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

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Founding Editor
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The Honeymoon Is Over

CONGRATULATIONS TO GALEN GRUMAN for an accurate assessment of the Microsoft-Apple hoax (“The Honeymoon Is Over,” Macworld Online, http://www.macworld.com/daily/daily.384.html). The legendary arrogance of both companies will surely come home to roost someday. We recently purchased and registered a 9500 and 5300c. The Mac OS twists and turns have been a nightmare.

As a disgruntled and struggling user of Microsoft's productivity suite, I have found a and continue searching for alternatives to Word and Excel. To install both applications on our computers required a grand total of 56 floppies. Enough already!

MELONY DRAKE via Macworld Online

Even More Best Web Sites

I CAME ACROSS THE POWER COMPUTING site mentioned in “The Best Mac Web Sites” (August 1996)—the one that allows you to build your dream system and check out the price tag—but when I tried the URL given, I found myself on the Web page of Australia's largest distributor of IBM computers! I hope that wasn't a Freudian slip.

DOUG KORWIN via Macworld Online

Maybe that's why Power Computing was so eager for Macworld editors to grunge jump at the Boston Macworld Expo... now. That URL should've been http://www.powerce.com.—Ed.

IN “THE BEST MAC WEBSITES,” HOWARD BALDWIN writes: “Like the ocean, the Web is a vast and murky place. Diving in randomly, you're just as likely to discover a clear, clean Macintosh site as a clunky site posted by a 14-year-old fan of Smashing Pumpkins.” What exactly does he mean by that? I am a 14-year-old, and a fan of The Smashing Pumpkins. Does this mean for some reason that I am not organized or computer literate? Just because I am not a pocket-protectors-clad math whiz doesn't mean I don't know anything about computers, the Internet, and the World Wide Web. I read Macworld and can program in C and Pascal. I also listen to Nirvana and play electric guitar. Baldwin could have made his point just as well if he had said “a clunky site with pictures that didn't load and missing links” instead of resorting to the use of a cheap stereotype.

M. WEYANDT via the Internet

As a pocket-protector-clad math whiz, might I ask what you meant by that?—Ed.

Don't Forget 1's and 1's

OUR FRIEND DAVID BLATNER STRIKES again (Publishing Workshop, August 1996). His short, to-the-point column should be required reading for all computer users. As an instructional technologist, getting my students to use indents instead of tabs is my most difficult task. Now, if I could only get those boys and girls to stop using double spaces after periods, I'd have it made.

ALAN APPLEGATE Littleton, Colorado

Names We Love to Hate

KUDOS TO DAVID POGUE FOR HIS TERRIFIC, funny article on product naming and numbering. He left out two of the most blatant naming-protocol violations, however: HoTMetaL Pro and—the absolute worst product name ever—theFONDler. Ugh!

RAUL REGALADO via America Online

I GOT A GOOD LAUGH OUT OF DAVID Pogue's column about product names, particularly his comments on the arbi...
LETTERS

CORRECTIONS

• The phone number for Power Computing ("High-Performance Systems," Reviews, October 1996) is 512/388-6868.
• The phone number for STF Technologies ("Faxstar 3.2," Reviews, October 1996) is 816/463-1412.
• DayStar Digital's phone number is 770/967-2077 ("The New Speed Champs," July 1996).
• Inmedia will require QuarkXPress 3.32 or later to run (News, August 1996).
• The Practical Peripherals MacClass 288 V34 PC Card modem has a five-year warranty ("PC Card Modems," July 1996).
• The Editors' Choice box in "Best Buys in Optical Drives" (October 1996) for the 2.6GB Optical Drive is as follows:

OPTICAL DRIVES

For optical drives, we looked for the best mix of price/performance, clear documentation, useful bundled software, and good overall design.

2.6GB Optical Drive


THOUGH WE ARE GRATIFIED THAT Macworld has finally taken some notice of our CD-ROM work of art, Scrutiny in the Great Round, it was curious to find it on a list of the five worst Mac product names (The Desktop Critic, August 1996). David Pogue complains that you'd never be able to tell from the title that this is a CD-ROM, that the title "not only conveys no information, but implies a double entendre." Would anyone be able to tell solely from its title that Hard Drive is not a piece of equipment, not a porno flick, but a book by one David Pogue? Scrutiny in the Great Round is the name not of a software tool but of a work of the imagination. Since when has it been customary for works of art to have utilitarian, marketing-driven titles? What information is conveyed by such titles as As You Like It, Moby-Dick, or "Let It Be"?

My partner explains the meanings it has for her in a biographical video that our publisher, Calliope Media, went out of its way to include on the disc. It is intentionally a multiple entendre, referencing the womb, the passing of seasons, cycles of life and death, the eye, mandalas, and more, associations that become clearer the more time you spend with the disc.

JIM GASPERINI
New York, New York

Another Year, Another Expo

WHAT ARE THE DATES OF THE Macworld Expo in San Francisco in January 1997?

GARY WEBB
Belleveu, Washington

We just got back from the last Expo and you want us to think about the next one in '97? Man, if you must think about it now, the 1997 Macworld Expo in San Francisco will run January 7 through 10. For more information, call Mitch Hall Associates at 617/361-8000.—Ed.

Mac or Windows or Both?

NO, THIS CAN'T BE RIGHT! DO I HAVE to buy an IBM? All I want to do is take a Director movie that I make on a Macintosh, make a projector out of it, and press it onto a CD for playback on both platforms. Do I really need an

TRARY USE OF UPPER- AND LOWERCASE LETTERS IN PRODUCT NAMES. IMAGINE MY SURPRISE WHEN I TURNED THE PAGE AND SAW AN ENTIRE ARTICLE ON "AutoDesk"!

AMELIE VON FLUGEGGE, AUTODESK
San Rafael, California

DAVID POGUE FORGOT THE MOST COMMONLY MADE INTERCAP MISTAKE: MACINTOSH.

HEATH HANLIN
via Macworld Online

SO YOU DON'T LIKE THE NAME WOW for CompuServe's new service? Since the service includes censoring of content, maybe the name is appropriate. Upside down it's MOM.

TOM KELLER
via CompuServe

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LETTERS

IBM and a Macintosht version of Director? What about hybrid CDs?
I haven’t purchased my new system yet. I was going to get a Mac, but if I need to buy two copies of Director and two different machines in order to produce cross-platform CD-ROMs, forget it. Is there anything I can do, or do I have to buy an IBM and forget about the Macintosh platform altogether?

Well, you could always buy a Mac and forget altogether about the PC platform. . .

Jim Heid, Macworld’s multimedia expert, responds: If you want to create Windows titles with Macromedia Director, you must indeed buy a Windows machine and the Windows version of Director. You can develop Windows titles using the Mac versions of Apple Media Tool and Metropolis’s mFactory—but it’s still a good idea to have a Windows machine on hand to test your project as it comes together.

As for just buying a Windows machine and forgetting about the Mac platform, that’s certainly an option, although it’s one that will cost you in sales. Macintosh owners are more likely to buy CD-ROMs than are people on the Windows side, where installation and compatibility hassles are common.

Multimedia Notes

In your recent article about QuickDraw 3D (“The Mac’s 3-D Edge,” August 1996), you neglected to mention the QuickDraw 3D Web site at http://quickdraw3d.apple.com. This site lists scores of vendors that support QD3D and provides about 20 demo applications for QD3D. It also talks about future plans for Windows, integration with QuickTime, and the relationship to VRML 2.0, and even has a gallery of QD3D work for people to contribute to.

Tony DeYoung
via the Internet

The Mac Isn’t Fine without CAD

Charles Seiter incorrectly concludes that “Mac CAD Does Fine without AutoCAD” (News, August 1996) by simply ignoring the mechanical CAD application and basing his conclusion on interviews with design firms that use the Mac for CAD. The reality is that large architectural firms are standardizing on Windows 95 and NT operating systems. Lack of the latest AutoCAD version on the Mac only serves as further justification for their OS strategy.

Apple and the Macintosh CAD developer community deserve to compete on a level field when it comes to selecting a platform. When the leading CAD product is not available, Mac faces an uphill battle. There is certainly need for concern.

Neil Kleinman
Tucson, California

Reminds Me of Paul Simon

I read your review of the Kodak Digital Science DC50 Zoom Camera (Reviews, July 1996), and I would like to know: Is that really a white alligator? Where is it? What’s the person in the background doing?

Tim Bogar
Lansing, Michigan

The photo is from the Denver Zoo, but Antoine Le Blanc is currently vacationing at the San Francisco Zoo before he heads home to New Orleans. We think he likes the foggy summertime weather.—Ed. ♦

Letters should be sent to Letters, Macworld, 501 Second St., San Francisco, CA 94107; via fax, 415/442-0766; or electronically to CompuServe (#70370,702), MCI Mail (294-8078), America Online (keyword Macworld), AppleLink (Macworld), or via the Internet (letters@macworld.com). Include return address and daytime phone number. Due to the high volume of mail received, we can’t respond personally to each letter. We reserve the right to edit all letters. All published letters become the property of Macworld.
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Mark Hall
Editor in Chief
Macweek
July 24, 1995

"Canvas 5, what a product! Image editing, page layout, presentation and tech illustration wrapped into one easy to use interface. This is the true Swiss Army Knife of any graphics applications out there. Deneba has done everything the graphics community has asked for."
Keith Bancroft
Director of Computing
Cornell University
August, 1995

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State of the Mac
by Adrian Mello

New Road Ahead for the Macintosh

RECENT DEVELOPMENTS ARE CHANGING THE MAC LANDSCAPE

The Mac market has been pretty sleepy since the Worldwide Developers Conference in early May. No major announcements from Apple other than continued changes in the executive team and the absence of PowerBooks; no major product announcements outside of Apple, either. The entire Mac world has seemed to be in sleep mode.

Suddenly, though, things are getting interesting. Events have occurred that will permanently change the Mac landscape and lead to significant new product developments. As I see it, these events fall into a few important areas: computers, system software, and media and graphics. This overview will help put them into context. When you're ready for more, dive into this month's special report, “OS Essentials.”

The Bit-by-Bit OS
The biggest development is Apple's system-software upgrade schedule. Apple will no longer provide a single major release of its operating system, but will instead offer a series of updates every six months. What used to be code names for full-integer system releases—Copland and Gershwin—now refer only to collections of the technology well Apple will draw upon to incrementally release new system functionality (see "Mac OS 8: Back to Square One," this issue).

According to Ellen Hancock, Apple's new vice president of research and development, chief technology officer, and the principal architect of the new policy, Apple is considering a subscription pricing scheme. We may have to buy system releases incorporating major new features, though not releases for collections of bug-fixes and minor enhancements.

Hancock acknowledged that Apple must keep its developers apprised so that they can make product and marketing plans that take advantage of advances in the Mac OS. And Hancock says she's committed to Apple's doing just that.

While Apple has a new course for the Mac OS, OpenDoc is picking up steam. At Macworld Expo, Apple introduced version 1.1 of its component technology, and 16 companies introduced new OpenDoc parts—now called Live Objects—and containers (still called containers). Apple will make sure OpenDoc works with both Windows and Java so developers will be more likely to support it (see “OS Essentials: OpenDoc Finally Gets Tangible,” this issue).

The good news is that you can use a variety of parts and get a real feel for the technology. See what it's like to add features to the application without the memory and storage overhead you've come to expect from monolithic applications like Word 6. It's also good news to a new class of developers who have interesting ideas for adding value to existing applications.

Blazingly Fast Computers
A slew of new computers were announced at and around Macworld Expo—not just from Apple, but clones as well. The biggest trend is speed. Faster PowerPC chips are enabling computer makers to ratchet up performance significantly.

The brightest lightning flashes came from Power Computing's new high-speed PowerTower Pro series in 180MHz, 200MHz, and 225MHz versions. With real lightning, if you count the seconds to the thunderclap, you can predict how far away the storm is. In Power's case, count on a few miles: the higher-speed 200MHz and 225MHz versions aren't available yet (see “Systems Watch,” News, this issue).

Apple has bumped up the speed of several of its models. You can now buy a 200MHz version of the 9500 as well as a version with two 80MHz processors. This first dual-processor Mac uses DayStar's nPower 360+ card; the card will also be available for other Apple, Power Computing, and Umax SuperMac models.

IBM, Motorola, and Apple announced plans for faster versions of the PowerPC microprocessor code-named the G3 and G4 series. The current 603e and 604c will eventually attain speeds above 300MHz. The G3's, available in 1997, will be even faster. The G4's, planned for 1998, will be faster yet, clocking speeds up to 500MHz (see "Blindingly Fast Chips," News, this issue).

News for the Value-Conscious
Several computers were announced that offer more performance at a better price. Apple's new Performa 6400 is faster than most previous Power Macs, and starts around $2400 (see Reviews, this issue).

Power Computing's PowerBase series is based on the fast 603e PowerPC chip and should be available as you read this for roughly $1500 to $2200. Umax's continues...
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Circle 5 on reader service card
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<th>MAG InnoVision® DX15T</th>
<th>Sony Multiscan® 15sfl II</th>
<th>NEC MultiSync® E15</th>
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4:45 PM  Sending my 48 meg file to be printed. Color calibrating? Three clicks, all done. Traps and overprints? They all showed up. Revisions? OK, so I’m a little obsessive. The comp? It actually matches the screen.

5:00 PM  What’s next? I’m out of here.

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CHRP Moves Closer to Reality
APPLE, MOTOROLA, AND IBM SHOW OFF PROTOTYPE SYSTEMS
by Galen Gruman

Long promised but now closer to reality: at the recent Macworld Expo, IBM and Motorola demonstrated their respective systems to run both the Mac OS and Windows NT. And Apple demonstrated a working prototype of a Common Hardware Reference Platform (CHRP) system that ran the Macintosh OS and included PC-style parallel, serial, and infrared ports running, respectively, a standard PC parallel printer, a PS/2 serial mouse, and an infrared serial keyboard.

One System, Two OSs Motorola displayed its Viper motherboard, which it will use in forthcoming CHRP Mac and Windows NT systems and sell to other systems makers. Viper has ADB, PS/2 serial, EIDE, and SCSI-2 ports, so it can handle both Mac and PC peripherals. IBM showed off its similar Long Trail motherboard.

IBM and Motorola both demonstrated how their CHRP motherboards let users switch between the Macintosh OS and Windows NT. When you start up (or restart), you get a screen with buttons for Windows NT and the Mac OS; the screen and its buttons are part of the Open Firmware ROM that the CHRP specification uses.

Both companies touted the new release of Windows NT 4.0 for PowerPC, which they demonstrated running Microsoft Excel. Then they rebooted their CHRP systems to run Fractal Design Painter under the Mac OS.

Apple's Mac Focus Apple's prototype system, code-named Opus, is not a dual-boot system; instead, it is a Mac-specific system based on CHRP. Apple's engineering manager for CHRP, Mike Bell, said that today's Mac programs would run unmodified on a CHRP-based Mac. To prove it he ran ClarisWorks 4.0, loading the communications component, and demonstrated that the communications dialog box shows two new ports—the PC's standard COM1 and COM2—in addition to the Mac's standard Modem Port and Printer Port.

Bell said the January update to System 7.5, code-named Harmony, should run fine on CHRP Macs as well, since the changes to support...
Brave New Driver
LASERWRITER 8.4 OFFERS A NEW INTERFACE, ONE-PASS PRINTING
by Anita Epler

Users of LaserWriter 8.4 will immediately notice a dramatic new look in Apple’s (408/996-1010, http://www.info.apple.com) latest printer driver. But its enhancements are more than simply cosmetic.

When LaserWriter 8.0 debuted, it didn’t take long for Apple customers to cry foul over the so-called innovation of two-pass background printing. Unlike older versions of Apple’s printer driver, LaserWriter 8.0 first spooled print jobs to your hard drive, then streamed the data to the printer as a second step. This reduced the time required to return control to the application, but you needed twice the hard drive space to spool files in this fashion. In environments where file sizes are measured in hundreds of megabytes, such as service bureaus, this was no small sacrifice. Most shops opted to turn background printing off to avoid the disk crunch.

LaserWriter 8.4’s biggest news is the elimination of this two-pass method. In addition, nearly all of the driver has been converted to PowerPC-native code. But you probably won’t see major improvements in overall speed, despite predictions of Apple engineers at May’s Worldwide Developer Conference, who promised performance boosts of 25 to 35 percent over previous versions.

Apple’s claims are now more modest. “We’ve seen that LaserWriter 8.4 provides different results based on different test suites,” says Ken Feehan, Apple’s product line manager for laser printers. “The more complex a document is, the more likely people are to see the benefits of native code.”

The new driver also features an enhanced user interface that allows you to switch between like devices (for example, from one monochrome laser to another) within the dialog box, without having to cancel your print job and go to the Chooser. Other improvements include the ability to set layout options (such as 2-up or 4-up printing) within the Print dialog, and the relocation of printer- and application-specific options to their own screens, accessible via a drop-down menu in the Print dialog’s main window.

LaserWriter 8.4 also requires that you adopt Apple’s new desktop-printer scheme for managing output devices; the old PrintMonitor is gone. However, thanks to LaserWriter 8.4’s companion software, Desktop Printing 2.0, desktop printers can now reside in any folder, not just on the desktop.

LaserWriter 8.4, currently shipping only with the LaserWriter 12/640 PS (see Reviews, October 1996), is available for download from Apple (http://www.info.apple.com/swupdates/). Feehan won’t comment on when the new driver will be available for mass distribution, but says it will likely be sometime in the fall.

Workstation Graphics on the Desktop
NEW MAC APPLICATIONS EMERGE AT SIGGRAPH
by Cathy Abes

This year’s Siggraph conference in New Orleans was dominated by the usual developers of Silicon Graphics products, along with Microsoft pushing Windows NT as the high-end graphics platform. Still, a number of Macintosh products were shown, ranging from 3-D modeling, rendering, and animation to video painting and compositing to virtual reality applications.

Powerful Rendering and Animation LightWave 3D 5.0, from NewTek (913/228-8000, http://www.newtek.com), is finally coming to the Power Mac. The $1495 package, slated for October release, offers broadcast-quality modeling, rendering, and animation capabilities and will support QuickDraw 3D for viewing changes to graphic objects in real time. Macintosh users will have access to such professional-level features as full ray tracing, depth of field, motion blur, and variable lens settings. Other new features include MetaNURBS, which allows real-time transformations between polygons and splines to create organic 3-D objects, and MetaBalls, which uses spheres to approximate complex shapes and transform the rough shapes into complex 3-D objects.

Also migrating from Silicon Graphics workstations—and supporting QuickDraw 3D—is Vertigo 3D, from Vertigo Technology (604/684-2113, http://www.vertigo3D.com). Designed to ease the transition from 2-D to 3-D graphics, Vertigo incorporates Pixar’s RenderMan renderer. Through its use of the QuickDraw 3D plug-in rendering architecture, it will also support other rendering packages such as LightWorks (see below). Fea-

Alps joins Scanner, Printer
SMEAR-PROOF PRINTS AND METALLIC INKS

Alps Electric (408/432-6000, http://www.alpsusa.com) is planning to release the $699 MD-4000 Color Printer/Scanner. The “MD” in MD-4000 stands for Micro Dry Inks, which promise printing that is sun- and waterproof on any kind of paper. The inks come in metallic gold and silver, as well as the usual blue, red, yellow, and black. The MD-4000 also functions as a 24-bit scanner and handles images up to 8 by 11 inches.

The 600-dpi QuickDraw printer was expected to ship by the end of October. A model without a scanner, the MD-2010, should already be available for $499.—Suzanne Courteau
tions include Phong-shaded previews, deformation lattices, effectors (plug-ins that generate effects such as waves, wind, and noise), hierarchical keyframing, and animatable shaders. You can drag and drop objects into a scene, change an object’s contours by dragging any control point, and even drag shaders onto effectors.

You can drag and drop objects into a scene, change an object’s contours by dragging any control point, and even drag shaders onto effectors. Vertigo’s Orbit window lets you move or rotate an object by moving the cursor around the window. For $800, you get a Mac-based program that can exchange data with—and has all the functionality of—its $3000 Silicon Graphics sibling, while the company promises the next Mac version will have more. Future features will include capabilities such as moving text along a path, rotating text, changing letterspacing, and mapping text around an ellipse.

LightWorks, from LightWork Design (441 114 266 8404, http://www.lightwork.com), is a photo-realistic renderer tool kit that’s currently available only to other developers of 3-D software.

However, the company is working with Apple to package LightWorks as a plug-in renderer for QuickDraw 3D 1.5 (a release date is still to be determined).

**Video and 3-D Painting**

Illuminaire, from Denim Software (310/618-9700), is actually two programs, Illuminaire Paint and Illuminaire Composition, that can be bought separately ($795 each) or together ($1395). The former, an object-based painting application, provides more than 30 draw modes, including smooth, blur, emboss, dodge/burn, tint, and posterize. You can change the order in which paint strokes and filters are applied to produce different results. Illuminaire Composition offers 3-D compositing of film clips and still images. Both packages support Adobe Photoshop and After Effects plug-ins.

**Version 1.5 of MeshPaint 3D**, from Positron (402/365-1002, http://www.3dgraphics.com), allows animators to create texture maps by painting directly on 3-D surfaces. New features in the $600 package include VRML support, a clone tool, and a Chroma-Stripper mode for removing color as you paint. VRCreator, from VReam (312/477-0425, http://www.vream.com), is a virtual reality authoring tool that supports VRML and Java to let you create interactive virtual worlds on the Web.

For accelerated rendering, GreenICE, from ICE (617/768-2300, http://www.icei.com), combines a Mac with an ICE 16-processor rendering engine. The product’s pricing begins at less than $15,000; the system is due by year’s end.

The Thunder 3D graphics card, from Radius (408/541-6100, http://www.radius.com), is designed to accelerate QuickDraw 3D applications and increase frame-rate performance; it supports enhanced resolutions and a 30-bit color palette. Prices begin at $4499.

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### ISDN for PowerBooks

**SCI Offers PCMCIA Card**

If you’re on the road and a 28.8-Kbps modem doesn’t cut it for your file-transmission needs, consider ExpressSO PCMCIA, a $495 ISDN card from SCI Telecom (813/562-5971, http://www.sctelecom.com) that works with Apple Computer’s PowerBook. The card supports ISDN Basic access, consisting of two B channels at 64 Kbps plus a D channel at 16 Kbps. Mac PPP and TCP drivers are included. Of course, you’ll also need an ISDN connection from the local telephone company.

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### Umax Pulls Ahead of Power Computing

**MW LAB**

**Umax Pulls Ahead of Power Computing**

Armed with the latest and fastest PowerPC 604e 250MHz CPU, the prototype Umax SuperMac 5900 601/250 was able to outperform Power Tower Pro despite having a smaller cache (512K versus 1MB). However, the 225MHz version of the SuperMac 5900 was slower than the 250MHz PowerTower Pro. Expect to see 250MHz 604e-based systems from Power Computing and DayStar this fall. For details on our tests, see “The New Speed Champs,” July 1996—MacWorld lab testing supervised by Mark Hurlow.

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*Prototype system.*

Indicates typical performance in a mixed-use environment, such as at a company or school. Indicates performance for most business and personal tasks. Indicates performance for analytical, 3-D, and other specialized uses. Indicates performance of the Mac’s data-transfer capability, which affects all users.

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### Is There Life after JPEG?

**Vendors Promote Wavelet Compression as New Standard**

by Stephen Beale

JPEG has always been an imperfect solution for compressing still color images. Established as an accredited industry standard by the International Standards Organization (ISO), JPEG uses a lossy compression algorithm in which small amounts of data are thrown away as part of the compression process. The more you compress the image, the more data gets thrown out, eventually resulting in artifacts and lost detail. Nevertheless, JPEG has become the dominant format for still-image compression. It’s built into QuickTime and Adobe Photoshop, and is a popular format for displaying images on the Web.

Several vendors are now...
promoting alternative compression schemes as potential replacements for the discrete cosine transform (DCT) technology currently used in JPEG. Most are based on a technology known as wavelet scalar quantization (WSQ), originally developed at Los Alamos National Laboratory for the FBI as a method of storing and transmitting fingerprint data.

Like DCT, WSQ is a lossy technique, but there’s generally less of a trade-off between the compression ratio and image detail. Wavelet vendors say you can squeeze the picture about twice as much as with JPEG to get the same level of quality.

Two companies offering Mac-based wavelet-compression products are LizardTech (206/728-8120, http://www.lizardtech.com) and Aware (617/276-4000, http://www.aware.com). Both vendors have connections to the original WSQ development effort: Aware’s technology is a direct implementation of the FBI fingerprint standard, while LizardTech’s software was written by the same programmers who created the original WSQ algorithms.

LizardTech plans to offer wavelet compression through a product called MrSID, which is primarily targeted at the geographic information systems market. The company claims that you can compress a color image at ratios up to 100:1 with no discernible loss of quality. The software has three components: a compiler-compressor, a distributed image-database server, and a viewer-decompressor. A Netscape plug-in version of the viewer is currently available from the LizardTech Web site, which also includes sample compressed images. Pricing for MrSID itself has not been announced.

Aware’s technology is implemented in the form of AccuPress, a $395 Photoshop plug-in that was introduced last February. You can compress the image at any ratio between 4:1 and 150:1 using Photoshop’s Save As function. The package also includes a viewer that allows you to read AccuPress images. Like LizardTech, Aware plans to offer a free version of the viewer as a Netscape plug-in.

The primary obstacle to acceptance of wavelet compression is a lack of standards: images compressed with one vendor’s product cannot be decompressed with software from competing companies.

None of the wavelet vendors is big enough to establish its technology as a de facto standard, leaving them with two choices: get a major vendor like Apple or Adobe Systems to endorse their format, or get a standard-setting body such as the ISO to establish wavelets as an accredited industry standard.

Greg Gilley, director of engineering for imaging and video for Adobe, says that any WSQ implementation would have to be in the public domain—if not actually accredited—for Adobe to adopt it. There would also have to be widely available tools for working with the format. However, he sees WSQ as the most likely successor to JPEG, and expects the technology will be adopted more widely in the next year or so.
Adobe Rebuilds Graphics Powerhouses

UNVEILS MAKEOVERS FOR PAGEMAKER, PHOTOSHOP, AND PERSUASION

The latest versions of Photoshop, PageMaker, and Persuasion feature new interfaces and offer enhanced Internet publishing features. But will they help Adobe maintain its dominant position in the Mac graphics market? *Macworld* answers the question in this special report.

PageMaker 6.5 Goes for the Jugular

Just a year ago, Adobe Systems (206/622-5500, http://www.adobe.com) brought us PageMaker 6.0, boasting of color-management and master-page features meant to attack QuarkXPress on its own turf. Now Adobe has turned up the heat, adopting a key QuarkXPress layout approach—the use of boxes to hold text and graphics for structure layouts. PageMaker, acquired from other companies—share similar approaches and interfaces. That means PageMaker gets the tabbed palettes of Photoshop 3.0 and the ability to have multiple layers on a page—the electronic equivalent of paper overlays.

The multiple layers allow PageMaker users to create documents that contain multiple versions—you might have a layer for text in different languages, for example, or separate layers for Web and print graphics. By selecting the layers for output, you create a version of the document for a specific medium or reader. This is the kind of feature whose power will not be obvious to you at first but over time will become a must-have.

New Plug-in Scheme

Another significant interface change is in how plug-ins, formerly called Additions, are managed. Plug-ins are no longer confined to a menu list, so developers can now create them so they reside in any menu, dialog box, or palette—just as QuarkXPress’s XTensions can. This means you’ll be able to access added functionality where you’d expect to use it.

While competitor Quark has focused on creating an XPress add-on called Immedia to produce multimedia documents (see “Immedia Makes QuarkXPress Interactive,” News, August 1996), Adobe has extended PageMaker to the Web. The previous version had rudimentary HTML export, but the new version really aims at the Web.

The HTML export now handles most HTML 3.2 features, including frames. And PageMaker now automatically converts graphics to JPEG and GIF formats when exporting for the Web. You can also create hyperlinks in your document, including those to URLs.

A year ago, I thought PageMaker 6.0 was a necessary but not awe-inspiring upgrade. This year, Adobe Systems is on its way to hitting a home run with PageMaker 6.5, if the final version delivers on the prototype’s promise.

Photoshop 4.0 Delivers New Interface

Photoshop 4.0 is bound to stir controversy among veteran Photoshop users, since its redesigned interface will necessitate significant re-learning. However, once you continue
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get used to the many reshuffled keyboard commands, such as those for Clone and Deselect, you can turn your attention to some major enhancements.

**New Palettes**

Two new palettes add useful functions: the Navigator palette provides flexible zooming and panning, an improvement over 3.0's preset zoom levels, while the Actions palette offers task automation and batch processing—you can record your editing steps, reorder them, disable selected ones, and play them back on any number of files. User-definable guides and grids provide precision alignment. Another useful interface enhancement is control-drag, which pops up a menu of common operations related to whatever tool is selected.

Adobe's commitment to layers is evident in its addition of Live Picture-style adjustment layers, which act as masks through which filters and other effects can be applied to underlying image layers. Thus, an adjustment layer can be changed repeatedly without altering the image permanently. However, aficionados of floating selections may be disappointed to find that such operations as applying a filter or adding text create a new layer rather than a floating selection.

**Improved Distortions**

Transformations have also been enhanced. The new Free Transform command lets you apply multiple distortions—such as scale, skew, and rotate—to an image in one step, simplifying complex manipulations and reducing image degradation. And the ability to specify numeric transformations lets you edit images with more precision.

Users who prefer not to install a slew of third-party filters will be pleased with the 48 new effects filters that have been added to 4.0, including Adobe Gallery Effects. Another new feature is ImageMarc, software by Digimarc that embeds visually imperceptible watermarks throughout an image that are still readable even after the image is edited, printed, or rescanned. When you open a watermarked image in Photoshop, the program indicates the presence of copyright information and provides a link to the copyright owner's Web site.

**Web Format Support**

Like every other application these days, Photoshop has added Web-related features. It supports Portable Network Graphics (PNG) and Progressive JPEG, and lets you save Acrobat PDF files. For those who are hungering for more speed, Photoshop supports symmetric multiprocessing on Macintoshes with multiple processors.

Expected to ship by November, Photoshop 4.0 will retail for $895. It will include an interactive tutorial, stock photos, sample plug-ins, a digital gallery, and demo versions of other Adobe software.

**Web Features Add Life to Persuasion**

Adobe Persuasion has long been among the leading programs for design and production of 35mm slide presentations. But as fewer people use 35mm slides, developers have transformed their packages into tools for on-screen presentations, adding what are essentially interactive multimedia functions. Now, given the industrywide push toward Internet publishing, it should be no surprise that Adobe has made the World Wide Web a focal point for Persuasion 4.0.

**Internet Retrofit**

It's an alluring concept: take a tool similar to the one in 3.0 and convert it into a self-running presentation and put it on the Web. Persuasion 4.0 offers several tools for doing so: import filters for GIF and JPEG, Web-page autotemplates, and the ability to drag and drop URLs from a Web browser to a slide. However, instead of generating HTML code for the Web page, Persuasion 4.0 produces an Acrobat PDF file using Acrobat Distiller. This less-than-ideal solution makes Persuasion's Web support look more like a retrofit than an integral part of the software.

**Managing Fonts and Links**

A new font-management function displays all fonts used in a presentation and allows you to globally replace one font with another. The new Links Management dialog box shows the location and file size of all linked graphics, sounds, and movies. You can also use this dialog box to keep track of—and modify—hyperlinks.

Also new: variable-speed transition effects, an eyedropper tool similar to the one in Photoshop, and customizable autotemplates for multimedia presentations.

**Improved Integration**

Other features in the $395 package follow Adobe's recent trend of better integrating its products. Palettes and keyboard shortcuts are now reminiscent of those in Photoshop and Illustrator; there's even a Layers palette similar to those in Adobe's other graphics packages. Photoshop and Illustrator files can be imported in native format, the former with layers intact.

To improve cross-platform compatibility, the Mac version of Persuasion includes several features previously available only under Windows: dashed and dotted lines, a cropping tool, and enhanced tab functions. There's also a conversion utility for Microsoft PowerPoint files.

However, considering that 4.0 is the first major upgrade to Persuasion since Adobe's merger with Aldus, surprisingly little is new. In part, this is a sign of a mature—some might even say geriatric—software category.

It will be a long time before users lose their need for sophisticated business presentation tools. But if Persuasion 4.0 is any indication, improvements to the tools themselves will be incremental at best.
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CHRP hardware are concentrated in the Mac's Toolbox and thus should work in future System 7 versions.

This contradicts statements in early August by Mac OS product manager Vito Salvaggio that the CHRP OS might diverge from future System 7 versions. However, at that point, Apple was working on a more substantial System 7 revision under the Harmony rubric that is now scheduled for summer 1997. The delay may explain why Bell is confident that his team can keep the CHRP OS on par with the Mac-only OS.

CHRP Timeline

At the conference, executives from Apple, IBM, and Motorola said CHRP systems should appear when the CHRP Mac OS is ready. George Scalise, Apple's chief administrative officer, said the final CHRP Mac OS should be ready in early 1997; the developer version is supposed to be ready in September.

Scalise countered rumors that Apple would not move its full system lineup to CHRP, but said it would take several years. He suggested that 1999 would be the first year that Apple had no more non-CHRP systems for sale; it took a similar period to phase out 680X0 Macs after the Power Macintosh was introduced.

IBM's Mac Quest

The IBM Microelectronics Division, which invented and coproduced the PowerPC CPU, would like to see Big Blue develop and sell IBM-branded Mac systems, says Jesse Parker, director of segment marketing at IBM Microelectronics. But the reason IBM can't commit to doing so is that the IBM PC Company—the division that makes and sells Intel-compatible PCs—has not agreed to make Macs, despite the Microelectronics Division's push to create a new Mac market based on the Common Hardware Reference Platform (CHRP) standard developed by IBM, Motorola, and Apple.

Parker did not discuss the details of the IBM PC Company's objections, but it's been clear for several months that the IBM systems division has opposed developing Mac systems for fear of turning attention away from the division's PC line. Last summer, a power struggle between the IBM PC Company and the now-defunct Power Personal Systems Division, which was to have made Macs for resale by other companies, led to the dissolution of the Power Personal Systems Division. The Microelectronics Division then rekindled the Mac flame this winter, using its leverage as a huge part of IBM—making up 10 percent of the company—to survive the initial political challenges.

The Microelectronics Division also manufactures Intel-clone CPUs, including the 8X686 Pentium-class CPU, which is used in several PCs. The Microelectronics Division recently acquired a license from Apple to sell the Macintosh OS to any company that buys PowerPC CPUs, and the division has set up three training centers throughout the world to help Mac-clone makers develop CHRP-based Macs. It would also help companies seeking to build CHRP systems running Windows NT.

Blindingly Fast Chips

NEW POWERPC WOULD RAISE CPU SPEEDS TO 500MHZ

by Charles Piller

Think today's Mac compatibles are fast? Be prepared to adjust your standards next year. In fact, you may not need to wait until next year—some Mac systems makers, such as DayStar Digital, expect to have 300MHz PowerPC 604e-based systems by the end of this year.

Just as Mac systems are beginning to demonstrate the PowerPC processor's long-promised superiority to Intel's Pentium, the PowerPC's designers have announced a sketch of the PowerPC's future into the new millennium.

The G Series

IBM, Motorola, and Apple have announced two new chip series, code-named G3 and G4, that are designed to enhance the performance of the PowerPC dramatically, well into the next century.

The G3 series will extend the architecture of today's 603e, 604e, and 620 microprocessors by tuning the bus and software, adding a "back-side" cache (a separate cache similar to that used by Intel's Pentium Pro CPU); and by shrinking the chips' die size from the current 0.5-to-0.25-micron range to 0.35 to 0.25, allowing an increase in the number of transistors per chip from a limit of 8 million today to as many as 30 million.

Motorola's PowerPC marketing manager, Will Swearingen, and his counterpart in IBM's Microelectronics Division, David Ryan, indicate that today's 603e and 604e desktop-CPU families (as well as the 620 server CPUs) will gradually be extended above 300MHz.

G3 CPUs, slated for release in 1997, will raise the stakes, starting at 200MHz and going higher than 400MHz, offering up to 10 times the speed of the original PowerPC 601 CPU, according to Ryan.

New Architecture

The G4 series, expected in 1998, will use a new architecture and a much smaller die size, 0.25 to 0.18 microns, allowing up to 50 million transistors per chip and speeds above 500MHz, according to IBM and Motorola. Despite the new architecture, the G4 will be fully backward-compatible with today's software programs, Ryan says.

The companies say that these new generations of chips continue
Most often, online illustrators and print illustrators are the same person, wearing two hats. Someone who expects equally great drawing performance in both worlds. That's why the most popular drawing tool from print to online is Adobe Illustrator. Our latest version 6.0 for the Mac makes it even easier to take your drawings wherever they need to go. With the best image support of any illustration program, drawings (both vector and raster) get online smoothly and intact. Adobe Illustrator 6.0 runs Photoshop filters and even rasterizes Adobe Illustrator artwork in place. Save work as a GIF file or drag and drop directly into Adobe PageMill or Adobe Photoshop. Now you can move drawings from the printed page to cyberspace with ease. Paper or pixels? You can't wear just one hat anymore; and neither should your drawing tool. For even more information about Adobe Illustrator 6.0, just call 1-800-649-3875.
**Internet Watch**

BY KEITH A. MITCHELL

**Browser Wars**

With the near-simultaneous release of Netscape Navigator 3.0 (415/528-2555, http://www.netscape.com) and Microsoft Internet Explorer 3.0 (206/882-8080, http://www.microsoft.com), both companies are tripping over each other to entice Web users to their products. Netscape had a Web traffic jam the day it released the downloadable Navigator 3.0, but Microsoft stole some thunder by offering free temporary subscriptions to popular online sites like the Wall Street Journal, ESPNET SportsZone, and MTV Online. Netscape countered with its own content freebies, including the New York Times, PC World Online, Netscape World, and Sony Music. Netscape also issued a point-by-point comparison of the two browsers, claiming that Navigator is 30 percent faster than Internet Explorer. At this point, Macintosh users don't have much choice: a Mac version of Navigator 3.0 won't be available until later this year.

**More Than a Face-Lift**

Users of America Online's (703/448-8700, http://www.aol.com) new client software, version 3.0, will notice much more than a new look—the new Mac client contains every feature found in its Windows sibling.

The AOL 3.0 Web browser—based on Microsoft Internet Explorer 2.1—supports frames, tables, background colors, and most multimedia formats. The new browser will also support Netscape plug-ins. Other improvements include drag-and-drop capability and a native version for Power Macs.

**Server on the Cheap**

Would you like to maintain a Web server but can't afford to lease a T1 line? FireSite ($499 list price), the new WebStar plug-in from ClearWay Technologies (617/973-5001, http://www.cleanway.com), may be the answer. Users can rent server space from an Internet service provider (ISP), pay for a low-speed connection, and use FireSite to get T1 results far more cheaply.

FireSite copies the slow-loading graphic elements of your Web site to the ISP's server, which is directly connected to a T1 or T3 line. So even though your HTML pages are served over your 28.8-Kbps line, the graphics come from the T1, dramatically improving speed. It's all transparent to the ISP and Webmasters. An $1199 multimedia edition accelerates downloads and supports Macromedia Shockwave and Apple QuickTime.

**BeOS on the Power Mac**

The operating system offers preemptive multitasking, protected memory, and true virtual memory. Best of all, it runs on a Power Mac. Has Apple suddenly performed a miracle with an early release of Mac OS 8? No, it's the BeOS from BeInc. (415/462-4100, http://www.be.com), the company launched in 1990 by former Apple executive Jean-Louis Gassée.

At the recent Macworld Expo in Boston, Be demonstrated a version of the BeOS running on a PowerPC-based Macintosh system from Power Computing. The OS was originally developed for the BeBox personal computer, but the company announced last year that it would port the software to other computers.

The Power Mac version of BeOS is the first fruit of this effort. It's a natural for the new operating system, because the BeBox also runs on a PowerPC processor.

**Not Ready for Prime Time**

The Expo demonstration was just a technology preview, and the Macintosh version of the BeOS was not quite ready for prime time. As of early September, drivers for the floppy drive and Ethernet were not working. In addition, there's no easy way at present to share files between the Mac OS and BeOS.

But the BeOS itself appeared to run cleanly, and its preemptive-multitasking capabilities were evident as company representatives simultaneously played movies, MIDI files, and game applications. They also demonstrated protected-memory capabilities by deliberately crashing an application without bringing the system down.

**Third-Party Obstacles**

At this point, Be's biggest obstacle is the lack of third-party BeOS applications. However, any programs that run on the BeBox should also run without modification on BeOs for Power Mac. On the other hand, Be marketing director Mark Gonzales says the OS requires minor tweaking to run on specific Power Mac models. However, he adds that it will be relatively easy to port the OS to systems based on the Common Hardware Reference Platform (CHRP).

Gonzales expects BeOS for Power Mac to gain an early following among multimedia and digital-video producers. As third-party applications move to the BeOS, he also expects that some vendors will bundle the continues
SuperScan took top honors in every important performance category

Macworld

In February, Macworld editors voted the SuperScan Mc 21 their “runaway favorite for focus, brightness, contrast, and color.” Send for a free information kit and learn why. For example, the exceptionally fine dot pitch in our Mc 21 monitors displays 40% more pixels than our competitors’ aperture grill technology. That translates into crisper detail and the sharpest image you can buy. To learn more, call NSA at 800 441-4832. Or dial our faxback system at 800 555-8552.

SuperScan 21” shadow mask
0.22 mm horiz. pitch
0.21 mm mask
1818 displayable pixels

Competitors 21” aperture grill
0.31 mm stripe pitch
0.30 mm mask
1290 displayable pixels

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HITACHI

Circle 74 on reader service card
OS with their applications.
Be plans to demonstrate a more complete implementation of the BeOS at the January 1997 MacWorld Expo in San Francisco. The software is scheduled to ship in the first quarter of next year.

direct dial-up integrated into Timbuktu, you no longer need the separate Timbuktu Remote program. And when you’re connected to a colleague by modem, you can “talk” through a new chat window—handy if you don’t each have two phone lines.

Another interesting addition is a Netscape plug-in. Web designers could give people access to portions of their network via this plug-in; Farallon expects it to be used mainly with intranets and secure Internet pages.

No matter how you’re connected—over the phone, via ARA, over TCP/IP, via LocalTalk, or via NetWare IPX—you can use Timbuktu’s new Notify option, which tells you when someone you’re trying to reach over the network is available. Think of it as a phone’s camping-line feature. Also handy for network use: guests can log on after getting your permission—this way you don’t have to allow universal guest access or set up an individual’s access privileges in advance.

Timbuktu Pro 3.0 costs $139 for one user, $189 for two users, and $679 for ten users; other high-volume licenses are available. If you have version 2.0, the upgrade is $20, plus another $10 to get ARA Personal Server; Timbuktu 1.0 or Timbuktu Remote users can get upgrades for $50.

When you dial into another Macintosh, Timbuktu Pro 3.0 allows you to share files or even control the machine.

Clone Vendors Delay Systems
Power Computing (510/388-6886, http://www.powercc.com) and Umax (510/226-6886, http://www.supermac.com), which have been heavily promoting their latest Mac clones, have fallen behind in their efforts to ship the machines. Power Computing in particular has adopted a strategy of gaining mind-share by aggressively marketing products it cannot initially ship in volumes close to the demand generated.

PowerTower Delays As of early September, Power Computing had shipped only a handful of its PowerTower Pro 200 and 225 units. The Power Computing sales force has told callers that units will be available no earlier than September 23. As of mid-August, the company was not even taking orders on 180MHz models, and a few weeks later callers were told not to expect the machines until early October. The company had similar delays on its 180MHz and 200MHz PowerTower models.

Mike Rosenfelt, Power Computing’s marketing director, acknowledges that the company never expected to ship the 225MHz units in volume until late September, and that it usually takes 30 to 40 days to catch up to demand for a faster CPU. Power Computing has also yet to ship its consumer-level PowerBase models. It decided to add 3-D-graphics acceleration and thus was still doing engineering work on them as of early September.

Umax had similar delays with its consumer-oriented Macs, the C500 and C600 lines. By preannouncing faster hardware, both companies face the danger of dampening demand for earlier systems. And Umax faces another, possibly significant unintended consequence. Like Apple, Umax sells primarily through dealers. In addition to shrinking its revenues, preannouncements tend to alienate dealers. Power Computing, on the other hand, sells most of its machines by mail order, and thus does not have to worry about alienating dealers.

Megahertz War One executive involved in PowerPC development called the rapid rollout of faster and faster models “a megahertz war” that will confuse customers and inflate the unsold inventory of slower machines.

But industry analyst Pieter Hartsook believes that, on balance, raising the excitement level and generating renewed interest in the Mac is good for the market. He doubts that the purchases of slower machines will drop off much as a result of such tactics.

David Ryan, PowerPC marketing manager for IBM Microelectronics, believes that such rapid revisions based on increasingly speedy CPUs is an anomaly. In one quarter, 166MHz, 180MHz, 200MHz, and 225MHz versions of the 604e CPU were introduced. From now on, speed improvements will be phased in much more gradually.
Imagine the phone booth is your Mac, and the people are extensions.

{Now Startup Manager™ determines who gets to talk first.}

It's hard to get your work done if your Mac hangs up before it starts up. To make sure that doesn't happen to you, Now Startup Manager has been completely re-written and re-designed to keep your Mac going without any problems. It's just one of the many enhancements we've stuffed into Now Utilities™ 6.5.

We've also enhanced Now Super Boomerang™ to make it easier for you to work with files—just resize the Open and Save dialogs to see longer file lists and sort files in the order that's most useful to you. When using Now ShortCuts™ you can duplicate, compress, archive, lock and share your files with one mouse click. And NowTabs,™ the component which gives you a quick-access tab bar at the bottom of your screen, also gives you a direct link to our 24-hour help desk for Now Utilities tips and solutions.

