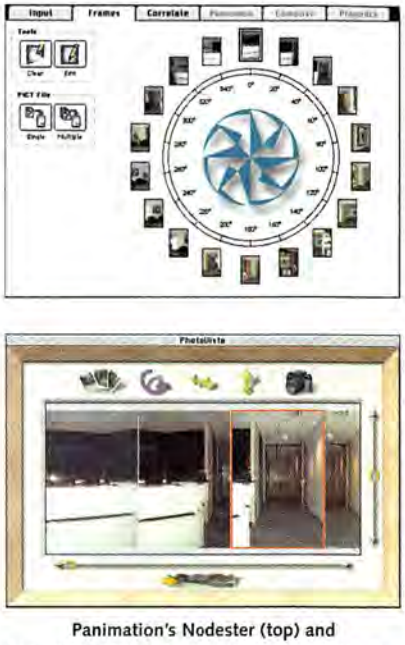

Panimation's Nodester (top) and Live Picture's PhotoVista (bottom) make it easier to create QuickTime VR panoramas.

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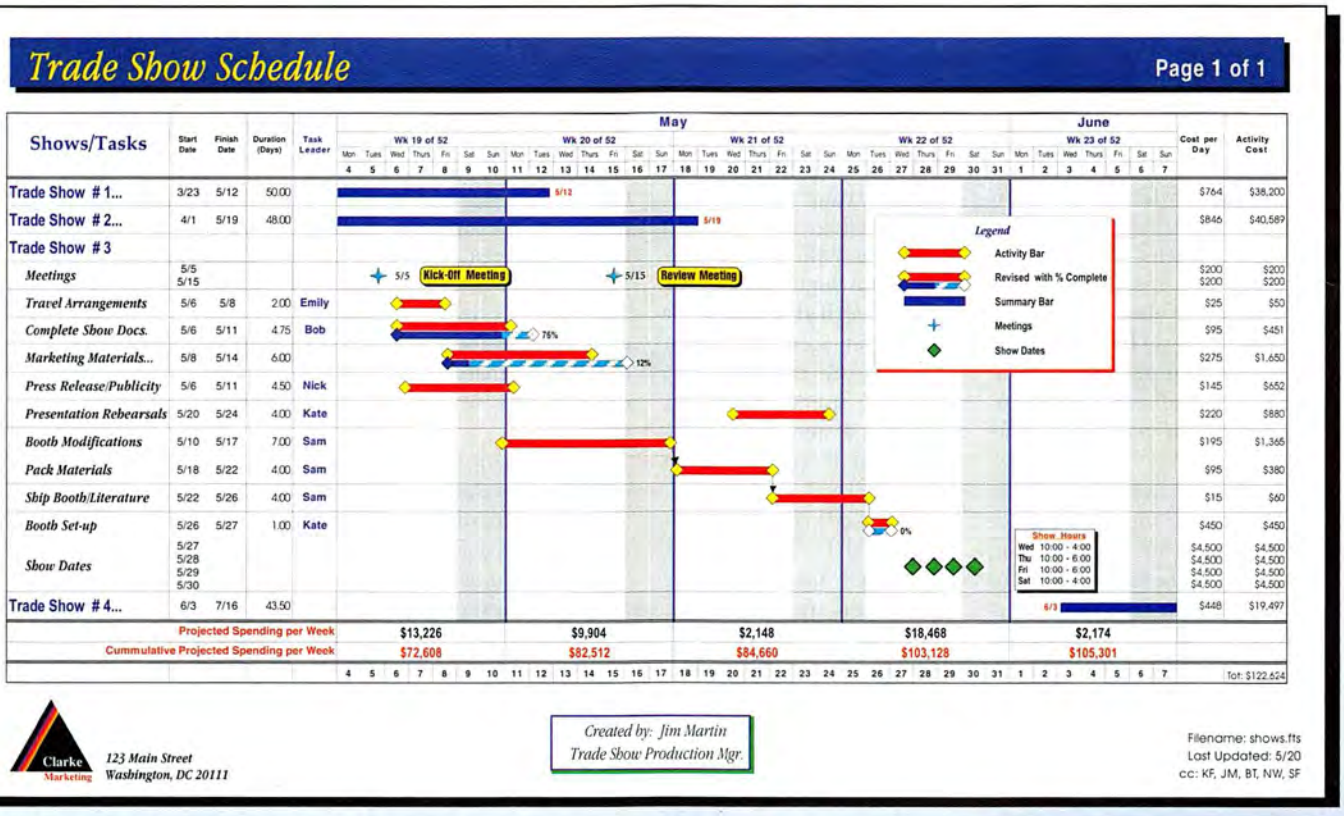

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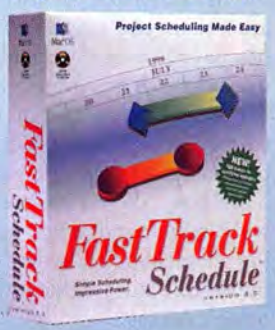

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Circle 203 on reader service card

the authoring side, but you can view the panoramas using a Mac-based ActiveX control for Microsoft Internet Explorer or Netscape Navigator.

Interactive Pictures (formerly OmniView) offers Mac-based authoring and viewing software, including a Macromedia Director Xtra, but instead of paying for a standard software license, you pay $25 to $100 for each completed movie, depending on the quantity you produce. You can capture a complete panorama with two shots from a camera equipped with a fish-eye lens. In addition, images are mapped to the inside of a virtual sphere—rather than QTVR's virtual cylinder—meaning that you can look all the way up and down in addition to left and right.

NetVR's Tornado is based on Java, so you don't need special plug-ins to view the content. Currently, Tornado generates in-line 3-D objects—equivalent to QTVR's object movies—but the company is also developing a panoramic movie component. The pricing is similar to Interactive Pictures'—you pay a sliding fee for each object you create.

Panoramic Camera Be Here, which introduced its Portal S1 Panoramic Capture System at the 1997 Macworld Expo in San Francisco, has reduced its original $15,000 asking price to $9995. However, it's another metered system: the base price buys you the right to make 100 images; after that, you pay $4 to $5 per saved image depending on volume. The advantage of the Portal S1 is that it can capture an entire 360-degree panorama in a single shot. This lets you create scenes with people and other moving elements that would be impossible to produce with other cameras.

systems

Some Day My Mac Will Come

MAC SYSTEM VENDORS DELIVER FASTER IN 1997

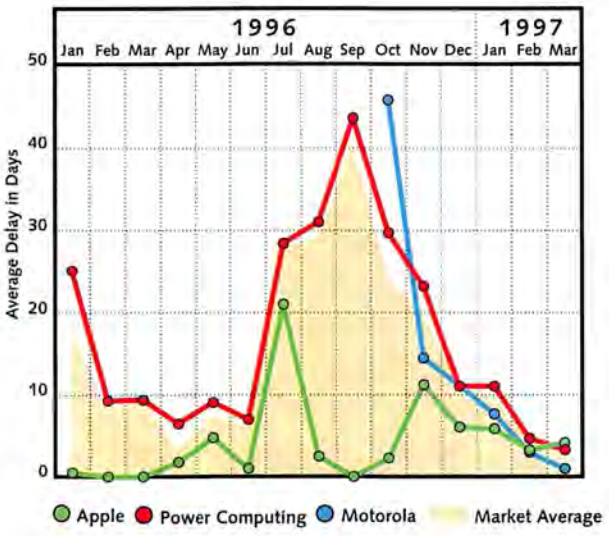
by Cameron Crotty

Back in the Great Mac Drought of 1996, buying a Macintosh was difficult, and certain high-end models couldn't be had for love or money. But according to an online survey conducted by *Macworld*, users are seeing improved system availability and dramatic reductions in delivery delays.

We asked visitors to Macworld Online's Web site how long it took them to receive their systems after placing the order. Respondents overwhelmingly verified the anecdotal reports of Mac shortages in fall 1996. The worst month, September, required patience of biblical proportions, as customers waited an average of 40 days and 40 nights for their systems to be delivered. But later that year, new systems vendors joined the market and existing vendors ramped up production. By December, in the midst of the busy holiday season, the average wait was down to 11 days. By March 1997, consumers were waiting an average of only three days for a new system.

Readers should note that results in surveys like these tend to be negatively skewed, as individuals with complaints are more likely to respond than are satisfied users. Nevertheless, generally it's easier than ever to buy a Mac OS system.

Still, not all is rosy. Apple's latest high-end Macs are still very hard to find, with the Power Mac 8600/200 and 9600/233, announced in February, just becoming available in volume as this was written. Also, systems based on the 250MHz PowerPC 604e chip remain extremely scarce.



This graph shows the average time (in days) elapsed between ordering and receiving a Mac OS system, as reported by our online survey. Only Apple, Motorola, and Power Computing generated enough responses to be broken out individually.

publishing

Java for Portable Documents

JSTREAM OFFERS AN ALTERNATIVE TO PDF

by Cameron Crotty

Adobe's Portable Document Format (PDF) is great for high-quality, precisely formatted documents. But PDF's huge file sizes can be a high price to pay, especially when sending the files over the Internet.

JStream (360/891-0649, *www.jstream.com*) believes it has the answer in its JPress Document Format (JPD), a proprietary compression technology based on the company's text-handling libraries, which are written in Java.

Built-in Viewer JStream's WiredWrite publishing application, scheduled to ship this fall, translates documents into the JPD format—which compresses them significantly—and attaches a small (70K), Java-based viewer. The resulting files retain all formatting, are rapidly searchable, and can be read on any computer running a Java virtual machine. Also, you can reformat text as you read it;

continues

TIMOTHY COOK

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Drive Bays	7 open/2 open
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* CacheDoubler upgrade will work on all existing S900 machines, available in Fall '97.

Circle 99 on reader service card

Internet WATCH

BY CAMERON CROTTY

Buddying Up on the Net

Until recently, real-time Internet communications meant logging on to the chat channels, or setting up a voice connection with one of several telephony products. But now, America Online (703/448-8700, *www.aol.com*) and Excite (415/568-6000, *www.excite.com*) have announced products that alert you when colleagues access the Internet, and then provide a vehicle for exchanging text messages with them.

To use America Online's Instant Messenger or Excite's PAL, you must download client software and register with the AOL or Excite server. The client software informs the server that you are online and lets you exchange messages.

Currently, the software is freely accessible from the Excite and AOL Web sites. Excite's PAL is completed, while AOL's was still in beta testing at press time. AOL expects to have the final version available this fall.

High-Style E-Mail

Text-based e-mail is beginning to look paltry when stacked up against brightly colored Web pages with dancing graphics. But sending multimedia messages is still a nightmare of enclosures, coding, and uncertainty about whether the recipient has the required viewer applications.

Novita Communications (408/745-5990, *www.novitacom.com*) dodges this problem with NovitaMail, a new HTML-based e-mail client that lets you build formatted messages combining text with graphics, animations, and even embedded Java applets. NovitaMail then packages, compresses, and mails the message along with an extractor written in Java; since the message is in HTML, any Web browser can read it. A public beta program for the Mac version is set to begin by the time you read this; the product should ship this fall for $39.

Industrial-Strength Web Design

Handcrafting a Web site page by page in an HTML editor might work for a small site, but not for a large corporate site with lots of pages and constantly changing data.

Pictorius (902/492-2880, *www.pictorius.com*) is offering an alternative in the form of Pictorius Inet Developer. Based on the company's Prograph object-oriented development environment, the software lets you develop and store content in a database, from which you generate HTML pages on the fly. You can easily edit and rearrange content without the drudgery of rebuilding pages by hand. Inet Developer should be available by the time you read this. For $1495 you get the site and page editor, the application server, the integrated development environment, and a Web server.

if you resize the window, a JPD document reflows to reflect the change.

Java Limitations JStream has far to go before JPD will be widely accepted, largely because Java's printing and typography features are embryonic at best. Also, while many current applications can directly output PDF files, users must filter documents through WiredWrite to produce JPD files. And PDF, given its roots in PostScript and growing acceptance in the print world, will likely be the electronic document format of choice for high-quality output. But JPD may offer a viable alternative when PDF is too much and HTML is not enough.

systems

No More Free Tech Support

APPLE ADOPTS 90-DAY PHONE SUPPORT POLICY; AFTER THAT, YOU PAY

by Cameron Crotty

Free tech support, long a standard in the Macintosh market, is becoming the exception rather than the rule. Apple recently announced that it will no longer provide lifetime toll-free tech support for its Macintosh systems. Some Mac makers are sticking to their free support policies, but others, such as Apple, are finding that the cost is too much to bear.

If you bought your Mac between April 1, 1993, and April 1, 1996, Apple will continue to provide free tech support. But if you purchased a Mac after April 1, 1996, you get only 90 days free. After that, hand-holding over the

telephone will cost you a minimum of $69.95. That's the annual cost of a Level I Apple Support Line contract, which covers ten service incidents per year. If you have more incidents, you'll have to pay for another contract, which covers you for another year or ten incidents, whichever comes first.

Feeling the Pinch In today's PC market, few vendors offer unlimited free telephone support. Even a large company like Apple feels the pinch when support representatives must process 20,000 calls per day. In addition to salary and equipment costs, each support rep must be extensively trained.

"Free telephone tech support forever is a nice thought, but it's not sustainable," says Pete Gladstein, senior director of Apple Assist for the Americas.

Nevertheless, Mac vendors tend to have more liberal support policies than their PC counterparts. Power Computing and Umax Computer, for example, both provide unlimited toll-free tech support. Umax believes it's an important way to create a positive image in customers' minds.

"If customers feel that they've been treated well [during a support call], maybe they'll pick up another Umax product," says Jim O'Rourke, director of quality and services at Umax.

But even Umax is feeling the pressure, given Apple's recent flurry of system software upgrades. O'Rourke says that Umax strongly encour-

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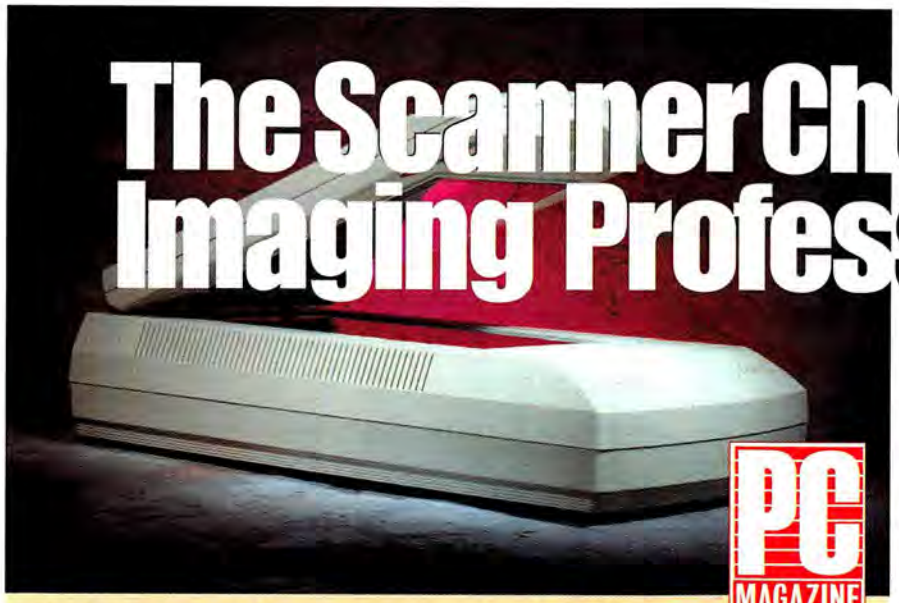
TIMOTHY COOK

The Scanner Choice of Imaging Professionals.



"As for image quality, our jury panel judged the ScanMaker III's images best in show among the 17 scanners we reviewed." —*PC Magazine*, March 4, 1997

PC MAGAZINE EDITORS' CHOICE™
March 4, 1997
Microtek ScanMaker III

"The ScanMaker III is the best I've seen. It gets the sharpest scans, and the dynamic range and capabilities are incredible. The descreen filter is absolutely phenomenal — I wouldn't know what to do without it!" —Jon Lucenius, Rupple Productions Inc., Baltimore, MD

"My Microtek ScanMaker III pays for itself everytime I use it." —C. David Piña, designer of main titles for the *Academy Awards,® Tony Awards,® Grammy Awards,®* and *Emmy Awards®* telecasts

"The image quality is awesome! It's even better than the drum scans I was paying for every week. I especially enjoy being able to capture images at the full 36-bit range without any mapping down." —Warren Patterson, photographer Warren Patterson Photography & Imaging, Wellesly, MA

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For the location of the Microtek reseller nearest you, contact Microtek Sales at 1-800-654-4160. For additional information, point your Web browser to: www.microtekusa.com.

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Circle 105 on reader service card

ages callers to provide a serial number to get support. "But we don't just turn them off if they don't have one," he says. "We try to help them a little bit." A Power Computing spokesman also hinted that, long-term, the company would work to wean users off toll-free phone support as costs increase.

Going Online Nearly all Mac systems vendors have augmented their support departments with online resources, from FAQs on Web pages to e-mail support. But the Internet is not a magic bullet for tech support. "Online support is not 'throttleable,'" says APS Technologies' president, Paul Mandel. When telephone lines are saturated, a company can "turn on the busy signal" and refuse more incoming calls, but there is no similar mechanism to keep from drowning in e-mail. Some vendors have tried systems that automatically send messages telling you how many queries are queued up ahead of yours, but these have proved to be dismal failures. "People would just send more e-mail, *and* call, *and* send faxes," Mandel says.

With Apple restricting its free telephone tech support, some systems vendors worry that their support burdens will increase. "Customers seek out the guy with the free tech support," often regardless of which vendor the customer purchased the original product from, says APS senior vice president Paul McGraw.

publishing

Workflows in Cyberspace

NEW PRODUCTS BRING YOUR SERVICE BUREAU TO THE DESKTOP

by Stephen Beale

Macintosh users in the publishing business have long awaited the era of virtual manufacturing, a brave new world in which the service bureau and commercial printer become a seamless extension of your desktop. Thanks to a host of recently announced software products and telecommunications services, that promise is closer than ever to reality.

OPENing Move The technology to enable this vision first appeared in the OPEN workflow-management system from Luminous (206/689-6700, *www.luminous.com*), which lets service bureaus create pipelines where incoming jobs are automatically inspected, trapped, imposed, color-separated, and printed with or without the involvement of a prepress operator. OPEN is both a product and a plug-in architecture; any OPEN-compliant prepress application can be added to the automated pipeline.

A companion product, Luminous Virtual Network—formerly Adobe Virtual Network—lets your service bureau accept transmitted print jobs for automated processing through the pipeline. It has two components, a host program run at the service bureau and a client program that can be freely distributed to customers. Luminous offers a free generic version of the client on its Web site, but your service bureau can also generate customized client modules for distribution to customers.

Choose Your Service The customized client makes your service bureau appear as a Chooser-level output device. When you print the job, you fill out an electronic order form with instructions for handling the file. The file is then automatically transmitted to the service bureau.

Luminous recently announced Virtual Network Pro, which lets users at remote sites collectively review and annotate documents. Luminous Virtual Network Pro for ISDN, introduced in June, includes two- and four-channel ISDN boards.

continues

Marathon to Run Mac Race

NEW MOTOROLA LICENSEE TO SHIP RACK-MOUNT SYSTEMS IN JULY

Start-up Mac maker Marathon Computer (615/242-9700, *www.marathoncomputer.com*) is joining the ranks of Motorola sublicensees, which also include PowerTools and APS Technologies.

The Nashville-based Marathon plans to offer rack-mounted Mac OS computers beginning in mid-July. Based on Motorola's Tanzania motherboard, the line will be called the RackMac TZ.

Each model will include SCSI and IDE buses, built-in video, a 200-watt power supply, and three PCI slots, with CPUs ranging from a 180MHz 603e to a 200MHz 604e. A bare-bones model with those components and a 180MHz 603e will go for $1995, while a Web-server model that adds 16MB of RAM, a 256K cache, 2MB of VRAM, a 1.2GB hard drive, a 16× CD-ROM drive, and a mouse will cost $2999. (Three higher-priced Web servers, two with a PowerPC 603e CPU at either 200MHz or 240MHz and one 200MHz 604e, are also available.) Marathon's top-of-the line $3799 system features 32MB of RAM, a 512K cache, 4MB of VRAM, a 2GB hard drive, a 16× CD-ROM drive, a mouse, and either a 240MHz 603e or a 200MHz 604e.

The rack-mounted models are aimed at the server and professional video markets. Marathon vice president Stephen Woolverton says 80 percent of the inquiries the company has fielded about the systems have come from multimedia designers. For the server side, Marathon will offer optional monitoring software for the Web. FailSafe, a $99 software option for the RackMacs, helps prevent server lockups by polling the system for operational failures. After it has detected a certain number of system failures, FailSafe automatically restarts the server for you.—TOVA FLIEGEL

ARNOLD TIOSEJO

Marathon's rack-mounted RackMac TZ is based on Motorola's Tanzania motherboard.

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Circle 233 on reader service card

Group Logic (703/528-1555, *www.grouplogic.com*), which developed the core technology in Luminous Virtual Network, has released its own version, called Mass Transit. The company also offers a remote document-viewing and annotation program called Imagexpo 2.0.

Tempus in a Teapot DK&A (619/488-8118, *www.dka.com*) has developed an alternative to OPEN, called Tempus, that can handle native QuarkXPress and Adobe PageMaker files in addition to PostScript and PDF; OPEN is limited to the latter formats. Current Tempo-compliant software products include DK&A's InPosition and Trapper and EFI's Fiery Booklet Maker. DK&A is inviting other software developers to create Tempus-based products.

High-Speed Pipelines File-transfer software does you little good if you don't have a fast data pipeline. Fortunately, several vendors have introduced products and services targeted at the file-transmission requirements of graphics professionals.

WamNet (612/204-3100, *www.wam.net*), a high-speed telecommunications service for graphics professionals, has established a network of large prepress and printing companies that can accept jobs sent through the service. A recently introduced $250-per-month low-volume option lets you transmit up to 750MB of data with a guaranteed throughput of 40MB per hour, the company says. You can send additional data for 35 cents per megabyte. Higher-volume services are also available. The company also announced a service called WamProof that lets clients automatically print on color-proofing devices at remote locations.

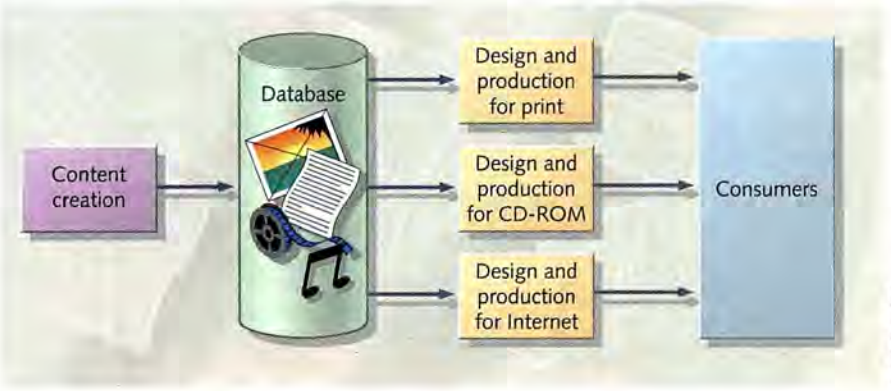
MCI, British Telecom, and Scitex have announced the Digital Graphic Network service, which will permit high-speed file transfer among designers, advertising agencies, stock-photo houses, service bureaus, and printers.

MCI also sponsored development of a $129 Adobe Photoshop plug-in called Genuine Fractals, from Altamira Group (818/556-6099, *www.altamira-group.com*), that compresses scanned images into resolution-independent Fractal Image Files of 1MB to 2MB. Once transmitted, these files can be enlarged to between 400MB and 500MB—even if the original scan was only 10MB to 25MB.

Another company staking a claim for high-speed file transmission is 4-Sight (617/935-5090, *www.4sight.com*), whose ISDN Manager software uses standard ISDN connections to transmit jobs to service bureaus.

Agfa is using ISDN Manager in a new service called PrintCast that lets you submit jobs to facilities that have installed its ChromaPress digital printing system.

Apple's Vision for Digital Workflow



K. DANIEL CLARK

As vendors like Luminous and Group Logic strive to reduce the barriers between service bureaus and their customers, Apple is promoting its own vision of a digital-media workflow. Apple executive vice president Ellen Hancock recently presented a new model for media production that accommodates CD-ROM and Web authoring as well as traditional print media.

The current model, she said, is driven by print production: at a certain point in a print project, a designer adapts existing text and graphic elements for the Web or CD-ROM. Under the new model, all elements used in print and new media are stored as objects in a central media database, from which various forms of print and online content can be generated in parallel. In addition to permitting the reuse of appropriate media elements, she said, the model is better suited to the immediacy of online communications, because production is not dependent on the print workflow.

What is Apple's stake in this? Chris Gulker, Apple's business development manager for publishing, entertainment, and new media, says that WebObjects, the sophisticated Web authoring software that Apple obtained as part of the Next acquisition, is the glue that will enable databases and other software components to work within this new-media–production model. The software currently runs under Windows NT and Unix, but Apple promises a Mac OS version by the end of the year. The current price tag is $5000; however, Gulker says the price is likely to drop as Apple targets the software at a broader market.

Gulker admits that the new workflow model is geared toward the largest publishing operations—companies like Time Warner and R.R. Donnelley & Sons that manage huge volumes of information. And support for the model is far from unanimous. On hand for Hancock's presentation at Seybold New York, Quark chairman Tim Gill argued that the needs of electronic and print media are so different that few elements can be reused in the manner suggested by Apple's proposal.—STEPHEN BEALE

TIMOTHY COOK

Are you losing sleep dreaming of a sexy spreadsheet and

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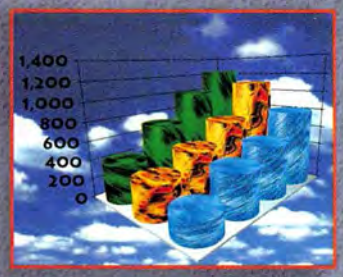

Surf

SURFBOARD SALES

Model	1995	1996	1997	1998	1999
Caffeine Overkill	3.2	8.3	17.1	24.3	36.9
WaveCrusher	5.0	12.7	14.3	22.1	29.7
Tsunami 550 GTi	7.4	14.2	16.8	24.9	34.0
OutOfControl 700/MB	11.1	34.5	61.2	76.7	89.1
Trueman Big Kahuna	2.2	4.1	31.6	50.5	66.3
Northern Impact II	12.0	22.5	27.8	34.9	42.1
HyperActive XV400	4.2	14.0	36.7	44.1	46.2
HyperActive XV7000	5.9	18.7	45.9	51.2	57.8
Terminator One	0.2	7.8	58.2	70.3	85.3
TOTAL:	51.0	129.0	251.4	328.7	402.1

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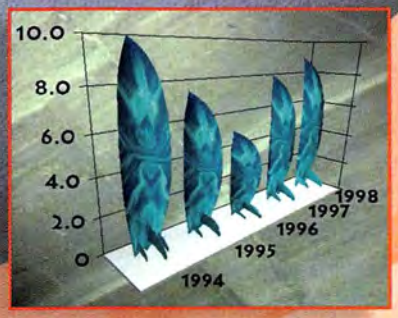

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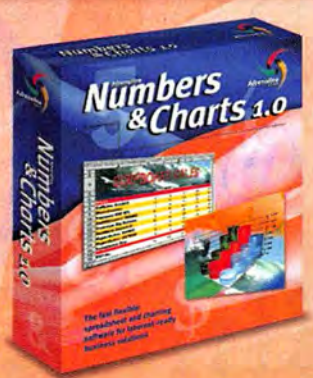

renaline Numbers & Charts is available right now at Cyberian Outpost, the Mac-friendly ol place for computer stuff. You may order via their web site at http://www.cybout.com/ or 1-800-856-9800. Adrenaline Numbers & Charts is also available from MacWarehouse in e USA at 1-800-397-8508 or in Canada at 800-268-7805. An electronic version of Numbers & arts is available from C/Net at http://BuyDirect.com

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System requirements

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- 16 MB of physical RAM
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systems

Possible Hope in Licensing Fracas

OUTLINE OF AN AGREEMENT EMERGES

by Galen Gruman

After months of skirmishing over the terms of Mac OS licenses, Apple and the clone makers seem to be close to an agreement, according to sources at several licensees. An agreement may be reached by the time you read this, although the sources cautioned that several key disputes remained unresolved at press time. Apple declined to comment.

While he would not discuss the licensing issues, Motorola Computer Group commercial products general manager Dennis Schneider told *Macworld* that Motorola resumed negotiations with Apple in mid-June, after breaking off talks in frustration several weeks earlier. Similarly, Taiwan's Tatung, an IBM sublicensee that has been unable to ship its Common Hardware Reference Platform (CHRP) systems because of delays at Apple in Mac OS support for CHRP, said, "We are happy to learn that Apple is back to the reasonable track, and we are optimistic to have the Mac OS licensing agreement settled down soon."

Apple Loosens Its Control The licensees say Apple finally capitulated on a major demand: that Apple stop dictating through its certification process what technologies the other Mac makers could use. Under the emerging agreement, Apple will develop a set of compatibility tests that the clone makers would use to demonstrate certification compliance, ending Apple's approval of the clone makers' specific engineering approaches and technology choices.

Apple's chief software engineer, Avie Tevanian, recently complained to *Macworld* that the clone makers don't innovate enough. This is ironic, because Apple's current certification process dictates what the licensees may add to the Apple motherboard architectures, and the licensees have long complained that Apple uses the current certification process to restrict their innovation. Tevanian acknowledged this reality and said that he and Apple chief hardware engineer Jon Rubinstein are ensuring that the Rhapsody OS will make it easy for licensees to add technologies to the Mac without Apple's intervention or approval.

Under Rhapsody, Tevanian said, vendors will be able to add their own drivers to support innovations in their CHRP systems.

Not Thrilled The licensees also compromised in the talks, accepting higher licensing fees for Mac OS 8 than they wanted. None would discuss the fees, but they appear to be about $100 per Mac, with higher prices for high-performance systems, up from about $50 under the Mac OS 7.6 license. Licenses for fast systems would cost more.

Executives at several companies said they were by no means happy with the proposed agreement but thought they could live with it for a year or so, giving Apple additional breathing room to adjust to the reality of strong competitors. They said they remain concerned that a year from now, Apple would try to impose more restrictions.

Allies or Parasites? Apple has its own complaints about the clone makers. Rubinstein said that the Mac OS licensees "skim the top off Apple's market" rather than enlarging it. Other Apple executives have echoed this concern, but none would cite possible markets for expansion. Yet the licensees have complained that Apple expects them to sell products in markets that Apple doesn't think it can succeed in or that Apple has already failed in.

Licensees are still concerned about the cozy relationship between Apple's OS and Mac groups, fearing that Apple will tweak the OS to its own hardware designs while assigning a lower priority to the licensees' OS needs. Apple has clearly decided to focus on its own requirements first: "My biggest customer is this guy," Tevanian said, pointing to Rubinstein, during an interview with *Macworld*. Both hastened to express their support for the need for Mac licensees to grow the Mac platform.

SUZANNE ROADY

Fargo Printer Strives for the Elite

Photo-quality ink-jet printers may be the current rage, but many graphic artists still prefer the continuous-tone quality of dye-sublimation output. The $2195 PrimeraPro Elite from Fargo Electronics (612/941-9470, *www.fargo.com*) continues the company's tradition of offering inexpensive color printers that combine dye-sublimation and thermal-wax transfer technologies. The dye-sub mode offers the best quality, while the thermal-wax mode uses less costly consumables, about 60 cents per sheet compared with $3.30 for dye-sub output.

New from Fargo is a dye-sub ribbon called FotoShield that adds a clear, UV-resistant overlay to the print; a package that includes the ribbon and 50 receiver sheets costs $190.

The Elite can produce an A4-size dye-sub print in about 4.5 minutes, Fargo says, which is almost three times faster than its predecessor, the PrimeraPro. The maximum printable area has been slightly expanded to 8.5 by 11 inches. Maximum resolution is 600 by 300 dpi. Adobe PostScript Level 2 is a $466 option.—STEPHEN BEALE

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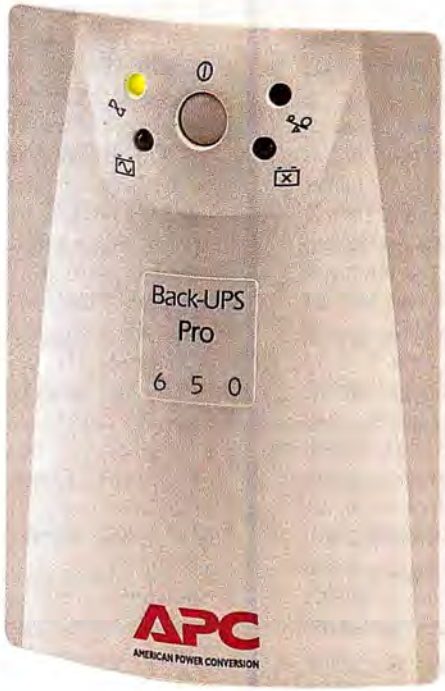
Antonio Pasin, Radio Flyer

Experts Insist on UPS Protection

Experts agree, the consequences of not protecting network workstations are great and costly. Today's high-performance Macs demand reliable power protection to perform efficiently in the event of an unpredictable power event. Automatic Voltage Regulation (AVR) provides complete protection against extended brownouts or overvoltages, without battery drain. CellGuard™ intelligent battery management extends battery life with fast recharge and deep discharge protection. User replaceable, hot swappable batteries can be easily swapped out without sending the UPS out for service.



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MacWEEK

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MacUser

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Circle 72 on reader service card

Systems WATCH

BY TOVA FLIEGEL

Summer of Price Cuts

Systems vendors—including Apple—are paving the way for their new fall lineups by slashing prices on existing systems.

Power Computing's (512/388-6868, *www.powercc.com*) "Summer of Power" promotion touts free RAM as the next best thing to free love. As of July 1, the former 32MB versions of the PowerTower Pro 250 and 225 now have 128MB of RAM, and sell for $3995 and $3495, respectively, down from $4495 and $3695. The 16MB version of the 225, now with 128MB of RAM, was reduced from $3195 to $2995. There's no change in PowerCenter Pro prices, but the $2395 16MB PowerCenter Pro 210 includes a free RAM upgrade to 64MB. Through July 31, you can get $100 rebates on the entry-level PowerBase 240 and 200, bringing the 240 to $1499 and the 200 to $1299.

Apple's (408/996-1010, *www.apple.com*) high-end Power Mac 9600/200MP drops from $4699 to $4199; the $4200 9600/233 is now $3499; and the $3699 9600/200 is cut to $3199. Formerly $3199, the Power Mac 8600/200 is now $2999. The midrange 7300/200 (formerly $2699) and 7300/180 (formerly $2399) are now $2299 and $2099.

DayStar Digital (770/967-2077, *www.daystar.com*) announced price cuts ranging from 15 to 24 percent on multiprocessing systems. The Genesis MP 900, with four 225MHz 604e CPUs, is $8499, down from $9999; the Genesis MP 800, with four 200MHz 604e's, is $6499, down from $8499; and the Genesis MP 450, with two 225MHz 604e's, is $4999, down from $5499.

New at the High End

Slated for August release, the Umax (510/226-6886, *www.supermac.com*) SuperMac S910/250 will sport 64MB of RAM and 1MB of cache; its predecessor, the S900, comes with 32MB of RAM and a 512K cache. The $4695 S900 also includes a faster (7200-rpm) 4GB Ultra SCSI drive and 100BaseT Ethernet. In the fall, a $495 CacheDoubler card will add 1MB of in-line cache to the S910, S900, and J700.

Motorola's New 250MHz 604e Debuts

Motorola's (*www.mot.com/powerpc*) faster next-generation PowerPC CPU is code-named Mach 5. Improving on the design of the previous 604e's, the 250MHz Mach 5 CPU consumes less power (5 watts instead of 14.5w), is about one-third the die size, uses less voltage (1.8 volts instead of 2.5), and runs cooler. Motorola says the Mach 5 is suited for high-end systems, while the Arthur G3 (PowerPC 750) series is for portables and most desktop machines. Mach 5 speeds should surpass 300MHz before the end of the year. According to Motorola, you should begin seeing the first Mach 5's in systems released this fall.

"INSIDE THE NEXT-GENERATION MACS"

continued from page 33

The ROM Bottleneck Although CHRP systems are almost here, the effort is not over. In the longer term, Apple faces an unknown amount of work and time to make a Mac OS that removes all vestiges of the Mac ROM.

The ROM contains part of the Mac OS, and the various Mac models' ROMs have always been written with specific hardware configurations in mind. That's why OS updates are sometimes required to make the Mac OS run on new systems. (For example, a hardware dependency in the ROMs used in the Power Mac 7300, 8600, and 9600 this winter caused them not to run Mac OS 7.6, forcing Apple to develop Mac OS 7.6.1 after the new Power Macs were shipping.

Such dependencies could also cause a nightmare for CHRP designers and Apple OS engineers, since a CHRP system using components that the OS doesn't know about could require an OS patch, just as happens in Apple's proprietary Mac designs. But with CHRP, which is open to a variety of components—more than Apple uses now—the potential for incompatibilities is much greater.

This means that Mac makers will at first rely on tried-and-true components, and will need to introduce new components slowly so they have time to create patches that allow compatibility.

Even so, expect some compatibility issues to surface initially. For example, because of a flaw in the design of common IDE controller circuits, the first CHRP-enabled Mac OS (version 8.0, due out in late July), won't support IDE drives. Mac makers say there are several other minor compatibility issues with various components in Mac OS 8. Because of these issues, Apple will release a Mac OS 8 update—varyingly called Mac OS 8 1.1 and CHRP OS 1.1—that will work around the IDE controllers' flaw and fix the other compatibility issues. That update should be available in late August or September, and most Mac makers will delay their systems until it is available.

ARNOLD TIOSEJO

You'll soon be seeing Macs from Umax and Motorola that feature CHRP motherboards.

Jon Rubinstein, chief systems hardware engineer at Apple, says he's not sure how long it will take to wean the Mac OS completely from hardware dependencies. Eighteen months was an off-the-top-of-the-head guess, he said.

Apple needs to create a hardware abstraction layer (HAL) that separates the hardware components from the operating system, eliminating the need for hardware-specific code in the OS. The HAL sits as an intermediary between the OS and the motherboard; the motherboard communicates with the HAL via software drivers that translate the peculiar needs of hardware components into standard descriptions for the OS. Rubinstein says Apple is taking a HAL approach for its Rhapsody OS.

continues

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Circle 26 on reader service card

See Us At The Macworld Expo Booth# 5512

Apple has completed the work to eliminate the ROM chip, but the "ROM in RAM" solution that should be available with Mac OS 8 1.1 merely moves the ROM into software. Still, ROM in RAM helps Mac makers in two ways:

- They don't need to worry about availability of a physical part. The need for a physical ROM chip can slow down Mac makers' ability to deliver CHRP systems when there are supply hiccups.
- They can reduce the number of patches in the Mac OS, since they can replace a problem in the ROM rather than load a patch. (With physical ROMs, the OS can't remove bad code, so it has to load a patch from the Extensions folder.)

But until the need for a ROM is completely removed, Mac makers still have to be careful when they adopt new or modified components.

Conflicted Apple Sources at several companies tell *Macworld* that some of the delay in CHRP is due to political issues—that Apple is concerned about releasing a floodgate of CHRP systems that could further erode sales of its profitable Macs. Apple denies this, refusing to discuss specifics.

With the ROM moved to RAM, Apple cannot control how many systems a Mac maker has by rationing the ROM chips. Within Apple, a faction was opposed to losing this control, according to sources, especially now when Apple has been late in shipping its profitable systems, such as the 8600/200, and has seen Mac licensees aggressively target the high-end market. However, the licensees also have helped keep the overall Mac market share from dropping precipitously even as Apple struggles with supply problems.

Another bone of contention has been licensing terms for Mac OS 8 (which includes CHRP systems). For several months, Mac licensees voiced frustration over what appeared to be delays in licensing Mac OS 8 and attempts by Apple to impose a certification process on CHRP-based systems that would give Apple some control over engineering choices (see "Apple Pins Hopes on Gossamer," *News*, August 1997, and "Apple's Clone Support in Question," *News*, June 1997).

And Apple has resisted efforts to add notebook support to the CHRP specification as it has sought to prevent competing Mac notebooks. (Apple has also refused to license the Mac OS components required for notebooks.)

Mac makers have been a bit skittish about CHRP for the last several months since Apple officials said that the company will not entirely adopt CHRP itself. This raised fears that CHRP is a Trojan horse strategy that will make Mac OS support for CHRP a low priority, while forcing licensees to use only those technologies Apple has endorsed through its certification authority. Licensees fear that if these endorsed technologies are inferior to what Apple uses in its own systems, CHRP could become a vehicle for holding licenses back.

At press time, Apple seemed to have taken a more moderate stance, and the licensees were cautiously optimistic that an acceptable solution to all these issues would be in place by the time you read this. (See "Possible Hope in Licensing Fracas," elsewhere in this section. To follow this ongoing story, see Macworld Daily at *www.macworld.com/daily/*.)

A Rocky Road CHRP has not had a smooth ride from concept to completion. It even had a rocky birth: Apple, IBM, and Motorola hammered out the CHRP specification—which was also known briefly as the PowerPC Platform (PPCP)—in spring 1995, about six months after the companies joined forces to create an industry-standard architecture around the PowerPC in November 1994. Until that decision, IBM had been promoting its PowerPC Reference Platform (PReP), which did not support Mac-specific technology (see "Apple Says No to IBM's Macintosh," *News*, October 1995).

Even once the CHRP specification was finalized in 1995, CHRP was delayed. Apple was supposed to have a version of the Mac OS that ran on the CHRP architecture in July 1996, but that was delayed along with the abortive Copland OS. Skirmishing over the CHRP specification helped slow down progress. Apple's CHRP OS was also delayed this year.

Mac OS 7.6 for CHRP was completed this spring, but Apple decided not to release it because Mac OS 8 was imminent.

Although there's still a chance for further delays, it appears that with the release of Mac OS 8 1.1 late this summer, Mac makers will be able to deliver on the promise of CHRP, taking the technology from their labs to your desk.

GIBSON

NEC Gets Its Printer in Gear

NEC Technologies (630/775-7900, *www.nec.com*), which pulled out of the Mac printer market in 1996, is back with the SuperScript 1260. The 600-dpi monochrome laser printer is the first Mac output device to include Adobe's PrintGear technology, a low-cost alternative to PostScript. It won't print PostScript files, but uses a RISC-like architecture to accelerate graphics rendering. A Mac PrintGear driver is included.

The SuperScript 1260 offers 12-pages-per-minute output speed; a 250-sheet cassette; and a manual feed for envelopes, transparencies, and other unusual stocks. NEC expects it to sell for $800, plus $300 for a network option that supports TCP/IP, NetWare, Windows NT, Windows 95 peer-to-peer, and EtherTalk.—STEPHEN BEALE

Some Tools Change the Way We Work. Forever.

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Tired of going around in circles shooting, digitizing, editing, and compressing digital video? Maybe you haven't had the right tool for the job. Let Hitachi's new MP-EG1A MPEG camera put you in the fast lane. It's the only digital video camera in the world that creates MPEG files—and in real time, no less! Now you can transfer MPEG or JPEG files by directly connecting to the PC-type III slot in your PowerBook or using the optional SCSI Adapter (MPADS1A). And nothing's simpler than dropping the MPEG video clip into your QuickTime™ 3.0 Mac software. That's a real productivity tool.

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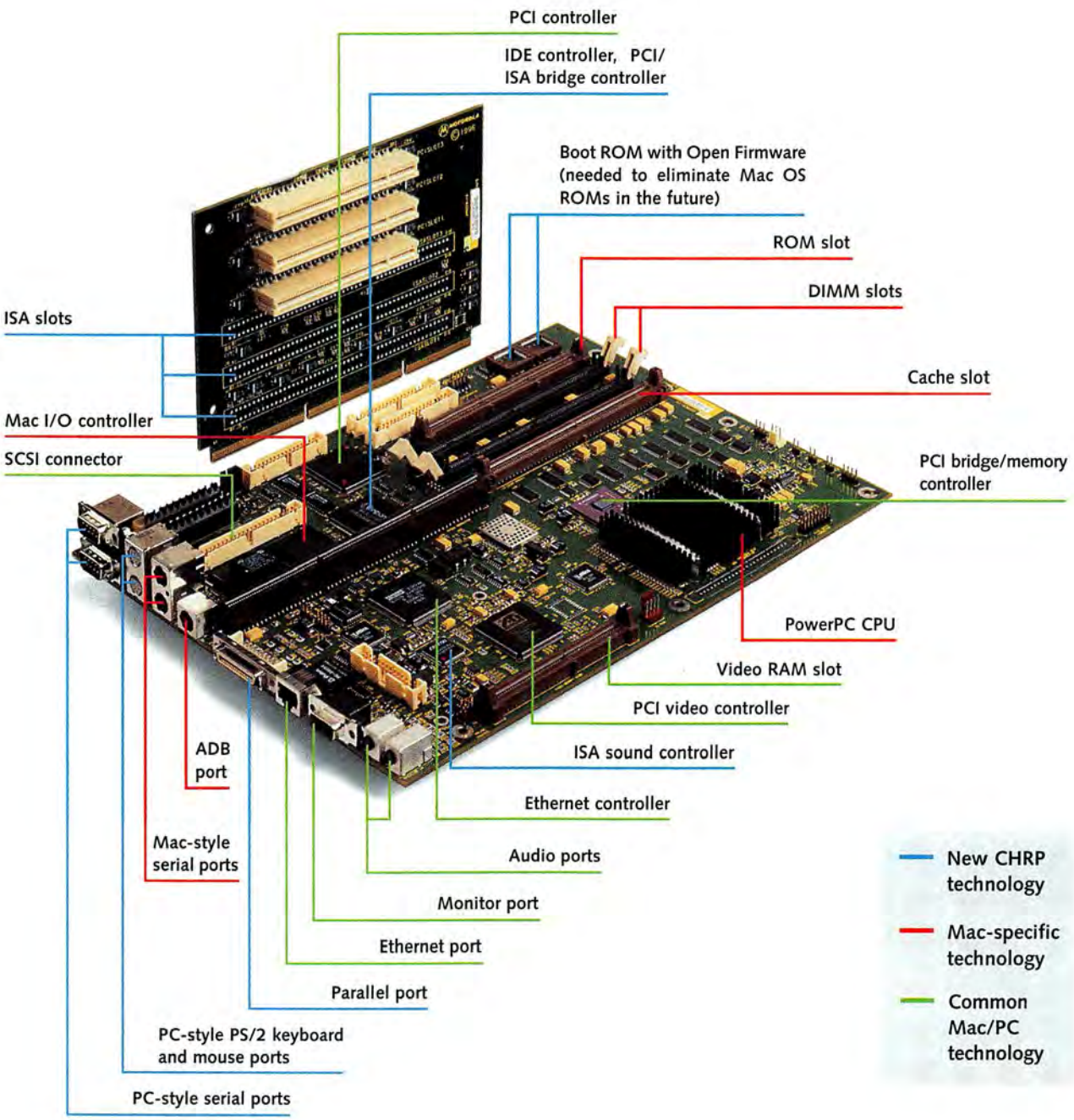
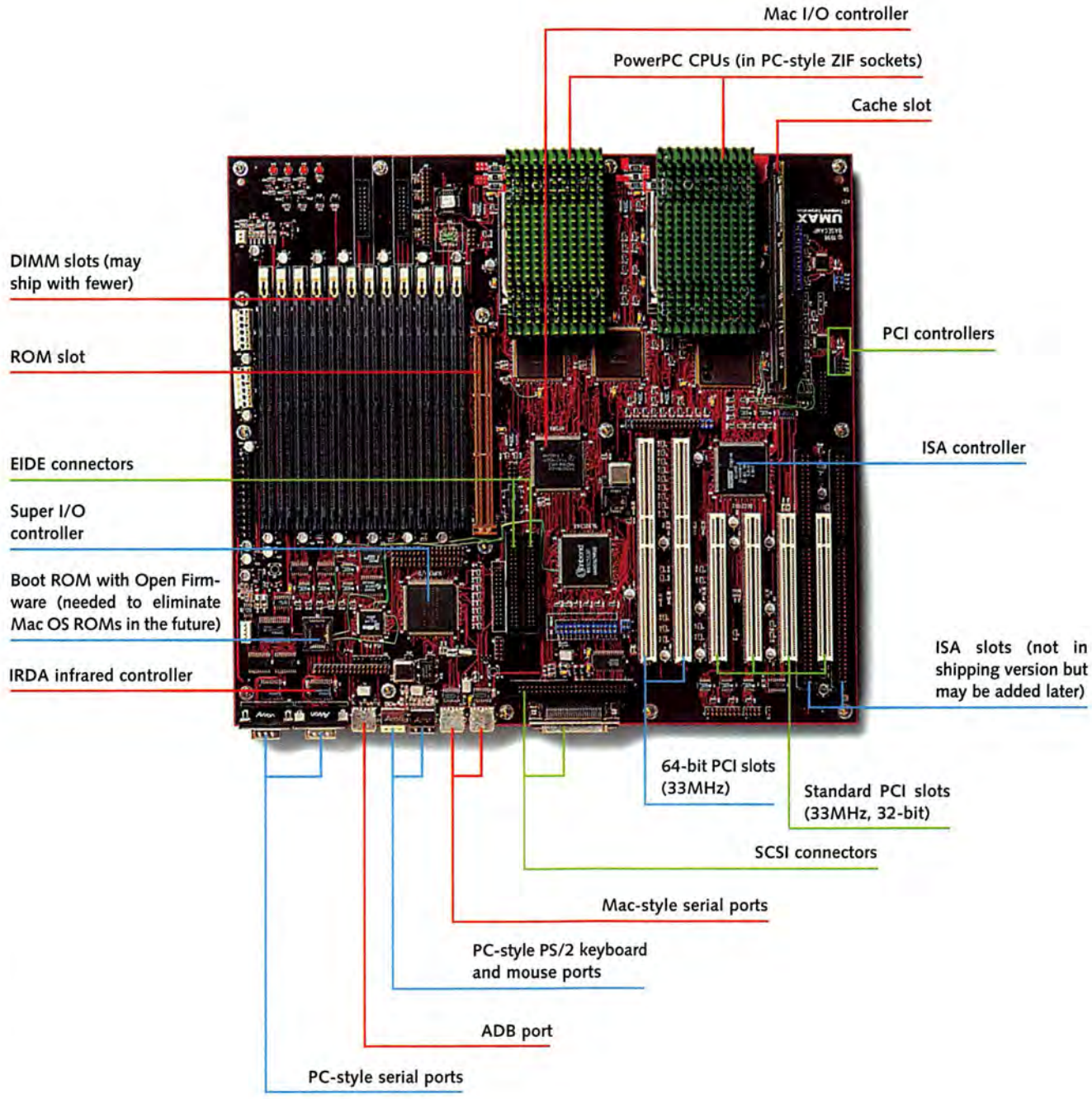
Up Close: What Two Open Mac Designs Offer

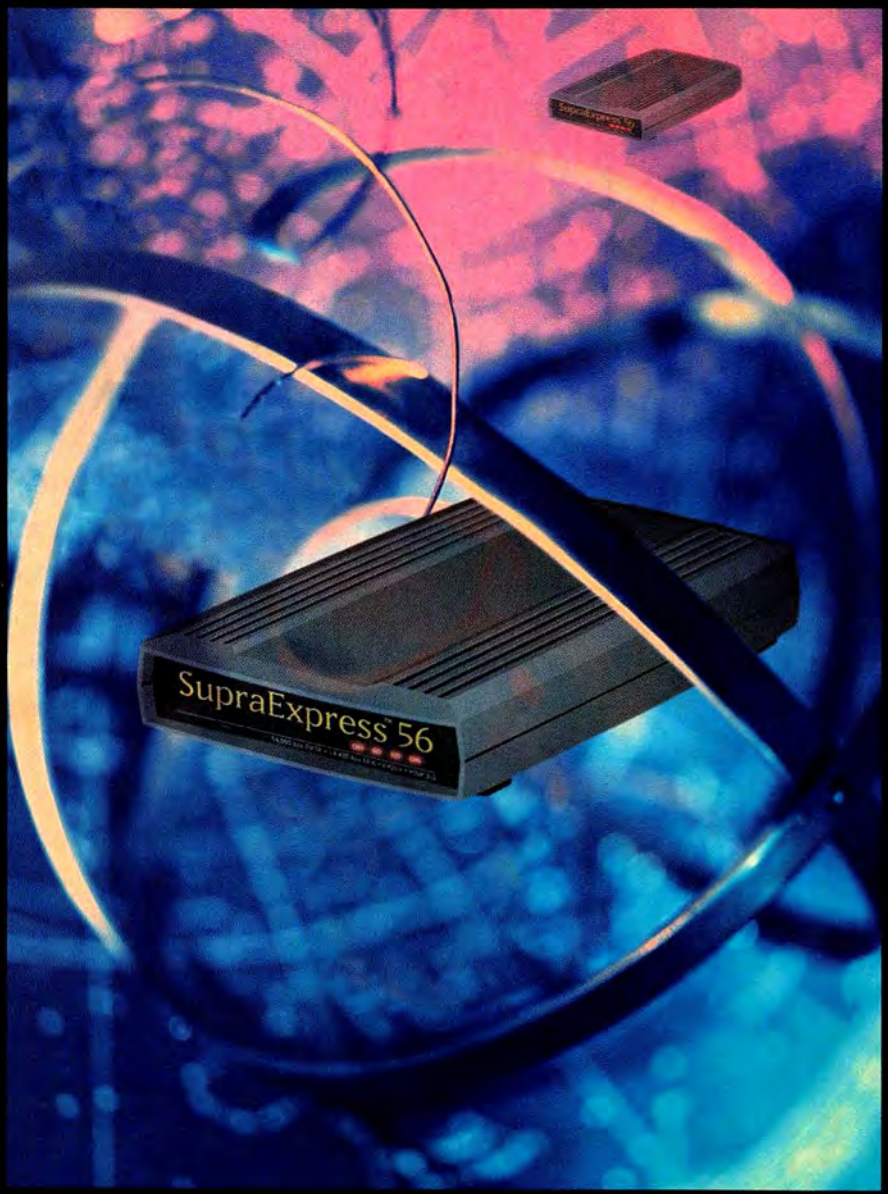
MOTOROLA VIPER PROTOTYPE



Since it was announced in November 1995, the Common Hardware Reference Platform (CHRP) has been held out as a cross-platform architecture that would merge the best of the PC with the best of the Mac, letting multiple operating systems (Mac OS, Windows NT, Unix, and OS/2) run on one system. Today, the OS list has been shortened considerably to just the Mac OS, Unix, and BeOS. But the CHRP architecture is still poised to deliver on the hardware promise. As these prototype motherboards show, Mac makers are taking advantage of popular—and inexpensive—PC technologies to make the Mac even more capable. And faster, too.—GALEN GRUMAN

UMAX BASECAMP PROTOTYPE





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Circle 83 on reader service card

New Products

THE LATEST MACINTOSH RELEASES

Edited by Keith Mitchell

COMMUNICATIONS

Ace in the Hole

If you compute on the go, you don't want to gamble on connectivity options. Ositech's (519/836-8063, *www.ositech.com*) $399 MacJack of Diamonds combines a 33.6-Kbps modem and 10BaseT Ethernet port on a single PC Card.

