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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<sup>®</sup>, start your applications up to four times faster than before.



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

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

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**Cover photo** / Steven Underwood

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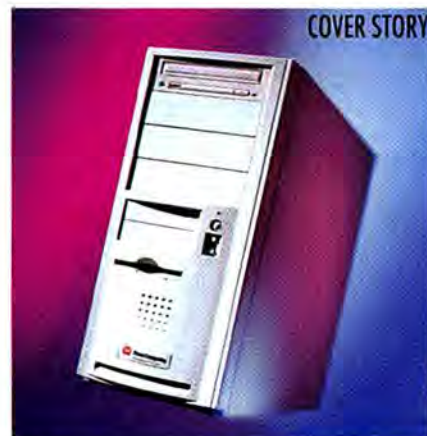
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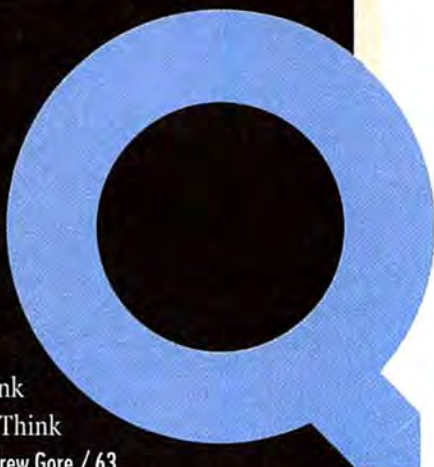
## TECHNOLOGY UPDATE

# QuickTime

QuickTime 2.5 delivers big on multimedia features — and the future looks even brighter.



The features list is impressive by any count: software MPEG and MJPEG, faster compression options, support for interlaced fields and multiple processors, better MIDI, and a powerful QuickTime plug-in for your favorite Web browser. And on the horizon? Think Windows. Think digital cameras. Think interactivity. By Jeffy Milstead and Andrew Gore / 63



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# MacUser

COMING SOON:

# 96

NOVEMBER

## DRAWING PACKAGES

It's back to the drawing board this November for four of the leading high-end drawing packages! MacUser looks at key areas of functionality that professional desktop publishers and graphic artists look for in a drawing package and matches those needs to the right program. Also, find out how Corel Draw and Canvas rank amongst FreeHand and Illustrator when MacUser tests and mouse-rates each of these programs. MacUser helps buyers draw the best buying conclusion!

## DIGITAL FIELD CAMERAS

In the November issue, MacUser looks at what's new in the digital camera playing field. Bruce Fraser, the industry's imaging expert, along with MacUser Labs tests and mouse-rates digital field cameras priced between \$1,000-\$10,000 for ease-of-use, ease-of-set-up and image quality. In this and every issue, MacUser makes smart buying an easy task!

## SMALL BUSINESS ACCOUNTING PACKAGES

Attention all you number crunchers! This November, MacUser provides an information-packed article on small business accounting packages. Learn all about newly introduced products and how they can help streamline your work when MacUser rounds-up, tests and mouse-rates accounting packages. MacUser considers ease-of-set-up, reporting capabilities, and technical support. Small business owners will not want to miss this issue of MacUser!

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# MacUser

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(800) 888-8583 ask for agent 5436.

| Model                               | ViewSonic PT810 | Sony 20sfil | ViewSonic PT770 | Sony 17sfil |
|-------------------------------------|-----------------|-------------|-----------------|-------------|
| Aperture Grille Pitch               | 0.30mm          | 0.30mm      | 0.25mm          | 0.25mm      |
| CRT Size                            | 21"             | 20"         | 17"             | 17"         |
| Viewable                            | 20.0"           | 19.1"       | 16.0"           | 15.0"       |
| Horizontal Scan Rate                | 30-96 KHz       | 30-85 KHz   | 24-82 KHz       | 30-65 KHz   |
| Maximum MAC <sup>®</sup> Resolution | 1600x1200       | 1280x1024   | 1280x1024       | 1024x768    |
| Color Control                       | Yes             | Yes         | Yes             | No          |
| CRT Warranty                        | 3 Years         | 2 Years     | 3 Years         | 2 Years     |
| MSRP*                               | \$1,995         | \$2,299     | \$945           | \$1,099     |

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

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# LETTERS

## Mac Marketing Miasma

YOU'RE JUST NOW noticing ("Where Have All the Titles Gone," June '96, page 23)?! It's been like this for years. Next time you venture out of state, visit the local software store to see for yourselves the slings and arrows of outrageous misfortune that have been visited upon us. Apple had better do *more* than just woo developers, or we'll be left with nothing at all upon the shelves!