Now Utilities 6.5 continues to improve your Mac with other enhancements to Now FolderMenus,™ Now AutoType,™ Now QuickFiler,™ and Now Scrapbook.™

And of course, these time-saving functions all begin with the new Now Startup Manager. It offers superior automatic conflict resolution, as well as a complete online and downloadable extensions and conflicts database for up-to-the-minute information. It manages third-party plug-ins from Netscape, Adobe, and others and even imports your old Conflict Catcher sets automatically for an easy switch. Not only is Now Startup Manager 7.0 included in Now Utilities 6.5, but it's available as a stand-alone product as well.

Visit http://www.nowutilities.com and try Now Utilities 6.5 and Now Startup Manager 7.0 for yourself. Before long, everyone will be talking about them.
Disasters don’t play favorites. It doesn’t matter if you’re a huge corporation or a one-man band. The result is the same: without Retrospect, your files can be completely wiped out in a second.

1. How to get disaster insurance for your data.
   Data loss will happen to half of us this year: meteors, fire, theft, earthquakes, power surges, hard disk failure, human error—it goes on and on. But with Retrospect and a solid backup strategy, nothing can harm your data.

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   Figure out what you’ll back up to—removable cartridges or a dedicated backup drive. For lots of files, you want a device with the capacity for unattended operation—say DAT, DLT, or an autoloader.

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   Retrospect will show you the best way. The EasyScript feature sets up a backup strategy from your answers to a few simple questions, then carries it out automatically to whatever media you select.

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   The answer is Retrospect Remote, our network backup product. Use a set schedule or the more flexible Backup Server which automatically backs up Macs with the oldest backup first—ideal for PowerBooks that appear and disappear off the network.

5. How to laugh in the face of danger.
   We’re not suggesting standing on the top of the building during a lightning storm. But when disaster strikes, Retrospect can restore whatever you’re missing—files from your latest backup, older files, or the entire hard drive.

Take the next step. There has to be a reason why more people rely on Retrospect than all the rest combined. Why it consistently earns the top scores, the best reviews. We have the answers. Call us at 800-982-9981 for our Understanding Backup white paper. It would be a disaster not to.
New Products
THE LATEST MACINTOSH RELEASES

COMMUNICATIONS
Messaging and Fast Fax
The $290 SupraSonic 336 V+ fax modem from Diamond Multimedia Systems (408/325-7000, http://www.diamondmm.com) includes voice messaging, automatic fax-voice discrimination, and remote access to messages. A headset included with the SupraSonic modem allows hands-free phone operation, message recording, and playback.

LAN-Modem PC Card
The EtherMac, from Farallon Computing (510/814-5100, http://www.farallon.com), provides 28.8-Kbps data-transmission and 14.4-Kbps fax-transmission speeds and works with both PowerBooks and PC notebooks. And because it combines Ethernet and modem capabilities on a single card, the EtherMac leaves the second slot open for another PC Card. Included with the EtherMac is Farallon’s Timbuktu Pro 2.0.

DISPLAYS
Micro Conversions Adapter
Micro Conversions (817/468-9922) has announced a new graphics card that supports resolutions of up to 832 by 624 pixels in 32-bit mode and up to 1280 by 1024 pixels in 8-bit mode (it works in 8-, 16-, and 32-bit modes; on a Mac, 32-bit mode is the same as 24-bit mode). The VP2MPCI card comes with connectors for both Macintosh and VGA monitors. These connectors also offer the flexibility to mirror monitors for presentations. The 2MB, 32-bit VP2MPCI sells for $249. Micro Conversions also announced that it is dropping the prices on the NuBus 2124MB II and PDS 1724PD cards, which now sell for $399 and $299, respectively.

GRAPHICS
Clip Art for Every Occasion
If one picture’s worth a thousand words, the clip art world just got a lot more verbose.
- The Metals Collection, from Digital Textures (815/637-6139), is a set of 25 high-resolution metal images photographed on 8-by-10-inch film. The two-CD set costs $149 plus $7 for overnight shipping.

MULTIMEDIA
Plug-and-Play Video
Digital-video systems offer video professional more power and flexibility than ever before. Several new hardware and software products are filling out a growing field.
- Bravado 1000, from Truevision (408/562-4200, http://www.truevision.com), is a QuickTime-based video-capture, -editing, and -playback system that provides professional-level video output for about $1000. The Bravado 1000 captures and outputs full-screen, full-motion video and supports composite-video and S-Video input and output for both PAL and NTSC. It’s compatible with a wide range of QuickTime-based applications such as animation, modeling, image-editing, and illustration packages.
- Bonis Effects 2.0, from Artil Software (617/566-0870, http://www.alacnet/users/artel), is an upgrade to the digital video effects plug-in for Media 100 and Adobe Premiere that offers unlimited effects, tracks, video cubes, soft borders and shadows, motion path controls, and specular lights. Also included is a library of more than 100 effects. The upgrade is $99 for the Media 100 version, $49 for the Premiere version.

Get the Best Sound
Tired of tinny sound from your Mac’s puny speakers? Try one of these high-powered sound systems.
- Two subwoofer systems from MIDI Land (909/592-1168), the $100 MLI-SA15 and the $130 MLI-SA25, provide sound with minimum distortion. The MLI-SA15 outputs 15w (rms), while the MLI-SA25 outputs 25w. Both feature enclosures of medium-density fiberboard, which absorbs low-frequency noise and provides higher-quality sound.
- Yamaha’s (714/522-9011, http://www.yamaha.com) YST-M7 is a multimedia speaker system that provides 5-watts-per-channel stereo output for the Mac. Due by fall, the $70 YST-M7 has a subwoofer output jack with volume control and dual stereo inputs, which eliminates the need to switch wires. Yamaha is also introducing the $200 YST System 35, continues
which pairs the YST-M7 speakers with its YST-MSW10 subwoofer (available separately for $150).

HyperCard Stacks on the Web

Thanks to LiveCard, from Royal Software (813/581-6422, http://www.royalsoftware.com), you can now add life to your HyperCard stacks by placing them on the World Wide Web. Stacks can be viewed from any platform using standard Web browsers. Users of the $150 package can write HyperCard scripts that create HTML forms, send E-mail, print invoices, and update Web pages remotely.

Comet Sitings

Digital Comet (415/331-5551, http://www.digitalcomet.com) is staking its Internet claim with two new products. CometPage is an $80 package that lets you drag and drop templates, macros, and commands into Web pages created with a variety of Web authoring tools. CometSite, CometPage’s $130 companion CGI, lets you test pages locally before uploading them to a server.

Site Management

EveryWare Development (905/819-1173, http://www.everyware.com) is offering tools that allow you to manage complex Web sites. Bolero is a Web logging, analysis, and real-time reporting system that tells you the number of hits your site is getting, where the visitors are coming from, and what they do once they get there. Pricing begins at $995 for a version that supports a single Quarterdeck WebStar server. Tango Merchant gives businesses a 24-hour storefront for electronic commerce. At $4995 for a single “storefront” and $999 for unlimited stores, it includes HTML templates created with Tango (EveryWare’s Web-and-database integration tool), along with a point-and-click interface for online shopping and a relational SQL database for storing product information.

Monkey on Your Mac

Internet Setup Monkey, from RockStar Studios (415/242-1984, http://www.rockstar.com), lets Internet and intranet administrators create custom installers that automatically configure users’ Macs for TCP/IP and PPP. Netscape Navigator, Eudora, and other Internet applications. License fees range from $1.90 to $2.50 for each distributed installer; a PPP plug-in that troubleshoots connection problems is included.

CalComp Adds to Plotter Line

CalComp (714/821-2000, http://www.calcomp.com) has added two models to its Techart Designer line of ink-jet plotters. Model 5624, priced at $2495, produces D-size output, while the 5636 ($2995) offers E-size output. Resolution is 360 dpi in color and 720 dpi in black and white. A PostScript-compatible interpreter is an option.

Fonts in Reserve

DiamondSoft (415/381-3303, http://www.fontreserve.com) has introduced Font Reserve, a $120 font-management program that uses a database to store font names, font IDs, foundry information, version information, and each font’s location in the system. It also checks for corrupted and duplicate fonts, and maintains corresponding pairs of Type 1 printer and screen fonts. You can view, open, and close fonts using the database.

16 CDs at a Time

Need to access several CDs on your network? Optical Access International (617/937-3910) has a solution: its new $8495 CD/MacXnet 1600, a CD-ROM server that contains 16 hot-swappable 4x CD-ROM drives. Better yet, the device uses only two SCSI ROM servers that contain 16 hot-swappable 4x CD-ROM drives. Better yet, the device uses only two SCSI IDs. A version using 4x CD-ROM drives costs $10,895. It works on Apple, Novell, Microsoft, IBM, and Banyan networks.

Printers

• Finfont is the newest collection of pictorial fonts from Judith Sutcliffe: The Electric Typographer (712/563-3799). Available for $45 (plus $2 postage), Finfont is a fanciful school of tropical fish from shark to sea horse.

• The AgfaType Collection CD-ROM version 7.0, from Agfa (508/659-5600, http://www.agfa.com), contains 3400 typefaces in four type libraries: the Creative Alliance Library (contemporary fonts), the Cornerstone Collection (classic fonts), the AgfaType Logo and Symbols Library, and the Adobe Library.

PUBLISHING

Fonts for Every Occasion

Just when you think you’ve got every font you could possibly want, along comes a whole new group of selections—from elegant, old-world faces to whimsical animal fonts.

• Zetafonts (519/369-3898) has a collection of 12 unusual display fonts called Mainly Art Nouveau Fonts; these versions of historical font styles include Mahlau, Elmwood, Pini, Philip, and Madrigal. Each font is $50; the set sells for $300.

• International Typeface Corporation (212/371-0699, http://www.agfa.com) has released several new font sets. ITC Rennie Mackintosh Light, Bold, and Ornaments are based on the hand lettering and motif designs of Charles Rennie Mackintosh. The ITC Golden Cock-Erle font series is the first digital version of Eric Gill’s classic type designs. ITC Kaffls is a calligraphic font available in Type 1 and TrueType. ITC has also added five Fontek text faces originally developed by Letraset—Charlotte, Charlotte Sans, Elysium, Gilgamesh, and Figural. Each font is $40. Discounts are available for the purchase of three or more weights.

• Fintek is the newest collection of pictorial fonts from Judith Sutcliffe: The Electric Typographer (712/563-3799). Available for $45 (plus $2 postage), Fintek is a fanciful school of tropical fish from shark to sea horse.

• The AgfaType Collection CD-ROM version 7.0, from Agfa (508/659-5600, http://www.agfa.com), contains 3400 typefaces in four type libraries: the Creative Alliance Library (contemporary fonts), the Cornerstone Collection (classic fonts),
Removable one-gig disks, unlimited space, fast as a hard drive.

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Mac OS 8
Back to Square One

Apple has killed the Copland OS as we knew it. What’s in store now?

by Galen Gruman and Anita Epler

Copland, we hardly knew ye. For two years, Apple has painted a brave new world for the Mac OS, one that would bring a state-of-the-art infrastructure to today’s OS, delivering agents to help automate your work, preemptive multitasking and threading to let programs do several things simultaneously, and an interface that would both simplify and customize your interactions with the Macintosh.

Rewind.

As Macworld revealed exclusively a month ago (see “Mac OS 8’s About-Face,” News, October 1996), Apple has dismantled its grand OS scheme. CEO Gillett Ameio confirmed Apple’s plans at the Boston Macworld Expo a few weeks ago, and AppleSoft vice-president Jim Gable has shared with Macworld more details on the new OS strategy.

The new strategy means that users will face a constant stream of OS updates: Apple plans to release new versions of system software quarterly, as well as semiannual upgrades with substantial new technologies, interspersed with smaller bug-fix releases.

The new strategy also means that Copland—officially called Mac OS 8—and its follow-on, Gershwin, are essentially gone. Many of the technologies originally scheduled to be released with Copland and Gershwin will be developed for new versions of the Mac OS, but there is no grand target for what the future Mac OS will become. Instead, Apple’s OS development will be more evolutionary, based on the technologies Apple can deliver when it can deliver them. Apple’s new strategy is a mixed blessing—it’s bad that there’s no grand target to motivate users, developers, or Apple; it’s good that there won’t be broken promises.

The Copland name will still be used, but only to refer to groupings of technologies that Apple plans to deliver—Copland no longer means Mac OS 8, just the technologies once promised as Mac OS 8.

The current strategy change stems from decisions by Apple’s new chief technology officer and vice-president of research and development, Ellen Hancock, who decided to end the megarelease Mac OS 8 strategy and focus on delivering real enhancements in a more timely way. That decision led to the incremental-update plan, supported by Ameio, and to the reorganization of engineers from several Mac OS teams (Harmony, Copland, and so forth) into one Apple Mac OS group.

Apple is being coy about its plans for the coming years, but Macworld has gleaned the following from interviews with Apple employees and from internal planning memos. Keep in mind that Apple’s official line is often out of sync with its unofficial line, and that Apple is revisiting most of its strategies, so the company may again change its OS approach.

Some changes may come from outside pressure. The latest set of announcements has angered outside developers who are now unsure what to aim for; inside Apple, numerous engineers and product managers are also unclear on what the future holds, and many have seen their pet projects delayed or canceled. Because of these reactions, Apple may reconsider its changes. Be sure to check Macworld Online’s ongoing coverage of this and other key stories at http://www.macworld.com/daily/.
System 7.5 Shell Game

According to Apple's original schedule, we'd all be running Mac OS 8 today. But months ago, Apple realized it needed to do something in the interim, so it launched Harmony, a System 7.X version scheduled for early 1997, which was originally slated to incorporate parts of the Copland interface and wrap in revised versions of QuickTime, OpenDoc, Cyberdog, QuickDraw 3D, and the Finder. Apple officials presented detailed Harmony plans this May at the Worldwide Developers Conference.

That was May. In August, Harmony was clearly behind schedule, so Apple broke it into two pieces: one for January 1997 and one for summer 1997. The January System 7.X piece (perhaps to be called 7.6) will include updated versions of QuickTime, OpenDoc, Cyberdog, QuickDraw 3D, and the virtual memory manager, but no Copland technologies. "We'll have a few things there to wrap [these components] all together," says AppleSoft's Jim Gable, "but essentially there'll be no new stuff in January."

So why bother with the January release? "This is a big deal for Live Objects developers," said Gable. (Live Objects is the new name for OpenDoc components, the engine and the architecture retain the name OpenDoc.) "With this release they can expect the infrastructure to be in place that they need," without having to include OpenDoc with their products. Developers won't need a license from Apple to distribute OpenDoc.

The System 7.Y release—slated for July 1997—will be more in line with previous reports of Harmony's features. "This is where we'll start to see Copland technologies," says Gable. Apple still isn't sure what Copland features it will roll out in July. Gable states, "We've got to do some homework to find out what we can include. We don't know how much we can decouple." This is frustrating for users and developers alike, but probably the right thing to do considering Apple's poor track record in predicting OS components.

Mac OS 8's Shadowy Future

So when will Mac OS 8 ship? No one knows. The official date is late 1997, but Gable acknowledges that this is optimistic: "I don't know when it will ship."

When does the name change to Mac OS 8? No one knows that, either. Gable says it's no sure bet when the OS number will change from 7 to 8. The logical time to change the number is when the new microkernel is incorporated into the Mac OS, since the microkernel is the guts of the OS, and changing it is what gives Apple the ability to add most of the Copland features that so excited us a year ago: preemptive multitasking, protected memory, and so forth.

But Gable says no decision has been made on what will constitute the number change. It could be the microkernel, or it may simply be when Apple runs out of decimal places for System 7.X.

Copland as originally defined is gone, and so is Gershwin, the planned successor to Copland. Copland was supposed to be a way station to Gershwin, with Copland being the Mac OS that introduced preemptive multitasking, multithreading, and protected memory—all key to seamlessly operating simultaneous programs and to reducing system crashes and application conflicts. Copland was supposed to be like Windows 95, in which these services are available for the operating system but applications still share memory and have to multitask cooperatively (as they do in System 7). Gershwin was to introduce preemptive multitasking, multithreading, and protected memory between applications, so each would reside in its own safe space (as in OS/2 and Windows NT). The good news is that by not shipping Copland/Gershwin as originally planned, the Mac OS might see full preemptive multitasking earlier than the original Gershwin schedule.

Because Mac OS 8 remains undefined, no one—developers or Apple engineers—really knows what to aim for. The effect has been dramatic. Finally poised for the first developer (beta) release of Copland—known as DR1—in early August, Apple pulled the plug unexpectedly during Macworld Expo. "We're not going to release it as it is," Gable says, while confirming that those developers who work on low-level code will receive some subset of the current beta and that engineering work will continue on Copland DR1.

Gable says rank-and-file applications developers will be seeded for interim OS releases but won't receive DR1. "Because we're not going to be doing a single, monolithic release, there's no reason to release what we have," he says. "There's a tremendous amount of work in there, [but] a single, monolithic seed is wrong."

Some developers have interpreted the
In an interview with Macworld, Apple's CTO Hancock made it clear that Apple can't keep giving away the Mac OS. Apple needs to find a way to make money from it to pay for its continued development, she asserts. This subscription-like release plan may be one of those ways.

Gable notes that one advantage of the new incremental-release plan is that many Copland technologies will now run on 68040-based Macs, 680X0 Macs with PowerPC upgrade cards, and perhaps even some 6300-based Macs. (Under the original plan, Copland wouldn't run on any of these.) Now that there is no unified mega-release, Apple can decide on a component-by-component basis whether a technology will perform on 680X0 Macs.

"Now you don't have to wait for the next major release to get neat new stuff," Amelio says. He points to the Mac OS's multitasking-generally don't lend themselves to being rolled out in piecemeal fashion. "That's one of the things we have to figure out," admits Gable. "No one really knows for sure.

The OS That Keeps On Coming

Remember the shifts from the 680X0 architecture to the PowerPC and from System 6 to System 7? Both needed to happen, but it wasn't until after the fact that users and developers saw the benefits. Similar transitions are taking place for Macintosh networking as networks move from LocalTalk to Ethernet, from AppleTalk to TCP/IP, and from classic networking to Open Transport. Here's a look at how Apple's network strategy addresses these transitions.

Bug-Fixes This Summer

Open Transport, first released over a year ago, is the Mac OS's next-generation network and communications foundation. Its modernized AppleTalk and TCP/IP protocol stacks speed network transmissions, its enhanced control panels improve network-configuration options, and its open APIs help developers write applications that can take advantage of Open Transport's streamlined architecture. Unfortunately, Open Transport's launch was rocky; versions 1.0 and 1.1 suffered from performance problems and assorted bugs. Open Transport 1.1.1, scheduled to ship in October, fixes bugs in version 1.1 and increases performance. Current system software includes Open Transport and Apple's previous implementation of AppleTalk and TCP/IP (which Apple calls classic networking; it's required for 68020 Mac models and below). However, starting with System 7.X, Apple will ship only Open Transport (no classic networking) with the Mac OS and its updates.

One of the most significant improvements in Open Transport 1.1.1 is more-efficient memory recycling, which will increase the performance of servers with high transaction volumes (Web servers, for instance).

Another bug-fix allows Open Transport 1.1.1 to run on the 5200, 5300, 6200, and 6300 Performas. Open Transport 1.1.1 also fixes some problems with Apple Remote Access, such as its not seeing all network devices, and problems with PowerBooks' recovering from sleep mode.

Open Transport's Next Big Step

Open Transport 1.5 is scheduled to ship as part of Tempo, the Mac OS release slated for July 1997.

Open Transport 1.5's support for multiple active-network interface ports will let you have Ethernet, LocalTalk, and infrared ports active simultaneously; it will also allow a server to use PPP.

But Apple still has a ways to go in its network software.

Finally, Apple Remote Access Goes PPP

Over three years ago, Apple said it would deliver Apple Remote Access software that would provide dial-in capability via the Point to Point Protocol. PPP supports multiple protocols, including AppleTalk, TCP/IP, and NetWare's IPX; it had—and still has—widespread industry support.

Finally, in August of this year, Apple took its first steps toward PPP support by releasing a beta of Open Transport/PPP to replace the freeware MacPPP (OT/PPP is scheduled to ship in October). Product manager Richard Ford acknowledged that Windows 95's including TCP/IP over PPP accelerated Apple's efforts to get OT/PPP into users' hands.

In the first half of 1997, Apple expects to ship Apple Remote Access 3.0, which will run AppleTalk and/or IP over PPP, or the AppleTalk Remote Access Protocol (ARAP) over PPP. Upgrades for the client and the personal server will be offered, but pricing was not set at press time. The ARA client will be part of a future version of the Mac OS, says Ford.

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Senior associate editor ANITA EPLER and executive editor GALEN GRUMAN both follow Mac systems developments closely. Additional reporting by HOWARD BALDWIN.
multiple Ethernet cards.

Support for multiple addresses for the same port (called multihoming) via TCP/IP and AppleTalk will allow a Web server to have one Ethernet port for multiple TCP/IP addresses.

Open Transport 1.5 will also include built-in PPP, which eliminates the need for a separate dialer, and Open Transport's built-in LocalTalk bridge software will let you share a printer connected to your Mac.

Network managers will be happy to see the long-awaited update of Mac-SNMP; version 1.5 will ship with Open Transport 1.5.

You can use AppleScript to customize the control panels—for example, setting different configurations for Ethernet access at work and dial-up access from home. You can save configurations and import or export them via drag and drop, which will be handy for network managers distributing remote-access configurations.

**AppleShare over TCP/IP**

While Open Transport has helped Apple make strides in providing TCP/IP for clients, Apple has lagged behind the rest of the computer industry with servers.

AppleShare client software included with the Mac OS allows file sharing and printing via the AppleTalk Filing Protocol (AFP), which runs over AppleTalk. Open Transport contains an updated AppleTalk stack, as well as code that provides backward compatibility with existing AppleTalk implementations. Apple will maintain AppleTalk but will not invest any significant effort in upgrading it, according to Andy Lauta, manager of product marketing for AppleNet.

Instead, Apple is working on an enhanced version of AppleShare that will support AFP over TCP/IP, HTTP for Web servers, FTP, and Internet mail protocols. This new version of AppleShare, code-named FutureShare, is scheduled to ship in early 1997, according to product manager Joe Sowerby. AppleShare Workstation Client version 3.7 and the new AppleShare server will run AFP over both TCP/IP and AppleTalk.

The new AppleShare server software will be required for TCP/IP file and print services; you will not be able to use the Personal File Sharing peer-to-peer model for TCP/IP. That should start moving the masses away from AppleTalk.

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**The Last Word**

At press time, Apple had not decided how FutureShare will be sold or priced. Currently, if you want to buy PowerPC-native AppleShare 4.2.1, you have to buy an Apple Workgroup Server; you can't buy the software separately—an odd model for a company that should be encouraging people to use its software, especially something as fundamental as its network operating system.

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**OpenDoc Finally Gets Tangible**

Developers are now supporting component software—why it matters to you

by Cameron Crotty

Aft er two years of promise, Apple's OpenDoc technology is starting to deliver. Apple introduced version 1.1 of OpenDoc at Macworld Expo in August, and developers announced 16 new OpenDoc products.

CI Labs, the organization dedicated to compliance with specifications created by the Object Management Group, an industry consortium, announced that OpenDoc-based components will be called Live Objects. CI Labs will also introduce the Live Objects Validation Kit, which developers can use to test their components for compatibility.

According to Apple product manager Gina Centoni, OpenDoc 1.1 (available online at http://www.opendoc.apple.com) focuses mainly on optimization, reducing the RAM footprint, and increasing the performance on both PowerPC and 680X0 Macs. Along with OpenDoc 1.1, Apple will release the Apple Live Objects Essentials Kit—a set of basic OpenDoc parts, including text, image, and sound editors as well as viewers for Apple-sponsored data types such as QuickDraw 3D, QuickTime Conferencing, and QuickTime VR.

**Plugging In Other Plug-Ins**

OpenDoc is not the only architecture to let developers create small pieces of software that can plug into other programs and the OS. Microsoft has its competing Object Linking and Embedding (OLE), as well as the ActiveX subset being positioned for the Web, while Sun has Java, also positioned for the Web. Rather than fight them, Apple is embracing them—encapsulating them, to be more accurate.

Mac OLE users can expect OpenDoc interoperability soon: at Macworld Expo, Apple demonstrated the ComponentGlue "wrapping" that lets OLE parts work with Mac OpenDoc system extensions; ComponentGlue is expected to ship soon.

This past spring, Apple promised to bring Java to the Mac OS, and the first fruits of that labor have appeared. The Mac OS Runtime for Java is now available at http://www.devtools.apple.com/mj/.

The prerelease version 1.0a1 includes three ways to run Java applets: a stand-alone application (Applet Runner), an OpenDoc part (Applet Viewer), and a screen-saver module compatible with Berkeley Systems' After Dark utility. Applet Viewer and Applet Runner can both load and launch applets from a hard drive or the Internet.

Applet Runner works on both Power Macs and 680X0 Macs, while Applet Viewer requires OpenDoc version 1.0.4 or later. Apple says that the final version of Cyberdog 1.1 will support Applet...
The following companies introduced OpenDoc parts at Macworld Expo:

- Addison-Wesley New Media Products
- Group/West: Virtual Field Trips
- Aladdin Systems: StuffIt! Installer/Maker 3.1
- Bowers Development: AppMaker
- ComGrafix: Geolsight
- Corda Technologies: C-Graph and C-Table
- Digital Harbor: Way
- Eastgate Systems: Web Squirrel
- Eclipse Services: Outliner
- Kantara Development: Pathfinder
- MetaMinds: PageComposer
- Network Multimedia: Microbrew
- Power Productions: WebBurst
- SoftLink: Lexi
- Theta Group: 81F Database Toolkit
- Totally Hip Software: Sizzler
- WordSoft: WorldWrite

Previously announced OpenDoc parts include:

- Claris: ClarisWorks
- Corel: WordPerfect
- Nisus: Nisus Writer

OpenDoc’s Increased Supporters

IBM assures Macworld that it is on track to ship OpenDoc for Windows by the end of the year. However, it’s not clear whether OpenDoc will make a dent on the Windows platform, where OLE has been heavily adopted for the last two years and where ActiveX seems to be following a similar path to majority status.

But on the Mac, OpenDoc appears to be gaining the steam needed to succeed.

The Last Word

The promise of OpenDoc remains one for developers—it’s a way to break programs into small pieces that can be more easily managed or used across programs, as well as a way to get paid to add functions to someone else’s programs. For users, OpenDoc is simply a universal plug-in architecture that may now actually become universal on the Mac.

Associate editor CAMERON CROTTY covers the Internet, OpenDoc, and other interaction technologies.

OpenDoc Developers

QuickTime Media Layer integrates dynamic technologies

by Stephen Beale

QuickTime must be near the top of the list as Apple’s new leadership surveys the company’s strategic assets. From its humble beginnings as a low-resolution movie player, QuickTime has evolved into a comprehensive architecture for the authoring and playback of synchronized video, audio, graphics, and text, elevating the Macintosh into a leading platform for multimedia creation.

QuickTime 2.5, which began shipping this summer, is the core of what Apple now calls the QuickTime Media Layer (QTML). QTML encompasses the software technologies within Apple’s Interactive Media Group, including QuickDraw 3D, QuickTime VR, and QuickTime Conferencing, in addition to QuickTime itself.

Much of what’s new in QuickTime 2.5 is under the hood: support for multi-processor hardware; an improved primary data handler for faster playback; asynchronous JPEG and Raw codecs that can compress or decompress video as QuickTime performs other functions; and a new Clock component that enhances synchronization of video and sound. Other features are more explicit. Support for QuickDraw 3D allows content creators to incorporate 3-D objects within QuickTime movies. A graphic-importer component expands the range of file formats QuickTime supports directly.

For video professionals, QuickTime now implements a standard interchangeable format for Motion JPEG, a popular codec previously available from several board vendors in incompatible flavors. On a more esoteric note, QuickTime now allows digital-video editors to extract fields within a frame (each frame of video consists of two alternating fields). If you capture video with closed-caption text, you can now embed the text in a QuickTime text track. For musicians, Apple has enhanced QuickTime’s support for the popular MIDI interface. Previously, QuickTime included a software synthesizer and an instrument library licensed from Roland. With QuickTime 2.5, any vendor can offer QuickTime versions of synthesizers and instrument libraries.

All this comes in the wake of improvements to other QTML components. Apple has shown a new version of QuickTime VR that allows the embedding of QuickTime movies and 3-D graphics into panoramas. QuickDraw 3D 1.5, announced in August, offers a host of features that move it much closer to being a serious 3-D authoring environment (see “A New Spin for 3-D Graphics,” News, Macworld, October 1996). Apple has even announced a QuickTime-based technology, QuickTime IC, that will allow the development of digital cameras with built-in functions—such as time-lapse photography, Internet connection, and image filters—that would otherwise be implemented in software on the host computer.

Microsoft Plays Catch-up

Apple has enhanced QuickTime so aggressively that Microsoft has been forced to play a constant game of catch-up. Its first response to QuickTime, Video for Windows, was to establish a Windows-based alternative to QuickTime, but it performed poorly and lacked QuickTime’s rich support of multimedia data types. ActiveMovie, Microsoft’s latest response, is much closer to offering QuickTime-like features. It will gain instant credibility due to Microsoft’s huge installed base, but QuickTime has the benefit of being better established among multimedia pros.

Meanwhile, Apple is expanding QuickTime to other platforms. Soon you’ll be able to author QuickTime movies under Windows, not just play them. Apple has also moved QuickTime into the Unix realm, announcing early this year that Silicon Graphics would incorporate QuickTime playback capabil-
ities into its StudioCentral software, which allows movie and TV producers to keep track of their media assets.

Ultimately, Apple would like to see QuickTime become a standard for supporting dynamic media on the World Wide Web. Apple has released a Netscape plug-in that permits the viewing of QuickTime movies, and in April Apple announced that Navigator 3.0 would include the plug-in.

The Last Word
So what's left? The beauty of QuickTime is that it is highly scalable; the same technology that allows hobbyists to edit home videos has also become increasingly useful for multimedia and video-production professionals. Expect to see further moves into the professional realm, including support for ever-increasing levels of resolution. Expect to see new compression technologies; Cinepak, the primary codec in QuickTime, is getting long in the tooth. Expect to see the ability to incorporate interactive elements into QuickTime movies.

QuickTime has done for multimedia professionals what Adobe’s PostScript did for print: provided a core set of technologies around which hardware and software developers could build cutting-edge products. It didn’t duplicate existing technologies or attempt to upstage Apple’s third-party developers. QuickTime is clearly a model for Apple to use elsewhere. m

Apple Revives QuickDraw GX

Graphics and type functions become available as a shared library

by Stephen Beale

Apple, attempting to boost its moribund QuickDraw GX technology, will unbundle the graphics and typography portions of GX and provide them to software developers as a dynamically loading shared library. As a result, users who have not installed QuickDraw GX will now be able to run GX-dependent applications. And because the library does not include GX printing functions, you won’t have to change the way you print; at least not until GX is fully incorporated into the Mac OS. However, you’ll still need special GX fonts to take advantage of the technology’s advanced graphic functions.

QuickDraw GX is now an optional extension to System 7.5, but it’s supposed to be an integral part of Mac OS 8. It offers a host of sophisticated graphics capabilities, especially in type: up to 65,535 character shapes per font, automatic ligature substitution, built-in kerning functions, and more, all available to any GX-dependent application. It also provides a new printing architecture for the Macintosh, one in which output functions are controlled by icons on your desktop rather than the familiar Chooser.

Early Problems
Despite these features, GX has so far failed to catch on with users or developers. Early versions have been plagued by bugs, hefty RAM requirements, and difficult handling of PostScript fonts. The list of “GX-smart” applications is short, and the list of GX-dependent packages even shorter. Only a handful of type foundries offer GX typefaces. Worse, none of the major graphics software vendors—Adobe, Fractal, Macromedia, and Quark—has shown interest in GX, due in part to the lack of a Windows version.

However, GX has provided a breeding ground for a few small developers, such as Lari Software (919/968-0701, http://www.larisoftware.com), PaceWorks (415/835-0900, http://www.paceworks.com), and SoftPress (415/331-4820, http://www.softpress.com), that see GX as an opportunity to break into markets that would otherwise be closed to them.

Now that Apple is offering GX as a shared library, users can get a taste of the technology, says Phac Le Tuan, vice president of engineering for PaceWorks. Dancer, the company’s flagship product, is a GX-based animation and multimedia authoring tool.

Electrifier, developed by Lari and available free from the Electrifier Web site (http://www.electrifier.com), allows you to view GX-based vector graphics and animations over the World Wide Web using Netscape-compatible browsers. A forthcoming version developed by Lari and PaceWorks will allow the use of Electrifier graphics within QuickTime movies. The companies claim that the vector-based animations can be hundreds of times smaller than equivalent bitmapped animations, solving the bandwidth problems endemic to the Web. You can create Electrifier graphics from PICT or Illustrator files using LightningDraw Electric, available free on Lari’s Web site.

Cross-Platform Issues
Still, until a Windows version of GX is available, major developers with cross-platform graphics products are unlikely to embrace the Apple technology. Nevertheless, you can expect an announcement on cross-platform GX availability by the end of the year, says Carla Ow, Apple’s GX product manager. It is likely, she says, that Apple will offer at least a Windows-based GX playback tool. Less certain is a full-fledged Windows GX.

The Last Word
By transforming the GX graphics and typography functions into a shared library, Apple rewards the developers who have taken a chance on GX while removing one of the most problematic aspects of the technology: the printing architecture. But Apple still has far to go before it establishes QuickDraw GX as a must-have environment for graphics creation. m

Senior associate editor STEPHEN BEALE follows graphics and publishing technology, and manages Macworld’s news. Additional reporting by JASON L. LEVINE.

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Introducing three things you might not expect from Motorola.

StarMax for Mac OS  PowerStackII for Windows NT and AIX

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What you never thought possible.

Circle 207 on reader service card
The hottest competition of the summer took place not on the playing fields of Atlanta, but on the floor of Boston’s Macworld Expo, where both Canon and Epson won Macworld’s Best of Show for their new color ink-jet printers. Canon’s BJC-4550 supports 720-by-360-dpi output on 11-by-17-inch paper for a remarkable $500 price, while the Epson Stylus Color 500 delivers great graphic output for a street price under $300. Hewlett-Packard also recently began shipping the DeskWriter 680c, an update to its popular 660c. For small offices or home users, this trio provides a range of options.

Differences are immediately apparent: the BJC-4550 is bigger than its competitors, allowing for its large-format output. HP’s 680c uses a front-loading paper tray with an option for printing banners, and a raised output tray. Meanwhile, Epson hasn’t been investing in industrial design: compared with the modern curves and cool white casing of the other printers, the 500’s square shape and cream shading are positively old-fashioned. But output quality, speed, reliability, and price are far more important than style, and in those areas the Stylus Color 500 outpaces the competition.

The Dream Graphic
Comparing graphic output is like watching Olympic men’s basketball: the output from the Stylus Color 500’s Super mode (720 dpi) is so far superior to the others’ that there is no contest. Even the 500’s Best mode (360 dpi) is better than the competition’s highest-quality options. That said, the output from the HP and the Canon is still world-class. All three printers produced perfectly presentable graphics, and output from the BJC-4550 and the 680c is fine for most jobs. (Canon sells special photographic ink and high-res paper; with these, the BJC-4550’s output could easily join the NBA.)

Text output is a slightly different story. In normal mode, using plain paper, the 680c’s text output came out ahead. The 680c prints color images at 300 dpi but boosts black text to 600 dpi. Text was smooth and dark, with none of the fuzziness typical of ink-jet printers. However, all the printers produced clean text, and any of them would be satisfactory for a home or small-business user.

Track and Field
If you’re used to laser printers, you’ll be unpleasantly surprised by how slow color ink-jet printers actually are. Still, the new models are faster than their predecessors.
In midrange modes, printing a complex graphic took 3½ to 5 minutes, while a simple ClarisWorks newsletter took 1½ to 2½ minutes. In high-quality modes, these printers crawl: in the worst case, the BJ-4550 took an incredible 32 minutes to print a 10-page word-processing file.

The overall winner is clearly the Stylus Color 500. In its midrange mode, it was the fastest printer in five of six tests, and tied the sixth. In high-quality mode, it also won five tests. When printing QuarkXPress newsletters and spreadsheets with charts in this mode, the 500 was faster than its nearest competition by as much as 4½ minutes—roughly 1½ times as fast. The only exception was in printing a long text document, where the 680c beat the 500 by close to 10 minutes, despite taking a painful 12 minutes to complete the job.

And on to Gymnastics
Just as the Olympic gymnastics judges see was faster than its nearest competition by 680c beat the 500 by close to 10 minutes, as much as 4½ minutes—roughly 1½ times as fast. The only exception was in printing a long text document, where the 680c beat the 500 by close to 10 minutes, despite taking a painful 12 minutes to complete the job.

Lucrative Endorsements
These printers are all bargains. The 680c and the Stylus Color 300 have street prices under $300, which is as cheap as color ink-jets currently come. At $500, the BJ-4550 looks expensive by comparison, but other 11½-by-17-inch printers, such as the Epson Stylus Pro XL, cost closer to $2000. Canon also offers a PostScript option for an additional $99.

The cost of consumables can add up for color printers. None of these products require special paper, but their output looks far better on glossy stock; you'll want to spend the extra $20 to $30 for 200 sheets of your important work. Epson and HP use similar ink cartridges, but HP's prices are slightly higher. The BJ-4550, meanwhile, seems to eat ink: we used it up at an appalling rate. Canon's ink cartridges include a print head and replaceable ink tanks; the tanks cover only 100 to 200 pages. (The BJ-4550 also offers other ink choices, including neon and photographic colors.)

The Other Sports
The 680c had the best, most straightforward driver software. Although the Epson and the Canon offer some sophisticated features, their software is complex and sometimes less than intuitive.

The Stylus Color 500 and the BJ-4550 came with bundled software; unfortunately, Canon's two-CD-ROM set is for Windows only. Epson's Look Your Best Color Pak includes Adobe HomePublisher and PhotoDeluxe.
Netscape Navigator 3.0

STILL THE BEST BROWSER, BUT COULD USE A DIET

T

his month's entry in the Web-browser wars comes from the 800-pound Mozilla, as the long-anticipated Netscape Navigator 3.0 dives into the fray. Since Netscape's 2.0 version, Microsoft's surprisingly competitive Internet Explorer 2.0 has been fighting back hard; now, in response, Navigator 3.0 arrives with enough new Web goodies to sting the contender from Redmond.

New to Navigator 3.0 is support for different sound formats (including music that can play in the background of Web pages); QuickTime movies; and best of all, Java, which lets you enhance your Web pages with mini applications known as applets. JavaScript, Navigator's built-in scripting language, has new commands and bug-fixes. There's also increased support for HTML 3.2 tags, and as usual, Netscape has thrown some new tags of its own, including ones for multicolumnar text, background colors in tables, and font control. On the security front, Navigator 3.0 includes harder-to-crack 128-bit encryption keys, up from the 40-bit keys in the previous version. At press time, Netscape hadn't shipped the Mac plug-ins for Live3D, which implements its VRML support, or for CoolTalk, the Internet phone feature. Also still in beta was Navigator Gold 3.0, which adds a WYSIWYG HTML editor to the program.

RAM Hungry—and Proud of It

Navigator 3.0 isn't frugal in its requirements: including the Java components, it takes up 8.3MB of disk space, and you'll probably want to reserve another 5MB or so for the cache folder, which stores pictures and text from your frequently visited sites. The program also asks for a whopping 9MB of RAM. Adding insult to injury, loading a Web page with a lot of text or even a small Macromedia Shockwave animation often causes Navigator to complain that it is out of memory, request more, and abort the page load. In contrast, Internet Explorer 2.0 gets by with 4MB of your hard disk and 4MB of RAM, and doesn't choke on big pages.

Navigator's speed in loading Web pages is good, although due to the real-world vagaries of loading pages over the Internet, my tests were necessarily informal. Internet Explorer loads pages from the Web at about the same speed as Navigator, but beats Navigator hands down in reloading viewed pages. While pressing Navigator's Back button leads to a perceptible wait, clicking on Internet Explorer's Back button causes text and graphics to snap back onto the screen almost instantly. Internet Explorer also gives the impression of being faster when loading pages because it displays text immediately, then fills in the images.

Getting the Mail, Reading the News

Navigator's improved integrated E-mail and Usenet news modules are serviceable and convenient, but they lack features found in stand-alone mail and news programs. Both modules display their information in a window containing three resizable frames. The largest frame contains the current E-mail message or Usenet posting. The two smaller frames list your selected newsgroups and a list of postings (in the news module) or a list of your mail folders and the mail list (in the mail module). Stuffing all these functions into one window makes the modules feel cramped, even on a good-sized monitor (see "Mail Call").

The mail module has some unique features: you can send and receive HTML documents, and the recipients (if they're also using Navigator) see them as if they were actual Web pages, including text, graphics, multimedia, Java, and JavaScript. URLs in mail messages (and Usenet postings) appear as links. You can also create as many mail folders as you wish, which helps in organizing your messages.

As is the unfortunate case with most Web browsers, including Internet Explorer 2.0, Navigator 3.0 crashes a lot. A long surfing session almost always ends with a crash, usually of the freezing-the-whole-Mac variety. I often take this as a sign that it's time to turn off the computer and just go to bed. Still, there's no excuse for this sort of instability in an application that has become a basic tool for so many people.

The Last Word

The frenzied pressure to compete in the browser market has brought forth another winner from Netscape. As the only shipping browser that supports Java, Navigator 3.0 gives Macintosh users a much-needed window into this exciting addition to the Web experience. With its built-in mail and news clients, it may be the only Internet program many users need. Unfortunately, the program sucks up more than its fair share of system resources, and the pressure to revise products quickly (Navigator 4.0 is expected to begin public beta testing before 1997 rolls around) has made Navigator 3.0 less stable than it should be.

Netscape Navigator 3.0 is still the best Web browser available for the Macintosh. But it comes with enough flaws that Netscape should hardly rest easy, especially with the next Macintosh release of Internet Explorer just around the corner.—Tom Negri

Mail Call  Even on a 17-inch monitor, reading mail with Navigator can be a bit cramped, although having URLs as live links is a nice feature. And even while checking my mail, I could hear a sound file playing from the Web page in the background.

---

Performa 6400/200

DELIUGHTFUL SOHO SYSTEM, AT A PRICE

DOWN AT MY LOCAL ELECTRONICS store, I'm always greeted by a familiar scenario: five to ten Intel-based PCs running superexciting video and blasting out jazzy tunes. And then there's the lone Performa. Like a wallflower at the prom, it sits quietly, waiting for someone to come by and discover the power of Macintosh.

Enter the Performa 6400, a new breed of Performa design. Nicely packaged in a sporty minitower chassis with scads of power and lots of room for expansion, it's also packed to the gills with entertainment, education, and productivity software.

The Performa 6400/200 is powered by a 200MHz PowerPC 603e and a 256K Level 2 cache. It comes stock with 16MB of RAM, upgradable to 136MB via two DIMM sockets. Storage includes a floppy drive, an 8X CD-ROM and a 2.4GB hard drive, and an empty 5.25-inch expansion bay for additional goodies. A Global Village Teleport Platinum 28.8-Kbps fax modem is built in. Expansion options include two 7-inch PCI slots and two proprietary slots. (A 180MHz version with a 1.6GB hard drive but without the L2 cache is available for $2399.)

A New Beginning
A positive out-of-box experience is essential with any new computer, and the 6400 takes this concept to new levels. On startup, you'll notice a deep, loud tone, courtesy of a meaty speaker in the bottom of the 6400's chassis. If you attach external speakers, the internal speaker acts as a subwoofer, capturing bass tones while sending high tones out to the external pair. It's the best sound I've ever heard coming directly from a computer.

After the extensions march across the screen, you're greeted by a friendly video guide who takes you through your new Mac's features, including mouse skills, online registration, and a Mac OS tutorial. The guide's delivery is excellent and communicates Mac basics well to a wide variety of users.

Full of Surprises
The first goodie I tried was the telephone, though my previous experiences with computer-based speakerphones had yielded lukewarm results and my expectations were low. When I explained to the person I called that I was using my computer as a phone, he was quite surprised and said my voice sounded clear and loud. The software responsible is Megaphone, a great little telephony application that includes voice-mail features.

Next, I got up and running on the Internet, surfing the Web in a matter of minutes, thanks to the Apple Internet Connection Kit. In conjunction with the Performa 6400's release, Apple has launched My Home Page (http://www.myhome.apple.com), a handy stepping-off point for new users and old pros alike.

And the list goes on. The Performa 6400 comes with an impressive list of software titles for use in everything from writing your memoirs to creating and publishing your own Web page. For a complete list, check out http://product.info.apple.com/productinfo.

The Last Word
The Performa 6400 is full-featured, zippy, and fun. I just wish it were cheaper. In the supercompetitive SOHO market its price represents a significant investment for those on a tight budget, especially when Windows-based home machines offer similar features at a lower price. Apple has done its job in creating a home computer that is truly delightful. The task at hand is convincing consumers to pay a little extra for that delight. —Matt Clark

RATING: ★★★★/7.0 PROS: Lots of power; lots of software; lots of fun. CONS: A bit pricey.

Performa 6400/200 Stacks Up Nicely

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For more information on our tests, see "The New Speed Champs," Macworld, July 1996. —Macworld Lab testing supervised by Mark Hurlow
YoYo 1.2

TELEPHONY DOESN'T HAVE TO BE TRICKY—OR BORING

BIG ISLAND'S YOYO 1.2 IS SOMETHING NEW—a hardware-and-software combination that connects to your phone and your Mac. With the YoYo, you can screen and log your calls, dial the phone, and even have your Mac page you when you're away from the phone (see "Your Mac Is Ringing," elsewhere in this issue). For small-office or home-office users in particular, YoYo is an amazing productivity tool.