DISPLAY

More Monitor

Looking for a high-resolution monitor? LG Electronics (201/816-2000, *www.lgeus.com*) has two to pick from. The $1600 Studioworks 28i offers a 20-inch viewable area, maximum 1600-by-1280-pixel resolution, and on-screen adjustments. The $800 Studioworks 78D is a 17-inch monitor with maximum 1600-by-1280-pixel resolution, a Diamondtron tube, and memory modes to store up to 40 different settings.

Acuris 3d AcuWorlds

GRAPHICS

Lions and Tigers and Bears

Acuris (215/493-4302, *www.acuris.com*) has joined forces with MetaCreations (formerly MetaTools) to create 3d AcuWorlds, a $299 package that combines a special version of KPT Bryce 2 with more than 100 models of animals, vegetation, and humans. Available in Bryce and DXF format, the models allow 3-D designers to create populated worlds and landscapes. The models are available separately for $149.

Line-Art Automation

Adobe Systems (408/536-6000, *www.adobe.com*) has a new version of its popular autotracing program, Streamline 4.0. The upgrade adds the ability to perform multiple conversions on a single image, new tools that control curves and lines, and more direct control over the conversion process. The $199 product preserves the color from original images when converting to color line art.

MULTIMEDIA

No More AM Radio Sound

Tired of hearing poor-quality sound from your Mac's on-board speaker? Two new products offer answers.

- The Audio Signal Enhancer from Z-Man (616/246-7929, *www.z-man.com*) is designed to take the sometimes excessive treble and harshness out of digital sound. The $198 hardware device uses a vacuum tube to achieve the effect, and plugs in with standard RCA connectors.
- MidiLand (909/592-1168, *www.midi-land.com*) has a new low-cost speaker system with a subwoofer. The $79 Crescendo includes two full-range speakers and a separate subwoofer with built-in 3-D surround sound and 25w output.

NETWORKING

Building Bridges

Network administrators can expand their networks to other buildings without installing cables. Skyway Bridge from Digital Ocean (913/888-3380, *www.digitalocean.com*) wirelessly connects Ethernet-compliant networks in multiple buildings at distances up to 20 miles apart. The $3895 product transmits data at up to 2 Mbps. You get up to 18 simultaneous voice lines and 3 fax lines.

Nonstop Server

The Internet Station from Dayna Communications (801/269-7200, *www.dayna.com*) is a $600 communications server that combines router and modem-pooling functions. It provides up to three simultaneous ISDN or analog connections, two PC Card slots, and one serial port. It gauges outgoing Internet traffic, automatically disconnecting you after a set time if there's been no activity from your computer.

ONLINE

Add to Your Web Tool Belt

Digital Frontiers (847/328-0880, *www.digfrontiers.com*) has added GIF image-editing capabilities to its HVS Color Adobe Photoshop plug-in. The new version, called HVS ColorGIF 2.0, includes a stand-alone GIF animation editor and batch-export capabilities. It costs $99; current owners can upgrade for $49.

PRINTING

The Tiniest Print Server

XCD (714/573-7055, *www.xcd.com*) has created a $195 print server that fits inside a Hewlett-Packard LaserJet 6P. The Pony Printer Server uses a 10BaseT Ethernet connection and can simultaneously support up to three protocols, including TCP/IP, AppleTalk, Windows 95 peer-to-peer, and IPX/SPX. It is compatible with most popular network operating system printer utilities, including Apple's LaserWriter and Windows Print Manager.

PRODUCTIVITY

Database Evolution

Helix Express 4.5 isn't part of a DNA strand—it's the latest evolution of Helix Technologies' (847/465-0242, *www.mcs.net/~hxtech*) $795 relational database. The update increases speed, includes new keyboard shortcuts, and lets you add items to each page in a document based on the user's actions. Helix has also added support for scripting.

SCIENCE/ENGINEERING

Share Your Statistics

StatView, the statistical-analysis program from Abacus Concepts (510/540-1949, *www.abacus.com*), now runs on AppleShare, Windows 95 and NT, and Novell networks. The new network version lets multiple users work on the same project, even in mixed-platform networks. Prices begin at $695 per user. Site licenses and academic discounts are available.

STORAGE

Megs Over Easy

Need to move large files? The $449 DynaMO 640si from Fujitsu (408/432-6333, *www.fcpa.com*) is an internal 640MB magneto-optical drive. It includes a Macintosh driver, but many Mac systems will require an additional frame kit available from other companies. Blank 640MB cartridges cost $25. m

Fujitsu's DynaMO 640si

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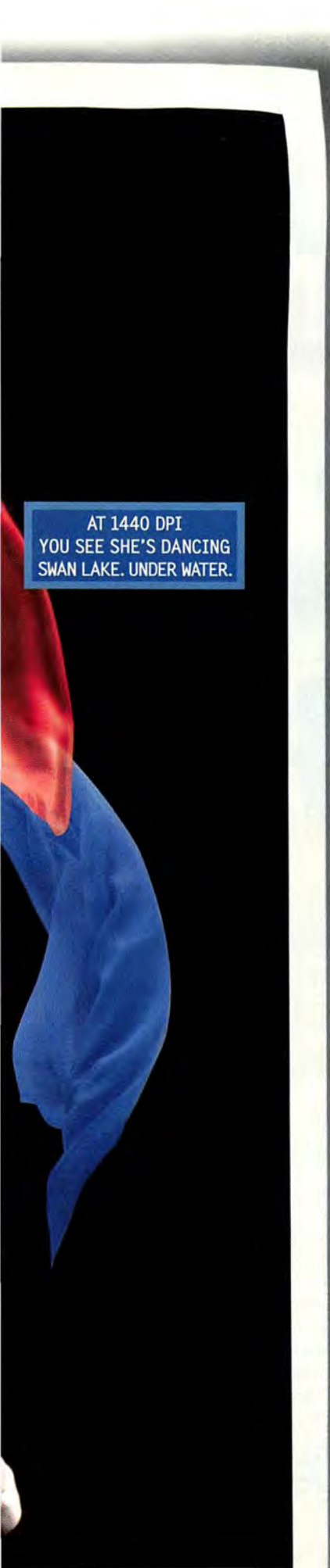

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Reviews

Director 6 Multimedia Studio

EASIER AUTHORING, POWERFUL WEB LINKS

JAMES STEINBERG

THE CHALLENGE: TO MAKE Director, Macromedia's venerable multimedia-authoring powerhouse, easier to use while extending its talents—and without forcing veterans to start from scratch. The verdict: although Director 6 doesn't match the simplicity of some competing authoring programs, it's easier to learn and use than version 5.0 (see *Reviews*, July 1996). Longtime Director users will still find themselves at home and will revel in the new productivity-boosting features, while power-hungry developers will find a feast of high-end features addressing everything from animation to the Web.

Director obviously has the lead role in Director 6 Multimedia Studio, but the supporting cast deserves a mention. SoundEdit 16 2.2 is a powerful, easy-to-use audio editor (see *Reviews*, June 1996); xRes 3 is a solid image-editing package (see the review of FreeHand Graphics Studio in February 1997); and Extreme 3D 2.0 is an industrial-strength 3-D modeling and rendering package (see *Reviews*, April 1997). All the programs have similar interfaces and work well together.

Settling the Score

Director has always had a steeper learning curve than the competition because it takes a frame-by-frame, timeline-oriented approach: when you run a project, playback proceeds sequentially unless a script tells it to jump to a specific frame. This operating style is ideal for creating animations, but it means extra work when you're creating interactive projects such as CD-ROMs. To keep a particular scene visible until, say, a user clicks on a button, you must write a script that tells Director to play that frame over and over again.

By comparison, programs such as mFactory's mTropolis (see *Reviews*, February 1997) and Allegiant's SuperCard (see *Reviews*, May 1997) take a screen-oriented approach similar to that of a publishing program. You create a screen, then add text, graphics, movies, and other media elements. To create a button that leads to a different screen, for example, you choose commands that add the appropriate interactivity. When the project runs, a screen remains visible until the user clicks on the button.

While Macromedia hasn't changed Director's basic approach to interactivity—you'll still find yourself fighting the program's innate desire to play your project from start to finish with no pauses—it has taken steps to make the program easier to work with. One improvement is a

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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

redesigned Score window, sans the headache-inducing hieroglyphics the previous versions displayed (see "Director Scores Big"). Director 6 also supports multiple Score windows, giving you numerous views into a project's timeline. You can set different zoom scales and display options for each window, and drag and drop elements (called *sprites*) from one window to another.

No other authoring program could touch Director 5's animation features, and Director 6 ups the ante. Where Director 5 allowed up to 48 sprites in each Score (and therefore on the Stage), Director 6 allows up to 120 sprites on the Stage simultaneously, and you can animate each one at up to 500 frames per second.

In the new Score window, working with sprites is much easier than in previous versions. Gone is the In Between command, Director 5's clumsy way of moving a sprite across the Stage; you can now animate a sprite by simply selecting the last frame in which it appears and dragging it to its final destination. You can also insert keyframes to create complex animation paths. And if you resize a sprite so it appears in more or fewer frames, Director 6 resizes the keyframes proportionally so the sprite travels faster or slower along the animation path.

Limited Behavior

To address users' criticisms of Director's script-dependent approach, Macromedia has added a Behavior Inspector. This new tool lets you create interactive buttons and hot spots without using Director's Lingo language. It works, but it doesn't go as far as similar features in competing products.

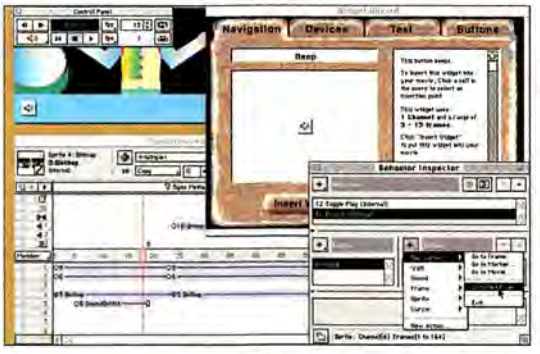
In the Behavior Inspector, you choose an object, an event (such as a mouseclick), and an action (such as playing a sound) from pop-up menus, and Director creates a Lingo script. Alas, the generated scripts aren't commented, so their value as learning aids is limited. What you can do with the Behavior Inspector is also limited. You can't use it, for example, to build a behavior that controls the playback of a QuickTime movie. For this and other advanced tasks, Director includes a library of canned behaviors—in the form of Lingo scripts—that you can drag and drop onto sprites or frames.

Along with the new Widget Wizard, which allows one-click access to common interface elements, these behaviors are solid steps forward, but they don't give Director the simplicity of mTropolis; Lingo still lurks just beneath the surface.

Speaking the Web's Lingo

Director's reliance on scripting makes for a steeper learning curve, but it's also what makes Director such a superb tool for high-octane interactivity. In version 6, Macromedia extends Lingo's vocabulary to allow greater control over media and stronger ties to the Internet.

One significant new feature is the ability to synchronize an animation with an audio track or QuickTime movie. In previous versions, synchronizing animation with audio was a hit-or-miss affair; it's rock solid in Director 6, thanks to tighter integration between Director and SoundEdit 16. You can use SoundEdit 16 to add bookmarklike labels to a sound file or QuickTime movie, then import the sound or movie and synchronize animation events with the labels.



Director Scores Big Director 6's new Behavior Inspector (bottom right) and Widget Wizard (top right) let you create interactive projects without scripting.

Many of the Lingo enhancements in version 6 add capabilities to Shockwave for Director, the technology that enables Director movies to play within Web browsers. Because Shockwave itself now supports streaming (which allows a Director movie to begin playing while it's still downloading), it's a far more viable option for Web developers who want to add CD-ROM–like features and animations. Director 6 also supports browser scripting: using JavaScript or Microsoft's VBScript, you can control Shockwave movies—for example, pause and resume playback or jump to a specific point.

Director 6 also makes it easier to create hybrid CD-ROM–and-Web projects. You can now import and establish links to graphics, text, and other elements stored on Web sites; when a CD-ROM containing Web links runs, it retrieves and displays those media elements. Director's enhanced Web features don't approach those of third-party plug-in modules—such as g/matter's XtraNet or Allegiant's Marionet for Director, both of which give programmers low-level access to Internet protocols—but they're more than adequate for creating simple hybrid CD-ROMs that retrieve and display information from Web sites.

Another way the Web has infiltrated Director 6 is in the program's unmatched built-in help system: it now features Web links that take you directly to relevant areas of Macromedia's Web site, where you can download examples, read new tips, and get late-breaking information.

Macworld's Buying Advice

Although an enhanced Score window and new behavior features make the program more approachable for beginners, Director remains more difficult to learn than mTropolis. And while you can create Windows run-time projects in mTropolis, Director requires that you buy the Windows version.

Nonetheless, Director 6 Multimedia Studio is a first-rate bundle of production power, and Director remains the premier tool for professional multimedia development. It offers more options for tuning performance, superior animation features, and stronger ties to the Web. No other authoring program provides a more powerful mix of features, productivity aids, and performance.—JIM HEID

Director 6 Multimedia Studio

DIRECTOR 6 ★★★★/7.8
MULTIMEDIA STUDIO ★★★★/8.2

PROS: Enhanced authoring environment; simplified Score; excellent Web features; bundle offers great value. **CONS:** Timeline approach and heavy reliance on scripting complicate authoring; must purchase Windows version to create Windows titles. **COMPANY:** Macromedia (415/252-2000, *www.macromedia.com*). **COMPANY'S ESTIMATED PRICE:** $999.

Virtual PC

SLOW-BUT-STEADY EMULATOR'S PRICE IS RIGHT

UNTIL RECENTLY, IF YOU WANTED to run Windows 95 on your Mac without installing a PC-compatibility card, you had exactly one choice—the almost intolerably slow SoftWindows 95 from Insignia Solutions (see *Reviews*, July 1997). If you wanted to run OS/2 or Windows NT on your Mac, hardware cards were your only option. Now, thanks to the hardware-emulation gurus at Connectix, there's a cheaper and more flexible route to Windows compatibility. The eagerly awaited Virtual PC 1.0 provides an emulation program that allows you to run PC software on your Mac—albeit slowly—by converting X86 instructions into PowerPC instructions on the fly.

Windows in a Window Virtual PC lets you fill your entire screen with Windows 95, or run the OS in a Macintosh window.

Because Virtual PC mimics an Intel Pentium PC with MMX capabilities, it supports any operating system that runs on the Intel Triton chip set—including Windows NT, OS/2, and OpenStep (Insignia Solutions' products, by comparison, are OS-specific). The program comes bundled with your choice of Windows 95, or Windows 3.1 and DOS. Like SoftWindows 95, Virtual PC allows you to access Mac peripherals from within PC applications.

Virtual PC's most appealing feature is its price: less than half that of SoftWindows 95 4.0. It's also easier to install and configure, but it has steeper system requirements: Connectix recommends a PowerPC 604 or 604e chip, or a 603e chip running at 180MHz or faster.

Even on fast hardware, though, Virtual PC's speed is disappointing. Although the program offers excellent compatibility with PC software, it's not noticeably faster than SoftWindows. In fact, in some of our speed tests on a Power Macintosh 7300/200, Virtual PC ran slower than SoftWindows 95 4.0 (see "Virtual PC's Speeds on Par with SoftWindows'"). Macworld Lab also spot-tested Virtual PC on a 601-based 7500/100 (which Connectix doesn't support) and found that it ran consistently slower than SoftWindows 95 on that machine.

Virtual PC is easier to set up and less cumbersome than SoftWindows 95. SoftWindows requires you to tinker with memory settings in the program's Preferences to optimize performance. With Virtual PC, you simply assign more memory to the program using Get Info, and Virtual PC takes care of optimizing the allocated memory for maximum performance. (Boosting RAM allocation from 22MB to 30MB produced a noticeable improvement in performance.)

Setting up shared folders between the Mac and PC environments is also more straightforward with Virtual PC. Accessing PC files from your Mac is particularly easy; when you double-click on a Virtual PC hard-drive icon—the virtual PC hard drive on your Mac—it actually mounts on the Mac desktop, just like any other disk.

Like SoftWindows 95, Virtual PC offers a quick-start feature that saves a snapshot of the current PC environment when you quit. You can run Virtual PC within a window on the Mac desktop or in full-screen mode. It's easy to swap between the two views; pressing the ⌘ key makes Virtual PC's menu bar appear whenever you need it. Unfortunately, Virtual PC doesn't allow you to copy and paste from PC programs to Mac applications—something SoftWindows does quite well. You can, however, copy and paste from Mac to Windows.

Macworld's Buying Advice

Anyone who's serious about running PC applications on a Mac—particularly games and multimedia titles—should bypass both Virtual PC and SoftWindows and spring for a PC-compatibility card from Apple or Orange Micro. For users who occasionally need to run PC programs without steep speed requirements, or for those who want to experiment with other operating systems, Virtual PC is a viable, low-cost solution—and a better deal than SoftWindows.—JOSEPH SCHORR

RATING: ★★★/6.8 **PROS:** Least expensive PC-on-Mac option; supports full range of Intel-based operating systems; easy installation and setup. **CONS:** Slow performance; can't copy from PC to Mac. **COMPANY:** Connectix (415/571-5100, *www.connectix.com*). **COMPANY'S ESTIMATED PRICE:** $149.

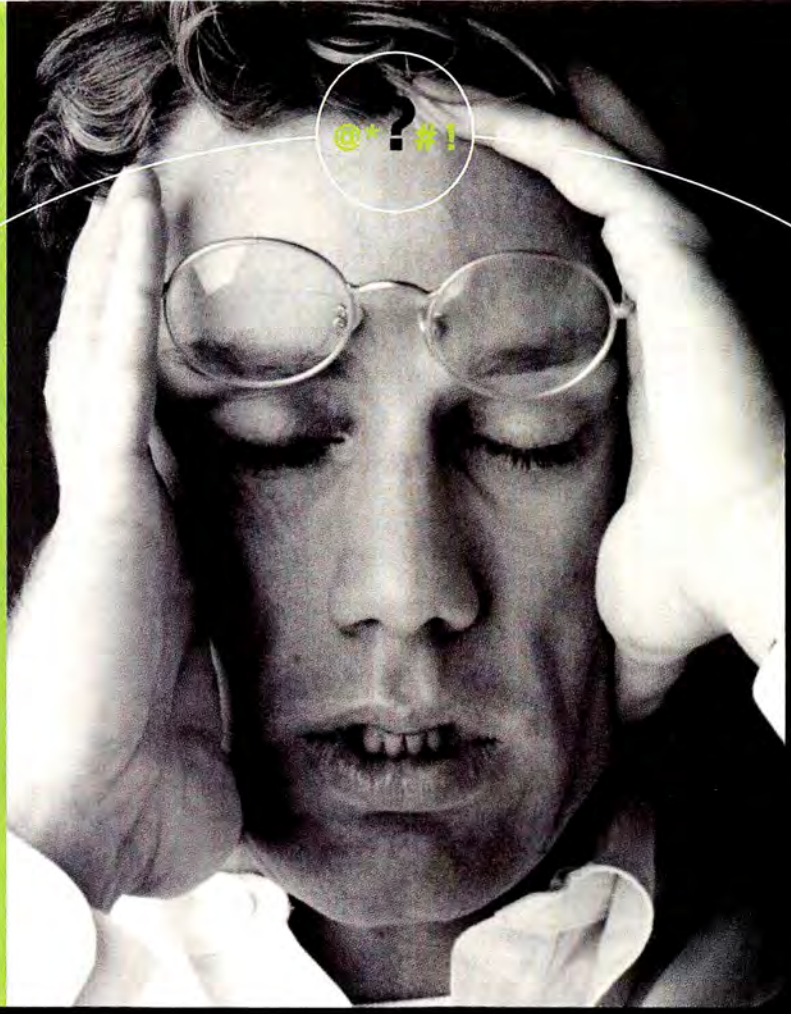
Macworld LAB TEST

Virtual PC's Speeds on Par with SoftWindows'

Longer bars are better. Results are times as fast as a Sony PCV-120 200MHz Pentium MMX PC (Pentium 200 = 1.0). ▶ New product.

Behind Our Tests

For more information on our methodology, see "Windows 95 Compatibility Solutions," *Reviews*, July 1997, or *www.macworld.com/tests/*. Both products tested on a Power Macintosh 7300/200.—**Macworld Lab testing supervised by Matt Clark**



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StarMax 5000/300

CONSUMER SYSTEM TAKES 603E LEAD

MOTOROLA'S TANZANIA II motherboard makes an impressive debut in the StarMax 5000/300. This 300MHz 603e-based machine—sporting a 50MHz bus—ties the 604e-based Apple Power Macintosh 7300/200 in overall speed and rivals the StarMax 4000/200 in Macworld Lab tests. It even *outperforms* 604e systems in many tasks, taking a pronounced lead in 603e performance.

Featuring a new memory controller and breaking free of the 40MHz system-bus speed of the original Tanzania motherboard (used in previous StarMax models), the Tanzania II increases bus speed by 25 percent over its predecessor. The new bus architecture, combined with a faster CPU clock rate, proved enough to push the StarMax 5000/300 past its competitors, making it a great option for small-office/home-office users. The 5000 outruns the only other shipping 300MHz 603e-based system, Apple's Power Macintosh 6500/300 (which also uses a 50MHz bus), by 4 percent overall.

The StarMax tops Power Computing's PowerBase 240 (with a 40MHz system bus) by a whopping 36 percent. But because of its $1499 price (which includes a $100 rebate from Power Computing through the end of July), the PowerBase remains an incredibly strong value. As a result, the top-performing StarMax 5000/300 ties the value-oriented PowerBase 240 as *Macworld*'s Editors' Choice for best SOHO system (see *Mac Superguide* in this issue).

Still, if you need more features and speed than the PowerBase 240 offers, the StarMax 5000/300 provides both at a respectable value. For $2899, Motorola includes 4MB of on-board video RAM, compared with the 2MB of VRAM on both the Power Mac 6500 and PowerBase 240. (A $3399 model includes an 8MB IXMicro TwinTurbo 128 video card and 100BaseT Ethernet.)

Like its competitors, the StarMax includes on-board video and 3-D acceleration. The StarMax 5000/300 also includes an Iomega Zip drive, 10BaseT Ethernet, a 4GB hard drive (all standard on the Power Mac 6500), and a 16× CD-ROM drive (versus 12× models in the PowerBase 240 and Power Mac 6500).

The StarMax 5000 also offers four free PCI slots (a fifth is taken up by the Ethernet card) versus the three free slots the PowerBase 240 offers. That expandability, the Zip drive, and the system's video capabilities make the StarMax 5000 attractive to novice content creators and general-purpose business users. Motorola has also added internal SCSI, a feature users have been demanding. Priced $100 less than the Power Mac 6500, the StarMax 5000/300 offers more for the money—and although the PowerBase 240 is less expensive, the StarMax 5000 makes up for its price with its generous features.

One disadvantage: those upgrading from older systems won't be able to transfer RAM into their newly purchased StarMax 5000. The StarMax uses 3.3-volt DIMMs, which are incompatible with older memory modules.

Macworld's Buying Advice

Although we don't recommend it for professional graphic designers or multimedia producers, general business users and

ARNOLD TIOSEJO

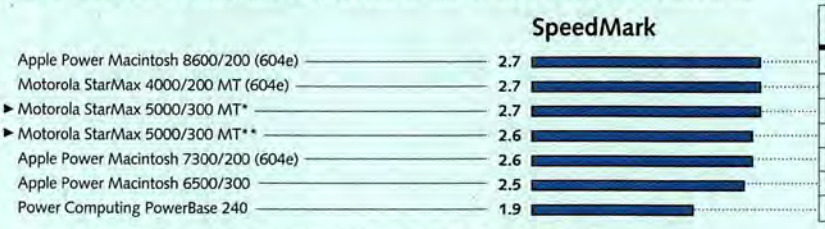
even entry-level content creators should consider the StarMax 5000/300; it matches the performance of several low-end 604e systems and leads all 603e models. The StarMax 5000/300 offers a rich set of features at a respectable price, and—thanks to the Tanzania II motherboard—top-notch performance.—TOVA FLIEGEL

RATING: ★★★/6.6 **PROS:** Great performance and features; solid value. **CONS:** 3.3-volt DIMMs. **COMPANY:** Motorola Computer Group (800/759-1107, *www.mot.com/computer/*). **LIST PRICE:** Base model $2899; with 8MB video card and 100BaseT Ethernet $3399.

Macworld LAB TEST

Fastest 603e-Based System Yet

Longer bars are better. ►New system. An Apple Power Macintosh 7100/80 has a SpeedMark score of 1.0.



CPU	FPU	Disk	Video	Star Rating
3.0	2.9	1.9	3.6	★★★/6.5
3.0	2.9	1.9	3.0	★★★/5.3
2.9	2.6	2.1	5.9	★★★/6.6
2.8	2.5	2.1	4.0	★★★/6.6
2.9	2.9	1.6	3.6	★★★/5.9
2.7	2.5	1.9	3.3	★★★/5.9
2.1	1.9	1.6	2.4	★★★/6.5

*With 8MB IXMicro TwinTurbo 128 video card. **With 4MB of on-board VRAM.

Behind Our Tests For detailed information on our systems benchmarks, see *Mac Superguide* in this issue or *www.macworld.com/tests/*.—**Macworld Lab testing supervised by Mark Hurlow**

IS THIS JAZ OR THE *hustle?*

FREE 5-PACK

Visit our website for all the details on our free 3.2 gigabyte 5-pack media offer.

Once you get past the cute name and trendy packaging, the only thing Jaz® users have left is a thinner wallet. Good thing there's DynaMO®640 removable storage from Fujitsu. DynaMO 640 is much more durable because it's magneto-optical (unlike Jaz). It lets you save your work on different media capacities ranging from 128MB to 640MB (unlike Jaz). You get free tech support (unlike Jaz). And it's less than half the cost of Jaz media,* with a 640MB cartridge going for only $25. There's also our No Excuses℠ policy: Our promise that in the unlikely event should anything go wrong within warranty period, you'll get a replacement drive in two business days. (Bye-bye Jaz.) For more details, without the hustle, call, or visit our website.

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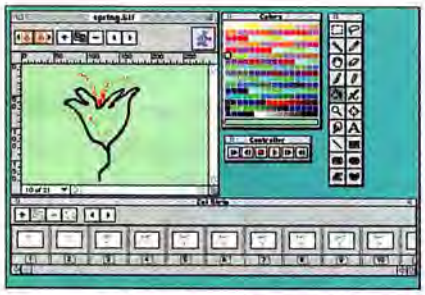
Circle 202 on reader service card

Web Animation Tools

VERSATILE PROGRAMS PAVE THE WAY FOR INTERACTIVITY

UNTIL RECENTLY, WEB ANIMATION meant nightmarish download times and novelty pages reminiscent of Times Square on New Year's Eve. No more; several programs released over the past year prove it's possible to develop 2-D animations that load quickly and add useful interactivity to a site. I checked out four of these new tools, ranging from $50 to nearly $450, from the simple to the sophisticated. The result: you get what you pay for.



The Organic Approach WebPainter's simple interface requires creating or importing individual cells.

Animation Controls

One of the first and most popular 2-D Web animation tools for the Mac, Totally Hip Software's WebPainter 1.0 creates cel-based animations—in other words, it produces individual cels that, shown in succession, create an animated effect. The others are frame-based; you create keyframes in which you draw or import only the parts of your animation that change, and the program generates the transitional frames using motion interpolation.

WebPainter's simple interface consists of a document window, where you create new cels and import and create bitmapped graphics; a strip displaying each cel in sequence; and color and tool palettes. Unfortunately, you need to create (or import) each cel of your animation without the help of keyboard commands for manipulating cels or even playing your animation.

In contrast, DeltaPoint WebAnimator 1.1's interface feels too complex. You create your animation in three separate views: Draw, where you draw and edit objects; Animation, where you resize and reposition elements of your animation's frames; and Storyboard, which displays a cel-type overview of each frame. Switching back and forth between the views quickly becomes annoying.

Graphic timelines and object layers give Macromedia's Flash 2.0 and PaceWorks' ObjectDancer 1.1 more flexibility than the other programs have. In both, individual objects appear on layers beside the timeline. Flash's animation controls appear in pull-down menus attached to keyframe markers on the timeline; ObjectDancer's dynamic controls let you click in the timeline or use keyboard shortcuts to build your animation.

Moving Pictures

When it comes to generating motion, Flash and ObjectDancer are the most intuitive of the three frame-based programs: you either draw a motion path or drag an object to designate motion between keyframes. WebAnimator interpolates selectively; to resize an object over successive frames, you draw the individual frames, selecting menu commands only for certain types of interpolation.

In ObjectDancer, recycling motion and other attributes of an object is a snap. You simply copy an object's attributes and paste them onto other layered objects in your timeline, or store them in a library for future use. Similarly, Flash can generate grouped animations that are either reused in the same animation (ensuring smaller file sizes) or stored in libraries.

Timing Is Key

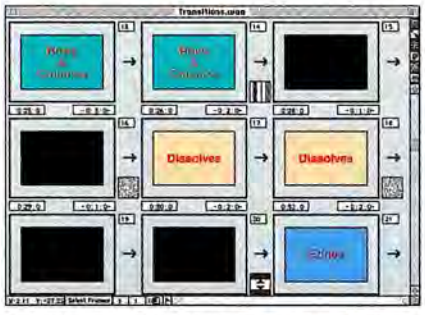
Creating a fast-loading but good-looking animation is a balancing act that requires careful attention to timing controls. Two factors are the interframe delay, which essentially determines the objects' velocity, and the frame rate. The more frames in your animation, the smoother it appears—and the bigger the resulting file.

This is where cel animation's weaknesses are most obvious: to smooth out changes in an object's velocity in WebPainter, you have to create extra cels. WebAnimator gives you more control, letting you adjust the interframe delay in individual frames in the Storyboard view. ObjectDancer gives you excellent control over the velocity of individual objects as they move through the timeline; you double-click on an object's attribute in its timeline layer, then reshape Bézier points on a velocity curve. To alter objects' velocity in Flash you use an *easing* control in interpolated sequences.

Technicolor Web

Despite some shortcomings, Flash's drawing and painting tools offer more flexibility than do the others (ObjectDancer lacks such tools entirely). A standard paint bucket can fill objects with broken or closed lines; set the pencil tool to recognize shapes, and those lopsided papayas become perfect circles. Even the options for flipping, rotating, and scaling are far more comprehensive than those in WebAnimator and WebPainter.

Flash's vector-based approach produces smaller files than bitmapped draw programs can manage, but limited tolerance settings make drawing with pinpoint accuracy difficult. Drawn objects are often broken into segments, making them difficult to move around quickly. And although you can import, scale, and trace bitmapped graphics, the trace feature frequently creates complex paths; it's best used for simple objects, such as logos.



Storyboarding This WebAnimator view displays a sound timeline and transitions between keyframes.

WebPainter draws and imports only bitmapped files, making for potentially large file sizes and jaggy animations. While you can draw and import vector-based graphics in WebAnimator, its drawing tools are limited, and imported bitmaps consistently changed position when I toggled between views.

ObjectDancer offers no drawing tools, imports bitmapped formats exclusively, and relies heavily on well-implemented but transitional QuickDraw GX technology. Flash's vector-drawing

Festival of Animation: Four Web Animators Compared

	Flash 2.0	ObjectDancer 1.1	WebAnimator 1.1	WebPainter 1.0
Company	Macromedia	PaceWorks	DeltaPoint	Totally Hip Software
Star Rating	★★★★/8.2	★★★★/7.4	★★★/6.0	★★★/6.9
Price	$199.00	$445.00	$49.95	$99.95
Phone	415/252-2000	415/261-6180	408/648-4000	604/685-6525
Web address	*www.macromedia.com*	*www.paceworks.com*	*www.deltapoint.com*	*www.totallyhip.com*
Import formats	AutoCAD DXF, BMP, EMF, GIF, Illustrator, JPEG, PICT, Shockwave Flash, SPL, SWF, WMF	GIF, JPEG, MacPaint, Photoshop, PICT, QuickDraw GX (graphics or text), QuickTime (sprite, video, text), SGI.RGB	BMP, DIB, EPS, GIF, JPEG, PCD, PCX, PDF, PICS, PICT, PNG, TGA, TIFF, WebAnimator Object	GIF, PICS, PICT, QuickTime
Export formats	animated GIF, AVI, BMP sequence, DXF sequence, EMF, EPS 3.0, GIF, Illustrator sequence, JPEG, PICT, QuickTime, SPL, SWF, WMF	GIF, GIF89, GX, Java, PICT, QuickDraw GX, QuickTime, QuickTime sprite	animated GIF, QuickTime (512 × 384 only), WebAnimator	animated GIF, GIF frames, PICS, PICT frames, QuickTime, QuickTime sprite, Sizzler
Drawing tools	vector	none	vector	bitmap
Sound formats	AIFF, WAV	AIFC, AIFF, AU, DigiDesign Sound Designer II, MIDI/CD imports, QuickTime soundtracks, WAV	AIFF, SND, WAV; supports 4 soundtracks	none
Plug-in	Shockwave Flash (.SWF)	none	WebAnimator (.WAN)	Sizzler (.Sprite)
Animated GIFs	Exports 4, 8, 16, 32, 64, 128, and 256 colors, black and white, and adaptive palettes; no support for transparency.	Exports GIFs with built-in palettes, including System, Netscape, optimized, 4 colors, 16 colors, options for custom; supports transparency.	Exports animated GIFs; stores bitmapped images in 8-bit format; default color palette is Mac system palette.	Defaults to adaptive palette; supports background transparency.
QuickTime/ video compression	animation, Cinepak, Component Video (YUV), graphics, Microsoft RLE, Microsoft Video 1, Motion JPEG A/B, Photo JPEG, Planar RGB, video	animation, Cinepak, Component Video (YUV), graphics, Photo JPEG, video	animation	animation, Cinepak, Component Video (YUV), graphics, Photo JPEG, video

approach also allows good typographical control, letting you skew, flip, rotate, and otherwise manipulate text. WebPainter and WebAnimator are more limited; they don't skew or rotate text easily, and because WebAnimator's plug-in format uses client-side fonts, you need to make sure you're using a common typeface.

Web developers who don't have the patience to work in Java or Macromedia Director should have a field day with the interactivity built into Flash and WebAnimator. Animated and rollover buttons are particularly easy to create in Flash, using a simple timeline with four keyframes and a wide range of button actions. WebAnimator also lets you navigate between scenes, or link multiple scenes and play them locally, but it doesn't support branching between scenes over the Web.

Curtain Up

If you've added sound to your animation, users will need a browser plug-in to hear it (unless you export your animation as a QuickTime movie). They'll also need plug-ins to display interactive elements created in Flash or WebAnimator. Sound and animation (at 10 or 15 frames per second) in plug-in formats played very well over the Web using a 28.8-Kbps connection and a 100MHz CPU. Faster rates can mean skipped frames if the sound streams faster than the images.

Sound production was particularly good in ObjectDancer, which supports unlimited soundtracks per scene and has a nice audio-marking window for scrubbing and synchronization. Though ObjectDancer exports applets, it can include audio only in QuickTime and video exports.

The compression that the plug-in formats offer is a definite advantage, except in the case of animations saved in WebPainter's Sprite format. In Flash, a giant 600K GIF with more than 100 colors became a 7K streaming Shockwave Flash movie; WebAnimator pared the same GIF from 524K down to 46K. While WebPainter's cel-based animated GIF was the smallest of all—162K—its streaming Sprite weighed in at 255K.

ObjectDancer has no plug-in format; a 94-color GIF test image clocked in at 545K, unreasonably large for general Web viewing. But with its built-in GIF palettes, great typography, and motion controls, ObjectDancer lets you achieve wonderful effects with smaller GIFs. You have to jump through a few hoops to make sure animations saved in the WebAnimator and Shockwave Flash plug-in formats display correctly, and in Flash, a variety of useful but often tricky parameters—like HTML tag attributes for playing movies at high or low quality—can drastically affect the appearance of your movie.

Macworld's Buying Advice

All the animation programs I looked at are good enough to generate simple animations; your choice depends on how much sophistication and interactivity you're after. WebPainter is an adequate tool for very simple, no-frills animations and sprites. WebAnimator is reasonably priced considering its comprehensive features and interactivity, but limited drawing tools and motion controls make it best suited for animations like banner ads and simple logos. The high-priced ObjectDancer cries out for more interactivity, though its sophisticated object-oriented timeline and animation controls make it worth a serious look from new-media professionals. But for an all-purpose animation tool with a simple interface and interactive components, look no further than Flash. It's all you need to give your site a dynamic future.—ROXANNE GENTILE

Color Page Scanners

CONVENIENT, INEXPENSIVE NEWCOMERS ARE A WEB PUBLISHER'S DREAM

MITSUBISHI PIONEERED THE color sheetfed scanner with its MCA S600c (*Reviews*, June 1997), and now two more vendors have stepped up to the plate. Microtek's Color PageWiz and Visioneer's PaperPort Strobe carry on the tradition of archival scanners, delivering speedy scans at quality levels useful to online producers and low-end publishing. Both products deliver medium-quality 24-bit color scanning, but neither scans at resolutions needed for color print publishing.

A Study in Contrasts

The slower, bulky PageWiz—priced at an amazingly low $159—is roughly the size of a compact ink-jet printer; its built-in sheet feeder makes page alignment easy. By comparison, the more-expensive Strobe is small and sleek—taking up even less space than its predecessor, the PaperPort Vx (*Reviews*, March 1996). The Strobe lacks a sheet guide, but you can easily stow it behind your keyboard so it's always at hand for quick, convenient scans. Both scanners connect to your Mac via a supplied SCSI cable, but the PageWiz makes you daisy-chain additional devices onto the back of the scanner itself; the Strobe's piggyback connector lets it jump into the chain right at your Mac's SCSI connector.

Setting up either product is easy; both offer plenty of online documentation and quick-start guides that get you up and running quickly. The Strobe requires careful calibration with a special sheet. Pay attention to Visioneer's instructions—scanning the calibration sheet incorrectly can mess up your colors beyond recognition.

Both units automatically begin scanning when you insert a page; the Strobe immediately scans and stores the image, while the PageWiz first asks you to confirm scan settings—inconvenient when you're scanning multiple pages. The PageWiz's bright scan light remains on continuously, which I found annoying in a dimly lit office.

Speedy Scans, So-So Saturation

For basic document scans—100-dpi monochrome—the Strobe performs twice as fast as the PageWiz: 4 seconds compared with 8 seconds, for a single sheet. The speed difference narrows at higher resolutions or in color mode, but the Strobe always maintains a performance edge. The PageWiz offers 300-by-600-dpi optical resolution, while the Strobe's limit is 300 by 300; the difference shows up in high-resolution color scans, where

KEVIN CANDLAND

Color PageWiz, top, and PaperPort Strobe

the PageWiz captures more detail. Strobe images also tended to be washed out, requiring post-scan correction; Visioneer says a corrective patch will be available online by the time you read this.

You can easily change either scanner's parameters on the fly; both products include preset configurations for common situations—such as OCR or photo storage—and both let you create your own presets. The PageWiz, however, remembers only your last four settings, while the Strobe stores any number. Both scanners include document management software with an icon-oriented desktop that lets you drag and drop documents to arrange, stack, OCR, print, fax, file, and e-mail them. The Strobe's PaperPort software is more convenient and sophisticated than the PageWiz's PageSuite application.

Plays Well with Others

PaperPort lets you scan directly into an application (such as an image editor), use the OCR engine to dump text to a word processor, or send your image directly to Internet e-mail (PageSuite, in contrast, supports only Lotus cc:Mail); a one-step hot key makes faxing very convenient. You can also search PaperPort archives using annotations inside a document, as well as external keywords; PageSuite limits its searches to keywords only.

Xerox TextBridge serves as the OCR engine for both scanners, although the Strobe only includes TextBridge LE, while the PageWiz bundles the full 3.0 application. Either TextBridge version does a fair job of capturing document formatting—including tabs, indentations, and fonts—but if you want the Strobe to yield highly accurate OCR, you'll have to take advantage of Visioneer's $159 optional upgrade to TextBridge Pro, which surpasses even TextBridge 3.0's features. The PageWiz also bundles MicroFrontier's ColorIt 3.0.8; the Strobe includes PictureWorks' PhotoEnhancer 3.1 and Connectix QuickCards 1.0.

Macworld's Buying Advice

If you need top-quality color scans, buy a low-cost flatbed scanner—neither the Microtek Color PageWiz nor the Visioneer PaperPort Strobe can touch their resolution or color accuracy. Otherwise, let your budget be your guide: if money is tight, the PageWiz offers color imaging and advanced OCR capabilities for a super-low price. If time savings are more important than cost, you'll prefer the Strobe's fast scanning, behind-the-keyboard positioning, and exceptional document-management software.—MEL BECKMAN

Color PageWiz

RATING: ★★★★/7.2 **PROS:** Good value. **CONS:** Bulky; no direct-to-application scanning; limited one-step e-mail; slow scanning speed. **COMPANY:** Microtek (310/297-5000, *www.microtekusa.com*). **LIST PRICE:** $159.

PaperPort Strobe

RATING: ★★★★/7.9 **PROS:** Compact, fast; one-step fax hot key; scans direct to applications and e-mail. **CONS:** Slightly washed-out colors; limited OCR configuration options; lower resolution. **COMPANY:** Visioneer (510/608-0300, *www.visioneer.com*). **LIST PRICE:** $299.

Painter 5

UPGRADE TOUCHES UP INTERFACE AND ARCHITECTURE

PAINTER 4, WITH ITS EXCELLENT emulation of natural-media techniques and innovative digital brushes, is a tough act to follow (see *Reviews*, March 1996). But MetaCreations—the result of the Fractal Design and MetaTools merger—has done it: Painter 5 is better than ever. The new version introduces an extended plug-in architecture, dynamic floaters (layers), more than 100 new brushes, selection and masking tools that conform to industry standards, and a more versatile interface. It also includes the Kodak Color Management System and supports both CMYK and Hexachrome output.

But despite all the changes, Painter is still Painter. Veteran users will find themselves on familiar ground, and novices still face a significant learning curve on the road to proficiency. But nothing worth attaining is easy, and Painter 5 is definitely worth the effort.

Torn between Two Brushes

When Painter 3 did away with the ability to tear off individual brush variants, I mourned. Painter 5 not only restores this feature but improves it: the new version lets you collect both tools and menu commands into user-definable palettes. That means you can keep your favorite pencils, airbrushes, and erasers close at hand, just as you would on a real drawing table—a terrific improvement that addresses how artists really work.

Among Painter 5's new brushes are one that paints in the style of John Singer Sargent; brushes that let you twist and pull colors across an image and paint on transparent layers, similar to working on glass or acetate; Super F/X brushes that apply glows and flames; and Super-Cloning brushes that transform an image as you clone it. New Photo brushes let you paint with individual color components (such as hue and saturation) and brush on imaging-filter effects (such as Blur, Sharpen, Dodge, and Burn). Unlike filters that work on entire images or selections, these brushes let you apply the effect only where you want it. If you've spent any time in a darkroom, you know this is a better way to manipulate a photo.

Painter still supports standard Adobe Photoshop 3.0 plug-ins (Photoshop 4.0 alters the conventions, making some new plug-ins—such as Alien Skin's Eye Candy—incompatible with Painter), but it extends the architecture so developers are no longer limited to Photoshop's capabilities. For example, Painter 5's new Dynamic Plug-in Floaters produce user-definable and -modifiable effects on a floating selection or on the image area beneath the selection. One dynamic floater applies glass distortions, blurring image elements directly underneath—when you move the floater, the distortion moves with it. If you save the image in Painter's native RIFF format, you can return to change the floater's location and blurring parameters. Other dynamic floaters burn and tear selection edges, adjust the image (with Brightness/Contrast, Equalize, and Posterize options), paint with liquid-metallic blobs, and bevel edges—a great way to create Web-page and multimedia buttons.

Transforming the Clones Painter 5's Super-Cloning brushes can rotate, scale, shear, and otherwise transform an image. Here, the brushed-on clone is slightly rotated and mirrors the source image.

New Selection Tools

Painter's powerful but offbeat selection tools have long confused users and irritated professionals who regularly switch among programs during projects. New with version 5 are selection tools (marquee and lasso) that adhere to Mac conventions. Adding to a selection now takes a simple shift-click; earlier versions' misguided Controls Palette buttons are gone. Painter can still transform a pen-drawn Shape object into a selection definition, letting you select odd-shaped areas and edit selection boundaries more precisely. The long-overdue selection-tool changes make Painter more accessible to novices and more useful for everyone.

Painter 5's handling of masks (alpha channels) now better conforms to Photoshop practice. It can save as many as 32 user-defined masks with each document; when you import images into Photoshop, saved masks correspond to channels #4 and higher (up to Photoshop's 24-channel limit), and the channels of imported Photoshop images appear in Painter's Mask List palette. Similarly, Painter's image floaters correspond to Photoshop layers and Painter's Shapes to Photoshop paths. Altogether, it's easier than ever to use the two programs collaboratively.

Painter's greatest flaw is still its complexity. The manual is thorough and well organized, but it's hefty enough to frighten the faint of heart. Less daunting is the tutorial, which provides an excellent introduction to the program. The Painter CD contains lots of examples to help you plumb Painter's depths—predefined floaters, scripts, lighting designs, selection definitions, and interface sets—along with additional brushes, Image Hose nozzles, paper textures, weaves, patterns, color gradations, and color palettes.

Macworld's Buying Advice

Painter 5 is complicated and demanding to learn; then again, so are traditional art techniques. As with color on canvas, novices can start painting right away, learning the program's nuances as they gain experience. The payoff for persistence is mastery of an outstanding graphics tool. Painter 5 is a program no artist should be without.—CARLOS DOMINGO MARTINEZ

RATING: ★★★★★/9.1 **PROS:** Great new plug-in tools and dynamic floaters; excellent, customizable interface; amazing natural-media emulation. **CONS:** A learning curve befitting a complex program. **COMPANY:** MetaCreations (408/430-4100, *www.metacreations.com*). **LIST PRICE:** $449.

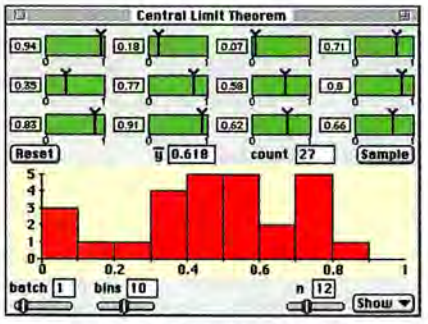
Statistics Packages

NEW ARRIVALS BOLSTER MAC'S SCIENTIFIC STANDING

FOR A REAL-WORLD DEMONstration of the Mac's aptitude for turning numbers into decisions, look no further than these new statistics packages: ActivStats 1.0, part of Addison-Wesley's interactive CD-ROM series; FloStat 2.0 from the survey experts at Senecio; and Prism 2.0, a Mac version of GraphPad's popular Windows lab-statistics program. Geared to users in three different segments of statistics, each product covers its chosen area well.

A Well-Rounded Package

The ActivStats package combines three components: a student version of Data Description's longtime stats favorite Data Desk (see *Reviews*, March 1996), educational movie clips, and an effective set of



Plenty Active ActivStats offers a score of interactive experiments to clarify basic principles—such as why bell curves pop up in many contexts.

student activities that use Data Desk as a computation engine (see "Plenty Active").

An indexed online book uses material from Paul Velleman's introductory text, *Learning Statistics with Data Desk*, encompassing basic probability, distributions, hypothesis testing, analysis of variance, correlation, and regression. Besides providing enhanced first-year college statistics, ActivStats can automatically connect to Web sites offering additional material, links to statistics references, and intermediate-version updates.

All too often, an educational CD-ROM's multimedia material is a goofy sideshow aimed at keeping reluctant students glued to the screen. ActivStats, in contrast, makes every special effect count, illustrating specific technical points. The far simpler (but still effective) Mystat book-disk package from Duxbury Press (800/347-7707, *www.cyberbound.com/duxbury/*) covers many of the same topics and runs on the aging hardware found in many college computer labs; ActivStats, though, offers a first look at statistics for the twenty-first century.

Education and More

Senecio Software's FloStat is well-suited to education in the social sciences and business, but it serves professional users, too. As a specialty package for collecting and analyzing interview and survey information, FloStat provides a standard spreadsheetlike data-entry grid, buttons for common social-stats functions (t-tests, graphing, regression), and a large database of survey data. The set of statistical tests in FloStat is nothing like the 50-item list available in mainstream packages such as Abacus Concepts' StatView 4.5 (see *Reviews*, February 1996), but it supports nonparametric stats and cross-tabs, as well as special provisions for survey-specific issues (such as multiple answers to multiple-choice questions).

Two other FloStat features are designed to aid beginners: its narrow focus helps novices understand the basics without overwhelming them with irrelevant topics, and its tutorial serves as a respectable stand-alone statistics course for FloStat's range of application. Basic time-series functions and fancier table formatting would strengthen the program, but there's no complaining about its basic competence.

Bull's-eye for Labs

Similarly, Prism aims at one topic and hits the target dead center. It focuses on "wet" sciences (chemistry, biochemistry, molecular biology, and clinical lab work) and provides an automated lab notebook that's right for users all the way from college labs to professional publishing sites. Alas, Prism is priced a bit steeply for students, who should check out GraphPad's older product, InStat, as an alternative.

Before debuting as a commercial Windows product, Prism started life as custom software in the labs of Harvey Motulsky at Columbia University. As a result, its feature set corresponds exactly to the demands of practical data analysis. It includes detailed graphing tools and tweaks for making charts fit the particular specifications of scientific journals, as well as plenty of online selection aids to help you choose the right type of test for your data—a key consideration for scientists who are more likely to have a rack of pipettes than a statistics text on their lab bench. The manual (based on Motulsky's friendly introductory book, *Intuitive Biostatistics*) and tutorial provide excellent aids for the practicing scientist.

Prism's Windows origins show in a few details: it's slower on large data sets than Mac-native speed demons like Data Desk, and it exhibits occasional odd glitches. Still, the program behaves like a Mac application in most instances.

Macworld's Buying Advice

There's no clear winner among this threesome; each product provides capabilities that the others lack, and as a group they cover a wide variety of users and needs. ActivStats offers a great all-around package for everyone, including folks who are merely curious about statistics. FloStat is the program of choice for surveys and related efforts, while Prism is ideal for those who share their lab space with petri dishes or glassware.—CHARLES SEITER

ActivStats 1.0

RATING: ★★★★/7.6 **PROS:** Complete basic package; brilliant use of interactivity. **CONS:** Best on newer Macs. **COMPANY:** Addison-Wesley Benjamin/Cummings (800/822-6339, *www.awl.com/bc*). **LIST PRICE:** $29.95.

FloStat 2.0

RATING: ★★★/6.8 **PROS:** Fast; ideal for social sciences. **CONS:** Narrow focus. **COMPANY:** Senecio Software (419/352-4371, *www.senecio.com*). **LIST PRICE:** $149; student version $49.

Prism 2.0

RATING: ★★★★/7.1 **PROS:** Lab templates cover most real-world uses. **CONS:** Glitches from Windows port. **COMPANY:** GraphPad Software (619/457-3909, *www.graphpad.com*). **LIST PRICE:** $495.