Keith Johnson  
wolfram@mcn.net

AFTER READING Pamela Pfiffner's column, I made a trip to the local CompUSA and Best Buy for a software shopping spree. Both stores were in the process of downsizing their already minuscule Mac sections. I found nothing of use and left both stores extremely unhappy. I love the Mac, but my frustration is growing to the point where a Windows-based machine is starting to look pretty good. Can anybody tell me why I shouldn't stop waiting for Apple, sell my PowerPC machine, and buy an IBM clone? Does it not cease to amaze anyone that such a fabulous computer could be marketed so badly?

Dave Foley  
DaveNCSA@aol.com

AS A LONGTIME Apple diehard, I'm concerned about how Apple is being represented at the retail level. I recently visited a local computer retailer, and while passing the Apple section, I noticed several systems either disassembled, incomplete, turned off, or damaged. While checking out a new PowerBook 5300cs, I was unable to get it booted up and, upon further inspection, I noticed that the display

hinge was badly damaged. I came across another model that was operating, but practically every application and document on it was "DiskDoubled" and DiskDoubler had been removed from the machine, so I couldn't get anywhere with it either. The whole experience was appalling. And nobody around seemed to care or think anything was wrong with this scene.

The final straw was when I passed one of the few operating desktop Mac systems and saw that it was displaying a QuickTime movie of a Compaq commercial.

I've been in business long enough to know that this is not how you sell product. Doesn't anyone from Apple ever visit the company's retail outlets?

Ed Barbosa  
WoodMan@aol.com

PAMELA PFIFFNER missed an important point. If other Mac users are like me, they wouldn't be buying titles off the shelf anyway! Why buy software for the high prices typically charged in a retail outlet? A quick call to any of the numerous catalog companies gets your software to you for a lot less — and the software is delivered to your doorstep the next morning!

Perhaps Apple and the software companies should talk retailers into displaying mail-order catalogs next to the Macs they sell. This would provide an elegant response to a would-be customer's concerns about the availability of Mac software!

Tom Davenport  
Clearfield, UT

I REALLY HOPE Heidi Roizen does something fast, because if you don't have the right software, even the best computer in the world is useless.

Jose Roshardt  
eureka@es.com.sv, attn Jose Roshardt



## Open Folder

According to Larry Kolodziejewski, our staff needs to attend the Pablo Neruda school for the metaphorically challenged. Failing that, we should at least take a trip to the local body shop to learn a thing or two about cars. When recently attempting witty automobile analogies, we referred to *the brake* when we meant to say *the clutch* and we called the Corvair a "midengine wonder." (Larry informed us it's actually a rear-engine car.) Jeez, you'd think that after growing up listening to car-oriented songs ("She'll have fun fun fun 'til her daddy takes her Fairlane away") and watching car-oriented TV (*Car 52, Where Are You?*), we'd have picked up a thing or two. We *promise* it won't happen again.

"Pick up a Mac. Break your mother's back. Pick up a Mac. Break your mother's back." The next time you visit your local computer store to peruse the latest offerings from the Macintosh world, you're likely to find the staff childishly chanting and slinking among (but not touching!) the Mac inventory in the store. So says Jee Hoon Lee, who was regarded with shock and suspicion for expressing an interest in the much maligned computer. "It seems the general public is avoiding the Mac section as if the section were carrying the Ebola virus," says Lee. Yeah, well, the general public fell for Orson Welles' Martian-invasion broadcast. The general public bought millions of Milli Vanilli recordings. The general public camped out for copies of Windows 95 as if Michael Jackson concert tickets were going on sale. The general public is a sucker for a hoax.

Tom Davies asks, "Why are the code names of Apple products so much cooler than the ones the computers end up with? Given the choice, I would rather have a 'Tsunami' than a 'ninetousandfivehundred.'" True, *Tsunami* evokes images of speed and power whereas *ninetousandfivehundred* sounds a bit like something you'd use for removing pesky grease stains from shag carpeting. Would *THE CPU Formerly Known As Tsunami* suffice?