Who's on the Phone?
The YoYo requires the phone company's Caller ID, a service that lets you know who's calling before you pick up the phone. Between the first and second rings, the phone company transmits the caller's phone number—and in some parts of the country, the caller's name—to the YoYo hardware, which passes it on to the YoYoLand software running on your Mac. The YoYo attempts to identify the caller by matching the Caller ID information with an entry in the built-in phone book. If the phone book recognizes the caller, a small window pops up on your screen with a name and phone number; otherwise, the window shows the phone number and the legend "Unrecognized Caller." People who have blocked their Caller ID information appear as "Masked Caller."

Another handy call-screening feature lets you associate each type of caller with a sound and an icon—one for people you know, another for unknown callers, and a third for masked callers. The program comes with a library of icons and sounds you can assign to anyone in your phone book; I've set up mine so that when my girlfriend calls, a sultry voice coos, "Hi, honey." The software also logs each call, saving the caller's name and number, the date, the time and duration of the call, and the status (incoming or outgoing). When your Mac is off, the YoYo stores the ID information and dumps it into the log the next time you boot up.

If you're out of the office, the YoYo can send the caller's name and number to your alphanumeric pager. If you have a numeric-only pager, you'll get the caller's number plus a configurable two-digit code letting you know the page came from the YoYo. In either case, you can specify that all calls, or only those from callers on a VIP list, go to your pager.

I Want to Be Alone!
When you don't want to take any calls, you can set the YoYo's call-blocking feature. Your phone won't ring, but your answering machine or voice mail will still pick up, and the YoYo will still log the call. You can specify that some callers always be blocked (perfect for those annoying relatives) and others never be blocked; you can even block calls from certain area codes and prefixes or during certain hours. Because the call-blocking lists are stored in the YoYo hardware, blocking works even when the computer is turned off.

The YoYo also works as a telephone speed dialer—you simply assign a hot key to bring up a list displaying the contents of the phone book. If you subscribe to your phone company's voice-mail service, a flashing light on the YoYo tells you when you have messages waiting. Unfortunately, the YoYo doesn't allow you to use a calling card; Big Island says this feature is slated for a future release.

The YoYo hardware hooks up in a flash, connecting to the Mac via the ADB port. On the back of the YoYo are two standard telephone jacks, one for your telephone and the other for your answering machine or wall jack. The current hardware only works with one phone line, which hardly seems enough in today's world. The YoYo works fine with Centrex systems but may be incompatible with PBXs, especially older ones, that can't transmit the Caller ID data.

If you prefer to use your own personal information manager instead of YoYo's phone book, the included sample AppleScripts let you send the Caller ID information to Now Software's Now Contact or TouchBase Pro, Symantec's ACT, or Claris's FileMaker Pro, which then looks up the caller and displays that record. The combination of a good PIM and the YoYo is terrific because it makes all your data on a caller—including name, personal information, notes from previous calls, and reminders of events you have planned with the caller—instantly available when you answer the phone. You'll probably have to tweak the supplied scripts a bit, though; they create a new record whenever there is no match for the Caller ID, resulting in new records for wrong numbers and telemarketers.

The Last Word
The YoYo makes the long-promised computer telephony a reality on the Mac. I was surprised to discover how advantageous it is to see who's calling; I'm better prepared when clients call, and it's easier to screen my calls when I'm working and don't want to be disturbed. If you're like me and have to juggle lots of telephone calls, the YoYo is a winner.—TOM NEGRINO

Cool Phone Tricks

The YoYo hardware and software make it easy to use. The three smaller windows show what appears on your screen when you receive calls from a recognized caller, an unknown caller, and a masked caller.
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Let's say it's 4:37 on Tuesday, and your client proposal is due at 9:00 on Wednesday. Hey, that's tomorrow! And, you haven't even started yet! Well, if you had a business computer from UMAX, there'd be no need to panic. First, shoot off an email to the client via the built-in 28.8 bps fax/modem telling them how hard you've been working on their account and how you can't wait to take their money. Now to work. Thoughts flow out easily using Claris Works', the super-program that's perfect for putting the shine on your remarkable ideas. Missing a few critical facts? Check it out quick with NowWhat 'Talking Globe' Atlas/Chronosphere' and Grolier Encyclopedia. Boy are you smart! And what about those numbers? Just fire up Quicken' and the next thing you know, you've got your bottom line. Legalities? Put it all down in writing with Family Lawyer', a program that allows you to draft up some of the most commonly used legal documents with just a few simple keystrokes. You are so wise! Last-minute changes? Let the computer read them in for you with the NewSoft' OCR. Phew! Now you're done. Just check your schedule with Now'UptoDate' and... oh oh, a conflict! The boss has scheduled a power breakfast at Benny's in the morning. Don't worry. Get the client's web address using Netscape' Navigator', send your proposal over the net - and the b.c.l's in their court. But, what if they respond? You don't have a web-page! Better start building it now with Pagemill'... the #1 page building title today. Yeah, okay, but first how about a double latte? Sorry, can't help you there. Thats the only thing a UMAX can't do.

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Phaser 350

THE LATEST TEKTRONIX SOLID-INK PRINTER DELIVERS LASER-QUALITY OUTPUT

The hottest feature of the Tektronix Phaser 350 solid-ink printer isn’t its zippy print engine, vibrant color output, or bundled printer-management software; it’s the unlimited supply of black ink that Tektronix is providing free.

The free black ink is more than a promotional gimmick; it’s part of Tektronix’s marketing plan to boost the appeal of its newest solid-ink printer to users who require a workgroup printer that can handle both color and monochrome jobs. The idea is that with the black ink supplied free, you can afford to use the 350 for all your office printing—not just the fancy color jobs. (Tektronix is also offering the free ink to users of the Phaser 340, the 350’s predecessor.)

Even without the free ink, though, the Phaser 350 is a compelling printer. It has a compact design, a relatively speedy 6-pages-per-minute print engine, and solid-ink technology that delivers rich colors on standard office paper. The print quality is far superior to that of earlier Tektronix solid-ink printers, such as the Phaser 300 PXi. Amazingly, the 350 produces color output that rivals that of color laser printers—yet it costs at least $1500 less than even the least expensive color laser. Consumables—in the form of color ink sticks at $99 for a package of three—are also less expensive than color laser toner cartridges, which can cost more than $200 each.

The 350 is easy to set up, with clearly marked components that pop neatly into place. The slots for loading the ink sticks are easy to access and are color- and shape-coded, making it impossible to drop ink sticks into the wrong slots. The front control panel is a bright, two-line LED display with a straightforward menu structure that makes it easy to configure the printer, activate internal cleaning operations, and print test pages. The 350 is equipped with a SCSI port and a parallel port; optional Ethernet, Token Ring, and LocalTalk interfaces are available.

The printer operates in three modes: Fast Color, Standard, and Enhanced. The Standard mode, at 300 dpi and about 4 ppm, is fine for most jobs, producing deeply saturated colors and text that is clean and smooth, though not razor sharp. The Fast Color mode, intended for quick proofing jobs, allows the 350 to print up to 6 ppm, but with somewhat washed-out color, more dithering, and cruder-looking text. The Enhanced mode bumps the resolution up to 600 by 300, but requires at least 24MB of memory (the basic 350 ships with 8MB of RAM). The resolution enhancement produced the best results, of course, but the improvements were not always that noticeable compared with the Standard mode.

Because the 350 must first melt the solid ink sticks in order to print, the printer requires a relatively long warm-up—about 15 minutes. Once it’s warmed up, though, it’s pretty fast—for a color printer. In its Standard mode, on average the 350 printed a bit faster than a 600-dpi Tektronix 550 color laser printer. In our Adobe Photoshop tests, the two printers were neck and neck. However, the 350 was able to handle certain jobs faster than the laser printer. For example, the 350 printed an Adobe Illustrator file 16 percent faster than the 550, completing the job in 102 seconds instead of 122. And it cranked out an Adobe PageMaker newsletter in less than half the time of the 550, processing in 91 seconds what took the 550 just over 184 seconds.

The Last Word
The Phaser 350 delivers what most users are looking for in a color laser printer—but at a much better price. Despite its 300-dpi print engine, it produces gorgeous color and acceptable text. If you don’t require tabloid printing—the 350 can handle only letter- and A4-size stock—it’s an excellent choice for cost-effective color printing.—JOSEPH SCHORR


Reasonable Speed for a Color Printer

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Behind Our Tests
All tests were performed on a Power Mac 7100/80 with 24MB of RAM running System 7.5.3. Printers were connected via the Ethernet port. For more information, see "Color Laser Values," in this issue.—Macworld Lab testing supervised by Jeff Sacilotto.
AppleTalk for Windows 95

FINALLY, NEAR-SEAMLESS CROSS-PLATFORM NETWORKING

EIGHT MONTHS AGO, THE FIRST AppleTalk networking software for Windows 95 was a disappointment (see Reviews, March 1996). The two products—Miramar Systems’ Personal MacLAN Connect 5.5 and Cooperative Printing Solutions’ COPSTalk 1.2—didn’t integrate fully into the Windows 95 networking architecture, and they didn’t support Windows 95’s new, 250-character file names.

That’s changed. Both programs have been revised, and both now offer near-seamless integration with Windows 95.

Windows 95 Network control panel to see what chip set you have.) Both PC MacLAN and COPSTalk offer only rudimentary extension maps, which allow the correct Mac icon to appear in Windows (such as an Adobe PageMaker icon for a PageMaker file). The programs automatically set up a few common mappings, but there are no lists of others in the manuals or online help. It would be much better if you could click on a Mac file to get its file and creator types, and then add the PC extension. While both programs include an editor to add and modify file maps, they rely on you to figure out the Mac file and creator types—something the Mac OS doesn’t reveal.

The Big Difference
Both products are equally well integrated with Windows 95, and both let a PC run as an AppleTalk client. So why choose one over the other? PC MacLAN 6.0 also lets a PC act as a file server to Macintoshes (and AppleTalk-based PCs), allowing client Macs to see its drives and printers. Because COPSTalk 2.0 is just a client, it lets the PC see Mac devices but not vice versa.

PC MacLAN 6.0’s integration with Windows 95 comes in handy for using the server. PC MacLAN 6.0 integrates itself into the Windows 95 context menus, which display only relevant actions when you right-click on a device or file. Using PC MacLAN 6.0, the context menu for a drive (fixed or removable) lets you turn file-sharing for that device on or off, as well as to launch the PC MacLAN server. This helps make PC MacLAN truly an integral part of your Windows 95 environment.

The previous version of PC MacLAN’s server software worked capably, and the changes are minimal. You can now configure the file server to start automatically when Windows 95 starts. (Unfortunately, the manual’s directions to do this are unnecessarily difficult. It’s easier to put an alias of the server icon in the StartUp folder, right-click the icon, enter the Properties menu, and add a space and then -s to the end of the Shortcut Target’s command line.)

PC MacLAN’s configuration of the file server could also stand improvement. If you turn on the file server, you’ll find your performance throughout Windows 95 slowing to a crawl—you’ll go crazy trying to work like that. The culprit is the default polling time for the file server: it polls the network constantly, giving Windows 95 and your programs minimal resources. The fix is complicated and not well documented in the manual. (You can find full directions on Macworld Online, http://www.macworld.com/pages/november.96/extras/windows.html.) The file-server control panel should let you change this value directly, rather than force you to edit the innards of the Windows 95 registry file (the equivalent of using ResEdit on the Mac).

The Last Word
Both COPSTalk 2.0 and PC MacLAN 6.0 work well—once they’re set up, you’ll forget they’re there. That’s great news. For peer-to-peer cross-platform networking, where both Macs and PCs can see each other’s files and printers, PC MacLAN 6.0 is the only choice. But if you’re mainly a PC user who only needs access to a Mac server, COPSTalk 2.0 does do the trick for less—GALEN GRUMAN

COPSTalk 2.0 for Windows 95

RATING: ★★★/6.8 PROS: Gives PCs running Windows 95 native access to Mac files, printers, and folders. CONS: Expensive; does not let Macs work with PC files, printers, or folders. COMPANY: Cooperative Printing Solutions PRICE: $199 (single user).

PC MacLAN 6.0 for Windows 95

RATING: ★★★/7.5 PROS: Lets PC users use Mac files, printers, and folders as standard Windows 95 resources, plus lets Macs use Windows 95 files, printers, and folders. CONS: Does not provide easy file-extension mapping; has some unnecessarily difficult configuration requirements. COMPANY: Miramar Systems PRICE: $199 (single user).
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Map Factory

UNIQUE RASTER-BASED MAPPING PROGRAM

T he dominant geographic information system (GIS) programs for the Macintosh, ESRIS's ArcView and MapInfo's MapInfo, use a vector-data model, which represents geographic features as points, lines, or polygons. Both are limited to the static viewing of raster data, where a fine grid is laid over the landscape, dividing it into a large number of evenly spaced cells with each cell accorded its own value.

ThinkSpace's Map Factory, a new entry in the GIS market, focuses exclusively on the raster-data model. While its overall capabilities are not as broad as ArcView's or MapInfo's, Map Factory provides a rich set of functions for creating, editing, analyzing, and presenting raster data. Researchers, educators, and planners interested in landscape analysis should take a particularly close look at Map Factory.

In a vector-based GIS, each geographic feature is associated with a record in a data table. This approach is most appropriate for discrete geographic features, such as school sites (points), streets (lines), or cities (polygons). However, many types of geographic data are continuous rather than discrete; for example, soil composition, elevation, and precipitation do not change abruptly, but instead vary gradually over space. A raster-based GIS most effectively portrays such data types. The hundreds or thousands of cells that represent a landscape allow for complex spatial variation, similar to the role pixels play in a digital photograph.

First, Make a Map

The first step in using Map Factory is to create a map. One common source of raster data is scanned images of paper maps—particularly the topographic sheets published by the United States Geographic Survey. While Map Factory provides a set of simple tools for manually tracing line and area features, this is a tedious process. Fortunately, users can avoid most tracing by using Map Factory's translators to import data from digital images (such as satellite pictures and aerial photographs) and other mapping applications. Several translators convert vector data to raster form, allowing it to be used in Map Factory.

One key source of raster data is the USGS's archive of Digital Elevation Models, available free over the Internet. Map Factory provides only a rudimentary mechanism for registering maps to Earth's surface, so for the greatest accuracy all data sources should be in the same map projection.

Once you create a map, Map Factory shines in its display and analysis functions. A legend window summarizing cell values accompanies each open map window. A magnifying-lens tool is available to highlight individual pixel values, which is handy when the legend contains numerous unique values.

Users can select value ranges and apply graduated color sequences, or change the colors that correspond to individual values. Unlike other GIS programs' muddled or pixelated color sequences, those in Map Factory are bright and distinct. Unfortunately, the interface for changing colors is a somewhat cumbersome dialog box that you must open and close for each change. A floating palette would be much easier to use.

Analyzing Maps

One of the most important advantages of Map Factory's raster-data model is the relative ease and speed of analytical operations. Map Factory includes about 20 such operations, along with a full suite of mathematical functions and operators for working with cell-value matrices. Spread, for example, is a sophisticated tool for creating variable buffers depending on elevation or any other factor, for use in everything from analyzing flood zones to modeling the dissipation of pollutants through groundwater. The Clump feature aggregates cells of similar types within a specified distance, allowing for, say, the examination of forest patches and clearings. To conduct your analyses, you build statements in a nicely designed script editor, complete with drop-down menus for inserting the proper syntax. Each operation draws on one or more source maps to create a new result map.

Once analysis is complete, you can use Map Factory's layout facilities to place a map on a page along with elements such as a title, legend key, scale bar, and north arrow. Creating attractive presentation maps to suit one's taste is easy. One particularly nice formatting feature is the ability to create gradational scales for continuous data such as elevation.

Map Factory is admirably conservative with system resources, requiring as little as 3MB of permanent hard drive space and 1.5MB of RAM to run comfortably on a Power Mac. The program is not a speed demon, and analytic operations can take several minutes to complete, depending on the data's size and operation's complexity. Once the results are ready, though, drawing to the screen is always reasonably quick.

The printed manuals accompanying Map Factory are lucidly written, well organized, and full of practical examples. In addition to the User Guide and Module Reference describing the program's functionality, Map Factory includes an excellent 200-page tutorial that steps through the entire process of creating, displaying, analyzing, and presenting a map.

The Last Word

Map Factory is no substitute for high-end GIS programs, nor for common desktop mapping programs. But it's unique for the functionality it brings to the Mac. Users who need to do landscape analysis, particularly those who need to teach others about GIS, may find it a useful addition to their toolboxes.—KARL GOLDESTIN

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DO THREE SPEAKERS REALLY GIVE YOU BETTER SOUND THAN TWO?

As I wrote in my recent survey of computer speaker systems, a three-piece computer speaker system with a dedicated woofer (some call it a subwoofer) should offer better-quality bass, but some models just don't deliver (see "Multimedia Speakers," Buyers' Tools, March 1996). In this comparison, Yamaha improves upon an older model, but Midi Land's system is subpar.

Midi Land S35/818

The Midi Land S35/818 System has two sets of controls. You'll find a standard power switch, volume and tone controls, and a headphone jack on the right-hand satellite unit. The subwoofer has an additional set of controls and jacks on a small, separate module. This control unit has its own system volume control, a level control for the woofer, a control to set the frequency at which the woofer takes over (although it offers no visual indication of what you're setting), and a DSP switch that creates a 3-D sound effect. At the rear of the module is a phase-smoother switch that's supposed to provide clearer reproduction of low frequencies (I didn't notice much difference), plus various input jacks. You can connect two sources and a mike.

Midi Land claims that its Mli-S35 subwoofer goes down to 35Hz, which is a pretty low frequency limit for a small speaker. But a quick run with a test CD showed that very little was audible once you got below 60Hz. For most musical material that's probably adequate. The bass, however, had a thumpy, boommy quality, and the all-important midrange, where most musical material lies, sounded rather harsh. Neither voices nor music excelled with this product. The DSP circuitry extended the sound stage of CD games but simply made music CDs sound more distorted than they were already.

The manuals for both the satellites and the subwoofer are bare-bones affairs, just four pages each. The system's functions are illustrated, but there is no advice on how to fine-tune the satellite units and subwoofer for best performance. The manual shows the phase switching, 3-D effects, and subwoofer frequency adjustment controls, but doesn't tell you how and when to use them.

Yamaha System 45

Yamaha's System 45 mates a new product with an older one. The YST-M15 multimedia speaker system (available separately for $99.95) is new, while the subwoofer component, the YST-MSW-10, was examined as part of the YST-SS1010 system in the "Multimedia Speakers" article. This subwoofer is an OK speaker, with good bass and a listenable but slightly smeared sound quality.

The Yamaha's controls are straightforward. The right-hand satellite unit has basic power, volume, and tone controls and a headphone jack at the front. Output to the subwoofer, and separate inputs for your Mac and (for example) a CD player, are found at the rear. The subwoofer has a two-position switch to select the frequency at which it takes over, plus a level control and power switch.

The all-too-brief manual is multilingual, offering confusing setup illustrations with captions in seven languages. As with the Midi Land speaker system, you get no advice on adjusting the volume level or placing the subwoofer module.

When it came to sound, the Yamaha System 45 fared rather well. The sound was reasonably crisp and clean, and bass notes sounded strong but not boomy. While the floor didn't shake, I got usable bass down to around 50Hz. The system played loudly enough for a small room, but don't expect miracles.

All told, though, the System 45 didn't quite come up to the level of the top-rated product in this category, the Acoustimass Multimedia system from Bose. However, it also costs less than half as much.

The Last Word
When it comes to features, both systems have the right stuff. But sound is where it's at, and the Midi Land system fared poorly in its sonic attributes. In contrast, Yamaha's System 45 is a step up from its predecessor, giving you decent sound at a decent price. It's worth a listen, but don't expect it to be a match for a good-quality conventional home stereo.—Gene Steinberg
Buy the modem CRN rated “top performer overall.”

Viking Fax Modems

In recent comparisons of the industry’s leading modems, the Computer Reseller News Test Center designated Viking Components “the top performer overall,” beating out such industry icons as USR and Hayes. In fact, CRN called Viking’s NetLink 28.8 ISA modem with digital simultaneous voice data (DSVD) “the stand-out winner.” The Rockwell-based Viking modem landed five first-place and one second place finishes, including fastest in all SVD benchmarks, outpacing the nearest competitor by as much as 45%. It was “the only modem tested that displayed virtually no degradation in performance in the presence of voice, making it an excellent choice where voice is a constant and optimum transfer rates are critical.” Of the top finishers in the test, Viking was also the lowest priced. Sometimes you do get more than you pay for. To order a Viking NetLink 28.8 modem, call toll-free, 1-888-91-4-INFO.
Telephone Directories on CD-ROM

PRODUCTS RANGE FROM RINGING OFF THE HOOK TO WRONG NUMBER

A T FIRST GLANCE, THREE NEW telephone directories on CD-ROM—PhoneDisc PowerFinder, Phone Search USA, and Select Phone—are similar, but putting them through their paces made it clear they're not created equal.

Variations on a Theme
The CDs contain the numbers and addresses of businesses and residences in the United States. All three split their data over geographically segmented discs. PhoneDisc PowerFinder and Select Phone each have 6 discs, but PhoneDisc claims 112 million listings while Select Phone has 100 million. Phone Search USA pulls up the rear with only 80 million listings on 3 discs.

Phone, you type your criteria into the search window and press return, and your results appear almost immediately, although complicated searches can take minutes in Phone Search USA. In PhoneDisc, as you type your search criteria the scroll box instantly fills with the nearest matches. This fast response beats the other two programs.

One by One
Phone Search USA has the simplest design and offers the most basic features. It lets you add records to a selection for later exporting and printing—particularly useful when compiling records from multiple discs. Phone Search USA was originally developed for Windows, a fact that's obvious when you consider its many un-Mac-like ways. For example, switching from one disc to another is needlessly complicated, and the program completely lacks menus (there's not even a Quit command).

Select Phone most closely resembles a Mac program. Its SmartFind feature displays records that are close to your specifications—great when you're not certain of spelling or location. Also helpful, especially for compiling marketing lists, is the ListMagic feature, which selects only records that meet certain qualifications. The unique GeoTarget feature searches for records within a certain distance of a location, or for a given number of records near a location. Another practical feature lets you view records that are close to a selected item, either geographically or alphabetically. Select Phone's only disappointments are that searching across discs is a pain, and switching discs is too complicated.

PhoneDisc has some unfortunate interface problems. For example, the selection bar in the search-results window obscures the data it's supposed to highlight. You can't use shift-tab to move to previous fields in dialog boxes. And PhoneDisc can't tag records for easy collection into a single file.

Still, PhoneDisc offers enough powerful features that I can forgive these flaws. You can narrow searches by entering additional information that must match. PhoneDisc allows you to see a listing's neighbors, but instead of displaying just one street, you can scroll to see other streets in the same town, or towns with similar names. The Try Harder feature, which looks for similarly spelled names, is also nice.

The Last Word
Given its poor reliability and bare-bones feature set, there are only two reasons to consider Phone Search USA: its low price and its unique ability to be used in conjunction with DeLorme's Street Atlas USA 3.0 (also reviewed in this issue). Deciding between PhoneDisc and Select Phone is a little more difficult. While I like the instant response and easy disc switching of PhoneDisc, Select Phone is somewhat more reliable and has a few very useful features, most notably GeoTarget, that PhoneDisc doesn't offer. Top it off with a nice Mac interface, and Select Phone edges out PhoneDisc.

---

PhoneDisc PowerFinder 2.2

RATING: ★★★★/7.2 PROS: Most listings; instant response; quarterly updates, with one free.

Phone Search USA 2.0

RATING: ★★★/3.0 PROS: Compiling lists is easy; inexpensive; works with Street Atlas USA.

Select Phone 4.0

RATING: ★★★★/7.2 PROS: Most accurate and Mac-like; many useful, unique features; quarterly updates are available. CONS: Switching discs is difficult; updates are expensive. COMPANY: Pro CD (508/750-0055, http://www.procd.com). LIST PRICE: $99, quarterly updates $89.
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Eudora Pro 3.0
INTERNET E-MAIL READER IMPROVES, BUT NOT BY MUCH

Eudora has been the benchmark in Internet E-mail since its release as freeware several years ago, but it was starting to show its age when Claris Emailler arrived last year and offered some much-needed competition. The commercial release of Eudora Pro 3.0 smooths out the rough edges of the program’s interface, improves mail handling, and makes the program more convenient to use. It doesn’t pioneer many new features, though; this feels more like a minor revision than a major upgrade.

Eudora Pro’s most dramatic improvement lies in its mail filtering. This feature lets you apply a set of rules to incoming or outgoing mail; for example, I set up a filter that takes incoming mail from macworld.com, sets it to high priority, labels and colors it, plays a sound, and files the message in a special mailbox. You can create any number of filters, and you can even apply filters manually to any messages (Emailler’s Mail Actions aren’t as flexible as Eudora Pro’s, and they filter mail only as it’s received). Missing is the option to take action if the sender is (or is not) in the address book, a filter that’s present in Emailler.

Eudora Pro relieves the stark user interface of its predecessors by adding a configurable tool bar with icons denoting the program’s common commands. Still, the interface could be charitably described as no-nonsense (or, not so charitably, as just plain ugly). The address book is another improvement, but it’s still vastly inferior to Claris Emailler’s. Eudora requires a nickname for every address and forbids spaces or punctuation in the nickname. When you enter a partial nickname in the To field of a new message, Eudora won’t complete the name unless you use a menu or keyboard command (Emailler guesses and completes the name as you type). Emailler can easily handle multiple E-mail accounts for an addressee, and while you’re addressing the mail you can choose which account to send the message to; with Eudora you have to use a separate address-book entry. You can drag and drop addresses from Eudora’s address book into a message, but you can’t drag addresses from messages into the address book to create a new entry. And while the manual says you can create a mail group by selecting several addresses and using a menu command, repeated attempts to do this crashed my Mac.

One nice improvement is that Eudora Pro now colors and underlines URLs in messages, and clicking on an URL launches the appropriate application. And Qualcomm has made several other small but welcome improvements: the program no longer slices messages larger than 32K into smaller messages; it now supports styled text in messages sent to mail clients that understand the “text/enriched” MIME standard (which, at the moment, means only other Eudora Pro users); the Find command has been enhanced, making it easier to search multiple mailboxes; you can now append any number of signatures to messages; and the program ships with Working Software’s Spellwell 7, a spelling checker that works from within other applications.

The Last Word
Eudora Pro is a very good Internet E-mail client, and longtime Eudora users should be happy with this upgrade. But in spite of the powerful mail filtering and improved interface, nothing here is compelling enough to tempt Claris Emailler users to switch...—Tom NeGrino


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AirCommunicator Lite

CELLULAR FAX MODEM WITH FLAIR OFFERS A COMPLETE SOLUTION

Most cellular modems require you to have your PowerBook turned on to receive a fax—not very convenient when you’re running through an airport. The AirCommunicator Lite solves that problem by receiving and storing faxes while it’s in your pocket. You can download the faxes into your PowerBook later. On top of this elegant bit of convenience engineering, the AirCommunicator doubles as a cellular phone, an answering machine, and a 14.4-Kbps modem.

The AirCommunicator package includes a cell phone and battery, desktop charger, serial cable, Mac and Windows software, and a user guide with a well-written Macintosh section. An optional Executive package adds a docking station that lets you run the AirCommunicator off AC power and use it as a 14.4-Kbps fax modem over regular phone lines. The Mac software consists of Smith Micro Software’s MacComCenter fax and terminal-emulation package, and a set of scripts for Apple Remote Access (ARA).

The compact AirCommunicator phone is a little larger and heavier than the popular Motorola flip phone, but fits well in the hand and has an easy-to-read two-line backlit alphanumeric display. You can configure the AirCommunicator in stand-alone mode to receive and store faxes, to send stored faxes to a fax machine, and to operate as a digital answering machine. As shipped, the unit can hold about a half-dozen fax pages or two minutes of voice mail. The Executive model’s memory-compression feature ups these limits to 37 pages and 16 minutes, respectively. A remote software-upgrade feature conveniently lets you download new software from Air Communications over the air, a feature I tested by downloading the memory-compression option.

When set up to receive faxes automatically, the AirCommunicator display tells you how many faxes have arrived. Alas, the fax counter shows only a single digit; when more than nine faxes are stored, the counter turns to an asterisk.

Once a fax is stored, you can send it to a fax machine (handy for paper copies) or your PowerBook. To transmit a fax to your PowerBook, you connect the AirCommunicator to the Mac’s serial port. The Mac sees the incoming fax as a phone call and automatically receives it. You can then view or manipulate the fax just as if it had been received over a regular phone line. The fax software is rather generic but has all the features you need for faxing on the road, including cover sheets and a phone directory.

AirCommunications touts its proprietary AirTrue cellular protocol, designed to ride out cell switches and brief signal outages. Indeed, I was able to maintain an Internet connection while traveling in a car all over Los Angeles, as long as I was able to first configure the remote end with the special AT commands documented in the user guide. However, because fax machines don’t support these commands, faxing while moving works poorly.

The Last Word

The AirCommunicator Lite is a wonderfully elegant solution to the problem of receiving faxes while traveling. That it includes a slew of other useful features—

including well-thought-out Mac documentation and software—is icing on the cake. When combined with the optional docking station, it can be a complete PowerBook modem solution. —MEL BECKMAN

RATING: 4.5/5
PROS: Stand-alone fax send and receive; integrated voice mail.

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MANY MACINTOSH USERS ARE only dimly aware of servers based on the Network File System standard perhaps because the first NFS client-server setups were available only for Unix and Windows NT servers. But you may soon encounter URLs that begin with nfs:// rather than http://, on a corporate intranet if not yet on the Internet. Because the NFS technology essentially makes any server—a Mac, Windows NT, or Unix system—look like just another hard drive on your desktop, it's a natural extension of the Mac interface. That's why it's disappointing that Apple didn't implement NFS as part of the system software.

Fortunately, two third parties have stepped in: InterCon with its NFS version of tcpConnect4, version 4.0 Enterprise; and NetManage with ChameleonNFS 3.6. Both provide standard Internet applications (FTP and Usenet clients, Gopher, E-mail, terminal software, and SLIP/PPP connections), along with support for Web browsers and HTML, but the philosophical and practical differences between the two are substantial.

These suites feature simple client software that lets network administrators manage security and other issues easily—tagging servers to appear at start-up, updating server lists, and associating different levels of security with different office groups. They work just like AppleShare, and they use the Chooser to let you select your NFS sites as if they were local physical network units.

That's where the similarities end. For one, Chameleon's origins as a Windows product are evident in the manual and the software itself. And Chameleon packs a large assortment of conveniences to help you work with Unix hosts, along with basic tools for HTML: tcpConnect4 doesn't do this, but it includes some special applications and a consistent icon bar across those programs.

The cloud hanging over both programs is dust from the Netscape-Micro soft browser race. FTP clients, efficient and trustworthy though they are, seem almost quaint compared with the FTP functions in Netscape Navigator 3.0. The old model of one application for E-mail, one for Gopher, one for Telnet, and so forth has receded before the forces of the Web and the current generation of megabrowsers. Neither Chameleon's WebSurfer nor tcpConnect4's browser—both clean, simple, and quick—can handle Java yet, so they'll need some updating. And while NetManage's terminal communications program is useful, fully programmable, and broadly configurable (the terminal software in tcpConnect4 is less powerful but significantly easier to configure and use), it's been a while since terminal programs—however powerful—were the focus of Internet or intranet development. The prices quoted here are for individual licenses, and per-station prices drop considerably for large sites, but these suites compete in an environment where browser software is free.

The Last Word

With a disciplined programming and configuration effort, companies can use ChameleonNFS to build a fast, secure, multifunctional network that runs well on minimal Mac client hardware. The suite's individual components have little Web-style gee-whiz value, but they work well together, with no surprises. tcpConnect4's suite is simpler to install and use but is less feature-laden. The question hanging over both suites, though, is whether they're still worth considering if NFS support is dropped into the two big Web browsers.—CHARLES SEITER

**ChameleonNFS 3.6**

**RATING:** ★★★★☆

**PROS:** Good collection of small, fast applications. **CONS:** Some tools are ports of older Windows products. **COMPANY:** NetManage (408/973-7171, http://www.netmanage.com). **LIST PRICE:** $395 per user.

**tcpConnect4 4.0 Enterprise**

**RATING:** ★★★★☆

**PROS:** Designed for Mac; easy installation and setup; good integration. **CONS:** Individual apps cover just the basics. **COMPANY:** InterCon (703/709-5500, http://www.intercon.com). **LIST PRICE:** $495 per user.

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CyberGauge

NETWORK MONITORING FOR THE MASSES

ONE-TRICK PONY ISN'T A BAD DEAL if its trick is a useful one, for a reasonable price. Neon Software's CyberGauge does one fine trick—monitoring network bandwidth use—with flair and aplomb, and at a price that makes it an easy buy. Ordinary folks buying Internet access or sharing router connections will find CyberGauge useful for checking that providers and other users are living up to their performance promises. And network administrators will find it a convenient tool for on-the-spot measurements and problem diagnosis.

CyberGauge uses the Simple Network Management Protocol (SNMP) to monitor data traffic in a single network device. It graphs the traffic as a percentage of total available bandwidth, giving you a colorful picture of the device's workload over time. Because CyberGauge monitors a single device, it doesn't need a dedicated Ethernet port as protocol analyzers require. And because its job is much simpler than that of high-end analyzers, you don't need to read a fat manual or understand network protocols to find CyberGauge useful.

Upon launching, CyberGauge displays an intuitive three-window interface. Once you select the device to monitor by typing in its IP address or name, CyberGauge queries the device and displays information about it and its interfaces. You then select the interface (such as Ethernet or serial) you want to monitor and click on the Begin button; CyberGauge starts graphing the device's bandwidth use in its Trends window. At the same time, CyberGauge continuously tracks the minimum, maximum, average, and current use for both input to and output from the monitored interface. Moving the cursor over a graph line displays the exact measurements at that point.

CyberGauge has intelligent defaults for all its configurable parameters—interface speed, SNMP community name, monitoring interval, and SNMP timeout—but you can fine-tune these if necessary. You can also opt to have CyberGauge display raw bits-per-second values rather than bandwidth use. You can print any window—useful for documenting problem situations—and optionally log collected statistics to disk. CyberGauge stores up to several days' worth of measurements on disk and can replay them as needed or export them to a tab-delimited file for spreadsheet analysis. Saving a particular device configuration as a CyberGauge document in your Startup Items folder lets you automatically start monitoring when you restart.

Because virtually all modern network devices, including Mac CPUs, are SNMP-capable, you'll likely have no trouble finding devices to monitor on your LAN. Which device you choose depends on what you're trying to measure. For example, monitoring your Internet router can tell you whether you're getting the bandwidth you're paying for; monitoring an AppleTalk server can warn you when it's time to split the server's load across two or more machines. The ubiquity of measurable devices brings out the one annoying flaw in CyberGauge: it can monitor only one device, and only one interface on that device, at a time. I found an undocumented work-around for this—create multiple copies of the CyberGauge application and run them simultaneously—but this is inconvenient, to say the least.

The Last Word

Until CyberGauge, bandwidth monitoring was the domain of Internet gurus and network administrators—the only people who could justify the expense and education required to use full-blown network-management tools. By making bandwidth monitoring intuitive and easy, CyberGauge brings one key aspect of network management to the masses.—MEL BECKMAN

RATING: ★★★★☆/8.0

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Circle 27 on reader service card
Viewpoint Model 100

MUCH LIGHT, SOME SOUND IN A SURPRISINGLY SMALL PROJECTOR

ONCE UPON A TIME, SHOWING A group of people what was on your Mac meant renting an LCD projection pad—an expensive, inch-thick plate-glass sandwich—and perching it atop an overhead projector. Never mind that such an overhead, a relic from the days of eighth-grade biology class, could overheat, wash out your images, or give you a hernia carrying it.

That’s the beauty of a self-contained Mac projector, a single device that connects to your Mac. The Viewpoint Model 100 weighs 9.2 pounds, is the size of three stacked PowerBook 5300’s, and throws a crisp, bright, extremely customizable image onto the boardroom wall from up to about 20 feet away.

What’s more, the Viewpoint’s phalanx of back-panel jacks stand ready to accommodate more than just your Mac: output cables from VCRs, camcorders, DOS-based computers, and even expensive S-Video gear can all find a home. If you feel you’re not getting your $5795 worth showing slides during meetings, let this multitalented black plastic box double as a projection TV when you’re at home.

Whatever you do, don’t lose the remote control. It’s the only means of controlling many of the Viewpoint’s special features—and there are dozens. You can freeze the picture, enlarge the image, or both. You can summon a little pointing-finger cursor onto the screen and move it by pressing directional arrow buttons on the remote. You can adjust the color, tint, brightness, and so on. If you plan to mount the projector behind the screen or on the ceiling, the remote can flip the image horizontally or vertically. More practically, you can use the remote to switch between the Mac and your VCR.

On the projector itself, an effective keystone control compensates for a common problem: a projected image that’s wider at the top than the bottom. On the other hand, the Viewpoint lacks adjustable legs; to adjust its angle, you’ll have to stuff some magazines under it. So much for high tech.

The Viewpoint falls flat in the audio department. The unit’s speakers are barely loud enough to fill a bathroom. And if you crank the volume, the speakers distort horribly. Given this nod in the general direction of the sound department, the included stereo pan, bass and treble, simulated stereo, and surround-sound stereo controls seem like fancy new deck chairs on the Titanic. Fortunately, the stereo-sound output jacks make it simple to connect external speakers.

Two other touch-ups are called for. First, the remote control offers no backlight (as some rivals do), so you’ll be fumbling in the dark. Second, the manual, while clearly written, is a carnival of clashing fonts, sizes, styles, and misspellings of such challenging words as *handle*.

The Last Word

Of course, you don’t buy a projector for its manual or its remote—or, usually, even for its sound; size, weight, and picture quality are far more important. In that regard, the Viewpoint Model 100 has its heart in the right place. Its dozens of grace notes include a battery of useful visual effects; a clever, self-protective pop-up lens assembly; every conceivable cable and adapter (except the one to adapt a PowerBook’s nonstandard monitor jack); three spare bulbs; and a well-designed carrying case. The Viewpoint is nearly everything you’d want in a projector—without the overhead.—DAVID FOGUE

RATING: ★★★/6.9 PROS: Wonderfully small and lightweight; bright, crisp picture; remote control offers zoom, pan, and other special effects.

CONS: Speakers too weak and distort easily.


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Circle 23 on reader service card
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Amapi 2.1
MODELER FALLS SHORT OF BRILLIANCE

LAUNCHING AMAPI 2.1 IS A BIT LIKE waking up in a foreign country—it's an experience at once beautiful and alien. Developed in France, Amapi is built around an interface that's chic and conceptually innovative; unfortunately, Macintosh users may find it needlessly complex, often demanding, and occasionally awkward.

Less expensive than in its previous incarnation as Ashlar's Design Reality, Amapi offers a very competent, high-precision modeling environment suitable for applications ranging from industrial design to illustration. However, it lacks high-quality rendering and animation tools. If you need photo-realistic images or motion sequences, you have to export models elsewhere.

Amapi lets you build objects combining polyhedral and NURBS (nonuniform rational B-spline) surfaces. You can extrude, sweep, and loft 2-D elements into 3-D surfaces; build objects that are normally lathed, like goblets, by extruding the base-defining curve along a path describing the object's contours; and edit objects by manipulating vertices. Tools that build shapes from three or four defining lines and apply Boolean functions to objects make Amapi adept at producing compound-curved objects.

A virtual table supported by sawhorses sits in the center of Amapi's workspace, and you toggle among three tool palettes—Construction, Modeling, and Assembly—by sweeping the cursor off the side of the screen. Select a construction tool, and Amapi extends two hash-marked, color-coded axes from the cursor for easier 3-D alignment.

Sweeping the cursor downward displays a control panel that contains tools for grouping objects and producing quick-shade renderings. Amapi's Catalog palette lets you save documents simply by clicking on an empty thumbnail and naming the file. It's great for saving model iterations quickly or storing subassemblies for subsequent use in the workspace. Unfortunately, because cataloged objects retain their original location and orientation in space, you can't just drag them to new coordinates alongside other objects.

Amapi's interface is visually striking, but its operation isn't strikingly elegant. Until you learn the program, you'll probably feel a little lost. Unfortunately, Amapi's documentation doesn't help much. The manual—really just a command reference—suffers from content errors, misidentifications, and translation problems. The online tutorial is almost incomprehensible. A new construction-exercise booklet is a step in the right direction, but it too is hampered by language difficulties and a poor layout.

The Last Word
Amapi is a capable, if quirky, modeling program with a visually appealing but somewhat irritating interface. Amapi can produce excellent models, but its lack of rendering and animation tools limits its utility for many applications. In today's competitive 3-D market, there are better options.—CARLOS DOMINGO MARTINEZ


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Circle 43 on reader service card www.macworld.com November 1996 87
For most Macintosh users, ElectricImage Animation System is the holy grail of 3-D. The newest member of the EI family, ElectricImage Broadcast, offers all the features of the film version (see Reviews, December 1994), without the daunting price tag. Although it renders at lower resolution than its sibling, EI Broadcast is one of the most feature-laden animation tools available for the Mac.

Besides dropping the price, ElectricImage has added some features that make this version more robust: the Inverse Kinematics tools have been improved, the Camera Map Projection plug-in lets users create 3-D matte paintings from 2-D images, and the interface lets you drag multiple keyframes in the timeline. Along with the standard tool set of volumetric lights, motion blur, particle generators, and third-party plug-ins, these new features make EI one of the best 3-D applications in the business.

EI's biggest strength is the animation interface. The new version lets you look at a scene from the point of view of a light source; move the camera and its reference point independently; pan, tilt, zoom, and dolly by dragging within the camera window; and scrub or preview an animation from any window.

Because you can edit an animation as you would a spreadsheet, you can import data from and export to applications such as Microsoft Excel. Once you've completed the animation, you launch the Camera application to render the files using Phong shading, the Projector to convert animations into different formats for playback, and the StillCamera application to render high-resolution images.

EI may be the fastest-rendering 3-D application on any platform; in just minutes it renders complex, million-polygon scenes that would choke the average program. Notably absent are multiple cameras, QuickDraw 3D rendering support, adequate documentation, and a robust texture-mapping interface. Another disappointment is that the distributed- and batch-rendering component is unreliable in multimachine environments, with one or all of the computers often dropping out of the rendering queue. Electric Image says version 2.7.5 (Broadcast is essentially version 2.7) will fix the rendering problems and add multiple cameras; the next major release, expected early next year, will add a modeler.

The Last Word For professional 3-D designers, ElectricImage is the industry workhorse. It's easy to use, the rendering quality is superb, and it's fast.—Craig Lyon

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HAVING TROUBLE FINDING RARELY used fonts? Constantly rounding up fonts installed willy-nilly? Suspect that corrupted screen fonts are causing problems? These and other frustrations are addressed by a new breed of font-maintenance utilities—first Rascal Software's theFONDlier (see Reviews, April 1996) and now Insider Software's Font Box 1.8.3. Unlike Symantec's Suitcase and Alsoft's Master Juggler, these utilities help consolidate, repair, and organize large font collections. Font Box is easy to use, but it begs for some serious repair work itself.

Font Box has a one-track mind, essentially approaching each task by finding, repairing, and reorganizing all your fonts. You tell Font Box where to search for fonts and the things you want corrected (see "Having Problems"), then tell it where to store your newly defect-free fonts, how to organize them (in their current location, in one new folder, or divided into subfolders), and whether to save or delete the originals. Font Box looks for the fonts in the specified locations and asks what you want to do with corrupted or otherwise problematic fonts, rebuilds your entire font collection, fixes font ID conflicts, reunites font family members, and resolves the issues you specified. Depending on the size of your font collection, the extent of the problems, and the speed of your Mac, the entire process can take anywhere from a few minutes to half an hour.

While Font Box may claim to take you to font utopia, the program isn't without flaws. Options and buttons are labeled confusingly, and the program doesn't prevent you from enabling incompatible options. On my PowerBook, the problems listed in the dialog boxes are practically unreadable. If Font Box runs out of RAM or disk space, it quits. If you want Font Box to analyze and organize a set of specific folders or drives, you have to quit and relaunch after each has been processed (that's also how you cancel an in-progress analysis). Font Box's optional written reports sometimes go haywire; one, at 21.5MB, was far larger than my font folder. The program doesn't save your previous settings, it often won't clean up a disorganized font collection, and it doesn't delete AFM files.

The Last Word I recently spent many tedious hours reorganizing hundreds of fonts. Not long after, Font Box did the same thing much better and in a matter of minutes. In contrast, theFONDlier practically requires a Ph.D. in fontology. And while Master Juggler 2.0 and Adobe's ATM Deluxe 4.0 (now in beta) both scan for corrupted fonts, neither can help you make order out of chaos. Flaws and all, at the moment Font Box is the best font-organization and maintenance utility available.—ROBERT C. ECKHARDT


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Circle 32 on reader service card
Fastedit/Deluxe

PHOTOSHOP PLUG-INS HAVE A TROUBLING DRAWBACK

Large and complex images can be ponderously slow to open and manipulate in Adobe Photoshop. If you find yourself waiting whenever you need to do a minor touch-up, Fastedit/Deluxe, a pair of Photoshop plug-ins, might be the answer.

Fastedit's Acquire plug-in lets you open a portion or single layer of a Photoshop image. You define image sections by dragging across a preview, and you can select individual layers via a scrolling list. When you're done with your edits, the Export plug-in updates the original file, incorporating your changes. If necessary, you can save the image segment and return to it later for further editing.

Isolating image sections means you spend less time opening files before you start working. And because Photoshop doesn't have to juggle the entire image, computationally intensive tasks, such as applying filters and transformations, are faster as well. However, one disadvantage of working with an individually acquired image layer is that you don't see how the changes will look in relation to elements in other layers. In many cases, you'll want to open the entire image anyway.