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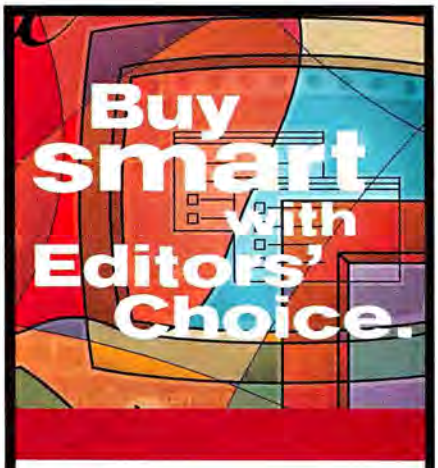

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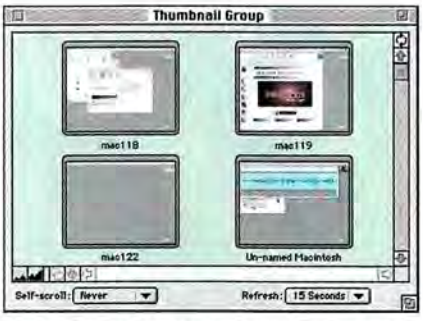
Screen To Screen

FLAWED SCREEN-SHARING UTILITY

IMAGINE COMPETING FOR KIDS' attention when they're within arm's reach of their e-mail box, the World Wide Web, and a white-knuckle game or two, and you'll understand why teachers have long wished for a way to synchronize students' screens with their own, and view students' screens while they're working independently.

Until recently, the only solution involved complicated hardware networks; the Apple Network Administrator Toolkit software's screen control is too complex for educators who don't need its other features (see *Reviews*, December 1996). Screen To Screen promises a simpler, more focused program. Unfortunately, the programmers at Power On Software didn't quite finish their homework; Screen To Screen 1.02 is buggy enough that it couldn't work reliably in classroom testing.



Screening Student Work Screen To Screen lets instructors view thumbnails of student machines.

Screen To Screen's setup and installation are quirky but relatively straightforward. The installer places the client extension on any or all machines on the network; the instructor's machine requires the Screen To Screen application as well. This application allows you to change the administrative password—a good idea since the default is easy to guess—and its Connections menu lets you observe, control, or broadcast to networked systems from the administrative Mac. The current version works on any AppleTalk LAN or WAN; future versions may support TCP/IP and IPX networks.

In our real-world tests, Connections dialog boxes and windows didn't always redraw properly when resized, occasionally had phantom borders and scroll bars, and sometimes failed to display all the zones on our network. With a little perseverance we were able to establish connections to the client machines.

Once the instructor's machine is connected to clients, you can monitor activity on all machines in a zone, and have the option of viewing several small thumbnail screens at once in a scrolling window (see "Screening Student Work"). The thumbnail images refresh at fixed, administrator-defined intervals. If you double-click on a thumbnail, it enlarges to fill the screen, allowing you to temporarily control the remote machine.

Screen monitoring and control worked reliably in our tests, but we can't say the same for screen sharing. When we tried to broadcast presentations from our instructor's machine to 20 classroom Macs, student screens froze after a few minutes, forcing us to restart the clients. We experienced these problems with both large and small test networks, and with a variety of applications.

Screen To Screen is also supposed to let you broadcast audio messages over the network and establish two-way audio communication with students, but we couldn't get it to work in our tests.

Macworld's Buying Advice

We can't recommend this version of Screen To Screen; it feels like beta software. Power On promises a more robust version soon. If you have your heart set on Screen To Screen, we recommend that you download it from the company's Web site and test it on your network.

For now, the Apple Network Administrator's Toolkit is a better choice for broadcasting presentations over a network; for remote screen control and collaboration, we still prefer Farallon's Timbuktu Pro 3.0 (see *Reviews*, January 1997). Unfortunately, both of these programs are overkill for most educators' classroom needs—there's room for a simple, reliable instructional lab program like Screen To Screen . . . once the bugs are worked out.—GEORGE BEEKMAN AND TODD SHECHTER

RATING: ★/2.2 **PROS:** Fills a niche for educators; straightforward interface. **CONS:** Extremely buggy; limited to AppleTalk networks. **COMPANY:** Power On Software (330/735-3116, *www.poweronsw.com*). **LIST PRICE:** Two-machine license $149.95 (educational and volume discounts available).

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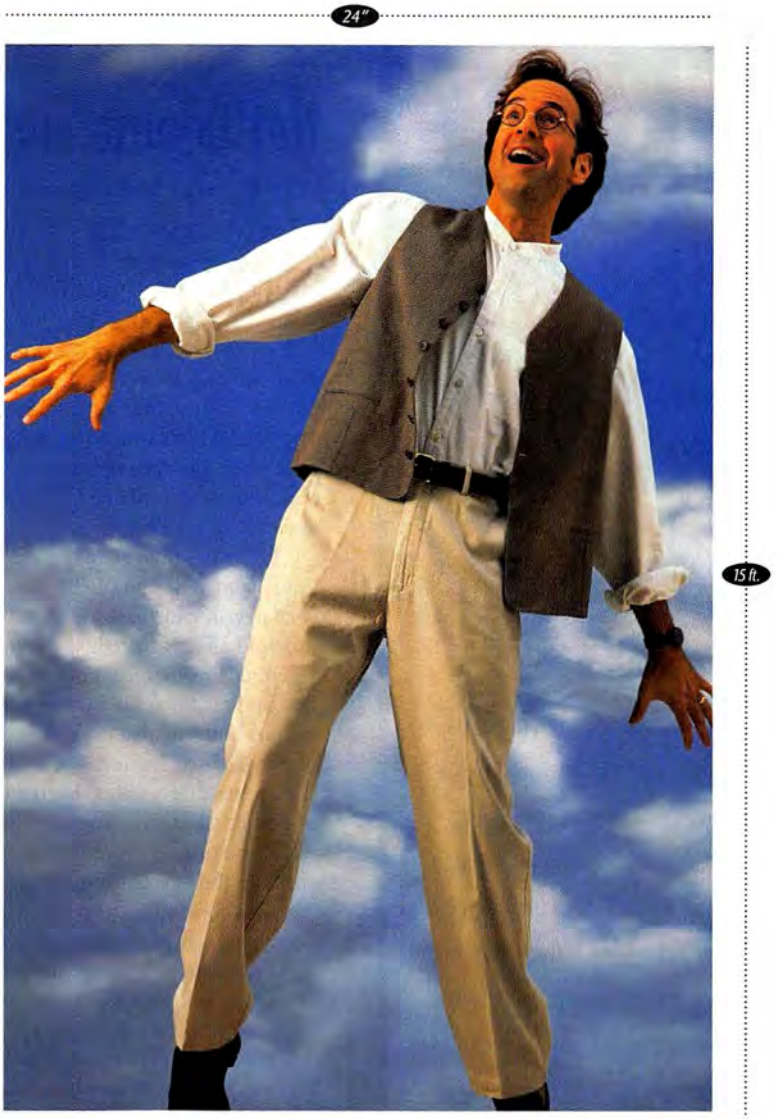

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NetObjects Fusion 2.0

STILL THE BEST WEB AUTHORING TOOL FOR DESIGNERS

TRAILING THE PREMIER VERsion by mere months (see *Reviews*, May 1997), NetObjects Fusion 2.0 polishes the program and makes it even easier to create slick-looking Web sites. Users of version 1.0 will want to take advantage of this free upgrade, which keeps the program competitive in the face of such excellent new contenders as GoLive CyberStudio (see *Reviews*, July 1997).

Of the many major and minor improvements, one of the most welcome is that you can now drag and drop text (up to 32K), RTF files, images, sound, video, Macromedia Shockwave files, and Java applets from the Finder to the Fusion layout. You can also drag links from most browsers into Fusion. Layout improvements include guides, better tables and alignment options, support for anchors and horizontal rules, and new spelling-checker and search-and-replace tools.

Also new to Fusion are Master Borders: you can place any text or graphics that you want to appear throughout your site in the four borders surrounding your page layout. You can name a Master Border set and apply it to individual pages, and use several sets within the same site. Changing a Master Border automatically updates all the pages that use it.

Version 2.0 also includes a new batch of predesigned SiteStyles, which let you change the look of your site with just one click. SiteStyles work with Master Borders, so you can now use vertical banners and navigation bars that update automatically as you build your site (see "Dogs on the Side").

The new version addresses several complaints about Fusion 1.0, including the gripe that it generated complex HTML tables that displayed slowly in browsers—Fusion 2.0 creates nested tables that are much simpler and quicker to load. Another was that Fusion's approach made collaboration among designers and programmers difficult. It's still not as transparent as in CyberStudio, but you can now include pages created with other HTML editors in your Fusion site.

The new version can also import entire Web sites rather than just single pages, and the fidelity of the import is vastly better, if far from perfect: the resulting page still requires tweaking, and Fusion can't import pages with frames. Likewise, frame support in version 2.0 is better but not perfect. Although Master Borders are the fastest, easiest way I've seen to create a site with frames, creating custom frames is awkward.

Fusion still suffers from poor design decisions. You can't open more than one window at a time, so it's impossible to drag elements from one page to another. You either have to leave a site open or quit the program; you can't simply park it in the background. Some dialog boxes and error messages are badly labeled or just plain uninformative. And the Mac version lacks the Windows version's database-connectivity features.

Dogs on the Side One of Fusion 2.0's more whimsical SiteStyles is shown here; the vertical navigation bar on the left is a Master Border element.

Macworld's Buying Advice

NetObjects Fusion 2.0 still shines for small-business users who want to put up good-looking sites quickly without digging into the underlying HTML, and for designers with particular ideas about how their sites should look. Fusion's automation and precision come at a price—at $695, Fusion is the most expensive of the Web authoring tools *Macworld* has reviewed. Just think of it as the QuarkXPress of Web publishing.—TOM NEGRINO

RATING: ★★★★/7.7 **PROS:** Excellent page layout and site management; improved importing; can include external HTML files. **CONS:** Expensive; some annoying interface quirks. **COMPANY:** NetObjects (415/482-3200, *www.netobjects.com*). **LIST PRICE:** $695.

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MiniCAD 7

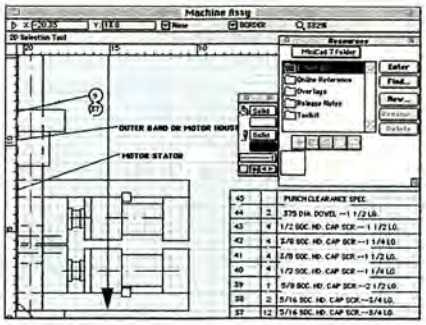
CAD LEADER IMPROVES ON THE BEST

DIEHL GRAPHSOFT'S MINICAD 7 incorporates hundreds of customer requests sent in over nearly 12 years. The resulting product is amazingly easy to use for a full-featured professional CAD system, and includes enough features and interface improvements that it may lure even die-hard fans of competing products into the fold.

MiniCAD can now tackle professional-grade 3-D modeling, with Add, Intersection, and Subtract commands that work directly on solid objects; you can build a library of 3-D objects in minutes, starting with a few primitive shapes. To display 3-D projects in their appropriate magnificence, version 7 uses QuickDraw 3D to support all sorts of shading options, light-source positioning, and third-party rendering engines. New dashed hidden lines give engineers an idea of what's actually going on beneath MiniCAD's beautifully shaded 3-D surfaces.

For day-to-day work, version 7 offers some major improvements. Dimensioning has been made more flexible: the same drawing can support both metric and English dimensions, and can feature varying decimal accuracies at different places in the drawing. MiniCAD's Smart Cursor—already the most informative mouse-driven object in CAD (changing shape for different drawing functions, identifying objects with its own text bar, and so on)—now adds sound. And there's a new audible click when you slide the cursor to the correct point in a drawing for modifying an underlying object (see "One Mouse Clapping"). Although this feature seems simple, it's a great frustration-saver in crowded drawings, sparing you numerous pokes at the same object.

A package of new features for architecture automatically generates floor plans, 2-D framing plans, and 3-D framing models, all with automatically joining walls. MiniCAD also includes a substantial tool kit covering major CAD fields—such as architecture, landscaping, product design, and engineering—and a tutorial that helps you use these prepared parts to build complex drawings in minutes. Worksheets have long been a key MiniCAD feature; as an additional time-saver, version 7 can generate a parts worksheet from your drawing using a single command.



One Mouse Clapping You can't hear it in this figure, but MiniCAD's Smart Cursor makes a distinct click to identify objects in version 7 drawings.

AutoCAD import and export dominates the translation needs of most CAD users. Because Diehl Graphsoft also produces MiniCAD 7 for Windows, it's fully aware of AutoCAD's DOS-style oddities, including special characters and treatment of drawing layers. Nonetheless MiniCAD 7's DXF/DWG file translator still experiences minor problems with details such as hatching and fonts when importing AutoCAD files; drawing elements translate correctly but style details don't always map properly. (MiniCAD also includes a ClarisCAD translator to rescue that program's abandoned users.) Graphsoft's superior customer support offers workarounds for some of these glitches, but others remain unresolvable. MiniCAD's only other weakness is that new users are likely to want a more intuitive or modern internal programming system than MiniPascal.

Macworld's Buying Advice

If you use your Mac daily for CAD, MiniCAD 7 is worth a look—even if you're happy with your current program. If you're using MiniCAD already, version 7's $195 upgrade price is a bargain, considering the wealth of useful new features. In short, MiniCAD 7 offers the most powerful CAD software available, at a still-modest price.—CHARLES SEITER

RATING: ★★★★/8.1 **PROS:** Automated drawing functions; Smart Cursor now even smarter; huge library of tools; stellar customer support. **CONS:** Minor file-translation problems persist; outdated MiniPascal language isn't intuitive. **COMPANY:** Diehl Graphsoft (410/290-5114, *www.diehlgraphsoft.com*). **LIST PRICE:** $795.

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Overture 2.0

SHEET-MUSIC MAKER ADDS PRO-LEVEL FEATURES, COMPLEXITY

THE SCIENCE OF MUSIC NOTATION isn't much of a science; for every rule that exists, another rule violates it. (Eighth notes are beamed in pairs, *except* when the meter's numerator is a multiple of three, *unless* it's a complex polyrhythm . . .) That's why no music software can ever be both easy to use and complete. In version 2.01, Opcode Systems' Overture slides along the scale toward completeness—and away from simplicity.

Overture seems to have been designed (and named) in response to Coda Music's Finale, whose infinite flexibility has made it the best-seller for years, but whose complexity cows newcomers (see *Reviews*, May 1996). Dramatic design differences are everywhere: Where Finale requires a different tool-palette icon for each kind of musical marking, Overture's single Arrow tool selects and moves nearly anything in the score. Where Finale's MIDI features exist solely to input notes for printing, Overture's integrated sequencer makes the program just as good at *playing* the music. Dozens of musical tasks require only one step in Overture, making Finale's corresponding features look clunky by comparison.

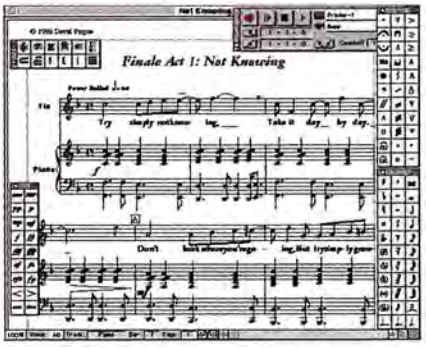
As with any new music program, however, the original Overture sacrificed flexibility for simplicity. In previous versions even intermediate musicians banged their heads against silly limitations: you couldn't put a triplet inside a triplet, make jazz markings or harp-pedal diagrams, write tablature, or draw lines and squares on your sheet music. All these limitations have been removed with finesse. The new features add still more tear-off palettes to the program's interface, though, making a large monitor even more important than it was before (unlike its rivals, Overture doesn't offer a horizontal scrolling view).

The primary new feature in 2.0, however, is a staggeringly complex system for managing sounds on multiple synthesizers. Studio musicians flanked by synths will appreciate this feature (and the 38 pages of documentation required to describe it), but the average teacher, band arranger, or amateur composer—Overture's real market—will wonder what the fuss is about.

Unfortunately, despite the handful of new professional features, many of the earlier irritants remain. The program still uses an infuriating copy-protection scheme that requires hard-disk authorization; if you reformat your hard drive without deinstalling the software first, your $495 program is vaporized. Overture won't run if its two extensions aren't in the System Folder, printouts can't approach the quality of Finale's, articulation marks don't play back, and stems don't automatically flip in the correct direction in two-voice passages. Finally, Overture is no rock of stability; the Read Me file lists 13 known bugs, including 3 that crash the program.

Macworld's Buying Advice

Overture's new features move it away from its original incarnation as a fast, simple sheet-music factory and into more professional territory. You're far less likely to be frustrated in your attempts to create piano parts, band charts, or even orchestral pieces in Overture 2.01 than in version 1.0. The result is a program with a split personality, combining high-end features with low-end limitations. Fortunately, nonprofessional musicians probably won't care; they'll revel in Overture's speed, natural ways of doing things, and beautiful integration of printed and played music.—DAVID POGUE



Prelude to Overture Most of Overture's new features are in the form of palettes. Unfortunately, there's no automatic way to get proper spacing; colliding lyrics still have to be fixed manually.

RATING: ★★★★/7.0 **PROS:** Easy to learn; equally good at printing and playing music; new pro-level features. **CONS:** Many clunky features still unaddressed; obnoxious copy protection. **COMPANY:** Opcode Systems (415/856-3333, *www.opcode.com*). **LIST PRICE:** $495.

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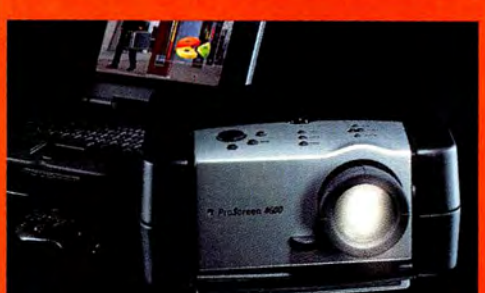

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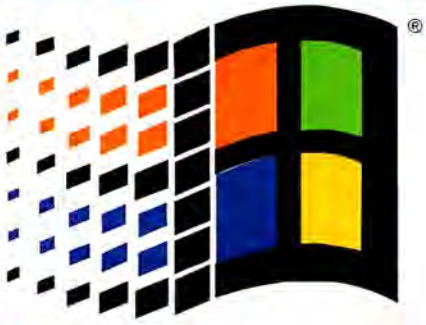

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KeyQuencer 2.1

UPGRADE OFFERS NEW CONTROLS

KEYQUENCER OFFERS A LEAN, mean, inexpensive alternative to CE Software's QuicKeys, automating your Mac with less memory and for fewer dollars (see *Reviews*, December 1996). What prevents KeyQuencer from becoming the robot for the rest of us, though, is its lack of a "watch-me" mode for creating macros. Version 2.1 doesn't improve on the geekiness of KeyQuencer's interface—you still have to type short scripts. Instead, it adds power in the form of new commands, fewer bugs, and a suite of useful Internet macros.

Version 2.1's dozens of tiny enhancements include Sort, which alphabetizes Clipboard text; Keyboard, which switches keyboard layouts without opening the control panel; and ActivityMonitor, which adds an icon to your menu bar when KeyQuencer is working. A Stopwatch tracks KeyQuencer's own elapsed macro time in microseconds; Macworld Lab, which uses KeyQuencer to conduct speed tests, is especially fond of this feature.

A suite of handy single-key commands type common HTML tag pairs, making Web-page editing more efficient. And the NetText command ought to be a built-in Mac OS feature: it converts normal text into Net-ready text (or vice versa), handling end-of-line returns, funny punctuation, and beginning-of-line quotation brackets.

Macworld's Buying Advice

KeyQuencer still can't create a separate set of macros for each program you use, as QuicKeys does, and its macros still require programming. But version 2.1 can exert more direct power over various components of your Mac: file sharing, folders, files, monitors, CD-ROM drives, printers, and so on. Better yet, the upgrade is free, either on the Web or by mail.—DAVID POGUE

RATING: ★★★/6.9 **PROS:** Useful Internet enhancements; fewer bugs; more commands for specialized tasks. **CONS:** Still requires simple programming. **COMPANY:** Binary Software (310/449-1481, *www.binarysoft.com*). **LIST PRICE:** $39.95.

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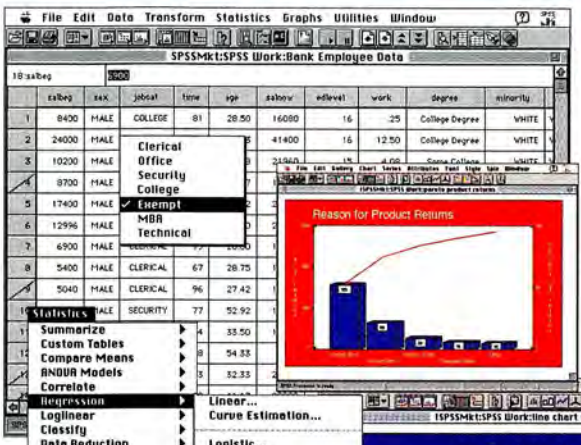

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Scorpio 1.1

MINUSCULE WORD PROCESSOR'S PRICE IS ITS BEST FEATURE

AS WORD PROCESSORS BREAK the 50MB barrier, it's fortunate that not every software company thinks big; with Scorpio 1.1, Abbott Systems thinks positively microscopic. The company urges you to consider this tiny, lean word processor as an upgrade to SimpleText and points out that Scorpio costs less than the *sales tax* on Microsoft Word.

Scorpio requires a nearly invisible 350K on disk and a paltry 1280K of RAM. It's also quick, opening a 50-page Word 6 document in under a second using Claris's XTND filters for exchanging documents (they're not included, but if you own any Claris products they're already on your hard drive.)

If small were all, SimpleText would take the cake. Fortunately, you do get some meaningful features in Scorpio: a simple spelling checker; search and replace; word count; color text and background; margins and tab stops; and page numbering. Like SimpleText, Scorpio can read your masterpiece out loud in one of PlainTalk's drunken voices. There's even an icon bar so that you won't feel too left out of the Microsoft generation.

The Score on Scorpio You certainly can't accuse Scorpio of interface overload; unfortunately, you have to highlight a paragraph completely before you can adjust the margins.

Scorpio also offers two completely fresh ideas. A tool-bar pop-up menu automatically inserts the date or time; or your name, address, phone number; or your Internet address. And Scorpio (like the company's CanOpener utility) can open *any* file on your hard drive—be it document, application, corrupted PC file, anything—promptly salvaging and displaying any text inside.

Because the world *needs* more small, fast $29 programs, Scorpio's downside is heartbreaking. Chief among the missing features is text drag and drop; even SimpleText offers this essential editing tool. (Also missing is the usual checklist of high-end features—thesaurus, tables, headers, footnotes—but those aren't the essentials Scorpio was designed to embrace.)

The keystrokes for bold, italic, and other styles are ⌘-shift-B, -I, and so on—a forgivable sin if the program used ⌘-B and -I for other functions, but it doesn't. Another rotten decision: fractional character widths in other programs is permanently enabled in Scorpio, so text is beautifully spaced in printouts but jostled on screen.

Macworld's Buying Advice For revenge on the excesses of Microsoft Word and Corel WordPerfect, buy the elegant, friendly $50 Mariner Write (see *Reviews*, March 1997). It's nearly as small, fast, and inexpensive as Scorpio but much less likely to make you feel claustrophobic. Still, Scorpio's text-recovery feature alone is worth $29, and its tiny size makes it perfect for running on PowerBook RAM disks, creating spell-checked Read Me files, and word processing for the featurephobe.—DAVID POGUE

RATING: ★★★/6.2 **PROS:** Small, quick; extracts text from any file on earth; extremely inexpensive. **CONS:** No drag and drop; letters run into each other onscreen; bizarre keyboard shortcuts. **COMPANY:** Abbott Systems (914/747-4201, *www.abbottsys.com*). **LIST PRICE:** $29.

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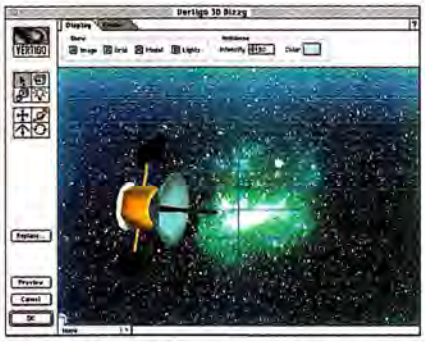
Vertigo 3D Dizzy

PHOTOSHOP PLUG-IN IMPORTS QD3D MODELS BUT LACKS DEPTH

HAVE YOU EVER WANTED TO SIMply drop a 3-D object onto a 2-D image? That's the idea behind Vertigo Technology's Vertigo 3D Dizzy, a new plug-in that lets you import QuickDraw 3D (QD3D) models and render them within Adobe Photoshop (it also works with Adobe Illustrator). It sounds great in theory, but in practice Dizzy still needs a bit of work.

Dizzy imports models into a mini–3-D environment in which you position, rotate, and scale the models directly on a preview of the 2-D image. Dizzy can work on only one model at a time, unfortunately, and the jerky movement makes precise positioning a chore. Although you can relocate the camera and save custom views, camera controls are limited and a bit unorthodox: when you drag the Camera Move tool upward, for example, Dizzy's ground plane moves upward, but the camera has actually moved downward. Adjusting the view can make your head spin, especially if you're trying to match the perspective of a background image.

Dizzy offers an ambient light source, to which you can add as many as five point lights to give the model visual definition. Both types can be colorized, but you can modulate only the ambient light's effect. When you're done, Dizzy automatically renders and composites the model with the image. But to render models to a layer in Photoshop, you must preselect the layer; that means you won't see the background image in the preview.



Demands of Galactic Proportions Vertigo 3D Dizzy demands lots of RAM for its best rendering options; 40MB wasn't sufficient to render this model using the LightWorks SuperLite engine.

Dizzy can accept QD3D plug-in renderers in addition to QD3D's interactive renderer. It comes with ThinkFish's LiveStyles (for producing illustration-style images) and the memory-hogging LightWorks SuperLite engine, which produces shadows, transparency, and antialiasing (though given its memory demands, you may be better off using a modeling-and-rendering program and traditional compositing techniques when placing a model in a photograph).

Dizzy also comes with more than 500 QD3D models. Most are simple in construction and texturing, however, making them better suited to use with illustrations than with photos.

Macworld's Buying Advice Despite its shortcomings, Vertigo 3D Dizzy offers a simple and relatively inexpensive way to incorporate 3-D models into Photoshop and Illustrator images. Graphic artists with RAM to spare will find Dizzy a practical addition to their plug-in collections, and one that should become more useful as other QuickDraw 3D plug-in renderers appear.—CARLOS DOMINGO MARTINEZ

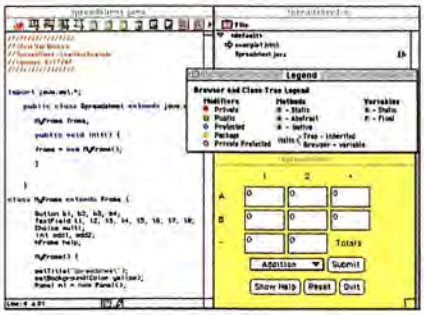
RATING: ★★★/5.4 **PROS:** Easy integration of 3-D models with 2-D images. **CONS:** Uncooperative 3-D environment; limited lighting tools; dizzying RAM requirements. **COMPANY:** Vertigo Technology (604/684-2113, *www.vertigo3d.com*). **LIST PRICE:** $119.

Roaster Release 3

JAVA FOR THE MASSES

ONE OF THE BRIGHTEST HOPES for the Mac is undoubtedly its strength as a Java platform; the only question is which Java package to buy. At the moment, Roaster Release 3 is the leading answer for Macintosh users. Described as the first "nondeveloper" release—in other words, it's now thoroughly debugged—Roaster 3 gets Roaster Technologies (a recent spin-off of Natural Intelligence) off to an impressive start.

Although Roaster 3 is the Mac Java tool best suited to delivering large-scale, professional, stand-alone applications, it also produces cross-platform applets that run inside a browser. You can build Mac-specific, double-clickable applications that incorporate Roaster's Java run-time engine. For cross-platform apps (those that execute as Java byte-code rather than native machine code), Roaster puts your work—typically 100 or more separate class files—into a single .zip file that both Windows and Unix systems can use. Besides being the fastest Mac compiler of new applets, Roaster 3 also yields stand-alone databases and other business applications whose performance is comparable to that of commercial software written in C++—an impressive feat in Java.



Numbers Game Roaster Release 3 makes it easy to create fast, stand-alone number-crunching and database applications in Java.

The Roaster environment now includes Netscape's Internet Foundation Classes, along with a huge collection of public-domain applets from Sun Microsystems, Apple, and Java books. You can learn Java pretty quickly by choosing a sample applet that has many of the elements you need for your own programming project. Roaster 3 also includes OpenLink Software's JDBC drivers, which support connection to ODBC databases; a long list of third-party Java tools; and Object Design's Java API, ObjectStore PSE. This API makes Java objects a useful component of fast online-database searching—technically, it makes persistent objects available as searchable data holders for transaction processing. Roaster's first-rate technical support can walk you through creating an ObjectStore program.

If, like most Mac programmers, you've been using the Metrowerks and Symantec development environments, you'll have some keystroke habits to relearn. Fortunately, the rewards of using the Roaster IDE are plentiful.

Macworld's Buying Advice If your only goal is to add visual interest to your Web page, you're better off with Symantec's Visual Cafe (see *Reviews*, May 1997); Roaster's main concessions to neophytes are a comprehensive set of examples and a self-explanatory interface (see "Numbers Game"). But if you're professionally committed to producing high-end Java applications, especially those involving database access, Roaster Release 3 is the most powerful Java tool set you can buy for the Mac.—CHARLES SEITER

RATING: ★★★★/7.7 **PROS:** Best tool for many serious Java jobs; great compile speed; unequaled tech support. **CONS:** Nonmainstream IDE. **COMPANY:** Roaster Technologies (617/876-4031, *www.roaster.com*). **LIST PRICE:** $99.

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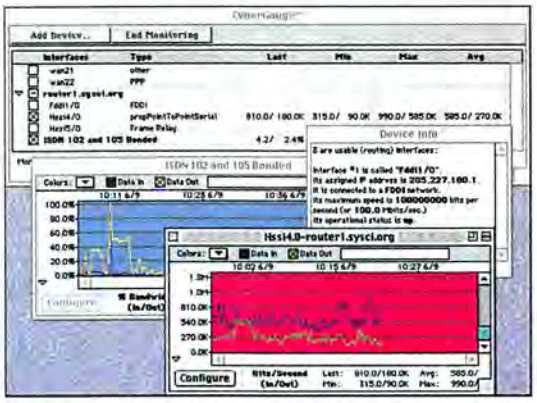
CyberGauge 2.0

EASY NETWORK TRAFFIC MEASUREMENT

NEON SOFTWARE'S NETWORK speedometer, CyberGauge, has been a track favorite with users since it was released last year (see *Reviews*, November 1996). As an inexpensive tool for monitoring the bandwidth use of network devices, it has no peer. In version 2.0, Neon has added several much-needed features and additional capacity without bumping up the price.

CyberGauge uses the Simple Network Management Protocol (SNMP) to measure the flow of traffic in a network device—such as an Internet router, an Ethernet hub, or a server—from a remote location. New with version 2.0 is the ability to monitor two devices simultaneously and any number of interfaces per device. CyberGauge displays separate graphs for each device, tracking the ebb and flow of data in bits per second or as a percentage of total available bandwidth.

When you launch CyberGauge, it asks for the name or IP address of the device to be monitored. CyberGauge retrieves information about the device's capabilities and interfaces, then presents you with a simple checklist of interfaces to monitor. The installation disk supplies monitoring tips for certain network devices, including those from Ascend and Cisco Systems, along with a comprehensive user's guide.



Watch for Traffic CyberGauge lets you simultaneously monitor up to 20 devices and any number of interfaces per device.

Although CyberGauge is easy to run right out of the box, it also has some advanced features you can grow into. Changeable background and graphing colors make it easy to sort through displays for multiple devices and interfaces, and an enhanced data-export option lets you collect statistics for subsequent processing by high-powered network performance analyzers. A bonding feature lets you treat several channels as a single unit to measure combined traffic flow.

Also new with version 2.0 is the ability to export a JPEG file periodically for any graph, so you can publish your network's performance via a Mac Web server. And you can now save an entire suite of CyberGauge settings and collected statistics, then later resume monitoring automatically by opening the saved document.

Macworld's Buying Advice Although it can be expensive for multiple devices, CyberGauge is the only low-entry-cost, low-effort network-monitoring tool around. If you're responsible for network use or performance, this is an essential tool to keep in your bag of tricks.—MEL BECKMAN

RATING: ★★★★/8.8 **PROS:** Inexpensive for a few devices; easy to use; data capture with text and JPEG export capability; no limit on number of interfaces per device. **CONS:** Expensive for monitoring many devices. **COMPANY:** Neon Software (510/283-9771, *www.neon.com*). **LIST PRICE:** $139 (2 devices) to $695 (20 devices).

LinkUPPP 1.1

REMOTE-ACCESS CLIENT DELIVERS

FOR YEARS USERS STRUGGLED with inadequate shareware PPP dialers, remote-access clients that connect a Mac to the Internet or to a networked remote-access server. Apple finally delivered its official PPP Dialer as part of Open Transport, but it's underwhelming: there's no AppleTalk support, the library of modem scripts is paltry, and the diagnostics are useless.

FCR Software has jumped into the void with LinkUPPP 1.1, a PPP dialer that offers AppleTalk TCP/IP support, a huge library of modem and log-in scripts, SLIP (Serial Line Internet Protocol) support, CHAP (Challenge Handshake Authentication Protocol) passwords, and very slick diagnostics, all at speeds up to 230 Kbps. I tested LinkUPPP with a variety of modems and ISDN terminal adapters and with both TCP/IP and AppleTalk networking. It worked flawlessly in all cases.

LinkUPPP comes on a single floppy accompanied by a handy quick-start guide. The installer not only makes installation easy, but automatically moves any existing PPP dialers to a Removed Items folder and loads an excellent online user's guide that you can read with any Web browser.

Detailed Diagnostics LinkUPPP's sophisticated diagnostic displays make troubleshooting easy.

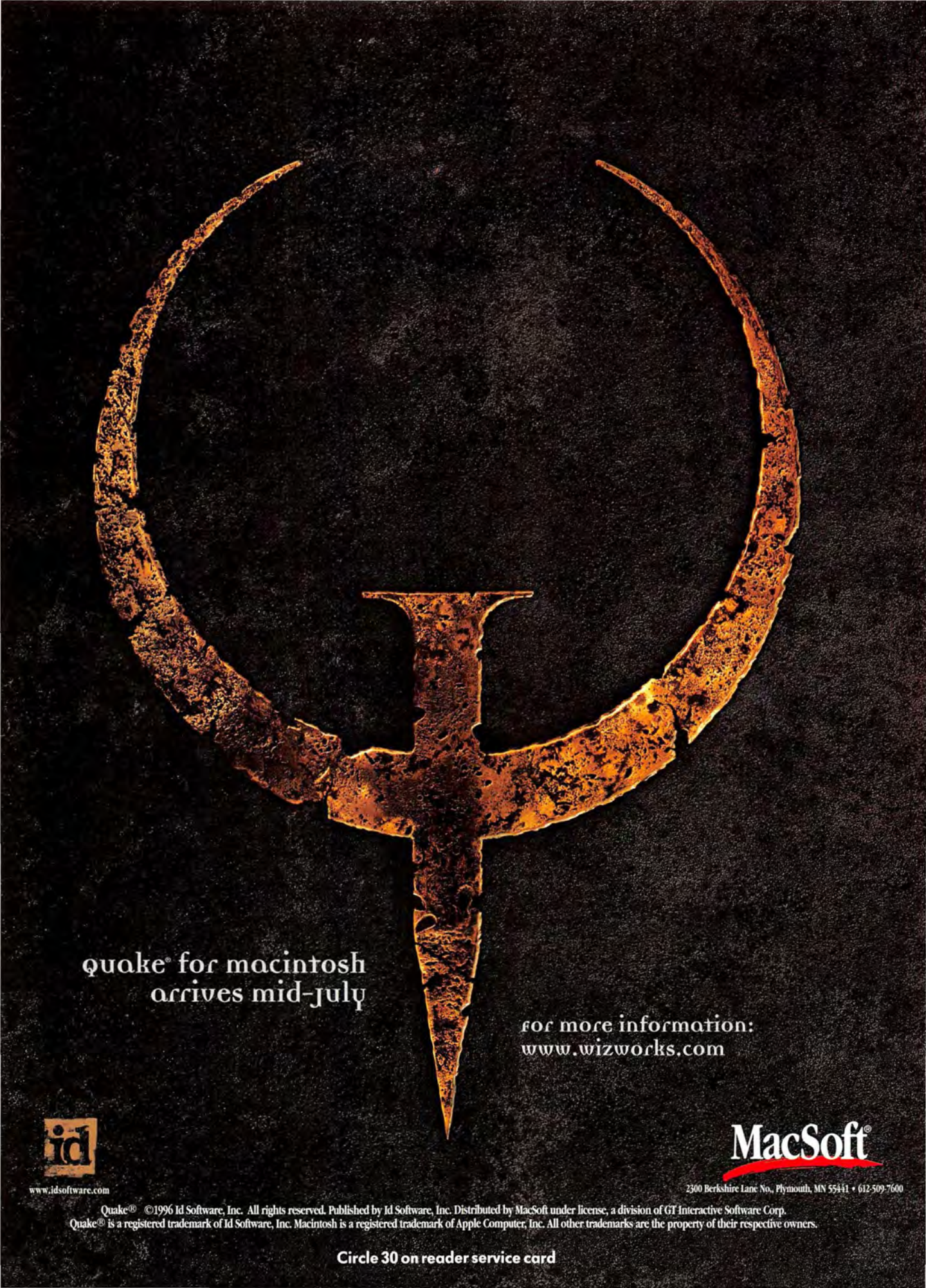
You configure LinkUPPP by launching it, selecting a modem script (scripts for 56-Kbps modems aren't yet available), and entering information about the remote server; then you start the network connection by clicking on Connect. Unlike Apple's solution, LinkUPPP includes an intelligent generic dialing script that can figure out almost any server's log-in requirements.

Because you save your connection configuration as a document, it's easy to use LinkUPPP to connect to several services; you simply create a LinkUPPP document for each. If necessary, you can invoke LinkUPPP's advanced options to specify autodialing, redial on busy, and other PPP parameters. To make a document your default network connection, you just drop it onto your Startup Items folder.

Although LinkUPPP normally dials in the background, three windows let you check the status of a connection or monitor the dial-up process. One window shows the link status, time connected, and traffic counts; the second displays the parameters (such as header compression) negotiated with the remote server; and the third is a detailed log of LinkUPPP's conversation with the remote server. Such sophisticated diagnostic aids are indispensable for troubleshooting and can save hours of tinkering.

Macworld's Buying Advice LinkUPPP's intelligent log-in, detailed diagnostics, and elegant interface make PPP dial-up networking a snap. Your time is valuable, and the hours you waste tinkering with a PPP dialer can easily outstrip the relatively minor cost of LinkUPPP.—MEL BECKMAN

RATING: ★★★★/8.6 **PROS:** Inexpensive; AppleTalk support; intelligent generic dialer; extensive diagnostics. **CONS:** Lacks scripts for 56-Kbps modems. **COMPANY:** FCR Software (617/494-1300, *www.fcr.com*). **LIST PRICE:** $59 (multiuser pricing available).



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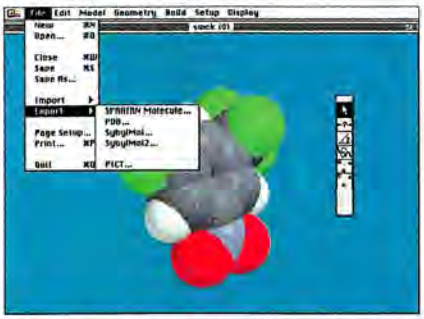
MacSpartan Plus 1.1

REAL CHEMISTRY ON THE MAC

WAVEFUNCTION'S MACSPARTan Plus, a molecular modeling program that lets chemists interpret chemical properties visually on a Mac, has arrived just in time to help introduce a whole new field. Combinatorial chemistry, a new twist on traditional organic chemistry, links smaller organic molecules in random combinations to make up thousands of trial molecules, then tests these huge collections for pharmaceutical activity. This relatively young method has dramatically increased the demand for software that allows convenient desktop molecular modeling and calculation of molecular properties.

MacSpartan Plus 1.1 is the best program for understanding both combinatorial and traditional chemistry. This powerful software creates 3-D pictures that show calculated charge distribution and other fundamental properties that used to require a Unix-based scientific workstation. MacSpartan has basic molecular-mechanics capabilities comparable to those of modeling packages associated with chemical databases; it also yields files that are compatible with other programs.



Molecules Everywhere MacSpartan can exchange information with other molecular modeling software, both simple and advanced.

But MacSpartan goes beyond basic parameter-based modeling, to include several more-powerful primary methods; two of these methods are semiempirical calculation of orbitals and ab initio calculation of molecular wave functions. This set of calculations has enough power to predict how some molecules will react to generate superb classroom graphics of orbital models for ground states and excited states, and to investigate the activity of powerful new combinatorial drugs. For calculating small property differences between very similar molecules, the fundamental issue in much of combinatorial chemistry, MacSpartan is the best commercial Mac package available.

Using MacSpartan for research on molecules with a few hundred atoms demands a 200MHz or faster Power Mac. In the scientific computing market, that's not much of a drawback—just a few years ago ab initio and other research-level computations were typically done using a Cray supercomputer, and the Mac actually produces better graphics than old supercomputers.

MacSpartan comes with a booklet covering the key topics in quantum chemistry from a typical advanced-organic course. A less useful accompaniment is the separate program that handles online help, though admittedly the average MacSpartan user won't require much guidance.

Macworld's Buying Advice For research or teaching, MacSpartan Plus does a great job of integrating computation and graphics. On a new, high-end Mac, this program puts serious computer chemistry in every lab.—CHARLES SEITER

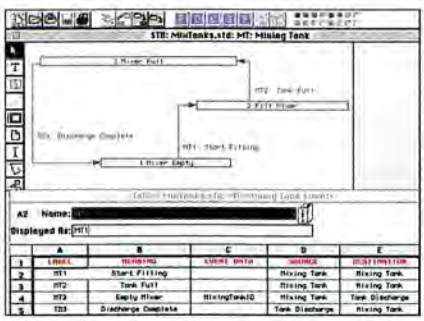
RATING: ★★★★/7.4 **PROS:** Performs Cray-level quantum mechanics on large organics; easy to use. **CONS:** Oddly implemented help system. **COMPANY:** Wavefunction (714/660-6101, *www.wavefun.com*). **LIST PRICE:** $999 ($449 educational).

MacA&D 6.0

MAKING A CASE FOR CASE TOOLS

ALTHOUGH CASE (COMPUTER-aided software engineering) tools are firmly in place at big companies, an amazing number of small Mac developers work from program specs scribbled on a whiteboard by the marketing VP. Excel Software, developer of MacAnalyst and MacTranslator, comes to the aid of beleaguered programmers with a CASE tool for top-down design. MacA&D 6.0 lets you outline a program's functions, then generate the line-by-line code from this high-level description. It's relatively easy to learn (considering the sophistication of the methods it supports), it's fast, and at the moment it has no real competition—although programs like Pictorius's Prograph CPX and Mainstay's VIP C (see *Reviews*, July 1996) also offer diagram-to-code translation, they don't follow the standard framework established by Edward Yourdon and other object-design pioneers.

CASE tools have a common goal: to produce a top-down design of a program's code so that different parts can be assigned to different programmers and still fit together in the final version. In MacA&D, the programming effort starts with a high-level diagram that outlines the main program functions and serves as a sort of combined table of contents and glossary (double-clicking on diagram elements opens both a specification and a text listing of associated code).



CASE Study This Shlaer/Mellor data diagram and its associated table are one way MacA&D highlights critical elements of a large program.

MacA&D produces working code from the abstract views you draw with its graphical tools: class diagrams generate C++ code, structure charts translate directly into C and other classic procedural languages (such as BASIC, FORTRAN, and Pascal), and data models generate sets of SQL commands. A companion product, WinA&D, sports the same model-to-code translation functions for Intel-based systems, so programmers have to learn only one set of CASE tools for the two main commercial platforms.

The latest version offers a tool-bar button for frequently used diagramming functions and an Icon Manager that lets you take your diagram beyond ovals and rectangles. You can model your program's critical functions, typically involving timing issues, with state diagrams and state tables that give you an overview of the project and make it easier to allocate team efforts and mark realistic milestones (see "CASE Study").

Macworld's Buying Advice MacA&D 6.0 is one of the few effective program-design aids for organizing enterprise-scale C and SQL projects on the Mac, and it lets Mac programmers use their program blueprints in Windows 95 and NT environments. It could stand a Web update—there's no provision here yet for the rise of Java as a popular programming language—but it's a first-rate, real-world tool for professionals.—CHARLES SEITER

RATING: ★★★/6.9 **PROS:** Complete set of CASE tools for standard languages. **CONS:** Needs a Java update. **COMPANY:** Excel Software (515/752-5359, *www.excelsoftware.com*). **LIST PRICE:** $1995.

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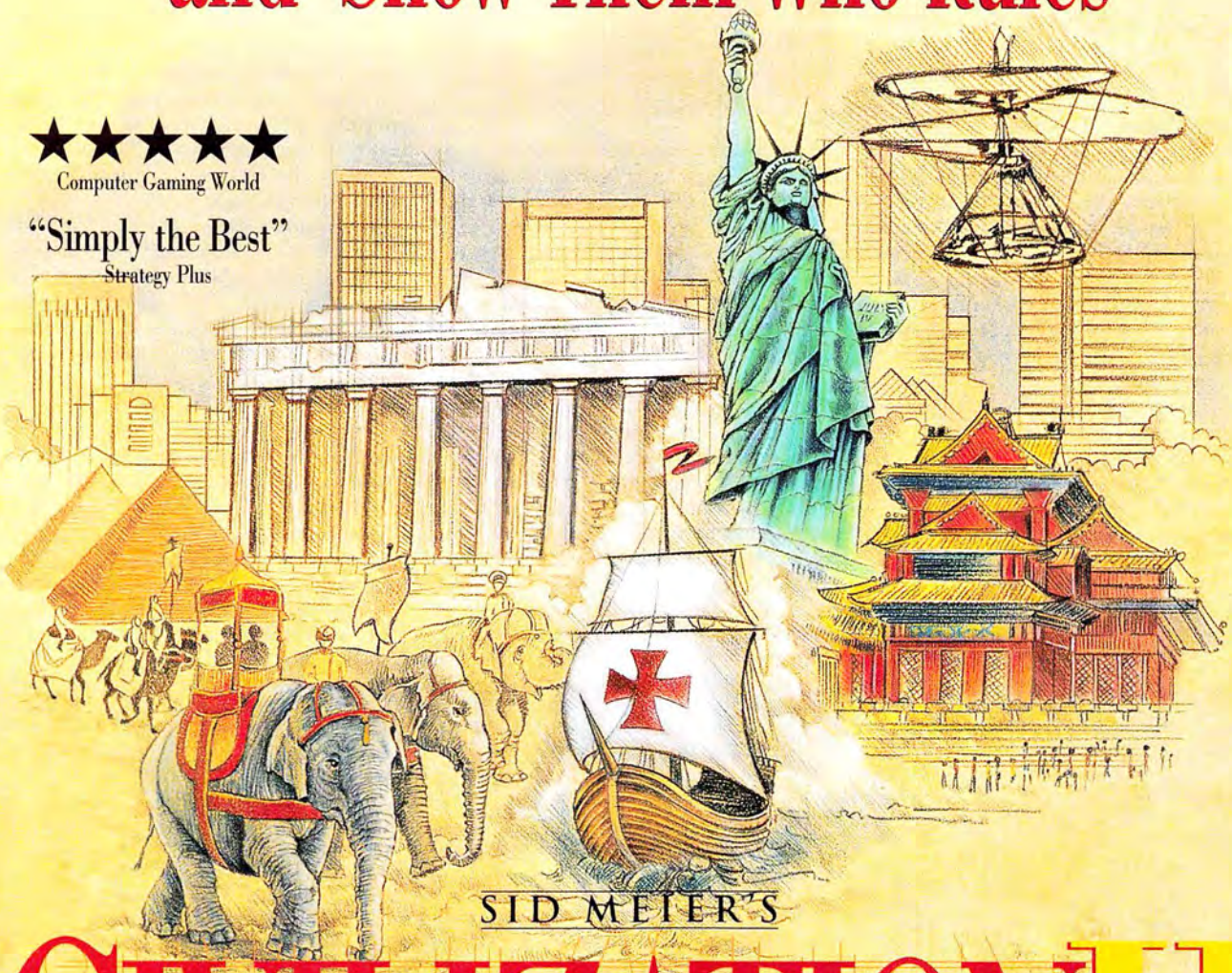

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ADB I/O

INGENIOUS GADGET LETS YOU CONTROL YOUR WORLD

ONE OF THE FEW MAC PERIPHerals to engender what I call Pure Geek Joy is BeeHive Technologies' ADB I/O. This hardware add-on for the Mac ADB port (where your keyboard and mouse plug in) sports eight pairs of electrical terminals that let you put all manner of sensors and switches under the control of your Mac.

For example, you can use it to log temperature and humidity readings, switch lights and appliances on and off, or check your *real* mailbox over the Internet (assuming you can get the wires out to it, that is). I attached a cheap temperature probe to an input port and an AC relay to an output port, then used the supplied HyperCard application to turn on my TV by putting the probe in a cup of hot tea. In a slightly more practical vein, you could use the ADB I/O to synchronize a Macromedia Director presentation with external lights, sound, and prerecorded video.

The ADB I/O controller's small plastic case is roughly the size of a paperback book, with two ADB connectors and eight pairs

SUZANNE ROADY

of screw-down electrical terminals; each pair of terminals lets you attach a sensor or remotely controlled switch. You connect the ADB I/O in line with your keyboard or mouse or to a second ADB port. Because the ADB I/O gets its power directly from the ADB port, installation is extremely easy. Internal jumpers let you assign a unique ID code to an ADB I/O unit, then connect up to four separately controllable ADB I/Os to the same Mac.

The first group of screw terminals act as programmable switches for turning electrical devices on and off; the second set work as analog-to-digital converters for reading analog voltage values from sensors, such as temperature probes. To manipulate household appliances, you need an external relay. (Both sensors and external relays are available at electronics stores.)

The package includes a well-written user's guide and a slew of software drivers for HyperCard, AppleScript, Director, ACI US's 4th Dimension, and C programming environments. BeeHive's Web site offers lots more, including Java software drivers and various Internet interfaces.

The only negative aspect of the ADB I/O, other than all the time lost to developing a remote-control kitty-litter sifter, is the need to power down your Mac when attaching or removing input sensors. Eliminating this requirement by improving the product's electrical isolation would make experimenting easier.

Macworld's Buying Advice The ADB I/O is safe and easy enough to use that elementary-school children can have fun with it. If you can screw down two wires, you can use it to achieve total world domination—or at least total control of your home appliances.—MEL BECKMAN

RATING: ★★★★/8.1 **PROS:** Easy to use; supports multiple units in series; both analog and digital input and output; plentiful software drivers. **CONS:** Requires powering down Mac to connect sensors. **COMPANY:** BeeHive Technologies (818/304-0664, *www.bzzzzzz.com*). **LIST PRICE:** $199.

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PowerKey Pro 600

POWER STRIP FOR GADGET FREAKS

THE POWERKEY PRO 600 SPORTS six outlets that can be controlled in seemingly infinite ways. You can program this supercharged power strip's outlets to activate when it encounters keyboard activity or events on your Mac, an incoming telephone call, or predefined times or dates. Not since the debut of the Newton has there been a product so exciting to the gadget freak.

The original PowerKey (which Sophisticated Circuits still sells) offers a clever surge-suppressing box with four outlets that let you turn on (and shut off) your entire system (monitor, printer, modem, Mac) via your keyboard's power key. The Pro version's elegant, well-conceived software lets you go far beyond those useful features. A thorough manual walks you through rigging the PowerKey to restart the Mac automatically after a crash, freeze, or power failure—perfect for file or Web servers. Unlike Apple's Energy Saver control panel, which darkens the screen but doesn't actually save electricity, the PowerKey Pro can turn your monitor off completely after a specified period of inactivity.

KEVIN CANDLAND

Because you can control outlets from your Mac's keyboard, it's easy to turn your printer or modem on or off without stirring from your chair. The PowerKey software can launch programs or trigger scripts (AppleScript or QuicKeys) at specified times, automating backups and e-mail dumps. If you use Apple Remote Access, the PowerKey can turn on your Mac when the phone rings, and respond to user-defined touch-tone codes to activate peripherals. You can even program the PowerKey to answer the phone only after business hours.

The software uses multiple-choice natural-language pop-up menus. A finished instruction might read: "When the phone rings 6 times, between 5:00 p.m. and 9:00 a.m., answer the phone. Start up the computer. When system is idle more than 20 minutes, shut down the system."

But computer-related uses pale in comparison with the possibilities of whole-*house* automation. Two quirks of the PowerKey Pro multiply its potential: your Mac doesn't even need to be turned on to use the timer- and telephone-based features; and you can chain multiple PowerKeys together. There's no reason you couldn't program your coffeemaker to start 15 minutes before your alarm clock rings; turn lamps on and off while you're away to fool burglars; and have your function keys turn on the stereo.

Macworld's Buying Advice The PowerKey Pro 600's sole peculiarity is that it doesn't offer surge protection, unlike the original PowerKey or the $99 PowerKey Pro 200 (which lacks on/off switches on the device itself, the automatic restart feature, and independent programming for each outlet). Still, few peripherals offer so many possibilities; Sophisticated Circuits has produced a functional, exciting, well-designed gadget.—DAVID POGUE

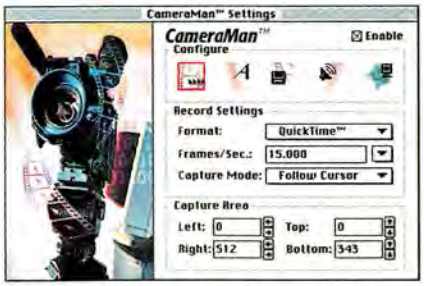
RATING: ★★★★/8.4 **PROS:** Flexible programming; excellent software and manual; attractive design. **CONS:** Doesn't offer surge protection. **COMPANY:** Sophisticated Circuits (206/485-7979, *www.sophisticated.com*). **LIST PRICE:** $199.

CameraMan 3.0

QUICKTIME MOVIES OF YOUR DESKTOP

MOTION WORKS GROUP'S CAMeraMan 3.0 does one thing very well: making QuickTime movies of what's taking place on the computer screen. You press a predefined keystroke, hear a tiny beep, and CameraMan records everything on your screen—menu movements, game action, Web animations, whatever. A second keystroke stops the recording and stores the finished QuickTime movie on your hard drive. Even if that were all CameraMan did, it would still be worth its low price. Fortunately, the program is filled with flexible features to help you grab exactly what you want.

For example, the program can make a movie of your entire screen; if you know QuickTime, though, you know that big frame sizes mean jerky playback. Therefore, CameraMan offers three smaller-frame options for smoother playback: you can designate a fixed recording area; CameraMan can move its "camera" to track mouse movement; or the "camera" can stay still until your cursor moves out of the frame, and then smoothly pan to the new location. This option creates professional-looking movies.



Lights, Action, CameraMan CameraMan's options let you specify the file format, the frame rate, and screen area to capture in your desktop movie.

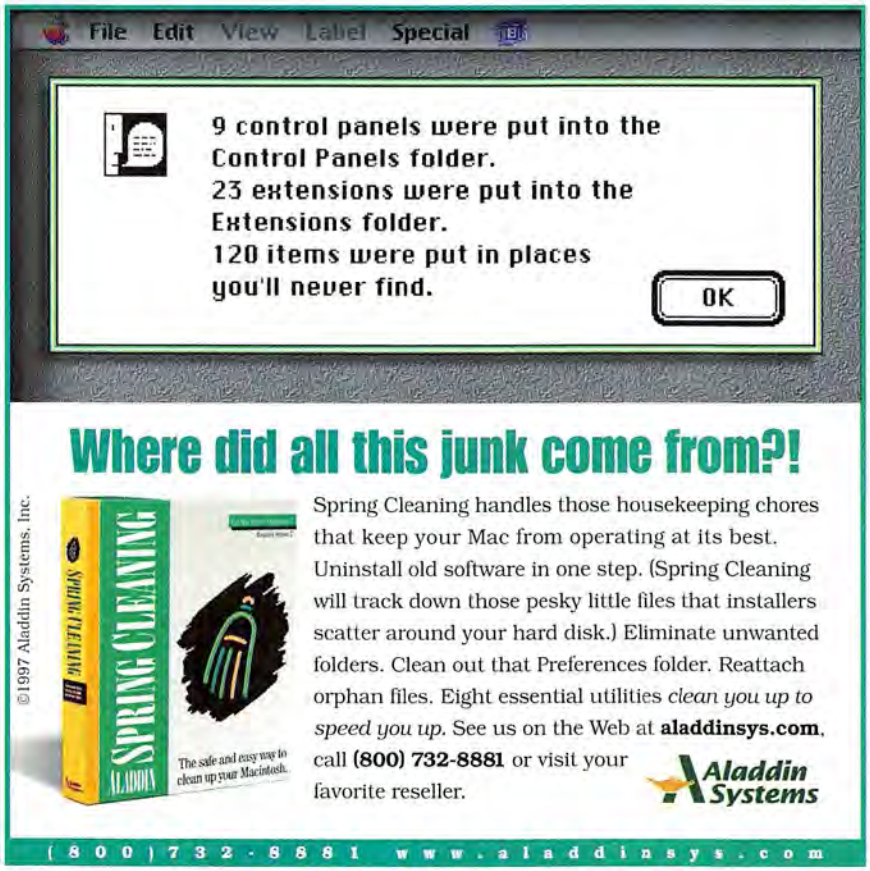
CameraMan can generate effective little sounds that mimic and correspond to the key-taps and mouse-clicks you make during filming. You can also add a soundtrack from your microphone or CD player during filming—great for narrations.

CameraMan 3.0's new features include multiple-monitor recording and native PowerPC code for added speed and smoother movies. A bonus editing program, QuickEdit, offers a new timeline that shows each video and audio track as a separate chunk you can slide, shorten, cut, copy, or paste.

Above all, though, CameraMan 3.0 offers enhanced compatibility. Anyone who's used an earlier version of CameraMan (or one of its now-defunct competitors, such as Strata's Instant Replay) knows that incompatibilities with various Mac models and system versions come with the territory; after all, you're asking the Mac to record its own activity. Most known problems have been solved in version 3, but not all: the excellent manual warns that you can't record in the PowerPC versions of Photoshop and Illustrator; the cursor will be missing from movies made on Power Macs with System 7.5.2 or 7.5.3; and 11 extensions—including PC Exchange, AutoDoubler, and Timbuktu—will foul up CameraMan.

Macworld's Buying Advice Not many people need CameraMan, but those who do—such as the producers of CD-ROMs, interactive training, and online help files—*really* need it. Considering that its only competition is now defunct, you might think the creators of CameraMan would be content to sit on their version 2.0 laurels. Fortunately, they haven't.—DAVID POGUE

RATING: ★★★★/7.4 **PROS:** Smoothly captures small areas of screen activity, with sounds; richly featured; inexpensive. **CONS:** Long list of incompatible software. **COMPANY:** Motion Works Group (604/685-9975, *www.mwg.com*). **LIST PRICE:** $69.95.



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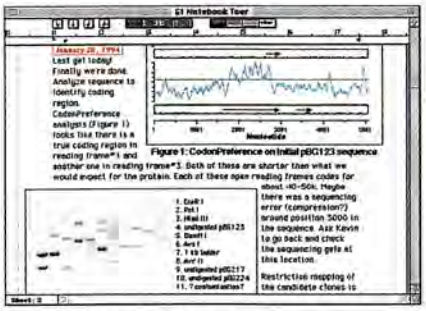
Gene Inspector

A DNA LAB ON YOUR MAC

ONE OF THE BIG REASONS THE Mac became the preferred desktop system for molecular biology is that it offered first-rate programs like Textco's Gene Construction Kit. The latest product from Textco, Gene Inspector 1.0, gives biotech firms and universities yet another reason to hang on to their Macs. This comprehensive and intuitive program is a virtual lab notebook for organizing sequence data and follow-on analyses. Because it doesn't require users to change their old paper-notebook habits, anyone familiar with sequencing can use it with no training.

Gene Inspector features more than 60 standard analyses for both nucleic acids and peptides: multiple sequence alignments, consensus sequences identified for match correctness with shading intensity, dot matrix plots, display of open reading frames in nucleic acid sequences, and prediction of the physical properties of translation-product peptides. That's a lot of molecular biology packed into a single, moderately priced program, and it's all presented in an interface that's nearly self-explanatory.



Lab on a Disk Gel scans, graphs, sequences, and every other element of molecular-biology lab work fit neatly into the Gene Inspector notebook.

But the most important advance over earlier software, from Textco or its competitors, is that you can hot-link data and analyses by defining a set of analyses, grouping them, and dynamically linking them to the original data set. Gene Inspector refines or extends a sequence when you enter the results of further experiments, then automatically updates all the linked analyses. After a quick initial setup, Gene Inspector's notebook links help you produce a research-publication first draft with graphs and appendixes faster than you can read a sequence from a gel.

Textco also gave considerable thought to what *not* to include; one example is sequence directories with specialized search engines, a popular combination a few years ago but of questionable value now, given the current pace of sequencing and the rise of the Web. Also left out is PCR (polymerase chain reaction) analysis software for designing primers, something most users won't need. For contiguous sequence assembly, try Sequencher from Gene Codes (313/769-7249, *www.genecodes.com*).

Macworld's Buying Advice Gene Inspector is one of the best pieces of science software ever released, and it's available exclusively for the Mac. It may seem expensive, but compared with the cost of lost data—or the cost in hours and reagents to acquire more data—it's a reasonable price to pay for the convenience of having all your data and analyses, along with superior graphing capabilities, in a single package. A rich set of notebook features and careful selection of analysis modes make Gene Inspector an essential component of any molecular-biology lab.—CHARLES SEITER

RATING: ★★★★/8.2 **PROS:** Powerful; easy to learn; uniquely effective notebook format. **CONS:** Missing a few features. **COMPANY:** Textco (603/643-1471, *www.textco.com*). **LIST PRICE:** $2599; academic price $1899.

Obsidian

VOLCANIC ROCK IS SOLID GOLD

THEY SAY THAT BEFORE A SWAN dies, it sings a song of great beauty and power. I don't know if it's true of these elegant birds, but it seems to be the case with the ailing Rocket Science Games. Obsidian, a Myst-like puzzle game developed by Rocket Science and distributed by SegaSoft, transcends many of the faults of its genre to achieve a level of integration that's purely delightful.

Many hard-core gamers avoid puzzle games because of their heavy reliance on prolonged full-motion video (FMV) sequences. The general feeling is something like watching a movie with a broken VCR—you have to push buttons and fix the tracking, and in the end you discover the video wasn't worth watching in the first place. Obsidian's creators, though, have done an excellent job of balancing game play, graphics, and story line, setting a new standard for puzzle and FMV games.

The story line is familiar: man creates machine, machine attains consciousness, humanity has problem. In this case, the machine explores its newfound sentience step-by-step, incrementally taking the player into new dimensions of its mind. From exploring a bizarre and elaborate bureaucracy to plumbing the depths of the machine's quest for true creativity, each world is beautiful and surreal.

The Burning Question Obsidian's bizarre, surreal world leaves you wondering where you are and how you got there.

Despite themes that run throughout the game, each new location pushes the envelope of the possible and expands on the story line. Far from simple video, the movie sequences are essential to game play and never overpower the other elements.

The core of Obsidian's game play is the puzzle itself. To advance, you must use your own cleverness to work through each of the machine's developing neuroses. Unraveling each puzzle not only lets you advance to the next, but also provides a clue to your ultimate goal—a refreshing change from games where puzzles seem to be free-floating entities. You find yourself looking forward to each new challenge and the secrets it will reveal, even as you search for its solution.

In most games, sound merely sets the stage. Obsidian's soundtrack—composed by Thomas Dolby and HeadSpace—moves to the foreground, playing an important role in several puzzles. Tone-deaf players won't be left in the dust, but sound is very much a part of the Obsidian world.

Obsidian's sole disappointment is its interface. With so many interesting elements, it's unfortunate that no improvements were made to the tired "click-on-the-glowing-thing" interface typical of puzzle games.

Macworld's Buying Advice Obsidian is to the puzzle genre what Zork was to text games. If you're a puzzle fanatic, like an intellectual challenge, or simply want to broaden your game-play options, Obsidian is an excellent choice. In what may be one of Rocket Science's final products, it's struck gold.—DANIEL MADAR

RATING: ★★★★/7.0 **PROS:** Challenging puzzles; delicately constructed, engrossing story line. **CONS:** Typically bland puzzle-game interface. **COMPANY:** Rocket Science Games/SegaSoft (888/734-2763, *www.segasoft.com*). **COMPANY'S ESTIMATED PRICE:** $39.99.

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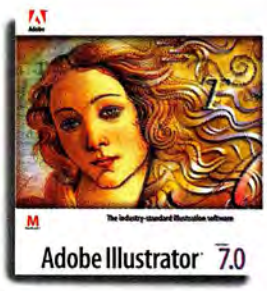

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Duke Nukem 3D

DEGRADING CONTENT TAINTS HOT GAME

A PERENNIAL FAVORITE ON THE PC platform, Duke Nukem 3D: Atomic Edition is finally available for the Macintosh. It's an action-packed, first-person shoot-'em-up game with a sense of humor. Too bad that sense of humor belongs to a 14-year-old with a taste for splatter films and girlie magazines. Within the game you become Duke Nukem, a one-man army out to save Earth from an alien invasion.

Duke doesn't wimp out when it comes to devastating weaponry. Falling squarely into the Gratuitously Violent Weapons category is the Microwave Expander, which provides a working demonstration of why you shouldn't put living creatures in microwave ovens. Alas, the same loving care used to craft such evil weapons wasn't applied to the creation of Duke's enemies. Higher-level aliens look otherworldly, but low-level troops resemble anthropomorphized tigers and pigs. Overall, the aliens' appearance and movement is disappointingly blocky and crude.

Fortunately, the same criticism can't be made of the worlds that Duke strides through. There are some weaknesses—the alien installations feel like James Bond movies—but the game's apocalyptic urban interior decor is very convincing.

Blow 'Em Away Duke Nukem offers you a little skin with your blood and guts.

Futhermore, Duke Nukem's creators deserve extra credit for their visual and sonic flourishes. The game is peppered with moving lights, animated signs and television screens, roaring creatures, and lots of fire. Although its puzzles aren't particularly challenging, the game's worlds are entertainingly interactive, filled with hidden nooks and crannies.

Duke's environment is also loaded with sight gags. Mirrors can reveal enemies lying in wait, but Duke can also check out his good looks. In bathrooms, the toilets work . . . and Duke can use 'em. Plus, Duke delivers hilarious Eastwood-esque commentary.

But there's an ugly devil hiding in the details. Switch on Adult Content mode (there's a password for parents), and Duke takes video-game violence to new depths, tossing in cheap, degrading sex while you're down there. In just one scene—set in an adult bookstore, no less—you can splash an alien's guts on the wall, walk over his corpse leaving bloody boot-prints, *and* check out a film loop of a woman rubbing her face against an apparently naked body. Interact with one of the many bikini-clad dancers scattered throughout the game, and Duke offers a wad of bills, asking, "Wanna dance, baby?" If you step back and pull the trigger, the girl explodes in a shower of money.

Macworld's Buying Advice As an action game, Duke Nukem is pure rock and roll, but its extreme violence and degrading content make it hard to recommend wholeheartedly. I had fun playing Duke—I just wanted to take a shower when I was done.—CAMERON CROTTY

RATING: ★★★★/7.0 **PROS:** Loud, fast action; humorous. **CONS:** Excessive violence; degrading suggestive content; disappointing enemies. **COMPANY:** MacSoft (612/559-5140, *www.wizworks.com*). **COMPANY'S ESTIMATED PRICE:** $49.95.

The Louvre Museum

ART APPRECIATION CD-ROM GEARED TO THE YOUNGER GENERATION

IF YOU WANT TO INSPIRE YOUR kids' love of fine art, you could fly them to Paris to tour the Louvre, one of the largest, most famous museums in the world. Of course, you'd have to battle crowds of tourists; long lines for the most celebrated works of art; and the usual specters of exhaustion, hunger, and whining that accompany travel with children. For a cheaper option, check out Voyager's The Louvre Museum, a CD-ROM of more than 150 paintings, sculptures, and other artworks.

Each piece of art appears in the center of your screen, surrounded by icons. The works span a wide variety of eras and genres, including a knife created around 3300 B.C., furniture built in the 1400s, and paintings from the eighteenth century. The CD—part of the Museums of the World series—includes some of the Louvre's most famous pieces, such as the *Mona Lisa*, and some that are decidedly obscure.

Each piece is accompanied by an audio clip: sometimes serious, sometimes lighthearted (see "If These Walls Could Talk").

If These Walls Could Talk Speculating on the girls' dialogue, the audio clip accompanying Sir Thomas Lawrence's portrait *The Angerstein Children* chimes, "How big am I? So big!"

For more information on the work, you can click on the book icon, which brings up a brief text that explains some of the artwork's history, plus questions to ponder as you look at the picture.

Clicking on the magnifying glass lets you look at a full-screen image of the work, and clicking on hot spots within each picture brings you even closer—a great way to get a look at fine details that you might not be able to see even if you were viewing the piece in the Louvre itself.

You can peruse artwork randomly by clicking on the frog icon (and jumping to a different picture), or geographically, by choosing the globe icon and selecting a country from the map that appears. As you click on a country, its native works of art are displayed as thumbnails; clicking on an image brings up the full-screen picture. You can also view art by time period, by selecting the clock icon. A timeline appears, and clicking on any portion of it shows you the selection of art from that era.

Of course, no kid-centered CD-ROM would be complete without a game or two, and The Louvre Museum includes five. Clicking on the cube icon brings up puzzles, such as finding a detail or spotting an out-of-place addition in each piece of art. The games encourage you to look more closely at the picture, although none are complex or exciting.

Macworld's Buying Advice The Louvre Museum's best asset is its ability to give kids insight into what they're seeing when they look at artwork. It's a great way to introduce them to some fantastic art, and a lot cheaper than a trip to Paris.—WENDY SHARP

RATING: ★★★★/7.3 **PROS:** Great close-ups of key works of art; fun kid-oriented information. **CONS:** Uninspired games. **COMPANY:** The Voyager Company (800/446-2001, *www.voyagerco.com*). **LIST PRICE:** $39.95.

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Exposure Compensation (EV)	7 Steps	7 Steps
White Balance	Auto	Auto
Shutter Speed	1/60-1/4000	1/60-1/4000
Recording Mode	Up to 20 shots Fine/up to 40 shots Standard	20 shots Fine/40 shots Standard
Picture Effects		4 (Monotone, Sepia, Negative, Pastel)
Flash	Built-in	Built-in
Self Timer	10 sec(on/off)	10 sec(on/off)
Lens	Fixed f=4.8, F=2.0 [3]	10:1 Zoom f=4.2-42mm,F=1.8 - 2.9 [3]
35mm Conversion	f=47mm	f=40--400mm
Focusing	Fixed	Auto/Manual focus dial

PLAYBACK		
Format	JPEG	JPEG
Recording Media	3.5" floppy disk 2HD only [4]	3.5" floppy disk 2HD only [4]
Image Size	640x480 (VGA)	640x480 (VGA)
LCD	2.5" 61K pixels	2.5" 61K pixels
LCD Brightness	Yes (+/-)	Yes (+/-)
Delete Picture	Yes (All/Select)	Yes (All/Select)
Index Viewing	6 Picture Display on LCD	6 Picture Display on LCD
Time Stamp	Yes (Date/Time)	Yes (Date/Time)
Menu	Yes	Yes

GENERAL SPECS		
Battery	InfoLithium NP-F530	InfoLithium NP-F530
Dimension (WxHxD)	5"x4.5"x2.5"	5"x4.5"x3"
Weight	1.1 lbs	1.3 lbs
Power Requirements	DC 7.2V	DC 7.2V

SUPPLIED ACCESSORIES		
Rechargeable Battery	NP-F530	NP-F530
Hand Strap	Yes	Yes
Battery Charger	BC-V615	BC-V615
PhotoStudio from ArcSoft	Bundled	Bundled
Back up Memory Battery	CR-2025	CR-2025

OPTIONAL ACCESSORIES		
Wide Angle Lens		VCL-ES06 (MVC-FD7 only)
Telephoto		VCL-ES20 (MVC-FD7 only)
Soft Carrying Case	LCS-FDC	LCS-FDC
Cleaning Kit	KK-LC3	KK-LC3

VCL-ES20

VCL-ES06

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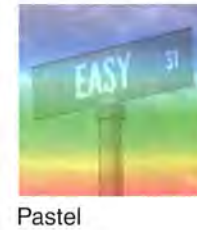

Pastel

Star Ratings

HARDWARE AND SOFTWARE PRODUCTS AT A GLANCE

Macworld's Star Ratings let you compare Macintosh products based on the authoritative assessments in our reviews and features.

What the Scores Mean The number of stars indicates the product's level of quality; each product also gets a numeric score that provides a more exact assessment of the product's quality within that level. The chart below shows the meaning for each level.

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Vendors: Please write to Macworld Star Ratings, 501 Second St., San Francisco, CA 94107, to inform us of changes in the version number or list price of your product, or of changes to your phone number.

Software

BUSINESS

★★★★/8.1 **4th Dimension 6.0,** ACI US, 408/252-4444, $299. Classic relational database does Windows and the Web. *Aug 97, p. 62*

★★/4.2 **Ascend 4.0,** Franklin Quest, 801/975-1176, $99.95. Information manager isn't competitive with other PIMs. *Apr 97, p. 72*

★★/3.8 **ePaper 1.5,** Second Glance Software, 360/692-3694, $169. Offers some markup tools, but if you're serious about OCR, invest in a dedicated package. *Jun 97, p. 64*

★★/3.8 **FormTyper 1.0,** Visioneer, 510/608-0300, $19.95. Forms software is cheap and easy to use, but it's too underpowered. *Aug 97, p. 54*

★★★★/7.3 **Informed Designer 2.0,** Shana, 403/433-3690, $295. If you're serious about forms, this feature-rich designer can't be beat. *Aug 97, p. 54*

★★★★/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*

★★★★/8.6 **Now Contact and Up-to-Date 3.6.5,** Now Software, 503/274-2800, $99.95. Personal info-management duo gets connected to the Net. *Jun 97, p. 70*

★★★/5.7 **OmniForm 2.0,** Caere, 408/395-7000, $149. Accurate but quirky program is handy if you need to scan existing forms. *Aug 97, p. 54*

★★★★/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*

★★★★/7.4 **Scripter 2.0,** Main Event Software, 202/298-9595, $199. Easy way to make CGIs work on a Mac-based Web site. *Apr 97, p. 74*

★★★★/7.8 **Spreadsheet 2000 2.01,** Casady & Greene, 408/484-9228, $110. This LKISS successor is ready for business. *Jul 97, p. 68*

★★★/5.0 **ViewOffice PowerSuite,** NewSoft, 510/445-8600, $79. Inexpensive scanning with solid image-editing tools but unimpressive OCR features. *Jun 97, p. 64*

GRAPHICS

★★/4.8 **3D WalkAround 1.0,** Abracadata, 541/342-3030, $99.99. Unsuitable for architectural projects, but fine for simple interior space planning. *Jun 97, p. 81*

★★★★/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*

★★★/6.3 **DesignWorkshop 1.5,** Artifice, 541/345-7421, $595. Low-end modeler offers excellent modeling tools. *Apr 97, p. 74*

★★★★/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*

★★★★/7.9 **Eye Candy 3.0,** Alien Skin Software, 919/832-4124, $199. Eye-catching Photoshop filters, and lots of 'em. *Aug 97, p. 58*

★★★★/7.2 **Illustrator 7.0,** Adobe Systems, 415/961-4400, $595. Slight upgrade marks a new beginning for venerable graphics app. *Aug 97, p. 46*

★★★★/7.8 **PhotoTools 1.1,** Extensis, 503/274-2020, $99.95. Polished collection of Photoshop filters includes a great text plug-in. *Aug 97, p. 58*

★★★★/7.0 **Texture Creator 2.0,** Three D Graphics, 310/553-3313, $129.99. Pro-level features in a beginner's package. *Aug 97, p. 76*

★★★/6.4 **Virtual Home Space Builder 2.0.4,** ParaGraph, 408/364-7700, $49. VRML 2.0 authoring program has limited modeling features. *Aug 97, p. 68*

★★★★/7.5 **WalkThrough Pro 2.6,** Virtus, 919/467-9700, $495. Best choice to quickly and elegantly create an architectural walk-through. *Jun 97, p. 81*

INTERNET/NETWORKING

★★★/6.9 **Apple VideoPhone Kit 1.5,** Apple Computer, 408/996-1010, $279. Camera/software combo offers good, basic videoconferencing. *Aug 97, p. 56*

★★★★/8.2 **Claris Emailer 2.0,** Claris, 408/727-8227, $49. E-mail innovator gets a face-lift and speed boost. *Jul 97, p. 52*

★★★★/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*

★★★/5.1 **CometPage 1.0.5,** Digital Comet, 415/331-5551, $149. Makes it easier to create dynamic Web pages—as long as you're comfortable working with HTML. *Jul 97, p. 70*

★★★★/8.1 **CommuniGate 2.8,** Stalker Software, 415/383-7164, free (5 users) up to $600 (200 users). Fast, reliable multimedia messaging suite adds new features. *Jun 97, p. 86*

★★★/5.7 **Connectix VideoPhone 2.01,** Connectix, 415/571-5100, $99. May be a good solution for high-speed networks without existing bugs. *Aug 97, p. 56*

★★★★/8.1 **CyberStudio 1.0,** GoLive Systems, 415/463-1580, $349. Excellent user interface and precise controls; a near-perfect application. *Aug 97, p. 104.* Editors' Choice for best Web publishing tool for small-business sites.

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

continues

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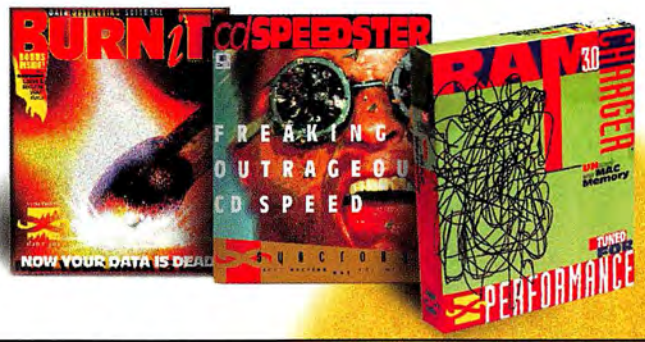

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Circle 55 on reader service card

Star Ratings

★★★/6.4 **Enhanced CU-SeeMe 2.0,** White Pine Software, 408/446-1919, $69. Color-capable version has good low-bandwidth videoconferencing, but unimpressive audio. *Aug 97, p. 56*

★★/4.8 **FrontPage 1.0,** Microsoft, 206/882-8080, $149. Helpful automation, peculiar interface, exorbitant hardware demands. *Aug 97, p. 104*

★★/4.1 **Globetrotter Web Publisher 1.1.1,** Akimbo Systems, 510/843-6888, $99. Intriguing automated functions, but murky design and documentation. *Aug 97, p. 104*

★★★★/7.0 **Home Page 2.0,** Claris, 408/727-8227, $99. Slightly more features than PageMill but occasional preview lapses. *Aug 97, p. 104*

★★/4.2 **HoTMetaL Pro 3.0,** SoftQuad, 416/544-9000, $159. HTML tags and image previews provide little meaningful feedback. *Aug 97, p. 104*

★★/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*

★★★★/7.5 **Internet Gateway 3.7.3,** Vicom Technology, 415/691-9520, $249 to $750. Network router software offers speedy Internet connections. *Jul 97, p. 70*

★★★★/7.8 **NetMinder 4.0.2,** Neon Software, 510/283-9771, $795. Network analyzer makes monitoring and problem diagnosis easy. *Aug 97, p. 78*

★★★★/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*

★★★★/7.4 **PageMill 2.0,** Adobe Systems, 408/536-6000, $149. A straightforward approach with first-rate previewing capabilities. *Aug 97, p. 104.* **Editors' Choice** for best Web publishing tool for personal sites.

★★★/6.9 **Phantom 2.0,** Maxum Development, 630/830-1113, $395. Web crawler lets you build your own search pages. *Jul 97, p. 78*

★★★/5.4 **Presto Personal Page 2.5,** NewSoft, 510/445-8600, $49.99. Modest features with average implementation, but easy to use. *Aug 97, p. 104*

★★/3.6 **QuickSite 1.0,** DeltaPoint, 408/648-4000, $99.95. Automatically generates entire sites at a time, but feature set is tiny. *Aug 97, p. 104*

★★★★/7.5 **RunShare 2.1,** RUN, 201/529-4600, $399 (2 users) up to $2499 (25 users). AppleTalk network tool revs up file transfers by 250 to 400 percent. *Jun 97, p. 86*

★★★★/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. Resembles PageMill, but has less-convenient access to key features. *Aug 97, p. 104*

★★/3.5 **WebWatcher 4.1.1,** Caravelle, 613/225-1172, $295 to $999. Web-site monitor doesn't live up to its name. *Aug 97, p. 72*

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*

★★★★/8.5 **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.

★★/3.7 **CD Speedster,** Syncronys Softcorp, 213/340-4100, $29.95. Provides modest CD acceleration, but only in limited cases. *Jul 97, p. 58*

★★★★/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*

★/1.5 **d-Time,** Acceleration Software, 206/224-3727, $59.95. This CD-ROM accelerator is disappointing across the board. *Jul 97, p. 58*

★★★/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@mmmsoft.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*

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

★★★/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*

★★★★/8.4 **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 **Ultimatte for Macintosh 2.0,** Ultimatte, 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

★★★★/7.5 **Adobe Type Manager Deluxe 4.0,** Adobe Systems, 408/536-6000, $99.95. The new ATM has font substitution and antialiasing. *Jun 97, p. 58*

★★★/6.8 **Adobe Type Reunion Deluxe 2.0,** Adobe

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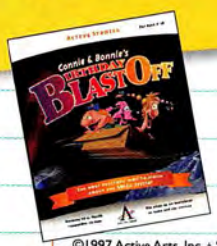

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Systems, 408/536-6000, $60. This font-menu manager has cool features but isn't as good as TypeTamer. *Jun 97, p. 58*

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

★★★/5.8 **Bookends Plus 4.0,** Westing Software, 415/945-3870, $129. Reference manager adds powerful Web functions. *Jul 97, p. 76*

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

★★/3.8 **Common Ground 3.0.1,** Hummingbird Communications, 415/917-7300, $195. Portable document program can't match Adobe Acrobat. *Jul 97, p. 72*

★★★★★/9.3 **Conflict Catcher 4.01,** Casady & Greene, 408/484-9228, $99.95. The best start-up manager gets even better with this upgrade. *Jul 97, p. 62*

★★★★/7.6 **Cumulus Desktop 3.0,** Canto Software, 415/905-0300, $99.95. Affordable multimedia database offers power and a superior interface. *Jun 97, p. 68*

★★★/6.8 **Fetch 1.5,** Extensis, 503/274-2020, $99.95. Multimedia database has cool features but lacks flexibility and ease of use. *Jun 97, p. 68*

★★★/6.8 **Font Box 2.1,** Insider Software, 619/622-9900, $29.99 (Personal Edition) to $169.95 (Network Edition). Font organizer is helpful, but not a panacea. *Aug 97, p. 74*

★★/3.0 **Front Office 1.6 LE,** STF Technologies, 816/220-0100, $59. A bad temp wouldn't garble your phone messages this badly. *Jun 97, p. 66*

★★/3.9 **Image Alchemy PS 2.1.4,** Handmade Software, 510/252-0101, $495. An expensive—and unreliable—solution to service-bureau crises. *Jul 97, p. 60*

★★★/5.7 **InfoGenie 2.0,** Casady & Greene, 408/484-9228, $79.95. Updated information manager adds links to Web browsers. *Jun 97, p. 84*

★★/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*

★★★★/8.8 **LetterRip 1.0.2,** Fog City Software, 408/454-1405, $295. Mailing-list server is simpler and cheaper than ListStar. *Jun 97, p. 77*

★★★★/8.3 **ListStar 1.1,** StarNine Technologies, 510/649-4949, $499. Serious mailing-list management with industrial-strength tools. *Jun 97, p. 77*

★★★★/7.2 **MAE 3.0,** Apple Computer, 408/996-1010, $459. Mac-in-the-box for Unix workstations. *Jun 97, p. 73*

★★★★/8.1 **MATLAB 5,** The MathWorks, 508/647-7000, $1795. Still the fastest route to solutions in industrial math. *Jul 97, p. 74*

★★/4.3 **Now Synchronize 1.0,** Now Software, 503/274-2800, $39.95. Disastrous PDA-to-PIM link for Pilot. *Aug 97, p. 70*

★★★★/7.3 **Numbers & Charts 1.0.1,** Adrenaline, 418/658-9909, $149.95. OpenDoc spreadsheet parts show the promise of component software. *Aug 97, p. 64*

★★★★/7.2 **OmniPage Pro 7.0,** Caere, 408/395-7000, $499. OCR package has improved interface but not accuracy. *Jun 97, p. 83*

★★★/6.6 **Online Army Knife 1.2,** JEM Software, 303/422-4766, $69.95. Add-on spelling checker is fast and Internet-savvy but has some rough edges. *Jun 97, p. 62*

★★★★/7.4 **Pro FORTRAN 5.0,** Absoft, 810/853-0050, $899. Formidable compiler suite has faster compiled programs and a better debugger. *Jul 97, p. 80*

★★★★/8.2 **QuicKeys 3.5.2,** CE Software, 515/224-1995, $119. Macro maker's recent update adds native PowerPC speed. *Jul 97, p. 62*

★★/4.7 **SoftWindows 95 4.0,** Insignia Solutions, 408/327-6000, $349 to $379 (estimated). Faster than before, but still no match for hardware solutions (or a PC). *Jul 97, p. 54*

★/2.6 **SpeechPrompter,** Orator Company, 619/420-9150, $89.95. Prompter software's jerky scrolling makes index cards look good. *Jun 97, p. 88*

★★★★/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*

★★/4.8 **Spellswell Plus 2.1.1,** Working Software, 408/423-5696, $14.95. Add-on spelling checker doesn't live up to its name. *Jun 97, p. 62*

★★★/6.0 **SpellTools 1.2.1,** Newer Technology, 316/943-0222, $19.95. Add-on spelling checker has text-to-speech feature but no interactive checking. *Jun 97, p. 62*

★★★/6.9 **StyleScript 3.5,** Infowave, 604/473-3600, $149. PostScript solution works...for some ink-jets. *Aug 97, p. 67*

★★/3.0 **System Sculptor 2.01,** Colourfull Creations, 810/749-3013, $29.95. Bare-bones utility for managing extensions. *Aug 97, p. 72*

★★/4.0 **Tailor 2.0,** EnFocus Software, 303/393-7282, $369. A weak interface and unreliable performance hinder its troubleshooting talents. *Jul 97, p. 60*

★★★★/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*

Hardware

INPUT DEVICES

★★★/5.2 **GlidePoint Keyboard,** Alps Electric, 408/432-6000, $139.95. Keyboard offers full set of keys with intuitive touchpad. *Apr 97, p. 60*

★★★★/7.5 **Orbit Trackball,** Kensington, 415/572-2700, $69.95. A well-designed, attractive mouse alternative. *Aug 97, p. 70*

★★★/5.9 **TrackBoard and NumPad,** Datadesk, 206/842-5480, $99.95 to $139.95. Keyboard has a separate numeric keypad but only a small trackball. *Apr 97, p. 60*

MISCELLANEOUS HARDWARE

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

★★★/6.3 **CD Stomper,** Stomp, 714/250-6771, $79.95. Of the two labeling kits tested, CD Stomper is clearly the better product. *Aug 97, p. 60*

★★★/5.1 **FM Radio 1.1,** La Cie, 503/520-9000, $49.95. If you want to listen to the radio, you're better off buying a boom box. *Jun 97, p. 90*

★★★/5.0 **MessagePad 2000,** Apple Computer, 408/996-1010, $949. This Newton's finally useful, but it's priced out of the realm of sanity. *Jul 97, p. 69*

★★/4.6 **Neato CD Labeler Kit,** Neato, 203/466-5170, $79.95. Neato can't hold a candle to the CD Stomper. *Aug 97, p. 60*

★★★/6.9 **OrangePC 540,** Orange Micro, 714/779-2772, $2456. Windows 95 compatibility card offers Pentium speed at a Pentium price. *Jul 97, p. 54*

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

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Star Ratings

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*

★★★/6.7 **Signature CD Color Printer,** Fargo, 612/941-9470, $1295. If you produce a lot of CDs, this printer is a good investment. *Aug 97, p. 60*

★★★/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 ten users. Flexible, reliable faxing on your network. *Apr 97, p. 57*

★★★/6.8 **Courier V.Everything 56 K,** U.S. Robotics, 847/982-5010, $395. If you're not ready for setup hassles, wait until 56K technology is more mature. *Jul 97, p. 67*

★★★/6.5 **DataShuttle 256,** RNS, 805/968-4262, $1395. Card allows superfast, two-line ISDN file transfers. *Jun 97, p. 75*

★★★★/8.6 **InterJet,** Whistle Communications, 415/577-7000, $1995 to $2395. All-in-one hardware-and-software combo gets your office on the Internet. *Jun 97, p. 60*

★★/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*

★★★★/8.4 **QuickStream Pro,** Sonic Systems, 408/736-1900, $999. Remote-access server offers Web administration, eases telecommuting access. *Jul 97, p. 80*

★★★/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 modem.

★★★/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 200-MHz 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 long, 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*

★★★/6.7 **Color LaserWriter 12/660 PS,** Apple Computer, 408/996-1010, $6100 (estimated). Lower price and more RAM than its predecessor, but still middle of the pack. *Jun 97, p. 56*

★★★/6.9 **DeskJet 1600CM,** Hewlett-Packard, 408/246-4300, $1999. Expensive ink-jet printer offers good speed and crisp text. *Feb 97, p. 140*

★★★★/7.8 **DeskJet 870Cse,** Hewlett-Packard, 408/246-4300, $599. Color ink-jet printer offers good speed and image quality. *Jun 97, p. 125*

★★★/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*

★★★/6.9 **IBM Network Color Printer,** IBM, 404/238-1234, $8999. Its speed and output won't disappoint you, but it's not a good deal. *Jun 97, p. 56*

★★★/6.2 **LaserJet 5M,** Hewlett-Packard, 408/246-4300, $2229. Laser printer is easily upgraded and offers top-notch software. *Jun 97, p. 125*

★★★/6.0 **LaserJet 6MP,** Hewlett-Packard, 408/246-4300, $1149. Laser printer offers middling performance and excellent software. *Jun 97, p. 125*

★★★/6.0 **LaserWriter 12/640 PS,** Apple Computer, 408/996-1010, $1599. Laser printer has good speed and image quality for the price. *Jun 97, p. 125*

★★★/5.4 **MD-2010,** Alps Electric, 408/432-6000, $499. Low-end color printer is slow, with poor-quality output. *Feb 97, p. 140*

★★★/5.2 **Personal LaserWriter 4/600 PS,** Apple Computer, 408/996-1010, $899. This expensive laser printer is slow and has nonstandard memory. *Jun 97, p. 125*

★★★★/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.

★★★★★/9.1 **Stylus Color 800,** Epson America, 310/782-0770, $449. Color ink-jet printer is fast with outstanding image quality. *Jun 97, p. 125.* **Editors' Choice** for best personal printer.

★★★/5.7 **TruPhoto,** Panasonic Interactive Media, 408/653-1888, $479.95. Digital photo printer offers instant snapshots, delayed gratification. *Apr 97, p. 64*

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*

★★★★/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*

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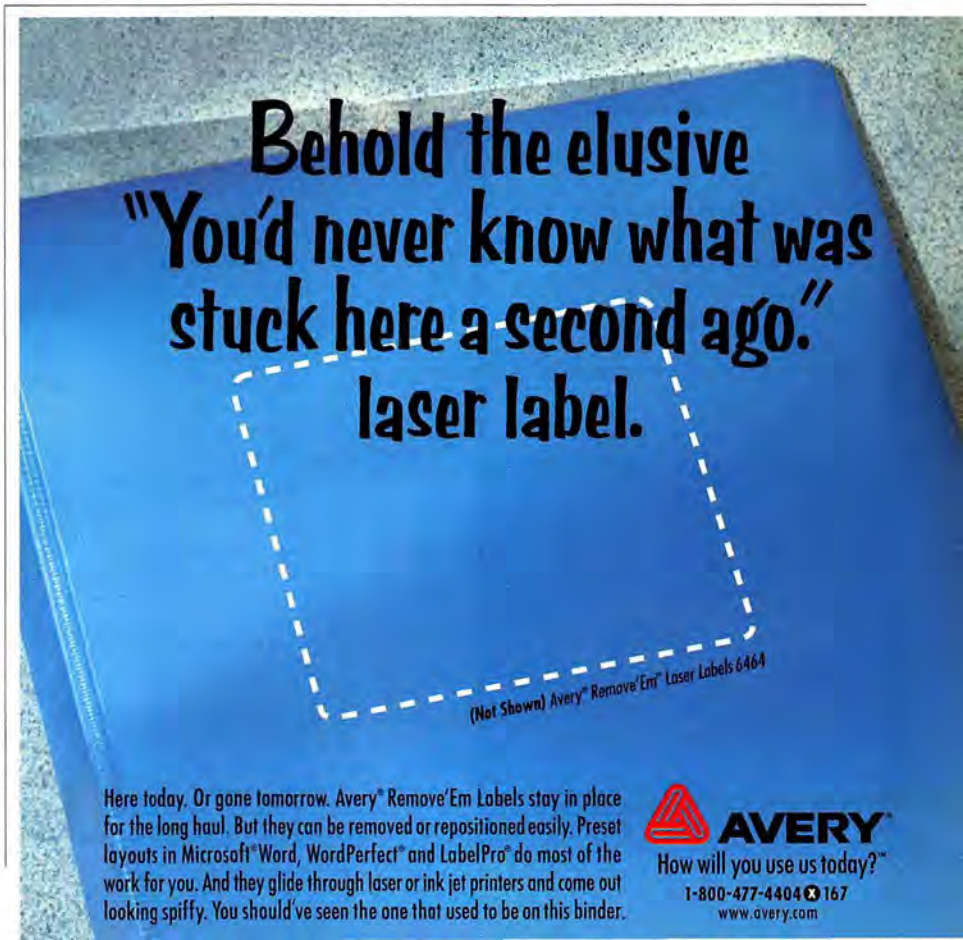

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Star Ratings

★★★★/7.1 **MCA S600C,** Mitsubishi Chemical America, 408/954-8484, $299. Document scanning gets colorized. *Jun 97, p. 78*

STORAGE

★★★★/7.4 **1.0GB Jaz,** Club Mac, 714/768-8130, $499. Speedy third-party Jaz drive is hobbled by poor manual and missing refinements. *Aug 97, p. 115*

★★★/6.6 **1.0GB Jaz D2/Stol,** La Cie, 503/520-9000, $469. Third-party Jaz drive crawls at barely half the speed of Iomega's own. *Aug 97, p. 115*

★★★/6.8 **2.6GB Optical,** ClubMac, 714/768-8130, $1699. Optical drive offers middle-of-the-road price, performance, and features. *Aug 97, p. 115*

★★★/6.6 **540MB MCD D2/Stol,** La Cie, 503/520-9000, $249. Slowest mid-capacity removable hard drive is no match for the APS M540. *Aug 97, p. 115*

★★★/5.7 **640MB MO D2/Stol,** La Cie, 503/520-9000, $499. Poorest-performing medium-capacity optical drive is not a good buy. *Aug 97, p. 115*

★★★/6.2 **640se,** Maxoptix, 510/353-9700, $685. Comparably priced and almost as speedy as the APS 640 MO, this drive is a reasonable choice. *Aug 97, p. 115*

★★★/6.3 **Apex 4.6GB,** Pinnacle Micro, 714/789-3000, $1695. Space-age case fails to make up for surprisingly poor performance. *Aug 97, p. 115*

★★★/5.5 **APS 230 MO,** APS Technologies, 816/483-1600, $379.95. Optical drive performs better than the Sys.230/SCSI, but it's no bargain. *Aug 97, p. 115*

★★★/6.4 **APS 640 MO,** APS Technologies, 816/483-1600, $599.95. Best-performing medium-capacity optical drive is a good buy. *Aug 97, p. 115*

★★★★/8.1 **APS Jaz,** APS Technologies, 816/483-1600, $499.95. This third-party Jaz drive comes closest to matching Iomega's. *Aug 97, p. 115.* **Editors' Choice** for best removable hard drive.

★★★★/7.2 **APS M540,** APS Technologies, 816/483-1600, $299.95. Top-performing mid-capacity removable is ideal for budget watchers. *Aug 97, p. 115*

★★★/5.9 **DynaMO 640,** Fujitsu, 408/432-6333, $499. Second-place speed for a medium-capacity MO and few amenities. *Aug 97, p. 115*

★★★/6.7 **EZFlyer 230,** SyQuest, 510/226-4000, $199. The Zip's nearest competitor has modest performance at a low price. *Aug 97, p. 115*

★★★/6.8 **HammerDisk 2600,** StreamLogic, 818/701-8400, $2509. Good performance but few amenities and a very high price. *Aug 97, p. 115*

★★★/5.6 **HammerDisk PE 640,** StreamLogic, 818/701-8400, $809. Highest-priced medium-capacity MO doesn't have great performance. *Aug 97, p. 115*

★★★★/7.2 **Hammer Jaz Solo 1000,** StreamLogic, 818/701-8400, $589. Highest-priced third-party Jaz with only modest performance and a so-so warranty. *Aug 97, p. 115*

★★★★/8.3 **Jaz,** Iomega, 801/778-1000, $399. The Jaz drive to beat: good price, warranty, performance, and design. *Aug 97, p. 115.* **Editors' Choice** for best removable hard drive.

★★★/6.8 **Nomai 540,** Nomai, 800/556-6624, $299. Pocket-size removable hard drive lacks essentials. *Aug 97, p. 115*

★★★/5.2 **PD,** Panasonic, 800/742-8086, $499.95. Its ability to read CD-ROMs and play CDs doesn't offset its slothfulness. *Aug 97, p. 115*

★★★/5.4 **PDI 5110,** ProDirect, 612/941-1805, $399. Dismal performance and weak documentation hinder low-capacity removable hard drive. *Aug 97, p. 115*

★★★/6.2 **PDI 5200,** ProDirect, 612/941-1805, $499. Higher capacity and better performance than the PDI 5110, but still no bargain. *Aug 97, p. 115*

★★★★/7.2 **PowerMO 2600/SCSI,** Olympus, 516/844-5000, $1799. Fastest optical drive is well designed and reasonably priced. *Aug 97, p. 115.* **Editors' Choice** for best optical drive.

★★★★/7.5 **RMD 1.0 ISD-G1/FWB,** DynaTek, 902/832-3000, $516. Middle-of-the-road Jaz drive is slower than most but reasonably priced. *Aug 97, p. 115*

★★★★/7.1 **ROS 4.6 PSD-G2/FWB,** DynaTek, 902/832-3000, $2012. Slower than others, but with twice the capacity at almost the same price. *Aug 97, p. 115.* **Editors' Choice** for best optical drive.

★★★/6.6 **SCSI Express 2600SME,** Micro Design International, 407/677-8333, $1995. Slowest drive in this size group also has lowest price. *Aug 97, p. 115*

★★★★/7.6 **SyJet 1.5GB,** SyQuest, 510/226-4000, $499. Highest-capacity removable hard drive is speedy but sensitive to SCSI-chain length. *Aug 97, p. 115*

★★★/5.2 **Sys.230/SCSI,** Olympus, 800/347-4027, $359. Drive has low capacity and poor performance at a price that's no bargain. *Aug 97, p. 115*

★★★/5.8 **Zip,** Iomega, 801/778-1000, $149. Best-selling removable is glacially slow but exceptionally cheap. *Aug 97, p. 115*

VIDEO DISPLAY

★★★/6.1 **AlphaScan 711,** Sampo Technology, 770/449-6220, $599. Unbeatable price for a great picture; limited color features and on-screen controls. *Jul 97, p. 117*

★★★/6.0 **AlphaScan 760,** Sampo Technology, 770/449-6220, $799. Screen is beautiful, but on-screen controls are ugly and not user-friendly. *Jul 97, p. 117*

★★★★/7.4 **AppleVision 1710,** Apple Computer, 408/996-1010, $799 (estimated). Fine picture, affordable price, plus excellent software control interface. *Jul 97, p. 117*

★★/3.9 **Crystal Lake 17,** Pacom Data, 408/764-0590, $549. Sharp picture and rock-bottom price, but limited features and controls. *Jul 97, p. 117*

★★★★/7.2 **Diamond Pro 87TXM,** Mitsubishi Electronics America, 714/220-2500, $829. Solid image quality, great controls—all at a realistic price. *Jul 97, p. 117*

★★★/5.5 **DJ702e-M,** Mag Innovision, 714/751-2008, $659. Good image quality and a good price, with cool hardware controls. *Jul 97, p. 117*

★★★/5.5 **DX700T-M,** Mag Innovision, 714/751-2008, $799. Sharp image, sensible controls, but picture's too dim to make the first rank. *Jul 97, p. 117*

★★★/6.2 **EO75-M,** Princeton Graphic Systems, 714/751-8405, $799. Terrific picture and low price with iffy controls and chintzy swivel. *Jul 97, p. 117*

★★★/5.8 **EO76-M,** Princeton Graphic Systems, 714/751-8405, $799. Despite poor on-screen controls, it's a fair deal with good picture and price. *Jul 97, p. 117*

★★★/6.5 **FlexScan FX-C5,** Eizo Nanao Technologies, 562/431-5011, $948. Good-looking, but has somewhat mystifying hardware controls. *Jul 97, p. 117*

★★★/6.7 **FlexScan TX-C7S,** Eizo Nanao Technologies, 562/431-5011, $1299. Excellent image quality and software interface, but it's exorbitantly expensive. *Jul 97, p. 117*

★★★★/7.0 **Mazellan 17PX,** Hansol Multitech, 714/562-5151, $899. Affordable, good image quality, and highly functional hardware controls. *Jul 97, p. 117*

★★★/6.4 **Multigraph 447Xi,** Nokia Display Prod-

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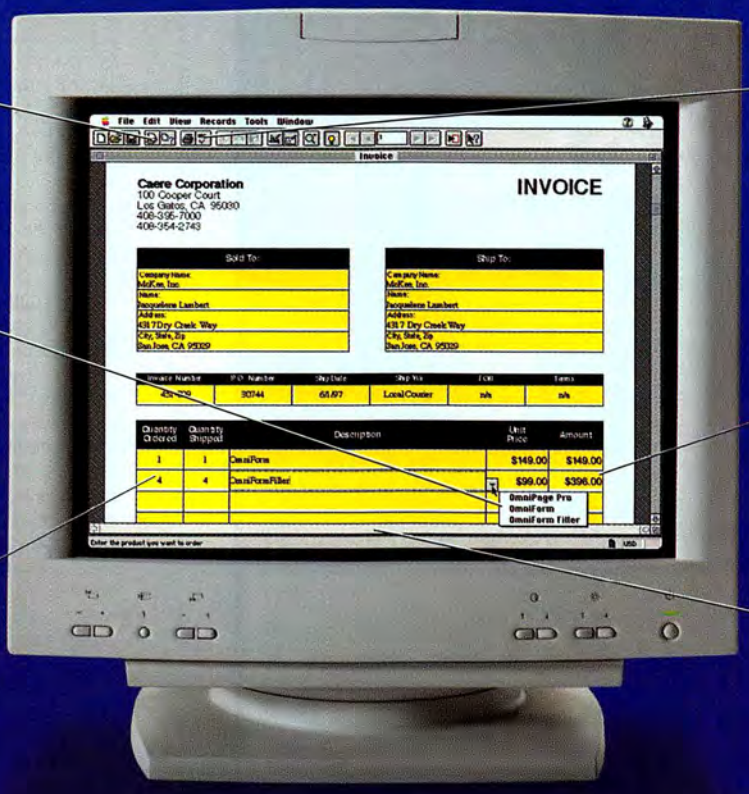

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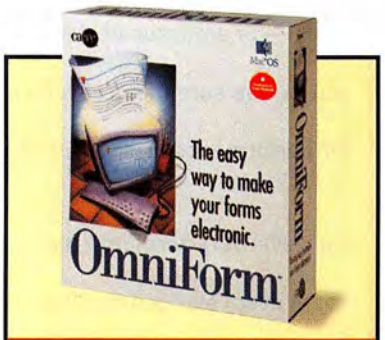

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MACWORLD EDITORS' CHOICE

Macworld EDITORS' CHOICE ★★★★★

To buy smart when choosing Macintosh hardware or software, you need an expert's opinion. Fortunately, the experts at Macworld are more than willing to give you theirs. Just leaf through the pages of this issue — or any issue of Macworld. Wherever you see Editors' Choice, you can be sure the product has passed the most rigorous tests for performance and quality in its class. And comes out a winner.

Our reviewers scrutinize just about every Mac product that hits the market. If it wins us over, you can't go wrong.

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Star Ratings

ucts, 415/331-4244, $925. Great color and great controls, but the price is above average. *Jul 97, p. 117*

★★★/5.1 **Multiple Scan 1705 Display,** Apple Computer, 408/996-1010, $649 (estimated). Good image quality, but tends to bloom at high brightness. *Jul 97, p. 117*

★★★/6.8 **Multiscan 17sell,** Sony Computer, 408/894-0555, $999 (estimated). A slight magenta cast and high price tag, but otherwise a good choice. *Jul 97, p. 117*

★★★★/7.5 **Multiscan 200sf,** Sony Computer, 408/894-0555, $799 (estimated). Excellent quality display plus an elegant interface and surprisingly affordable. *Jul 97, p. 117.* Editors' Choice for best 17-inch monitor.