Fastedit/Deluxe does reduce the RAM and disk space required to edit an image. If this is a pressing concern, it may be worthwhile, but many Photoshop pros already have the hardware resources to deal with their normal work. As well as handling Photoshop files, Fastedit/Deluxe can access images in TIFF, Scitex CT, DCS, and EPS file formats. Unfortunately, it doesn't support many formats, including such common ones as JPEG, GIF, Illustrator, and PICT.

Despite its basic utility, Fastedit/Deluxe's copy protection will be reason enough for many pros to banish it from their studios. You can't simply drag these plug-ins to the Photoshop folder. You must use an installer that permits only one installation. You can uninstall the plug-ins and move them to another machine, but if you need to reinstall the software, you're out of luck. Worse, after moving Fastedit/Deluxe I had to spend a day troubleshooting, and in the end resorted to a clean reinstallation of the Mac System to get Photoshop running again. Unorthodox circumstances? Yes, but caveat emptor just the same.

The Last Word Fastedit/Deluxe can be a helpful utility for editing image sections in Photoshop. However, inconvenient and potentially dangerous copy protection, limited image-format support, and a relatively high price (almost a quarter of the list price of Photoshop itself) lessen its usefulness.—CARLOS DOMINGO MARTINEZ

This Encapsulated PostScript (EPS) image was printed on a color inkjet printer without StyleScript.

The images at right were created in Illustrator, exported as EPS files into PageMaker and printed on an Apple Color StyleWriter 2500.

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NovaModem 288

DECENT PERFORMANCE FROM POWERBOOK PC CARD MODEM

THE INEXPENSIVE NOVAMODEM 288 for Macintosh offers several features—including voice messaging and direct cellular capability—that you won’t find in some competing PC Card modems. Alas, this is clearly a Windows-based product that was pressed into Mac service as an afterthought.

Installing the NovaModem 288 on my PowerBook 5300ce was a snap—I tried plugging it into both of the PC Card slots, and the laptop recognized it within seconds. The bundled software, Smith Micro’s MacComCenter, has convenient one-click installation that checks the modem and installs the proper drivers. Unfortunately, no connection scripts for Apple Modem Tool are included; I had to call technical support to get the modem up and running. And while the manual is serviceable, it was obviously written with the Windows user in mind.

Although I got consistently solid connections to America Online, CompuServe, and various Internet providers, true 28.8-Kbps speeds weren’t as frequent as with other PC Card modems I’ve used—I usually connected at 26.4 Kbps or less. (A 33.6-Kbps version of the Nova Modem is scheduled for release sometime this year. I couldn’t test the beta’s speed claims, however, since the major online services don’t yet support speeds that high. NovaLink won’t be offering a trade-in upgrade to users of the 28.8-Kbps version or a FlashROM upgrade for the new modem code.) The only real connection problem I encountered was with Claris Emailer: when the modem was installed in my PowerBook’s lower PC Card slot, I couldn’t dial out. NovaLink and Claris are looking into the problem.

MacComCenter includes fax and telecommunications capability, plus a component that lets you set up your PowerBook as an answering machine. As fax software, the program does the job; it lacks gray-scale support, however—something you’d find in competing products. The software’s voice module is relatively easy to configure, and you can record your own greetings or use the included canned messages. The program also supports additional users by letting you create multiple mailboxes.

Unfortunately, retrieving messages from another location is limited to an auto-forward feature; you can call in or page the program from another location to get your messages. Worse, one feature offered in the Windows version—paging—isn’t supported at all in the Mac version.

The Last Word It’s a tribute to Apple’s PC Card support that a modem designed for the Wintel world can be used easily on PowerBooks. With better fax and voice-messaging software, the inexpensive NovaModem 288 could lead the pack of PC Card modems. —GENE STEINBERG


Trade secrets

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Pro View 1.3
A BACK-TO-BASICS PRESENTATION TOOL

Pro View 1.3 is an inexpensive, unpretentious authoring tool that makes creating multimedia presentations a snap. The program allows you to blend text, graphics, sounds, and QuickTime movies into interactive presentations or self-running slide shows—without touching the manual.

In its first release, Pro View lacked stability and had such limited features that it was hard to produce really professional results with it. With version 1.3, E-magine has improved the program’s performance with features that allow you to create more sophisticated presentations, while the interface remains uncluttered and intuitive.

The program offers superb drag-and-drop support. You can add pictures (PICT or JPEG), text, and movies to your presentation by dragging them from the Finder. You can also drag elements from one Pro View page to another. If you option-drag a set of images onto a new Pro View presentation window, the program automatically imports all the pictures, neatly placing each image on its own separate page.

Once you’ve imported elements into Plain-Vanilla Authoring Pro View’s simple ten-button palette lets you import movies, pictures, and text to presentation pages, then add interactivity by placing buttonlike hot spots on the pages.

Pro View, you make your presentation interactive by adding hot spots, allowing viewers to navigate through presentations, trigger sounds, or print pages. You can also turn imported graphics into buttons.

Several new tools make it easier to format and position elements. You can now drag-select multiple items and align them with an Align Objects command. A new cropping tool allows you to crop imported pictures. Other new tools let you create a tiled background from an imported PICT or JPEG image, and add a smooth fade-to-black transition between screens in your presentation for a sleek, polished look.

You can save your presentations as Pro Viewers, with the option of compressing all the imported graphics, sounds, and movies into the Viewer. Your presentation then becomes a self-contained Viewer document that you can distribute freely.

Admittedly, Pro View can’t compare to full-blown authoring programs or even slide presentation programs; it takes a bare-bones approach. But it costs less than $100—and it has enough of the right tools to yield genuinely impressive results with a minimal learning curve.

The Last Word Pro View doesn’t let you create path animations or apply fancy transitions between slides—but frankly, many people don’t require such features. If you need to create professional-looking multimedia presentations under a tight deadline, Pro View is a perfect choice.—JOSEPH SCHORR

RATING: 4.5/5.0 PROS: Simple, uncluttered interface; excellent drag-and-drop support; creates stand-alone documents with run-time engine; inexpensive. CONS: Limited file-format support; no path animation; limited transitions.

revealed.

...set this end for a different tool. Or you can set it for a different mouse button, a double-click—or go to your favorite tool without having to mouse around.

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WACOM
A S A SERIOUS CHALLENGER TO Wolfram Research's Mathematica, Maple V had three deficiencies: it wasn't Power Mac native, its graphics lacked many 3-D display features, and it offered no simple way to get textbook-format equations on screen. The latest release of Waterloo Maple's mathematics software not only corrects those shortcomings, it makes Maple the best choice for users with hardware limitations or demanding speed requirements.

The program is almost twice as big as it was a year ago, but it actually runs faster. Waterloo Maple has added a plot-tools package that brings Maple close to Mathematica's graphics capabilities; enhanced differential and partial differential equation-solving; enlarged the special-functions libraries to handle most physics and engineering cases; and added tensor analysis. And not only do Maple V documents look like math rather than programming-language text, but they also contain hyperlinks—even the online help is now hyperlinked.

Mathematica 3.0, still in beta at review time, remains the leader in certain areas. Its signal-processing facilities are excellent; its implementation of a palette-based math notation entry system for rich document formatting is brilliant; and its collection of user-contributed notebooks is much larger than Maple's analogous Share Library. Outside these areas, however, Maple's speed and relative simplicity—you can learn enough to do something useful in an hour—are key advantages.

Recognizing that 150MHz Power Macs with 64MB of RAM are still a rarity in classrooms, Waterloo Maple designed the full implementation of Maple to run on an 8MB Mac; a separate command-line version is included that can run with room to spare in 4MB. That version has essentially no interface or graphics overhead, so it's great for high-speed computation on problems coded in the full-blown Maple interface. And it's really fast—the math tests that Macworld Lab used in a recent roundup of science software run so quickly on a Power Mac 7100/80 they can't even be timed in command-line mode. The command-line program's speed at diagonalizing a 20-by-20 matrix on a PowerBook 145B is an amazing spectacle; it's unlikely that Mathematica will ever run on such a humble box again.

The Last Word Maple has an edge over Mathematica in both large-scale, hours-long computations and the small-scale computations typical of education. Release 4 is the fastest, most complete version yet, and its modest hardware requirements will appeal to budget-minded math sites.—CHARLES SEITER

RATING: ****/7.8 PROS: Fast; easy to learn; runs well on modest systems. CONS: Fewer user-contributed packages and more-basic document-formatting options than in Mathematica.


Some people donate money to keep the air clean.
Jeff Angus wrote 2000 lines of code.

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**Slicer**

**VIEW 2-D SLICES OF 3-D IMAGES**

**A**ny time you see a color picture on your Mac, behind the scenes the computer is reading numbers from a table and converting them to their corresponding color values. That's a good thing, the human brain being better equipped to process color pictures than tables of numbers. Even scientists can extract more information from a picture than from raw data in a table; for example, an MRI scan is actually a 3-D table of numbers, but doctors look at 2-D "slices" of the data to make a diagnosis.

Even better than the visualization software shipped with MRI systems is Fortner Research's Slicer. Not only does it use a sophisticated ray-tracing system to present 2-D images using a huge range of color tables, but it lets you create animations from a series of slices and make rectangular cutouts in 3-D mode. You access the viewing, slicing, and rotating tools, all of which are workstation-fast, through palettes in the notably straightforward interface (see "Cut to the Heart").

Although Slicer 1.0 is officially (if not technically) a brand-new Mac product, it's amazingly bug-free. And it's particularly adept at importing and exporting—not just HDF and other standard science data-set formats, but data in the whole range of FORTRAN and C variable types (the actual images, rather than data, are exported as PICT and TIFF files). The advantage of such a wide scope is that Slicer can easily display almost any data.

Slicer does lack a few minor conveniences; for example, it would be nice to have a simple, usable tool for specifying a straight line through a 3-D image and viewing an x-y plot of values along that line. (The company's Web press release claims this as a feature, but I couldn't find it in the slender documentation or tool palettes.) It would also help if the isosurface simulation had more scope: you can pick a number value and render the pixels with other values transparent, but there's no reason this trick couldn't be extended to allow visualization of two, three, even four 3-D isosurfaces in a single image. (It probably will be soon—Fortner Research has the staff for doing just that.)

**The Last Word** Considering that Slicer 1.0 has no real competition, it's impressive that Fortner Research has done such a great job. For fast visualization of 3-D volumetric data, Slicer and the Macintosh are an unbeatable combination.—**CHARLES SEITER**

**RATING:** ****1/8.1 **PROS:** Fast; bug-free; easy importing of data in nearly any format.

**CONS:** Lacks a few useful options. **COMPANY:** Fortner Research (703/478-0181, http://www.fortner.com). **LIST PRICE:** $695.

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**ChemIntosh 3.4**

**DRAWING TOOLS FOR CHEMISTS**

**B**ack in the mid-1980s, when Intel-based computers were timidly learning to format text, the Mac's graphics superiority made it a natural choice for chemists. SoftShell got into the market early with its ChemIntosh structure-drawing software and has managed to maintain its loyal following.

One big reason for this loyalty is that, although the program has evolved considerably, it still has the shortest training time in the business. If you can draw structures with a pencil, you can use ChemIntosh's drawing tools immediately—every element you need to build a structure is available on an exceptionally simple palette (see "Picture This"). The intuitive interface is now supplemented with a much larger directory of predrawn compounds, a drawing utility (MS Palette Tool), an oddly named but relatively structured database (Entropy Lite 1.1), and an assortment of tools for diagramming processes (Chemical Engineering Collection) and depicting lab setups (Laboratory Glassware Collection). A new addition called ChemWeb, which translates ChemIntosh structures into GIFs for posting on the Web, is available free from SoftShell's Web site. There's even a spelling checker for standard word-processor dictionaries that has only a few dozen chemical terms. The output is excellent, and the documentation, while brief, is sufficient for a program as self-explanatory as this.

ChemIntosh isn't without rough edges, however. SoftShell used to be a Mac-only, then a Mac-first operation. Now ChemIntosh is a nonoptimized port of its Windows counterpart, ChemWindow, and an early version of ChemIntosh on a Mac SE is actually faster at menu response and most drawing functions than the current version (3.4.4) on a Power Mac 7100. Another problem is a somewhat lazy export: you can export to CambridgeSoft's ChemDraw format or to Molecular Design's popular MDL molefile format, but you'll have to resign yourself to lots of editing and tinkering to get the exported file exactly right. That might be simply a consequence of ChemIntosh's current second-class citizenship in SoftShell's world, but it's a nuisance if you're using the program for anything fancier than preparing documents. This shortcoming also points up a strength of its main competitor, CambridgeSoft's ChemOffice; ChemIntosh is a bit easier to learn for basic tasks, but ChemOffice is better linked to the larger world of computer-based chemical information on legacy systems.

**The Last Word** If all you're looking for is help producing chemical documents, ChemIntosh is your guaranteed least-effort choice. For serious chemical database work or molecular modeling, though, you'll probably want ChemOffice.—**CHARLES SEITER**

**RATING:** ****1/8.1 **PROS:** Easy drawing of chemical structures; useful database and accessories. **CONS:** Some export and performance problems. **COMPANY:** SoftShell (970/242-7502, http://www.softshell.com). **LIST PRICE:** $799 ($199 academic, $99 student).
3 OUT OF 4 GAME CHARACTERS SURVEYED
would rather humiliate and destroy you while playing on a MAC with an

ATI XCLAIM VR
graphics upgrade.

And that's just because that one last QuickDraw 3D game goon hasn't seen what this sucker can do. How its MAC2TV feature lets you plug your Mac right into your TV for the ultimate big screen spine-chiller that blows away arcade games once and for all. How its new ATI 3D technology breathes life into everything on screen. With face-blasting speed, butter-smooth 3D detail and full-screen QuickTime video. Oh ya, just in case your left brain demands some sensible reason to run right out and get one, XCLAIM™ VR does mean business apps, too. And in-your-boss's-face big screen presentations. And video capture from camcorders and VCRs. And VR on the Web. And because it's really five upgrades in one, you get more performance and features than a Power Mac 8500. On the other hand, XCLAIM VR costs just $269* so chill out! See your dealer, or see more about it at www.atitech.ca.

MAC2TV

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### Street Atlas USA 3.0

**MAP PROGRAM BETTER AND CHEAPER, BUT STILL FLAWED**

When I reviewed Version 2.0 of Street Atlas USA, DeLorme Mapping's CD-ROM containing colorful, detailed maps of the entire United States, I liked it enough to overlook such problems as questionable data integrity and annoying interface quirks (see *Reviews*, October 1994). Version 3.0 is considerably less expensive and contains some useful new features, but it suffers from many of the same flaws.

Upon launching, Street Atlas USA fills the screen with a detailed map, a floating toolbox, and a new overview map. The tools are pretty much self-explanatory and there is online help, which is good since the 24-page user's manual is weak.

As with version 2.0, you can search by area code and exchange, zip code, or city name. The most significant new feature is the ability to locate a specific building—enter a street address and zip code, and its approximate location on the block is shown on the map. Thanks to efficient indexing, searching takes only a few seconds, but drawing a map can take up to 20 seconds, even on newer Macintoshes.

Street Atlas USA 3.0 links to DeLorme's Phone Search USA (also reviewed in this issue). After searching this directory, you can press the Map button to see the location of the selected entry in Street Atlas USA. Unfortunately, disc-swapping is needlessly complicated.

A slew of new land-use tints for woodlands, parks, wetlands, and other land types can be turned on or off—like other map features such as roads, bodies of water, and place names—to display only the level of detail you want. Also new are user-definable text, symbol, and note objects for annotating maps. Finally, you can now change the location and size of the title and legend, and display zip codes, latitude, and longitude.

**The Last Word** I uncovered a number of inaccuracies, such as through roads not connecting, railroads appearing where none exist, and towns missing or misplaced, in Street Atlas USA 2.0. Unfortunately, such errors persist in the new version, despite DeLorme's claim to have doubled the number of street segments to 25 million. Furthermore, Street Atlas USA still suffers from user-interface problems. For example, Ctrl-W doesn't close windows, you can't pan around the map with a hand cursor, and editing draw objects is completely unintuitive.

Its flaws notwithstanding, there's nothing that compares to Street Atlas USA 3.0, and I recommend it to anyone with even a passing interest in cartography. Be warned, however, that the license allows making maps for personal and in-house business purposes only.—OWEN W. LINZMAYER

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### Street-Level Mapping

You can search for specific addresses, as well as phone numbers, zip codes, cities, and streets. Also new are the overview map and user-definable notes.

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**RATING: ★★★/4.5**

**PROS:** Inexpensive; fast, detailed searches; tremendous amount of data; fun.

**CONS:** License limits practical applications; questionable accuracy; some interface foibles.

**COMPANY:** Delorme Mapping (207/865-1234, [http://www.delorme.com](http://www.delorme.com)).

**LIST PRICE:** $79.
Today, the market is full of Trinitron™-like technologies. And while most companies are satisfied with simply cloning it, ViewSonic® has improved it.

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MacUser gave it a 4-mice rating and added, “It boasts image quality so good even demanding graphics artists and desktop publishers will be pleased.”

Computer Reseller News gave the SonicTron PT770 their Editor’s Choice award in April, 1996.

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* MSRP as of August 1, 1996. Prices and specifications subject to change without notice.

Circle 59 on reader service card
Hexen

THE HERETIC FANTASY CONTINUES

Okay, I admit it: I love to kill things—that’s why I like Hexen. Not only do I get to kill things, I get to kill lots of them, and I get to do it in new and interesting ways. Not only can I turn my enemies to ice, I can also fry ‘em, tear ‘em apart with spirits, chop ‘em up, and even transform them into little piggy. Oh, the fun of it all!

Distributed by GT Interactive, Hexen is the latest production from Raven Software using an engine licensed from id Software (creator of Doom), and it lives up to Raven’s previous standards of gore. The designers have taken game play a step further by allowing players to choose from one of three classes of characters: warrior, cleric, or mage. Each class has its own strengths, weaknesses, and—above all—weapons. Depending on which class you pick, your strategy must adjust for speed, range of weapons, and armor. Clerics have access to Wraithverge, a must-see weapon that summons spirits to rend your foes limb from flying limb.

Breaking away from the linear progression of levels, you proceed from hubs, each broken down into a series of levels that must be cleared. Within levels, the play environment runs the gamut from lava pits to fog-filled swamps to icy caves. The environments keep the game interesting. Even if you’re not actively killing things, you can marvel at the landscape.

Each level is filled with plenty of levers to pull, items to find, and hidden chambers to discover, all of which eventually help to unlock the secret of the hub itself, allowing further travel. Unfortunately, these puzzles aren’t terribly challenging and tend to require a lot of repetitive wandering from level to level. But since your foes regenerate when you least expect it, you won’t be bored for long.

Hexen’s game engine is essentially identical to that of its predecessor, Heretic, with a few innovations. You can look up and down, strafe, jump, and even fly, but Hexen lacks features that other engines now allow, such as ducking and peeking around corners.

Should you feel the urge to blast the daylights out of your coworkers, Hexen offers modem and network play for as many as four Macs using TCP, AppleTalk, and MacPlex protocols. You can even take out your aggressions on your Windows-equipped colleagues: Hexen’s multiplayer mode is cross-platform capable.

The Last Word

Hexen is another strong showing from Raven. Its action-packed game play allows you a number of possible ways to kick butt, despite the limitations of its engine and the simplistic nature of its puzzles.—Daniel Madar

RATING: ★★★/6.9
PROS: Realistic violence; interesting new levels and choice of character types.
CONS: Static puzzles; linear and simplistic story line; engine doesn’t offer as much flexibility as competitors.
COMPANY: GT Interactive
COMPANY’S ESTIMATED PRICE: $54.95.

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102 November 1996 MACWORLD
Macworld says

GOTTA HAVE IT

The Mac OS ought to work this way.

Reviews, July 1995

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With all the quality education software now available for the Mac, your kid's head can fill with knowledge faster than you can say "academic scholarship." And the nice thing is, you don't have to comb the Earth to find it. There's the completely '90s experience of buying it off the Internet. Or you can go through...

JumpStart Toddlers features musical animals, bouncing shapes and an evacuated chalkboard to present the alphabet, numbers and over 200 vocabulary words in this magical first step in computer discovery for children 18 months to 3 years. From Knowledge Adventure.

Freddi Fish and his sidekick Luther are on the case of the haunted schoolhouse and its missing toys. This undersea mystery has everything to keep the kids entertained for hours as they help the finned dynamic duo solve the crime. From Humongous Entertainment.

Deep within the heart of the Math Metropolis lies the secret to math success. Whether kids are having a tough time with math or are certified math superstars, Mighty Math Number Heroes will put them on the road to math greatness. From Edmark.

A collection of third-party software from Apple Computer handpicked with you and the Internet in mind. You're on the web in minutes with the help of the easy-to-use Internet Dialer application. It comes with a manual too, written in simple "Apple Guide" language.

What's the best tool for kids to learn about basic fractions? A pizza, of course. That's just one of the 25 fun activities found in Interactive Math Journey. With it, kids build skills, problem-solving abilities and most important, confidence in math. From The Learning Company.

The Camel Revitalizer's been stolen, and it's Elroy and Syd's science project. What happens if they can't solve the riddles, unravel the codes and crack basic science puzzles to solve this terrible crime? A fate too scary for any kid—summer school. From Headhouse Interactive.

Join Kermit and the Muppet crew in their very own version of the Robert Louis Stevenson classic, "Treasure Island." Outsmart the scurvy pirates as you discover puzzles, activities and fun learning games in this exciting interactive hunt for buried treasure. From Activision.

This new edition of Carmen helps kids with world geography and cultures as they explore 50 countries, getting fun clues from animated characters along the way. A rich database is included, with video clips from the National Geographic Society. From Broderbund.

The math program that has set the standard for helping kids learn math is now bigger and better than ever before. Mega Math Blaster gives you enhanced arcade games, exclusive supplemental learning materials and, most important, more math fun. From Davidson.

Apple Internet Connection Kit
Quick and easy Internet access.

With all the quality education software now available for the Mac, your kid's head can fill with knowledge faster than you can say "academic scholarship." And the nice thing is, you don't have to comb the Earth to find it. There's the completely '90s experience of buying it off the Internet. Or you can go through...
one of the very informative mail-order catalogs. Perhaps you want to get out of the house (no explanation is necessary). For that, there are a bunch of great stores like Best Buy and CompUSA. And if you can't tell by now, we're out to make finding excellent Mac software just as easy as using it. So let's review. If you want to become better educated on our incredible selection of software and all the different ways you can buy it, just pull up a chair at our web site, which is http://www.macsoftware.apple.com. Or call 800-500-4862.

Mac OS
The microfilm was stuffed in his cheeks. If they made him talk, he would swallow and recover it later.

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Star Ratings

Hardware and Software Products at a Glance

Macworld Star Ratings lets you compare Macintosh products based on the authoritative assessments in our reviews and features. 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. We evaluate seven factors to derive the Star Rating: feature set, design implementation, performance, reliability, ease of use, innovation, and value. We take these evaluations, weight their importance for each class of product, and calculate the final score. The higher the score, the better a product is, even among products with the same number of stars. The following list shows how the ratings and scores relate.

- Outstanding (9.0 to 10.0)
- Very Good (7.0 to 8.9)
- Good (5.0 to 6.9)
- Flawed (3.0 to 4.9)
- Unacceptable (0.0 to 2.9)

This section also lists products that have been awarded an Editors' Choice designation in a Macworld product comparison.

If a product has been upgraded since our last assessment, the most recent version number appears in parentheses after the main reviewed version number. To read a full review of any product in the listing, please consult the issue indicated at the end of the listing.

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

- GeoQuery 5.0, GeoQuery, 313/944-9280, $295. Put your business data on the map. Jun 96, p. 92
- Let's Keep It Simple Spreadsheet 1.0, Casady & Greene, 408/884-9228, $189.95. New approach to spreadsheets uses graphical programming style. Sep 96, p. 67
- Microsoft Excel 5.0, Microsoft, 206/882-8080, $339. The only game in town, but a glutton for RAM and disk space. Jun 96, p. 98
- Microsoft PowerPoint 4.0, Microsoft, 206/882-8080, $295 (estimated). A solid, simple-to-use slide machine. Jun 96, p. 38
- Microsoft Word 6.0.1, Microsoft, 206/882-8080, $295 (estimated). The most bloated word processor on earth may be mandatory in big corporations. Jun 96, p. 98
- Minitab 10 Xtra, Minitab, 814/238-3280, $595. Updated package offers a complete statistical tool kit. Jun 96, p. 66
- OmniPage Pro 6.0, Caere, 408/395-7000, $695. Flagged-text feature is indispensable. Jun 96, p. 93
- Ready,Set,Go 7.0.2, Abbott Systems, 914/747-3116, $395. Revamped page-layout software continues to offer more than the basics. Sep 96, p. 83
- Suitecase 3.0.1, Symantec, 503/334-6054, $695. Font manager vies with MasterJuggler for superiority, and still no clear winner. Sep 96, p. 72
- SuperATM 3.9, Adobe Systems, 415/961-4400, $69. ATM's Postscript font rendering plus intelligent substitution of missing fonts. Apr 96, p. 102
- Xdream 1.0, Vision's Edge, 904/386-4573, $99. These 24 tools range from useful to indispensable. Jun 96, p. 50

EDUCATION/ENTERTAINMENT

- Bad Mojo 1.0, Pulse Entertainment, 310/264-5579, $54.95. Want to be a fly on the wall? Sep 96, p. 96
- Chaos 1.0, HarperCollins Interactive, 212/207-7000, $49.95. High-concept CD-ROM game is low on entertainment. Sep 96, p. 100
- Cliffs StudyWare for Algebra I, Cliffs Notes, 402/423-9053, $39.95. Algebra tutorial makes poor use of multimedia. Jul 96, p. 76
- College Advisor, Princeton Review Publishing

www.macworld.com November 1996 107
### Star Ratings

- **iMac 25.5, Canto Software, 408/905-0300, $179.95.** Turn your multimedia archives into a network image database.
- **iPhoto 1.0, Apple Computer, 408/996-2200, $199.99.** Impressive Kodak scanner software.

### Graphics

- **Macromedia FreeHand 5.5, Macromedia, 415/252-2000, $599.** Single most significant and capable image editor.
- **PhotoStudio 3.0, Adobe Systems, 415/961-4400, $49.** Major improvements to a classic parametric 3-D classic.
- **3D Studio Max 2.0, Discreet Design, 805/390-4000, $1,995.** Professional-quality 3-D animation and rendering software.
- **Photoshop 5.5, Adobe Systems, 415/961-4400, $599.95.** Color-correction filters take up where Photoshop leaves off.
- **PhotoMatix 2.0, DayStar Digital, 770/240-1553, $199.95.** Professional-grade photo editing software.
- **PhotoImpact 3.0, Jasc Software, 415/253-5000, $199.95.** Comprehensive photo editing and compositing software.
- **PhotoPaint 3.0, Corel, 512/304-0600, $299.95.** Professional-quality photo editing software.
- **PhotoFast 6.0, Corel, 512/304-0600, $299.95.** Professional-quality photo editing software.
- **PhotoSuite 4.0, Jasc Software, 415/253-5000, $199.95.** Comprehensive photo editing and compositing software.
- **PhotoMatch 2.0, Corel, 512/304-0600, $299.95.** Professional-quality photo editing software.
- **PhotoImpact 2.0, Jasc Software, 415/253-5000, $199.95.** Comprehensive photo editing and compositing software.
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Download a complete demo version of Expression from our Web Site at http://www.fractal.com
**/6.5  LAN Commander, Power On Software, 612/879-9190. $299.95. Network management made simple. Oct 96, p. 79

**/3.1  LANscape SNMP 2.0. Sonic Systems, 408/736-1900, $799. SNMP console sports some sophisticated features, but needs work. Jul 96, p. 74

**/6.2  MachTLP 2.22, Tim Enders, TimeLink. $199. Preprocessor can help you tailor your HTML for specific browsers. Oct 96, p. 104

**/5.3  MacPerl 5.0.6, Matthias Neeracher, neeri@iis.ve.ethz.ch, free. CGI scripting language is portable to other platforms. Oct 96, p. 104

**/7.4  Navigator 2.0, Netscape Communications, 415/528-2555, $49 to $69. Netscape pushed beyond Web browsing. May 96, p. 50


**/6.5  NetFool 2.0, Maxum Development, 708-830-1113, $195. Forms-processing aid is simple to install and use. Oct 96, p. 104


**/6.3  QuickMail 3.6, CE Software, 515/221-1301, $199 to $1499. Easy to use, but message-tracking features are limited. Oct 96, p. 134


**/6.6  Tango 1.5, EveryWare Development, 905/819-1173, $495. CGI program forwards queries to a SQL database and reformats the responses into HTML. Oct 96, p. 104

**/7.3  Tango for FileMaker Pro 3.0, EveryWare, 905/819-1173, $349. Tool kit for putting your FileMaker database on the Web. Oct 96, p. 93

**/6.7  Tapestry 1.1 (2.0), Concept 1, 905/305-8655, $69. Beginners get help weaving the perfect Web site. Oct 96, p. 80

**/7.2  TeleFinder 5.0. Spider Island, 714/453-8095, $675. BBS software understands the Net. Aug 96, p. 65

**/5.5  Timbuktu Pro for Networks 2.0, Farallon Computing, 510/814-5000, $139 to $3999. Despite drawbacks, it's almost like being there. Oct 96, p. 124


**/7.4  WebMail 1.2, Open Door Networks, 515/225-4400, $20-60/month. Authoring software is abysmal. Oct 96, p. 114


**/7.8  Word Internet Assistant 1.0. Microsoft, 206/822-8080, free. Converts existing Word files to HTML. Oct 96, p. 114


**/7.1  Apple Media Tool 2.0, Apple Computer, 800/237-7320, $69. Easy and powerful but requires too much scripting. Aug 96, p. 100

**/7.2  Studio Vision Pro 3.0.3, Opcode Systems, 415/856-3333, $995. For MIDI audio conversion, this audio program is the one to buy. Sep 96, p. 76


**/5.1  ACT for Macintosh 2.5.1, Symantec, 541/334-6054, $199.95. A weak offering in the field of PIM software. Jul 96, p. 62

**/4.8  ACT for Newton 1.0, Symantec, 541/334-6054, $119.95. Only die-hard fans of the desktop version could love this portable PIM. Jul 96, p. 62

**/6.8  Claris Organizer 1.0, Claris, 408/988-7000, $49 (estimated). Simple little PIM is fast, easy to learn, and intelligently designed. Jun 96, p. 106

**/6.9  DateBook Pro 4.2, Now Software, 503/274-2800, $69.95 (estimated). A well-designed but often sluggish calendar and scheduling program. Jun 96, p. 106

**/5.2  Full Contact 3.0, Pitch Software, 408/374-5504, $169. Resurrected PIM has been improved—but not enough. Feb 96, p. 65

**/7.0  In Control 4.0. Attain, 617/774-1110, $85. Outline-based PIM adds Net links. Aug 96, p. 63

**/6.9  iTouch 2.5.2, Prairie Group, 515/225-3720, $49.95. Simple contact manager doesn't force you to plug data into designated slots. Jun 96, p. 106

**/8.3  Quicklenke 6.0. Intuit, 520/295-3220, $69.95. The best-selling package gets bigger and better. Feb 96, p. 65

**/6.8  TouchBase Pro 4.2. Now Software, 503/274-2800, $69.95 (estimated). Slow, but offers up to 16 custom fields. Jun 96, p. 106

**/6.9  Cafe DR1, Symantec, 541/334-6054, $99.95. Java development environment needs continuos...
Until now, the on-ramps to the Internet have been under construction.

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crash-proofing and a faster code-development cycle.

Oct 96, p. 54


LaserMerge Electronic Paper 2.0, MindGate Technologies, 615/937-6800, $95. Speeded-up printing utility multiplies your output options. Sep 96, p. 62

Mac Drive 9.0, Media 4, 515/225-7409, $99. Acceptable, if infeliege, file sharing with Windows 95. Sep 96, p. 60

MacOpener 2.0, DataViz, 203-268-0030, $50. File-transfer utility's reliance on DOS extensions is disappointing. Sep 96, p. 60

MacTools Pro 4.0, Symantec, 514/334-6054, $114. A respectable troubleshooting and data-recovery program for a reasonable price. Jun 96, p. 106

MacTransfer 1.0, Insignia Solutions, 408/327-6000, $49. A solid choice for cross-platform file exchanges. Sep 96, p. 60


Nov Utilities 6.0, Now Software, 503/274-3800, $89.95. A good collection of utilities, but a mediocre upgrade. Aug 96, p. 59


SAM 4.0.8, Symantec, 514/334-6054, $99. SAM finds viruses, kills 'em. Jul 96, p. 72

Speed Double1.2 (1.3), Connex4t, 415/671-5100, $99. Connectix makes a Power Mac's 68000 emulation feel native. Feb 96, p. 56


Tempo II Plus 3.0.9 (3.0.9A), Affinity Microsystems, 303/442-4840, $179.95. Powerful macro program suffers from undue complexity. Jun 96, p. 106

TransferPro 1.0, Digital Instrumentation Technology, 505/662-1459, $189. File-transfer capabilities need to work better in the Windows 95 world. Sep 96, p. 60

XChange 1.2 (1.3), Optima Technologies, 714/476-0515, $49. Cross-platform transfer capabilities are a buggy disappointment. Sep 96, p. 60


UTILITIES

Adobe File Utilities 1.0, Adobe Systems, 415/961-4400, $149. Mac utilities work well but are unnecessary for many Mac users. Aug 96, p. 62

Conflict Catcher 3.0.1 (3.0.4), Casady & Greene, 408/484-9228, $99.95. The perfect tool for managing extensions. Jun 96, p. 106


Here & Now 2.0, Software Architectures, 206/497-0122, $99.95. The best choice for helping Win95 files work with the Mac. Sep 96, p. 60

HSM ToolKit 1.0, FV8, 415/325-4392, $79. Infinite storage made infinitely more simple. Oct 96, p. 77

LaserMerge Electronic Paper 2.0, Mind-Gate Technologies, 615/937-6800, $95. Speeded-up printing utility multiplies your output options. Sep 96, p. 62

Mac Drive 9.0, Media 4, 515/225-7409, $99. Acceptable, if infeliege, file sharing with Windows 95. Sep 96, p. 60

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Hardware

MISSISSIPPI HARDWARE

Color QuickCam 1.0 (2.0), Connectix, 415/671-5100, $299. Low-cost camera for passable digital video. Sep 96, p. 79

Fujitsu DS-220, Fuji, 914/789-8100, $1200. Digital camera misses the mark. Sep 96, p. 85

HP Scanjet 4600, Hewlett-Packard, 408/246-4300, $515. High price and slow scan times; a mediocre choice. Jul 96, p. 54

Kodak Digital Science DC500 Zoom Camera, Eastman Kodak, 716/742-4000, $1000. Camera combines zoom and autofocus with good color and detail. Jul 96, p. 57

MagicLink PIC-2000, Sony, 408/342-1600, $899. PDA has readable screen and built-in modem but it’s too large. Jul 96, p. 102


Poloidar PDC-2000, Poloidar, 716/256-4435 ext. 868, $3695 as tested. New breed of camera creates output as cool as its hardware. Aug 96, p. 52

Psion Series 3a, Psion, 508/371-0310, $595. PDA has readable screen and built-in modem but an awkward L-shape when open. Jul 96, p. 102


Zaurus ZR-5000, Sharp, 201/529-8200, $499. Easy-to-carry PDA offers decent graphics but it's too large. Jul 96, p. 102

MODEMS/NETWORK


Communicad 28.8, Dayna Communications, 801/269-7200, $359 to $416 (estimated). Expensive PC Card modem, without digital line protection frequently found in similar cards. Jul 96, p. 141

DF2814, TDK Systems, 916/478-8421, $379. Low price, but PC Card modem was bogged down by JPEG file transfer. Jul 96, p. 141


Will You Make Your Mother-In-Law Sound Like A Pig Or A Cow?

Introducing YoYo, the most fun way to find out who is calling before you answer the phone. Working with Caller ID and your Mac, YoYo identifies whose calling with sounds from “Danger Will Robinson” to “I’ll be back.” YoYo also gives you call blocking, automatic paging, call logging and more. Never be bothered by unwanted calls again! Call 1-800-788-7751, or visit www.big-island.com.

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Circle 31 on reader service card
Mac Class 288 V.34, Practical Peripherals.


The price is right, but this drive unfortunately uses the noisy, slow Travan technology. Aug 96, p. 143.


PD/C, Plasmon Data, 408/474-0100, $620. This dual-purpose drive is worth considering if you need a CD-ROM drive. Oct 96, p. 141.


PDC 2400, ProDirect, 612/941-1805, $800. 2.4GB drive is tops for speed, value, and design. Jun 96, p. 153. Editors' Choice for best 1.0GB to 2.5GB hard drive.

Phaser 860 Dual PD, Topaz Marketing & Sales, 415/341-7152, $649 (estimated). Neither price nor performance can keep pace with the competition's. Oct 96, p. 141.


T4-2600, Maxoptix, 510/553-9700, $2349. No formatting software included and slow performance in its class. Oct 96, p. 141.

114 November 1996 MACWORLD Circle 77 on reader service card
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| Circle 159 on reader service card |
### Star Ratings

This system may be worth its high price. Jul 96, p. 84

★★★★/7.2 Genesis MP 600, DayStar, 770/967-2077, $6999. This multiprocessing system excels at imaging tasks, but cheaper—and faster—options are right around the corner. Oct 96, p. 58

★★★★/7.3 Nupower for PowerBook 500 series, Newer Technology, 316/943-0222, $725. Solid path to PowerPC for 500-series notebooks. Aug 96, p. 54

★★★★/5.5 OrangePC 440, Orange Micro, 714/779-2772, $1196 (16 mb of RAM). Cards come on strong; SoftWindows is still slow. Jul 96, p. 58

★★★★/7.6 PowerBook 500 PowerPC Upgrade, Apple Computer, 408/996-1010, $769 with 8MB of RAM. Solid path to PowerPC for 500-series notebooks. Aug 96, p. 54

★★★★/6.3 PowerCenter 120, Power Computing, 512/388-6886, $1995. The cheapest fast desktop Mac out of 7500/120 in price, and is near enough in speed. Jul 96, p. 84

★★★★/5.9 PowerCenter 120 Low Profile, Power Computing, 512/388-6886, $1895. Low-profile case limits internal-drive expansion. Jul 96, p. 84

★★★★/7.1 PowerCenter 132, Power Computing, 512/388-6886, $1895. The desktop Mac to get if you want to shave some costs. Jul 96, p. 84

★★★★/7.3 PowerCenter 150, Power Computing, 512/388-6886, $2095. The best desktop choice—and fairly inexpensive to boot. Jul 96, p. 84

★★★★/4.3 Power Mac 7200/120 PC Compatible, Apple Computer, 408/996-1010, $2799. Cards come on strong; SoftWindows is still slow. Sep 96, p. 58

★★★★/4.6 Power Macintosh 7200/120, Apple Computer, 408/996-1010, $2299. System is not cheap enough, and will cost too much to upgrade. Jul 96, p. 84

★★★★/5.8 Power Macintosh 7600/120, Apple Computer, 408/996-1010, $2999. The best desktop choice and fairly inexpensive to boot. Jul 96, p. 84

★★★★/6.3 Power Macintosh 8500/132, Apple Computer, 408/996-1010, $3899. For a moderate drop in performance, but a big price break, this system is still just for AV users. Jul 96, p. 84

★★★★/6.0 Power Macintosh 8600/150, Apple Computer, 408/996-1010, $4699. AV professionals will continue to like the 8600, despite its hard-to-upgrade design and high price. Jul 96, p. 84

★★★★/5.6 Power Macintosh 9500/150, Apple Computer, 408/996-1010, $4799. Pricey but fast; its real advantages are its six PCI slots. Jul 96, p. 84

★★★★/7.1 PowerTower 166, Power Computing, 512/388-6886, $3795. Comparable to a Power Mac 8500/150, the PowerTower 166 is cheaper but lacks AV features. Jul 96, p. 84

★★★★/7.3 PowerTower 180, Power Computing, 512/388-6886, $4195. The top Mac performer at a solid price. Jul 96, p. 84

★★★★/7.9 PowerTower Pro 200, Power Computing, 512/388-6886, $4495. Middle of the PowerTower Pro line. Oct 96, p. 63


After July 1, 1996 when you purchase a ScanMaker III for Windows or for Macintosh you also get Fractal Design's popular Painter 4.0 (on CD ROM) the world's leading paint program.

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Painter's Natural-Media® tools simulate the tools and textures of traditional artists' materials. Use brushes in Painter, simulating the styles of Seurat and Van Gogh to make everything you scan with your ScanMaker III a masterpiece. You can even use Painter's Mosaic tool to turn scanned photos into multi-colored mosaics. (Bundled Painter® software is on CD-ROM, printed color user guide is included. Retail packaging is not included).

For the location of your nearest authorized Microtek reseller, call 1-800-654-4160, use our convenient AutoTech fax-back system at 310-297-5101 or check out the Microtek Web site at http://www.mteklab.com/.

Circle 105 on reader service card

The ScanMaker III features: 600 x 1200 dpi optical resolution • 4800 dpi maximum resolution • 36 bit color depth • Up to 3.4 optical density • Up to 68.7 billion colors

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Back-UPS Office is a small-office/home-office computing market and for general computing workstations. APC products have won more awards for reliability than all other UPS vendors combined.

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3. Convenient BlockSafe Outlet Spacing: Back-UPS Office's outlets are spaced to accommodate all size plugs, including large transformer blocks. No need to sacrifice the use of any outlet to accommodate large plugs.

4. Integrates the Security of a Surge Suppressor with the Power of a UPS: Back-UPS Office provides enough outlets to protect your customers' entire system. Six outlets guard your hardware with full-time surge protection. Three of the six provide instaneous battery backup to keep your system from crashing in the event of a brownout or blackout.

5. Site-Wiring Fault Indicator: Without a proper ground, surge protection is useless. Back-UPS Office alerts you to wiring problems such as missing ground and reversed polarity, two common wiring mistakes which otherwise would require an electrician's visit to diagnose.
Facing the issue is hard, but inevitable: You have a better chance of winning the lottery than of escaping power problems: They’re the single largest cause of computer data loss and hardware damage.

Back-UPS Office provides reliable power for your entire system. Instantaneous battery backup ensures uninterrupted operation of your Mac, monitor and an external storage device. Full-time surge suppression and site-wiring fault protection spreads a true Multipath safety net under any remaining integrated peripherals, like modems, printers, faxes and phone systems. Back-UPS Office also provides convenient BlockSafe™ outlet spacing to handle all size plugs – even large block transformers.

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Plugging a phone line into your computer doubles your vulnerability to power problems; add any peripheral, and it triples. Even if your AC power-line is shielded, when a surge hits an unprotected peripheral, it can blaze down serial and data lines, and toast your expensive Mac.

MULTIPATH MEANS TOTAL POWER PROTECTION

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Back-UPS Office means true Multipath protection, clean, safe power to every peripheral, and instant battery backup to keep your cutting edge system and O/S from crashing. It means protection for less by integrating the security of a surge suppressor with the power of a UPS, with protection guaranteed up to $25,000.

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Sights, sounds, and motion:

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Multimedia Face-Off. In the corner at left, a 166MHz Pentium PC assembled by Macworld Lab challenges the Power Computing PowerTower 180 at right in the battle to be the best AV system, period.
Despite stiffer competition, the Mac still reigns

You're a video or audio producer and want to bring your production studio to the desktop. Or maybe you're an educator or hobbyist and want to try your hand at multimedia production. You've always heard that the Mac is the premier platform for media production, but you've also heard that Microsoft Windows is coming on strong.

You've heard correctly on both counts. The Mac remains the best platform for media producers of all levels, but Windows 95 and Windows NT machines are gaining ground rapidly. Recognizing this, developers of media-production tools are embracing Windows. Some products, such as Adobe Premiere, debuted on the Macintosh. But others are available exclusively for Windows, and the best of them will impress even the most fervent Mac zealot.

To find out how the Mac and Windows compare, Macworld Lab assembled a collection of audio- and video-production hardware and software. We didn't round up every product in every category, but instead sought out those products that are offered for both platforms or have a strong reputation in their class. With the help of Red Herring Pictures, a video- and multimedia-production house in Venice, California, we put these products through their paces: digitizing and editing video and audio, creating special effects, and analyzing the results.

Our primary goal was to compare how the Mac and Windows platforms stack up for desktop audio and video production. But we also wanted to show how some of the fastest Macs fare in a battery of audio and video tests (see the benchmark, “Media Moguls Face Off”). In particular, we wanted to see where multiprocessing has its biggest impact.

While we had our lab coats on, we added one more platform to the mix. We tested a Silicon Graphics Indigo2 Impact Max, a $48,000 workstation popular in the Hollywood special-effects industry. Price, product selection, and ease of use make the Mac and Windows platforms more appealing for most tasks and budgets, but it's enlightening to see the capabilities in the stratosphere (see the sidebar “The Impact of SGI”).

Digital video and audio are demanding forms of data. They require specialized hardware for connecting external analog devices and digitizing their signals. They demand operating systems that can handle time-sensitive requirements—keeping multiple tracks of audio and video synchronized, for example. They thrive on multitasking features that speed time-consuming jobs. They need processors, memory, expansion buses, and hard drives that can move megabytes of data every second. By these measures, the Mac and Windows platforms are closer than ever; each platform holds a small edge in specific areas.