★★★★/7.3 **MultiSync P750,** NEC Technologies, 630/775-7900, $899 (estimated). Worth the money for its brilliant picture and great on-screen controls. *Jul 97, p. 117*

★★★/6.9 **MultiSync XV17+,** NEC Technologies, 630/775-7900, $749 (estimated). Richly colored picture and superb controls—a good bargain. *Jul 97, p. 117*

★★★★/7.1 **Optiquest V773,** ViewSonic, 909/869-7976, $599. The best combo of image quality and controls we've seen for under $600. *Jul 97, p. 117*

★★★/6.7 **PanaSync S17,** Panasonic Computer, 201/392-4500, $729. A sensible choice—good picture, controls, price, and support. *Jul 97, p. 117*

★★★/6.4 **PanaSync/Pro P17,** Panasonic Computer, 201/392-4500, $899. High-quality image, controls, and support, like its lower-price sibling, the S17. *Jul 97, p. 117*

★★★/6.9 **Pivot 1700,** Portrait Displays, 510/227-2700, $1099. Unique pivoting feature isn't cheap, but it's the only one in town. *Jul 97, p. 117*

★★★/6.4 **PT775,** ViewSonic, 909/869-7976, $999. Good image quality and controls, but price doesn't match performance. *Jul 97, p. 117*

★★★/5.3 **RasterOps SuperScan Mc 600,** Hitachi/NSA, 617/461-8300, $799. Slightly clunky controls but decent picture—a good choice for the budget-minded. *Jul 97, p. 117*

★★★/5.1 **RasterOps SuperScan Mc 611,** Hitachi/NSA, 617/461-8300, $949. Merely average image quality for the price, and hard-to-see controls. *Jul 97, p. 117*

★★★★/8.9 **Sony GDM-W900,** Sony Electronics, 408/955-5142, $4999. A wide-screen monitor for the color connoisseur. *Jun 97, p. 84*

★★★★/7.1 **SyncMaster 17GLi,** Samsung Electronics America, 201/229-4000, $789. Affordable, good-looking display with smart, snazzy controls. *Jul 97, p. 117*

★★★★/7.0 **SyncMaster 17GLsi,** Samsung Electronics America, 201/229-4000, $1019. Outperforms the 17GLi, has custom color controls, but at a big price hike. *Jul 97, p. 117*

★★★/6.8 **VisionMaster 17,** Iiyama North America, 215/957-6543, $799. Great image quality at a very good price; slightly convoluted controls. *Jul 97, p. 117*

★★★★/7.2 **VisionMaster Pro 17,** Iiyama North America, 215/957-6543, $899. Beautiful, feature-rich, and sensibly priced; slightly confusing controls. *Jul 97, p. 117*

★★★/5.4 **Visual Sensations VS-9,** KDS, 714/379-5599, $753. Good-looking display, but inelegant controls and inflexible swivel stand. *Jul 97, p. 117*

★★★/5.5 **WyseVision WY-782D,** Wyse Technology, 408/922-4300, $949. Compelling picture and price, but marred by awkward controls. *Jul 97, p. 117*

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Mac Superguide

MACWORLD SELECTS THE BEST MAC OS SYSTEMS

Edited by Allyson Bates

Looking for a new Macintosh? Confused about what new model to buy? Look no further. Each month, the *Mac Superguide* provides *Macworld*'s picks for the best Mac OS systems. Typically we recommend an Editors' Choice winner and two runners-up. Current recommendations, however, may have changed from last month's, based on the present lineup and price changes.

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 June 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 previously reviewed Mac systems, the summaries reference 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.

OFFICE SYSTEM

EDITORS' CHOICE

★★★/6.5 **PowerCenter Pro 180** This affordable 180MHz Mac is superspeedy and has great features for all tasks. It's our top pick for an office Macintosh. Subtract $100 for the desktop version. Power Computing (512/388-6868): $2274, 604e, 32MB RAM, 1MB cache, 4MB VRAM (4MB maximum), 2.0GB hard drive, 16× CD, 2 free drive bays, 3 PCI slots. *Aug 97, p. 48*

★★★/5.9 **Power Macintosh 7300/200** Apple's price cuts make the 7300/200 a great buy. It's a strong performer that's competitively priced and easily expandable. Apple Computer (408/996-1010): $2299, 604e, 32MB RAM, 256K cache, 2MB VRAM (4MB maximum), 2.0GB hard drive, 12× CD, 1 free bay, 3 PCI slots. *May 97, p. 100*

★★★/5.4 **SuperMac J700/180** A bargain Mac with one more PCI slot, one more free drive bay, and more cache than the 7300/200. Umax Computer (510/226-6886): $1795, 604e, 16MB RAM, 512K cache, 2MB VRAM (4MB maximum), 2.1GB hard drive, 8× CD, 2 free drive bays, 4 PCI slots. *May 97, p. 100*

PORTABLE SYSTEM

EDITORS' CHOICE

★★★★/7.2 **PowerBook 3400c/200** It's almost twice as fast as a top-of-the-line Pentium portable yet costs just $500 more. However, the 3400c isn't perfect: it's expensive, it doesn't support multiple monitors, and its CPU isn't upgradable. Apple Computer (408/996-1010): $5495, 603e, 16MB RAM, 2.0GB hard drive, 6× CD, 12.1-inch active matrix LCD, 1 drive bay, 2 PC Card slots. *May 97, p. 50*

★★★/6.1 **PowerBook 1400cs/117** A midrange notebook with an optional CD-ROM drive and a large passive matrix LCD panel. Now more affordable and a better system than the old 5300 series. Apple Computer (408/996-1010): $2000, 603e, 12MB RAM, 750MB hard drive, optional 6× 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*

To the top: The Motorola StarMax 5000/300 MT's speed and features grab an Editors' Choice.

SMALL-OFFICE/HOME-OFFICE SYSTEM

EDITORS' CHOICE

★★★/6.6 **StarMax 5000/300 MT** Motorola's new 300MHz Mac pumps top speed and features into an affordable computer. Consultants and small businesses will enjoy this feature-rich tower. Motorola Computer Group (800/759-1107): $2899, 603e, 32MB RAM, 512K cache, 4MB VRAM (8MB maximum), 4.3GB hard drive, 16× CD, 3 free drive bays, 5 PCI slots, Zip drive. *Sep 97, p. 60*

EDITORS' CHOICE

★★★/6.5 **PowerBase 240** It's slower than the StarMax 5000, but still has a great price/performance ratio. Now offering a $100 rebate. Power Computing (512/388-6868): $1599, 603e, 16MB RAM, 256K cache, 2MB VRAM (4MB maximum), 2.0GB hard drive, 8× CD, 3 free drive bays, 3 PCI slots. *May 97, p. 100*

★★★/6.1 **Power Macintosh 6500/225** This decent SOHO alternative has cool features—even a Zip drive. But the 225 is hardly upgradable and a bit pricey. Apple Computer (408/996-1010): $1999, 603e, 32MB RAM, 256K cache, 1MB VRAM (1MB maximum), 3.5GB drive, 12× CD, no free drive bays, 2 PCI slots, 33.6-Kbps modem. *Aug 97, p. 52*

EDUCATION SYSTEM

EDITORS' CHOICE

★★★/6.7 **Power Macintosh 5500/225** This all-in-one Mac—available only to schools—is rich in features and performance. Same case, convenience, and price as the old 5400's, but with more power and 3-D capabilities. Apple Computer (408/996-1010): $1999 (only sold to schools), 603e, 16MB RAM, 256K cache, 2MB VRAM (2MB maximum), 2.0GB hard drive, 12× CD, no free drive bays, no PCI slots; Ethernet card, internal stereo speakers, monitor included. *Aug 97, p. 52*

Cool handles, buttons, and levers make it easy to upgrade the Power Macintosh 8600/200.

EDITORS' CHOICE

★★★/6.2 **PowerBase 200** It's fast, *cheap*, and expandable, with 3-D video acceleration. A great buy for cash-strapped schools and students. Take off $100 if you buy this summer. Power Computing (512/388-6868): $1399, 603e, 16MB RAM, 256K cache, 2MB VRAM (4MB maximum), 2.0GB hard drive, 8× CD, 3 free drive bays, 3 PCI slots. *May 97, p. 100*

IMAGE-EDITING AND 3-D GRAPHICS SYSTEM

EDITORS' CHOICE

★★★/6.4 **PowerTower Pro 225** This expandable tower is ideal for image editing. A multiprocessor-based Mac is faster for some key operations, but the 225 is faster and cheaper. Plus Power Computing's summer sale offers 128MB RAM for a bargain price. Power Computing (512/388-6868): $3495, 604e, 32MB RAM, 1MB cache, 8MB VRAM (8MB maximum), 2.0GB hard drive, 16× CD, 6 free drive bays, 6 PCI slots. *Jun 97, p. 108*

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

Macworld LAB TEST

Every Shipping Mac Tested and Rated

To help you make the right buying decision, *Macworld* rerated all shipping Macs according to our new SpeedMark and grouped systems in Professional, Consumer, and Portable categories. New scores have been adjusted proportionally to reflect anticipated technological developments for the following year. Only shipping systems are tested and rated.

Longer bars are better. Editors' Choice winners' names are in red. ► New. An Apple Power Macintosh 7100/80 has a SpeedMark score of 1.0.

Professional Category

	SpeedMark	Star Rating[A]
Apple Computer		
Power Macintosh 7300/180	2.4	★★★/5.8
Power Macintosh 7300/200	2.6	★★★/5.9
Power Macintosh 8600/200	2.7	★★★/6.5
Power Macintosh 9600/200	3.1	★★★/6.7
► Power Macintosh 9600/200MP	2.9	★★★/6.2
Power Macintosh 9600/233	3.3	★★★/6.6
APS Technologies		
MPower 604e200	2.6	★★★/5.9
DayStar Digital		
Genesis MP 800+	3.1	★★★/5.9
► Genesis MP 900+	3.2	★★★/5.7
Motorola Computer Group		
StarMax 4000/200 DT	2.6	★★★/5.2
StarMax 4000/200 MT	2.7	★★★/5.3
Power Computing		
PowerCenter Pro 180	2.9	★★★/6.5
PowerCenter Pro 210	3.2	★★★/6.4
PowerTower Pro 200[B]	NA	★★★/6.6
PowerTower Pro 225	3.4	★★★/6.4
► PowerTower Pro 250	3.6	★★★/6.2
Umax Computer		
SuperMac J700/180	2.7	★★★/5.4
SuperMac S900/180	2.9	★★★/6.5
SuperMac S900/180DP	2.7	★★★/6.4
SuperMac S900/200	3.1	★★★/6.6
SuperMac S900/200DP	2.8	★★★/6.1
SuperMac S900/225	3.1	★★★/6.4
SuperMac S900/233	3.2	★★★/6.5
► SuperMac S900/250	3.5	★★★/6.3
► SuperMac S900/250DP	3.3	★★★/6.2

Consumer Category

	SpeedMark	Star Rating[A]
Apple Computer		
Power Macintosh 4400/200	1.9	★★★/5.5
Power Macintosh 5500/225[C]	2.1	★★★/6.7
► Power Macintosh 6500/225	2.1	★★★/6.1
Power Macintosh 6500/250	2.2	★★★/6.0
► Power Macintosh 6500/275	2.4	★★★/5.9
► Power Macintosh 6500/300	2.5	★★★/5.9
APS Technologies		
MPower 603e180	1.3	★★★/5.0
MPower 603e200	1.7	★★★/5.2
MPower 603e240	1.9	★★★/5.7
Motorola Computer Group		
StarMax 3000/180 DT	1.7	★★★/5.6
StarMax 3000/180 MT	1.8	★★★/5.7
StarMax 3000/200 DT	1.8	★★★/5.6
StarMax 3000/200 MT	1.8	★★★/5.6
StarMax 3000/240 MT	2.2	★★★/6.0
► StarMax 5000/300 MT	2.6	★★★/6.6
Power Computing		
PowerBase 180	1.7	★★★/6.1
PowerBase 200	1.8	★★★/6.2
PowerBase 240	1.9	★★★/6.5
Umax Computer		
SuperMac C500/180	1.7	★★★/5.2
SuperMac C600/200	1.8	★★★/5.1
SuperMac C600/240	1.9	★★★/5.0

Portable Category

	SpeedMark	Star Rating[A]
Apple Computer		
PowerBook 1400c/117[B]	NA	★★★/6.1
PowerBook 1400cs/117[B]	NA	★★★/6.1
PowerBook 1400c/133	NA	★★★/6.2
PowerBook 3400c/180	1.7	★★★★/7.0
PowerBook 3400c/200	NA	★★★★/7.2
PowerBook 3400c/240	2.0	★★★★/7.2

NA = not available. [A]*Based on features, implementation, innovation, performance, reliability, ease of use, and value. (See* Star Ratings *section for full explanation.)*
[B]*SpeedMark score unavailable. Vendor did not send system in time for testing.* [C]*Available only to educational institutions.*

EDITORS' CHOICE

★★★/5.9 Genesis MP 800+ The ultimate Mac system is a new Editors' Choice. It speeds through programs such as Adobe Photoshop and leaves plenty of room for upgrades. DayStar Digital (770/967-2077): $6499, 604e, 32MB RAM, 512K cache, 4MB VRAM (4MB maximum), 2.0GB hard drive, 16× CD, 7 free drive bays, 6 PCI slots. *Jun 97, p. 108*

PUBLISHING AND DESIGN SYSTEM

EDITORS' CHOICE

★★★/6.4 PowerCenter Pro 210 You can't go wrong with this Mac. It costs less than high-end Macs with similar specifications, but it's a bit slower. But now you get 64MB of RAM free. Power Computing (512/ 388-6868): $2395, 604e, 32MB RAM, 1MB cache, 4MB VRAM (4MB maximum), 2.0GB hard drive, 16× CD, 2 free drive bays, 3 PCI slots. *Aug 97, p. 48*

EDITORS' CHOICE

★★★/6.4 PowerTower Pro 225 The fastest single-CPU Mac is great for publishing pros, at a superlow price. Buy this summer, and get free 128MB RAM upgrade. Power Computing (512/388-6868): $3495, 604e, 32MB RAM, 1MB cache, 8MB VRAM (8MB maximum), 2.0GB hard drive, 16× CD, 6 free drive bays, 6 PCI slots. *Jun 97, p. 108*

EDITORS' CHOICE

★★★/6.4 SuperMac S900/225 Nearly as fast as the PowerTower Pro 225, but with fewer free bays. A solid choice for an expandable, fast Mac. Umax Computer (510/226-6886): $3495, 604e, 32MB RAM, 512K cache, 8MB VRAM (8MB maximum), 2.1GB hard drive, 8× CD, 4 free drive bays, 6 PCI slots. *Jun 97, p. 108*

MULTIMEDIA AND VIDEO-CREATION SYSTEM

EDITORS' CHOICE

★★★/5.9 Genesis MP 800+ This expandable Mac speeds through multiprocessor (MP)–enabled programs such as Adobe Premiere. Plenty of bays for upgrades. DayStar Digital (770/967-2077): $6499, 604e, 32MB RAM, 512K cache, 4MB VRAM (4MB maximum), 2.0GB hard drive, 16× CD, 7 free drive bays, 6 PCI slots. *Jun 97, p. 108*

★★★/6.5 Power Macintosh 8600/200 A clever case and cool built-in video for novice video creators. Its slow CPU can be improved with upgrades. Apple Computer (408/996-1010): $2999, 32MB RAM, 256K cache, 2MB VRAM (4MB maximum), 2.0GB hard drive, 12× CD, 1 free drive bay, Ethernet card, built-in video. *Aug 97, p. 50* m

The Right Options: What Each Shipping Mac Offers

Company	Product	Star Rating [B]	Price [C]	SPEED-RELATED FEATURES: CPU Type 750	CPU Type 604e	CPU Type 603e	CPU Speed	Cache	Bus Speed	MEMORY: RAM 32MB	RAM 16MB	RAM Slots
Apple Computer	Power Macintosh 9600/233	★★★/6.6	$3499		●		233MHz	512K	46.6MHz	●		12
(408/996-1010)	Power Macintosh 9600/200MP	★★★/6.2	$4199		2		200MHz	512K	50MHz	●		12
	Power Macintosh 9600/200	★★★/6.7	$3199		●		200MHz	512K	50MHz	●		12
	Power Macintosh 8600/200	★★★/6.5	$2999		●		200MHz	256K	50MHz	●		8
	Power Macintosh 7300/200	★★★/5.9	$2299		●		200MHz	256K	50MHz	●		8
	Power Macintosh 7300/180	★★★/5.8	$2099		●		180MHz	256K	45MHz		●	8
	Power Macintosh 6500/300	★★★/5.9	$2999			●	300MHz	512K	50MHz	64MB		2
	Power Macintosh 6500/275	★★★/5.9	$2999			●	275MHz	512K	50MHz	●		2
	Power Macintosh 6500/250	★★★/6.0	$2299			●	250MHz	256K	50MHz	48MB		2
	Power Macintosh 6500/225	★★★/6.1	$1999			●	225MHz	256K	50MHz	●		2
	Power Macintosh 5500/225	★★★/6.7	$1999 [G]			●	225MHz	256K	50MHz	●		0
	Power Macintosh 4400/200	★★★/5.5	$1499			●	200MHz	256K	40MHz		●	3 [H]
	PowerBook 3400c/240	★★★★/7.2	$5500			●	240MHz	256K	40MHz		●	1
	PowerBook 3400c/200	★★★★/7.2	$5000			●	200MHz	256K	40MHz		●	1
	PowerBook 3400c/180	★★★★/7.0	$4500			●	180MHz	256K	40MHz		●	1
	PowerBook 1400c/133	★★★/6.2	$3200			●	133MHz	128K	33MHz		●	2
	PowerBook 1400cs/117	★★★/6.1	$2000			●	117MHz	none	33MHz		●	2
	PowerBook 1400c/117	★★★/6.1	$1700			●	117MHz	none	33MHz		12MB	2
APS Technologies [J]	MPower 604e200	★★★/5.9	$1899		●		200MHz	512K	40MHz		24MB	3 [H]
(813/483-1600)	MPower 603e240	★★★/5.7	$1799			●	240MHz	256K	40MHz		24MB	3 [H]
	MPower 603e200	★★★/5.2	$1499			●	200MHz	256K	40MHz		●	3 [H]
	MPower 603e180	★★★/5.0	$1199			●	180MHz	none	40MHz		●	3 [H]
DayStar Digital [J]	Genesis MP 900+	★★★/5.7	$8499		4		225MHz	512K	45MHz	●		12
(770/267-2077)	Genesis MP 800+	★★★/5.9	$6499		4		200MHz	512K	50MHz	●		12
Motorola Computer Group	StarMax 4000/200 MT	★★★/5.3	$2695		●		200MHz	512K	40MHz	●		3 [H]
(800/759-1107)	StarMax 4000/200 DT	★★★/5.2	$2495		●		200MHz	512K	40MHz		●	3 [H]
	StarMax 5000/300 MT	★★★/6.6	$2899			●	300MHz	512K	50MHz	●		3 [H]
	StarMax 3000/240 MT	★★★/6.0	$2195			●	240MHz	512K	40MHz	●		3 [H]
	StarMax 3000/200 MT	★★★/5.6	$1695			●	200MHz	256K	40MHz	●		3 [H]
	StarMax 3000/200 DT	★★★/5.6	$1495			●	200MHz	256K	40MHz		●	3 [H]
	StarMax 3000/180 MT	★★★/5.7	$1395			●	180MHz	256K	40MHz	●		3 [H]
	StarMax 3000/180 DT	★★★/5.6	$1249			●	180MHz	256K	40MHz		●	3 [H]
Power Computing [J]	PowerTower Pro 250	★★★/6.2	$3995		●		250MHz	1MB	50MHz	● [K]		8
(512/388-6868)	PowerTower Pro 225	★★★/6.4	$3495		●		225MHz	1MB	45MHz	● [K]		8
	PowerTower Pro 200	★★★/6.6	$3195		●		200MHz	1MB	50MHz	● [K]		8
	PowerCenter Pro 210	★★★/6.4	$2674		●		210MHz	1MB	60MHz	● [L]		4
	PowerCenter Pro 180	★★★/6.5	$2274		●		180MHz	1MB	60MHz	●		4
	PowerBase 240	★★★/6.5	$1599			●	240MHz	256K	40MHz		●	3
	PowerBase 200	★★★/6.2	$1399			●	200MHz	256K	40MHz		●	3
	PowerBase 180	★★★/6.1	$999			●	180MHz	256K	40MHz		●	3
Umax Computer	SuperMac S900/250DP	★★★/6.2	$6495		2		250MHz	512K	50MHz	●		8
(510/226-6886)	SuperMac S900/250	★★★/6.3	$3795		●		250MHz	512K	50MHz	●		8
	SuperMac S900/233	★★★/6.5	$2995		●		233MHz	512K	46.6MHz	●		8
	SuperMac S900/225	★★★/6.4	$3495		●		225MHz	512K	45MHz	●		8
	SuperMac S900/200DP	★★★/6.1	$3295		2		200MHz	512K	50MHz	●		8
	SuperMac S900/200	★★★/6.6	$2595		●		200MHz	512K	50MHz	●		8
	SuperMac S900/180DP	★★★/6.4	$2995		2		180MHz	512K	51.4MHz	●		8
	SuperMac S900/180	★★★/6.5	$2595		●		180MHz	512K	51.4MHz	●		8
	SuperMac J700/180	★★★/5.4	$1795		●		180MHz	512K	45MHz		●	8
	SuperMac C600/240	★★★/5.0	$1695			●	240MHz	256K	40MHz		●	2
	SuperMac C600/200	★★★/5.1	$1295			●	200MHz	256K	40MHz		●	2
	SuperMac C500/180	★★★/5.2	$1095			●	180MHz	256K	40MHz		●	2

Editors' Choice winners in red. ● = yes; NA = not available. [A] All 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 featur
Star Digital, Power Computing, and PowerTools prices are direct. [D] All systems without on-board video come with a PCI video card installed. [E] Accepts short (7-inch) cards only. [F] Allows only one drive to be
available. [K] Summer sale offers free 128MB RAM upgrade. [L] Summer sale offers free 64MB RAM upgrade. [M] Low-profile desktop configurations (no free drive bays) are available for $100 less.

VIDEO DISPLAY			STORAGE							EXPANSION [A]							COMMUNICATIONS	
				Hard Drive		CD-ROM Drive						Internal Bus						
VRAM (std/max)	On-board Circuitry [D]	3-D Circuitry	Free Bays	1.0GB–1.9GB	2.0GB–2.9GB	16×	12×	8×	Zip Drive	Case	PCI Slots	Ultra SCSI	SCSI-2	SCSI-1	EIDE	Modem	Ethernet
8MB/8MB			2		4.0GB		●			tower	6		●				●
8MB/8MB			2		4.0GB		●			tower	6		●				●
8MB/8MB			2		4.0GB		●			tower	6		●				●
2MB/4MB	●		1		2.0GB		●		●	tower	3		●				●
2MB/4MB	●		1		2.0GB		●			desktop	3		●				●
2MB/4MB	●		1		2.0GB		●			desktop	3		●				●
2MB/2MB	●	●	0		4GB		●		●	tower	2 [E]				● [F]		●
2MB/2MB	●	●	0		4GB		●		●	tower	2 [E]				● [F]		●
2MB/2MB	●	●	0		4GB		●		●	tower	2 [E]				● [F]		●
2MB/2MB	●	●	0		3.5GB		●		●	tower	2 [E]				● [F]		●
1MB/1MB	●	●	0		2.0GB		●			all-in-one	0				● [F]		●
2MB/4MB	● [I]		0	1.2GB				●		desktop	2				●		●
1MB/1MB			1		3.0GB		●			portable	1					●	●
1MB/1MB			1		2.0GB					portable	1					●	●
1MB/1MB			1	1.3GB						portable	1					●	●
1MB/1MB			1	1.0GB				6×		portable	0						
1MB/1MB			1	750MB				6×		portable	0						
1MB/1MB			1	750MB						portable	0						
2MB/4MB	● [I]		4		2.5GB	●			option	tower	5			●	●	option	option
1MB/4MB	● [I]		5		2.5GB	●			option	tower	5			●	●	option	option
1MB/4MB	● [I]		3	1.2GB		●			option	desktop	3			●	●	option	option
1MB/4MB	● [I]		3	1.2GB		●			option	desktop	3			●	●	option	option
4MB/4MB			7		2.0GB			●		tower	6		●				●
4MB/4MB			7		2.0GB			●		tower	6		●				●
2MB/4MB	●		3		2.5GB			●		tower	5			●	●		●
2MB/4MB	●		1	1.2GB				●		desktop	3			●	●		●
4MB/8MB	●	●	3		4.3GB	●			●	tower	5			●	●	●	●
4MB/4MB	●		4		2.5GB			●		tower	5			●	●	●	
1MB/4MB	●		4		2.5GB			●		tower	5			●	●	●	
1MB/4MB	●		4	1.2GB				●		desktop	3			●	●	●	
1MB/4MB	●		4		2.5GB			●		tower	5			●	●	●	
1MB/4MB	●		4	1.2GB				●		desktop	3			●	●	●	
3MB/8MB			6		2.0GB	●			option	tower	6		●				●
3MB/8MB			6		2.0GB	●			option	tower	6		●				●
3MB/8MB			6		2.0GB	●			option	tower	6		●				●
4MB/4MB	●	●	2		2.0GB	●			option	tower [M]	3	●	●				●
4MB/4MB	●	●	2		2.0GB	●			option	tower [M]	3	●	●				●
2MB/4MB	●	●	3		2.0GB		●		option	tower [M]	3		●		●	option	
2MB/4MB	●	●	3		2.0GB		●		option	tower [M]	3		●		●	option	
2MB/4MB	●	●	3	1.2GB				●	option	tower [M]	3		●		●	option	
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		●				●
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		●				●
2MB/4MB			2		2.1GB			●		desktop	4		●				●
1MB/1MB	●		2	1.2GB				●		tower	3		●		●	●	●
1MB/1MB	●		2	1.2GB				●		tower	3		●		●	●	
1MB/1MB			2	1.0GB				●		desktop	2		●		●	●	

implementation, innovation, performance, reliability, ease of use, and value. (See Star Ratings section for full explanation.) [C] *Apple, Motorola, and Umax prices are company estimates; APS Technologies, Day-onnected.* [G] *Available only to educational institutions.* [H] *Uses 3.3-volt DIMMs, which are not compatible with other Macs' 5V DIMM slots.* [I] *Has only a VGA video connector.* [J] *Other configurations are*

Macworld
SPEEDMARK

Inside the New SpeedMark Scores

WITH THIS ISSUE, MACWORLD LAB introduces a new set of system benchmarks tuned for today's high-performance Macintoshes. These new tests show the real-world performance of today's Macs using a wide range of software common to Mac professionals.

Real-World Benefits The tests are real-world, which means that they work the Mac the same way users do: running actual tasks, not some program that spends a few seconds making calculations that may have nothing to do with how your Mac system performs overall. The SpeedMark tests, by contrast, take about seven hours to run on a 200MHz PowerPC 604e–based Mac.

Another advantage of the real-world approach versus competing isolative tests is that Mac makers can't tune their Macs to get better SpeedMark scores unless they make the systems actually run better. With isolative tests, it's easier to get a higher score that doesn't translate into user experience, as several system makers have admitted.

The SpeedMark tests show you how systems compare in four key areas: CPU-intensive work, which forms the bulk of most programs' operations; FPU-intensive work, which shows performance for 3-D, scientific, and other analytic or modeling programs; disk-intensive work, which shows how well the Mac's hard drive feeds data to the rest of the system (a fast CPU is easily hobbled by a slow hard drive); and video-intensive, which shows the video system's speed.

Our holistic tests show how the *entire* Mac system performs, not just isolated components. After all, you work with your entire Mac every day. That's where the SpeedMark score comes in. It takes all of our tests and assigns each a different weight depending on how representative it is of a real-world environment; the SpeedMark is a composite of those results. It's the one number you can use to compare any Mac from any Mac maker, no matter what kind of work you do. Use the CPU, FPU, disk, and video numbers to understand the trade-offs among systems you're considering, but trust the SpeedMark score as the final word for performance.

Note that the SpeedMark results are not comparable to those of our previous tests, but you can divide any of our Overall Scores published since January 1996 by 2.9 to get a roughly equivalent SpeedMark score.

Behind Our Tests Created by Mark Hurlow, a Macworld Lab senior technical analyst who has developed systems tests for ten years, the SpeedMark tests cover 54 tasks in 15 PowerPC-native programs and the Finder. The programs are Adobe Illustrator 6.0, Photoshop 4.0, and Premiere 4.2; Claris FileMaker Pro 3.0 and ClarisWorks 4.0; Macromedia FreeHand 7.0 and SoundEdit 2.0; MetaCreations Infini-D 3.5 and Painter 4.0; Metrowerks CodeWarrior 10; Microsoft Excel 5.0 and Word 6.0; QuarkXPress 3.3; Waterloo Maple V 4.0; and Wolfram Research Mathematica 3.0.

Our SpeedMark tests are automated, thanks to the use of Binary Software's KeyQuencer 2.1, a Power Mac program that accurately counts the time for each test and removes any time it spends recording. We nonetheless run every test three times (restarting the program before each trial), since some programs use cache files and other techniques to improve performance the more often they run a type of task—improving themselves to match your work. The three iterations create a safety cushion by having sufficient data so that we can spot any odd results.

We configure all Macs with 32MB of RAM so they can run memory-intensive programs such as Photoshop and Painter without resorting to the hard disk, which slows performance. We've optimized our file sizes for that amount of RAM.

We run the SpeedMark tests under Mac OS 7.6.1. (Mac OS 8 was not shipping when we retested, although we will move to Mac OS 8 after it has been field-tested and any bugs fixed.) We leave installed any performance enhancements the Mac maker might include, such as Connectix's Speed Doubler, since those affect everyday performance.

We set the system disk cache to 512K—enough for most programs, but not so large that it makes the Mac access the hard drive often, which slows overall performance. This number is lower than the standard setting on most Macs, since programs such as Photoshop slow down under the default settings.

Our standard test configuration also includes a monitor set at 832-by-624-pixel resolution displaying thousands of colors (16-bit color). We use whatever hard drive the Mac system comes with, as different hard drive makes can affect performance on otherwise identical systems. ■

KEVIN CANDLAND

The Lab Team from left: Mac Superguide editor Allyson Bates; lab director Lauren Black; analysts Matt Clark, Mark Hurlow, Jeff Sacilotto, and Susan Silvius; and inventory controller Paul Brown.

Macworld LAB TEST

Performance Showdown: Every Mac Tested

Use the SpeedMark number to compare systems' total real-world performance against each other, rather than try to keep track of different PowerPC CPUs and different megahertz numbers. Use the results in the CPU, FPU, Disk, and Video categories to see how the major subsystems' performance compares. We tested all shipping Macs available as well as prototypes of several systems planned for release this summer. Note that Apple was unable to provide any PowerBook 1400's or the 3400c/200 for testing under the SpeedMark tests, Power Computing was unable to supply a PowerTower Pro 200, and PowerTools was unable to provide any systems.

Best overall performance. Longer bars are better. Bold indicates best result in a specific test. Editors' Choice winners are in red. ►New system.

An Apple Power Macintosh 7100/80 has a SpeedMark score of 1.0.

Shipping Macs	SpeedMark	CPU	FPU	Disk	Video	Star Rating*
► Power Computing PowerTower Pro 250	3.6	**3.9**	**3.8**	2.5	**7.6**	★★★/6.2
► Umax SuperMac S900/250	3.5	3.8	3.7	2.5	7.3	★★★/6.3
Power Computing PowerTower Pro 225	3.4	3.6	3.4	2.3	7.2	★★★/6.4
► Umax SuperMac S900/250DP	3.3	3.5	3.3	2.6	6.6	★★★/6.2
Apple Power Macintosh 9600/233	3.3	3.5	3.4	2.3	6.9	★★★/6.6
► DayStar Genesis MP 900+	3.2	3.3	2.8	**2.9**	6.1	★★★/5.7
Umax SuperMac S900/233	3.2	3.4	3.4	2.0	6.9	★★★/6.5
Power Computing PowerCenter Pro 210	3.2	3.4	3.2	2.4	4.3	★★★/6.4
Apple Power Macintosh 9600/200	3.1	3.3	3.1	2.3	6.7	★★★/6.7
Umax SuperMac S900/225	3.1	3.3	3.3	2.0	6.8	★★★/6.4
DayStar Genesis MP 800+	3.1	3.1	2.8	**2.9**	6.2	★★★/5.9
Umax SuperMac S900/200	3.1	3.2	3.1	2.0	7.1	★★★/6.6
Power Computing PowerCenter Pro 180	2.9	3.1	2.9	2.3	4.1	★★★/6.5
Umax SuperMac S900/180	2.9	3.0	2.8	2.0	6.5	★★★/6.5
► Apple Power Macintosh 9600/200MP	2.9	3.0	2.8	2.1	5.9	★★★/6.2
Umax SuperMac S900/200DP	2.8	3.0	2.8	1.9	6.2	★★★/6.1
Apple Power Macintosh 8600/200	2.7	3.0	2.9	1.9	3.6	★★★/6.5
Umax SuperMac S900/180DP	2.7	2.9	2.6	1.9	6.1	★★★/6.4
Motorola StarMax 4000/200 MT	2.7	3.0	2.9	1.9	3.0	★★★/5.3
Umax SuperMac J700/180	2.7	2.9	2.7	1.5	5.5	★★★/5.4
► Motorola StarMax 5000/300 MT	2.6	2.8	2.5	2.1	4.0	★★★/6.6
Apple Power Macintosh 7300/200	2.6	2.9	2.9	1.6	3.6	★★★/5.9
APS MPower 604e200	2.6	2.9	2.9	1.7	3.0	★★★/5.9
Motorola StarMax 4000/200 DT	2.6	2.9	2.8	1.6	3.0	★★★/5.2
► Apple Power Macintosh 6500/300	2.5	2.7	2.5	1.9	3.3	★★★/5.9
► Apple Power Macintosh 6500/275	2.4	2.6	2.3	2.0	3.4	★★★/5.9
Apple Power Macintosh 7300/180	2.4	2.7	2.6	1.5	3.3	★★★/5.8
Apple Power Macintosh 6500/250	2.2	2.3	2.1	1.8	3.1	★★★/6.0
Motorola StarMax 3000/240 MT	2.2	2.3	2.1	1.8	3.0	★★★/6.0
► Apple Power Macintosh 6500/225	2.1	2.2	2.0	1.8	3.1	★★★/6.1
Apple Power Macintosh 5500/225**	2.1	2.2	2.0	1.8	3.1	★★★/6.7
Apple PowerBook 3400c240	2.0	2.1	2.1	1.6	2.3	★★★★/7.2
Power Computing PowerBase 240	1.9	2.1	1.9	1.6	2.4	★★★/6.5
Umax SuperMac C600/240	1.9	2.0	2.0	1.7	2.1	★★★/5.0
Apple Power Macintosh 4400/200	1.9	2.0	1.8	1.7	2.6	★★★/5.5
APS MPower 603e240	1.9	2.1	2.0	1.4	1.7	★★★/5.7
Power Computing PowerBase 200	1.8	1.9	1.8	1.5	2.4	★★★/6.2
Motorola StarMax 3000/200 MT	1.8	2.0	1.9	1.6	1.7	★★★/5.6
Motorola StarMax 3000/180 MT	1.8	1.9	1.8	1.6	1.7	★★★/5.7
Umax SuperMac C600/200	1.8	1.9	1.8	1.6	2.0	★★★/5.1
APS MPower 603e200	1.7	1.9	1.8	1.3	1.7	★★★/5.2
Power Computing PowerBase 180	1.7	1.8	1.7	1.5	2.3	★★★/6.1
Umax SuperMac C500/180	1.7	1.8	1.7	1.4	1.9	★★★/5.2
Motorola StarMax 3000/180 DT	1.7	1.8	1.8	1.4	1.7	★★★/5.6
Apple PowerBook 3400c/180	1.7	1.8	1.7	1.4	2.0	★★★★/7.0
APS MPower 603e180	1.3	1.4	1.3	1.2	1.4	★★★/5.0
Prototype Macs						
► Power Computing PowerTower Pro G3/275	5.1	**5.9**	**5.2**	2.8	**9.4**	not shipping
► Umax SuperMac S910/250	3.8	3.9	3.7	**3.1**	7.2	not shipping
► Umax SuperMac C600x/280	2.5	2.7	2.5	2.1	1.6	not shipping
► Umax SuperMac C600x/240	2.2	2.4	2.5	1.6	2.4	not shipping

**Based on features, implementation, innovation, performance, reliability, ease of use, and value. (See Star Ratings section for full explanation.) **Available only to educational institutions.*

Behind Our Tests

For detailed information on systems benchmarks, see story at left.—**Macworld Lab testing supervised by Mark Hurlow**

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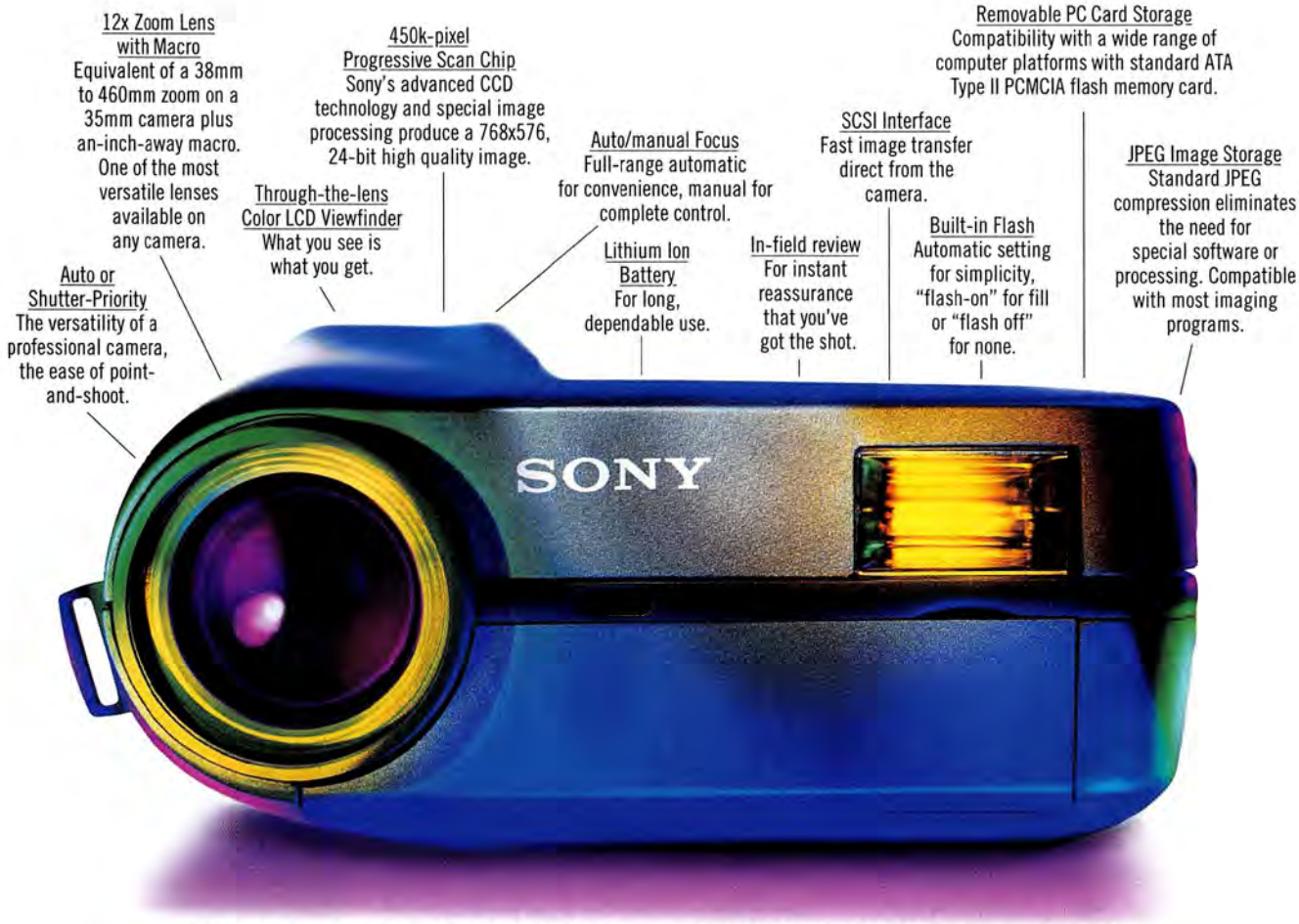

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275MHz Mac Powerhouse

First PowerPC 750 system unveiled

BY TOVA FLIEGEL

Macworld LAB TEST

It's another milestone for the Mac. The first systems using the next-generation PowerPC CPU, officially named the PowerPC 750 and commonly known as the G3 Arthur, are set to arrive by the end of August from Power Computing (512/388-6868, *www.powercc.com*). And Macworld Lab tests show that these PowerPC 750–based machines will be as revolutionary as the first PowerPC 604's, which changed the course of the Macintosh platform nearly two years ago.

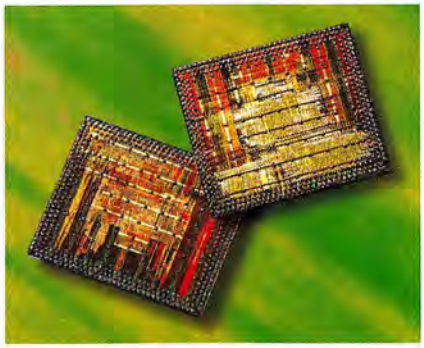
In a Macworld Lab exclusive, we tested a prototype PowerPC 750 machine, the PowerTower Pro G3/275. Powered by a 275MHz CPU, it beat its closest competitor, a 250MHz 604e (also a prototype system), by 34 percent in overall indexed results. That large a spread indicates the PowerPC 750 will raise the performance bar for systems to a new height, thanks largely to that CPU's improved design and new caching scheme.

As for the PowerTower Pro G3, these numbers earn it the title of fastest Mac ever—by a long shot.

The PowerTower Pro G3 even outperformed a 266MHz G3 Motorola system using the Viper motherboard, based on the Common Hardware Reference Platform (CHRP) specification (see "First CHRP System Is Stingingly Fast," *News, Macworld*, June 1997). At that time the Viper was the fastest system we tested, but it's too soon to say how shipping CHRP Macs will stack up against the PowerTower Pro G3, since the Viper was an early prototype that Motorola has no plans to market.

Hard as it is to believe, the new PowerTower Pro would certainly be even faster if it could take advantage of the 66MHz bus speed promised by CHRP. You were probably expecting to see CHRP machines by now (we were), but CHRP, which had been set to arrive in late spring, has been delayed a few months due to complications in the licensing talks between Apple Computer and the other Mac makers.

Thankfully, Power Computing decided not to wait for licensing issues to be settled. Power Computing makes the most of the PowerPC 750 to offer blazingly fast speeds even before CHRP's arrival. The PowerTower Pro G3 does an admirable job of pushing the 50MHz system bus on the Tsunami motherboard to new limits. (Still, if you're hell-bent on absolute speed, you might consider waiting to see how CHRP systems using the PowerPC 750 perform.)



Motorola's 275MHz G3 (aka PowerPC 750) helps power the newest, fastest Mac.

PowerPC 750's Superiority

No question about it: the PowerTower Pro G3/275 gains a slight speed edge simply because the CPU runs at 275MHz—a higher clock speed than that of the fastest (250MHz) 604e currently shipping. But there's a lot more to the story than just megahertz. With its improved design and 0.25-micron circuitry size, the PowerPC 750 can handle more instructions per cycle than previous PowerPC CPUs. Simply put, even on a megahertz-for-megahertz basis, the PowerPC 750 is faster than the 604e and improves overall Mac performance in most operations. (The PowerPC 750 is optimized for integer calculations and not for floating-point operations, so the 604e CPUs still have their place for floating-point–intensive scientific applications, such as rendering and modeling.)

Backside Cache But it's in a revised caching scheme, commonly called *backside cache*, that the PowerPC 750's true speed advantage lies. The PowerPC 604e and 603e CPUs share their external cache bus with main memory, but the 750 has a separate cache bus to handle requests from the CPU independently, which alleviates bottlenecks. (A second G3 processor, the PowerPC 740, does not include connectors for a backside cache.)

Systems makers can choose to implement the 750's backside cache in a 2:1, 3:2, or 1:1 ratio between the CPU speed and cache-bus speed. To avoid long division, let's take a nice round number, such as a 300MHz CPU, as a simple example. A 300MHz PowerPC 750 could use any of three cache-bus speeds: 150MHz (2:1), 200MHz (3:2), or 300MHz (1:1). Of course, in this scenario, the 300MHz cache bus will result in the fastest overall performance, since it means the CPU and cache can communicate with no delays because they operate at the same speed.

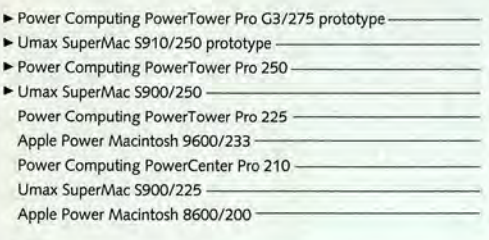
The PowerTower Pro G3/275 uses the 1:1 implementation, so the 275MHz

Macworld LAB TEST PowerTower Pro G3's Mighty Leap

By combining a very fast cache technology and the new PowerPC 750 CPU, Power Computing has accelerated the Mac pace to an unexpected new level. Using the same basic motherboard architecture as in its other PowerTower Pros, Apple's Power Mac 9600 series, and Umax Computer's SuperMac S900 series, Power Computing's prototype 275MHz PowerTower Pro G3 outpaces all other systems by a wide margin—it's 34 percent faster than the nearest competitor. A 300MHz version of the G3 should add even more distance.

Best overall performance. Longer bars are better. Bold indicates best result in a specific test. Editors' Choice winners are in red. ►New.

An Apple Power Macintosh 7100/80 has a SpeedMark score of 1.0.



	SpeedMark	CPU	FPU	Disk	Video	Star Rating
► Power Computing PowerTower Pro G3/275 prototype	5.1	**5.9**	**5.2**	2.8	**9.4**	not shipping
► Umax SuperMac S910/250 prototype	3.8	3.9	3.7	**3.1**	7.2	not shipping
► Power Computing PowerTower Pro 250	3.6	3.9	3.8	2.5	7.6	★★★/6.2
► Umax SuperMac S900/250	3.5	3.8	3.7	2.5	7.3	★★★/6.3
Power Computing PowerTower Pro 225	3.4	3.6	3.4	2.3	7.2	★★★/6.4
Apple Power Macintosh 9600/233	3.3	3.5	3.4	2.3	6.9	★★★/6.6
Power Computing PowerCenter Pro 210	3.2	3.4	3.2	2.4	4.3	★★★/6.4
Umax SuperMac S900/225	3.1	3.3	3.3	2.0	6.8	★★★/6.4
Apple Power Macintosh 8600/200	2.7	3.0	2.9	1.9	3.6	★★★/6.5

Behind Our Tests For detailed information on systems benchmarks, see *Mac Superguide*, September 1997.—**Macworld Lab testing supervised by Mark Hurlow**

CPU accesses the cache at 275MHz, which means the CPU gets access to cached data as fast as it possibly can. And at a full megabyte, the cache is heftier than that in many competing systems. (For more details on backside cache, see the diagram, "New Caches Bolster Speed.")

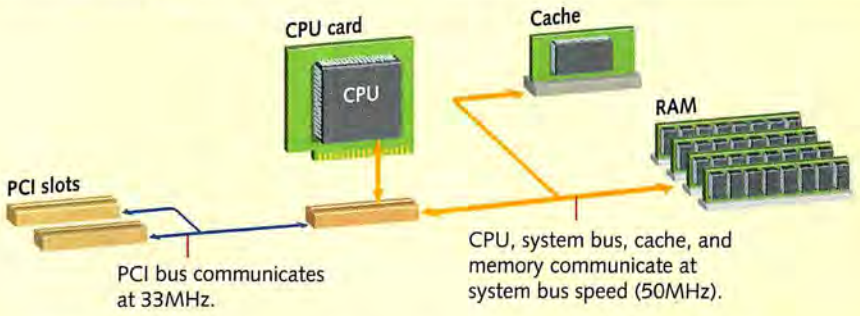
In-line Cache Other Mac makers are using a slightly different caching scheme, called *in-line cache*, to boost performance. Last month, Umax Computer was the first to announce its in-line caching scheme in the form of the CacheDoubler card for its 603e-based C600 SuperMacs. CacheDoubler raises the C600's cache-bus speed to 80MHz, up from the system-bus speed of 40MHz. By fall, Umax plans to release CacheDoubler for the SuperMac S910, S900, and J700 systems, giving them a full megabyte of in-line cache. CacheDoubler will raise their cache-bus speeds to 100MHz, up from the overall system-bus speed of 50MHz.

In our tests, the prototype S910 with 1MB of standard external cache showed a performance boost of 8 percent over the SuperMac S900/250—a noteworthy improvement. But based on tests of the C600 using in-line cache, we expect to see closer to a 15 percent improvement once CacheDoubler is installed in the S910.

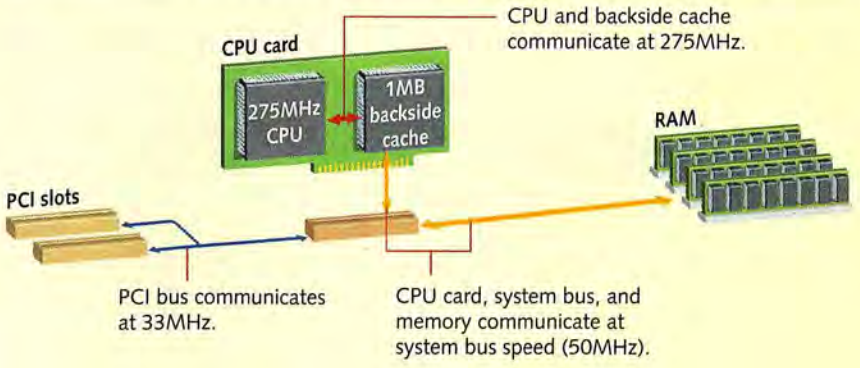
In contrast, the PowerTower Pro G3 benefits from three significant improvements: it uses fast backside cache communicating with the CPU at 275MHz, whereas the PowerTower Pro 250's previous standard external cache communicated at 50MHz; it uses the far-superior PowerPC 750; and the CPU runs at 275MHz, not 250MHz.

NEW CACHES BOLSTER SPEED

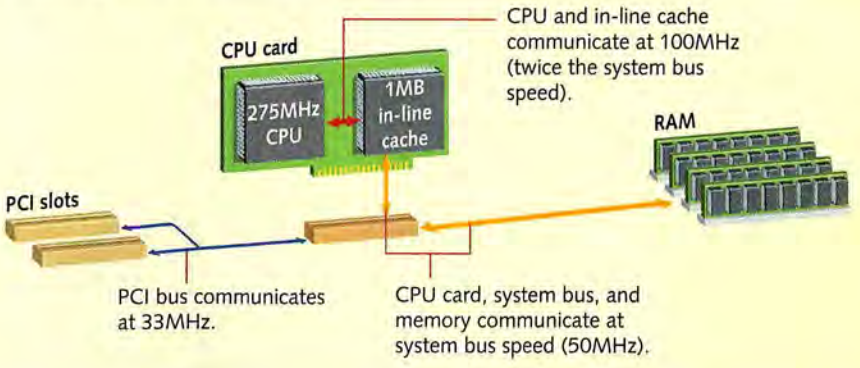
STANDARD CACHE found in most current systems



BACKSIDE CACHE in Power Computing PowerTower Pro G3/275



IN-LINE CACHE in future Umax and other high-end systems



Rounding Out the System

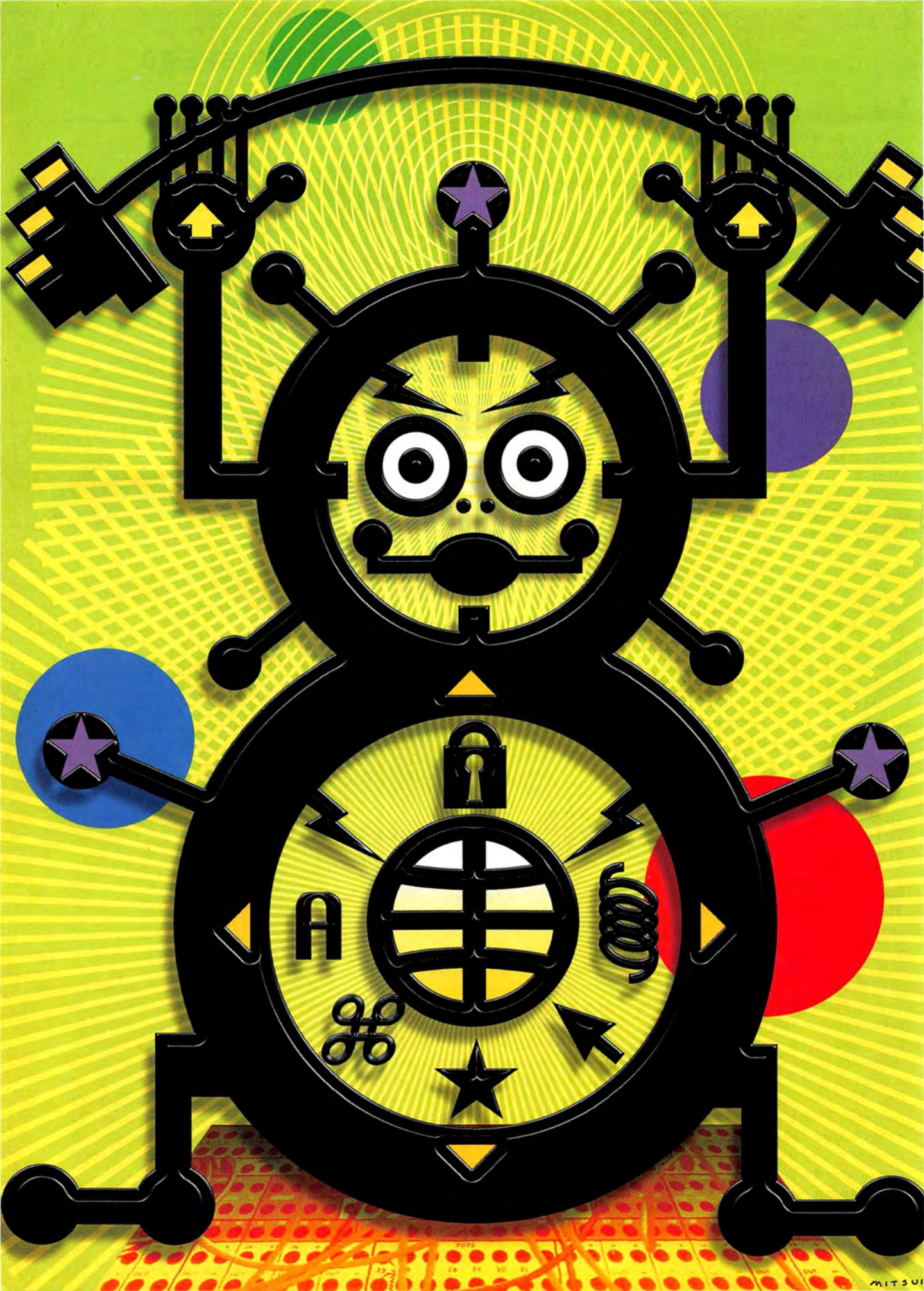
The prototype PowerTower Pro G3 we tested, like today's standard shipping PowerTower systems, came with a 2GB 7200-rpm AV-capable hard drive and an 8MB IXMicro TwinTurbo accelerated video card, which helps explain its top-notch performance in video operations. Power Computing plans to use an even faster video card in the shipping unit that also accelerates 3-D video. The PowerTower Pro G3 also comes standard with Adaptec's 2940 Ultra Wide SCSI card, which helped disk-intensive operations, so users will be getting a more balanced system with the PowerTower Pro G3.

Although we used only 32MB of RAM in our test system, the PowerTower Pro G3 will ship with 64MB of RAM. It offers the same expansion features as the rest of the PowerTower Pro series: nine drive bays (four 5¼-inch and two 3½-inch); six PCI slots; and an upgradable CPU slot, which can use DayStar Digital's dual-processor nPower card. Tentative pricing for the PowerTower Pro G3/275 is $4495; the G3/250 is set for $3995; and a core configuration of the 250, the G3/250c with 32MB of RAM and a 2MB IXMicro video card, is set for $3395. A 300MHz model is likely to be released at the same time as the 275MHz machine. Jaz, Zip, and RAID drives will be optional.

The Last Word

CHRP systems promise to infuse new excitement into the Mac market. In the meantime, Power Computing is offering users the first PowerPC 750 systems, pushing the Tsunami architecture well beyond its perceived limitations. The new PowerTower Pro G3 with its backside-cache implementation is the fastest Mac yet, and well worth consideration by serious users tired of waiting for CHRP's arrival. **m**

TOVA FLIEGEL is all out of breath from covering systems for *Macworld*.


MITSUI

BY FRANKLIN N. TESSLER

Mac OS 8 Arrives

APPLE DELIVERS ITS STRONGEST UPGRADE IN YEARS

REMEMBER COPLAND, the jazzy new operating system that was supposed to make you forget about Windows 95? When Apple killed Copland last summer, no one knew how many of its features—if any—would ever make it to the desktop. At long last, though, there's good news for Macintosh aficionados: Mac OS 8, formerly known by the code name Tempo, and scheduled to appear in late July, offers plenty to cheer about.

While it doesn't include every whiz-bang feature that Copland promised (see the table, "Copland No-Shows"), Mac OS 8 is the most comprehensive update to the Mac OS in years, sporting a bold new look, a speedier Finder, more shortcuts, and integrated Internet functions. (Mac OS 8 runs only on Macintoshes with 12MB of physical RAM and 68040 or PowerPC processors, however. The 68030-based Macs, even those with PowerPC upgrades, are no longer supported.)

So hang on, and I'll take you on a whirlwind tour through the hottest changes in Mac OS 8. As you read, you can refer to the combination screen shot, "The Mac OS 8 Desktop," and the sidebar, "Tempo's 5 Greatest Hits," which summarizes the most important new features. For an insider's guide to getting the most out of the new OS, check out the two companion stories: "Mac OS 8 Secrets" offers tips for the new OS, and "Best Utilities" reviews essential add-ons for any version of the operating system.

THE MAC'S NEW LOOK

Thanks to its new appearance, you can spot a Mac running OS 8 from across the room. The changes range from purely cosmetic to functional, but all help define a distinctive new Mac personality. (Macintosh users have been able to preview the Mac OS 8 look with a shareware extension called Aaron.) This new version adds a multitude of ways for you to personalize your Macintosh.

• **Desktop Pictures.** A new control panel lets you display your favorite picture on the desktop, with options to scale, center, or tile the image (see the label "Desktop Pictures" on the combination screen shot). And if you'd prefer to stick with desktop patterns, Mac OS 8 provides 40 to choose from.

• **3-D interface.** Some interface changes in Mac OS 8 aren't limited to the Finder. For example, windows, dialog boxes, progress bars, and alerts all sport a bold 3-D motif that jumps out of the screen (see the label "3-D Interface").

• **Appearance settings.** A new control panel lets you select colors for scroll boxes, text highlighting, and progress bars (see the label "Appearance Settings"). The control panel also lets you select a system font; for now, you get to choose between Chicago and a new typeface called Charcoal. You can also specify whether you want the 3-D interface to apply to all applications or only to the Finder. (If you choose the latter, windows and dialogs retain the "old" look.)

TIMESAVING SHORTCUTS

Five new features help you work smarter by cutting down on keystrokes and trips to the menu bar.

• **Contextual menus.** Click on an icon, window, or some text while holding down the control key, and a pop-up menu lets you perform actions that apply to your selection (see the label "Contextual Menu"). For example, if you control-click on the icon for a disk, the menu lets you open, get information about, share, or create an alias for the volume. (As with some of the other changes in Mac OS 8, Windows users got this one first. That's only fair, since some people have accused Microsoft of copying the Mac interface.)

And thanks to a new system extension, contextual menus will work in any application, although software developers will have to recode their software to make use of this feature. This capability is already built into Microsoft Word 6.0, Excel 5.0, and PowerPoint 4.0; Claris FileMaker 3.0; Adobe Photoshop 4.0; and Corel CorelDraw 6.0. It is not yet in QuarkXPress 3.3, ClarisWorks 4.0, or Adobe PageMaker 6.5.

• **Move To Trash and Show Original.** These two new File menu commands let you throw items into the Trash and display the original for a highlighted alias. Both have ⌘-key equivalents, so you can invoke them without lifting your fingers from the keyboard (see the label "New Finder Commands").

• **Drag-and-drop aliasing.** This handy shortcut creates an alias when you drag any item into a window while pressing ⌘-option.

• **Spring-loaded folders and searches.** These navigational tools help to manage desktop clutter (for tips on using them, see the accompanying "Mac OS 8 Secrets" story).

RELIEF FOR BEGINNERS

Using a computer for the first time can be a frustrating experience for anyone, even on a Macintosh. Several features making their debut in Mac OS 8 help smooth the way for novices.

• **Setup assistance.** When you first boot Mac OS 8, a program called Mac OS Setup Assistant walks you through basic System setup procedures, such as setting the computer's name and location and choosing a printer (see the screen shot "Easy Setup"). Even if you're an experienced user, using the Setup Assistant is much less cumbersome than configuring a series of control panels.

• **Revamped Finder menus.** The Label menu is gone, its functions folded into a submenu under the File menu. And a new Help menu puts balloon help and other help commands back with the rest of the Finder's menus, where they're easier to spot (see the label "New Help Menu").

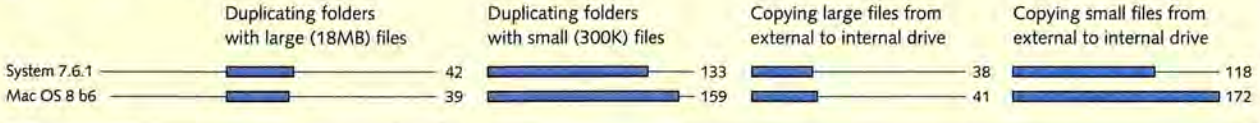
• **Simple Finder.** Another option designed for beginners, Simple Finder lets you simplify the Finder's menus by eliminating nonessential commands such as

Macworld LAB TEST

How Fast Is Mac OS 8?

One anomaly that we discovered with a late beta of Mac OS 8 is the speed of the newly native Finder. While one would expect it to be faster than System 7.6.1, in fact it was actually slower in most tests. It was only a couple of seconds faster duplicating folders with large files, but it was about a minute slower copying small files from an external drive to an internal one. According to Apple, the new OS is optimized for responsiveness (that is, the speed with which you retain cursor control), not operations.

Results are in seconds. Shorter bars are better.



Behind Our Tests All tests were performed on a Macintosh 7300/200 equipped with 32MB of RAM and a 256K L2 cache, with disk cache set to 512K, and with virtual memory and RAM disk disabled.—**Macworld Lab testing supervised by Mark Hurlow**

The Mac OS 8 Desktop

ew Finder Commands
hose who love aliases can now ighlight a file and create an lias or highlight the alias and nd the original.

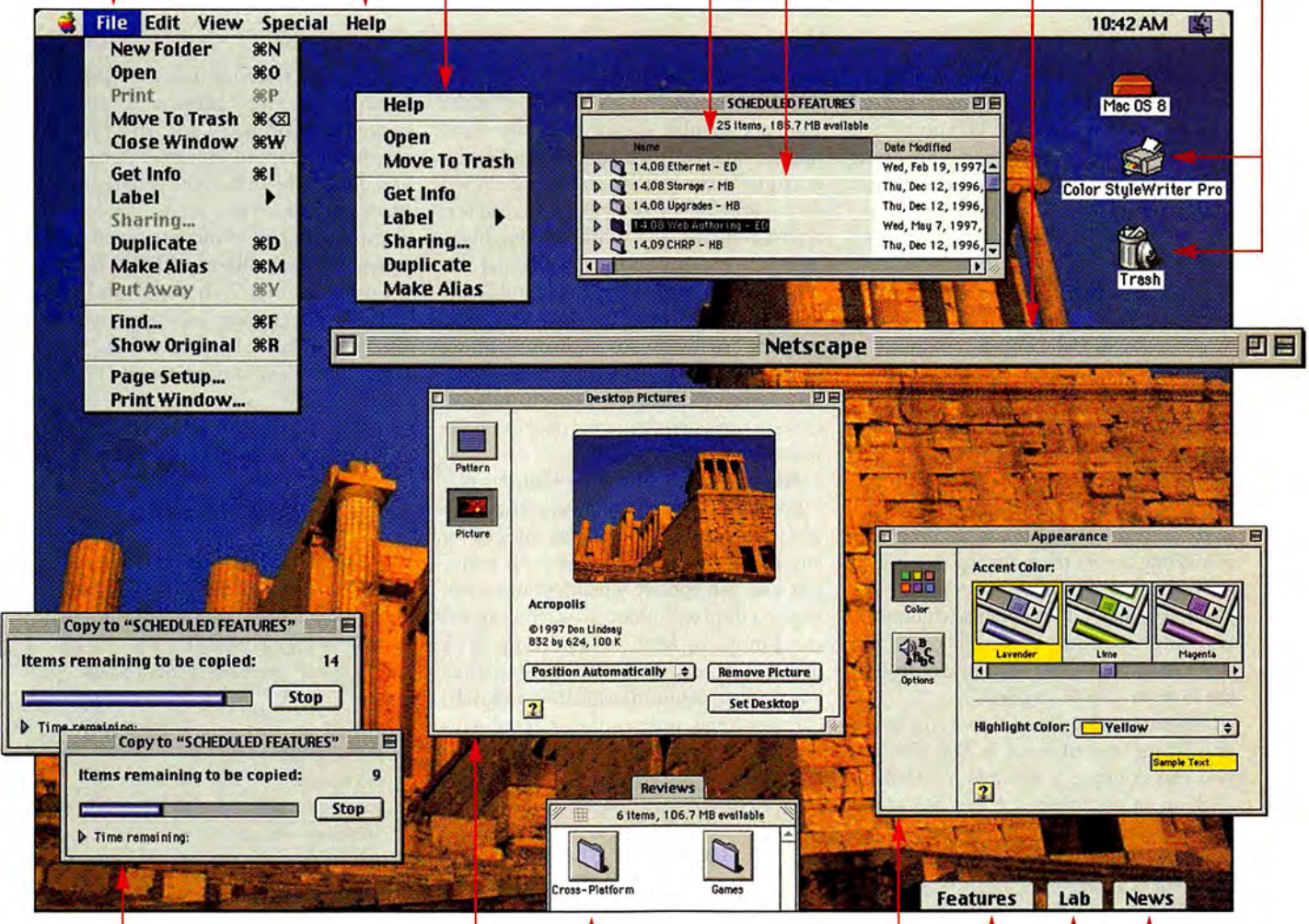
Contextual Menu
Hold down the control key while clicking on an icon, and you'll get an appropriate menu of commands.

Collapsible Windows
The WindowShade control panel has been replaced by a new box on the far right of the title bar.

New Help Menu
For some reason, not enough people associate a question mark with help, so now it's spelled out.

Grid Lines and Shading
List views are now easier to read, thanks to shading between columns and lines between rows.

3-D Interface
No more flat Trash Can or printer icons.



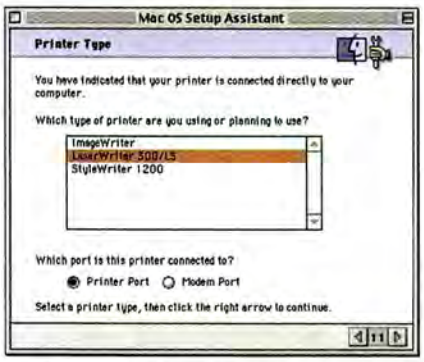
Multithreaded Finder
Now you can launch Finder commands, such as Copy, and go on with your work—or launch more Copy commands.

Button Views
Another way to view folders—they're also accessible with a single click, as with the Launcher command.

Tabbed Windows
A real space-saver: set your windows as pop-up windows and then drag them to the bottom of the screen.

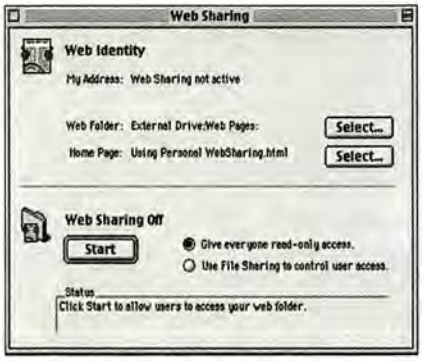
Desktop Pictures
The patterns are still there, but now you have a lot more choices for your desktop background.

Appearance Settings
Here's your chance to really personalize the look of your Macintosh, with a variety of accent and highlight colors.



Easy Setup The Mac OS Setup Assistant walks you through the configuration of your Macintosh, including printer setup.

Speedy Internet Access Apple hopes to simplify the painful process of signing up with a local Internet service provider.



Your Own Web Server Mac OS 8 includes a way for you to create and store your own personal Web page so your friends can access it.

Make Alias. (You turn Simple Finder on and off in the Finder Preferences dialog.)

• **Sticky menus.** As in Windows 95, menus stay open with a single click: you no longer have to hold the mouse button down.

ENHANCED VIEW OPTIONS

Mac OS 8's Finder gives you more ways to display the contents of volumes and folders. Although some of the new functions were already available with third-party software such as Now Utilities, it's refreshing to see them incorporated into the operating system.

• **Live scrolling.** This updates windows in real time as you drag the scroll box, so you don't need to release the mouse button to see how far you've scrolled.

• **Collapsible windows.** As with the WindowShade control panel in Mac OS 7.6, you can collapse a window by double-clicking on the title bar. A new box at the right side of the title bar serves that purpose, but you only need to click on it (see the label "Collapsible Windows").

• **Button views.** You can display items as buttons that open or launch with a single click, a helpful shortcut for kids or beginners who haven't mastered the art of double-clicking (see the label "Button Views").

• **Tabbed windows.** Drag a window to the bottom of the screen and it turns into a small tab that stays anchored there (see the label "Tabbed Windows"). Click on the tab, and the window pops up. Drag the tab off the bottom, and it turns back into a conventional window.

• **New List views.** In Mac OS 8, all of the Finder's tabular views (view by date, name, and so on) are consolidated under a single View As List command. Horizontal grid lines make it easier to read text across columns, and subtle shading highlights the background of the selected column (see the label "Grid Lines and Shading"). As in the current List view, you can sort the list by clicking on the column headers. And Mac OS 8 lets you show creation and modification dates in relative format, replacing the actual dates with the words *today* and *yesterday*.

• **View controls.** The View Options dialog box—another Windows standard—lets you customize the display options for any window view. In List view, for example, you can specify which columns you want to display. In Icon view, you can tell the Finder to keep items arranged by name, date, size, kind, or label, even when you add or delete files. (Unfortunately, changes apply only to the selected window; there's no way to set view preferences for an entire volume.)

INTEGRATED INTERNET FUNCTIONS

Whether you're a veteran Web surfer or a newbie, Mac OS 8 makes it easier than ever before to go online.

• **Internet Setup Assistant.** Like the Mac OS Setup Assistant, the Internet Setup Assistant simplifies the task of setting up Internet access over a modem or direct connection. If you already have an account, the assistant asks questions about your Internet service provider (ISP) and hardware configuration, and creates a connection protocol for you (see the screen shot "Speedy Internet Access"). If you don't have an ISP, the program automatically logs on to a server that lets you register with one of three national ISPs.

• **Personal Web Sharing.** PWS lets you create your own Web server and share HTML documents and files over the Internet or on a local intranet. To use PWS, you need a continuous TCP/IP

COPLAND NO-SHOWS

Although Mac OS 8 provides some of the features originally planned for Copland, other features will have to wait for future releases of the Mac OS or for next year's Rhapsody release.

Feature	Copland	Mac OS 8
3-D interface	●	●
Advanced find technology	●	○
Multiple user settings	●	○
Native coding	●	●*
Redesigned file and other subsystems	●	○
Open Transport	●	●
OpenDoc	●	●**
Preemptive multitasking	◖	○
Protected memory	●	○
QuickDraw GX	●	●***
Rewritten microkernel	●	○
Spring-loaded folders	●	●

● = yes; ◖ = partly; ○ = no. * *Including Finder.* ** *Maintenance development only.* *** *Ships with Mac OS 8, but no longer under development.*

connection and a static IP address. If you have a suitable Internet connection, PWS is the fastest and easiest way to get your documents online (see the screen shot "Your Own Web Server").

• **Bundled Internet software.** Mac OS 8 ships with two popular Web browsers, Netscape Navigator 3.01 and Microsoft Internet Explorer 3.01, saving you the time and expense of downloading them. Version 3.0 of America Online's software is also included (you still have to pay the monthly fee). And Mac OS 8 comes with the latest release of Cyberdog, version 2.0, Apple's OpenDoc-based suite of Internet tools. (Although Apple has halted OpenDoc development, Cyberdog provides an alternative to third-party Web browsers and Internet clients.)

• **Mac OS Runtime for Java.** Unlike plug-ins, which support Java only within Web browsers, Runtime for Java (RFJ) is a stand-alone program that lets you run Java mini-applications, or applets, on the desktop. (RFJ is also compatible with Macs with 68030 or newer microprocessors running Mac OS 7.5 or later.) Although the process isn't as transparent as launching conventional applications, it's a significant first step. With Java rapidly becoming the lingua franca of desktop computing, this capability should help the Mac maintain a foothold in mixed computing environments.

IMPROVEMENTS UNDERNEATH

Even die-hard Mac supporters admit that the Macintosh Operating System is showing its age after almost 14 years. Although Mac OS 8 still shares much of its code with System 7.6, the new OS sports a few significant internal improvements.

• **PowerPC-native Finder.** The Finder code has finally been rewritten so it's native to the PowerPC (as opposed to 680X0 emulation). To gauge the change, Macworld Lab ran a series of comparisons with System 7.6.1 (see the benchmark, "How Fast Is Mac OS 8?"). Surprisingly, the new Finder is slower, not faster. According to Apple, the OS was optimized for responsiveness, not necessarily the speed of operations. As a result, though Finder operations may not be faster, it will feel as if you're getting back control of the cursor sooner.

• **Multithreading.** The Mac OS 8 Finder can run several threads, or tasks, simultaneously (see the label "Multithreaded Finder"). For instance, you can copy a file while you're launching an application, which means less time waiting and more time working. (Alas, you're still locked out while you're formatting a disk.)

• **Open Transport version 1.2.** Although Apple has committed only to maintaining its networking software, this release provides a host of high-priority bug-fixes. For example, version 1.2 includes protection against Ping o' Death attacks, in which large file packets can render Macs on TCP/IP networks susceptible to crashing (see "A Ping to Die For," *News, Macworld*, February 1997).

• **Backward compatibility.** Despite all the changes in Mac OS 8, Apple has achieved a remarkable level of compatibility with existing software. I used a beta version of the new OS with a wide range of third-party applications and extensions, and didn't encounter any significant conflicts: even tricky extensions such as Now Software's Now Menus seemed to function without major problems. (Inevitably, though, some software will require updates.)

THE LAST WORD

From its bold new look to its multithreaded Finder, Mac OS 8 is the first upgrade in a long time that you'll actually look forward to installing. And the price is right: $69 for 7.6 users and $99 for others. (And if you buy a Mac within 30 days of the July 22 introduction, the cost of upgrading is $9.95 through Apple.) While it's unlikely that Mac OS 8 will convince many Windows users to switch, current Mac fans should find more than enough to keep them from defecting.

Even more promising, Mac OS 8 is only the first of a series of yearly major updates that Apple plans to release at the same time it develops Rhapsody, the Next-based OS, through the end of the century. If you've got a Macintosh that supports the new operating system, you need Mac OS 8. **m**

Contributing editor FRANKLIN N. TESSLER wrote last month's cover story on Power Mac upgrades and has used a Macintosh since Finder 1.1g.

TEMPO'S 5 GREATEST HITS

It's easy to be overwhelmed by the wealth of changes in Mac OS 8. Here are my picks for the top five improvements.

1 SPRING-LOADED FOLDERS

This is my hands-down choice for the best new feature in Mac OS 8. Icons open automatically when you drag an item over them, making it easy to navigate layers of folders. Another plus: double-clicking on a volume or folder icon without releasing the mouse button turns the cursor into a magnifying glass that lets you dig through underlying folders' contents.

2 NEW FINDER MENUS AND VIEWS

The Finder's new menus are more logically arranged than before, and they offer a variety of useful new options and controls, including customizable list views with live scrolling. For beginners, Simple Finder presents a subset of Finder menus with only essential commands.

3 CONTEXT-SENSITIVE POP-UP MENUS

Control-clicking on an item displays a pop-up menu of shortcuts (such as Duplicate and Create Alias) that apply to that item.

4 MULTITHREADED, POWERPC-NATIVE FINDER

Finally, you're not locked out when you copy a huge file in the Finder. And the Mac OS 8 Finder is faster, too. A surefire winner for people who hate to wait for their Mac.

5 3-D APPEARANCE

OK, so the high-tech look is a bit like Windows 95's, but the old Mac seems ho-hum by comparison. Once you've seen it, you won't want to switch back.

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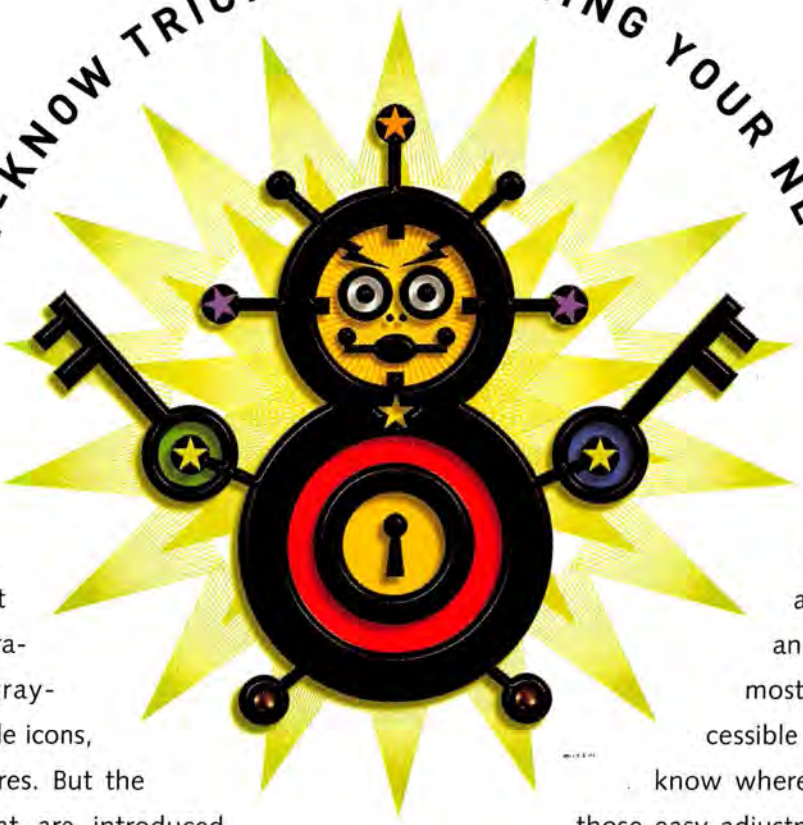
Circle 4 on reader service card

BY JOSEPH SCHORR

Mac OS 8 Secrets

MUST-KNOW TRICKS FOR TUNING YOUR NEW OS



THE FIRST thing that you notice about Mac OS 8 is its dramatic new look: gray-scale menus, 3-D–style icons, pretty desktop pictures. But the elegant changes that are introduced in the Macintosh's new operating system are more than cosmetic; along with that sleek, revamped appearance are some key new features—contextual pop-up menus, spring-loaded folders, and pop-up windows—that can make it easier for you to manage files, launch programs, and organize your workspace.

With this redesign, Apple has added many opportunities for you to personalize your Macintosh and make it work the way you want it to work, and to make the files and folders you use most frequently as accessible as possible—if you know where and how to make those easy adjustments. So, now that we've given you the basic rundown on Mac OS 8, here's a collection of mostly undocumented tricks and techniques that will help you get up to speed on this latest batch of operating-system enhancements.

In the coming months, you'll find even more timesaving tips for getting the most out of Mac OS 8 in my *Secrets* column, in Lon Poole's *Quick Tips* column, and in Macworld Online's Tip of the Day newsletter.

MENUS ON DEMAND

Mac OS 8's new contextual pop-up menus provide access to frequently used commands whenever you control-click on an icon, window, or the desktop within the Finder. Granted, most of the options available via these contextual pop-up menus may not seem very significant—for example, who's going to control-click on a folder in order to access the pop-up Open command, when you can simply double-click on the folder instead? In reality, contextual menus provide the fastest, most direct access to several commands that until now involved a lot more effort. Here's the short list of pop-up menu items worth learning and using.

1 Quick change of scenery

There's no need to journey up to the Apple menu to open the Desktop Pictures control panel when you feel the urge to change your desktop picture from Hong Kong At Night to Cancun Sunset; you can get there directly by control-clicking on the desktop and choosing the Change Desktop Background command (see the screen shot "Quick Change").

2 Switch views quickly

You can still use the Finder's View menu to switch between icon, list, and button views, but the same options are available right under your mouse. Just control-click on the desktop or a window (or even the tab of a collapsed pop-up window) to switch views without traveling up to the menu bar.

3 Share faster

Contextual menus offer the fastest way to set up file-sharing privileges for a file or folder. Control-click on any file, folder, or volume and choose the Sharing command to go directly to the item's sharing controls.

4 View print queues

If you use Desktop Printing, you can control-click on a desktop printer icon to turn the printer's queue on or off or to change your system's default printer.

Remember that once you have control-clicked to invoke any one of these contextual menus, you can immediately release both the control key and the mouse button; the menu stays open by itself until you click the mouse again.

Quick Change You can redecorate your desktop in record time. Simply control-clicking on the desktop will provide you with quick access to the Change Desktop Background command and take you directly to the Desktop Pictures control panel.

DRILL DEEPER, CLICK LESS

With Mac OS 8's spring-loaded feature, disks and folders pop open automatically whenever you drag items onto them. But you can also take advantage of the convenience of spring-loaded folders when you're *not* dragging items into new locations, thanks to the Finder's new automatic folder-burrowing command.

1 Click and hold

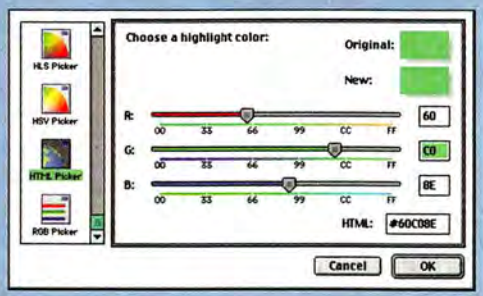
Double-click on a volume or folder icon, holding the mouse button down on the second click—Apple calls this a "click-and-a-half"—and instantly the pointer turns into a magnifying glass. Now any folder you drag over will spring open by itself, even though you're not dragging anything onto it.

THE CHLORINE-ISH GREEN MAC

THE MAC HAS always made it easy to mix your own custom highlight and label colors—and Mac OS 8 gives you even more flexibility in that department. Now you get no fewer than six System-level color pickers that allow you to mix your own highlight, accent, and label colors in the Finder, as well as define custom colors within various applications. The new color pickers include the HTML Picker, which is perfect for Web authoring (see the screen shot "Take Your Pick"). Create the color you want using the three RGB sliders, and the picker displays the proper hexadecimal code to embed in the HTML on your Web page to generate that color.

Most novel, though, is the Crayon Picker, which presents you with a box of 60 crayons in a great variety of premixed colors, such as Spring Frost, Chlorine, Mildew, and Warm Shale (see the screen shot "No Sharpener Needed"). Don't let the crayon-like simplicity of this color picker fool you; it's got a lot of power.

First, if you hold down the mouse button when you drag over the crayons, the color swatches and names change automatically as you move from crayon to crayon so you don't have to click on each one individually. Press the option key, and the pointer turns into an eyedropper with which you can pick up other colors on the crayons, wrappers, or crayon box. Click on the crayon wrappers to see darker tints of existing colors; click on a crayon tip's highlighted left edge to see lighter tints. When you select any of these variations, the names of the colors cleverly change, with the suffix *-ish* added. Pick a darker shade of Mildew, for example, and its name automatically changes to Mildew-ish.



Take Your Pick When you use the sliders to create a color using Mac OS 8's HTML Picker, the HTML field displays the code you must use to re-create that color on your Web pages.

No Sharpener Needed Sixty premixed colors are at your disposal via the Crayon Picker. Hold down the option key and drag across the crayons to see variations on the default colors.

2 Navigate multiple levels

You can burrow through as many folders as you want as long as you keep the mouse button depressed. Moving the magnifying glass out of a window automatically closes it, so you won't end up with a lot of window clutter.

WINDOW POPPING

Pop-up windows provide easier access to files: you can reduce windows to small tabs that cling to the bottom of the screen until you drag them into view. Here are some tips on how to use them efficiently.

1 Drag to convert

The View menu contains an As Pop-up Window command, but you can save yourself some time by ignoring it. Instead, just drag any window to the bottom of the screen; this allows you to convert the window to a pop-up window, collapse it, and place the window tab exactly where you want it—all in one step.

2 Drag to open

If you want to place an item inside a collapsed pop-up window, there's no need to expand the window first. Just drag a file onto a collapsed window tab, and the window automatically expands for you. Drag the icon back out of the window, and it collapses back into its tabbed state.

3 Close shortcut

When you've finished working with a pop-up window, you can snap it back down to the bottom of the screen by pressing ⌘-W—the same old keystroke you use to close regular windows.

4 Easy resizing

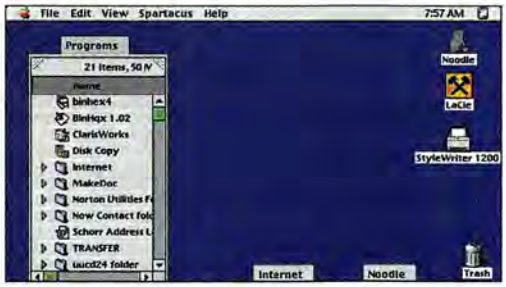
Resize windows containing a lot of items, making them as tall as possible, before turning them into pop-up windows. This way, when you click on the collapsed window's tab, the window expands to reveal as many files as possible—without additional scrolling.

5 Expand with a click

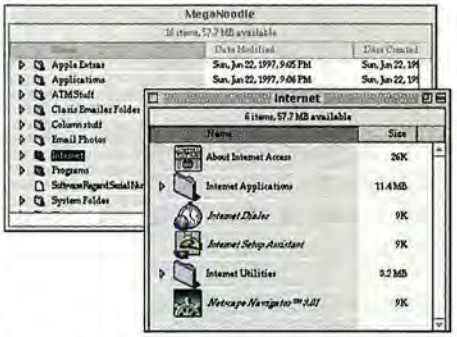
You don't have to collapse one pop-up window to make room for another; the Mac does it for you. Expanding one pop-up window (with a single click on its window tab) automatically collapses the previous window, keeping things neat and tidy. The key to this kind of one-click window switching is to make your windows tall and narrow *before* collapsing them the first time, and then position the window tabs far enough apart so that you'll be able to see (and click on) the collapsed tabs even when another pop-up window is expanded (see the screen shot "Keep Tabs on Your Work").

Until now, the Views control panel has forced you to apply your List and Icon View preferences on a systemwide basis. For example, you could choose to show columns such as label, size, and date in List Views or hide them. You could turn Calculate Folder Sizes on or off. In each case, your settings applied to every List View in the Finder.

All of that has changed with Mac OS 8. Now you can set all such preferences on a *window-by-window* basis. When you choose the View Options command from the Finder's View menu, your List View settings apply only to the currently opened window. This means, for the first time in Mac history, you can set one window to display a List View with small icons, showing the full complement of file info columns, while another window displays large icons with only the Size field visible (see "Points of View").



Keep Tabs on Your Work It's easy to switch between pop-up menus with one click if you keep your pop-up windows tall and skinny and your collapsed window tabs widely separated. In this example, one click on the Internet tab will simultaneously collapse the Program window and expand the Internet window.



Points of View In Mac OS 8, you can assign every window its own view options. In this example, the background window is set to display lists with small icons and date columns, while the foreground window displays large icons and the size column.

PULL THE SHADES

The WindowShade control panel is gone, but you can still collapse windows in WindowShade fashion by clicking on the new collapse box that's been added in the upper right corner of each window.

1 Close all windows

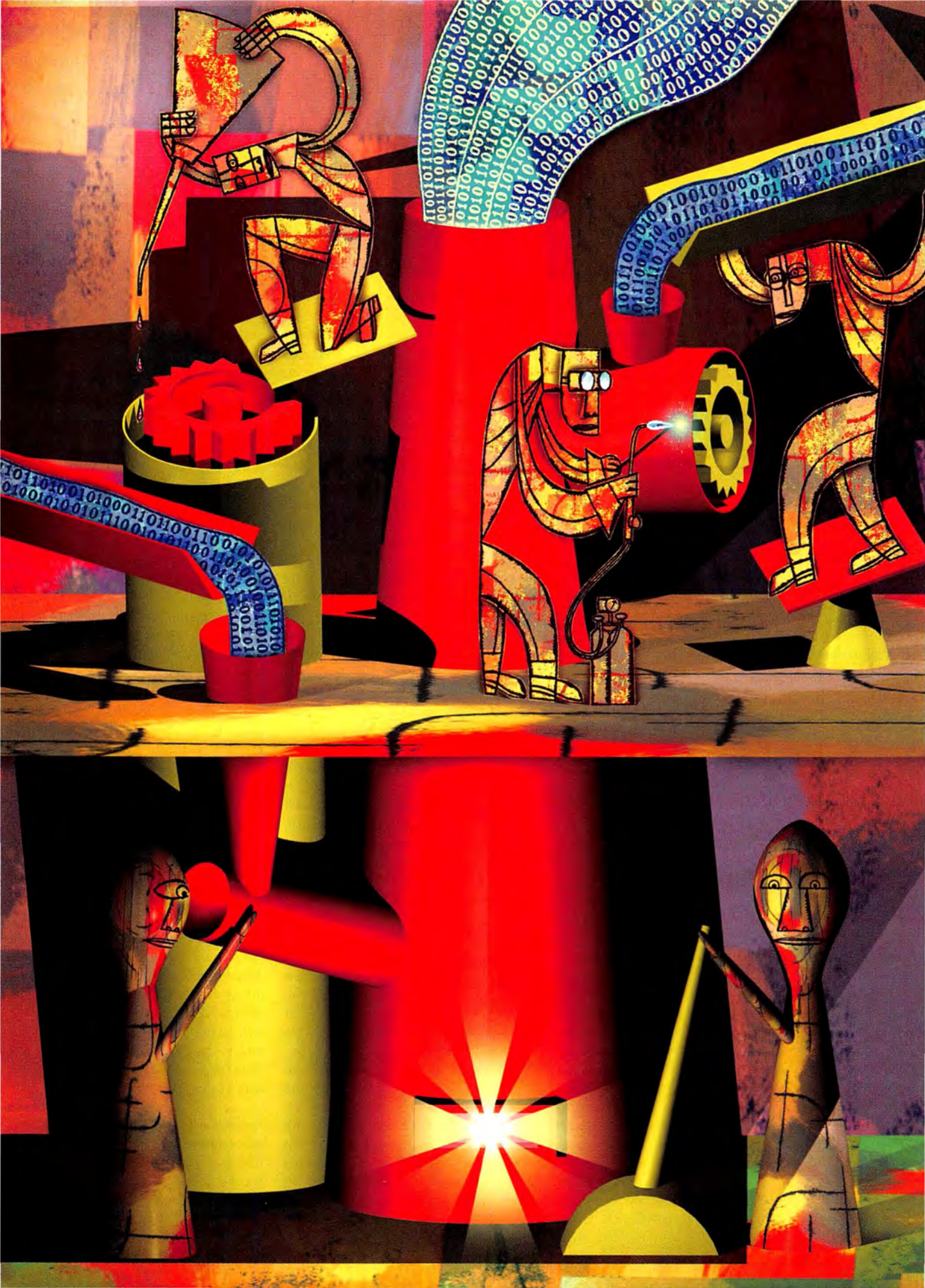
Here's the new twist: option-clicking on the collapse box rolls up not only that window, but *every* open window on your screen—a quick way to clean up a cluttered screen quickly without having to close and reopen a lot of windows. (Option–double-clicking anywhere on a window's title bar does the same thing, if you have that option enabled in the Appearance Settings control panel.)

The Last Word

Tapping into these new OS features will convince you that Mac OS 8 is much more than a face-lift; it's a true refinement of the Mac interface that will have you working faster and more efficiently. Before long, you'll wonder how you ever got by without it. **m**

JOSEPH SCHORR is coauthor of *Macworld Mac Secrets*, fourth edition (IDG Books Worldwide, 1997). His hobbies include classical music, biking, and installing Apple system software upgrades.

As in the past, you can switch between the Mac's various color pickers—and even define colors—entirely from the keyboard. When you first access the color-picker window, use the up- and down-arrow keys to move between the six picker icons available in the window's left pane. Once you've selected the picker you want to use, press the tab key to edit the numeric values in any of the color-picker windows (except the Crayon Picker, which doesn't contain any numeric fields). Tabbing through all the fields returns you to the window's left pane again, at which point you can use the arrow keys to switch to another color picker.



BEST UTILITIES

Macworld's top picks for enhancing the newest Mac OS

Now that Mac OS 8 is here, third-party enhancements are obsolete, right? Well, not quite. Despite many advances in the new operating system, one thing hasn't changed: there's still room for improvement, and that's where utilities come in. I canvassed *Macworld*'s editors and contributing editors to find out which utilities they use. I ended up with a collection that spans five key areas: performance, telecommunications, keyboard shortcuts, text management, and organization. These system enhancements will make Mac OS 8—and you—even more efficient and productive. For a firsthand look, check out the demo versions and shareware at *www.macworld.com/more/*.

BY ROBERT C. ECKHARDT

ENHANCED PERFORMANCE

MANY OF US bought a Mac so we wouldn't have to tinker under the hood. But several worthwhile utilities can do some useful tinkering for us.

RAM Doubler 2.0.1 With RAM prices at rock bottom, it makes sense to stock up. Even so, there's a place for RAM Doubler from Connectix, which can triple your installed RAM (up to 256MB).

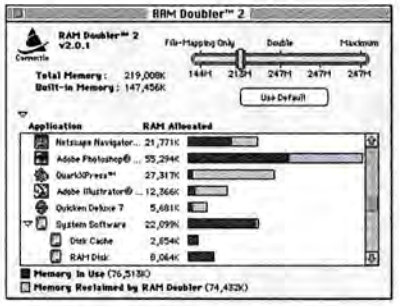
I've found RAM Doubler to be remarkably stable. It can also boost RAM efficiency (see the screen shot "Using RAM Efficiently"). If you have a Power Mac and turn off virtual memory for better performance, the computer automatically turns off file mapping. Consequently all your native applications require more RAM. RAM Doubler turns file mapping back on; native apps once again require less memory and you recover megabytes of real RAM—I recovered a hefty 15MB from my standard suite of Microsoft Excel, Microsoft Word, and Adobe Photoshop.

DiskExpress II 2.21 Some people never defragment their hard drive—and never notice the difference. But if your work involves high-speed input and output, such as audio or video, or if you use Netscape Navigator with its cache option turned on, optimizing, or defragmenting—reuniting the pieces of individual files scattered across a drive—is essential for best performance.

Symantec's recently released Norton Utilities for Macintosh 3.5 contains a major revision of the formerly undistinguished defragmenter Speed Disk. Now Power Mac native, the new Speed Disk defragments selected files as well as entire drives, has a clearer and more comprehensive fragmented-file display, and can organize your defragmented disk for general use (which groups files by type) or for a specific purpose, such as multimedia, software development, or CD-ROM mastering. Symantec also says the new version is up to twice as fast.

If you already own Norton Utilities, you may find Speed Disk adequate. But DiskExpress II from Alsoft has been my first choice for defragmentation for many years.

It watches me as I work; notes which files I use most often; and when it defragments my drive, it tightly clusters the files I use most often, further speeding performance.



Using RAM Efficiently RAM Doubler's control panel shows you how much RAM each running application is using and how the System has allocated RAM to its different functions.

HELP FOR THE TELECOMMUNICATIVE

WITH MOST OF US online these days, utilities that were once the province of a hardy few are now everyday necessities.

StuffIt Deluxe 4 One such indispensable tool is StuffIt Deluxe from Aladdin Systems. My copy of StuffIt has never met a downloaded file that it didn't like—and decompress without complaint. With companion utilities DropStuff and StuffIt Expander on the desktop, all I have to do is drop a file on the appropriate icon to compress or decompress the file, or I can install a menu that compresses or decompresses highlighted files on command.

As a Netscape Navigator helper, StuffIt Deluxe works quietly in the background, it can create self-extracting files (which you can give to people who don't have a decompression utility), and it's great for archiving no-longer-needed documents as well.

Tex-Edit Plus 2.0.1 Once upon a time I was overwhelmed by e-mail and newsgroup digests that were almost unreadable because of all the line feeds, carriage returns, and oddball characters. Then I got Tom Bender's shareware Tex-Edit Plus. (All the shareware mentioned in this article is available from *www.macworld.com/more/*).

With an unmistakable, don't-mess-with-Texas style, this text editor cleans up untidy e-mail files with a single command and performs more difficult jobs with a dialog box full of cleanup options.

Tex-Edit Plus can also handle text files too big for SimpleText; display previews of graphics files in its Open

Translation Service StuffIt Deluxe 4 can translate virtually any compressed file; several of the compression formats listed in StuffIt's Translate menu are so rare online that I have yet to encounter them.

It can also defragment drives on a user-defined schedule, such as when you're at lunch or during the weekly staff meeting.

Although not yet Power Mac native and rather dated in appearance, DiskExpress II remains my current pick. (An upgrade, DiskExpress Pro, in the works at press time, was scheduled to ship in July; it will be Power Mac native.)

EDITORS' CHOICE

★★★★/7.8 **DiskExpress II 2.21** Intelligently defragments hard drives for optimum performance. **Company:** Alsoft (281/353-4090). **List price:** $89.95.

★★★★/8.6 **RAM Doubler 2.0.1** As much as triples your RAM, plus reduces the amount of RAM required by Power Mac–native applications. **Company:** Connectix (415/571-5100, *www.connectix.com*). **List price:** $99.

dialog box; count the words in a selection or document; search for and replace text according to font, size, style, and color; play sounds embedded in files; and even read my e-mail out loud (Texas drawl not included).

EDITORS' CHOICE

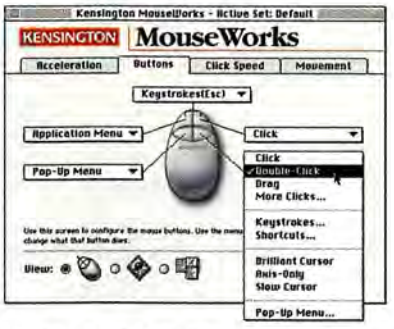
★★★★/7.3 **StuffIt Deluxe 4** If you got a file off the Internet, StuffIt can almost certainly decompress it for you. **Company:** Aladdin Systems (408/761-6200, *www.aladdinsys.com*). **List price:** $129.95.

★★★★/7.9 **Tex-Edit Plus 2.0.1** Cleans up messy downloaded text files effortlessly; handles files too large for SimpleText. **Author:** Tom Bender (*members.aol.com/tombb*). **List price:** $10 shareware fee.

KEYBOARD SHORTCUTS

MINIMIZING MOUSE movements and keystrokes saves you time and can help prevent repetitive-strain injuries.

Kensington MouseWorks 5.02 It's worth buying a mouse or trackball from Kensington Microware just for the software. With Kensington MouseWorks, you can program the buttons on a Kensington input device so that one click—or a click-and-key combination—invokes any of a variety of mouse movements or key commands, calls up a QuicKeys shortcut or a pop-up menu, types predefined text, or opens a menu of active applications (see the screen shot "Mouse-Button Shortcuts").



Mouse-Button Shortcuts On a Kensington input device, you can define a different function for each individual button, plus the two primary buttons *chorded* (pressed in unison).

I use a trackball and a mouse, so being able to define a different speed and acceleration for each is handy. When I press certain modifier keys, MouseWorks slows the cursor to a crawl for precision work or restrains it to horizontal or vertical movements.

QuicKeys 3.5.2 Macros are the classic example of efficient shortcuts. While there are several macro utilities, almost all my *Macworld* colleagues find QuicKeys by CE Software the best compromise between power and ease of use. I use it to enliven my function keys—so they can, for example, launch and switch among applications—and to assign convenient keyboard combinations to commands that lack them, multistep actions, or boilerplate text. You can also use QuicKeys to process multiple files with one keystroke and to create tool bars full of shortcuts. Although still far from perfect—there are many things that it can't do, and it's a major RAM hog—QuicKeys remains the Mac's most useful automation tool.

TypeIt4Me 4.7 Riccardo Ettore's shareware TypeIt4Me takes its cues from shorthand-style abbreviations, automatically converting them into full words, phrases, and even paragraphs (available at *www.macworld.com/more/*).

Once you teach TypeIt4Me what to do, *al* immediately becomes *Abraham Lincoln*, *mw* becomes *Macworld*, and so on. Properly trained, the program can eliminate hundreds or thousands of keystrokes, and it corrects common misspellings. However, I find text expansion occasionally annoying—when I want to write a note to Al, for example, not Abraham Lincoln.

AliasDragger 1.0b1 Perhaps the simplest and most elegant Mac shortcut is found in Leonard Rosenthal's freeware AliasDragger (available from *www.macworld.com/more/*). With AliasDragger installed, I press the control key, click on an icon, and drag it to where I want the alias to appear. The original file stays put; the software creates the alias and deletes *alias* from the name. Couldn't be simpler.

EDITORS' CHOICE

★★★★/7.7 **AliasDragger 1.0b1** Makes alias creation a snap. **Author:** Leonard Rosenthal. **List price:** Freeware.

★★★★/8.3 **Kensington MouseWorks 5.02** Offers superior control over cursor movements and input-device button functions. **Company:** Kensington Microware (415/572-2700, *www.kensington.com*). **List price:** Sold with input devices such as the Thinking Mouse ($109.99) and the Turbo Mouse ($169.95).

★★★★/8.2 **QuicKeys 3.5.2** This is the best—but still imperfect—compromise between power and ease of use in a macro utility. **Company:** CE Software (515/224-1995, *www.cesoft.com*). **List price:** $119.

★★★★/7.5 **TypeIt4Me 4.7** Automatically expands user-defined abbreviations in any application. **Author:** Riccardo Ettore (*72277.1344@compuserve.com*). **List price:** $30 shareware fee.

MORE MANAGEABLE TEXT

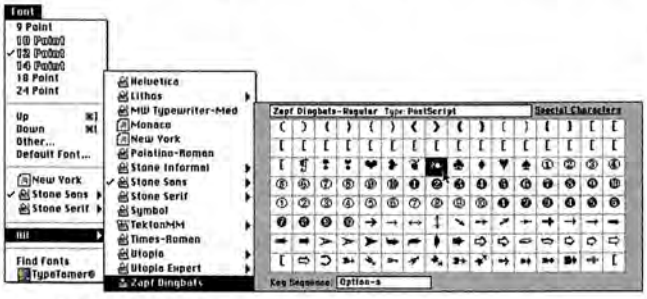
DEALING WITH WORDS is what most of us do most often. Consequently we can all reap big benefits from even small improvements in the text-management process.

Adobe Type Manager Deluxe 4.0 After years of watching Symantec's Suitcase and Alsoft's MasterJuggler duke it out for the font-management heavyweight title, Adobe has finally entered the ring with ATM Deluxe 4. Sporting the same high-quality, on-screen display for PostScript fonts as basic ATM (which is free with Adobe type packages and most applications), ATM Deluxe also offers on-screen antialiased fonts, intelligent font substitution (in documents containing fonts you don't have), and Multiple Master font support.

In its new font-management module, grouping fonts in sets is easy, and turning fonts or sets on and off is quite Conflict Catcher–like. ATM's font manager also clearly labels listed fonts as PostScript or TrueType, displays font samples on request, checks for font damage, and if necessary automatically retrieves fonts when you open a document that requires them.

ATM Deluxe has definitely delivered a knockout punch to its rivals.

TypeTamer 1.1.8 and Adobe Type Reunion Deluxe 2.0 For organizing your Font menu, the choice is between ATM's sidekick, Type Reunion Deluxe, and TypeTamer from Impossible Software. Both products cost $60. Both automatically group related fonts into families and let you group font families into sets (by function, type of font, whatever). At the top of the Font menu, Font Reunion shows the most recently used fonts; TypeTamer displays the fonts used in the current document.



Entering Hard-to-Find Characters TypeTamer's modified Font menu can display a character-set chart, from which you can select and insert any character for any font.

Type Reunion can show each font name in its own typeface and it allows you to rename fonts, a handy option to have with Multiple Master fonts. With TypeTamer, I can scroll through the Font menu using the letter keys and display sample text or a complete character set without leaving the menu (see the screen shot "Entering Hard-to-Find Characters").

Choosing between these two programs depends to a great degree on your personal preferences; Impossible Software offers a demo version of TypeTamer on its Web site so that you can at least see how well this utility works for you. Personally, I prefer TypeTamer for its separate in-use font list and Font menu that scrolls in response to keyboard input.

Spell Catcher 1.5.7 Why should you use ten mediocre spelling checkers that operate ten different ways in ten different programs, when you can use Spell Catcher from Casady & Greene in all your applications?

Spell Catcher can check both interactively and on command, and operating it entirely from the keyboard is as easy as it gets. Its suggested spellings are almost always right on the money, and it can also correct capitalization, punctuation, double spaces, double words, and other errors. It's fast, and if you use Spell Catcher interactively, its glossary option works like TypeIt4Me, expanding user-defined abbreviations into full words. If there's a better spelling checker around, I haven't seen it.

BigThesaurus 2.1 However, there is a better thesaurus than Spell Catcher's, and it's BigThesaurus from Deneba. I find this program easier to operate from the keyboard, and its entries are more clearly organized and usually offer a larger choice of synonyms and antonyms.

Unlike Spell Catcher, which has but a single window, BigThesaurus allows me to view multiple entries at the same time, each in its own window, which I find helpful when I'm searching for the perfect word.

EDITORS' CHOICE

★★★★/7.2 **Adobe Type Manager Deluxe 4.0** New font-manager module proves you can teach an old dog new tricks—and beat the competition. **Company:** Adobe Systems (408/536-6000, *www.adobe.com*). **List price:** $99.95.

★★★/6.8 **Adobe Type Reunion Deluxe 2.0** Groups fonts in the Font menu into families and user-defined sets; lets you rename fonts or display them in their own typeface for easy identification. **Company:** Adobe Systems (408/536-6000, *www.adobe.com*). **List price:** $60.

★★★★/7.7 **BigThesaurus 2.1** The most complete, easiest-to-use electronic thesaurus available. **Company:** Deneba Software (305/596-5644, *www.deneba.com*). **List price:** $29.95.

★★★★/7.8 **Spell Catcher 1.5.7** Fast, well-designed spelling checker can be operated entirely from the keyboard. **Company:** Casady & Greene (408/484-9228, *www.casadyg.com*). **List price:** $59.95.

★★★★/7.3 **TypeTamer 1.1.8** Groups fonts in the Font menu into families and user-defined sets; lets you scroll Font menu from the keyboard, and more. **Company:** Impossible Software (714/470-4800, *www.impossible.com*). **List price:** $59.95.

BETTER ORGANIZATION

SCRAPBOOKS AND notepads can get as disorganized as the real thing, and control-panel and extensions folders can get pretty anarchic as well—that is, unless you enlist some help.

Conflict Catcher 4.0.2 Apple is as guilty as the rest of making chaos out of order in the System Folder. Although Apple's latest, better-designed Extensions Manager tries to solve the problem, Conflict Catcher 4 from Casady & Greene is by far the best way to understand, organize, and control start-up documents of all kinds.