Architecture is important, but what makes or breaks a platform is third-party products. Here, the Windows platforms have narrowed the gap as well. (Unless otherwise noted, all references to Windows refer to both Windows 95 and Windows NT.)
**VIDEO DIGITIZING**

Video digitizing converts the analog signals from a video deck into a stream of 1s and 0s. Digitizing is a game of trade-offs, where the need to compress video frames to save storage space battles with the fact that compression means compromised quality. Less expensive systems tip the scales toward compression. Midrange and high-end systems emphasize quality and thus where the need to compress video frames to save storage space battles with the fact that compression means compromised quality. Less expensive systems tip the scales toward compression. Midrange and high-end systems emphasize quality and thus demand high-capacity, high-performance hard drive arrays.

**How the Foundations Compare**

**Hardware**  
Digital video requires speed: fast CPUs, fast expansion buses, and fast hard drives. All three are in equal supply in the Mac and Windows worlds.

For CPUs, the PowerPC and Pentium generally run neck and neck for media-production applications. (In 1997, Intel plans to ship an enhanced Pentium chip that incorporates its MMX technology, designed to speed certain multimedia-related operations by providing additional instructions and 64-bit processing capabilities.)

All Power Macs and most PCs include PCI expansion slots, which provide the throughput needed for video applications.

Having access to fast hardware is one thing; getting it to work is another. Windows 95’s Plug and Play is supposed to ease the setup nightmares that historically plagued PCs. Plug and Play works—sort of. It simplifies setting up an individual device, but it doesn’t mean multiple cards will work together.

Plug and Play isn’t available on Windows NT, where much of the high-end video action is. As our testing experience confirmed, hardware configuration under NT can still be a brain-bending odyssey of shuffling cards to different slots, tweaking jumpers, and fiddling with drivers.

For video and graphics work, it’s useful to be able to connect multiple monitors. The Mac has the edge here, too: Windows doesn’t support a multiple-monitor virtual desktop.

**System Software**  
Apple’s QuickTime owns the digital-video world on personal computers. This domination is partly due to its availability for both the Mac and Windows.

As a technology, QuickTime is simply superior to Microsoft’s Video for Windows. Basics such as performance and synchronization of audio and video are better. Also, QuickTime provides advanced features—text Tracks, 3-D and virtual-reality support (via QuickDraw 3D and QuickTime VR), and built-in multiprocessing support—that Video for Windows lacks.

Microsoft is trying again, and this time it’s on to something. Its ActiveMovie technology not only addresses Video for Windows’ shortcomings, but also includes support for QuickTime and streaming (simultaneous downloading and playback) over distribution technologies such as satellites and the Internet. It’s too early to assess ActiveMovie’s impact on digital video—when we were testing, ActiveMovie for Windows was still in beta, and a Macintosh version isn’t expected until late this year at the earliest. But on paper, ActiveMovie is impressive.

An operating system’s ability to juggle multiple tasks can make a difference in performance—not only as measured on a stopwatch, but as perceived by users as they switch between programs and invoke time-consuming tasks. Here, Windows 95 and NT have a significant edge over the Mac OS, which is hamstrung by an aging multitasking mechanism prone to performance bottlenecks and crashes.

Windows 95 and NT feel more responsive under many circumstances. You can launch one program, then launch another while the first one loads. In many programs, you can open or save a large file and then switch to another program while the disk operation takes place. The Mac OS doesn’t permit these conveniences; indeed, even a simple operation such as holding down the mouse button brings all background tasks to a halt. That doesn’t happen under Windows.

Apples says Mac OS 8 will address some of these problems, but unfortunately, not until 1998 or perhaps later. The multitasking and protected-memory parts of Mac OS 8 will be introduced after the Mac OS’s new microkernel, which itself almost certainly won’t appear until 1998 (for more about Apple’s OS strategy, see “Special Report: OS Essentials,” in this issue).

The Mac may be weak at multitasking, but it’s no slouch at multiprocessing, thanks to the MP architecture developed by DayStar Digital and Apple and used in DayStar’s Genesis MP family and its nPower 360+ card (which also powers Apple’s Power Macintosh 9500/180MP and runs on Power Computing and Umax clones as well). When used with applications that support multiple processors, these machines stream through complex tasks such as rendering and filtering.

With QuickTime 2.5’s multiprocessing support, any application that performs video compression will get a major speed boost. In informal tests conducted with QuickTime 2.5, Cinepak compression with the Genesis MP was nearly twice as fast as with an equivalent single-processor Mac.

**Who Wins**  
Macintosh, thanks to the power and maturity of QuickTime, the Mac OS’s superior plug-and-play features, and the Mac’s ability to drive multiple monitors.

**How Video Hardware Compares**

**Out-of-the-Box Video**  
Apple’s Power Mac 8500 provides built-in video-digitizing and video-output features (see Media, in this issue). Add a fast hard drive, and you can digitize quarter-screen video at 30 frames per second. With the 8500’s hardware-zooming functions, you can connect an NTSC monitor or video recorder and play those movies back at full-screen sizes.

There’s a vast selection of third-party digital-video products for Windows computers, but no mainstream Windows products for Windows computers, but no mainstream Windows...
machine includes ready-to-use video-digitizing and video-output features. In a way, this isn't surprising: the PC mind-set stresses building your own system customized to your needs rather than buying a turnkey one.

Who Wins Macintosh. The Windows world has no equivalent to the out-of-the-box capability of the 8500.

Entry-Level Digitizing As quality requirements increase, Windows machines become contenders.

The entry point for full-screen, full-motion PCI-based digitizing cards is about $1000. The best-known member of this spectrum is miro's (415/855-0940, http://www.miro.com) $799 miroMotion DC-20, which provides S-Video-quality digitizing and playback. The DC-20 works on PCI machines. We tested the DC-20 under the Mac OS and under Windows 95. It worked well on both platforms, although under Video for Windows the sound sync drifted over time. (Loss of audio-video sync is a common problem in Video for Windows; it has plagued QuickTime to a lesser extent over the years, although QuickTime 2.5 addresses it nicely.) We also encountered some dropped frames on a Power Computing PowerTower 180, but paring down our extension collection fixed the problem.

A similar card is Truevision's (408/562-4200, http://www.truevision.com) $1095 Bravado 1000, in Mac or Windows 95 (not NT) versions; both include Adobe Premiere 4.2.

Who Wins Macintosh. The third-party hardware is generally equivalent across platforms, but QuickTime maintains sound-video synchronization better than Video for Windows.

The Middle Digitizing Ground The $3000-to-$5000 range is occupied by a new generation of products that outperform NuBus-based digital-video products, providing superior video quality and faster performance for less money.

The $3295 Truevision Targa 1000, a PCI card available for the Macintosh and for Windows NT (not 95), provides full-screen video digitizing and CD-quality audio recording and playback. We tested the $3995 Truevision Targa 1000 Pro, which adds support for Betacam component video and true CCIR-601 component digital video.

We also tested Media 100's (508/460-1600, http://www.media100.com) Mac-only $4995 Media 100qx. The Media 100qx combines digital video and CD-quality stereo audio digitizing in one PCI card; a $2000 option adds component video support. In a nutshell, colors captured by the Targa card seemed truer, while the Media 100qx's colors were a bit flat.

Because these products use lower video-compression ratios in order to provide better image quality, they demand high-speed disk arrays and high-performance SCSI controller cards. We used a 16GB, PCI-based FWB (415/833-4616, http://www.fwb.com) SledgeHammer Pro disk array for both the Mac and Windows platforms. We experienced much more difficulty tweaking drivers and optimizing the array's performance under

Freeze Frames: Comparing Digital-Video Quality

The complexities of video digitization and compression mean that no two cards deliver identical results. Here are single-frame captures from three of the cards we tested. The original video is from a Sony Betacam.

miroMotion DC-20 (Mac and Windows) This card provides full-screen, full-motion video for $799. But next to the output of costlier cards, its quality limitations are apparent. Image contrast is flatter, colors are less saturated, and compression artifacts are visible in the areas of sharp contrast, such as where the flower stems meet the green background.

Truevision Targa 1000 Pro (Mac and Windows) This $3995 card delivers excellent image quality, with rich contrast and color saturation and minimal artifacts. This image was captured using Truevision's codec. When we tested the card with Avid's MCXpress software, which uses an Avid codec, we saw more compression artifacts and poorer edge details.

Media 100 (Mac Only) The $22,900 Media 100 system provides outstanding image quality. The card retains shadow details a bit better than the Targa 1000: note the flower stems in the shadowed area in the lower-left corner of the image. Compression artifacts are minimal.
The Impact of SGI

Personal computer manufacturers frequently introduce their fastest machines by saying they provide "workstation-like" performance. The workstations they refer to are often those made by Silicon Graphics, Inc. (415/960-1980, http://www.sgi.com). SGI machines have a well-deserved reputation for performance and have attracted numerous developers of high-end 3-D-modeling and -rendering packages and video-effects tools. This has made them popular in the rarefied world of motion-picture and broadcast graphics production. (Many SGI models have also become the tools of choice for scientific and industrial applications and for high-end Web-site development and content serving.)

We tested an SGI Indigo2 Impact Max, in which a 250MHz MIPS R4400 (a 64-bit RISC processor) presides over 128MB of high-speed memory (expandable to 384MB), an array of custom graphics acceleration chips, three EISA expansion slots, digital and analog audio input and output connectors, and two Fast SCSI-2 buses. For supplemental storage, we used a disk array from Ciprico (612/551-4000, http://www.ciprico.com). The computer runs IRIX, SGI's version of the Unix operating system, on top of which runs a downright gorgeous graphical user interface. The interface doesn't fully mask the complexities of Unix, however, which is a bear to set up, maintain, and optimize. By the same token, though, its speed, low-level system control, and multitasking capabilities are well ahead of those in the Mac OS or Windows 95 or NT.

Road Tests: Spend a few minutes with a system like this, and you'll never again look at a Mac or Windows machine in the same way. No Mac or Windows machine can deliver the kind of real-time, photo-realistic 3-D graphics that we saw on the Indigo2's screen saver.

After recovering from the Indigo2's screen saver and other graphics demos, we tested several key compositing, effects, and postproduction programs, including Discreet Logic's Flint (prices, including an SGI system, start at $100,000; 514/272-0525, http://www.discreet.com), Xaos Tools' Pandemonium ($4495; 415/487-7000, http://www.xaostools.com), Interactive Effects' Piranha Animator ($10,000; 714/551-1448, http://www.webcom.com/~ie), and Alias/Wavefront's Composer ($7995; 416/362-9181, http://www.awsgi.com).

At a basic level, these programs provide the kind of video-compositing features that you find in Adobe After Effects. However, they often provide far more image and motion control than After Effects does, and they typically take advantage of the SGI's 3-D talents in a variety of ways, enabling you to paint on and apply video and images to 3-D objects, and apply 3-D lighting and effects to 2-D images. We were particularly impressed with Flint's elegant design and ability to work with uncompressed video in near-real-time.

In the SGI world, the definition of rendering quality tends to differ from what we Macintosh users are accustomed to. With Flint, for example, draft-mode rendering is often equivalent to what Mac or Windows products deliver at their highest-quality settings. And while we rave about 32-bit color support, these programs often support 48 and 64 bits.

However, because Unix is complex and because these programs tend to take over the system at a low level and are difficult to set up, most workstation users run only one or two programs on their systems—there isn't the application mixing and matching that personal computer users take for granted. This is one reason why most programs take an all-in-one approach to their feature sets.

Good for Each Other

The capabilities of Indigo2-class workstations and software are an order of magnitude beyond those of the best Mac and Windows systems, but price and complexity make them impractical for most media producers.

For high-end shops, it isn't an either-or proposition: many have supplemented their workstations with Macs and PCs, which handle less demanding tasks and free up time on their big boxes. Apple and SGI are cooperating to add features to QuickTime that enable exactly this kind of collaboration.

Finally, workstations are helping to create the state of the art: they drive personal computer manufacturers to improve the capabilities of their fastest systems, and they inspire software developers to add features traditionally available to a select few. Every kid needs someone to look up to; workstations give Macs and PCs that someone.
Windows NT than under the Macintosh Operating System.

**Who Wins** Macintosh, thanks to its superior plug-and-play features. It's simply easier to set up and optimize a digitizing card and high-performance storage system under the Mac OS than under Windows. However, once you successfully set up a Windows system, the overall quality of its output is just as good.

**High-End Digitizing** We tested Truevision's $10,995 Targa 2000 RTX and Media 100's ($10,995) Media 100. (Actually, we tested the $22,900 Media 100 Plus Whole Deal configuration, which includes a battery of options such as additional accelerated effects, a full eight tracks of audio, and a character generator for on-screen titles.) The Targa 2000 series is available for Windows NT and the Mac; the Media 100 family is Mac only.

Both products are major-league systems for video and broadcast professionals. Both can control external video decks; support component video; provide hardware-accelerated effects; and supply the low compression and high data rates necessary for tack-sharp video.

The Targa 2000 RTX has a unique dual video-stream architecture that lets it create, in real time, common video effects such as dissolves, wipes, pushes, and video within video. With compression ratios of less than 2:1, the Targa 2000 RTX had the edge in image quality; we were hard-pressed to find any compression artifacts, even after magnifying captured frames.

The Media 100 includes its own editing software, which is easy to use and provides solid media-management features—better than those of Adobe Premiere, though not as complete as those of Avid's MCXpress. The Truevision Targa 2000 RTX relies on third-party applications.


**Who Wins** The Targa 2000 series has enabled Windows to draw close to the Mac. However, the Media 100 is a superb product that's available only for the Mac. Also, the disk arrays that are so essential to high-end video products are easier to set up and optimize on the Macintosh. The Macintosh still has the edge.

**How Video Software Compares**

**Video Editing** After getting video into digital form, you must edit raw footage into a finished product—trimming clips, creating cuts and transitions between them, and generating a final movie. For video editing, the venerable Adobe Premiere 4.2 ($795; 415/961-4400, http://www.adobe.com) comes in Mac and Windows versions; the Windows version works with both Video for Windows and QuickTime files (see Reviews, March 1996).

Premiere's Windows performance is on par with its Mac counterpart's, and Adobe has nicely exploited Windows' two-button mouse, adding context-sensitive shortcut menus that appear when you right-click on a window or object. The Mac version also has shortcut menus, but to display them you must press Shift-option-control while clicking.

Premiere dominates among Mac video editors, but it has competition in the Windows world. Ulead Systems' (310/523-9393, http://www.ulead.com) $349 Media Studio Pro (for Win-

Razor Sharp insync's Razor Pro (left) and Speed Razor Mach III combine Premiere-like video-editing features with motion control and effects similar to those of Adobe After Effects (right). But the Razor family's effects capabilities can't keep up with those of After Effects, a Mac-only application—at least until early next year, when Windows versions ship.

We also tested Avid's (508/640-6789, http://www.avid.com) $4995 MCXpress for Windows NT. This industrial-strength video-editing package works with Truevision's Targa digitizing cards. (It's also sold with these cards starting at $15,000; the software and the bundles are available for PCI Macs.) MCXpress provides features and an interface similar to that of Avid's top-
of-the-line Media Composer family, which runs on PCI Power Macs, priced from roughly $20,000 to $120,000.

The MCXpress software's compatibility with Media Composer systems makes it appealing to Media Composer owners who want to add lower-cost editing workstations. However, we endured numerous configuration dramas before the program ran reliably under Windows NT. What's more, we noticed that video captured using Avid's video compressor/decompressor (codice) and a Targa 1000 card lacked the quality of video captured using the same card with Truevision's own capture utility. Black areas were more prone to artifacts, and background edge details weren't as clear.

Who Wins Windows, but with qualifications. The selection of Windows-based editors is larger than that of Mac packages, and Windows-based editors often feel more responsive, thanks to Windows 95's and NT's superior multitasking. But an editor is useless without video digitizing and fast storage hardware, and integrating these components is easier on the Mac.

Video Compositing and Effects You might want to create special effects by layering multiple tracks of video, animating video clips, and applying appearance-altering filters. The industry standard for video compositing on personal computers is Adobe After Effects ($995; production bundle $1995; see Reviews, March 1996). After Effects has long been a Mac-only product, but Windows 95 and NT versions are scheduled to ship early next year. When After Effects becomes available for the Windows platforms, the Mac will lose a key advantage.

Many video-effects packages are plug-ins that tap into programs such as After Effects and Premiere. One of the finest collections, MetaTools' KPT Final Effects ($695; 805/566-6200, http://www.metatools.com), works with After Effects and thus is currently a Mac-only product (see Reviews, April 1996). KPT Final Effects' junior cousin, Final Effects AP ($249), works with Adobe Premiere (Mac and Windows versions). Most other fil-

ter and transition collections are offered for both platforms.

Who Wins Macintosh, but only until MetaTools ships a Windows version of After Effects.

Audio Production

Audio production has several facets: creating monophonic or stereophonic recordings; editing recordings to remove flubbed words or add background music; editing soundtracks for digital-video productions; and creating multitrack recordings.

How the Foundations Compare

Hardware Every Mac includes built-in audio recording and playback circuitry; all Power Macs can record and play 44kHz, 16-bit stereo audio without additional hardware.

Few Windows computers include on-board audio circuitry; however, the vast majority include a third-party sound card—often one of Creative Labs' SoundBlasters. A high-quality sound card typically sells for about $200 and provides stereo audio input and output jacks and digitizing circuitry that supports 44kHz, 16-bit recording and playback.

Windows sound cards generally provide features no stock Mac provides, including MIDI (Musical Instrument Digital Interface) connectors and on-board MIDI synthesizers. PC games often take advantage of sound cards' synthesis features, which also work well with Web-browser MIDI plug-ins (including Apple's QuickTime plug-in for Netscape Navigator 3.0).

There are no MIDI synthesis cards for Macs. Apple has built excellent MIDI support into QuickTime, but midrange and high-end Windows sound cards provide better sound quality. Also, unlike QuickTime, MIDI-equipped Windows sound cards include sounds for all 128 General MIDI instruments.

System Software Support In the Mac OS, the Sound Manager handles sound recording and playback. The Sound Man-

What Will It Cost?

The huge array of computer systems, peripherals, and software makes it impossible to provide specific prices for a media-production system. But here are ballpark price ranges for the hardware and software you'll need to add to a Power Mac.

We recommend a PCI-based machine with a PowerPC 604 chip, at least 32MB of memory, 24-bit video, and a 17-inch or larger display.

### Low-Budget Video

- **Digitzing Hardware**: microMo- tion DC-20; includes Adobe Premiere LE (limited feature set). $799.
- **Supplemental Storage**: 4GB hard drive. Approximately $1000.
- **NTSC Monitor**: Optional—allows you to preview video as it will appear on a TV. Approximately $300.
- **Software**: Adobe Premiere. Estimated price $500.
- **Total**: Approximately $2600.

### Midrange Video

- **Digitzing Hardware**: Media 100's Media 100px or Truevision Targa 1000. $3000 to $5000, depending on options.
- **Supplemental Storage**: Disk array. $3000 and up, depending on speed and capacity.
- **Software**: Adobe Premiere. Estimated price $500.
- **Total**: Approximately $8000.

### High-End Video

- **Digitzing Hardware**: Media 100's Media 100px or Truevision Targa 2000 family. $8000 and up.
- **Supplemental Storage**: Disk array. $3000 and up, depending on speed and capacity.
- **Software**: Adobe Premiere. $5000 to $10,000 and up, or Truevision Targa 2000 family. $8000 and up.
- **Total**: Approximately $14,000 and up—way up.

### Supplemental Software

- **Adobe After Effects**: Special effects and compositing software. Estimated price $700 ($1900 for production bundle).
- **MetaTools KPT Final Effects**: Effects plug-ins for After Effects. $695.
- **MetaTools Final Effects AP**: Effects plug-ins for Adobe Premiere. $249.
- **Macromedia SoundEdit16 and Deck2**: Software-only audio editing and multitrack recording. Estimated price $389.
- **Waves AudioTrack**: Premiere and Deck 2 audio-enhancement plug-in module. Estimated price $249.
ager provides a solid list of features, including the ability to record while playing back previously captured sound—essential for multitrack recording applications. Also, the Sound Manager often has problems playing back multiple tracks in perfect sync.

Still, the Sound Manager is well ahead of its Windows 95 equivalent, which doesn’t even allow simultaneous recording and playback. (Windows-based multitrack audio products such as Digidesign’s Audiomedia III bypass the Windows sound manager.) Microsoft is promoting its DirectSound technology as a next-generation foundation for audio, but it initially doesn’t support simultaneous playback and recording, either.

Who Wins  Macintosh, but with qualifications. Sound cards are so common in the Windows world that a Mac’s built-in audio no longer represents a significant strength for amateur and semiprofessional two-track audio applications—especially since those ubiquitous Windows sound cards often provide superior features. The Mac OS’s Sound Manager is better equipped for multitrack audio applications, but Apple needs to fix the synchronization problems.

How Audio Products Compare

Audio Editing and Processing  Macromedia’s SoundEdit 16 ($389; 415/252-2000, http://www.macromedia.com) incorporates support for QuickTime soundtracks, CD-quality audio, and plug-in sound-processing modules (see Reviews, June 1996). At the high end, Digidesign’s venerable Sound Designer II ($495; 415/842-7900, http://www.digidesign.com) meets the needs of audio professionals and is the foundation for powerful audio plug-ins from third-party developers (see “The Mac Recording Studio,” December 1995).

On the Windows side, we tested two professional-level audio editors: Sonic Foundry’s Sound Forge ($495; 608/256-3133, http://www.Sound Forge.com) and Steinberg’s WaveLab ($399; 818/993-4091, http://www.steinberg-tws.com). Both of these powerful, easy-to-use programs take advantage of Windows’ multitasking and multithreading features to deliver faster, smoother performance than any Mac audio editor can. For example, they enable you to switch to other applications while a lengthy audio file loads from disk. Wavelab can even perform many processing functions while playing back.

Who Wins  Windows, with qualifications. Editing QuickTime movie soundtracks is easier on the Mac because SoundEdit 16 can open QuickTime movies directly. Still, the power of Sound Forge and WaveLab creates an argument for exporting soundtracks to audio files, editing them under Windows, and then reuniting them with their movies. Also, if your audio-processing needs demand a plug-in that isn’t offered for Sound Forge, the Mac is preferable.

Multitrack Recording and Playback  For software-only multitrack audio, the Mac’s dominance resonates. Built-in audio-digitizing circuitry and connectors make Macs perfect for amateur and semiprofessional audio work. A fast hard drive or disk array enables PowerPC 604-based Macs to record and play back a dozen or more tracks. There are no software-only multitrack programs for Windows.

Midrange hardware sings a different tune. Digidesign’s Audiomedia III ($995), a PCI card, provides CD-quality multitrack recording for Windows machines or PCI Macs. Testing the Audiomedia III on a 166MHz Pentium computer running Windows 95 was a plug-and-play, hassle-free experience. The card worked beautifully with Sound Forge and WaveLab and delivered outstanding results with Digidesign’s Session multitrack software. The Session/Audiomedia III duo can handle four simultaneous recording tracks and eight tracks of playback.

At the high end, the Mac holds a strong audio advantage—for now. Digidesign’s ProTools III ($6995 and up), available for NuBus- and PCI-based Macs, provides professional-quality digital-signal processing and a groundbreaking plug-in architecture that has made it the most popular high-end audio product.

Numerous third-party developers, including pro-audio firms such as Dolby and dbx, have shipped an array of sound-processing plug-ins that work under ProTools. ProTools also accepts add-ons that unite it with digital-video systems, enabling you to create and edit video soundtracks and then synchronize them with the original video.

With the ProTools hardware in PCI form, it’s only a matter of time before Digidesign creates Windows software for it.

Who Wins  For software-only audio, high-end multitrack
Media Moguls Face Off

For media producers, performance is paramount. Rendering video transitions and special effects, compressing video, and processing audio are time- and processor-intensive jobs.

To see how Mac and Windows platforms compare, we conducted performance tests on a 166MHz Pentium computer running either Windows 95 or Windows NT, a DayStar Digital Genesis MP 600, an Apple Power Mac 9500/150, and a Power Computing PowerTower 180. Since we finished testing, faster models have shipped—though they are in short supply (see "Systems Watch," News, in this issue). But the following results are readily scalable to the faster machines and their successors—and will be until the companies adopt new system architectures sometime this spring.

Key findings include:

- Single-processor Mac and Pentium machines perform equally well in media-production tasks. Each platform has small performance advantages, but not the kind that should sway a buying decision. When we ran video tests under Windows NT, the Pentium machine showed a bigger performance advantage—evidence that the PowerPC chip is hamstrung by the Mac OS's aging multitasking architecture and lingering emulation of 68000 code.
- If you run Mac applications that are not multiprocessor-aware, processor speed is everything. With such applications, the 180MHz PowerTower 180 was faster in every test than the four-processor DayStar Genesis MP 600.
- If you run Mac applications that are multiprocessor-aware, a multiprocessor machine is a must. Adobe After Effects was more than twice as fast on a Genesis MP 600 than on the PowerTower 180, and almost three times as fast as the Power Mac 9500/150. Many mainstays of media production, from Adobe Photoshop to Strata Studio Pro, are also multiprocessor aware. And now that QuickTime is multiprocessor-aware, any program that compresses or plays video enjoys a significant improvement.

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<th>Shorter bars are better. Times are in seconds.</th>
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<td>Wipe Transition</td>
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Behind Our Tests

We ran a variety of tests that represent common time-consuming media-production tasks—examples of which are shown here. For video, we timed how long it took to render two common transitions, a two-second wipe and a two-second cross-dissolve. The project resolution was 640-by-480, 24-bit color, using the codec specified by each board vendor. With the Mac OS and Windows 95, we used Adobe Premiere 4.2 (45MB of memory allocation); on Windows NT, we used Avid's MCXpress 1.0 (32MB of memory allocation). On the Mac OS machines only, we also measured the time required to render an Adobe After Effects 3.1 (70MB of memory allocation) project containing eight layers and numerous filters and effects. For audio, we measured the time required to resample a four-minute, 44kHz and 16-bit recording to 22kHz and 8 bits, and the time required to apply a reverb effect to the same clip. On the Mac OS, we used Macromedia's SoundEdit 16.2.0; under Windows 95, we used Sonic Foundry's Sound Forge 3.0 (32MB of memory allocation). The 166MHz Pentium machine had 64MB of memory and ran a 512K cache. The Mac had at least 80MB of RAM and ran System 7.5.3. We used a 16GB PCI-based FW3 SledgeHammer Pro disk array—Macworld Lab testing supervised by Avi Hoffer, Red Herring Pictures.

The Last Word

From its system architecture to its third-party product selection, from its ease of integration to its ease of use, the Macintosh remains the best personal computer for media production.

Although Windows 95 and Windows NT have closed the gap significantly, each still has drawbacks. Windows 95 has a greatly improved user interface and plug-and-play features but an awkward file-management scheme. Windows NT provides a more robust file system and dreamy multitasking features, but lacks plug-and-play capabilities and is difficult to optimize. While the Windows world makes you choose between ease of use and power, the Mac combines a generous dose of both.

The Mac OS machines we tested illustrate a trend that bodes well for the Macintosh platform: it's the clone manufacturers who are pushing the performance envelope.

DayStar Digital's MP architecture, also adopted by Apple, delivers great performance with Adobe After Effects and Photoshop, and with QuickTime 2.5.

Power Computing has shown itself willing and able to take advantage of the latest, fastest PowerPC chips. When we began testing for this story, the PowerTower 180 was the fastest Mac OS machine available; within weeks, it was eclipsed by PowerTower Pro models running at up to 225MHz.

Power Computing also offers its own AV machines configured with the outstanding miroMotion DC-20 card—which, unlike Apple's Power Mac 8500, provides full-motion, full-screen video. As the clone market grows, the competition should keep performance up and prices down.

However, because high-end audio and video products demand so much from a computer, their makers tend to support only specific computer models that have passed certification tests. At this writing, Digidesign, Data Translation, and Truevision guarantee compatibility with Apple-brand PCI Macs only. (Truevision has also certified the DayStar Genesis MP.)

This kind of problem plagues the PC world and is likely to become more common in the Macintosh world as the clone industry grows. But it's preferable to a large-scale user and developer defection to Windows. A market filled with a diverse array of fast, competitively priced machines is exactly what's needed to keep the Macintosh the best machine for making media. [ ]

Contributing editor and Media columnist JIM HEID operates a Web site (http://www.heidsite.com/) that covers Mac-based media production.
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It comes with some of the most popular educational software already installed and runs hundreds of other educational programs that make learning more fun—to help kindergartners learn to read and write, high school kids prepare for college or grown-ups master a second language.

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Your personal interests.
We've even made the Internet more personal by including your own Personalized Internet Launcher—a service from Apple that automatically searches the Internet and brings to your screen the newest and hottest web sites that interest you most.

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Introducing the Macintosh Performa 6400.

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And it is a Performa — designed with families in mind to be easy to set up, easy to learn and easy to use.

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And although the life span of some computers may appear to extend just beyond that of the average goldfish, we've loaded the Performa 6400 with ample power and plenty of expansion options so you and your family will enjoy it for years to come.

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There's more than enough power for today's applications and plenty of expansion options that make it easy to add functionality no matter what you want to do — now, and down the road. When your family grows, your Performa grows with you.

Your personal computer get?
Quick show of hands: how many of you have ever answered the phone only to find the call was already on its way to voice mail? And how many of you wanted to just push a button and yank the call back? Almost everyone? I'm not surprised. Though it's the most convenient, widespread communications device known to mankind, the telephone has a lousy interface: 12 buttons, no drop-down menus or intuitive icons, and no backspace key.

Meanwhile, undoubtedly not far from your office phone sits your Macintosh, a device known for its ease-of-use interface. But the Mac isn't exactly the first piece of equipment that comes to mind when you think of voice mail or making outgoing calls. That could change, thanks to a technology called computer-telephone integration (CTI) that strives to merge the telephone with the personal computer.

Imagine Mac software, complete with a 12-button telephone keypad interface, that lets you erase an incorrectly entered digit before you place a phone call, saving you from having to redial the whole number, or worse, being charged for a misdialed long-distance call. Visualize being able to access faxes and voice-mail messages from one mailbox on your Mac. And
Imagine having the ability to set up an office voice-mail system on your computer without investing in costly, proprietary voice-messaging hardware and software.

Despite these attractive features, Mac telephony is not yet a mature technology. Some programs, for instance, just don't deliver the simplicity and ease of use for which the Mac is famous. To help you find the best, most reliable programs, I let my fingers do the walking through seven currently shipping Mac telephony applications. (Two programs, Sagem's [http://www.snt11sn.com] The Phone and Third Planet Publishing's [http://www.3rdplanet.com] DigiPhone for Mac, weren't available for review in time for this article.)

In essence, there are three types of Mac telephony products. The first type, including Big Island Communications' YoYo and Cypress Research's MegaPhone, are designed for single users. These programs offer diverse features. Some primarily do call management, while others throw in voice mail and faxing—which makes life difficult for comparison shoppers. In this article, I've focused mostly on the single-user products, as they're the easiest to set up and use and are often the most versatile programs of the lot.

The second group, multiuser telephony products, which includes Cypress Research's Voice Messenger and Pacific Image Communications' SuperVoice, offer voice-mail messaging and other features. They're considerably more difficult to install and use and are mostly geared for small to medium offices. Moving up the scale in complexity, the third group consists of call-management products for corporations. They're covered in the sidebar, "Top-Gun Telephony."

### Single-User Telephony: Call Management

Call-management software, the most prevalent type of single-user Mac telephony software, represents the basics behind merging the phone and the Mac. For starters, it uses a representation of a telephone keypad for an interface. To make a call, you click on the numbers in the keypad or select a person's name from an address book of preentered numbers. The Mac does the rest, keeping a record of whom you called, when, and how long you talked.

But that's where the similarities end. The three products that focus primarily on call management—Big Island Communications' (http://www.big-island.com) YoYo, Cypress Research's (http://www.cypressrr.com) MegaPhone, and Diamond Multimedia's (http://www.supra.com) SupraSonic VoiceMail—all take different approaches to transforming your Mac and telephone into an intelligent communication system.

#### Hardware Required

You need a piece of hardware to act as an intermediary between your Mac and your phone. Of the call-management products, the Big Island YoYo hardware is the most unusual. The YoYo is designed to integrate with, and expand the capabilities of, Caller ID (a service available now from most telephone companies that displays the phone number of an incoming call). The package includes a telecommunications device that uses a 1200-bps modem chip to route calls from your phone line to your Mac. About the size of a bagel, the device has an ADB pass-through jack that plugs into the back of your Mac. A green light showing through a curved piece of plastic on the front of the device turns red when a call comes in.

In contrast, Cypress Research's MegaPhone requires a modem to interface with your telephone. The modem isn't included, and you're limited to using specific, albeit commonly used, models (see the table, "Calling All Macs.") Diamond Multimedia's SupraSonic VoiceMail ups the ante, as it ships with the company's own 33.6V+ fax modem.

#### Call Handling

Of the three programs, YoYo and MegaPhone offer the most attractive call-handling features. Even so, they have their differences. YoYo is particularly adept at providing instant, detailed information on who's calling. In conjunction with Caller ID service, the YoYo software displays the name and number of the person calling. You can also configure it to play different sounds depending on who's calling.

In addition, YoYo can automatically bring up the database records you've entered on a caller from the YoYo phone book or a YoYo-compatible personal information manager (PIM) such as Now Software's Now Contact. YoYo's call-blocking feature is a great time-saver. The program can block calls from people you don't want to talk to,
and it can block calls at specified times. Unfortunately, you can’t block certain calls at specific times, so as to keep your in-laws from calling during dinner.

Megaphone's call-management features are particularly well suited for mobile users. With Megaphone installed on your PowerBook, for example, you can change your "dialing from" location and easily adjust your outgoing dialing preferences (such as changing the first digit of every number from 9 when you’re at the office to 8 when you’re at a hotel). Handy boxes store phone-card access numbers and account numbers for billing purposes. A destination icon tells you the current time in the city you’re calling, and the area-code data is a godsend.

Diamond Multimedia's VoiceMail offers basic voice-mailbox and call-handling capabilities. Because the software is essentially an updated version of Supra's Faxcilitate fax-management software, though, VoiceMail's strengths have more to do with managing incoming and outgoing fax transmissions.

Voice Mail YoYo doesn't include voice-mail capabilities. Megaphone's voice-mail features are fairly basic—fast-forward, rewind, and time and date stamping. SupraSonic VoiceMail has a few noteworthy voice-mail features, such as a group of prerecorded celebrity-soundlike greetings (a Bill Clinton impersonator says, "Someone will get back to you, as long as Hillary says it's OK").

Address Books If you've already spent hours typing names and phone numbers into a PIM, the last thing you want to do is duplicate the effort. Nonetheless, that's the situation you're likely to face when trying to import PIM data into a call-management program.

All three programs gave me comparable headaches when I was trying to import data from PIMs into their address books. When I tried to import phone-book information from Now Contact into Megaphone, for instance, I received cryptic messages such as "An error occurred while getting a contact from the PIM: unable to coerce data." I ended up with columns headed only by letters, not words. In addition, Megaphone's address book is limited to 400 phone numbers. Hello! I have 50 contacts at Apple Computer alone.

Conclusion YoYo, with its ease of use, ability to maximize Caller ID, call blocking, and other features, is the hands-down winner among the call-management programs.

Single-User Telephony: Internet Phone VocalTec's Internet Phone 3.0 (http://www.vocaltec.com) is the only Mac application I evaluated that lets you place long-distance voice calls over the Internet. With a flat monthly rate for Net access, a PlainTalk microphone, and Mac or Windows Internet Phone software on both ends of the line, you can chat up a storm without incurring long-distance or hourly online charges. (For now, anyway; the long-distance companies are already lobbying to block this free ride through FCC regulations, and are, at a minimum, looking for ways to profit from this trend. Stay tuned for more.)

I had a lot of fun with...
Internet Phone. All you have to do is install it, click on the Call button, and type in the desired Internet address. The person you’re calling must be at his or her computer, with Internet Phone software running, to accept your call. There’s a slight but noticeable delay in voice transmission, and the sound quality can range from that of a cordless phone to that of an overseas call to a faraway country, depending on, among other things, your proximity to the person you’re calling.

You can download Internet Phone from VocalTec’s Web site and try it for a week. You’ll find people all over the world trying it out as well—the software automatically reveals a list of Internet Phone chat rooms. You’ll probably notice some focusing on adult topics. Fortunately, Internet Phone includes a filtering capability that prevents the software from listing chat rooms that contain words you’ve deemed undesirable.

**Conclusion** It’s not clear how long you’ll be able to make free calls over the Internet. Nonetheless, a $50 investment in Internet Phone is worth it. The program is easy and fun to use, and can be a real money saver.

### Multiple-User Telephony: The Mac as Party Line

Like the single-user products, the multiuser telephony applications offer very different features and capabilities, which makes comparisons difficult. Cypress Research’s Voice Messenger, for instance, focuses on voice mail. Front Office 1.5, recently sold to STF Technologies (http://www.fixstf.com) by Pleiades Research, adds a fax-back capability so that potential customers can call in, input their fax numbers, and have the Macintosh automatically fax them material. Pacific Image Communications’ SuperVoice includes voice mail, faxing, and an internal BBS for uploading documents—such as color proofs—that can’t be faxed.

These programs share some common negative traits, however: they were difficult to install and use and frequently had poor documentation.

**Installation** Installing and setting up the multiuser telephony programs requires a time commitment and dedication beyond the casual user’s capacity. To make sense of the installation, you need a strong grounding in flowcharts and workflow, because you have to carefully plan user extensions and the pathways remote users will follow when they’re pushing buttons on their telephones.

It’s so difficult to set up these programs, in fact, that you can introduce errors that come back to haunt you. When I tried to send a fax with SuperVoice, for instance, I got an error message

### Calling All Macs

<table>
<thead>
<tr>
<th>Company</th>
<th>Product</th>
<th>Star Rating</th>
<th>List Price/Company’s Estimated Price</th>
<th>Phone</th>
<th>Additional Hardware Required</th>
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<tr>
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<td></td>
<td></td>
<td></td>
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<td></td>
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<td>Big Island Communications</td>
<td>YoYo</td>
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<td>★★★/7.0</td>
<td>$100/$50</td>
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<td>GeoPort adapter, Global Village</td>
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<td>408/446-8690</td>
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<td>DigPhone for Mac</td>
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<td>Pacific Image Communications</td>
<td>SuperVoice 1.03</td>
<td>★★★/4.8</td>
<td>$130/NP</td>
<td>818/457-8880</td>
<td>Best Data 2834VLX</td>
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<tr>
<td>STF Technologies</td>
<td>Front Office 1.5</td>
<td>★★★★/5.3</td>
<td>$299/NP</td>
<td>213/259-1710</td>
<td>GeoPort adapter ($129)</td>
</tr>
</tbody>
</table>

NP = Not provided. * Based on features, implementation, innovation, performance, reliability, ease of use, and value. (See Star Ratings section for full explanation.) ** Actual prices could be higher or lower.

More Than the Fax You can tell from the fax-machine icon and the “No Fax File Selected” message on screen that Diamond Multimedia’s SupraSonic VoiceMail application has its origins as fax software. But it’s still easy to use for making calls—type in the number you want, select dial, and you’re off.
Combined with voice mail and Caller ID, this is the most full-featured call-management program for the Mac.

Great for automated dialing, but phone book is disappointing.

Better integration would move this beyond fax software with a voice-capability module.

An ISDN-based application for incoming and outbound call management.

Set to ship in late summer '96, this will include Caller ID and full duplex speakerphone capabilities.

Software for telephoning toll-free over the internet is easy to set up (once MacTCP is installed) and use.

Has a clean and simple interface, but would benefit from easier setup.

The only product to offer a BBS for data transmission, but suffers from glitches.

Nicely retrieves calls that have gone into voice mail, but program is too difficult to set up.

than the estimated street price provided by the company.

saying that the attachment had to be a vox (voice) file. It turns out that a bug in SuperVoice gives you this message if the modem isn't set up properly.

Documentation In general, the documentation with these programs isn't much help at all. The Voice Messenger documentation, for instance, comes with an electronic manual you must access page by page. When printed, it comes to 125 pages, much of it white space.

In some cases, program features or elements aren't even explained in a manual—for example, a button on the Preferences screen in Front Office called Phone Interface. This is an important setting, as it's where you indicate your modem type and your outgoing phone number—yet the manual never explains it.

Voice Mail In theory, voice mail on your Mac is a great idea—you can buy one of these programs for anywhere from $50 to $300 and load it up on a Mac to use for voice mail. Compare that with anywhere from $2500 to $25,000 for a typical voice-mail system, and it's a bargain. The reality, though, is less than ideal.

Of the three programs, Front Office has some of the best voice-mail features. In particular, I appreciate the Interrupt button, which allows you to pick up a call even after it's gone into voice mail—something you can do with an answering machine but not with most proprietary voice-mail systems.

Front Office is still a product in transition, having recently been sold to STF Technologies. The program's future, as a result, remains to be seen—one reason I'm reluctant to recommend it.

I really enjoyed editing my own message with Cypress Research's Voice Messenger, too, but overall, the other programs' voice-mail features are too often more trouble than they're worth. When I tried to record an outgoing message with SuperVoice, for instance, recording started without a problem. But clicking on the Stop button was useless; I had to force-quit the application (none of the suggestions of the company's technical-support staff solved the problem). And SuperVoice doesn't allow you to import numbers into its phone book—you have to type them in individually.

Conclusion Overall, the multiuser telephony programs just don't deliver on their promises, and they ask too much in patience and setup time to make them truly worthwhile. Small to medium-size businesses would be better off for now with a traditional voice-mail system.

The Last Word Two products in the single-user category—YoYo and InternetPhone—earned an Editors' Choice because they're easy to use and offer worthwhile features. The other products in that category—Supersonic VoiceMail and MegaPhone—are worth considering as well, although they aren't quite as straightforward.

In general, though, the current state of Mac telephony is a bit disappointing. It seems that, as with the multiuser programs, the more ambitious telephony programs become, the more they come up short. And despite the fact that telephony has been around for several years now, only seven Mac applications were available for my evaluation—not exactly a sign of a competitive product category.

Nonetheless, the future of Mac telephony looks bright. Earlier this year, Apple announced it was abandoning its Mac-only GeoPort hardware and was evolving GeoPort software to be compatible with the new FireWire 400-megabits-per-second interface, which will soon appear in both Macs and Windows PCs. This is significant news: there will be more incentive to develop Mac telephony applications because they can be ported more easily to Windows.

So who knows? With luck, soon your office phone and desktop computer will merge into one powerful, easy-to-use workstation; the possibilities are endless. But even if that golden day never arrives, at least you'll be able to get your calls back from voice mail.

Senior editor HOWARD BALDWIN has written about all kinds of telephony applications.

The Macintosh as Mailbox Setting up voice mailboxes for users is pretty easy using the Add New, Edit, Change, and other buttons in Cypress Research's Voice Messenger software. PowerTalk, Apple's recently discontinued speech-recognition product, isn't necessary for using Voice Messenger.

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MACINTOSH TELEPHONY

It wasn't enough for these applications to work well; for an Editors' Choice designation they had to demonstrate synergy between the Mac and telephone, making the combination easier and more useful than the two technologies used separately. Only two single-user products filled the bill.

YoYo Inexpensive and easy to set up, YoYo offers a number of convenient call-management features and comes with its own telecommunications hardware. Company: Big Island Communications (408/342-8300, http://www.big-island.com). List price: $150.

InternetPhone 3.0 It's like a passport to call anywhere in the world free (for now, at least), and it's extremely easy to use for both person-to-person and chat-room communications. Company: VocalTec (201/768-9400, http://www.vocaltec.com). List price: $50.
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ITS FIRST CONSUMER SYSTEMS
OUTPACE THE COMPETITION

by Galen Gruman

FINALLY, A BIG-TIME systems company has entered the Macintosh market—and it's done so in a big way. Motorola Computer Group (800/759-1107, http://www.mot.com)—a division of the giant company that produces pagers, cell phones, modems, Unix and Windows NT workstations, and all sorts of computer chips—has introduced its StarMax series of Mac compatibles. And Motorola has endowed them with a new motherboard architecture that keeps cost down yet provides fast performance.

How fast? Motorola loaned *Macworld* a StarMax 3000 MT603e-200 for exclusive hands-on testing for this article. That prototype 200MHz PowerPC 603e-based system beat the Apple Performa 6400/200 by 5 percent, and it beat a prototype Power Computing PowerBase 200 by a healthy 14 percent. It even beat a PowerBase 240 by 3 percent, despite the PowerBase's faster CPU. The speed advantage appears to be due to two factors: the StarMax's fast hard drive and its new motherboard design.

The StarMax's prices will be competitive as well. Motorola expects the well-equipped MT603e-200 StarMax 3000 minitower system to cost about $2700, compared with $2475 for a similarly equipped PowerBase 200 and $2875 for a PowerBase 240. A comparable Performa 6400/200 costs $2975. Motorola says it won't finalize its pricing until it ships the systems on November 4, so it can react to its competitors' pricing.

**Welcome to Tanzania**

The StarMax Macs use a new kind of motherboard design, named Tanzania and codesigned by Apple and Motorola (see "Apple Unveils Its New Platform Design," *News, Macworld*, June 1996). The other Mac clones use one of Apple's existing motherboard designs: the Alchemy design from the Performa 5000 and 6000 series, used in Power Computing's PowerBase and Umax's Typhoon systems; the Catalyst design from the Power Mac 7200, used in the Power Computing PowerTower Pro and Umax SuperMac J700; and the Tsunami design from the Power Mac 9500, used in the Power Computing PowerTower, DayStar Genesis, and Umax SuperMac S900.

Tanzania is a sort of "CHRP lite," a design that weans the Mac design away from many of Apple's proprietary parts and supports several PC technologies (VGA, Enhanced IDE, and PS/2 serial). But unlike the full Common Hardware Reference Platform design (see "CHRP Gets a Boost," *News*, in this issue), it does not completely divorce itself from the Mac OS's hardware dependencies. A CHRP system needs to run a special version of the Mac OS that doesn't look for specific Apple components, while a Tanzania system still looks for these because it runs today's Mac OS.