With Conflict Catcher, turning control panels and extensions on and off and organizing them in sets is just the beginning. Conflict Catcher can also tell me the function and memory usage of all my start-up items, automatically test for conflicts, sort start-up items in ten useful ways (including by the program that installed them), manage plug-ins for programs such as Netscape Navigator and QuarkXPress, and even direct my Web browser to the update page for a specific item or to Casady & Greene's extensive reference database. Recipient of a rare five-star rating, Conflict Catcher deserves them all.

ScrapIt Pro 5.33 Sadly, Mac OS 8's Scrapbook still doesn't allow you to assign titles or keywords to clippings, view more than one clipping at a time, or search for clippings. One reasonable fix is the Now Scrapbook part of Now Utilities ($89.95; see *Reviews*, March 1997) from Now Software (503/274-2800, *www.nowsoft.com*). For my money, the best scrapbook going is shareware ScrapIt Pro by John V. Holder, which can open up to 20 scrapbooks and display each scrapbook's contents as a scrolling list (see the screen shot "A Better Scrapbook") or as a collection of thumbnails. (ScrapIt Pro is available at *www.macworld.com/more/*).

A Better Scrapbook You can display ScrapIt Pro contents as scrolling lists of titles or thumbnails (shown here); the selected item is shown full-size on the right.

The software automatically titles a text item with the item's first few words. It allows me to edit the text in a clipping and copy just part of a text or graphic clipping. I can attach a comment to any item and search for text occurring in the titles, comments, or bodies of all items. ScrapIt Pro fully supports drag and drop, and I particularly like the fact that I can add blank text items for on-the-fly notes.

Companion utility QuickScrap adds hot keys for copying and pasting directly into and out of the Scrapbook or its own multi-item clipboard, and—I found this especially handy—it allows me to name clippings when I copy them, for easy retrieval later.

DragStrip 2.0.1 Finding an application launcher with the perfect balance between maximum functionality and minimum screen clutter is not easy. Clear winners in the latter category are CE Software's QuicKeys (see the "Keyboard Shortcuts" section) and Now Utilities' Now Menus, which can install an applications and documents menu for each user of a shared computer.

But for those who like to see their choices all laid out in front of them, DragStrip from Natural Intelligence is it. Its button strips are compact, and it's a separate application (no extensions headaches here). Buttons can represent applications, documents, folders, groups of items, clippings (text, graphics, sounds, and so on), Control Strip modules, and special DragStrip modules (such as a calendar displaying phases of the moon).

It's easy to assign buttons a function via drag and drop, and many buttons can display pop-up lists of folders and documents. Since I'm trying to go mouseless, I especially like being able to select strips, navigate from button to button, and "click on" buttons using the keyboard.

EDITORS' CHOICE

★★★★★/9.3 **Conflict Catcher 4.0.2** This is a nearly perfect, and virtually essential, start-up document manager. **Company:** Casady & Greene (408/484-9228, *www.casadyg.com*). **List price:** $99.95.

★★★★/8.1 **DragStrip 2.0.1** Versatile, feature-packed file launcher is well worth the premium price. **Company:** Natural Intelligence (617/876-4876, *www.natural.com*). **List price:** $59.95.

★★★★/8.0 **ScrapIt Pro 5.33** Edit text, copy part of an image, and find items by title or contents in up to 20 open scrapbooks. **Author:** John V. Holder (*www.northcoast.com/~jvholder*). **List price:** $20 shareware fee.

Macworld's Buying Advice

You probably don't need every one of the utilities I've described here (none of the experts I polled use all of them). But no matter which ones you decide to work with—whether they're revving up your system performance, simplifying your online experience, cutting down your keystrokes, taming your text, or helping you get organized—these top-notch programs can make your life a lot easier by saving you time and trouble (see *www.macworld.com/more/* for a firsthand look at most of them). Best of all, a handpicked utility collection will enhance your Mac OS 8 upgrade, fixing the system software deficiencies that vex you the most while it boosts your productivity. Now there's an offer you can't refuse. m

Contributing editor ROBERT C. ECKHARDT thanks the *Macworld* editors who assisted with this article and who, like him, find utilities indispensable.

BY DAVID POGUE

Top Pocket

DISCOVER THE BEST PALM

Pick a Sidekick
We sort out the diverse charms of these data vessels.

PHOTOGRAPHS BY DAVID GAZ

Organizers

SIZE DEVICE TO CARRY YOUR DESKTOP DATA

NEWT APPLEBY WAS A TRAVELIN' MAN WITH A PROBLEM. As he made rounds of his computer clients, he frequently needed to check his schedule, look up a number, take notes, confirm an account code. But a PowerBook wasn't the answer for Newt—a laptop was too big, heavy, and slow for instant lookups. Besides, a PowerBook was another $3000 expenditure for a Mac fan who already owned a perfectly good computer. No, what Newt really needed was a Mac *satellite:* a less expensive handheld gadget that would exchange data with the Mac before and after each excursion from the office.

Newt wasn't alone in his quest for a lightweight data valet, either. While he was buying Apple's (*www.newton.apple.com*) Newton MessagePad 2000, three other fellow travelers across the continent were investing in their own satellites: U.S. Robotics' (*www.usr.com*) PalmPilot Personal; Sharp Electronics' (*www.sharp-usa.com*) Zaurus ZR-5800FX; and Psion's (*www.psioninc.com*) Series 3c. Each device was a study in electronic downsizing, and despite their similarities, each was as unique as its new owner.

Appleby's Nifty Newton

Newt Appleby bought the MessagePad 2000 for $949. It was big, good-looking, and powerful—"just like me," he winked to the salesperson. It came with a generous assortment of bonus software, including a spreadsheet, a word processor, e-mail software, and a Web browser.

To Newt's surprise, the MessagePad 2000's handwriting recognition really worked, turning his scrawl into neatly typed text with only rare (and easily corrected) mistakes. For use in meetings, he bought the compact black $80 Newton keyboard. And when he was home, he tethered the MessagePad to his Mac's serial port and typed data into the MessagePad using his Mac's keyboard.

The MessagePad's size and graphic personality offered Newt luxuries not available to other palmtop users. For example, one tap on the Dates icon took him directly to the day's agenda screen, and on the MessagePad's big screen, Newt could write events directly into their time slots—an impossibility on other palmtops. The drag-and-drop feature made rescheduling events a snap, and he could view any combination of day schedules (just Friday through Sunday, for example) on a single screen by dragging his pen across the little month-view calendar. The Newton's other programs exhibited similar graphic elegance, smoothing many operations.

By adding a PC Card or desktop modem (for the list of approved models, see *www.newton.apple.com/nie/*), Newt discovered, he could send and receive Internet e-mail and faxes with no additional software, or even browse the Web—complete with gray-scale GIF graphics, either full-size or scaled to fit the screen (but without frames, multimedia, JPEGs, or background patterns).

The Pilot: Light

Meanwhile, petite Manhattan lawyer Amelia Lindbergh also wanted a compact Mac satellite. But to her, the roughly 5-by-8-inch, 1.4-pound Newton was a behemoth; it certainly wouldn't fit in her pocket. Instead, she bought a U.S. Robotics PalmPilot Personal. At $299, the Pilot was about a third the cost of a Newton; and at about 3 by 5 inches, it was a fraction of the Newton's size.

The Pilot also relied on handwriting recognition (with an on-screen keyboard for emergencies), but required that Amelia print each letter in a prescribed way (known as the Graffiti alphabet). Learning Graffiti took her about 15 minutes, thanks to a thoughtful shortcut: drawing a big line up the Pilot screen made a handy cheat sheet appear.

Four push buttons sat below the Pilot's screen: Calendar, Contacts, To-Do's, and Notes; a single press of any button turned on the unit and opened the corresponding program. The tiny machine offered many of the Newton's graphic niceties: when entering her upcoming trip schedule, Amelia could drag and drop events between time slots; schedule recurring events; and switch among day, week, and month views.

The Pilot's other software programs were similarly lean, fast, and filled with grace notes such as automatic capitalization and capacious Notes pages. With SmartCode's $40 HandStamp software (847/945-3516, *www*

.smartcodesoft.com) and U.S. Robotics' tiny $129 Pilot modem (or—with a special cable—any desktop modem), Amelia could even use Internet e-mail. It was clear to her that somebody had sweated over the Pilot's design with an obsessive eye toward simplicity, speed, and clarity.

Dinah's Zaurus: A Bit Crude

Meanwhile, Ontario real estate agent Dinah Sharpton was testing her new $599 Sharp Zaurus. Instead of the rectangular, glass-faced slab design of the Newton and Pilot, this gizmo looked like a sunglasses case: screen on the top half, tiny keyboard on the bottom. Equipped with the matching snap-on $100 fax modem, the Zaurus even had full access to CompuServe e-mail, forums, and software libraries. (For regular Internet e-mail Dinah could purchase Rupp Technology's $79.95 Z-Email software [602/941-4789, *www.rupp.com*].)

The Zaurus didn't understand any sort of handwriting—the plastic pen was exclusively for making little drawings and tapping buttons on the screen. For text entry, Dinah had to type on the microscopic keyboard, staring down to peck with two fingers while balancing the tiny unit on her lap. "Some palmtop," she muttered. "Try *kneetop*."

Fourteen painted-on buttons, such as Activities, Contacts, Spreadsheet, and Help, surrounded the Zaurus's screen. The artwork was crude, however, and the labels were in all capitals—a lack of design polish that Dinah soon discovered in all aspects of the Zaurus. (She was particularly amused that the backspace key was labeled *BS*.)

The One for the Road U.S. Robotics' PalmPilot Personal fits in the palm of your hand but sacrifices none of the graphic elegance found in larger PDAs.

When she turned on her unit—unlike the other palmtops, this one takes several seconds to warm up—and pressed the Activities button, the datebook screen was a three-ring circus of controls and displays. A month-at-a-glance calendar, a to-do list, a sliding timeline for the day, and a list of the day's events were packed onto a single screen. Still, Dinah found the timeline to be a brilliant touch: she could schedule a meeting simply by dragging her pen across the appropriate hours. The Zaurus's sluggishness bugged her—after every operation, a SAVED! dialog box commandeered the screen for several seconds—but overall, she was pleased with the software's depth.

The Clean and Crisp Psion

At that very moment, Texas oil scion Cy N. Simon III was opening his new Psion 3c, a $549 British gadget. Like the Zaurus, the Psion had a sunglasses-case design; unlike the Zaurus, the Psion's screen snapped open to a nonadjustable, sometimes inconvenient angle. Still, Cy thought he'd prefer the Psion because of the huge library of programs legions of ardent Psion fans have created. And in case he wanted to use e-mail, $199 for the PC Card send-fax modem seemed reasonable enough.

Nine touch buttons bordered the Psion's screen, such as Time, Calc, Sheet (for spreadsheet), and Data (for database). After arriving at his hotel, Cy punched Agenda to turn on the unit and open the datebook. The Psion's datebook screen, as with all its programs, was clean and uncluttered, maximizing space for schedule display (day, week, year, to-do, and list views were all available).

To add events to the calendar, Cy started by punching the keyboard's Menu but-

Economies of Scale: What the Satellites Offer

Company	Apple	Psion
Product	Newton MessagePad 2000	Psion Series 3c
Star Rating*	★★★/6.9	★★★/6.0
List price (unit/connection kit)	$949/included	$549/$99
Phone	408/996-1010	508/371-0310
Size (w × h × l)/weight with batteries	4.7 × 1.1 × 8.3 inches/22.4 ounces	6.5 × 3.4 × 0.8 inches/9.7 ounces
Screen size (in pixels)	480 × 320	480 × 160
Memory (RAM/ROM)	5MB/8MB	2MB/2MB
PC Card slots	2 Type II	external PC Card adapter available
Input/output ports (sound, data, other)	1 proprietary; 1 serial; 1 infrared	1 serial; 1 infrared
Microphone/speaker	●/●	●/●
Sound features	voice recording; sounds on taps, drags, menu drops	voice recording; soundwave editor; chirps on button-presses
Temporary backlight	●	●
Unique features	rotatable screen; removable lid; cursive recognition	zoom in/out; built-in programming language; thesaurus
Comments	It's everything you'd want in a handheld: powerful and fast. At $1000 and 8.3 inches long, it approaches half the price and size of a laptop, but its solid connection to the Mac improves its Star Rating over our July review.	This cult favorite from England shows impressive attention to detail in its well-designed software (including hundreds of free and shareware apps). The much-improved Series 5 model, due later this year, will come with the touch screen this machine so desperately needs.

Editors' Choice winner in red. ● = yes, ○ = no, NA = not available. *Based on features, implementation, innovation, ease of use, and value. (See Star Ratings section for full explanation.)

ton. The menu bar appeared, sporting a generous range of commands in large, crisp lettering; from there, the arrow keys moved from menu to menu, and keyboard shortcuts were also available. All Cy missed was a more direct means of specifying an event's starting time: the sole palmtop without a pen, the Psion forced Cy to use arrow keys to move among time slots.

Sync or Swim

In their respective hotel rooms, the four hardy travelers tapped alarm times into their machines. The next morning, all four palmtops woke themselves up, then began chirping to awaken their owners. It was time to fly home and dock their new purchases to their desktop Macs.

By the end of her two-day trip, Amelia had scribbled into her Pilot five memos, several clients' e-mail addresses, and dates for upcoming appointments. Only one task remained: to transfer all this data onto her Mac. Now she'd find out exactly how well her digital assistant served as a Mac satellite.

To her delight, Mac synchronization was the Pilot's best feature. The Mac Pack included a Mac-based version—called Pilot Desktop—of the Pilot's own built-in programs so that Amelia could use the Mac to keep her contact list and calendar current while not on the road. (The Mac Pack is $14.95 when purchased separately, but is often available as a free bonus from the dealer with the purchase of a Pilot.)

Simple-Minded Apple's Newton Connection Utilities are easy to use, but are not as flexible as U.S. Robotics' Pilot Desktop for the Macintosh.

To dump her Pilot's data to the Mac, she slipped the Pilot into the custom cradle attached to her modem port and pressed the cradle button. The synchronization software automatically launched itself on both the Mac and the Pilot, backed up the Pilot's data, and produced an "I'm done!" chirp. Sure enough, Pilot Desktop now contained any new entries she'd entered in the Pilot, and vice versa.

The following week, Amelia bought Now Software's (503/274-2800, *www.nowsoft.com*) Now Synchronize for $30. A single button press on the Pilot's cradle now performed the mutual Mac/Pilot updating with Now Contact and Now Up-to-Date (although not without some hitches; see *Reviews*, August 1997). Amelia discovered that she could also have bought the Pilot, connection kit, Now Contact and Up-to-Date, and Now Synchronize for a bundle price of $299.

Newton Connects

Newt Appleby had similar success with the Newton's connection software—he just connected a modem-port cable, launched the Mac software, and tapped an on-screen Newton button—but the software wasn't quite as functional as the Pilot's. The Connection Utilities program was primarily a backup program; he couldn't edit his Newton data on the Mac, as Amelia could with Pilot Desktop. Though if Newt kept his names and addresses in Claris Organizer or Now Contact and Up-to-Date, the Newton Utilities software worked like the Pilot, intelligently bringing the Newton and those Mac programs up to date with each other—a beautiful thing to behold.

Half-baked Psion

As Cy N. Simon III discovered, the $99 Psion Link software made backing up the Psion extremely simple; he connected one cable end to a Psion socket and the other end to his Mac's modem port. Then he launched the Psion Link program on the Mac, which displayed a tree-style directory window for each device (Mac and Psion). To back up the Psion, Cy dragged file and folder icons from the Psion tree window into the Mac's tree window.

Unfortunately, opening the backed-up data on the Mac was another story. Cy learned that he'd first have to open each file on the Psion, one by one, and save it into an intermediary format, such as RTF for word processor documents or WKS for spreadsheets—and then import these transitional files into his Mac software. As for the calendar, Cy was out of luck; the Psion couldn't export its Agenda into any Mac-readable format—and the Psion's calendar program couldn't import event data at all. (Psion says it plans to release an overhauled connection kit later this year.)

Not Enough Zaurus

Dinah Sharpton was discovering back at her office that the Zaurus's hookup situation is similar to the Psion's: she could open spreadsheet, word processor, and database documents on the Mac only after converting them to intermediate formats. But the Zaurus's $6.95 connection software made an enormous difference, performing these translations automatically (instead of mak-

Sharp Electronics	U.S. Robotics
Zaurus ZR-5800FX	PalmPilot Personal
★★★/5.0	★★★★/8.3
$599/$6.95	$299/$14.95
201/529-8200	847/676-1441
3.7 × 1.0 × 6.7 inches/14.6 ounces	3.2 × 0.7 × 4.7 inches/5.7 ounces
320 × 240	160 × 160
2MB/NA	512K/8K
1 Type II	none
1 proprietary; 1 infrared	none
○/●	○/●
chirps on button-presses and taps	chirps on button-presses and taps
●	●
built-in CompuServe software; mapmaking tools; adjustable hinge	condensed schedule view (hides empty hours); text macros; docking cradle
The Zaurus is a serious computing machine; as such, it's the least user-friendly. Of these four handhelds, this one will seem the most alien to Mac fans, thanks to the keyboard's weird layout, the cluttered interface design, and the nonexistent shareware offerings.	Other palmtops have more features, but also more complexity, cost, and bulk. They may be better for people in special jobs; but if you're after a pocketable Mac satellite, the Pilot is the one you'll actually end up using.

Put a Rocket in Your Pocket Organizer: Just Add Software

ALL OF THESE PALMTOPS COME WITH SOFTWARE, BUT THE shareware and commercial worlds harbor hundreds of add-on programs that can make these palmtops even more useful. (You can find the shareware and free programs that follow at *www.macworld.com/more/*.)

Newton
Since the Newton is a nearly full-fledged computer in its own right, scads of software is available for it, including PocketMoney (Quicken-compatible finance program, $30 shareware), Aloha (America Online e-mail, $50 shareware), and dozens of special-market programs (for doctors, for example; a complete list of these is at *www.jointsolutions.com/newton_3/html/vertical.html*). There's even Speller, a tiny $20 spelling checker that flags errors (but doesn't propose replacements).

Pilot
Though the Pilot is the new kid on the block, the online software libraries offer hundreds of tiny goodies. Pocket Chess is impressive freeware that lets you play against another person or the Pilot; CurrEx is a free currency converter; PocketSynth is a $10 melody synthesizer; and DinkyPad is a pocket-size painting program ($5).

Zaurus
Because Zaurus software must be programmed on a specialty development system, there aren't as many shareware programs as for other palmtops (in fact, we couldn't find *any*). Most of the commercial products come from Rupp, which offers the Z-Games pack (poker, Othello, and Code Breaker for $49.99); Z-Calc (a scientific calculator for $49.99); and Z-Finance (Quicken-downloadable data, $49.99). And Sharp itself sells ZR-5P01 Expense Manager, with pop-up menus for quick input of travel expenses.

Psion
The Psion's software library is huge. Psion itself sells programs such as Expense Tracker ($49.99), Money (exportable to Quicken, $120), Berlitz Interpreter (French, German, Spanish, or Italian, $120), and Chess ($100). Even more potent programs are available, some from British companies—you can order these through New World Technologies (212/941-4633, *www.nwt.com*). Examples include Plain Paper Invoicing from Lasersoft, Mediman (medical record tracking from Publistix, 908/536-3954), and Compute-a-Diet from Comcard.

ing Dinah do a Save As for every document on her palmtop). Dinah found that even calendar data could be swapped—after being exported as a text file.

Macworld's Buying Advice

Several months later, an astounding coincidence took place on Flight 1220 to New York. Newt Appleby looked up to see, by a fluke of fate, three other palmtop users in his same airplane row. After a quick round of introductions, Newt, Dinah, Amelia, and Cy were delightedly exchanging notes on their palmtop experiences.

"I love my Newton," boomed Newt to the others. He explained how his gadget's graphic elegance, clever interface design, and high-speed 166MHz processor made it a worthy computer unto itself. "Only thing I'd change is the battery life," he finally admitted. "I run through four AA's in a couple of weeks."

"Oh, but that thing is so big and heavy and expensive!" exclaimed Dinah, brandishing her Zaurus. "Now, if you want a real computer in your pocket, check out this baby." She showed them the sophisticated built-in Zaurus programs; even on the Zaurus's 320-by-240-pixel screen, the spreadsheet offered font, size, and style commands; borders; pie, line, column, and stacked-bar charts; and so on. "And look," she concluded, "the word processor has a spelling checker, tabs, indents, and even drag-and-drop editing!"

Cy was taken aback by the Zaurus's crammed screens and clashing fonts. "And what's the deal with the Zaurus's keyboard?" he objected further, pulling out his Psion. "You got tab on the right side, slash on the left, and cursor keys at the top!"

Dinah looked wounded.

"Now, my Psion," Cy continued, "doesn't have one o' them plastic pens. But look here." He held up the Psion so the others could see how open and clean its screens were. "Overall, I guess my Psion's features aren't as rich as the Zaurus's. But I'll betcha I'm more productive anyway, just on account of my Psion is so much easier to figure out." He looked across the aisle at Amelia Lindbergh. "Whatcha got there, little lady?"

Amelia looked up. "This is the Pilot," she said. She took a moment to explain how the Pilot was designed from the start to be a personal-computer satellite, complete with one-button, two-way synchronization. As she demonstrated, the other three were amazed at her using-to-floundering ratio: Amelia never spent time figuring out how to do something on her tightly focused Pilot—she simply *did* it.

Dinah was impressed. "Yeah, but how much juice does that thing use?"

Amelia smiled. "Two AAA batteries; I haven't changed 'em in four months." As the plane touched down, Amelia relaxed back into her seat, confident that she had the fastest, smallest, niftiest satellite in the galaxy. **m**

Contributing editor DAVID POGUE (*www.pogueman.com*) is a gadget freak, composer, and coauthor of *Macworld Mac Secrets* (IDG Books Worldwide, 1997).

EDITORS' CHOICE

★★★★/8.3 **PalmPilot Personal** One-touch syncing with your Mac's data is the highlight of this tiny, fast, inexpensive, battery-stingy, 6-ounce marvel. **Company:** U.S. Robotics (847/ 676-1441, *www.usr.com/palm/*). **List price:** $299, plus $14.95 for Mac Pack connection kit.

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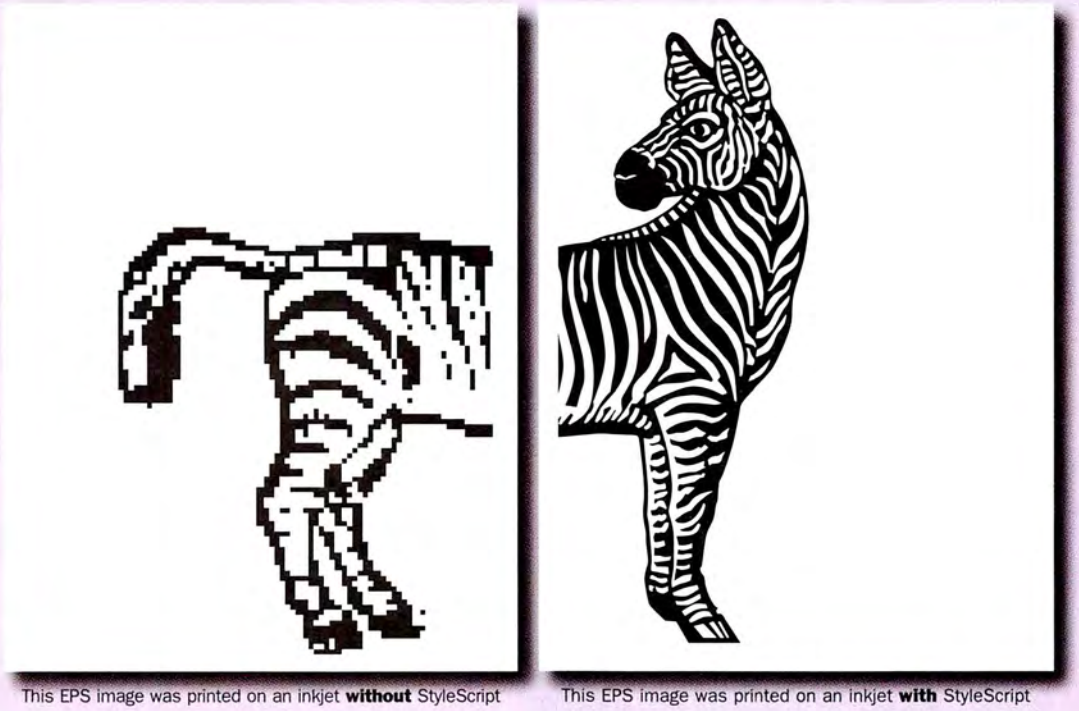

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This EPS image was printed on an inkjet **with** StyleScript

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This EPS image was printed on a color inkjet printer **with** StyleScript

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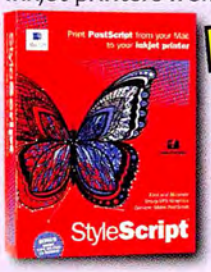

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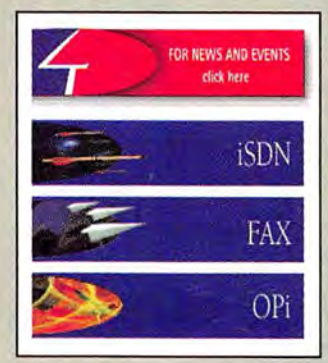

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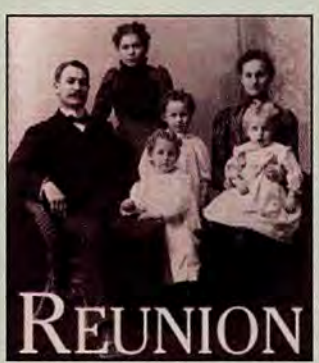

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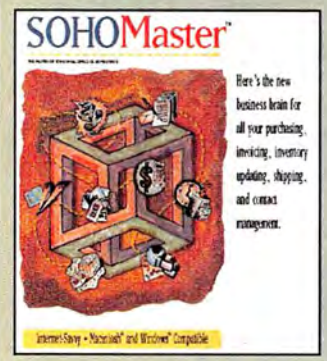

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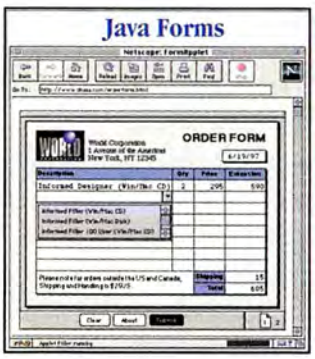

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SONY 17SEII	17" (16.0")	0.25 AG	NO
HITACHI Mc 7515	19"(18.0")	0.22 horiz.	YES (1672)
SONY 20SFII	20"(19.1")	0.30 AG	NO
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Secrets

Whistle While You Work

MAKE THE MOST OF THE CD PLAYER LIVING INSIDE YOUR MAC

by Joseph Schorr

The number one productivity application on my Mac isn't Microsoft Excel, Corel WordPerfect, or Claris FileMaker Pro; it's the AppleCD Audio Player—the free program that lets you play audio CDs on your Mac while you work. When I'm struggling to meet deadlines, writing into the early hours of the morning, it's the insistent blare of my favorite CDs that keeps me from collapsing into a slumbering heap on the keyboard.

At first glance, Apple's Audio Player may not seem terribly sophisticated, but this tiny CD player has a few features that put a Sony Discman to shame.

Technically, you don't *need* the AppleCD Audio Player to listen to a CD. With QuickTime 2.5 or later, you can click on the Auto-Play When Inserted option in the QuickTime control panel and your audio CD will start playing, one track after another, as soon as you pop it into your CD-ROM drive. But if you want to tap into the Mac's more prodigious audio-CD capabilities—and control playback from your keyboard—the Audio Player has what you need.

Name That Tune

When you insert an audio CD into your Mac, it appears by default in the AppleCD Audio Player window with the generic name Audio CD. The tracks appear in the Tracks list generically as Track 1, Track 2, and so on. But with minimal effort you can name your CDs and the individual tracks, so you can pick among them by name instead of number.

To name a disc, launch the Audio Player program, press tab to highlight the disc name, then type in the name of your choice. (You can also click once on the disc name to select it.) Pressing tab repeatedly steps you through all the track fields, so you can type in a name for each one (up to 62 characters per name).

Naming discs and tracks may seem like a lot of unnecessary work—after all, you can always just look at the CD case to figure out what's on each track—but the big payoff comes later: once you've assigned all these names, your Mac remembers them—*permanently*. Every time you insert a named CD in the future, all the track names will be at your fingertips instantly. You'll be able to jump from song to song, without so much as a glance at the CD case.

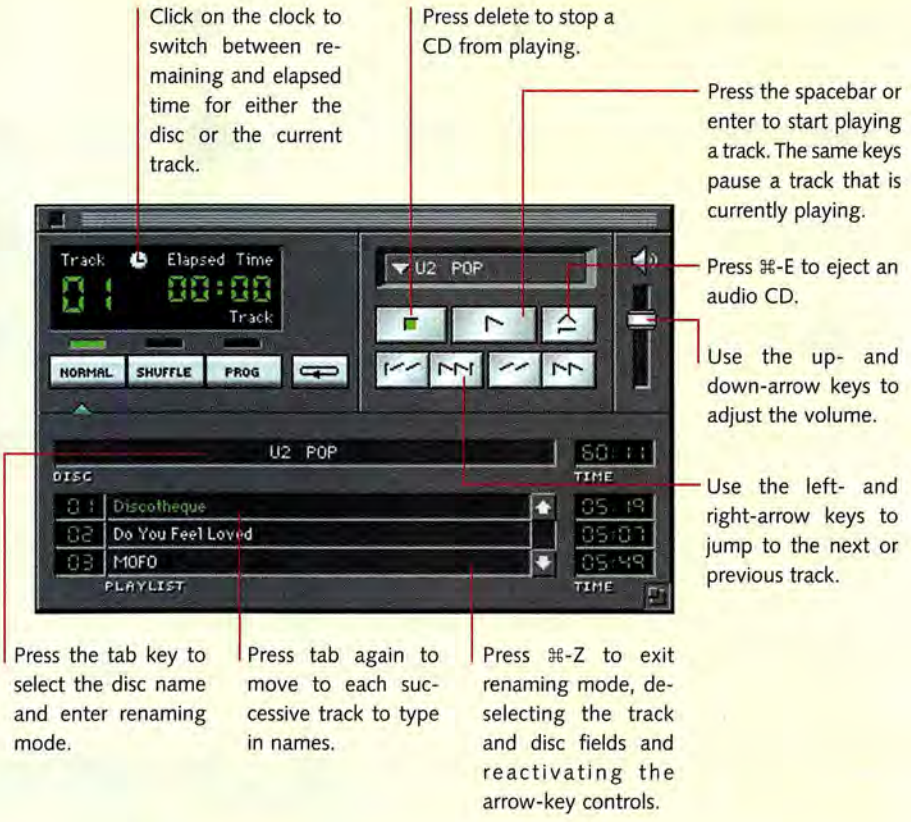
How does the Mac manage to remember all those names? It identifies each audio CD with a unique ID number,

continues

Playtime

IF YOU THINK BEING ABLE TO PLAY YOUR favorite CDs on your Mac while you simultaneously crunch numbers in Excel or fuss over a QuarkXPress layout is convenient, wait until you master the AppleCD Audio Player's numerous keyboard controls, which let you start, stop, pause and switch tracks, adjust the sound level, and eject discs, all without lifting your fingers from the keyboard.

The keyboard shortcuts shown here work only with the Audio Player program running in the foreground. To make them easily accessible, leave the Audio Player program running: collapse the window and drag it into an accessible spot on the desktop—just below the menu bar, for example—so that you can activate these controls when you need them. To pause a disc when you get a phone call, for example, click once on the collapsed window (no need to open it) and press the spacebar. To resume playing, press the spacebar again.



which is stored in a file called CD Remote Programs (it's in the Preferences folder in the System Folder). As long as that file remains intact, your Mac has a complete record of each and every CD it has come into contact with.

Programming—Once and Forever

Because the Audio Player is actually part of a fairly powerful computer, it's a lot smarter than your typical CD player. For example, one of the biggest frustrations with traditional CD players is their limited programmability. Sure, you can set up a customized program on your CD player to play back tracks in the order you want, but once you eject the disc or turn off the player, your programming efforts are obliterated. Wouldn't it be great if you could program a sequence of tracks for a disc and then have your CD player remember that sequence every time you play the disc?

The AppleCD Audio Player does just that. To set up a program, click on the Prog button. The lower portion of the player splits into two sections, with all the available tracks listed on the left side. Drag the tracks you want into the slots on the right side (called the Playlist) to set up the program (see "Be Your Own DJ"). You can drag the same track into more than one slot or leave tracks out entirely. Once you've dragged the desired tracks over, you can drag and drop within the Playlist to reorder the tracks however you please. To remove tracks from the Playlist, simply drag them anywhere outside. You can create a program containing up to 99 tracks. Then click on the play button and listen to the tracks in the order you've selected.

Here's the best part: like disc and track names, your custom playlists are also stored—permanently—in the CD Remote Programs file. As long as you preserve this file, your custom playlist is forevermore available when you insert that disc. (Remember this when you upgrade your system and perform backups. If you've done a lot of CD programming and track naming, you'll want to back up and preserve that precious CD Remote Programs file.)

Be Your Own DJ Programming Apple's built-in CD utility is easier than programming most CD players. Just drag and drop the tracks into the playlist in the order you want. The Mac will remember your choices forever.

Beyond Sosumi

Getting tired of the Wild Eep, Sosumi, and other stock alert sounds? You can create your own by recording snippets directly from your audio CDs. In the Monitors & Sound control panel, change the Sound Input setting to Internal CD, then load the CD you want to record from and start playing it. Now open the SimpleSound utility (which you use to add and delete alert sounds), set the Sound menu to CD Quality, click on the Add button, and then click on the Record button at the beginning and end of the portion of the CD you want to capture. Give the captured sound a name, save it, and you have a brand new CD-quality alert sound on your system. (Just remember that these custom alert sounds are for your personal, noncommercial use only.) **m**

JOSEPH SCHORR is coauthor of *Macworld Mac Secrets*, fourth edition (IDG Books Worldwide, 1997).

3D solid and surface modeling at its best ...

formZ

David Mattingly,

of Hoboken, New Jersey, is a well known artist specializing in science fiction illustrations. About four years ago he discovered the new electronic media and has since been one of their most imaginative users.
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As an illustrator specializing in science fiction and fantasy subjects, I am called upon to create some very unlikely and unpredictable forms in my 3D work. Because of the incredible depth of the program, form•Z always has an answer to my modeling needs, and usually two or three alternative approaches. My models usually have lots of detail, generating polygon counts that would choke other programs, but form•Z allows me to easily work in the high detail I need to fully realize my ideas.

Having recently worked on a 3D game project and testing many other major 3D programs, I found form•Z superior to much more expensive modelers.

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Image provided by Vivid Details

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Circle 17 on reader service card

Quick Tips

Tips, Tricks, and Shortcuts

by Lon Poole

To instantly select all messages from the same person in Eudora 3.0's In Box, Kelly McDaniel of Austin, Texas, suggests you press the option key and select any message from that person. You can also option-click the date or the subject to select all messages with the same date or the same subject (including subjects beginning with *RE* that are otherwise the same). You can now easily transfer the selected messages to a mailbox or scroll through the In Box to find one particular message. Eudora 3.1 minimizes the amount of scrolling you have to do by moving all the selected messages together. The selected items remain selected if you use the Sort submenu in the Special menu to put the messages in a different order. The option-click trick also works in the Out Box and in mailboxes you create.

Fractions

Q I have been putting together some charts in Microsoft Word that require using fractions. At work on my PC, this is no problem, since the three important ones—¼, ½, and ¾—are in the Symbol command's window. But at home on my Mac they don't exist. Is there any way to make fractions, or do they lurk somewhere within one of the fonts already in Word?

GREGORY KUNTZ
Los Angeles, California

A You can type your own fractions with ordinary fonts as follows: First type the whole number and the fraction without any spaces between. For the fraction bar, try typing option-shift-1 rather than a slash (this doesn't work in some fonts, such as Geneva and New York). Next select the numerator and make it superscript style. Then select the denominator and make it slightly more than half the size of the whole number. For example, if the whole number is 12 points, make the denominator 8.

If your fractions look too homemade or if that's too much hassle, you can buy fraction fonts. The Helvetica-like Sans-Fractions and the Times-like SeriFractions have diagonal and vertical fractions for ½ through ⅝, plus 16ths and 32nds.

They're shareware fonts by Tom Schmidt, available in a Mac version (TrueType and Type 1) and a Windows version (TrueType only) for $9.95 each.

Some commercial font vendors also offer fraction fonts. Linotype Fraction Pi from Linotype-Hell (516/434-2000, *www.linotype-hell.com*) has prefabricated serif and sans serif fractions and lets you build your own. You can also get Helvetica and New Century Schoolbook fraction fonts in Mac and PC PostScript versions for $22.50 each or $80 a set from Monotype (847/718-0400, *www.monotype.com*). And some Adobe Expert Collection font sets include fractions that match the typeface of the Expert set; contact Adobe (408/536-6000, *www.adobe.com*).

Personal Home Page

Q I would like to design my own home page, but how do I get Netscape Navigator to open without looking for the modem and dialing out? I have tried all I can think of.

JAY MCALEVY
Redding, California

A From Navigator 3.X's Options menu, choose General Preferences. If you want Navigator to start up with an empty browser window, under the Appearance file tab set the option Browser Starts With to Blank Page. If you want to see an HTML file from your hard disk when you start Navigator, set the option to Home Page Location and in the adjoining text box type or paste your HTML file's URL, which begins with *file:///* (not with *http://*). For example, if you specify the URL of your Bookmarks file—which is something like *file:///Macintosh%20HD/System%20Folder/Preferences/Netscape%20%C4/Bookmarks.html*—you'll see your bookmarks as hot links in an outline format, complete with descriptions you have entered, on a searchable Web page.

File URLs look intimidating, but you can easily copy and paste one by dragging the file (or an alias of it) to a browser window. The file's URL then appears at the

continues on page 152

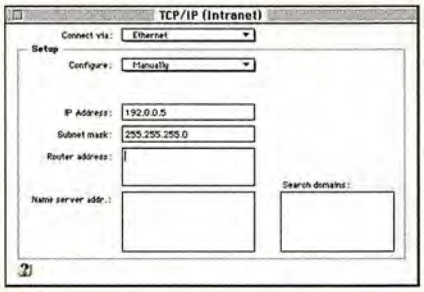
Intranet File Sharing

The Mac OS has file sharing, but what about sharing files with a PC? Cam Giesbrecht of Winnipeg, Manitoba, Canada, points out that it's not too difficult or expensive to connect a Mac and a few Windows 95 machines with a simple Ethernet network and set up an FTP server on the Mac for cross-platform file sharing. As detailed below, you need an Ethernet port on each computer, Ethernet cables, TCP/IP software on every PC, an FTP server program for the Mac, and FTP client programs for each of the PCs.

The most common type of Ethernet port is 10BaseT. Your Mac may have one of these built-in; it may have a built-in AAUI Ethernet port that requires a 10BaseT transceiver; or it may require an Ethernet card with a 10BaseT connector. Most PCs require a 10BaseT Ethernet network interface card (NIC). If you're connecting just two computers, you can use a crossover 10BaseT cable to connect their Ethernet ports, but if you're connecting more than two computers, you need a 10BaseT Ethernet hub and regular 10BaseT cables to connect each computer to the hub. Note that if you're not using a hub, you must boot the PC before starting up the Mac. If the Mac doesn't see another device on the Ethernet network, it switches to LocalTalk networking during start-up and displays an alert telling you what it did. (For more on setting up an Ethernet network, see "Connect Your Workgroup," *Macworld*, August 1997.)

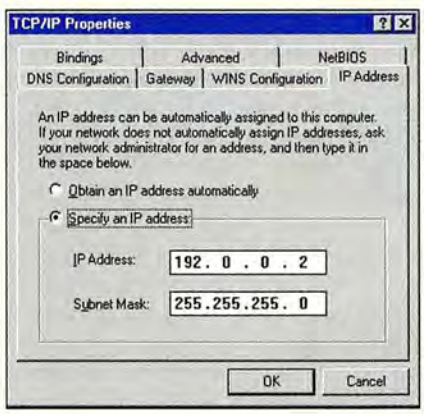
Each computer needs networking software. Make sure the Mac has a TCP/IP control panel version 1.1 or later. It indicates the presence of Open Transport, the enhanced networking software that comes with System 7.5.3 and later. (If the Mac has a MacTCP control panel, you can use it instead, but it's older and harder to configure so we won't cover it here.) On the PCs, make sure the network component for TCP/IP is present in Windows 95's Network control panel. If it's missing, click the Add button, click Protocol, click Microsoft, and finally click TCP/IP.

1 For the computers to communicate over your Ethernet network, you must give each one a numerically unique IP address. On the Mac you use the TCP/IP control panel. Since its current settings probably get you on the Internet, you should save them as a named configuration and create another named configuration for the intranet settings. Use the Configurations command in the TCP/IP control panel's File menu to duplicate the current configuration, rename the duplicate, and make it active. Then set the TCP/IP control panel's Connect Via option to Ethernet, the Configure option to Manually, the IP Address to 192.0.0.X (where X is a number between 1 and 255 that's not used by another computer), and the Subnet Mask to 255.255.255.0 (leave the other options blank). Close the TCP/IP control panel and answer yes when asked if you want to save changes. To reconfigure the TCP/IP settings later, open the control panel and choose a named configuration with the Configurations command.



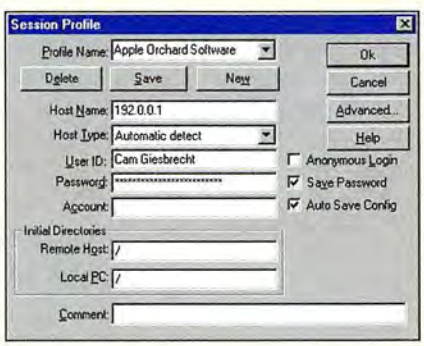
2 On each Windows 95 computer, open the Network control panel and bring up its TCP/IP Properties dialog box. In the IP Address section of that dialog box, select Specify An IP Address, type 192.0.0.X (making the last number unique) for the IP Address, and type 255.255.255.0 for the Subnet Mask.

For the FTP server program, you can use the shareware NetPresenz from Stairways Software (*www.stairways.com*). As explained in the NetPresenz documentation, the files you want to share go into a folder named Pub on the Mac that's running NetPresenz. You can set that folder's access privileges exactly as you would for Mac OS file sharing. Briefly, you use the Users & Groups control panel to allow (or prevent) guest access and to identify registered users and their passwords. You use the Finder's Sharing command on the Pubs folder to designate which registered user is the folder's owner and what the owner's privileges are; to designate a registered user or group with special access privileges; and to designate guests' access privileges. For details, check the Macintosh Guide in the Finder's Guide menu.



3 To access the server's Pub folder, a Windows 95 computer can use the Winsock FTP client program by John A. Junod (*www.ipswitch.com*). In that program's Session Profile screen you set Host Name to the Mac's IP address and Host Type to Automatic Detect. The User ID and Password must correspond to a user in the Mac's Users & Groups control panel, except for guest access. In that case the user name should be Anonymous and the password can be anything. Enter a single slash for each of the Initial Directories settings to see the server's Pub folder contents and the PC's current directory when you first connect to the server.

Macs could access the server's Pub folder with an FTP client such as Anarchie or Fetch, but it's easier to use Mac OS file sharing (through the Chooser).



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top of the browser window in the Location box, from which you can copy it. Next you bring up the General Preferences dialog box and paste it into the Home Page Location text box. (If you're wondering what all those %20 codes are, they're blank spaces in your file, folder, and disk names.)

Clipping Files

Q April's *Quick Tips* explained how to make a start-up message from a clipping file but said nothing about how to make the file. I would like to know how to make a clipping file.

BECKY VOOR VART
Omaha, Nebraska

A Select part of a document that you want to make into a clipping file and try to drag it to the desktop or to the icon or window of a folder or disk. If the application you're dragging from supports drag-and-drop editing between applications, the Finder creates a clipping file containing what you dragged. If nothing happens, or if the selection changes when you try to drag to the desktop, the application you're dragging from doesn't work with drag-and-drop editing. In that case you can make a clipping file by selecting, copying, and pasting into a document of an application that *does* work with drag-and-drop editing, and dragging to the desktop from there. Applications that work include recent versions of SimpleText, Note Pad, Stickies, and the Scrapbook; Eudora; Claris's Emailer, ClarisWorks, and FileMaker Pro; and Corel's WordPerfect (but not Microsoft Word or Excel). You can create clipping files of text, pictures, or sounds.

Invisible-File Aliases

Q I'd really like to have an alias of the Desktop Folder in my Apple Menu Items folder so that I can easily access desktop files from any program. Right now I can access the Desktop Folder as a submenu of the Apple menu because I have an alias of my hard disk in the Apple Menu Items folder, but I'd like to have the Desktop Folder on the Apple menu itself.

IAN LEVY
Arcata, California

Find Lost Bookmarks An easy way to find recently visited sites, writes Gib Kennen of Dayton, Ohio, is to display a directory of Netscape Navigator's cache, complete with linked URLs and file names. Type **about:cache** in the Location box at the top of the browser window or in the Open Location dialog box (⌘-L). To display a list of URLs you've visited and when you saw each one, type **about:global** instead.

A It's hard to make an alias of the Desktop Folder, not just because it's invisible but because the system software is such a special case. None of the disk and file utilities I've tried can make it visible, and none of the alias utilities can make an alias of it. But a disk's Desktop Folder becomes visible when you use file sharing to access the disk from another Mac on your network, if you're on one. So turn on file sharing on your Mac, go to another Mac on your network and use its Chooser to mount your shared hard disk, and use that Mac to make an alias of the Desktop Folder at the root level of your hard disk. The Desktop Folder remains invisible on your Mac, but the alias you created is visible, and you can put it in your Apple Menu Items folder. It's a good idea to lock that Desktop Folder alias in its Get Info window to prevent the alias from becoming invisible. Don't try to find the original item of a Desktop Folder alias by clicking the Find Original button in the alias's Get Info window (unless you want to crash your system).

If your Mac isn't on a network, you'll have to borrow a Mac and temporarily network it to your Mac by connecting the two computers' printer ports with LocalTalk connectors or a serial printer cable. Any Mac will do, even a Mac Plus. For help on configuring a LocalTalk network or file sharing, look in the Mac OS Guide (Macintosh Guide prior to Mac OS 7.6), located in the Guide menu when the Finder is the active application.

Fix Unreadable Floppies

TIP Getting the dread message "This disk is unreadable by this Macintosh. Do you want to initialize the disk?" after inserting a once-good floppy disk? Possibly the floppy was formatted or written on a different Mac, or is an old archive disk with essential data. A trick with Apple's Disk First Aid utility works in most cases to read and repair floppies that have become unreadable. Disk First Aid is included with the system installation disks as well as from Apple's online software library (*www.info.apple.com*).

When you get the "disk is unreadable" message, immediately eject the disk and open Disk First Aid. With Disk First Aid as the active application, insert the problem floppy again. In Disk First Aid's window, select the floppy's icon and click the Verify button. When Disk First Aid finishes verification, it should tell you that the disk needs repairs. Click the Repair button, and when Disk First Aid finishes, it will probably tell you that it successfully repaired the disk

This trick works only if you insert the floppy while Disk First Aid is the active application and if you have it verify prior to repairing. If you skip the verify step, the repair step ends unsuccessfully.

JOE MORTENSON
Escondido, California

I only panic when I see that "disk is unreadable" message on the second try. The first time I see that dialog box, I eject the disk, give it a good shake and say something nice to it, and try again. Almost always it reads OK.—Ed. ■

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 (*www.macworld.com/more/*) or America Online (keyword *Macworld*).

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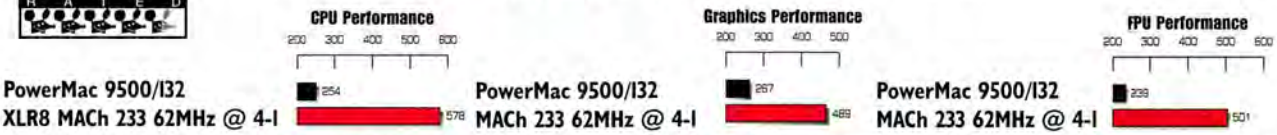

MacBench 4.0 results using PowerMac 9500, 16 MB RAM, on board SCSI, no hardware disk cache, 512K disk cache, running System 7.6. All products used in this test were shipping versions available to the public. All tests were performed by the XLR8 division of Interex. Ziff-Davis makes no representations or warranties as to the results of this test.

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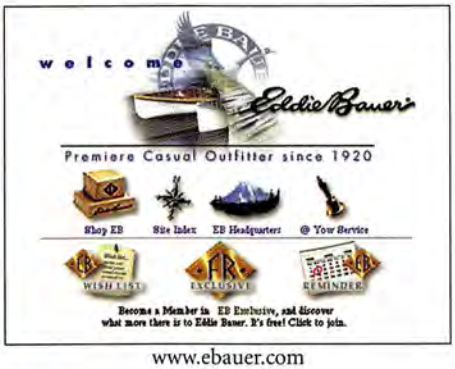

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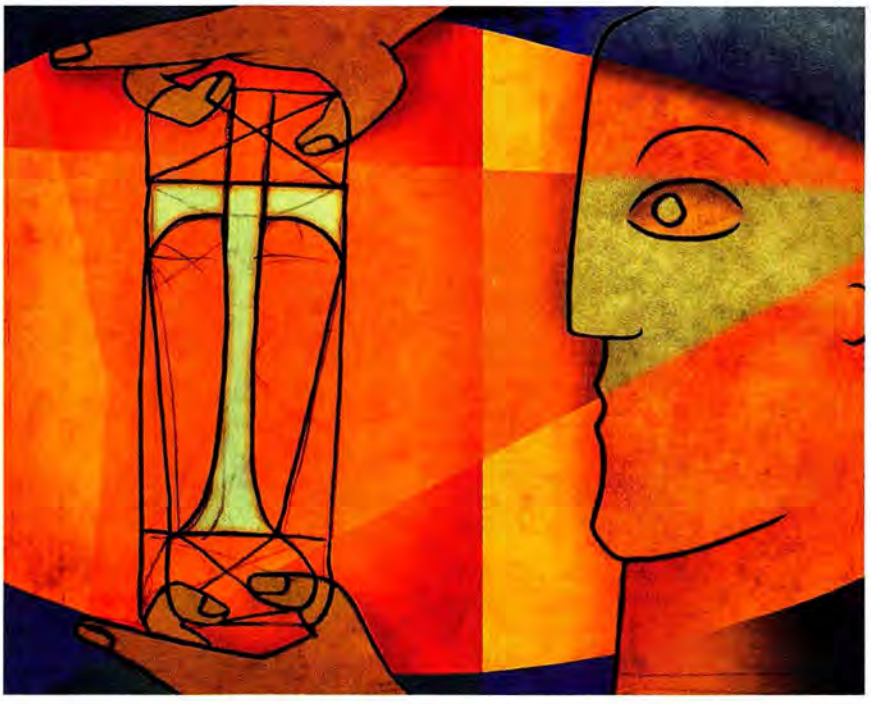
Improving Your Web Typography, Part 1

FOUR SIMPLE WAYS TO GET BETTER WEB TYPE

by Jim Heid



The World Wide Web is an exquisite cacophony of communications, but it isn't always a visual feast. One problem is the varying experience levels of the creators: many Web-page designers aren't familiar with the rules and conventions of good design and typography. But another problem is HTML, which was designed to describe a document's structure, not its formatting. To put it conversationally, HTML was designed to say things like "This is a heading" and "This is body text," not "This is 24-point Helvetica Bold" and "This is 12-point Times."

HTML's emphasis on structure rather than presentation has helped make the Web the platform-neutral medium that it is. Because the ultimate formatting decisions are up to the browser, an HTML page can be rendered by a text-only terminal, a personal computer, a workstation, a TV set, a voice synthesizer, or a Braille converter.

Still, designers have cried for more formatting control, and Netscape and Microsoft have responded. Both companies have created new HTML tags for their respective browsers, and most of these tags have become part of the latest HTML standard.

At the same time, Web designers have come to rely on tricks for controlling the width of text columns as well as vertical and horizontal spacing—more formatting controls that are missing or limited in HTML.

This column begins a two-part series on Web typography. This month, I look at four simple ways to improve Web type—techniques that are easy to implement, work on most browsers, and are compatible with older browsers. Next month, I'll focus on the future and on some developments that promise far more control over Web typography. For examples and links to more information sources, see *www.macworld.com/more/*.

Times Up

It's time to move beyond Times, the browser-default font in which all text in an HTML page appears (unless changed using the browser's preferences commands). With the **<font face>** tag, supported by versions 3.0 and later of both Microsoft Internet Explorer and Netscape Navigator, you can specify that text appear in a specific font; for example, **<font face="Helvetica">** formats the text that follows in Helvetica (see "Web-Page

continues

Web-Page Makeover

HTML's emphasis on structure over presentation makes it a platform-independent medium but allows browser settings to affect a page's look. Designers get more control over the layout and typography of their pages with a few simple tags that are becoming standard. (Check out these samples live at *www.macworld.com/more/*.)

Plain HTML

The **<hr>** tag lets you add horizontal rules, but you can't control their color.

Your text appears in whatever font your site's visitor happens to have set as the browser default.

Line lengths change as visitors resize the browser window.

You can add paragraph breaks, but you can't control vertical spacing precisely.