Motorola expects Tanzania and CHRP designs to coexist for at least a year, since Tanzania designs are cheaper. Motorola expects CHRP to be used in more expensive, power-user systems that could also run Windows NT and have many more expansion options.

**Two Lines, One Design**

The StarMax systems come in two lines: the 3000 series and the 4000 series, which have the same core designs and options.

**CPU and RAM** The StarMax comes with a CPU soldered on the motherboard, rather than on a replaceable card. Motorola says only 5 percent of PC owners upgrade their CPUs, so it figures saving the $25 cost of offering such an upgrade is worthwhile.

The StarMax 3000 series uses a PowerPC 603e CPU and a 256K cache...
Motorola Launches Eight Mac Systems

Motorola expects prices to range from $1700 to $2700.

The StarMax 4000 series uses a PowerPC 604e CPU and a 512K cache card. Motorola expects prices to range from $2400 to $3500. There are also three DIMM slots. The DIMM banks aren't interleaved, so you can mix capacities freely.

Video The 3000 series comes with 1MB of VRAM (supporting thousands of colors on a 14-inch monitor), while the 4000 series comes with 2MB (supporting thousands of colors on a 17-inch monitor). The on-board circuitry, expandable to 4MB, does not accelerate 3-D graphics (the PowerBase's circuitry does).

Motorola's First Mac Makes an Impressive Debut

And you thought the PCI Power Macs last fall and winter were fast. The 200MHz Motorola StarMax 3000's performance (highlighted in boldface) is nothing short of impressive. It was able to outpace the faster 240MHz PowerBase from Power Computing due to a faster internal IDE drive and newer motherboard design. The StarMax's superb performance is yet another sign that the consumer-oriented Macs—systems powered by G03e PowerPC CPUs—are now performance contenders, unlike early 680x-based systems. For details on our tests, see "The New Speed Champs," July 1996—Macworld Lab testing supervised by Mark Hurlow.

Motorola plans to sell the StarMax Macs throughout the world, including the United States, Canada, Japan, China, Taiwan, Europe, and South America. The first systems will be available just in North America, but by April, Motorola hopes to have local-language versions available overseas.

In the United States and Canada, you can expect to find Motorola's Macs from two major sources: via distributors who sell to corporations and via mail-order distributors. Motorola expects to sell many StarMax systems to companies that also buy Windows NT servers and desktop systems, which Motorola makes.

The Last Word Motorola is entering the Mac market with a big bang. My Macworld Lab colleagues and I were very impressed with the StarMax prototype's design and performance. The StarMax is the kind of system that should give PCs a run for their money and show once and for all whether Macs can expand into PC territory, after the barriers of high price and limited availability are gone. While Power Computing pioneered the Mac-clone market and established it as viable, Motorola brings the weight and confidence of a major player.
Award-winning Bose® Lifestyle® systems have been hailed as true audio breakthroughs.

With the Lifestyle® 12 home theater system, our goal was to develop the best sounding, easiest to use home theater system ever. One that was optimized for both movie soundtracks and music.

You won’t believe the simplicity.
The system is completely integrated. Every element is designed to work in harmony with the others – precisely, efficiently, simply.

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Thirty seconds with this system and you’ll understand why Home Theater Technology said, “...everything is included and carefully thought out.... The performance is awesome...”

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THE PERFORMANCE NATURALLY.

(TYPICAL DIRECTOR.)

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SECURE YOUR MAC

WHETHER FROM MISCHIEF OR MISHAP, HERE’S A PLAN TO PROTECT YOUR DATA

THE FOLLOWING STORY IS SAD BUT TRUE.

Long before the Macintosh set off the desktop publishing revolution, I worked on one of those old phototypesetting computers. You remember them—proprietary, dedicated systems that had 8-inch floppy drives, if they had floppy drives at all. They ran preinstalled typesetting software and nothing else, not even a screen saver.

You’d think such a system would be immune to tampering, but sure enough, one day in the late eighties, an employee suddenly disappeared, along with a number of disks containing customer jobs, fonts, and program updates. It took us weeks to redo the missing jobs, and some of those clients we never saw again.

All this is a prelude to an important point: If someone could muck up a dedicated system that easily, imagine what he or she could do with an easily accessible Macintosh. Now, it’s simple to copy software and take it elsewhere. And if anyone bore a grudge against your company, he could alter, corrupt, or even delete files at will. That’s why you need security software.
**Protecting Your Mac**

Personal computing is generally safe—if you work alone. But as soon as you let others use your Mac, your valuable files, including your private financial records, are at risk. And a virus infection introduced into your system (even by accident) could corrupt your files.

To help you protect yourself, your data, and your Mac, we collected 24 programs that promise some level of security, ranging from $39 to $249 (more for multiuser packages). Some of these programs restrict access to your hard drive, or to individual files and folders. Some even restrict copying files from your Mac. I also cover programs that can scramble (encrypt) files so they cannot be read by anyone without the right password.

You’ll see which security features are most important, and which products are likely to work best with your system. And you’ll learn which products can cramp your working style and restrict how you use your Mac. We’ll also take a look at three of the commercial virus-protection packages, all designed to keep those pesky intruders from mangling your data or corrupting your hard drive.

In addition to covering security and virus software, we’ve included a sidebar on hard drive utilities, which check your hard drive for possible damage and provide additional features to make your hard drive run better (see the sidebar “Damage Control: Hard Disk Repair Utilities”).

**Performance Hit**

Everything has its price, and virus protection and security software are no exceptions. With maximum virus protection, programs may open more slowly. Since disk-protection programs usually write to the SCSI device driver, you can no longer use a disk-level compression program such as Stacker (since that uses the same driver). You may also find you are unable to install new software, optimize your hard drive, update your hard drive, or run basic background checks of your disks and data without first turning off or removing the security software.

If you wish to back up your hard drive, you may not be able to automate the process. Or you may have to grant special user access to allow the backup software to retrieve files automatically from protected disks.

Such common tasks as moving files into different folders or disabling the wrong system extension can suddenly stop a security software program from working. Worse, it may require removing the security program to use your Mac.

On top of all that, you have to remember that password. If you forget the password, and a copy of the password or a key disk to remove protection from the drive is not available, you’re sunk. You are left with no option but to reformat your hard drive and lose every one of the valuable files you were trying to protect.

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Damage Control
```

**HARD DISK REPAIR UTILITIES**

- **The Software** in this category doesn’t so much protect access to your computer as keep files that are there already from being corrupted. Your hard drive’s directory is like a table of contents. If that directory becomes garbled in any way due to a crash or a problem with your SCSI chain, your files may become damaged or inaccessible.

Every Mac comes with a little program called Disk First Aid that can check your drive for minor directory damage and fix some of it. If you want more sophisticated disk diagnosis and repair, consider Symantec’s Norton Utilities for Macintosh (a similar product from Symantec, MacTools Pro, is no longer being manufactured but is still available; upgrades to Norton Utilities are $40). In addition to tackling a wider range of directory damage than Apple’s bundled utility does, these two programs provide tools to optimize your hard drive.

- Optimizing a drive moves all your data into contiguous spaces, so things run a little bit faster.
- NUM, as it’s known, can be set to scan your hard drive in the background, when your Mac is idle. And it puts up a message warning if a disk-directory problem is detected, and launches a disk-repair program.

The programs were comparable in detecting disk-directory damage, although I’ve found sometimes that one program will fix something the other cannot.

MacTools Pro, for example, has a feature called RAMBoot that creates a RAM disk on Macintoshes that support that capability. Unfortunately, Performa 5200, 5300, 6200, and 6300 models and PowerBook 190 and 5300 models couldn’t use this feature, nor could

All this extra work can cost you more money in employee time and inconvenience. When choosing a security or virus protection program, weigh its benefits against the complexities you’ll encounter.

**What Security Features Do You Need?**

The 24 security programs covered in this survey offer various options for protection (see the table, “Security Checkpoints”). Before you buy a product, consider the level of security you need. You don’t want to buy a vault when a safe will do, or a safe when a lock will do. Consider these eight important features.

- Hard disk security is probably the most elementary form of protection. It allows you to restrict access to a disk or partition with a password, but once you get access, you can use any of the files on that drive without restriction (not to be confused with the drive utilities covered in the sidebar).
- Folder protection grants access to specific folders on a hard drive. You can create a list of access privileges for each user.
- File protection, an extension of the folder-protection capability, allows only specific users to open a file. You can also grant separate access to allow users to change or delete files.
- Floppy drive protection allows you to decide whether a user can copy files to and from a hard drive or removable disk.
- Activity logs create a record of users who logged on to your Mac, for how long, and which files or disks they accessed.
• Time-limited access establishes a time frame during which someone can use your Mac. You can combine this with the limited-access choices above.

• File shredding provides secure erasing of sensitive files so they cannot be retrieved using one of the file-restoration programs, such as those available with MacTools Pro or Norton Utilities for the Mac (this is what would have kept Oliver North out of court).

• File encryption allows you to scramble a file so that only someone who knows the right password can open it. Contrary to the scene in Arnold Schwarzenegger's True Lies, even a top espionage agent couldn't crack encrypted records in a matter of minutes. If the files were encrypted using the National Bureau of Standards' Data Encryption Standard (DES), it might be impossible to unscramble them (so long as your password is hard to guess). Fortunately, a DES-based algorithm is included in all the programs in our survey that offer file encryption.

If you need a greater level of protection, or your hard drive software doesn't offer a protection option, you'll need to take the next step up the security chain.

Hard disk protection is at the core of most security products. usrEZ Software's cypherPad also includes a screen saver that limits disk access after a preset amount of time. A fast, one-button installation puts the software on your hard drive and guides you through creating a password. (It's too bad that userEZ's other products are not as simple to use.)

Nearly all the drive-protection programs we tried had convenient installers and were reasonably easy to configure (although it's always good to read the manual). The programs all ran reasonably well, without initiating an unusual number of crashes. I did, however, have to chase down updates for ASD Software's (http://www2.ndsoft.com) FileGuard, Symantec's (http://www.symantec.com) Norton DiskLock, and SmartStuff Software's (http://www.teleport.com/~smartstuff) UnderCover for the most reliable performance.

Moving up from basic hard drive security, Magna's Empower 5.0.4 adds controlled floppy disk access and DES-grade file encryption to the mix (version 5.0.5, which has a simpler interface, is now shipping). ASD's DiskGuard will protect both your folders and files, as well as the contents of your System Folder. If you need a greater level of protection, the company's FileGuard adds controls for application and floppy access, and sets limits on the amount of time a user can work on a Mac. In addition, FileGuard offers four encryption methods, including two variations of the DES standard.

Norton DiskLock controls access to folders and files and to applications, and also offers DES file encryption. I was especially impressed with its convenient Auto Setup feature, which lets you quickly configure your Mac for basic protection before you even crack open the manual to learn about the program's more sophisticated features.

On the basis of features alone, userEZ's ultraSecure offers just about everything you're likely to need in security software. You can customize almost every element of user access to a Mac on multiple user levels. In addition, there's a secure erase feature and three levels of file encryption (including two flavors of DES). If you can live without such features as limited-time user access control, save a few bucks and consider ultraShield instead.

These two programs offer installation procedures that will put off some users. Don't even attempt to install ultraSecure or ultraShield without reading an eight-page section in the manual that describes the process. You'll also want to study the manual carefully before using any of the program's advanced capabilities.

Power On Software's (http://www.poweronsw.com) On Guard offers a sophisticated level of protection for $70. A handy Finder-type menu makes the pro-
IS IT SAFE OUT THERE?

CHOOSE THE RIGHT TOOLS TO SECURE YOUR NETWORK PRIVACY

BY MEL BECKMAN

AS A NETWORK administrator, do you sometimes feel like Dustin Hoffman in Marathon Man, when Laurence Olivier drilled his teeth without benefit of novocaine? Are both users and management whining at you, “Is it safe? Is it safe?” In the movie, Olivier wanted Hoffman to confirm he could safely retrieve a cache of corporate jewels that will take you to court for unauthorized use.

With so many different software vendors, it’s software vendors’ who keep your network and software licensing violations, automatically seizing data from unattended systems. In your life, it’s good to have a few common dangers of Macbased NSG’s downside.

While AppleShare provides password control for shared volumes, nothing built into the Mac will stop someone from sitting down at an unattended machine and using volumes that are already mounted. Worse, someone might just make off with an external hard drive or oh-so-convenient removable cartridge, taking it back to his or her den of iniquity for leisurely browsing.

ELS’s Mac Manager 3.1 exists just to prevent such losses, by providing both safe and imperceptible access protection and data encryption. Mac Manager’s visible protection is a log-on screen that any would-be intruder must get past to reach your data. That data can be further protected using Mac Manager’s optional Apple HD SC (Hard Disk Security) Utility, which encrypts your hard drive in masse and then decrypts it automatically as you use it. The only way to access encrypted data is to log on through Mac Manager. There are computers and servers.

To take vengeance by creatively altering accounting and database systems. And anyone can unobtrusively eavesdrop on network traffic, leaving no trace of the crime.

Lots of people are counting on you to keep them safe. Management holds you accountable for network security, as do users who expect privacy in their workplace and software vendors who will take you to court for license violations. Even visitors to your Web site want some assurances of security before transmitting sensitive data such as credit card numbers.

Alas, the Mac Operating System provides little in the way of built-in security to address these requirements. Serious protection requires third-party products, ranging in price from $200 to $1700. I looked at the gamut of Mac-oriented tools covering a range of protection options: data encryption, access controls, security monitoring, and software license management. While no one product is the be-all and end-all security blanket you might wish for, each adds a layer of protection to your network.

First Step: Are the Doors Bolted? So, how good is your security right now? An easy way to answer that question is to run Mr. Mac Software’s (http://www.mmmac.com) Network Security Guard 3.1, which scans your network for unintentional guest access, poorly chosen passwords, and other security loopholes. You can even ask the program to ferret out every publicly accessible file on your entire LAN, which can be an eye-opening experience. A slew of reports tell you where to tighten security, and an audit feature can scan your network daily for repeat violations, automatically emailing you the reports.

NSG’s downside is its AppleTalk-only orientation. It ignores TCP/IP and NetWare (IPX) protocols, leaving some security lapses undetected.

Another kind of network monitoring looks for character, rather than network, flaws. Software license monitoring is a necessary chore given the police-state vigor with which vendors prosecute violations. This puts you in the uncomfortable position of license cop, keeping track of all your software licenses and making sure staffers are not exceeding their limits. Sassafras Software (http://www.sassafras.com) has a well-honed solution in KeyServer 4.1, an easy-to-install tool that lets you mark installed applications, then tracks them and enforces usage thresholds. Its many thoughtful features let you do this transparently. The version I tested was a delight to use but did not stop users from installing their own illegal software. At press time, however, Sassafras began shipping KeyServer 4.2, which monitors even for user-installed software.

Once you’ve found and plugged gaping holes, you can address less-immediate security threats, such as unauthorized access to your local
painful side effects, however. Mac Manager forces upon you one of three desktop interfaces resembling Mac OS 8, and performance is noticeably slower.

Maxum Development's WebLock 1.0 gives your Web server access protection similar to Mac Manager's password log-in. Based on AppleShare's Users and Groups access controls, WebLock prompts users for their user IDs and passwords before displaying non-public pages. Working with Quarterdeck's WebStar server, WebLock runs as a CGI (Common Gateway Interface) application that intercepts access to every Web page and verifies that the user is authorized. However, it may not coexist well with other CGI applications your Web pages require.

This kind of control would be better implemented as a WebStar plug-in, and that's just what Maxum promises to do in the next WebLock release.

Spy versus Spy
As a network manager, you realize that LAN traffic is susceptible to interception. What you may not appreciate, however, is just how easily a non-technical eavesdropper can snoop around in your LAN. Network-monitoring tools, running on Macs, PCs, or Unix machines, make child's play of filtering packets for such juicy phrases as password. Worse, an attacker can do this remotely, once having broken into one of your on-site systems.

Atemi's (http://www.atemi.com) NetShade 1.1, which can encrypt all your AppleTalk traffic, is one defense against snooping attacks. Easy to install and configure, NetShade scrambles data using a proprietary algorithm that will foil all but determined sniffers, and these can be foiled completely using one of the optional munitions-grade DES (Data Encryption Standard) or Triple-DES encryption plug-ins.

NetShade's own encryption scheme will protect your data from casual attackers; DES and Triple DES provide considerably improved protection. NetShade uses public-key cryptography behind the scenes to exchange secret keys safely between systems; frequent key exchanges limit damage in the event someone manages to decrypt your data.

The only downside to the advanced encryption algorithms is performance degradation. In tests, NetShade's default encryption slowed data transfer about 15 percent from unencrypted throughput of 5 Mbps, while DES dropped it to about 2 Mbps and Triple-DES to less than 1 Mbps.
The PowerPC-native encryption is even slower on 680DX Macs. Still, it’s nice to know you can have protection that even the National Security Agency considers impenetrable. There are holes, unfortunately. NetShade doesn’t encrypt TCP/IP or IPX traffic, so Internet and NetWare file-sharing traffic is exposed. Atemi says the 2.0 version of NetShade will encrypt TCP/IP (but not IPX).

Just as LAN traffic can be intercepted, so can Internet traffic, which exposes your corporate Web server and other network services talking across insecure wide area networks. Quarterdeck comes to the rescue with its WebStar SSL Security Toolkit, which lets you use transparent encryption to exchange sensitive data safely with popular SSL-capable Web browsers such as Netscape’s Navigator and Microsoft’s Internet Explorer. Any of your Web pages can initiate a secure session, quickly and safely exchanging public encryption keys with a requesting browser and then encrypting subsequent traffic with one of three algorithms, DES (least secure), RC4-40, and RC4-128 (most secure). Any of these algorithms significantly slows Web access, so you’ll only want to secure selected pages, such as order-entry forms.


THE BIG AUDIT Mr. Mac Software’s Network Security Guard audits your AppleTalk network for serious security flaws, automatically E-mailing you regular status reports.

If you want to protect more than just Web traffic on the Internet, you need multiprotocol encryption, and currently that’s available only through external hardware, in the form of an encrypting router. For example, Network Systems’ (http://www.network.com) economically priced BorderGuard Access Router is both an Internet firewall and an encrypting router. By itself, BorderGuard can block hacker attacks from the outside and help prevent unscrupulous employees from exporting corporate secrets from the inside.

BorderGuard’s true value, however, comes when two or more units communicate with each other across the Internet. When configured to do so, cooperating units set up encrypted information channels—through which you can transfer both AppleTalk and IPX traffic, as well as TCP/IP—letting you safely use the Internet as an inexpensive alternative to a private wide area network. Beware, however: configuring BorderGuard requires considerable Net savvy. You might easily spend as much as the cost of the router just having a consultant configure one.

The Last Word
Are these tools everything you need to lock up your network? Unfortunately, no. You’ll also need tools for onetime passwords, such as Security Dynamics’ 617/547-7820, http://www.secured.com) SecureID, which uses a credit card-size device to generate fresh passwords every minute. Also lacking are serious security audit tools, such as COP9 (Computer Oracle and Password System), Rscan, and SATAN (Security Analysis Tool for Auditing Networks)—Unix programs that seek out subtle security lapses, not just obvious ones. However, a number of vendors are poised to deliver Mac-oriented security products in the near future, which means you won’t have to rely on a stable of one-trick ponies to keep your network safe.

One-Trick Ponies
If you just want to protect individual files or folders, you might consider some additional options. These programs may also be helpful supplements to a basic security program that doesn’t offer a similar feature.

SmartStuff Software’s UnderCover, for example, creates a hidden and password-protected folder to keep files from prying eyes. ViaCrypt’s (http://www.viacrypt.com) ViaCrypt PGP and AT&T’s (http://www.att.com/bc/best_software/SAsoftware.html) SecretAgent encrypt files and provide digital signatures to allow you to authenticate the identities of those who send you E-mail.
The AT&T program was easy to set up and, with a careful study of the manual, fairly simple to use. It offers the added benefit of being compatible with the MS-DOS, Windows, and Unix versions.

On the other hand, ViaCrypt PGP wins the award for the most difficult program to set up, hands down. The bizarre process is much, much worse than the steps required for setting up ultraSecure or ultraShield. To get ViaCrypt PGP running, you have to copy the appropriate program files manually to your hard drive (either for 680X0 Macs or for the rest). Then you have to rename each file before use, precisely as shown in the manual. It's definitely not for a beginner.

**Infection Protection**

All the foregoing products protect you from snoops inside your office. But what about prying from the outside? Every so often the media report a big breakout, but you need to be aware of viruses constantly. A computer virus is basically a piece of code, added to a file, that replicates itself when the file is copied from one disk to another. Once a virus is created, it can spread easily from machine to machine within days. It may just put a silly message up on your Mac's screen. But it can also tamper with your software and even wipe out the data on your hard drive.

Unlike what you see in some popular movies, computer viruses aren't written to defeat spies or invaders from another planet. Viruses are written by people who want to play a prank (such as preventing you from typing vowels on your keyboard, as with the NVP virus), or by someone with a malicious intent. No matter what, the unprotected computer pays the consequences.

Any time your Mac receives files from other computers, even files you download via modem, it is vulnerable to virus infection. While the major online services and any responsible BBS system operator will check their files carefully before they're made available, there's still plenty of room for viruses to infect your system.

These programs will check your files for suspicious code. If a virus is found, the program will warn you of the virus's presence before it can do any damage. The program will also offer to repair the infected file, but since the process isn't 100 percent reliable, reinstalling the file from a fresh copy is the best solution (after the virus is removed, of course).

As new viruses are discovered, programs must be updated to search for additional types of infection. An update can be downloaded or distributed in the form of a new set of search strings, or as an application that actually stores the new detection capability in the program itself.

Virus problems on Macintoshes used to be few and far between, but the ad-
SECURE YOUR MAC

SECURITY CHECKPOINTS

<table>
<thead>
<tr>
<th>Company</th>
<th>Product</th>
<th>Star Rating</th>
<th>List Price</th>
<th>Telephone</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DESKTOP SECURITY</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>ASD Software</td>
<td>DiskGuard 1.5</td>
<td>4.5/7.3</td>
<td>$79</td>
<td>909/624-2594</td>
<td>Protectors hard disk, files and folders; System Folder; offers screen locking.</td>
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<tr>
<td></td>
<td>FileGuard 3.0</td>
<td>4.5/8.0</td>
<td>$139</td>
<td>909/624-2594</td>
<td>Protectors hard disk and floppy disk, files and folders, and applications; offers screen locking, encryption, and secure erase.</td>
</tr>
<tr>
<td>AT&amp;T</td>
<td>SecretAgent 3.0</td>
<td>4.5/6.1</td>
<td>$249</td>
<td>647/405-0990</td>
<td>Encryption.</td>
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<tr>
<td>Claro</td>
<td>At Ease 3.0</td>
<td>4.5/4.1</td>
<td>$49</td>
<td>408/987-7000</td>
<td>Encryption.</td>
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<tr>
<td>Datawatch</td>
<td>Virex 5.6.7</td>
<td>4.5/6.9</td>
<td>$100</td>
<td>508/988-9700</td>
<td>Virus detection, scheduled virus scans, password protection. Protectors floppy disk, file encryption.</td>
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<tr>
<td>Magna</td>
<td>Empower 5.0.4</td>
<td>4.5/5.0</td>
<td>$129</td>
<td>408/879-7907</td>
<td>Virus detection, scheduled virus scans, password protection. Protectors floppy disk, file encryption.</td>
</tr>
<tr>
<td>McAfee Associates</td>
<td>VirusScan 2.0</td>
<td>beta/not rated</td>
<td>$65</td>
<td>408/986-3832</td>
<td>Virus detection, scheduled virus scans, password protection. Protectors floppy disk, file encryption.</td>
</tr>
<tr>
<td>Power On Software</td>
<td>On Guard 2.1</td>
<td>4.5/7.1</td>
<td>$70</td>
<td>216/735-3116</td>
<td>Protectors hard disk and floppy disk, System Folder; limits when computer can be used; and network administration options.</td>
</tr>
<tr>
<td>SmartStuff Software</td>
<td>FoolProof 2.6</td>
<td>4.5/4.9</td>
<td>$39</td>
<td>503/231-4300</td>
<td>Protectors hard disk and floppy disk, System Folder, and applications.</td>
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<tr>
<td></td>
<td>UndeCover</td>
<td>4.5/4.3</td>
<td>$39</td>
<td>503/231-4300</td>
<td>Protectors files, folders, and applications; offers encryption.</td>
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<td>Symantec</td>
<td>Norton DiskLock 4.0</td>
<td>4.5/7.9</td>
<td>$129</td>
<td>541/984-2490</td>
<td>Protectors hard disk, files and folders, System Folder, and applications; offers screen locking, encryption. Disk repair and data recovery.</td>
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<td></td>
<td>Norton Utilities for Mac 3.2</td>
<td>4.5/7.7</td>
<td>$149</td>
<td>541/984-2490</td>
<td>Virus detection, scheduled virus scans, password protection. Protectors hard disk, files and folders, System Folder, and applications; offers screen locking, encryption. Protectors floppy disk, file encryption.</td>
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<tr>
<td></td>
<td>Symantec AntiVirus for Macintosh 4.0.8</td>
<td>4.5/8.1</td>
<td>$70</td>
<td>541/984-2490</td>
<td>Virus detection, scheduled virus scans, password protection. Protectors hard disk and floppy disk, files and folders, System Folder; limits when computer can be used; and network administration options.</td>
</tr>
<tr>
<td>usfE Software</td>
<td>cypherPad</td>
<td>4.5/6.2</td>
<td>$49</td>
<td>714/756-5140</td>
<td>Protectors hard disk; offers screen locking.</td>
</tr>
<tr>
<td></td>
<td>ultraSecure</td>
<td>4.5/7.0</td>
<td>$239</td>
<td>714/756-5140</td>
<td>Protectors hard disk and floppy disk, files and folders, System Folder, and applications; limits when computer can be used; offers screen locking, encryption, and secure erase.</td>
</tr>
<tr>
<td></td>
<td>ultraShield</td>
<td>4.5/6.4</td>
<td>$149</td>
<td>714/756-5140</td>
<td>Protectors hard disk and floppy disk, files and folders, System Folder, and applications; offers screen locking, encryption, and secure erase.</td>
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<td>ViaCrypt</td>
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<td>4/2.1</td>
<td>$129</td>
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<td>Atemi</td>
<td>NetShade 1.1</td>
<td>4.5/8.1</td>
<td>$299 (2 users), $129 (10 users)</td>
<td>217/352-3689</td>
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<td>4.5/8.3</td>
<td>$79 (single-user version), $299 (15 users)</td>
<td>352/375-0558</td>
<td>Protectors hard disk and floppy disk, files and folders, System Folder, and applications; limits when computer can be used; offers screen locking, encryption. Uses AppleShare Users and Groups control panel.</td>
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<td>WebLock 1.0</td>
<td>4.5/7.0</td>
<td>$195</td>
<td>708/830-1113</td>
<td>Scans for AppleTalk security oversights. Transparent encryption of AppleTalk and TCP/IP.</td>
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<td>Mr. Mac Software</td>
<td>Network Security Guard 3.1</td>
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<td>$289</td>
<td>619/453-2845</td>
<td>Transparent encryption of AppleTalk and TCP/IP.</td>
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<td>$1700</td>
<td>612/424-4868</td>
<td>Transparent encryption of AppleTalk and TCP/IP.</td>
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<td>Sashafras Software</td>
<td>KeyServer 4.1</td>
<td>4.5/7.8</td>
<td>$800 (10 users), $1350 (20 users)</td>
<td>603/643-3351</td>
<td>Automatic license management.</td>
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</table>

Based on features, implementation, innovation, performance, reliability, ease of use, and value. (See Star Ratings section for full explanation.)

I looked at the three retail virus detection products—Datawatch's (http://www.datawatch.com) Virex, Symantec's SAM (Symantec AntiVirus for Macintosh), and VirusScan from McAfee Associates (http://www.mcafee.com). Although these three have quite different interfaces, they all offer the same set of basic features: virus-detection updates, detection of Trojan horse and Word macro viruses, scheduled virus scans, and various forms of password protection.
Easy Setup Power On Software's On Guard uses tabs and a Finder-style interface to make a quick and easy job of putting limits on user access to your Mac.

Both SAM and Virex come with a convenient installer that lets the software scan your hard drive for viruses even before installation. Both programs install reference files of previously scanned files. This allows the programs to check only for changes to your drive, thus speeding up performance. An initial scan may take several minutes, while subsequent scans take a few seconds.

In addition to those features, SAM can be set to call up Symantec's support BBS automatically to retrieve virus-detection updates. This is useful if you don’t have access to an online service, where updates are routinely posted as soon as they’re available. And Virex can be configured to automatically scan the files you’ve downloaded from the Internet or an online service.

Although only a beta version was available when this article was written, McAfee’s VirusScan 2.0 looks to be a huge improvement over the previous version. VirusScan 1.0 (see Reviews, May 1996) was based on John Norstad’s popular freeware, Disinfector, and had little to recommend it over that. The new version offers a convenient installer wizard that asks you to specify the kind of virus protection you want and sets the preferences accordingly. An Expert mode lets you adjust settings manually.

VirusScan 2.0’s performance also seemed reasonably quick (though not as fast as SAM’s or Virex’s). Then again, this was not the program’s final release, so scanning speed may be tweaked further.

In terms of performance, SAM is a bit of a contradiction. Its system extension makes a number of programming calls to PowerPC routines with 680X0 code, which in theory should slow things down. But SAM didn’t intrude on performance all that much. Since the program checks start-up files for viruses, your Mac may take 15 or 30 seconds more to boot, but otherwise the impact is slight. Your applications will open with just a very short delay. On the other hand, Virex does tend to cause things—such as typing speed in Word 6.0.1—to drag.

After we completed testing, S&S International (617/273-7400, http://www.dsroolman.com), best known for its Dr. Solomon’s Anti-Virus Toolkit for the PC, announced a version for the Macintosh. The S85 utility has a couple of unique features that set it apart from the competition, including the acknowledgement that some Macintosh users, by virtue of mounting utilities and DOS-compatible cards, regularly insert PC-formatted floppies in their computers; hence it checks for PC viruses as well. In our spot check of the product (version 7.6.1 to match its PC counterpart), we found it ran more slowly than other programs (it’s not PowerPC native), but it uses a modest amount of RAM.

The Last Word

Overall, we were pleased with the caliber of the bolts and chains for the Macintosh. Top honors in our survey go to ASD Software’s FileGuard. This program is easy to set up, runs reliably, and offers most of the security protection you need. Symantec’s Norton DiskLock also gets good marks because it’s so simple to configure, but it lacks a few of the security features offered by the competition.

Among the remaining programs, userEZ Software’s ultraSecure is practically a textbook of all the possible combinations of available Mac security protection. But it’s hobbled by an awkward installation process, a dense manual, and many more cautions to the user than other products.

When it comes to virus software, Symantec’s SAM does it better. McAfee’s VirusScan 2.0 may also be worth a look; check out evaluation copies available for downloading from America Online and CompuServe.

And a final piece of advice: whatever program you choose, read the manual first. Some of these programs are quite complex, with a number of choices you’ll want to consider in order to tailor protection for your work environment. You also want to pay special attention to the steps needed to remove the software in case something goes wrong. By following the manual (and its cautions, of course), you can be assured you have done the best you can to make your work environment as safe and secure as the state of the art will allow.

Gene Steinberg is a computer security consultant, a forum leader with America Online, and author of the Using America Online books for Macmillan Publishing.

SECURITY SOFTWARE

FileGuard 3.0 This software combines sophisticated protection, easy setup, and reliable operation, while imposing as few limits as possible on your Mac computing experience. Company: ASD Software (909/624-2904). List price: $199.

WebStar SSL 1.2.4 For Web security, this lets you use transparent encryption to exchange sensitive data safely with popular SSL-capable Web browsers such as Netscape’s Navigator and Microsoft’s Internet Explorer. Company: Quarterdeck Software (310/305-3700, http://www.quarterdeck.com). List price: $129.5.

www.macworld.com November 1996 155
Chances are the color you choose when designing a web page is not what the countless people browsing the page will see. Why? The colors you choose on a Mac may not be available on a PC. Your colors may end up dithered or even changed...Get the picture? It's not pretty. Why leave it to chance? PANTONE ColorDrive guarantees high quality color and accuracy. And now, we're introducing ColorWeb™ to ensure accurate cross-platform color for your web page designs with Pantone's new tools for web authors. PANTONE ColorWeb and PANTONE ColorDrive...your net net solution for color on the net.

Care about color on the web? Call 1-800-222-1149 or 888-PANTONE for more information. Speak with Customer Service or request Document #1005 from our Fax-on-Demand System.
Macworld Lab Reveals Better Output and Lower Prices

WHEN THEY FIRST appeared a few years ago, color laser printers were an intriguing new technology—but with a number of hurdles to overcome. They were pricey (more than $9000) and difficult to set up. Consumables were expensive, too; output was slow; and the print quality was often disappointing.

A number of those problems persist with some models. But these days, there's good news on the color laser printer front. Prices have dropped—below $5000 in one case, the Xerox XPrint 4915 Plus (see the table, “Spotlight on Color Laser Printers”). There are more models than ever to choose from. And the technology has noticeably improved. While color lasers can't compete with dye sublimation for photo-realistic color, their output quality has come a long way.

We evaluated eight color laser printers to find the best among the current offerings. In our tests, we took a close look at output quality—after all, producing documents with rich, saturated, accurate color is ultimately what color printing is all about. We also considered speed. Because color laser printers must fuse four different kinds of toner to the page, print speeds can be slow, posing a problem for workgroups. Finally, we took into consideration each printer's ease of setup, hardware controls, consumables cost, and price.

Who Needs Laser Color?

Color laser printers are still at least $3000 more than their monochrome counterparts. If you work in a small office or home office and need an inexpensive way to add color to your documents, you'd better off with a color liquid ink-jet printer (see “Affordable Color Printers,” Macworld, April 1996).

Color laser printers aren't meant to replace the dye-sub and thermal-wax printers used for high-end graphics, either. Not one of the models we evaluated, for example, could print tabloid or legal-size pages in color—a must for graphics professionals.

Ideally, color laser printers are for offices that need to print color business materials (letterhead pages, transparencies, presentation handouts, and the like), yet also need a high-quality monochrome workgroup printer. All the color laser printers we looked at have engines that can handle 10 to 14 pages per minute (in monochrome mode). In addition, they support Ethernet (an optional feature with some printers), multiple paper-tray handling, and PostScript Level 2.

Color Lasers Compared

To judge image quality, we printed a variety of documents, including a full-page photo scanned into Adobe Photoshop and a complex PostScript file created in Adobe Illustrator. Then we assembled a panel of Macworld editors, art directors, and designers to rate the results (see
Spotlight on Color Laser Printers

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<tr>
<td>Apple Computer</td>
<td>Color LaserWriter 12/600 PS</td>
<td>★★★/6.7</td>
<td>$59.99 (NP)</td>
<td>408/596-1010</td>
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<td>Canon USA</td>
<td>Canon CLBP 360PS</td>
<td>★★★/6.5</td>
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<td>Hewlett-Packard</td>
<td>HP Color LaserJet 5M</td>
<td>★★★/6.1</td>
<td>$995$/7995</td>
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<td>Lexmark International</td>
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<td>$649/$6100</td>
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<tr>
<td>Tektronix</td>
<td>Phaser 550</td>
<td>Editor's Choice</td>
<td>★★★/7.6</td>
<td>$6995/NP</td>
<td>593/685-3067</td>
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<td>Editor's Choice</td>
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<td>$4995/$4500</td>
<td>716/442-4028</td>
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<td>$8995/$8100</td>
<td>716/442-4028</td>
<td>600</td>
<td>24MB/48MB</td>
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</table>

NP = Not provided. * Based on features, implementation, innovation, performance, reliability, ease of use, and value. (See Star Ratings section for full explanation.) ** Actual prices could be higher or lower; always check with dealers. *** 1200-dpi equivalent with resolution enhancement.

the benchmark, “Beauty and Speed in One Package”.

In the Photoshop test, the best-looking printouts (rated good but not excellent) came from the two Xerox (http://www.xerox.com) printers, the XPrint 4925 Plus and XPrint 4915 Plus. Both printers produced output with smooth color transitions, good skin tones, plenty of detail in shadowed areas, and rich color. The Lexmark International (http://www.lexmark.com) Optra C followed; its fairly good rendering of detail was offset by contrast problems and graininess.

The Canon (http://www.canon.com), Apple (http://www.apple.com), QMS (http://www.qms.com), and Tektronix (http://www.tektronix.com) printers garnered satisfactory but not exceptional ratings. The HP (http://www.hp.com) Color LaserJet 5M, however, brought up the rear; its Photoshop print samples were plagued with contrast problems and wildly inconsistent color.

In the Illustrator test, the ratings were generally lower overall, with most of the panel grading the output as exceptional. The Xerox XPrint 4915 Plus produced bold, clear images, with minimal banding on gradient fills. Likewise, the Tektronix Phaser 550, with its 1200-dpi resolution, rendered some of the smoothest gradients and crispest lines, though some panelists felt the output appeared a bit dark and streaky.

At the bottom of the heap were the Apple, Lexmark, and HP printers. The Apple Color LaserWriter 12/600 PS displayed a number of weaknesses rendering PostScript graphics, completely misinterpreting some PostScript instructions and producing reversed gradients. The

MW LAB

Beauty and Speed in One Package

If you’re looking to buy a color laser printer for use as a workgroup printer, speed is as important as output quality. We used default or standard print-quality settings when testing color laser printers for speed. The printers that

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

600 dpi

<table>
<thead>
<tr>
<th>Company</th>
<th>Index</th>
<th>Photograph</th>
<th>Illustration</th>
<th>Long Single-Font Report</th>
<th>Short Multi-font Memo</th>
<th>Presentation Slide</th>
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300 dpi

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Behind Our Tests

Color laser printers are expected to print a wide range of documents, from text only to full-color photographs to transparencies. Macworld Lab tested each printer's speed by printing a full-color photo scanned in Adobe Photoshop; an Adobe Illustrator-generated graphic; a 20-page Microsoft Word document with different fonts; a 2-page Word file with multiple fonts, sizes, and styles; a Microsoft PowerPoint overhead transparency; a four-page Adobe PageMaker newsletter with multiple fonts and PICT and EPS graphics; and a two-page Microsoft Excel spreadsheet. Macworld Lab ran all tests on a Power Mac 7100/80 running System 7.5.3 with 24MB of RAM and an internal 700MB hard drive. All printers were connected via the Ethernet port.

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The HP Color LaserJet scored low, this time due to noticeable toner spattering.

The Speed Factor
Happily, the printers that performed the best in our quality evaluations were usually among the fastest in our speed tests, too. The Tektronix Phaser 550 was the winner in our Illustrator tests, completing the job in just over 2 minutes, compared with the bottom-dwelling HP Color LaserJet, which finished at a sluggish 10-plus minutes. On Photoshop files, the fastest printers were the Tektronix and the Xerox 4915, along with the QMS magicolor CX/32.

On text-oriented jobs, however, the Lexmark and Apple printers were among the fastest. The Optra C rendered a 20-page Word document nearly three times faster than the Canon—completing the job in just over 2 minutes—and almost 50 percent faster than the Phaser 550.

Ease of Use, Maintenance, and Consumables
Print quality and speed are the key factors when choosing a color laser printer, but you should also consider hardware controls, maintenance ease, and the price of consumables.

The Tektronix and Lexmark printers both have well-designed control panels that let you configure printer options without hassle. The control panels on the Xerox machines have a more convoluted menu structure. The Canon controls feel cheap and flimsy, with tiny buttons, a control panel with a confusing menu, and poor construction. In fact, we inadvertently broke a latch off the output tray the first time we used it.

The Apple, Lexmark, and Canon printers get top marks for setup. With each of these printers, you add toner by sliding cylindrical toner cartridges (cyan, magenta, yellow, and black) into color-coded slots that make it impossible to insert the cartridges incorrectly. In contrast, setting up the Phaser 550 involves sliding in a large color-imaging kit, then another large photosensitive panel, in addition to the four toner cartridges. The HP is cursed with the worst setup of all: you have to empty bottles of toner into chambers one by one—the process is not only slow, but also presents serious spill potential. The LaserJet's clumsy setup process—not to mention its poor-quality output—is surprising, given HP's solid reputation in other printer categories.

The printers that generated the best-looking images in our output quality tests, the Xerox and Tektronix models, also required the most expensive consumables, including toner cartridges, toner developers, cleaning pads, fuser oils, and print drums, all of which must be installed and replaced regularly. Color toner cartridges cost anywhere from $43.95 (for the HP) to $269 each for the Phaser 550—and there are four of them in your printer that need replacement every 4000 to 8000 pages.

The Last Word
Unfortunately, no single printer performed well in all categories. Overall, the Tektronix Phaser 550 emerged as the best of the bunch. The Phaser's image and text quality were highly rated; it's the fastest; and it's the only model we evaluated offering true 1200-by-1200-dpi resolution. And at $6995, it's less expensive than most of its competitors.

Also worthy of recommendation is the Xerox 4915 Plus—the least expensive printer we tested. The 4915 produced images of outstanding quality, handled tough PostScript jobs, and was reasonably fast. With a street price of about $4500, it's a great value, considering that its output was equal or superior to that of printers costing thousands more. m


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<tr>
<th><strong>The Color Laser Printer Tests</strong></th>
<th><strong>MW</strong></th>
<th><strong>Colors</strong></th>
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<td><strong>Phaser 550</strong></td>
<td>3.4</td>
<td>3.3</td>
</tr>
<tr>
<td><strong>Xerox 4915 Plus</strong></td>
<td>3.2</td>
<td>3.1</td>
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Each output sample—photo, illustration, and text—was scored on a scale from 0 (worst) to 5 (best). Neither the testing supervisors nor the judging panel knew which printer produced each output sample. —Macworld Lab testing supervised by Mark Hurlow and Chris Uiterwijk
MACWORLD Expo/San Francisco delivers an explosion of technology as the largest Macintosh-focused event on the West Coast. It's your opportunity to explore an exhibit floor with everything you've ever wondered about... ask an expert's opinion... compare and critique hot new products... or get the buzz on the latest from industry gurus. Whether you're already sold on the Mac or wondering which way to go, MACWORLD Expo/San Francisco is the ultimate event to plan your direction.

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Take a look at the dozens of enabling new applications from Apple and third-party developers... see why the Mac is the premiere vehicle for Internet access and creation of content for the World Wide Web... and spend four days with Macintosh mavens who will share their most successful tips on how to animate, navigate, publish, customize, and otherwise profit from your Mac!

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Seating at all conference sessions is on a space-available basis.

Here's a preview of the 11 separate conference tracks and individual sessions:

A. The Macworld Magazine Track
Macworld's editors, columnists, and featured guests present living pages of the magazine's hottest topics.
- Macworld Magazine's Best of Show • The Best of Macworld MacSECRETS • Choosing the Best Mac for Your Needs • Illustrator/Freehand/Canvas/CorelDraw Shootout! • Maximizing the New PowerBooks • Multimedia Secrets

B. The Design/Art/Prepress Track
Celebrated artist, illustrators, designers, and graphics gurus share intensely useful tips, tricks, and technology breakthroughs.
- Desktop Color Scanning • Kai's Killer Tips and Tricks • Digital Photography • Illustrator WOW! Artists • Painter WOW! Artists • Photoshop WOW! Artists • Advanced Imaging for Professionals • The Stages of a Graphic Masterpiece

C. The Web Creativity/Web Masters Track
Get a leg up on the Web (and your competition) with sessions designed to help you cruise, serve, and populate the Net. Give your business the Macintosh/ Web Advantage!
- Choosing a Web Server • CGI and Database Tools Overview • Server Administration • Webcasting • New and Future Internet Technologies • Cool Web Server Tools • Building Interactivity Into Your Web Site •

D. The Operating System/Connectivity Track
Learn how to maximize the Mac with the bonuses Apple threw in for free -- to upgrade your Mac so that it'll continue to perform at peak, and connect to even more powerful networks.
- Essential Network Management Tools • Apple Extensions Explained • Apple OS Update • TCP/IP Report • Clones: A User Perspective • Stump the Network Experts! • Connect Anywhere Networking (Wireless/Mobile Computing) • Dealing with OpenDoc and Cyberdog

E. The Creating Entertainment Track
For design, video, film and multimedia professionals: the increasing power of the Mac, coupled with the global reach of the Web, offer unparalleled opportunities for entertainment creation. Learn from the pros and have fun while you're doing it!
- QuickTime VR • Career Opportunities for Digital Media Artists • Audio, Sound, and Music Tools • Developing Interactive Games • Case Study: On-Air Graphics • New Worlds of Expression with Digital Video • The Mac in Cinema • Creating Multimedia Content for Online and CD-ROM • 3D Animation: Step by Step

F. The Getting-Started Track
Practical, focused, step-by-step approaches and guidelines for those who need a concentrated course of beginner’s how-to’s on Mac technologies and techniques.
- Online Survival Guide • Beginner's Guide to the Internet • Beginner's Guide to Publishing a CD-ROM • Intermediate Internet • Getting Started with QuickTime • Getting Started with HTML • Getting Started with Java

G. The Telecommuting & Home Office Track
Never before has it been easier -- or more fun! -- to launch a small company or home-based business. Discover the cost savings and increased productivity that can be achieved by telecommuting, as millions of Macintosh users are now doing. Hear experts share their insights on how YOU can make it happen too.
- Introduction to Telecommuting • The Joy of Working from Home • Marketing with Your Mac • SOHO on the Internet • Using the Latest and Greatest to Run Your Small Business • Small Business Success Secrets

H. The Tools Workshops
Intensive training sessions on some of the most popular Macintosh tools, presented in a totally non-biased format by the award-winning staff of MacAcademy.
- Mastering the Macintosh • Clai rs Works • Adobe PageMill • Adobe Photoshop • QuarkXPress • Adobe Illustrator • Macromedia Director

I. The Educator's Track
An excellent opportunity for educators, administrators, and students to show and be shown new and classic examples of how the Macintosh positively shines as a teaching tool.
- Maximizing the Mac in Education • QuickTime for Educators • Multimedia for Educators • The Internet for Educators • The Macintosh Student Showcase • Webcasting for Classrooms

J. The Special Interest Group Track
Sessions for “birds of a feather” looking to compare Mac notes with others in a similar setting -- to solve special problems, to see how colleagues across the continent are getting more mileage out of the Mac, and to develop an invaluable “user network.”
- Macs in the Law Office • Macs in Science and Technology • User Group Academy Presents: The Mac and Your Non-Profit

K. The You-Asked-For-It Track
A combination of perennial MACWORLD Expo favorites, plus brand new topics in response to your special requests, with up-to-the-minute market developments. For starters:
- Customizing Your Mac • Internet Security • Resolving System Conflicts • Cross-Platform Development • JavaScript Tips and Tricks • Intranet Insights • Newton: What Can It Do Today?
SPECIAL FEATURES

The Keynote Sessions
There will always be a Macintosh in your future! The dynamic keynotes at MACWORLD Expo/San Francisco will catapult you closer to the excitement of tomorrow's promise — while putting you in touch with the next wave of Mac technologies. More dazzling session announcements to come — but meanwhile, here's just one sneak peek:

**Macintosh Coooool:**
The Hottest, Coolest, Baddest New Apps for the Mac
Join Apple Fellow and Ultimate MAC Evangelist Guy Kawasaki for a close-up look at some of the most exciting new applications to hit the Macintosh market. Guy has personally picked a panel of companies whose products have impressed him as hottest, coolest, and/or baddest — and they're ready to deliver not only a session that will spell-bind, but also a glimpse of how the future holds ever more power and productivity for your Macintosh!
**Keynotes:** Tuesday, January 7 • San Francisco Marriott Hotel

**The Net Zone**
The future of online communications is here! Enter the Net Zone and come in contact with the latest in Internet hardware/software; security and encryption; Intranet applications; cutting-edge demos; e-mail technologies; and more. Don't miss out on this opportunity to explore, sample and learn more about the world of the Internet.
MACWORLD Expo has built an extensive Conference Program featuring a multitude of sessions specific to the Internet. Fasten your seatbelt and learn how to maneuver along the superhighway!

**The Pavilions: Gateways of Discovery**
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**Business Solution Pavilion:** Explore the future of business management software products and solutions.
**Education Pavilion:** Sample new software and multimedia applications for every curriculum area.

**UGWUMP**
(User Group Welcoming/Unwinding/Meeting Place)
Exchange ideas and stories at this one-of-a-kind networking parlor for user groups. Swap newsletters, literature; learn how to start a user group in your area, and more!

**MacSciTech Resource Center**
Come and discuss with engineers and scientists the changes and issues dealing with how the Macintosh plays a role in chemistry, biology, computer science, design/test engineering; physics, mathematics, and more!

**Developer Central**
Developing applications or custom solutions? Then don't miss out on this opportunity to find the latest tools and training solutions for Macintosh and Newton development. Attend seminars taught by the world's best Mac techies!

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- **Package One $170**
  - Conference Sessions, Exhibits and Keynote Sessions
  - Pre-register by December 2nd ($195 at the door).

- **Package Two $25**
  - Admission to Exhibits only.
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- **Check if Applicable**
  - If you are an international attendee. Please mail my badge by Federal Express. Enclosed is an additional U.S. $45.

- **Check if Applicable**
  - If you are disabled and require special services, please attach a written description of your needs.

## 2. CUSTOMER INFORMATION

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- Company Address

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## 3. ATTENDEE PROFILE

**WHAT IS YOUR INDUSTRY? (Check One Only)**
- Accounting/Finance
- Aerospace
- Architecture/Construction/Process Industries
- Art/Design/Creative Services
- Arts & Entertainment
- Computer Reseller/VAR/VAD/Service Provider
- Consulting
- Engineering/R&D
- Government/Military
- Health/Medical Services
- Legal Services
- Manufacturing (Computer Industry)
- Manufacturing (Non-Computer Industry)
- Marketing/Sales/PR/Communications
- Printing/Publishing
- Telecommunications
- Utilities
- Other

**WHAT IS THE SIZE OF YOUR ORGANIZATION?**
- Under 50
- 51-100
- 101-499
- 500-999
- 1000 & Over

**WHICH TYPE OF COMPUTER DOES YOUR COMPANY USE?**
- IBM/PC
- Macintosh
- Power Mac
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**HOW MANY MACINTOSH COMPUTERS ARE USED IN YOUR ORGANIZATION?**
- 0
- 1-10
- 11-25
- 26-50
- 51-100
- 101-500
- 501+

**ARE THE COMPUTERS AT YOUR ORGANIZATION NETWORKED?**
- Yes
- No

**WHICH APPLICATIONS DO YOU USE? (Check all that apply)**
- Word Processing
- Spreadsheet
- Database
- Desktop Publishing
- Presentation Graphics
- Telecommunications
- Conference Rooms
- Computer Lab
- Internet Access
- Image Editing
- Electronic Data Interchange (EDI)
- CAD/CAM
- Financial Accounting
- Manufacturing
- Customer Relationship Management (CRM)
- Human Resource
- Project Management
- Programming/Analysis
- DTP/Graphic Design
- Web Design
- Media Production
- Other

**WHICH IF ANY OF THESE SERVICES DOES YOUR ORGANIZATION UTILIZE? (Check all that apply)**
- Catering
- Coffee Service
- Business Center
- Car Rental
- Travel Agency
- Telephone/Long Distance
- Conference Rooms
- Computer Lab
- Internet Access
- Image Editing
- Electronic Data Interchange (EDI)
- CAD/CAM
- Financial Accounting
- Manufacturing
- Customer Relationship Management (CRM)
- Human Resource
- Project Management
- Programming/Analysis
- DTP/Graphic Design
- Web Design
- Media Production
- Other

## 4. PAYMENT METHOD

- **Check enclosed (make payable to MACWORLD Expo)**
- Master Card
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- American Express

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**AMOUNT**

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Hotel availability is limited and on a first-come, first-served basis. A credit card number with one night's non-refundable deposit is required when making your reservation. Hotel rates and availability are subject to change.

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January 7-9, 9:00 a.m. - 6:00 p.m.
January 10, 9:00 a.m. - 4:00 p.m.

EXHIBIT HOURS
January 7-9: 10:00 a.m. - 6:00 p.m.
January 10: 10:00 a.m. - 4:00 p.m.

CONFERENCE HOURS
January 7: 1:00 p.m. - 5:15 p.m.
January 8-9: 11:30 a.m. - 5:15 p.m.
January 10: 11:30 a.m. - 2:15 p.m.

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January 7: Yerba Buena Ballroom,
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Keep Your Hands Off My Mac

SECURITY MEASURES THAT WILL KEEP YOUR SECRETS SECRET

by Joseph Schorr

This column is about real secrets—not obscure keyboard shortcuts or hidden software features, but stuff you want to keep away from prying eyes, like your Visa card number or that diatribe about your boss that was meant for your eyes only. Haven’t you stored information on your Mac that you’d rather not share with your coworkers? Then it’s time to implement a little Mac security. These free techniques won’t stop hard-core hackers, but they’ll definitely discourage casual snoops.

Make It Invisible

It’s easy to make a file or folder invisible using any incarnation of System 7. First copy a swatch of plain white space to the Clipboard. You can do this in any graphics program; or by opening the Desktop Patterns control panel, switching to plain white, and choosing Copy (⌘-C). Next, select the file you want to make invisible and choose Get Info (⌘-I) from the File menu. Click on the file’s icon in the Get Info window and choose Paste (⌘-P). Replace the file’s name with blank spaces. The file is now invisible in the Finder’s icon views, though not in list views. You can still select the file (by dragging over it) and open it—if you know where it is.

Make It Unopenable

Even if people stumble upon one of your files, it will do them little good if they can’t open it. You can lock a file by changing its Type and Creator codes. You’ll need some kind of file utility, such as ResEdit, DiskTop ($69.95; Prairie Group; 515/225-3720, http://members.aol.com/prairiefs/) or Laurence Harris’s shareware program File Buddy (available from Macworld Online). Here’s how to use ResEdit to lock a Microsoft Word document.

Launch ResEdit and choose the Get File/Folder Info command to select a Word file. In the Info window, you’ll see the file’s Type code (W6BN) and its Creator code (MSWD). Change the codes and the Mac has no idea what kind of file this is and what program opens it.

You can change each code to any four-character string you want, but it’s easiest to change uppercase characters to lowercase and vice versa—that adequately confuses the Mac. Now save and close the file. Double-click on the altered file, and you’ll get an error message. Even Word won’t recognize the file. To unlock the file, restore the original codes.

continues
To encode a message, launch ResEdit and use the New command (X-N) to create a new file. Choose the Create New Resource command from the Resource menu and select HEXA in the Select New Type dialog box. This will open a new hex editor window.

Click in the rightmost portion of the window (B) and start typing your message. As you type, you'll see the corresponding hexadecimal code fill in the center four columns of the hex editor (A).

When you've typed your complete message, click once anywhere within the columns of code, choose Select All (X-A) from the Edit menu, and then use the Copy command. Paste the text that you've copied into a word processor or E-mail document. You'll end up with a long, apparently meaningless string of numbers and letters (C).

To decode the message, copy the code to the Clipboard, launch ResEdit, then paste the string of characters into an empty hex editor window (either in an existing file or in a new ResEdit document). The message will instantly appear in the ASCII column on the right side of the hex editor.

To complete the disguise, rename the file something like AppLibTPC Enabler and put it in your Extensions folder. Who'd suspect that confidential files are pretending to be part of the Mac OS?

Hands Off
The best way to deter snoops is to keep them from pawing around on your Mac in the first place. Try these tricks.

Use ResEdit to create a threatening start-up message. Make a copy of System 7.5’s WindowShade Preferences file (it's in the Preferences folder in the System Folder) and open the copy with ResEdit. Double-click on the STR icon and then open STR resource -16397—the only one listed. In the field called The String is an error message that clicking on this file normally generates. Replace this text with your own message. Make it scary.

When you're done, save the doctored file and place it in the Startup Items folder. Finally, if you're using System 7.5 or later, turn off Macintosh Easy Open. An unsuspecting soul who starts up your Mac will be confronted with a very intimidating message—and might be spooked enough to shut down ASAP.

You can simply dismiss the bogus warning when you start up—or avoid it completely by holding down the shift key as soon as the Mac desktop appears (which allows extensions to load normally, but bypasses the Startup Items folder).

Turn It On, Turn It Off
Another start-up strategy: Drop a copy of System 7.5’s ShutDown desk accessory (in the Apple Menu Items folder) into the Startup Items folder. When an intruder tries to start up, your Mac simply shuts itself off. Again, bypass Startup Items by holding down the shift key during start-up.

Plant a Few Mines
Make a bunch of duplicate copies of the ShutDown desk accessory. Rename the copies and change their icons so that they look like other types of files. (To copy a file's icon, select the file, choose Get Info from the File menu, click on the icon in the Get Info window, and choose Copy. To paste the icon onto another file, select the file, choose Get Info from the File menu, click on the icon in the Get Info window, and use the Paste command.)

Plant these files all over your Mac. Make them alluring: call one My Hard Drive and give it your hard drive's icon, then drag it into the upper right corner of your desktop. Call another one My 1996 Income and paste an Excel spreadsheet icon on it. (Or try the surefire Confidential.) Every one of these files when double-clicked will shut down your Mac, driving a nosy intruder crazy. Believe me, these little traps really work if you make them convincing-looking: I inadvertently shut down my own Mac no less than a dozen times while writing this column!

Of course, such tricks aren't fail-safe security software. If you're looking to foil a serious intruder, check out "Secure Your Mac," elsewhere in this issue.

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Tips, Tricks, and Shortcuts

by Lon Poole

¡Caramba! You have just a few pages to print when the jets on your Apple StyleWriter’s ink cartridge begin to plug up, causing white streaks in the printer’s output. The StyleWriter Print dialog’s “Clean ink cartridge before printing” option doesn’t help, and there’s not a replacement cartridge in sight. What to do? Dan Coventon of San Pedro Sula, Honduras, has rescued several cartridges with this trick: Remove the cartridge; then wet a cotton swab with pure isopropyl alcohol and very gently swab the surface of the print head. You may have to repeat this a couple of times to get the cartridge to print like new. While you’re at it, why not take the time for further printer maintenance? Use a dry swab to soak up some of the ink in the sponge that caps off the print head when it’s parked at the right side of the printer.

Since going over the print head with a cotton swab could conceivably damage the print head, you may want to first check for lint around the sponge or the clear plastic wiper near it, and wipe off any accumulated lint with your finger. The lint may absorb ink and cause white streaks in the output just like an ink-clogged cartridge. If removing lint doesn’t eliminate the streaks, you have little to lose by swabbing the already malfunctioning print head.

TrackPad Insanity

According to Apple, sweaty hands or moisture on the pad can cause the pointer to move erratically. Oil or lotion can cause the same problem. Wipe off the pad with a soft cloth or tissue, and try using the pad with a piece of paper between your finger and the pad. If the problem persists, try removing the TrackPad preferences file (a new one will be created automatically). Also, try removing rings and bracelets; jewelry can interfere with TrackPad performance.

If the problem goes away with a piece of paper between your finger and the pad, Apple suggests you purchase a plastic membrane to fit over the pad; this will prevent moisture from directly contacting it. Before installing the membrane, clean the pad with a mild glass cleaner, spraying it on the cleaning cloth, not directly on the pad. One source of TrackPad membranes is APS Technologies (800/874-1341, http://www.apstech.com), which sells a sheet of 20 decorative, removable Mylar “skins” for $4.95 (item number 105289).

PPP Out of Control

Q My Mac seems to have a mind of its own. I use MacTCP with a PPP dial-up connection, and have the Config PPP control panel’s Disable Auto Connect option turned off so it will automatically dial and connect whenever I use an Internet application. Sometimes in the morning, the Config PPP control panel indicates that a connection was made overnight. My modem’s control panel shows that my Internet provider disconnected the link after a time out. I have also seen this happen in the evening while I am watching TV. The computer just decides to call for a couple of pizzas?

Kevin M. Lind
Houston, Texas

Please help me—I have been driven insane. Every time I touch the TrackPad of my PowerBook 190cs, the cursor jumps like a horse. My friends have no problem using my PowerBook’s TrackPad. I think the problem is that I sweat too much. At the moment, I am using my lab glove to operate my PowerBook. Help!

Ka Tai Shiu
Vancouver, British Columbia, Canada

According to Apple, sweaty hands or moisture on the pad can cause the pointer to move erratically. Oil or lotion can cause the same problem. Wipe off the pad with a soft cloth or tissue, and try using the pad with a piece of paper between your finger and the pad. If the
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According to the FreePPP FAQ document, MacTCP has an internal timer that causes a connection attempt after about 3½ hours of TCP network inactivity. Try one of these workarounds:

- Disable automatic connections. If you use FreePPP 2.5 or later, in FreePPP Setup turn off the option Allow Application to Open Connection. If you use an earlier version of FreePPP or any version of Mac PPP, turn on the Disable Auto Connect option in ConfigPPP. After disabling automatic connections, you’ll have to manually connect and disconnect using FreePPP Setup or ConfigPPP, or with PPPPremier, a great PPP timer that I described last month.
- Upgrade to System 7.5.3 (System 7.5 Update 2.0) and to FreePPP 2.5 or MacPPP 2.5. Then use the Network Software Selector application to switch from MacTCP to Open Transport 1.1.
- Turn off your Mac overnight. Save electricity and reduce the pollution that’s a by-product of generating it.

Cursor Stuck

Q For years I have struggled with an intermittent cursor problem. In any number of writing programs, including TeachText, if I go back to a line previously completed in order to indent it, neither the spacebar nor the tab key will push the text ahead. I can delete the first letter, but then the text realigns itself as before with the first letter now erased. I try going to the line above and pressing return, but this does not work, either.

HARRIET HART
New London, New Hampshire

A Sounds like you are trying to indent a line in the middle of a paragraph. The symptoms you describe are normal in that context. When the program wraps a paragraph to fit the margins, it puts all blank spaces and tabs occurring after the last word of a line at the end of that line, never before the word that begins the next line. So if you set the blinking insertion point (the cursor) before the first word on a line in the middle of a paragraph and then type spaces or tabs, that “white space” all gets added at the end of the line above the insertion point. You must press return to start a new paragraph—or in many word processors, type shift-return to start a new line in the same paragraph—and then press tab or type spaces to indent the beginning of the line.

Incidentally, it’s much better practice to use the tab key or the paragraph’s indentation settings, not the spacebar, to indent a line. You get more accurate alignment that’s not dependent on the font, font size, or font style of the blank spaces.

First or Last, Pronto

TIP In most folder and disk windows, you can highlight the item that comes first alphabetically by pressing any number key or the spacebar. In most cases you can highlight the item that comes last alphabetically by pressing the option key along with any number key.

MELISSA YORK
Austin, Texas

Those tricks, which stem from the ability to select an item by typing the first part of its name, work fine unless you have many item names that come after a bullet (•, option-8), including names beginning with most accented capital letters, most symbols you type with the option and shift keys, and some symbols you type with the option key alone. “Alphabetical Order” shows the

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QUICK TIPS

How Ironic.

YOUR MAC GETS A VIRUS

AND YOU’RE

THE ONE WHO GETS

VIOLENTLY ILL.

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Alphabetical Order This window, produced by Günther Blaschek’s freeware control panel PopChar Lite 2.7.2, shows the standard Macintosh characters in alphabetical order and indicates how to type the highlighted character. The window appears when you click a hot spot or icon in the menu bar; you can then select a character and it appears in your document at the insertion point and in the correct font. Some fonts do not contain all the characters after the diacresis (’); the Mac OS substitutes a hollow box for a missing character. An alternative to PopChar is using the Key Caps utility, which comes with the Mac OS, to learn the keystroke for a character.

First or Last, Pronto

In most folder and disk windows, you can highlight the item that comes first alphabetically by pressing any number key or the spacebar. In most cases you can highlight the item that comes last alphabetically by pressing the option key along with any number key.

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Syncing Billminder  If opening an old Quicken data
file causes Quicken’s Billminder feature to start
nagging you to pay old bills, use ResEdit to remove
the BIL# resource from the Quicken preferences
file located in the System Folder’s Preferences fold­
er. (As insurance, make a copy of the preferences
file before editing it.)

Sharing ClarisWorks Macros

Tip Let’s say you’ve created several ClarisWorks shortcuts you want
to give to other ClarisWorks users. For
instance, other people might be interest­
ed in a bunch of your shortcuts that
automate typing of HTML tags. You
could simply distribute copies of the
ClarisWorks Shortcuts file from your
Preferences folder, telling people to
replace their files with yours. The draw­
back to this method is that people will
lose any custom shortcuts they have
already created.

Instead, follow these steps to create a
file that people can use to add your short­
cuts to theirs:

1. Make a new ClarisWorks word
processing document and choose Edit
Macros from the Shortcuts submenu in
the File menu.

2. From the Macro pop-up menu,
choose a macro that you want to dis­
tribute. Then attach that macro to the new
document by selecting the Document
Specific option. Repeat this step for all
other macros you want to distribute, and
then click Done to dismiss the Edit
Macros dialog box.

3. Type instructions in the document
telling others how to install the macros in
their copies of ClarisWorks (hey, it’s a
built-in Read Me!), and save the docu­
ment with a descriptive name. Here are
the instructions you should type:

To put the macros contained in this doc­
ument into your copy of ClarisWorks, follow
these steps:

• Choose Edit Macros from the Shortcuts
sub menu in the File menu.
• From the Macro pop-up menu, choose
a macro that you want to install and deselect
the Document Specific option. Repeat this
step for all other macros you want to install,
and then click Done to dismiss the Edit
Macros dialog box.

4. Go back and deselect the Docu­
ment Specific option for all macros
continue.
luckman's Net Commander is an all-in-one Internet software package that has everything you need. Fully experience the Net starting with single button Internet registration, automatic set up and configuration of 18 Internet applications including E-mail, NewsWatcher, audio and video players and much more.

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Quick Tips

- The logic-board upgrade that makes a Performa 63X, 52XX, or 62XX the equivalent of a Performa 6300, as described in July’s Quick Tips, can be ordered from an Apple dealer. Apple’s estimated street price for the Power Macintosh 5300/6300 Logic Board Upgrade is $769 with your old logic board in trade. Contrary to my July report, installation is extra.

- The Control Strip, which provides quick access to various control-panel settings, is not installed automatically on all desktop Macs using the Easy Install option of the installers for System 7.5.3 and System 7.5 Update 2.0 (contrary to what August’s Quick Tips implied). You can use the installers’ Custom Install option to install Control Strip, remarks David Systma of Higashi Kurume-shi, Japan. He also notes that instead of Control Strip, you can use Desktop Strip ($20 shareware), Extensions Strip ($15 shareware), or OneClick ($129; WestCode Software, 619/487-9200, http://www.westcodesoft.com). Those alternatives can be moved anywhere on screen, and have other advantages over Apple’s control panel, which must stick to the left or right edge of the screen. Systma has a Web site (http://www.calvin.edu/~asytmsn89/) dedicated to Control Strip, alternatives to it, and supplemental Control Strip modules.

- Alan Torrey of Carson City, Nevada, fixed crooked scans in Adobe Photoshop as described in August’s Quick Tips until he discovered that it’s easier with Photoshop’s cropping tool. He selects the cropping tool and draws a box roughly around the image to be straightened, making sure the box isn’t too close to the document’s edge. Next, he rotates the cropping box by holding down the option key and dragging one corner of the box until it lines up with the cropped image. Then he adjusts the box to crop the image as desired. Finally, he clicks inside the box to have Photoshop straighten and crop the image in one step. You can simultaneously change the size of the cropped area by specifying a new size or resolution in the Cropping Tool Options palette before clicking inside the cropping box, says Scott Aronian of San Francisco. Chris Woodfield of Baltimore notes that the cropping tool can only rotate bitmapped images in 90-degree intervals. To rotate a bitmapped image differently, convert it to gray scale first.