HTML with Typographic Tricks

This colorful rule is a single-pixel GIF.
<img src="dot_pink.gif" width=490 height=4 vspace=12>

These typefaces and sizes were specified with the **<font>** tag's face and size attributes. For the body text, for example, I used Trebuchet, specifying fall-back fonts of Helvetica, Arial, and Geneva.
<font face="Trebuchet MS,Helvetica, Arial,Geneva,san-serif" size=3>

This transparent, single-pixel gif acts as a spacer.
<img src="dot_clear.gif" width=1 height=1 vspace=5>

To maintain fixed line widths, I used borderless tables whose dimensions are specified in absolute pixel values.
<table width=480 border=0 align=left cellpadding=0 cellspacing=0>

Makeover" and "HTML-Tag Cheat Sheet"). Browsers that don't support the tag ignore it; the text simply appears in the default font.

Fall-Back Fonts There's one big catch to the **** tag: for the text to appear in the desired font, that font must be installed on the visitor's system. If it isn't, the text appears in the browser's default font. Fortunately, you can specify what I call *fall-back fonts:* ones to use if your first choice isn't available. For instance, **** tells a browser "Use Impact if you have it; otherwise, use Helvetica." You can specify as many fall-back fonts as you like; a browser uses the first one it finds. If it finds none, it reverts to its default.

Platform Problems Although certain fonts—Times, Helvetica, Courier—are standard on both the Mac OS and the Windows platforms, they may go by different names. For instance, Windows' Helvetica equivalent is named Arial. And each platform has fonts that aren't available on the other—examples include the Mac OS's Geneva and Windows' MS Serif.

If you're using these fonts, try to specify rough equivalents that exist on The Other Side—for example, ****.

Bill Gates's Type Microsoft has done much to advance the cause of good Web typography. The **** tag debuted in Microsoft Internet Explorer. More recently, Microsoft created a standard set of screen-optimized TrueType fonts and made them available for free downloading from *www.microsoft.com/truetype/*. (Some of these fonts are included with the Mac OS and Windows versions of Internet Explorer 3.X.) Fill out a simple licensing form on Microsoft's site, and you can even post these fonts on your own site for others to download.

Variations in Style You can't access style variants such as bold and italic using ****; for instance, **** doesn't work. Instead, use **** for bold and **** for italics, as in *****your bold italic text here*****.

Size Up Your Text

The first HTML versions provided little control over type size. You could create large, bold headings with the heading tags (for example, **<h1>** and **<h2>**), but you couldn't control the size of those headings or of a page's body text.

Things have improved—some. Currently, there is no broadly supported way to specify exact point sizes for text, but you can control relative type size with the **** tag's **size** attribute. Its values range from 1 (smallest) to 7 (largest); each step up in size is an increase of 20 percent.

With ****, text normally appears in a default size of 3. (You can define which of the seven values is the default with the **<basefont>** tag—for example, **<basefont=4>**). You can create text larger or smaller than the default size by specifying an absolute size (for example, ****) or by specifying a relative size (for example, **** yields text 20 percent larger than the current default size).

HTML-Tag Cheat Sheet

Here is a quick recap of tags you can use to improve your Web typography. Some, particularly **<table>**, rely on attributes too numerous to list here. A superb reference for all HTML tags is *HTML: The Definitive Guide,* second edition (O'Reilly & Associates, 1997).

Tag	Example	Result
 	text	Specifies a typeface (secondary faces are fall-back faces).
	text	Specifies bold.
	text	Specifies italic.
<basefont>	<basefont=4>	Specifies one of HTML's seven relative sizes as the default type size.
	text	Specifies one of HTML's seven relative sizes.
	text or *text*	Specifies increase or decrease from default font size.
<img>	<img src="dot.gif" hspace=8 vspace=18>	The hspace and vspace attributes add space around a transparent single-pixel GIF to control spacing.
	<img src="dot_pink.gif" width=490 height=4>	The height and width attributes stretch a colored single-pixel GIF to create rules and boxes.
<table>	<table width=400>	Specifies line width using absolute pixel values.
border	border=0	As part of table tag, turns off cell borders.

Absolute versus Relative Using **<basefont>** in combination with relative font sizes gives you the flexibility to change type sizes for a whole page in one fell swoop: you simply change the page's **<basefont>** tag, and all the type within that page changes, while retaining relative sizes. If you use absolute sizes throughout a page, you must manually edit every **<font size>** tag.

Bigger Text for Aging Eyes On Mac OS browsers, body text is on the small side. Many Web sites bump up the size by using **<font size=+1>**. (Macworld Online does this for daily news stories.) This yields an attractive size on Macs, but on Windows machines, where fonts display larger than on the Mac OS, the text appears a bit bold and clunky for my taste. Let your eyes and your target platforms be your guide—or use smart server-side software such as Maxum's $195 NetCloak (630/830-1113, *www.maxum.com*; see *Reviews*, January 1997) to tailor pages for each platform.

Simulating Small Capitals When setting body text, top-notch typographers often use small capitals for acronyms (NASA, CPU) or abbreviations (M.D.) to avoid having huge capitals overwhelm the surrounding text. You can simulate small capitals with **<font size=-1>**.

Choosy Designers Choose GIF

HTML doesn't allow precise control over vertical and horizontal spacing. You can add extra line spaces with the **
** (break) tag and create indents by using the nonbreaking space (** **) code, but there's no tag for adding, say, 18 points of extra space between two paragraphs or indenting a line 12 points.

For these and other spacing chores, Web designers use the *single-pixel GIF* file. This is a graphic containing just a single, transparent pixel. It's tiny—about 50 bytes—so it downloads in a flash. And by using it along with the **<img>** tag's **hspace** and **vspace** attributes, you can specify extra horizontal and vertical space.

Use It Often You can use a single-pixel GIF repeatedly with no performance loss. It downloads just once and is stored in the browser cache. Subsequent uses retrieve the same GIF from the cache.

From Bars to Borders You can create bars, borders, bullets, and buttons by stretching colored single-pixel GIFs with the **<img>** tag's height and width attributes. A 1-by-1-pixel graphic downloads much faster than, say, a 20-by-400-pixel one. And because the graphic consists of a solid color, stretching it doesn't introduce any distortion.

Put It on the Table

HTML tables were designed to present tabular data such as financial figures or sports scores, but they've become essential design tools. You can use them to create multiple column layouts, to indent text from the browser window's left edge, to create site-navigation tool bars, and much more. And HTML layout tools make it easy to tweak tables to get the results you want (see "Web Publishing Made Easy," *Macworld*, August 1997).

Line-Length Decisions For best legibility, format your body text so that you have roughly 8 to 12 words per line. Specify table width using absolute pixel values rather than percentages; that way, the line endings won't change when surfers resize their browser windows.

Kill Those Borders Use the **border =0** attribute to turn off the ugly, superfluous borders that browsers normally put around each table cell.

More Control Ahead?

Now that I've told you about a few of the formatting tricks Web designers use, it's time to tell you that their days are numbered. *Cascading style sheets* (CSS) promise far more control over Web typography. I'll look at them and some other layout alternatives next month.

Why bother with formatting workarounds when real formatting alternatives are available? Compatibility. Unlike CSS, the techniques I've described here work in all current browsers and in most older versions of Navigator and Internet Explorer. And they don't cause formatting problems with browsers that don't support them. In a world where standards change faster than a politician's mind, simple tricks that work are worth their weight in gold. **m**

Contributing editor JIM HEID covers Web typography, style sheets, and more in his latest book, *HTML & Web Publishing Secrets* (IDG Books Worldwide, 1997).

Publishing Workshop

Spacing Out with Your Type: Leading and Kerning

by David Blatner

In this fast-paced world of six-second sound bites and instant oatmeal, printed materials have to get your message across quickly and with a minimum of effort on your reader's part. And because text is such an integral part of most printed matter, it can really pay to learn a little (or a lot) about typography. Two of the most commonly misunderstood and ignored elements in typography are leading, the amount of space between lines of type, and kerning, the amount of space between individual characters.

Leading

The term *leading* (rhymes with *wedding*) originally referred to strips of metal (lead) that typesetters placed between lines of type in order to space them out. Leading, or line spacing, is almost always specified in terms of the space from one baseline to the next (the baseline is the imaginary line that the text sits on): for instance, 11/15 describes 11-point type with 15 points of space from baseline to baseline.

When you read, the spaces between lines isolate the line you're reading from the lines above and below it. Each row of space guides your eyes from the end of one line to the beginning of the next. If there is too little or too much space, you get lost along the way and have to work too hard to take in the information.

Most programs automatically set leading at 120 percent of text size, so 10-point text, for example, gets 12 points of leading. Unfortunately, programs usually use the largest character in a line to set the leading, so if you enlarge one character, the leading for that line differs from that of the rest of the paragraph. The solution is to specify absolute values for leading (rather than relative or automatic values) to force the program to use the same leading throughout a paragraph.

In most desktop publishing programs, leading is a paragraph format; that is, a change in leading affects the entire paragraph. Adobe PageMaker does let you set leading on the character level; but you typically want an entire paragraph to have the same leading.

Kerning

The human eye is extremely good at recognizing breaks in a regular pattern. On encountering too much or too little space between characters within a word, the reader's eye stumbles. Kerning is the art of adjusting the space between characters in order to ensure a smooth flow of information from the text to the brain. Good kerning brings the characters within the word together into a single unit.

Fortunately, the font designer and the page-layout software take care of most kerning for you via automatic kerning pairs. For instance, a typeface may have a built-in kerning pair for the characters **Yo**, so that the **o** tucks under the arm of the **Y**. PageMaker and QuarkXPress read these

THE COLOR OF TYPE

When looking at type, it's crucial to pay attention to the *color* of a word, a line, a paragraph, or a page. When designers talk about the color of these elements, they mean the overall value of gray you see. The easiest way to see this is to squint your eyes so the page looks a bit out of focus. Every change you make to type—from selecting a font or size, to assigning leading, to fine-tuning the kerning of character pairs—alters the color of type.

Word Color Kerning is a major factor in the color of a word. In the top example below, notice how areas where spacing is inconsistent attract your eye. Kerning lets you even out the space between letters to give words consistent color. The kerned example (bottom) is easier to read quickly as a single word.

Impression
Impression

6-point Minion, 6-point leading

For more on typographical issues check out *The Mac Is Not a Typewriter* by Robin Williams (1990, Peachpit Press) and *Stop Stealing Sheep* by Erik Spiekermann and E.M. Ginger (1993, Adobe Press).

6-point Minion, 9-point leading

For more on typographical issues check out *The Mac Is Not a Typewriter* by Robin Williams (1990, Peachpit Press) and *Stop Stealing Sheep* by Erik Spiekermann and E.M. Ginger (1993, Adobe Press).

6-point Minion, 11-point leading

For more on typographical issues check out *The Mac Is Not a Typewriter* by Robin Williams (1990, Peachpit Press) and *Stop Stealing Sheep* by Erik Spiekermann and E.M. Ginger (1993, Adobe Press).

Paragraph Color Leading is a major factor in the color of a paragraph (or a page) of type. As in the examples above, you can make text appear dense (top left), medium gray (bottom left), or light (top right) simply by changing the leading to bring the lines of type closer together or push them farther apart.

kerning pairs and apply them throughout your document. (Note that many word processors ignore kerning pairs—just one more reason to use a page-layout application to get good-looking type.)

Nonetheless, you almost always have to perform manual kerning—especially for larger headline text—because the automatic kerning pairs rarely cover every pair possibility. The key is to look at each word's color (see "The Color of Type"). Is it consistent? Does your eye jump to one spot that appears too light (too much space) or too dark (too little space)? You need to remove or add space to eliminate those confusing spots.

Adjusting Automatic Kerning

If you find yourself doing *a lot* of manual kerning, it might be time to go in and change the font's automatic kerning pairs yourself. You can use software such as Macromedia's Fontographer to create your own kerning pairs within a font. Just remember that you're customizing the font, so if you move a document containing that font to another computer—say, at a service bureau—you have to send the font, too.

Or you can use QuarkXPress's built-in kern-pair editor. These kerning pairs are saved in the document itself (and in the XPress Preferences file), so they work only in QuarkXPress documents, but you don't have to worry about moving fonts around.

Just remember, while the computer can spec leading and kerning automatically, you don't have to accept these settings. Ultimately, where design is concerned, your eye is a better judge of space than your Mac. ■

DTP expert DAVID BLATNER can be reached at *david@moo.com.*

Kerning Tips

■ Characters should rarely touch each other, though if it looks better, go for it.

■ Apply varying degrees of kerning to make the best use of your time. Automatic kerning is better than none at all; apply it to everything. Adobe PageMaker's Expert Kerning plug-in applies "manual" kerning—based on character shapes and user-specified parameters—to text within a selection. It's not perfect, but it can save time and improve broad areas of text. In areas where letterspacing is most noticeable—say, headlines—it's worth your while to manually fine-tune the automatic kerning.

No kerning

In the Yellow Room

Auto kerning (using font's kern pairs)

In the Yellow Room

Manual kerning

In the Yellow Room

■ Words that are in all caps or reverse type (white letters on a dark background) need a little extra space between each character. Use tracking (sometimes called range kerning) to achieve this effect.

■ How much space does each character in a word need? It depends on the character shapes involved. Here are some general, shape-based guidelines.

Kerning Rules of Thumb

Letter Shapes	Pair Examples	How to Kern
Two verticals ▮▮	IM, li	Use standard kerning
Vertical and round ■●	HO, le	Kern in a bit
Two rounds ●●	OG, co	Kern in tightly
Hanging ▼●	We, AT	Kern in very tightly

Leading Tips

■ In general, don't let descenders (like the tail of the **y**) and ascenders (like the stem of the **h**) touch; however, in some headline text this can work.

■ Set the leading so that the space between each line is bigger than the spaces between the words to keep the reader's eye from getting lost.

7-point GillSans, 5.5-point leading

Now my charms are all o'erthrown, and what strength I have's my own, which is most faint. Now 'tis true I must be here confined by you, or sent to Naples.

7-point GillSans, 7-point leading

Now my charms are all o'erthrown, and what strength I have's my own, which is most faint. Now 'tis true I must be here confined by you, or sent to Naples.

■ The longer the line of text, the more leading you need to guide the reader's eyes.

9-point Industrial736 It BT, 9-point leading

Now my charms are all o'erthrown, and what strength I have's my own, which is most faint. Now 'tis true I must be here confined by you, or sent to Naples.

9-point Industrial736 It BT, 11-point leading

Now my charms are all o'erthrown, and what strength I have's my own, which is most faint. Now 'tis true I must be here confined by you,

■ Automatic leading can create inconsistent line spacing if all characters aren't in the same size type; specify absolute leading to force even spacing.

7-point Bembo, 12-point dingbats, auto leading

Full fathom five thy father lies, of his bones are coral made ✣ Those are pearls that were his eyes; ✣ Nothing of him that doth fade, but doth suffer a sea-change into something rich and strange. Sea-nymphs hourly ring his knell. Ding-dong.

7-point Bembo, 12-point dingbats, 9-point leading

Full fathom five thy father lies, of his bones are coral made ✣ Those are pearls that were his eyes; ✣ Nothing of him that doth fade, but doth suffer a sea-change into something rich and strange. Sea-nymphs

■ Don't be afraid to use halves or tenths of a point when specifying leading; often a minor change makes the text look just right.

■ Leading doesn't have to be greater than text size; headlines often benefit from tight leading.

24-point leading

Say
Cheese

28-point type

Graphics Workshop

Combining High-Res Line Art with Color Textures

by Cathy Abes

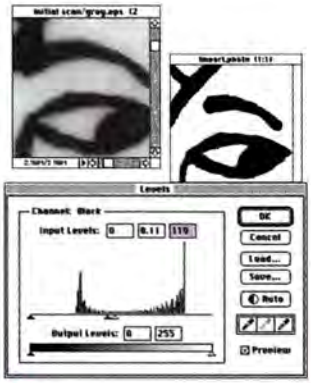
ARTIST Christopher Ching is an artist and illustrator based in New York City. His work, which combines traditional and digital media, has appeared in publications such as *Macworld*, *PC Magazine*, *Financial Executive*, and *Golf Pro*. He's currently putting together his Web site at *members.aol.com/ching416/*.

HOW IT WAS DONE Like many digital artists, Ching often combines line art with color textures. To keep the lines sharply defined, the line art should be output at a high resolution: at least 600 dpi. But working with color textures in a 600-dpi Adobe Photoshop file of, say, 4 by 6 inches would be daunting if not impossible, since the file could be as large as 50MB. And 600 dpi would be overkill for the color areas of the image, since they would reproduce just fine at 300 dpi.

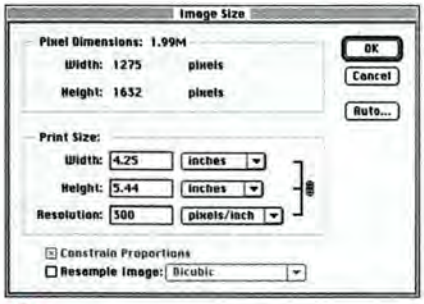
An easy way to circumvent this problem is to break the file into two parts: a high-res file for the line art and a much lower-res file for the color. To produce the composite image you place the two files one on top of the other in QuarkXPress. This technique allowed Ching to reduce file size significantly: the 600-dpi bitmapped file was 1MB, and the 300-dpi CMYK file was 10MB; by contrast, a 600-dpi CMYK file containing both line art and color would have been a whopping 41MB.

THE TOOLS **Hardware:** Power Macintosh 7100/66 with 56MB of RAM and 250MB internal hard drive; Apple 15-inch MultiScan color monitor; Mirror 750 external hard drive; Iomega Zip drive; ScanMaker IIHR flatbed scanner; Fast Mac V.34 28.8 fax modem; Epson Stylus Pro ink-jet printer. **Software:** Adobe Photoshop 4.0; QuarkXPress 3.2. **m**

1 The original sketch was scanned in grayscale mode at 600 dpi. Scanning at a higher resolution preserved the rough quality of the artist's pencil line-work on vellum.



2 Before converting the file to bitmap mode, Ching adjusted Levels to control line thickness and to boost contrast. Then he saved the line art in EPS with Transparent Whites checked This allowed the color to show through in the final image.



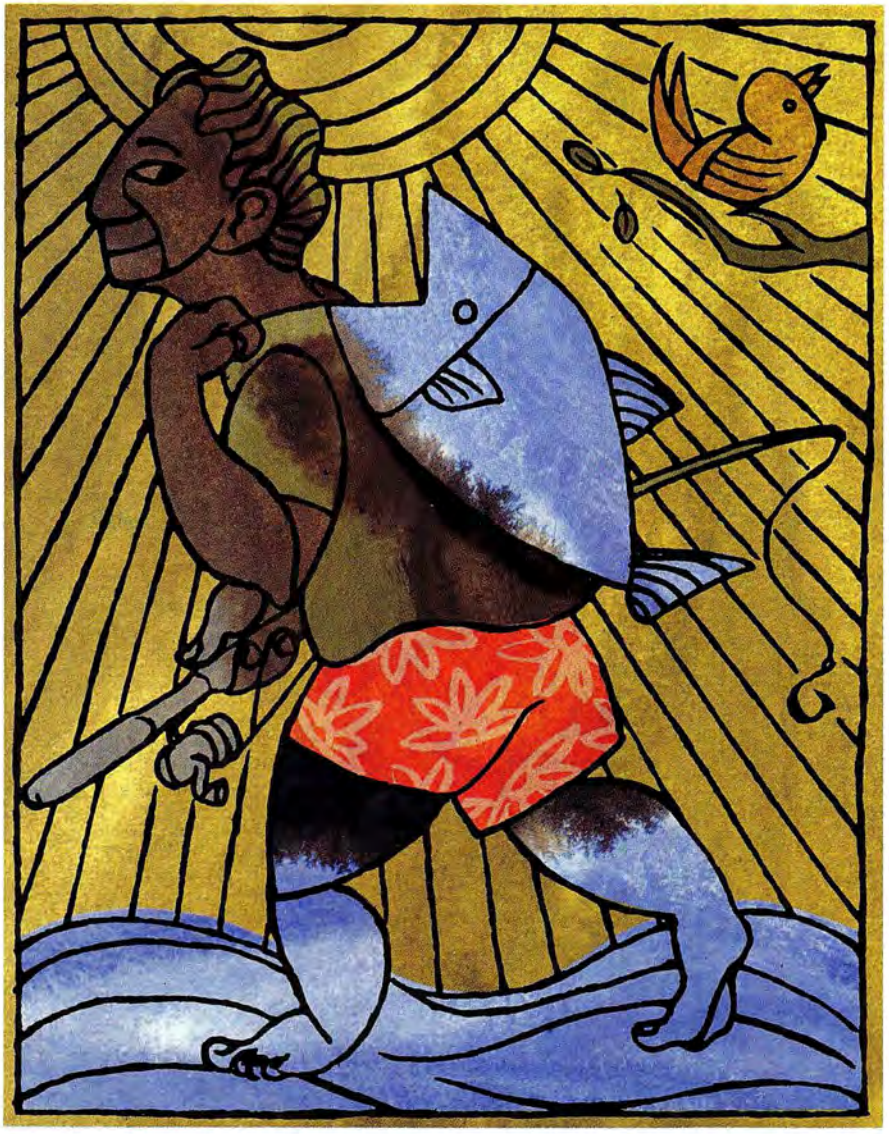
3 To create a template for filling in the color areas, he duplicated the line art, converted that to gray scale with a size ratio of 2, and halved the resolution to 300 dpi, with proportions constrained to keep the same size and dimensions as the high-resolution line art. Then he selected all, cut, switched to CMYK Colors, added a new layer with mode set to Multiply, and pasted. This gave him an empty background layer with the line-art layer above it.

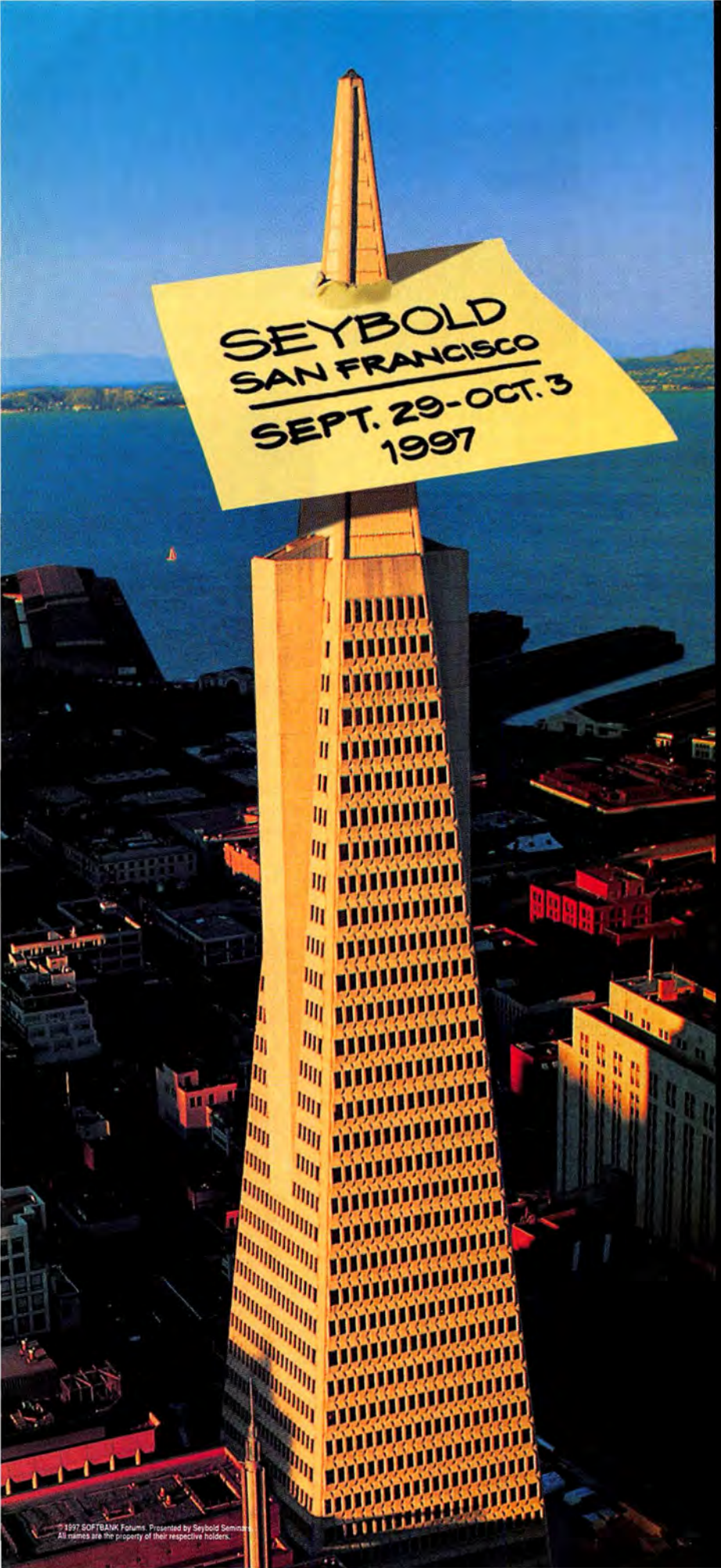
4 To define the color areas of the image—the sun, the waves, the skin, and the clothes—Ching painted watercolor textures on paper, scanned them into Photoshop at 300 dpi, and did minor color adjustments.

5 Ching pasted each color texture into a separate layer below the line-art layer. He then trimmed away the excess area using selections he made with the path tool.

6 Once he'd completed the color background areas, he deleted the line-art layer (it was there solely to act as a template) and flattened the remaining color layers.

7 In QuarkXPress, he placed the color image (setting the background of the picture box to None). Next, he chose Step and Repeat from the Item menu; he set the repeat count to 1 and both offsets to 0 (to place a duplicate box directly on top of the existing one). With the new box still highlighted, he placed the final line-art image.





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entertainment	◯	10	◯
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Any other products	◯	13	◯

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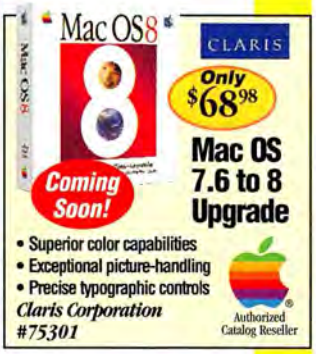

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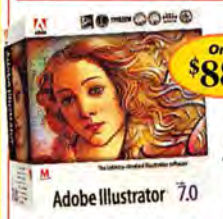

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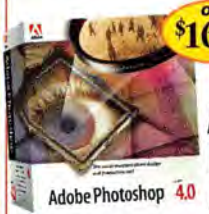

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2.1GB Tempest	QM32100TMA	11ms	Fast ATA-2 (IDE)	4500	$209	----
2.1GB Tempest	QM32150TMS	10.5ms	Ultra SCSI-3	4500	$259	$309
2.1GB Stratus	QM32160STS	10ms	Ultra SCSI-3	5400	$299	$349
3.2GB Tempest	QM33200TMA	11ms	Fast ATA-2 (IDE)	4500	$249	----
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3.8GB Tempest	QM33840TMA	11ms	Fast ATA-2 (IDE)	4500	$299	----
4.3GB Stratus	QM34320STS	10ms	Ultra SCSI-3	5400	$429	$479
4.5GB Atlas II	QM34550ALS	8ms	Ultra SCSI-3	7200	$699	$749
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4.3GB Enterprise	WDE4360W	8ms	UltraWide SCSI-3	7200	$749	$829

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4.3GB Barracuda 4LP	ST34371W	8.5ms	UltraWide SCSI-3	7200	$849	$929
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9.1GB Barracuda 9	ST19171N	8ms	Ultra SCSI-3	7200	$1399	$1449
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Description	Model	Access	Interface	RPM	Int	Ext
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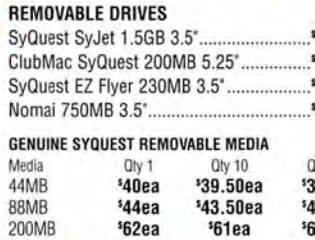

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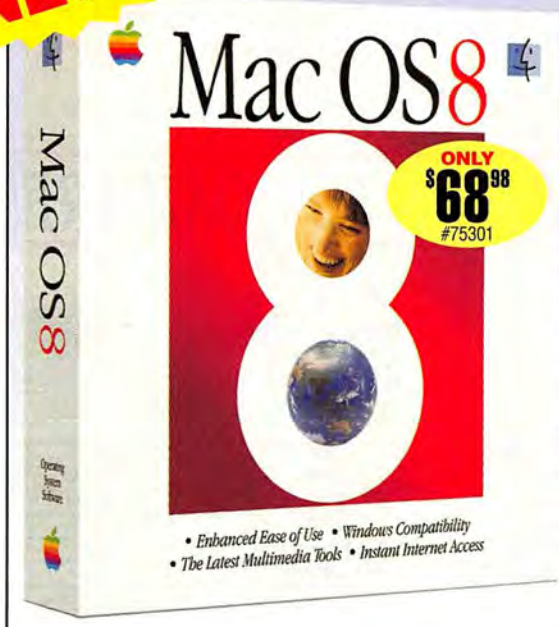

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Hard Drive	✔ 2.5GB	2GB
Internal CD-Rom	✔ 16X	12X
RAM	✔ 32MB	✔ 32MB
Cache	✔ 512K level 2	256K level 2
VRAM	✔ 2MB	✔ 2MB
Monitor	✔ 15" Philips/Magnavox display	None
FREE Software	✔ Yes ($1000)	Limited
Warranty	✔ 2 yr. limited	1 yr. limited
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Power Mac information taken from the MacWarehouse Web Site 6/19/97

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'S Q 6400	Quantum Fireball Stratus, 6236MB, 5400 rpm	579.95	649.95	679.95
'S Q 4500	Quantum Viking, 4345MB, 7200 rpm	699.95	769.95	799.95
'S Q 4300	Quantum Atlas II, 4341MB, 7200 rpm	779.95	849.95	879.95
'S ST 4300	Seagate Barracuda, 4148MB, 7200 rpm	N/A	899.95	929.95
'S ST 4500	Seagate Cheetah, 4348MB, 10000 rpm	N/A	N/A	1199.95
'S Q 9000	Quantum Atlas II, 8682MB, 7200 rpm	1299.95	1369.95	1399.95
'S ST 9000	Seagate Barracuda, 8600MB, 7200 rpm	N/A	1499.95	1529.95
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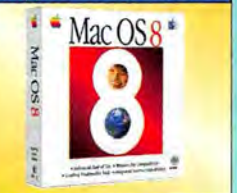

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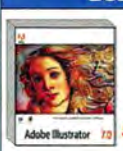

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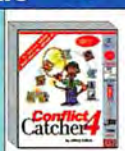

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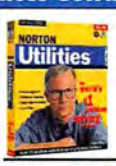

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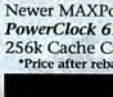

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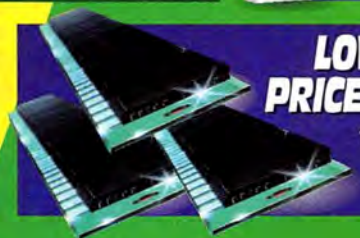

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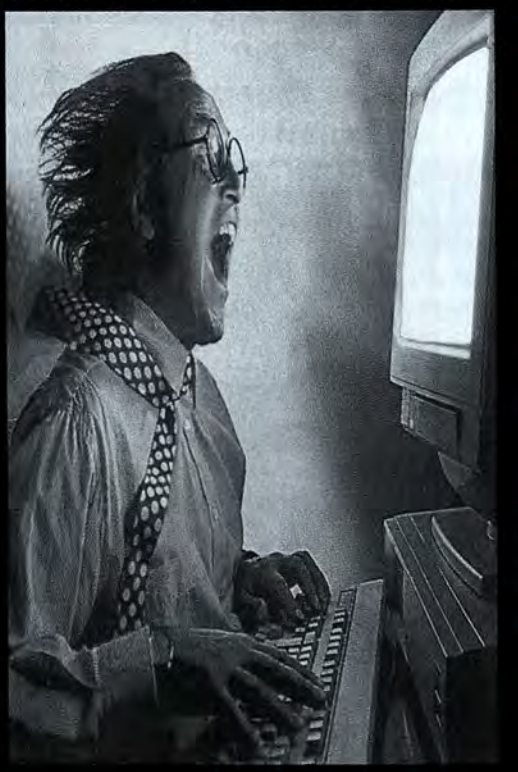

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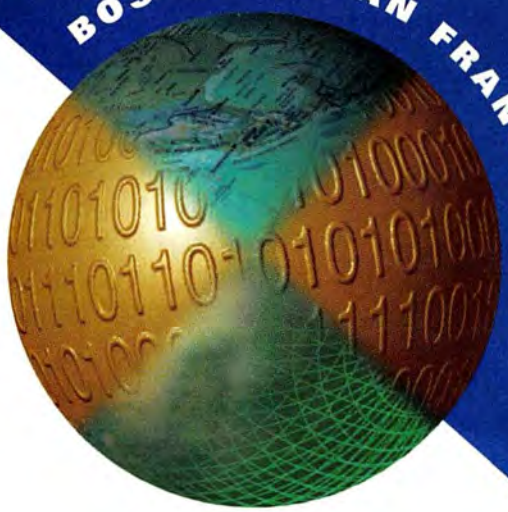

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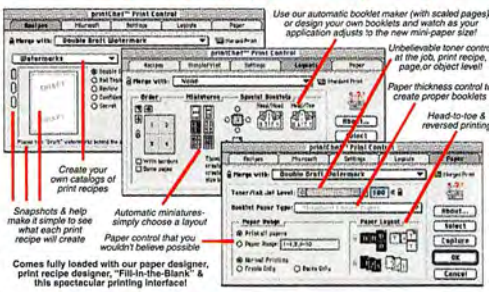

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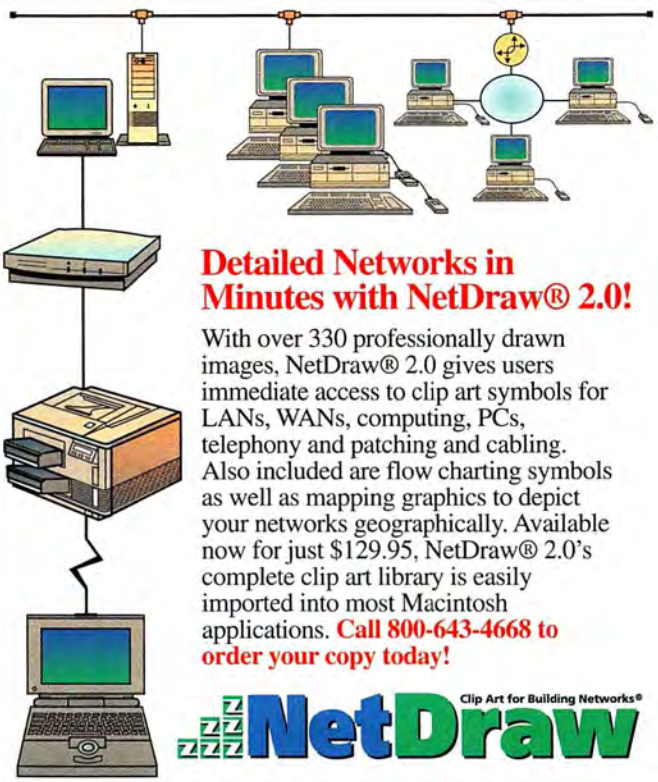

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Syquest	EZ 230 MB & Cartridge	239
Syquest	Syjet 1.5GB & Cartridge Int.	389
Syquest	Syjet 1.5GB & Cartridge Ext.	459
Syquest	Syjet 1.5GB & Cart. House Ext.	449
Fujitsu	640 MB Dynamo Int.	479
Fujitsu	640 MB Dyna. House Ext.	559
Fujitsu	640 MB Dynamo Ext.	599
Olympus	230 MB PowerMo Ext.	349
Olympus	2.8 GB PowerMo Ext.	1899
Pinn. Micro	4.8 GB Apex Ext.	1499
VST	230MB Opt. Dr. PB 5300	375
VST	640MB Opt. Dr. PB 5300	389

Keyboards/Modems

Keyboards

Apple	Design Keyboard	$ 69
Apple	Extended Keyboard II	119
Radius	Extended Keyboard	49

Modems

Farallon	Netopia (ISDN)	$ 329
Global Village	Teleport 33.6 internet	139
Global Village	Teleport 56K V.34 14.4 Fax	225
Global Village	PowerPort PC Card	219
Global Village	Platinum Pro PC Card	330
Supra	Express Modem 33.6	99
Supra	ExpressFax Modem 56K V.34	159
Supra	Express 56K Speakerphone	179
U.S. Robotics	33.6 PC Card Cellular/Ethernt	329
U.S. Robotics	Sportster 56K	189
U.S. Robotics	Sportster 33.6 internet	189

Peripherals

Cache Cards

256K	Performa 6400 Series	$ 110
256K	L2 Dimm, 7200-8500 Series	49
256K	L2 Dimm, 9500 Series	139
512K	L2 Dimm, 7200-9500 Series	129

Removable Cartridges

Syquest	200MB or 270MB	$ 25
Syquest EZ	135MB / 230MB	19/25
Iomega	Zip 100MB/JAZ 1GB	16/83
Nomai	200MB	25

Video Cards

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ATI	ExclaimVR 4mb V-card	249
IMS	Twin Turbo 4mb V-card	389
IMS	Twin Turbo 8mb V-card	549
Number 9	Imagine 128 8mb V-card	725
TrueVision	Bravado 1000 w/Premier	649

Expansion Cards/Cameras

Dos Cards

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Apple	Pentium 100mhz	825
Apple	586 100mhz	649

Ethernet Cards

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Farallon	Ethermac PCI 10BT w/BNC-T Cable	85

Processor Upgrade Card

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Epson	500 w/flash Mac Digital Camera	489
Kodak	DC 120 Digital Camera	898
Olympus	D200L Digital Camera	549
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Quantum Stratus 3.2 GB	339	399
Quantum Stratus 6.4 GB	599	659
Seagate Barracuda 2.1 GB N	539	599
Seagate Barracuda 2.1 GB W	559	659
IBM Ultrastar II 4.32 GB	559	619
Fujitsu Allegro 4.4 GB N	659	719
Fujitsu Allegro 4.4 GB W	725	820
Quantum Atlas II 4.5 GB N	759	819
Quantum Atlas II 4.5 GB W	759	859
Seagate Barracuda 4.3 GB N	765	815
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Quantum Atlas II 9.0 GB W	1299	1399
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96MB	Powerbook 3400c	969
8MB	168 Pin Dimm 60NS 5Volts	52
16MB	168 Pin Dimm 60NS 5Volts	79
32MB	168 Pin Dimm 60NS 5Volts	159
64MB	168 Pin Dimm 60NS 5Volts	299
16MB	168 Pin Dimm 60NS 3Volts	130
32MB	168 Pin Dimm 60NS 3Volts	210
64MB	168 Pin Dimm 60NS 3Volts	365

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4MB	VRam Dimm	$ 125

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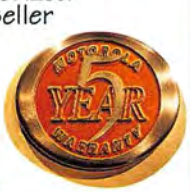

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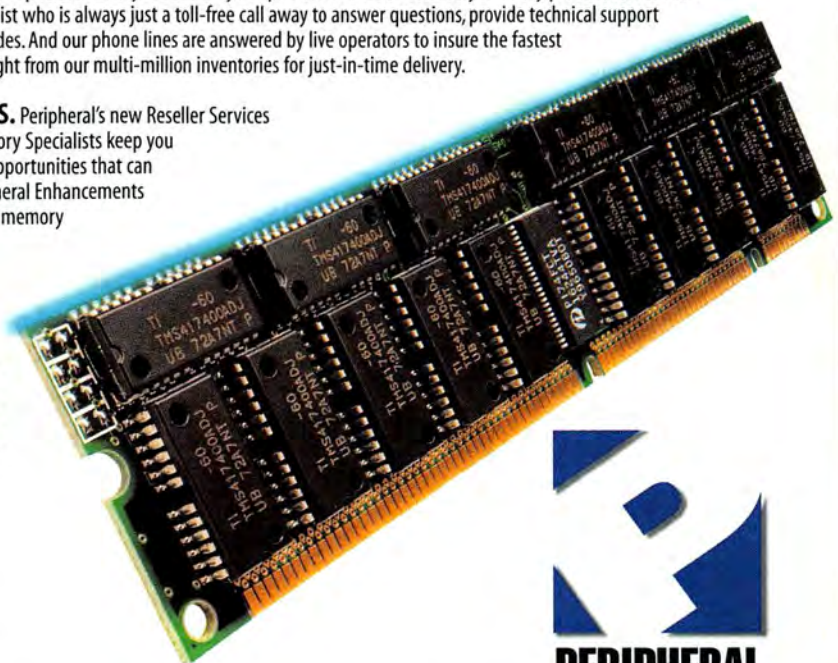

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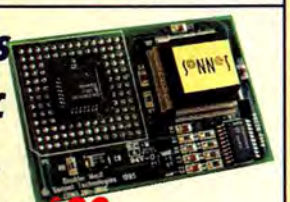

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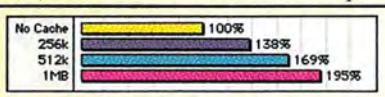

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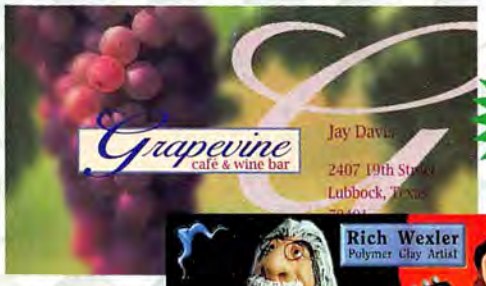

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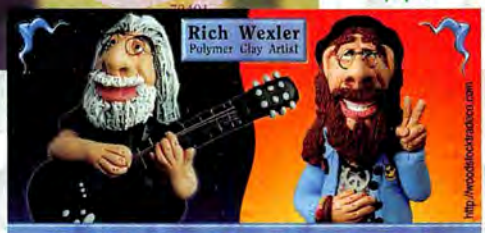

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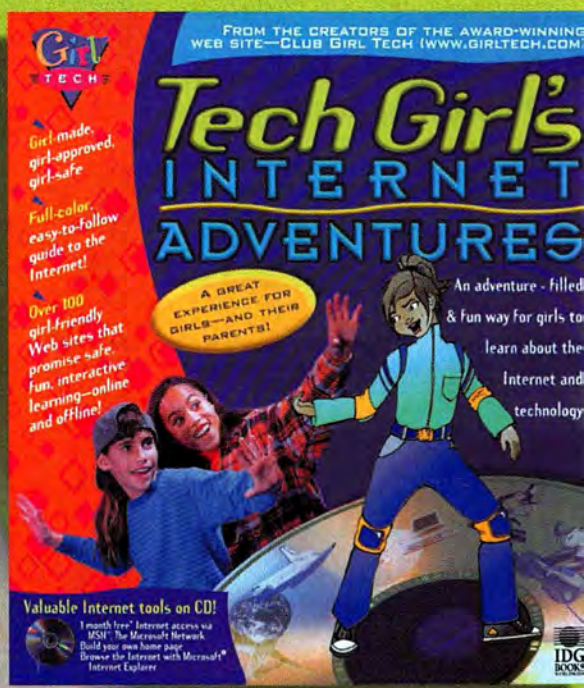

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continued from page 234

drag and drop, and a neat little clock up in your menu bar. Oh, yeah—and TeachText has a brand-new name!

Scorpio (the Bug; October 24–November 22)—We were born with a conscience for a reason, my friend, and you've been ignoring yours for far too long. You didn't register the shareware you've now been using for two years; you haven't read a Read Me First file for over a year; and you've got an AOL screen name you wouldn't want your family to know. And that copy of Adobe Photoshop? Use it for "evaluative" purposes all you want, but remember the rumor: every Photoshop document has an invisible serial number embedded in it. 'Nuff said.

Fate has a way of catching up with those who flout the great unwritten Computer Code. Don't tempt it.

Sagittarius (the Half-Mac, Half-PC; November 23–December 21)—Ever notice how everything mechanical seems to break after you take ownership? The answering machine dies, some plastic panel falls off your car dashboard, and Norton Utilities reports a "B-tree error" every time it checks your hard drive.

Don't tell me you think Netscape Navigator keeps crashing just because it's buggy! Nope, it's your aura: technology just doesn't like you. Time to start approaching your equipment with a new attitude. Consider *its* feelings for a change. Remember, computers are people, too.

Capricorn (the Billy Gates; December 22–January 20)—O long-suffering Capricorn! Thou obeyest every rule, purchasest every software upgrade, holdest down the shift key with every installation, keepest shareware and fringe technologies off thy hard drive, backest up daily, and thou *still* gettest system freezes. What giveth?

Fear not, dear Capricorn; the coming months will bring many new OS versions to your Mac. Fate will reward its loyal soldiers when the Great Day of Installation arrives.

Aquarius (the Web Surfer; January 21–February 18)—It's one thing to care about your data. It's quite another to limp along with "250K remaining" on your hard drive for two years just because you worry about throwing away some file you'll need again. How many times have you avoided cleansing your Preferences folder, wondering if you actually might need that Embedding Preferences file someday?

This is a good month for confronting your fears, buying a Zip drive for offloading all that junk, and combing through your little electronic attic. Think how much better you'll both feel.

Pisces (the Fish Screen Saver; February 19–March 20)—Sure you're emotional, but this is getting ridiculous: a Type 74 error makes you hysterical with rage and confusion. You've been spotted weeping quietly at a particularly well designed Web page. And if that hotshot at the office informs you that the Mac is dead *one more time*, they'll find him strangled with his own two-button-mouse cord.

On the one hand, maybe you should control yourself; try saying it out loud: "It's just a machine." On the other hand, stifling your emotion could be dangerous—after all, the Mac never bothers to hide *its* humanity. And isn't that what makes it great? **m**

DAVID POGUE, coauthor of *The Weird Wide Web* (IDG Books Worldwide, 1997), reads the stars regularly. Just yesterday he read that Madonna has a new hairdo.

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The Desktop Critic

by David Pogue

Your Back-Page Mac Horoscope

OUR FORTUNES, DEAR READER, ARE NOT IN OUR STARS BUT IN OURSELVES

GUESS WHAT'S ON THE back-page column of a normal magazine? Hint: It isn't Microsoft jokes, Apple musicals, or computer-industry sarcasm—it's horoscopes. So why should we, as Mac nuts, be any less interested in our fortunes? Surely our computers have ups, downs, and bad-hair days, just as people do.

Aries (the RAM Chip; March 21–April 20)—You've never been able to let the masses do your beta testing, have you? No, you're the quintessential early adopter. Your Mac history reads like a catalog of short-lived models: you bought the IIvx, sold it to buy a Mac TV, and last year got yourself a PowerBook 5300—a week before it was discontinued.

Dare I even *mention* the $750 you spent on the original Newton that now lives in the drawer with the batteries and extension cords?

But it doesn't have to be like this. This year, write it 100 times on your fridge: "I Will Not Buy Version 1.0 of Anything."

Taurus (the Dogcow; April 21–May 21)—You wouldn't know what ⌘-P stands for if it bit you on the nose. Keyboard shortcuts just aren't your thing—hey, that's what *menus* are for, right? In fact, shortcuts *period* aren't your style; you pull down menus by hand, type in your AOL password every single time you sign on, and when telling somebody a Web page address, you actually spell out that whole "H-T-T-P colon slash slash" business.

There's nothing wrong with being methodical. But watch your back: rivals are gaining on you. And they've got QuicKeys.

Gemini (the Clones; May 22–June 21)—Why don't you just throw out your printer, for goodness' sake? Everything you do or say is electronic anyway; you may as well reclaim the desk space for a couple more modems. Or spend the money you'll save on a second Internet account; sure, your first one's unlimited, but doesn't it make you all giggly to contemplate surfing two cyberspaces simultaneously?

Cancer (the Crabby Tech Support Rep; June 22–July 22)—The Cancerian Way is to protect. You've got a filter for your screen, a latex skin for your keyboard, and a surge-suppressing UPS for your power cord. You're so paranoid, you shut down your Mac just to unplug the *microphone*.

But even the best umbrella won't help when it's raining cinder blocks; as Saturn moves into Capricorn, your Mac becomes vulnerable from angles you don't suspect.

You can't protect your stuff from Life, pal, as you're about to find out. Relax and enjoy the surprise; remember, it's only plastic.

Leo (the ISDN Line; July 23–August 23)—Power User, thy name is Leo. Frankly, between your eight programmed trackball buttons, macro-tricked-out keyboard, and shareware-coated System Folder arteries, nobody but you could even operate your Mac. Man, you just *hated* it when the 250MHz PowerTower Pro came out, didn't you? It made your 225MHz look feeble. Maybe you can take consolation from your color laser printer, digital camera, and 1523 extensions.

No wonder you get 14 Mac catalogs each week; the mail-order firms are on to you. Otherwise, your feature lust is nothing to worry about. Your Mac will continue to be your faithful servant—if it starts up at all.

Virgo (the Clean Install; August 24–September 22)—It's no surprise you got into computers, really; where else can you indulge your neatness compulsion so easily? You close every window before shutting down; you'd die before you left an icon out on the desktop; and you alone among the millions actually use *labels* to color-code your folders.

It's just as much fun with your hardware, too, isn't it? Must've taken months to find those clever under-the-desk, colored cable organizers. Yes, it was a lot of effort to file your 75 CD-ROM discs into color-coded disc wallets, but it sure was satisfying. And I don't need to look in your desk drawers to know you keep your floppy disks in the little clear-plastic sleeves that everyone else throws away.

Today's tip: Better check your calendar. Isn't this mouse-ball-cleaning day?

Libra (the Shift Keys; September 23–October 23)—How *is* your SE/30 doing these days, anyway? Yeah, yeah: you're holding off on buying a new Mac until the market settles down a little. *You're* no dummy—you have no intention of watching your new Mac model superseded by newer, cheaper ones.

But I've got news for ya, Libra: you'd be amazed at how technology has marched on. They've got color now, and

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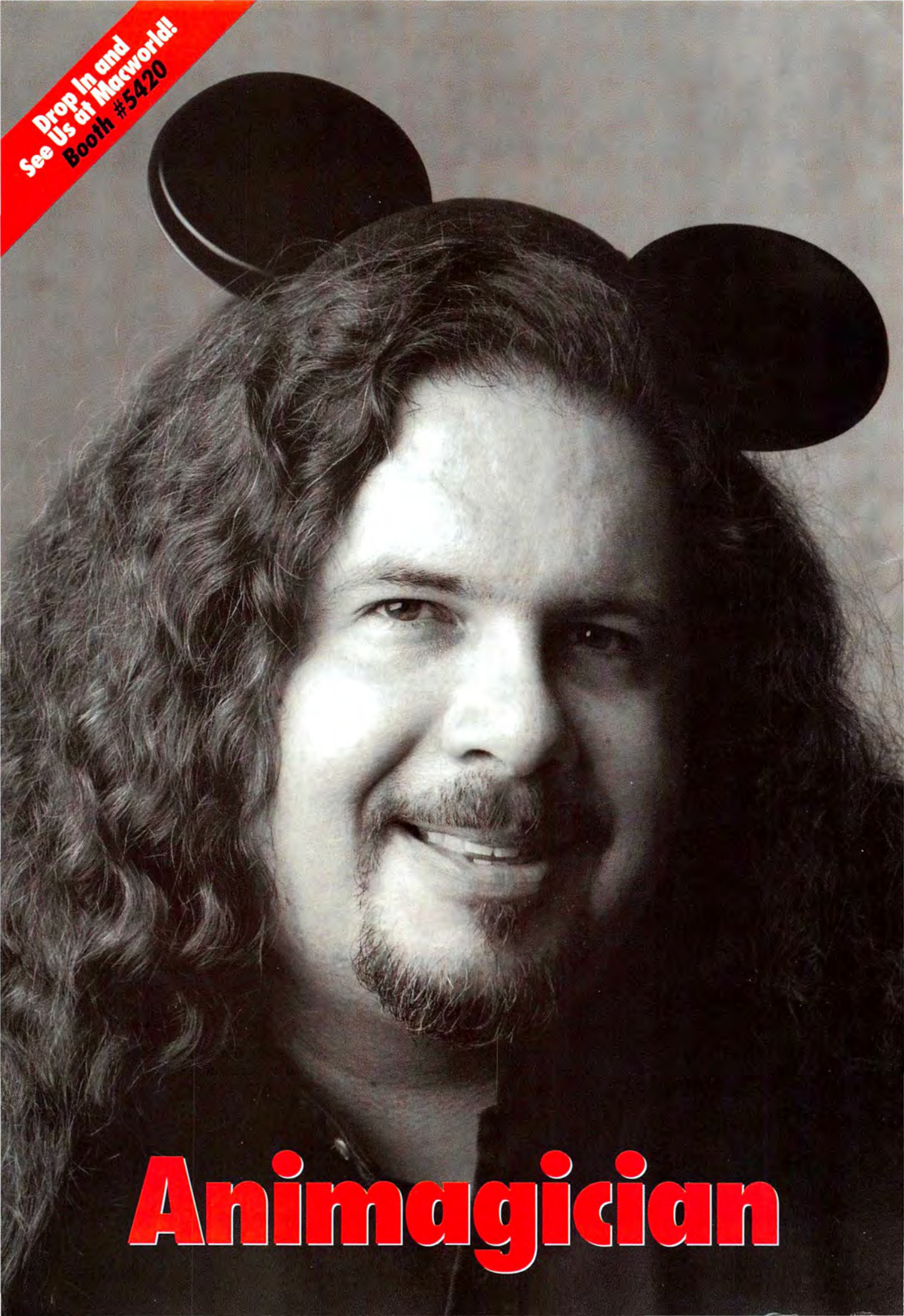
GENE GREIF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