- If you are having paper-feed problems with a Hewlett-Packard DeskWriter 520, 550C, or 560C printer, don’t use a mail file to clean its rollers, as suggested in August’s Quick Tips. Edward Lee of Toms River, New Jersey, reports that you can call 800/656-2324 and request HP’s free roller-cleaning kit. The kit includes a cleaning plate with Scotch-Brite abrasive patches and special software to spin the printer’s rollers.

- Do you need to download a Mac file from the Internet that won’t fit on a floppy, using a Windows or DOS PC? Rather than breaking up a large file using a PC word processor (as suggested in August’s Quick Tips), David Condit of Warrenton, Virginia, suggests you try using PKWare’s DOS program PKZip 2.04g ($47 for DOS, $49 for Windows; 414/354-8699, http://www.pkware.com) to compress the downloaded file about 25 percent and, if necessary, split it across multiple DOS floppies. Then use the ZipIt 1.3.5 utility ($15 shareware; Tom Brown) on the Mac to decompress and join the segments from the DOS floppies into an .hqx file. Finally, drag the .hqx file to StuffIt Expander 4.0.1 (freeware; Aladdin Systems) or ShrinkWrap 2.0.1 (free for educational or nonprofit use, $20 for commercial use; Chad Magendanz) to convert it to a usable Mac file.

The Macintosh shareware and freeware mentioned this month is available from Macworld Online (http://www.macworld.com).
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Plugging In to the Web

by Cameron Crotty

No sooner had the World Wide Web hit the public awareness than everyone knew what it was missing—media. Parents in Peoria and wallabies in Weehawken clicked their fingerprints off climbing through a suddenly three-dimensional, cross-referenced cosmos of text pages, but—as anyone who has passing acquaintance with a remote control can tell you—the big problem with hypertext is that it's text. Users and Webmaster wannabes wanted sounds, pictures, animations, and movies to liven up otherwise dry pages.

A natural outlet for these types of shenanigans already existed in Web browsers' helper-applications architecture, present nearly from the Web's inception. Under this system, when a browser hits a file of a data type it doesn't understand, it consults a table listing helper applications. It chooses and launches the appropriate application and hands the offending file off. The browser then washes its hands of the matter, and the helper application takes over, displaying or playing the image, sound file, movie, or whatever. Depending on how the helper app is set up, it either stays open when it finishes its task or dismisses itself and releases its share of RAM.

All things considered, the helper-applications architecture hasn't been a bad solution. Without it, each browser would have to be programmed to display every data type its authors could manage, ignoring all others until the next upgrade. Even so, helper apps leave a lot to be desired. Because they are separate applications, they carry all sorts of undesirable baggage, wantonly devouring RAM space and requiring users to learn a new interface for each new helper. Worse, the movie, sound, or animation appears in an individual window, not integrated into the Web page. The Web was crying out for a way to get that content onto the page. Into the breach stepped Netscape's plug-ins.

Plug-ins and the King

Graphics people are familiar with the plug-in concept because of Adobe Photoshop's plug-in architecture, which permits artists to add new functions quickly and easily to the Photoshop engine by simply buying a package of plug-ins and installing them in a plug-ins folder. But while the terminology is similar, the Photoshop and Netscape architectures are fundamentally different. Photoshop plug-ins act on the data contained in a document; Netscape plug-ins are actually miniature apps—minus a lot of interface and file-system overhead. A browser hosting a Netscape-style plug-in actually hands over a chunk of RAM and some window real estate to the plug-in, enabling it to run as an independent, threaded process within the browser's memory partition.

On the other hand, though plug-ins are generally technologically superior to helper applications, they co-exist peacefully. So if you have a favorite helper app, you can choose to have it handle particular data types by setting your browser's preferences.

Plug-ins overcome many drawbacks of helper applications. Most important to Web designers and aficionados, though, is that they enable media to be delivered within the browser window. This simplifies the user experience and integrates the presentations with the rest of the Web page. Also, users aren't forced to juggle multiple open apps.

One problem the Netscape plug-in architecture doesn't solve is that of memory gluttony. You might think that running plug-ins out of a single application would lead to a more efficient use of RAM resources, but in fact running a browser with Netscape plug-ins is something like feeding peanut butter-and-banana sandwiches to Elvis. While many plug-ins are relatively lightweight, others are downright piggish. Macromedia's Shockwave player, for instance, which plays specially prepared Director files in your Web page, weighs in at 1.1MB—and it's not the only or the worst offender.
**A Whip, a Chair: Taming Plug-ins**

Once you have the right one for the data type you want to see or hear, these plug-ins rarely act up. Still, as with any new technology, you'll have to fiddle around to get them to work properly. Most of the serious problems you'll run into will be memory-related—running Navigator, Internet Explorer, or Cyberdog with plug-ins installed requires at least an 8MB RAM partition; 12MB or 16MB is even better. For Navigator 3.0, here's how to get the plug-ins you need and resolve other problems you may run into on your way to playing the coolest sites.

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**Content that requires a plug-in appears in Web pages within the Embed HTML tag. Upon encountering this tag, your browser determines if you've got a plug-in that handles the embedded data. If the browser can't find a plug-in for that type of data, it loads the Default plug-in, which puts up a broken plug-in icon.**

Then the browser displays a dialog box that tells you what type of data your browser cannot understand.

Clicking on Netscape's Plug-in Info button takes you to a page with some introductory instructions and a link to a registry page (http://home.netscape.com/comprod/products/navigator/version_2.0/plugins/index.html) where you can download a plug-in that handles the data type you need. (Microsoft Explorer's Default plug-in takes you to http://browserwatch.iworld .com/plug-in.html.)

Browsers typically swap plug-ins in and out of memory as needed, but cruise the Net with several windows open (a common practice), and you'll quickly negate this advantage. Even if you restrict yourself to one window at a time, running your browser with a partition of less than 8MB is asking for trouble. (For tips on making your plug-ins behave, see "A Whip, a Chair: Taming Plug-ins."

**Browser Support**

As with so many other Web-related developments, Netscape's plug-ins have led the way, and other companies have had to fall in or follow behind. The latest version of Microsoft Internet Explorer for the Macintosh (v2.0.1) supports Netscape plug-ins, although the Explorer team has provided support for the display of many common data types (such as QuickTime movies) directly within the browser code.

Microsoft is also starting to ramp up its own plug-in architecture, ActiveX. Microsoft claims that ActiveX, which is based on the company's COM component-software architecture, offers more flexibility for developers than Netscape's plug-ins without adding the overhead of a full-blown component-software architecture like OLE or OpenDoc. Microsoft says it will continue to support Netscape plug-ins through an ActiveX translator component when an ActiveX-capable version of Explorer ships on the Mac, supposedly by the end of the year.

Version 1.1 of Cyberdog, which should be available by the time you read this, also supports Netscape plug-ins. Cyberdog, Apple's Internet-access tool, is a collection of OpenDoc parts, and version 1.1 includes a part that will accept Netscape plug-ins.

One neat side benefit of this approach is that, since any OpenDoc part can be embedded in any OpenDoc container, you can embed a Netscape plug-in within any type of document. For instance, in a spreadsheet report on the costs of streaming audio and video over the Internet, you could embed an

---

**Yikes, I don't have that plug-in. What should I do?**

Once you've downloaded and unstuffed the plug-in, and used its installer, your browser should be ready to display the data it couldn't handle before. If you still get the broken plug-in icon, you may need to drag the plug-in into the Plug-ins folder within your main browser folder.

If a plug-in acts squirrelly, or Netscape launches a helper application when you know you have an appropriate plug-in installed, Netscape may be confused about which plug-in to use. If you visit lots of pages with plug-ins, you may have downloaded more than one plug-in for a certain data type (for instance, several plug-ins handle MIDI data). To help the browser out, call up the General Preferences dialog box and click on Helpers. (Explorer uses a similar preference screen to map file types to both plug-ins and helper apps.) Double-click on the data type.

Use the pull-down menu in the subsequent dialog box to select the plug-in you want to use.
I'VE GOT THE PLUG-IN IN PLACE; NOW EVERYTHING'S COOL

Now, you're ready to hit that Web page again. The plug-in loads.

Cameron Crotty covers the Internet for Macworld.

Web Worthy

Presidential Jockeying 'Tis the season for sweaty-palmed punters yelling for their favorites; lathered, wild-eyed competitors with flaring nostrils; and dispassionate observers handicapping the results. The sport of kings is always in season (http://horseworlddata.com/racing.html), but in the United States, the sport of kingmaking comes only once every four years.

For those who like their politics with a spoonful of sugar, the Doonesbury Electronic Town Hall (http://www.doonesbury.com) sweetens straw polls and daily political briefings with Garry Trudeau's cartoons. For a harder liberal edge, see the Molo Wire, Mother Jones magazine's home on the Web; don't miss Coin-Op Congress (http://www.mojones.com/coinop_congress/), to find out which political action committees your candidate is beholden to.

Conservatives looking for shelter from legions of liberals and libertarians can launch to several right-leaning sites from the Conservative Internet Connections Group (http://www.portcom.com/BMDesign/GCG/cigc.html). If you prefer your wisdom received, try the New Republic's site (http://www.newrepublic.com/magazines/tr/).

If your taste runs more to the spectacle, head over to The Political Market (http://www.raspberryhill.com/politics.html), where you can trade shares of your favorite pols with fellow speculators. He who ends the elections with the most cash and credits wins.

My personal vote for political information goes to Vote Smart Web (http://www.votesmart.org/), Project Vote Smart's online arm. Despite the fact that major candidates rarely respond to the organization's issues questionnaire (the National Political Awareness Test), Vote Smart maintains an exhaustingly extensive site, loaded with information about candidates and campaigns, and packed with links to sites on all sides of nearly every major issue in play in contemporary politics. If information is the keenest blade, then a few hours spent at Vote Smart Web will have you ready to slice and dice.

OpenDoc part hosting a RealAudio Netscape plug-in.

Plug-ins have settled in and are maturing as a way to view multimedia content, but they'll do more than just play a 15-second movie trailer on a Web page. Browser plug-ins provide a doorway into the realm of component software—a world of trim, lightweight applications that perform specific functions but blend together to present a unified front to the end user. Look for an upcoming column to cover industrial-strength component software architectures, including Java, ActiveX, and OpenDoc.

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Shareware PICKS

Plug-ins are popping up faster than election-year pundits, but you'll at least want to load up your utility belt with these basic bits.

Macromedia Shockwave Currently one of the hottest multimedia tickets available, Shockwave is powering Director-based animations at many high-end sites.

Progressive Networks RealAudio Number one with a bullet on the helper-app hit parade, RealAudio is way out in front of its streaming-audio competitors.

Adobe Acrobat Users may love it or hate it, but content providers dig Adobe's portable document format (PDF), especially for posting documents created in traditional page-layout packages.

Apple QuickTime Don't leave home without the hottest video ticket on the Web. Before too long, you should start seeing QuickTime movies, which you'll be able to begin playing before they're completely downloaded.

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Optimizing the Power Mac 8500 for Media

HOW TO GET THE MOST FROM APPLE'S ULTIMATE MEDIA MACHINE

by Jim Heid

The Mac 8500, with its fast SCSI buses, even faster PCI expansion slots, and enhanced audio- and video-capture features, has captured the hearts of audio and video producers. The 840AV and the Power Mac 7100/80AV and 8100/100AV remain workhorses for producers who own NuBus-based hardware, but the 8500 wears the AV crown. Some quirks and subtleties behind the 8500's AV skills, however, are documented poorly if at all. Here's a guide to optimizing the 8500's built-in AV features, and a road map for when the built-ins aren't enough. For more information, visit http://www.beidsite.com.

The Truth about Frame Rates
When Apple first showed Macworld the 8500, the product manager said it would capture 30 frames per second (fps) at 320 by 240 pixels (quarter-screen size). But after the 8500 shipped, Apple literature listed the maximum frame rate as 25 fps. Many 8500 owners may never see that.

The determining factor for the 8500's frame rate is hard drive speed. The 1GB drive that ships with many 8500's starts choking at about 20 fps. With a 2GB drive, the 8500 handles about 25 fps. For this column, I used an 8500/132 with a 4GB Micropolis AV internal hard drive from APS Technologies. This speedster captured at 28 to 30 fps, dropped frames occasionally, but by and large delivered smooth video.

The 8500's lead engineer says to get best results you need a drive that can support sustained writes of 4.5MB per second. Where that drive resides is important. The 8500 has two SCSI buses—the internal bus supports the Fast SCSI-2 transfer mode; the external bus (the rear-panel connector) doesn't. So if you're buying a high-performance drive for video capture, buy a bare drive mechanism and install it in the 8500's spare drive bay. Use the fast drive for video captures only; performance slows if that drive holds applications and the System.

Video Output Demystified
The stock 8500 has great video-output features, but you must jump through hoops to use them. The 8500 can drive a monitor and a video device (such as a TV or video recorder) simultaneously, but only with 4MB of video memory (VRAM). Apple, in its finite wisdom, ships the 8500 with 2MB. That's where the hoops come in.
To digitize and edit video with the 8500, connect your gear as shown here. If your video equipment lacks S-Video connectors, use its composite-video connectors instead, but note that video quality will suffer.

**Digitizing Tips**

To get the fastest frame rates and smoothest movies from the 8500's built-in digitizer, follow these rules.

**RUN LEAN**

Turn off AppleTalk and file sharing, disable any extensions that aren't directly needed for processing video (especially anything time oriented, like calendar software), and quit any programs you aren't using.

**CAPTURE AUDIO AT 44kHz, 16 BITS**

You may think you can conserve bandwidth by capturing audio at lower-quality settings, but you'll actually slow the 8500 by forcing it to resample the audio on the fly. If you want lower-quality audio settings (for a CD-ROM or Web movie, for example), convert the audio after you capture. (For details on audio optimizing, see *Media*, April 1996.)

**USE MILLIONS OF COLORS**

For the fastest performance, set all your monitors (Mac and NTSC) to display millions of colors. Don't mix video bit-depth settings, as this slows the 8500.

**USE THE RIGHT SOFTWARE**

Avoid using the Apple Video Player utility that accompanies the 8500. Instead, use a video-editing program like Adobe Premiere ($795; 415/961-4400, [http://www.adobe.com](http://www.adobe.com)) or Avid VideoShop (bundled with the 8500).

**USE THE RIGHT SETTINGS**

Specify a movie size of 320 by 240 pixels and use the Component Video compressor. (In your capture program's Video Settings dialog box, choose the Compression pop-up menu, then Component Video.)

**TWEAK YOUR DRIVE**

Capture to your fastest hard drive, and defragment that drive before your capture session and after adding or removing a large number of files. Use a utility such as Symantec's Speed Disk, part of Norton Utilities for Macintosh ($149; 541/334-6054, [http://www.symantec.com](http://www.symantec.com)).

**OS Issues**

The best version of the Mac OS for the 8500 is System 7.5.3 Revision 2. The 8500's original version, 7.5.2, is burdened with the infamous Open Transport 1.0 networking software and the user-hostile Sound & Displays control panel.


**The Secret to Filling the Screen**

Another great feature of the 8500 isn't even mentioned in the manual or Apple Guide tutorials. That's the mysterious hardware-zoom mode that makes quarter-screen movies fill the screen. (It's easy to use; see "Recording to Tape")

QuickTime has had software zooming since 2.0 shipped in 1994, but software zooming simply doubles each of the movie's pixels, resulting in a bad case of the jaggies. The 8500 interpolates pixels on the fly, creating a new pixel whose color and brightness lies between two existing pixels. A dedicated chip handles...
Video-Output Tips

ACTIVATE HARDWARE ZOOMING
To enlarge a 320-by-240-pixel movie, open the Monitors & Sound control panel (or the Control Strip) and set the resolution: at 320 by 240 pixels the movie bleeds off the edges of the TV screen; at 256 by 192 pixels the entire movie fits within the TV screen.

USE MILLIONS OF COLORS
Set all your display devices to millions of colors (see "Digitizing Video").

USE PRINT-TO-VIDEO
To get the smoothest playback and eliminate the movie's title bar and frame, you should connect your equipment as shown here. This enables you to use the Mac's monitor for navigation and your NTSC video device for video output.

BEYOND BUILT-IN VIDEO
If you need true full-screen video, you can choose from a world of third-party options ranging in price from under $1000 to well over $10,000.

Sounding Off
The 8500 is a formidable base for digital audio work. Its RCA phono input and output jacks let you connect consumer-grade and semiprofessional audio gear, and its fast processor is up to the challenges that multitrack audio programs such as Macromedia's Deck II impose.

But there's always room for improvement. When recording to or from a digital audiotape (DAT) recorder, you should connect it to digital inputs and outputs. The 8500 lacks such beasts, forcing you to use the DAT recorder's analog ins and outs—and that puts your sound through additional, noise-inducing analog-to-digital conversions.

An ideal solution is the Audiomed III card from Digidesign ($795; 415/842-7900, http://www.digidesign.com). This PCI expansion card provides its own digital-analog converters, as well as digital inputs and outputs. The Audiomed III provides up to eight playback tracks and can record up to four tracks simultaneously. (A stock 8500 can record just two simultaneous tracks.) The card works with Digidesign's ProTools software and Digidesign-compatible programs such as Mark of the Unicorn's Digital Performer.

The 8500 is a media mogul now, but the future looks even better. Now that DayStar Digital is selling multiprocessor upgrade cards, you can replace your 8500's single PowerPC processor with a dual-processor card to get screaming performance with video compression under QuickTime 2.5 and with programs that support multiprocessing, such as Adobe After Effects and Photoshop (see "The Best Media Machine" in this issue). Apple sources tell me there will soon be a selection of expansion cards for the 8500's digital audio-video (DAV) connector, cards that enhance the 8500's built-in digitizing features—by adding full-screen capture support, for example. These developments hint that the 8500's AV reign will last for some time.

Next month: Designing graphics for TV

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Using Swatch Books for Predictable Color

The holy grail of desktop publishing has always been WYSIWYG: what you see is what you get. Your screen matches what comes out of your laser printer, which matches the final printed piece. A noble vision indeed—but elusive. Nowhere has that goal been more difficult to attain than in the world of color. Color-management systems such as Apple's ColorSync, carefully implemented, can help a lot, but I warn color publishers that WYSIWYG is more likely: what you get is what you get.

The simplest way to predict color accurately is to ignore on-screen colors (which are just reminders of what color you applied to what), and choose colors from swatch books—printed samples that show what will come off a printing press when you specify a color in a certain way. Find a color you like in the swatch book, specify it in your software, and the results from the printing press will be pretty close to the printed swatch.

A host of factors can affect the final printed color. For example, you probably use a different paper stock than that of the swatch book and print on a different press, perhaps with slightly different inks, so you'll still need to use some judgment. But nothing gives you a better idea of what will print than something that's actually printed.

So, which swatch book should you use? The first thing to consider is your printing method. Are you printing with the four process-color inks (creating all colors by printing separate passes of cyan, magenta, yellow, and black inks), or with spot-color inks (where the printer mixes the ink to make the color you want)? (Pantone is the dominant spot-color system in the United States. In other countries, you might use other systems, such as Toyo in Japan.)

If you're printing with spot-color inks, you can simply refer to a Pantone spot-color swatch book. Choose a color, select it in your software's color picker, and when you print separations, out comes a single piece of film for that plate. The printer mixes the ink according to Pantone's formula, and the color you get off press should match the color in the swatch book.

For process color, you have more choices of swatch books, but one thing's for sure: choosing colors for process-color jobs using a Pantone spot-color swatch book is a recipe for surprise and disappointment. Those beautiful Pantone ink colors can often be simulated using process inks, but most of those simulations aren't very close. Check out the Pantone Process Color Imaging Guide swatch book, and you'll see the difference between Pantone inks and their process simulations.

Specifying Swatch Colors

PROCESS SPECIFICATIONS
When you define process colors, the name doesn't matter at all, but the specifications (the percentages of the four process colors) definitely do; they determine the color that will come off the press.

Choose a color from a process-color swatch book, read the CMYK values in the book, and type them into your software's color-definition dialog box (in CMYK mode). Colors on screen and from color printers may look lurid and weird, but what comes off press will pretty much match the swatch book.

Some of the process swatch books have color-library equivalents in publishing and illustration software. You can certainly use these canned sets of predefined colors to indicate your choices from a corresponding process swatch book, but it's nothing more than a convenience. You can just as easily define them yourself by typing in the CMYK values.

PANTONE SPECIFICATIONS
With Pantone inks, you can name a color anything (say, "swamp" for muddy green) and specify it in any color model—RGB, CMYK, HSB. That specification affects what's on screen and what comes out of color printers. The final color depends solely on the

Once you've chosen a color from a swatch book, how do you specify it in your software? As with most things print related, it depends on whether you're printing with four-color process or Pantone (spot-color) inks.
Choosing a Swatch Book

In the United States, selecting a spot-color swatch book is easy—there's really only one standard. For process-color work, there's a wider variety. Swatch books often come in two versions, on coated and uncoated paper, because uncoated stock's absorbency affects the way colors look. Most art-supply stores carry swatch books.

Pantone Color Formula Guide (Pantone, 201/935-5500, http://www.pantone.com; $69.75). This guide replaces the Pantone Color Selector, which has long been the basic tool for spot-color work in the United States. The new guide contains swatches of the basic 1012 Pantone spot-color ink mixtures, on coated and uncoated paper, with number identifiers for communicating with the printer. (Note that for the Pantone books shown here, the process color reproduction may not match the Pantone-identified solid color standard.)

Pantone Two-Color Selector (coated and uncoated versions, $185 for the pair; Color and Black Selector and Color Tint Selector also available for $185 each). There's no better way to stretch a limited print budget—get a diversely colorful piece—than by combining tints of two Pantone inks. These “Color + Color” books show tint builds for 240 pairs of Pantone inks, plus overprinted and reversed type and a duotone for each pair. This subset of the million-plus possible two-color Pantone combinations is a good start and is cheaper than printing your own two-color swatch books.

Pantone Process Color Imaging Guide (coated version only, $88). This fan book shows 942 Pantone spot colors that can (according to Pantone) be simulated reasonably well using the four process inks. (Any software offering a Pantone ProSim library contains this subset.) The Pantone ink swatch is printed next to the process-simulation swatch to show the potential variance between a Pantone custom ink and its process-color simulation.

Pantone Pastel and Metallic Guides (pastels $32, metallics $42). These fan books show additional Pantone ink mixtures available. These colors are difficult or (for metallics) impossible to simulate with process inks. Don't even think about WYSIWYG.

Pantone Process Color System Guide (coated version only, $75). This fan book has swatches and specs for 3000 process colors. It's not related to Pantone spot colors; it's just a process-color book.

Trumatch Colorfinder (Trumatch, 212/302-9100, http://www.trumatch.com; coated and uncoated versions, $85 each). These fan books contain more than 2000 process-color swatches and specifications. Because of their organization, I prefer these books to the Pantone Process fan book; they make it easy to select a color, and then find lighter and darker versions of the same hue.

Computer Color: 10,000 Colors by Michael and Pat Rogondino (Chronicle Books, 415/777-7240, http://www.chronbooks.com; coated version only, $24.95). This 10-by-10-inch book is organized into pages with one-, two-, three-, and (shown above) four-color tint builds. This book offers more colors per dollar than any other.

PostScript Process Color Guide (Agfa Prepress Education Resources, 708/296-6703, http://www.agfa.com; $30). This 12-by-12-inch guide contains more than 16,000 swatches, set up very cleverly. The first 12 pages range from 0 percent through 100 percent yellow in 5 percent increments, with percentages of magenta and cyan running down the side and along the top (resulting in 1728 swatches). The next 12 pages are the same, except each swatch is overlaid with black tints at 5, 10, 20, and 30 percent. Then the whole thing repeats on uncoated stock. This is my favorite process-color swatch book, especially given the price.

ink the printer mixes. It's most convenient, however, to choose Pantone colors from your software's color library for three reasons.

• The color specifications are defined to give you the best rendition on screen and from color printers.
• Layout and illustration software now use consistent Pantone names. Import a FreeHand EPS file containing Pantone 449 into a PageMaker file with the same color, print the separations, and you get one piece of film for 449, which is what you want.
• The film is labeled "Pantone 449," not "swamp," so the printer knows exactly which ink to mix up.
Blending Objects in Photoshop with Layer Masks

by Cathy Abes


HOW IT WAS DONE Using layer masks in Photoshop is a quick and easy way to create a subtle blend between two images, as in this illustration: between the water and the background texture, and the fish and the water. An alpha channel must be loaded before you can see its effect on a selection; in contrast, a layer mask lets you work more interactively, displaying its effect immediately on application. This makes it possible to experiment with different masks without having to create a new channel each time.

For the background, Bishop scanned a slate tile. Enlarging a small section of the scan, he composited it with the original tile. After experimenting with various opacities, he adjusted the hue slider to make the layer pink; this changed the composite texture from purples and browns to a brighter range of jewel tones.

After making a layer for the shadow, Bishop used the layer mask from the slate texture to block out the shadow; if he hadn't, the shadow would have composited with the background and the slate texture, resulting in a less-than-pleasing color and texture (in this case, a washed-out magenta and gray).

THE TOOLS Hardware: Quadra 650 with 40MB of RAM and a 500MB internal hard drive; Radius Intellicolor 20-inch monitor; Apple 13-inch monitor; Radius Color Card with Photo Booster; Studio Scan II scanner; Pinnacle Micro 128-230 M/O drive; Micronet 44MB SyQuest drive. Software: Adobe Photoshop 3.0.
A photograph he'd taken of water became the next layer; its accompanying layer mask—containing a vertical black-to-white blend—kept the water inside the edges of the background.

Next came the photo of the bass; he created a layer mask with a horizontal blend from transparent (left) to opaque (right), reaching 100 percent opacity before the bass overlapped the edge of the water texture so the water wouldn't show through the fish.

Bishop made a new layer for the shadow and put it on top of the background but behind everything else. Here's how the slate texture would have looked if he hadn't then deleted the shadow layer mask from the composite area. The colors are muddy and the texture nearly obliterated.

After sandwiching the shadow layer between the background and the tile-texture layer, Bishop added a layer mask for the shadow. Next, he loaded the layer mask for the tile texture into the shadow layer and inverted the mask (Image>Map>Invert) to eliminate the shadow underneath the tile texture. This allowed the slate texture to composite correctly with the background, maintaining the rich hues he'd originally created.
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---

**PLEASE ANSWER THESE QUESTIONS, CHECK ALL ANSWERS THAT APPLY**

1a. For which of the following Mac-related products do you specify, recommend, approve, purchase or influence the purchase? (Check all that apply.)

<table>
<thead>
<tr>
<th>Product Category</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. <strong>Desktops/PowerBooks</strong></td>
<td>1</td>
</tr>
<tr>
<td>2. <strong>Monitors</strong></td>
<td>2</td>
</tr>
<tr>
<td>3. <strong>Printers</strong></td>
<td>3</td>
</tr>
<tr>
<td>4. <strong>Storage Devices</strong></td>
<td>4</td>
</tr>
<tr>
<td>5. <strong>Networking/Data Communications</strong></td>
<td>5</td>
</tr>
<tr>
<td>6. <strong>Internet/Intranet products/services</strong></td>
<td>6</td>
</tr>
<tr>
<td>7. <strong>Software: business/productivity</strong></td>
<td>7</td>
</tr>
<tr>
<td>8. <strong>Interactive Publishing/Editing/Design</strong></td>
<td>8</td>
</tr>
<tr>
<td>9. <strong>Other Software</strong></td>
<td>9</td>
</tr>
</tbody>
</table>

1b. Which of the following do you plan to purchase in the next 12 months? (Check all that apply.)

<table>
<thead>
<tr>
<th>Product Category</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. <strong>Desktops/PowerBooks</strong></td>
<td>1</td>
</tr>
<tr>
<td>2. <strong>Monitors</strong></td>
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<td>3. <strong>Printers</strong></td>
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<td>6. <strong>Internet/Intranet products/services</strong></td>
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<tr>
<td>7. <strong>Software: business/productivity</strong></td>
<td>7</td>
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<tr>
<td>8. <strong>Graphics/Design</strong></td>
<td>8</td>
</tr>
<tr>
<td>9. <strong>Other Software</strong></td>
<td>9</td>
</tr>
</tbody>
</table>

2. Are you employed, and involved in purchase decisions for 5 or more Macs?  
   - **Yes (1) Q**  
   - **No (2)**

3. What's Your Opinion?  
   - **What are your main frustrations in making Mac-related purchase decisions?**
     - 1. Lack of expertise in assessing products  
     - 2. Difficulty in installing or using products  
     - 3. Too many choices  
     - 4. Not enough choices  
     - 5. Unclear needs  
     - 6. Concern that cheaper, better products are about to come out  
     - 7. Other (please specify)

**PRODUCT CATEGORY INFORMATION**

For information on all of the products mentioned in an article or an entire category of advertised products, circle the appropriate number below.

- 951 Mail Order Companies  
- 952 Printers  
- 953 Scanner & Digital Cameras  
- 954 Online/Internet  
- 955 Storage Devices  
- 956 Monitors & Graphics Boards  
- 957 Utilities  
- 958 Clip Art & Fonts  
- 959 Memory  
- 960 Draw/Paint/DTP Software  
- 961 Image-Editing Software  
- 962 Other Graphics Software

**READER SERVICE NUMBERS FOR ADVERTISED PRODUCTS CAN BE FOUND IN THE PRODUCT'S AD AND IN BOTH THE ADVERTISER INDEX AND PRODUCT INDEX.**

---

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**POWERMac 7200**

**POWERBooks**

**Scanners**

**EPSON**

**Kodak**

**Nikon**

**AGFA**

**Polaroid**

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**Software**

**Printers & Input**

**Wacom**

**SupraFax Modern**

**Simple Internet**

**Microsoft Word V5.0**

**Adobe Photoshop V3.0**

**Adobe Illustrator V6.0**

**MacMedia Freehand V5.5**

**Director V5.0 w/ Shockwave**

**Director Multimedia Studio**

**SupraFax Modern**

**Fax/Modem 33.6 x 34**

**185 $810**

**125 $600**

**80 $400**

**Simple Internet**

**125 $600**

**Adobe Photoshop V3.0**

**145 $810**

**Adobe Illustrator V6.0**

**130 $700**

**Director V5.0 w/ Shockwave**

**125 $600**

**Director Multimedia Studio**

**140 $700**

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**270 $1350**

**Microsoft Excel V5.0**

**280 $1400**

**Adobe Photoshop V3.0**

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**Adobe Illustrator V6.0**

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**Director V5.0 w/ Shockwave**

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<td>Fontor 2.8.3</td>
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<td>Fractal Detailer</td>
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SYQUEST & OPTICAL DRIVES

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<tr>
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<th>Capacity</th>
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<tbody>
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<td>Syquest 230m Ext</td>
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<td>Fujitsu 640MO Int</td>
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SCSI HARD DRIVES

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<td>Quantum F1020s &lt;11ms</td>
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<td>Quantum Sat. 2.2g 6ms</td>
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<td>Quantum F17M-2.2g 10ms</td>
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CD-ROM RECORDERS

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128MB MAC...$12.95
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CD-R 74
CDT 8000...4-8 GB $825
SONY 5000...4-8 GB $725
HP 35480...2-4 GB $690
ARCH. 4322...2-4 GB $545
HP 35470...2.0 GB $590
WANGDAT 2.0 GB $475
HP C1553...24-46 MB $1990

8 MM EXB
EXB 8200...2.3 GB $425
EXB 8205XL...2.3-7 GB $1190
EXB 8505...5-10 GB $1290
EXB 8505X...7-15GB $1645
EXB 8700...14GB $1140

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ARCH. 4322...2-4 GB $545
HP 35470...2.0 GB $590
WANGDAT 2.0 GB $475
HP C1553...24-46 MB $1990

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HP C17160 650 MB...$635
HP C1716T 1.3 GB...$1795
MAX T.2M 1 GB...$590
SONY 1.3 GB...$900
HP C1113 2.6 GB...$1995
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MACWORLD November 1996 241
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<th>Model</th>
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<th>Storage</th>
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<td>7600</td>
<td>132MHz</td>
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<td>5950</td>
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<td>5950MP</td>
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<td>5950AP</td>
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### PERFORMAS

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<td>6290</td>
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<td>6320C</td>
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### KEY BOARD

- Apple Extended Keyboard: $149
- Apple Design Keyboard: $75
- Macally Extended Keyboard: $73

### PRINTERS

- Apple ColorWriter 1500: $2799
- Apple StyleWriter 2200: $279
- Apple LaserWriter 4/600: $819
- Apple Color LW 12/600: $579
- Apple LaserWriter 16/600: $579
- GCC Elite XLS 608: $2279
- GCC Elite XLS 1208: $3979
- Star SJ44 Color: $999

### POWERBOOK

<table>
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<tr>
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<td>66/8/500/</td>
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<td>250CS</td>
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<td>530CS</td>
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<td>530CS</td>
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<td>3999</td>
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### SIMMS/DIMMS

- 4MB: $75/119
- 8MB: $99/229
- 16MB: $175/175
- 32MB: $299/269

### STORAGE

- 1.1GB: $279
- 2.1GB: $629
- 4.3GB: $1059
- Syquest EZ-Drive: $198
- Syquest 200MB: $397
- Syquest 270MB: $419
- Iomega ZIP Drive: $199
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- Centris 660AV: $799
- Classic 6/80 k/m: $349
- Classic II 4/80 k/m: $599
- Mac SE 4/80 k/m: $459
- Mac LC: $249
- Mac IIC or IIS: $285
- LaserWriter INTX: $999
- LaserWriter INTX: $502

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- 705 EPSON E500 Pro: $109
- 705 EPSON E500 Pro: $129
- 705 EPSON E500 Pro: $199
- 705 EPSON E500 Pro: $249
- 705 EPSON E500 Pro: $299
- 705 EPSON E500 Pro: $349
- 705 EPSON E500 Pro: $399

### PRINTERS

- StyleWriter 1200: $199
- StyleWriter 2200: $299
- StyleWriter 3200: $399
- StyleWriter 4200: $499
- StyleWriter 5200: $599

### SCANNERS

- UMAX Astra Pro: $399
- UMAX Astra Pro: $499
- UMAX Astra Pro: $599
- UMAX Astra Pro: $699
- UMAX Astra Pro: $799
- UMAX Astra Pro: $899

### DIMM MEMORY

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- 16MB: $175/175
- 32MB: $299/269

### STORAGES

- 1.1GB: $279
- 2.1GB: $629
- 4.3GB: $1059
- Syquest EZ-Drive: $198
- Syquest 200MB: $397
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W/Apple Color Monitor & Keyb. $429.00

**Mac LC 4/80 Complete Color System**
W/Apple Color Monitor & Keyb. $349.00

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<table>
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<td>Mac SE (800K) 4/80</td>
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<td>Centris 610 4/500/CD</td>
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**Apple InkJet Printers**

**StyleWriter 1200 with Ink Cartridge & Cable** $159.00

**StyleWriter 1500 with Ink Cartridge & Cable** $249.00

**StyleWriter 2200** $179.00

**StyleWriter 2400** $179.00

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**PowerBooks**

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<td>Absolute Battery with Recharger Combo (140-180C)</td>
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**CD-300i Plus**

- 2X Speed Tray Loading
- Int. CD-Rom Drive

**ONLY - $59.00**

---

**Personal LaserWriter**

**NTR Logic Board**

With Trade-In ONLY $79.00

---

**Apple CD-300i Plus**

- 2X Speed Tray Loading
- Int. CD-Rom Drive

**ONLY - $59.00**

---

**Apple 14" RGB Display** $379

**Apple 16" RGB Display** $729

**Powerbook Ext. 1.4MB Floppy Drive** $75

**Sejin Ext. II Keyboard** $55

**Apple Hi-Density Floppy Disks (10 Pack)** $8

---

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Tempe, AZ 85282
(602) 858-0900 / Fax: (602) 858-0811

---

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### Powerbook

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### Power Mac Monitors

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### Supermac 150MHz 604 Processor PCI

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<tr>
<td>S900D 150MHz 16/2GB/CD/ROM</td>
<td>$3465.00</td>
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**BUSINESS LEASING AVAILABLE**

1000/150MHz $5,389
- 48/2GB/CD 600, 17" Monitor
- 48/2GB/CD 600, Monitor

9500/150MHz $6,777
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CIRCLE 455 ON READER SERVICE CARD

MACWORLD November 1996 247
**Graphics shown do not necessarily represent actual product.**
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### Power Mac 7200 Series

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### Power Mac 8500 Series

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<td>TARGA 2000 PCI</td>
<td>$3359</td>
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<tr>
<td>ARCUS II</td>
<td>$1999</td>
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### Customer Configuration

<table>
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<tr>
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<td>TARGA 2000 PCI</td>
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<tr>
<td>ARCUS II</td>
<td>$1999</td>
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</tbody>
</table>

*Prices subject to change without notice.*

---

**CIRCLE 443 ON READER SERVICE CARD**
**APPLE POWERBOOK 520c**

- 4MB RAM
- 240MB Hard Drive
- dual scan color display
- 25MHz/1040

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- Quadra 800/840w to PowerMac 8100/80 exchange $899
- Quadra 800 to Quadra 840w exchange $799
- Quadra 650 to PowerMac 7100-66 exchange $499
- IIx, IIcx/IIci to Centris 650 exchange $299
- PowerBook 630 to PowerMac 6200 exchange $699

---

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- Apple 14" Multiscan $299
- Apple 14" AV $299
- Apple 15" Multiscan $299
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- Radias TPD 21" mono $299
- Radias PrecisionColor Display 20 $299
- Radias PrecisionColor Plotter $299

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  - PowerBook 625c $299
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**PRINTERs**

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YOUR COST $999

Performa 6300/100
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- 16MB RAM
- 2GB hard drive
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- AppleDesign Extended Keyboard
- 15" Performa Plus Display
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- 4MB RAM
- 240MB hard drive
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- Performa 6300 8/150 w/15" Quadra 8/150...
- Performa 6320 8/150 w/15" Quadra 8/150...
- Performa 6360 8/150 w/15" Quadra 8/150...
- PowerMac 7000, 7500, 6500 and 9500...
- Quadra 600AV and 800AV...
- LC III and Performa 475...
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- Color Stylewriter 2400...
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- 5200 8/500/CD/CD/1175...

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- 16MB 72-pin $185

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- 17" Apple multi $275

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- 140 4/120 $225
- 145 4/200 $295

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- 140 4/120 w/15" Multiscan $225

**Quadras**

- 600 8/500 Call 650 8/500/840/850 Call

**Printers**

- Apple ImageWriter II $185
- Stylus 1200 $175
- Laser 330 $265
- Laser 320 $240
- Laser 4600 Call

**Monitors**

- 14" Apple Color $265
- 15" Apple Multi $275
- 17" Apple Multi $275

**Memory**

- 2MB 72-pin $115
- 16MB 72-pin $185

**Powerbooks**

- 600 8/500 Call 650 8/500/840/850 Call

**Printers**

- Apple ImageWriter II $185
- Stylus 1200 $175
- Laser 330 $265
- Laser 320 $240
- Laser 4600 Call

**Powerbook**

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- Apple StyleWriter II Refurb...
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7600/160 16/1.2G/CD/DOS/568 2999
7600/160 16/1.2G/CD/DOS/568/88 3199
8600/200 16/1.2G/CD/DOS 3399
8600/200 16/1.2G/CD/DOS/568 3699
8600/200 16/1.2G/CD/DOS/568/88 3899
8600/200 16/1.2G/CD/DOS/568/88 4099

NEC 128K/1126K
Apple 15" 279/299
Apple 17" 349/299
Apple 17" 16/16G / 1710 929/899
Apple Multiscan 20' 1699/1299

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NEC 17" 599
NEC 17" 119
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Apple LaserWriter 6/600PS 949
Apple LaserWriter 12/600PS 1499
Apple LaserWriter 16/600PS 2099

MACWORLD November 1996 255
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PowerMax Trinitron™ monitors are designed specifically for the rigorous demands of the Macintosh. They ship complete with Mac-ready cables and adapters, a three year warranty and our satisfaction guarantee. If the monitor is not just right, we'll replace it for you!

### PowerMax Trinitron™ Monitors

<table>
<thead>
<tr>
<th>Model</th>
<th>Display Size</th>
<th>Dot Pitch</th>
<th>Resolution</th>
<th>Price</th>
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<td>PM14T</td>
<td>25 mm dot</td>
<td>up to 1024x768</td>
<td>$319</td>
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<td>PM15T</td>
<td>25 mm dot</td>
<td>up to 1280x1024</td>
<td>$349</td>
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<td>PM17TE+</td>
<td>25 mm dot</td>
<td>up to 1024x768</td>
<td>$399</td>
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<td>PM20T</td>
<td>30 mm dot</td>
<td>up to 1600x1280</td>
<td>$1694</td>
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</table>

### PowerMax External Hard Drives

**PowerMax External 400 Mb Drive**

**PowerMax External 1 Gb Drive**

**PowerMax External 2 Gb Drive**

**Syquest EZ 153 Mb Drive**

**Syquest EZ Flyer 230 Mb Drive**

**Imomega Zip 100Mb Drive**

**Jaz Drive w/1 Mb Cartridge**

**Optima Mini/Pak 8000DAT tape drive**

**Optima Hot Swap Towers offer unsurpassed reliabilty with ultra-high performance.**

### Wacom Tablets

- **ArtPad II 4x5 w/erasing Ultra Pen**
- **ArtZ II 6x8 w/erasing Ultra Pen & Painter 4**
- **ArtZ II 12x12 w/erasing Ultra Pen & Painter 4**
- **ArtZ II 12x12 w/erasing Ultra Pen**

### Scanners

- **Microtek ScanMaker 3E 24 bit w/Color II**
- **Umax Vista S6E Soho Mac Scanner**
- **Umax Vista S12 Scanner**
- **Agfa StudioScan IIS w/Photoshop LE**
- **Agfa Arcus II Flatbed w/Photoshop & trans. Adapt.**

### Laser Printers

- **Apple LaserWriter 12/640**
- **Apple LaserWriter 12/640**
- **Apple LaserWriter 16/600**
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- **Apple Color LaserWriter 12/600 w/kit**

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- **OMS**
- **Quantum**
- **Radius**
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- **Agfa Arcus II Flatbed w/Photoshop & trans. Adapt.**

### Laser Printers

- **Apple Personal LaserWriter 320- Ltd. Supply!**
- **Apple LaserWriter 4600**
- **Apple LaserWriter 12/600**
- **Apple LaserWriter 16/600**
- **Xante Accel-A-Writer 8300 1200 dpi laser 20 Ram**
- **Apple Color LaserWriter 12/600 w/kit**

### PowerMax External Hard Drives

**PowerMax External 400 Mb Drive**

**PowerMax External 1 Gb Drive**

**PowerMax External 2 Gb Drive**

**Syquest EZ 153 Mb Drive**

**Syquest EZ Flyer 230 Mb Drive**

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- **Apple LaserWriter 12/600**
- **Apple LaserWriter 16/600**
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- We offer flexible terms, and are experts on easy leasing!
- We consult with you.
- We offer flexible terms. and are experts on easy leasing.'
### POWER MACS

<table>
<thead>
<tr>
<th>Model</th>
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<th>RAM</th>
<th>Storage</th>
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<td>8500/180</td>
<td>32/2000-CD</td>
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<td>6300/100</td>
<td>8/1000-CD</td>
<td>1999</td>
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<td>5260/100</td>
<td>16/800-CD</td>
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### DIGITAL VIDEO

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<th>Model</th>
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<tr>
<td>TARGA 2000</td>
<td>3950</td>
<td>3150</td>
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<td>TARGA 2000 PRO</td>
<td>4995</td>
<td>3850</td>
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### DIGITAL CAMERA

<table>
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<tr>
<th>Model</th>
<th>Price</th>
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<tr>
<td>KODAK DC50</td>
<td>939</td>
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<tr>
<td>POLAROID PDC 2000</td>
<td>CALL</td>
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<tr>
<td>AGFA ACTION CAM</td>
<td>7150</td>
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<td>AGFA STUDIO CAM</td>
<td>8350</td>
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<td>KODAK DCS420c</td>
<td>8995</td>
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### DRIVES

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
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<tbody>
<tr>
<td>EZ DRIVE/200MB SYQUEST</td>
<td>119/349</td>
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<tr>
<td>ZIP/JAZ DR</td>
<td>159/479</td>
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<td>PINNACLE VERTEX 2.6</td>
<td>1495</td>
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### POWER BOOKS

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
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<tbody>
<tr>
<td>Apple Color One HP</td>
<td>$539.00</td>
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<tr>
<td>ScanJet 4P Color</td>
<td>$485.00</td>
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<td>ScanJet 4C Color</td>
<td>$885.00</td>
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### PRINTERS

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
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<tbody>
<tr>
<td>Apple Color One</td>
<td>$539.00</td>
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<tr>
<td>ColorJet 4P Color</td>
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<td>ColorJet 4C Color</td>
<td>$885.00</td>
</tr>
<tr>
<td>Microtek Scanner</td>
<td>$349.00</td>
</tr>
<tr>
<td>ScanMaker E3</td>
<td>$529.00</td>
</tr>
</tbody>
</table>

### PRINTER SUPPLIES

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global Temper Platinum 28.8</td>
<td>$169.00</td>
</tr>
<tr>
<td>Supra Express V34 33.6</td>
<td>$169.00</td>
</tr>
<tr>
<td>Supra V34 33.6</td>
<td>$169.00</td>
</tr>
<tr>
<td>Supra 33.6 (w)</td>
<td>$119.00</td>
</tr>
<tr>
<td>Optima 288</td>
<td>$379.00</td>
</tr>
<tr>
<td>Apple Go Portal Adapter</td>
<td>$39.99</td>
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</table>

### CPU

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
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</thead>
<tbody>
<tr>
<td>9500/16/1.2GB/CD/28M</td>
<td>$3,499.00</td>
</tr>
<tr>
<td>9500/16/1.2GB/CD/28M</td>
<td>$3,499.00</td>
</tr>
<tr>
<td>9500/16/1.2GB/CD/28M</td>
<td>$3,499.00</td>
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### MEMORY

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIMM</td>
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</tr>
<tr>
<td>SIMM</td>
<td>$150.00</td>
</tr>
<tr>
<td>SIMM</td>
<td>$150.00</td>
</tr>
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### PRINTERS

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
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</thead>
<tbody>
<tr>
<td>StyleWriter 2 1/2MB</td>
<td>$119/299</td>
</tr>
<tr>
<td>StyleWriter 2 1/2MB</td>
<td>$119/299</td>
</tr>
</tbody>
</table>

### DRIVERS

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
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</thead>
<tbody>
<tr>
<td>TARGA 2000</td>
<td>$119/349</td>
</tr>
<tr>
<td>TARGA 2000 PRO</td>
<td>$159/479</td>
</tr>
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### DRIVES

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
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</thead>
<tbody>
<tr>
<td>EZ DRIVE/200MB SYQUEST</td>
<td>$119/349</td>
</tr>
<tr>
<td>ZIP/JAZ DR</td>
<td>$159/479</td>
</tr>
<tr>
<td>PINNACLE VERTEX 2.6</td>
<td>$1495</td>
</tr>
</tbody>
</table>

**Circle 485 on Reader Service Card**

---

We beat any price advertised in this magazine! *Free Apple Internet Kit!* A $50 Value Gift.

*With purchase of any Mac System with fax/modem.*
# PowerMacs

<table>
<thead>
<tr>
<th>Model</th>
<th>Frequency</th>
<th>Memory</th>
<th>Features</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>9500/150</td>
<td>225MHz</td>
<td>16/2GB</td>
<td>AT1 2MB</td>
<td>$2949</td>
</tr>
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</table>

*Keyboard & Monitor sold separately*

<table>
<thead>
<tr>
<th>Model</th>
<th>Frequency</th>
<th>Memory</th>
<th>Features</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>8500/180</td>
<td>200MHz</td>
<td>16/2GB</td>
<td>VRAM 2MB</td>
<td>$1995</td>
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</table>

*Call for a quote*

<table>
<thead>
<tr>
<th>Model</th>
<th>Frequency</th>
<th>Memory</th>
<th>Features</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>7200/120</td>
<td>180MHz</td>
<td>8/1.2GB</td>
<td></td>
<td>$1699</td>
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<table>
<thead>
<tr>
<th>Model</th>
<th>Frequency</th>
<th>Memory</th>
<th>Features</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>6100/100</td>
<td>800MHz</td>
<td>16/8GB</td>
<td></td>
<td>$1449</td>
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</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>Frequency</th>
<th>Memory</th>
<th>Features</th>
<th>Price</th>
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<tbody>
<tr>
<td>5200/75</td>
<td>800/800</td>
<td>16/1GB</td>
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<td>$1299</td>
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# Performas

<table>
<thead>
<tr>
<th>Model</th>
<th>CPU</th>
<th>Features</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performa 6300CD</td>
<td>8/1.2GB/CD</td>
<td>CPU, Keyboard, Mouse, TV &amp; 15&quot; Monitor</td>
<td>$1499</td>
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</table>

16/1.2GB/CD/28.8KBPS No Monitor $1198

<table>
<thead>
<tr>
<th>Model</th>
<th>CPU</th>
<th>Features</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performa 6320CD</td>
<td>16/1.2GB/CD</td>
<td>CPU, Keyboard, Mouse, TV &amp; 15&quot; Monitor</td>
<td>$1995</td>
</tr>
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</table>

Performa 580 8/800/4x/CD $999

# Powerbooks

<table>
<thead>
<tr>
<th>Model</th>
<th>Memory</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>5300CE</td>
<td>32/1GB</td>
<td>$CALL</td>
</tr>
<tr>
<td>5300C</td>
<td>16/750</td>
<td>$CALL</td>
</tr>
<tr>
<td>5300C</td>
<td>8/500</td>
<td>$CALL</td>
</tr>
<tr>
<td>5300CS</td>
<td>16/750</td>
<td>$CALL</td>
</tr>
<tr>
<td>5300CS</td>
<td>8/500</td>
<td>$CALL</td>
</tr>
<tr>
<td>5300Grayscale</td>
<td>8/500</td>
<td>$CALL</td>
</tr>
<tr>
<td>540C</td>
<td>4/320</td>
<td>$1995*</td>
</tr>
<tr>
<td>540C</td>
<td>12/320/MOD</td>
<td>$2399*</td>
</tr>
<tr>
<td>520C</td>
<td>4/240</td>
<td>$1199*</td>
</tr>
<tr>
<td>520C</td>
<td>12/240/MOD</td>
<td>$1699*</td>
</tr>
<tr>
<td>520</td>
<td>8/240</td>
<td>$879</td>
</tr>
<tr>
<td>190C</td>
<td>8/500</td>
<td>$1399</td>
</tr>
<tr>
<td>19</td>
<td>8/500</td>
<td>$999</td>
</tr>
<tr>
<td>180C</td>
<td>4/160/MOD</td>
<td>$1899*</td>
</tr>
<tr>
<td>150</td>
<td>8/250 w/14.4Kbps</td>
<td>$669</td>
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DUO2300C 8/750 $2199

DUO2300C 20/1.1GB/MOD $2999

DUO250 4/200 $599*

DUO250 12/200/MOD $999*

DUO280C 4/320 $1399

DUO280C 12/320/MOD $1799

DUO280 12/240/MOD $1299*

# Global Village Modems

Mercury 19.2kbps Internal PBSO50’s $199

Teleport Gold 14.4kbps External $69

with purchase of a Powerbook

# Printers

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
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</thead>
<tbody>
<tr>
<td>LaserWriter4/600</td>
<td>$699</td>
</tr>
<tr>
<td>LaserWriter Select 300</td>
<td>$429</td>
</tr>
<tr>
<td>LaserWriter Select 320</td>
<td>$499</td>
</tr>
<tr>
<td>LaserWriter Select 610</td>
<td>$499</td>
</tr>
<tr>
<td>LaserWriter 16/600/PS</td>
<td>$2099</td>
</tr>
<tr>
<td>COLOR LW 12/600/PS</td>
<td>$5299</td>
</tr>
<tr>
<td>Portable StyleWriter</td>
<td>$239*</td>
</tr>
<tr>
<td>StyleWriter 2500/1500</td>
<td>$369/249</td>
</tr>
<tr>
<td>StyleWriter 2400</td>
<td>$279/199*</td>
</tr>
<tr>
<td>StyleWriter 2200</td>
<td>$299</td>
</tr>
<tr>
<td>Star Color Printer XJ144MC</td>
<td>$99</td>
</tr>
<tr>
<td>HP LaserJet 5MP</td>
<td>$949</td>
</tr>
<tr>
<td>HP LaserJet 5M</td>
<td>$1779</td>
</tr>
<tr>
<td>HP LaserJet 4MV</td>
<td>$2699</td>
</tr>
<tr>
<td>HP DeskJet 870Cxi</td>
<td>$529</td>
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# Iomega JAZZ

$449

Apple 600E 4xCD $179
### Systems & Peripherals
### Memory & Upgrades

<table>
<thead>
<tr>
<th>Model</th>
<th>Memory Specification</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performa 630x (120MHz)</td>
<td>16MB SDRAM</td>
<td>$199</td>
</tr>
<tr>
<td>Performa 630x (200MHz)</td>
<td>32MB SDRAM</td>
<td>$309</td>
</tr>
<tr>
<td>Performa 630x (320MHz)</td>
<td>64MB SDRAM</td>
<td>$599</td>
</tr>
<tr>
<td>Performa 630x (120MHz)</td>
<td>128MB SDRAM</td>
<td>$999</td>
</tr>
<tr>
<td>Performa 630x (200MHz)</td>
<td>256MB SDRAM</td>
<td>$1999</td>
</tr>
<tr>
<td>Performa 630x (320MHz)</td>
<td>512MB SDRAM</td>
<td>$2999</td>
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</table>

**PowerBooks**

<table>
<thead>
<tr>
<th>Model</th>
<th>Memory Specification</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>PowerBook 100</td>
<td>16MB SDRAM</td>
<td>$299</td>
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<tr>
<td>PowerBook 200</td>
<td>32MB SDRAM</td>
<td>$499</td>
</tr>
<tr>
<td>PowerBook 300</td>
<td>64MB SDRAM</td>
<td>$999</td>
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</table>

**Monitors**

<table>
<thead>
<tr>
<th>Model</th>
<th>Specifications</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>SuperMac 9000</td>
<td>1MB/2MB</td>
<td>$295</td>
</tr>
<tr>
<td>SuperMac 9000</td>
<td>4MB/8MB</td>
<td>$495</td>
</tr>
<tr>
<td>SuperMac 9000</td>
<td>16MB/32MB</td>
<td>$995</td>
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</tbody>
</table>

**PB Accelerators**

<table>
<thead>
<tr>
<th>Model</th>
<th>Specifications</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 PIN SIMMS</td>
<td>1MB/2MB</td>
<td>$295</td>
</tr>
<tr>
<td>72 PIN SIMMS</td>
<td>4MB/8MB</td>
<td>$495</td>
</tr>
<tr>
<td>30 PIN SIMMS</td>
<td>16MB/32MB</td>
<td>$995</td>
</tr>
</tbody>
</table>

**PowerBook Memory**

<table>
<thead>
<tr>
<th>Model</th>
<th>Specifications</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>168 PIN DIMM</td>
<td>1MB/2MB/4MB/8MB/16MB/32MB/64MB/128MB</td>
<td>$995</td>
</tr>
</tbody>
</table>

**Cache Card**

<table>
<thead>
<tr>
<th>Model</th>
<th>Specifications</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>256K SIMMs</td>
<td>1MB/2MB/4MB/8MB/16MB/32MB/64MB/128MB</td>
<td>$995</td>
</tr>
</tbody>
</table>

**DIMMs (168-Pin)**

<table>
<thead>
<tr>
<th>Model</th>
<th>Specifications</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIMM64</td>
<td>8MB/16MB/32MB/64MB</td>
<td>$595</td>
</tr>
</tbody>
</table>

**SIMMs (72-Pin)**

<table>
<thead>
<tr>
<th>Model</th>
<th>Specifications</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIMM32</td>
<td>8MB/16MB/32MB/64MB</td>
<td>$595</td>
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</table>

**PBBook Memory**

<table>
<thead>
<tr>
<th>Model</th>
<th>Specifications</th>
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</tr>
</thead>
<tbody>
<tr>
<td>500/5300</td>
<td>16MB/32MB/64MB/128MB</td>
<td>$995</td>
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</tbody>
</table>

**PBBook Memory**

<table>
<thead>
<tr>
<th>Model</th>
<th>Specifications</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>128 MB DIMM</td>
<td>8MB/16MB/32MB/64MB/128MB</td>
<td>$995</td>
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</tbody>
</table>

**PBBook Memory**

<table>
<thead>
<tr>
<th>Model</th>
<th>Specifications</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>256K SIMMs</td>
<td>1MB/2MB/4MB/8MB/16MB/32MB/64MB/128MB</td>
<td>$995</td>
</tr>
</tbody>
</table>

**PBBook Memory**

<table>
<thead>
<tr>
<th>Model</th>
<th>Specifications</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&amp;2MB DIMMs</td>
<td>8MB/16MB/32MB/64MB/128MB</td>
<td>$995</td>
</tr>
</tbody>
</table>
### MEMORY LIFETIME WARRANTY

**DIMMS 168 PIN**
- 64 MB 60NS: $595
- 64 MB 70NS: $405
- 8 MB 60NS: $8

**72-PIN SIMMS**
- 32 MB 60NS: $395
- 32 MB 70NS: $305
- 8 MB 70NS: $80

**30-PIN SIMMS**
- 16 MB 70NS: $120
- 8 MB 70NS: $89
- 4 MB 80NS/MAC CLIX: $306/369

**PS C SIMMS**
- 9-BIT 1MB 50 PIN 72NS: $65
- 1MB 50 PIN 30NS: $21
- 8 & 16 BIT 22 74: $265

**64-PIN SIMMS**
- 16 MB 70NS: $179
- 8 MB 70NS: $110
- 4 MB 70NS: $99

**POWERBOOK 5300**
- 8 MB 32NS: $596
- 16 MB 32/62: $184/530

**POWERBOOK 2300**
- 16 MB 32/62: $335

**POWERBOOK 500**
- 4 MB 60NS: $74
- 8 MB 60NS: $94
- 16 MB: $160
- 32 MB: $355

**POWERBOOK DUO 210-230**
- 4 MB 60NS: $75/140
- 12 MB 14/4: $152/245
- 20 MB 14/1: $207/539
- 36 MB: $389

**POWERBOOK 190**
- 4MB 60NS: $73/120
- 12 MB 14 16 MB 30 NS: $272/320
- 32 MB 15 NS: $395

**POWERBOOK 150**
- 4MB 60NS: $127/140
- 12 MB 20 NS: $235/285

**MAJOR BRAND MEMORY ONLY.**

### FPU/COPROCESSOR/VRAM

- **FPU/ColorMath Processors**
  - **VARSHIP CACHES**
    - General FPS 25MHz: $109
    - 256K Mem Video RAM: $113
    - 1MB VRAM PM1.27/5/500:
      - 1MB VRAM PM1.27/5/500: $49
  - **FPU 33MHz Duo/Quad**
    - 256K Mem Video RAM: $23
  - **FPU 25MHz Duo**
    - 256K Mem Video RAM: $23

- **8MB 32/62**
  - **HEWLETT-PACKARD**
  - **Apple**
  - **DEC/DEC**
  - **IBM**
  - **386/486**
  - **SCSI**

- **EPSON**
  - **ColorStyleWriter 2500**
    - $35
  - **ColorWriter 4600**
    - $15
  - **ColorWriter 5600**
    - $15

- **SCANNERS**
  - **EPSON**
    - **1200 PRO**
      - $902
  - **VISIONEER**
    - **PaperPort**
      - $95
  - **NIKON**
    - **Scanscan II**
      - $95
  - **AGFA**
    - **ScanStation 8100**
      - $191

- **POLARIS GRAPHICS**
  - **U-MAX**
    - **POWERLOOK 3900**
      - $45

### PRINTERS

- **EPSON**
  - **ColorStyleWriter 2500**
    - $37
  - **ColorWriter 4600**
    - $17
  - **ColorWriter 5600**
    - $17

### QUANTUM

- **Atias 4.3GB External Drive**
  - **$1039**

### IOMEGA

- **ZIP 100 external drive**
  - **$149**
Memory & Upgrades

MEMORY
LIFETIME GUARANTEE
PC & Mac Memory in stock at Lowest Prices
SIMMs
DIMMs
SIPs
DIPs
ZIPs
VRAM
CACHE

University, Government & Corporate P.O.s with Approved Credit

CPUs
PowerBook Memory
Printer Memory
EDO Memory

DMS
Data Memory Systems, Inc.
24 Keewaydin Dr. Salem, NH 03079
Tel: 603-898-7750 / Fax 603-898-6585
Web Site: www.datamem.com/datamem
Email: datamem@aol.com
800-662-7466
Memory Upgrade Specialists Since 1987

Guaranteed Lowest Prices
Lifetime Warranty
- 30 Pin SIMMs
- 1 MB—16 MB
- 72 Pin SIMMS
- 1 MB—64 MB
- 168 Pin DIMM
- 4 MB—128 MB
- Memory for all PowerBooks
- Memory for all Printers
- VRAM, DIMM, CACHE

Printers & Scanners
Best Prices!

Eritech International
1-800-808-6242
Ph: 818-244-6242 http://www.eritech.com Fax: 818-500-7699

"If we had to place just one ad, it would be in Macworld Shopper. It just plain works better for us than the others ... We know, we've tried them."
—David Ash
Mac Solutions

"I bought a Personal LaserWriter from Shreve Systems, a Macworld Shopper advertiser, and got a great deal and an excellent product. They're better than local computer stores!"
—Technical writer,
Shopping Center Developers

"Source: Survey conducted by ComputerBuyer's report, January 1996"
## Memory

### 168-Pin DIMMs

<table>
<thead>
<tr>
<th>Size</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>8MB</td>
<td>$58</td>
</tr>
<tr>
<td>16MB</td>
<td>$100</td>
</tr>
<tr>
<td>32MB</td>
<td>$205</td>
</tr>
<tr>
<td>64MB</td>
<td>$395</td>
</tr>
</tbody>
</table>

All 60NS!

### Standard 36-Pin SIMMs

<table>
<thead>
<tr>
<th>Size</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>4MB</td>
<td>$60</td>
</tr>
<tr>
<td>8MB</td>
<td>$66</td>
</tr>
<tr>
<td>16MB</td>
<td>$26</td>
</tr>
<tr>
<td>32MB</td>
<td>$99</td>
</tr>
<tr>
<td>64MB</td>
<td>$199</td>
</tr>
</tbody>
</table>

### Powerbook Series

<table>
<thead>
<tr>
<th>Size</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>8MB</td>
<td>$88</td>
</tr>
<tr>
<td>16MB</td>
<td>$128</td>
</tr>
<tr>
<td>32MB</td>
<td>$197</td>
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</tbody>
</table>

### Powerbook ACCESSORIES

- **Batteries**
  - V36 Pro Battery
  - Charger, AC Adapter
  - V36 Pro 300 INT. TYPE III
  - V36 Pro 200 INT. Battery

- **Hard Drives**
  - VST EXP BAY Hard Drive
  - Powerbook Upgrade

- **Modems**
  - Global Village Powerport
  - Platiniun 28.8 V.34

### Policies

- **Pricing**: Subject to change without notice.
- **Office Hours**: M-F 7AM to 6PM, Sat. 9AM to 4PM, PST
- **Payment**:
  - Overnight Del: $7.50 and Up, UPS Ground: GST and Up
  - Returns subject to approval & restocking fees
- **We Accept**:
  - Visa
  - Mastercard
  - Discover

### Media

- Sony:
  - Recordable CDROM 560MB/10 PK
  - 32MB OPTICAL/MAC

- Verbatim:
  - 3.5" 12MB OPTICAL

- Other:
  - ZIP 100 MB CART.

### International Calls

- 0115CD, "MAC WORLD" 6117118100

---

**Powermac Accessory**

**Motion**

**Supra**

**ISDN B/W/64**

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Me: "Hello, my new Duo won’t print whenever its internal modem is on.”
Woman at Apple: “That’s correct, sir. Only one thing at a time can be plugged into the modem-printer port.” Me: “You don’t understand. It’s an internal modem. Built in. Doesn’t need the modem port.”
Woman: “Obviously, sir, if a printer is plugged into your printer-modem port, you can’t plug in a modem there.” Me: “Ma’am, are you familiar with the Duo 2300?” She: “Well, no, sir, not really.”

So if the experts in Austin are slowly being replaced by body-snatched automatons with almost no comprehension of the Mac, what’s to be thankful for? Three things. First, at least Apple’s front-line army of phone answerers eventually hands you off to somebody who knows something. Second, Apple’s help line is still free. By contrast, when my buddy recently called Compaq for help, they charged $35 to his credit card before they’d even listen to his question.

And third, the phone number itself gives hundreds of unwitting callers each week a delightful surprise: turns out that if you dial 800-S-zero-S-APPL, by mistake, a breathy female voice thanks you for calling “America’s hottest phone line.”

**Viruses Immunity**

There have been only a few Mac viruses in all history—and they’ve all been pretty darned mild. DOS- and Windows-based computer fans, on the other hand, live in fear of more than 500 nasty little viruses, some deadly to data, lurking at every turn on the info highway.

**ClarisWorks**

After reviewing Mac software for ten years, I can safely say there’s no shortage of software at my place; disks, boxes, and manuals consume roughly 93 percent of the available living space. But when I need to do something quick, professional, and reliable, what do I launch? ClarisWorks.

ClarisWorks, as much of the planet knows, is the world’s best-designed, smoothest, most trouble-free program. It dumps zero extensions into your System Folder; it runs in 1400K of memory; it needs no support files whatsoever. This week alone, I used its spreadsheet to type up a schedule of simultaneous rehearsals; its communications window to check a modem; its drawing module to make a quick map; and its word processor to create a Read Me file. While everything else is (a) getting bigger, (b) getting complicated, or (c) crashing, ClarisWorks will always be there, a happy little cocker spaniel with your slippers in its mouth.

**The Upshot**

I’m only warming up; given a long-enough Thanksgiving-dinner speech opportunity, I’d also give thanks for such glories as shareware, Zip disks, QuickTime, the 18 voices your Mac can use to speak, PC Exchange, Macworld Expos, desktop patterns, fax modems, TrueType fonts, E-mail, the Launcher, and the little cord-wrapping prongs on a PowerBook power adapter.

Too bad Thanksgiving rolls around only once a year. The other 364 days, we’ll go back to using the term real turkey to mean lousy software.

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THE LITTLE THINGS THAT MACINTOSH PILGRIMS CAN BE THANKFUL FOR

It hasn't been a completely pleasant year for us, the faithful Mac pilgrims. We suffered Microsoft's onslaught of bloated Windows-ware (Word 6, Excel 5). We watched Apple ingest three huge hunks of humble pie: financial fumbles, imperfect PowerBooks, and several successive servings of system software. Finally, we endured the preposterous public pillorying of Macs by the wise ones at various national news organizations, who greatly exaggerated rumors of the Mac's demise.

Still, Thanksgiving time is upon us, and we do indeed have much to be thankful for. We should remember that faith is a powerful force; the original Pilgrims didn't have much else going for them, and their little piece of market share hasn't done so badly. Despite our hardships, we, like they, should celebrate the little things, the surprising happinesses, the serendipitous touches that make Macs magical. Such as:

Interchangeable Power Cords
You don't appreciate this one until you've acquired a substantial collection of Macintosh add-on junk. Once you've done so, however, you discover an astounding fact: your Macintosh, PowerBook, CD-ROM drive, scanner, printer, monitor, and other external gizmos all use the exact same kind of power cord! It's that thick round cable with three prongs on one end and three slots on the other. In any junk-heap office, in a pinch it doesn't matter which cable you grab—it'll work.

Computers That Work in the Year 2000
Our Windows-using cohorts gloat at the apparent ubiquity of their computer format. Meanwhile, their big 90-percent-market-share ship is cruising at full speed toward an iceberg the size of Montana—namely, the year 2000. As you'll soon be hearing with increasing urgency, all those millions of less-sophisticated, non-Mac computers weren't designed to handle the turn of the millennium. When the year 2000 dawns, their software programs will rip off their little internal calendar pages and decide that it's now January 1, 1900. Picture the calamity as millions upon millions of tax programs, spreadsheets, calendars, and salary calculations derail like a runaway train.

The Mac's designers, on the other hand, had a little more foresight. Our computers won't have to be junked until the year 2040.

America Online Disks
If you're like most people I know, you just splurged your coffee involuntarily. "What?" you're saying. "I'm supposed to be thankful for the torrent of junk disks AOL dumps in my mailbox every week?"
You're damned tootin'. Last I looked, a box of ten high-density disks cost about $10 from MacWarehouse—but those Santa Clauses over at AOL are sending them to you for free.

Omni-Orientation Zip Disk Cases
You're gonna think I was running short of material here, but I do, in fact, give silent thanks almost every day for this tiny gift of convenience: every time I stuff a Zip disk back into its little clear plastic case, I pay absolutely no attention to which way it's going in: right side up, label front, label back, rotated 90 degrees, whatever—it fits no matter which way you shove it. (If you don't consider this a blessing, recall the fussiness of SyQuest cartridge cases, plastic videocassette boxes, audiocassette boxes, and CD-ROM cases, all of which require much more mental effort to stuff and close.)

Free Tech Support
Something bizarre is afoot over at 800/SOS-APPL. Suddenly Apple's famous help hotline seems to be staffed with an army of newcomers who know

continue on page 270
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