## WRITE TO LETTERS

c/o MacUser  
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letters@macuser.com

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## Imperiled Innovation

WE'RE DISHEARTENED by all the negative changes Gil Amelio deems necessary for Apple. We understand that change is of the essence, but is it necessary to remove Apple from the frontier completely? If you're not the lead sled dog, just think of the view you have to look forward to.

Macintosh is innovation. In a world of copycats, Apple stands as a rogue willing to try new ideas. Why is the company abandoning its bread and butter? Don't make us give up our bragging rights, Gil.

David Seppi and Jon Miles  
ethereal@aros.net

## Halcyon Hardware Days

IT'S GOOD TO SEE Apple rethinking its recent push to gain market share at the expense of performance and quality. One of Apple's strengths, up until about 1994, was its indestructible and integrated hardware and OS. Since that time, in order to gain PC market share, there has been a degradation of key Mac I/O systems. We've seen floppy-disk drives degrade in performance, a move to non-Trinitron-based monitors, and apparently slower hard-disk access. Waiting for a PPC to boot is, well, like waiting for Windows 95 to boot. All that power in the CPU wasted because of mediocre I/O.

From the user standpoint, it's the response and output of a system, not the underlying hardware, that makes the impression. Hopefully, Apple will again look toward pleasing customers first and shareholders second.

John T. Robinson  
jrobinson@sara.com

## Apple Cedes Lead in Schools

YOUR ARTICLE about the battle for America's classrooms missed the mark ("Mac OS and Win 95 in Classroom Brawl," June '96, page 29). Many schools have considered switching to Wintel-based machines for four simple reasons: lower cost, availability, software selection, and company-longevity concerns.

Schools are finding that most students have PCs, rather than Macs, at home. PCs are generally lower in price, and most are shipped within a week or two. Alternatively, many schools wait weeks, even months, for their Apple orders to arrive. (My wife, who is an elementary-school teacher, is still waiting for her new Power Mac 5300, which was ordered over eight weeks ago.)

Taking a look at some educational-software

catalogs reveals about two to three Windows software titles for each Mac OS title.

That's quite a change from a couple of years ago, when most educational software was Mac-based. Software developers know where the market is. Consumers are buying far more educational software than schools are, and most home machines are Wintels.

Furthermore, Apple claims that 63 percent of computers in schools are Apples. What the company doesn't mention is that of the 63 percent, about half of those are Apple II-based machines — not Macs.

Apple, get your ducks in a row before Bill Gates' picture is hanging in schools with those of other famous Americans.

Dann Sternsher  
Sternsher@msn.com

## MacUser for Fun and Profit

YOUR JUNE ISSUE was fantastic! "Image Tricks for Acrobat" (page 104) helped in my workplace, where a team is being assembled to convert files to PDF for our electronic Employee Info Center. "Surviving in a Windows World" (page 113) helped at home; my husband is being given a Wintel PC at work, and his systems administrator assured him he could "work and fax from his computer at home" — never mind that we have a Mac. "Where Have All the Titles Gone?" (page 23) set to music the melancholy blues I've been experiencing lately. And "Photo Play" (page 88) gave me what I needed: a way to have more fun with my Mac.

Kim R. M. Stangl  
kim62156@aol.com

## Photoshop Talk

YOUR "FORMULA 1 PHOTOSHOP" article (June '96, page 70) offered sound advice for optimizing performance, but I'd like to offer a much easier way to achieve the same goal.

Use the Memory control panel to create a RAM disk large enough to hold Photoshop. Restart, and then copy Photoshop to the RAM disk. We use this approach, with outstanding results compared to running Photoshop off the hard disk.

Jim Smiddy  
jstex@onramp.net

## Free 3-D

YOUR ARTICLE about 3-D-modeling and -rendering software ("Model Programs," June '96, page 78) was complete and informative, but one more program should have been

mentioned. PoV-Ray 2.2 is a ray tracer for the Mac. It can handle Metaballs, Boolean modeling, and basic animation. And it's *freeware*! I recommend it to anyone who cannot afford "real" 3-D software.

Mark Levin  
Strange@aol.com

## Credit Where Credit's Due

IN YOUR ARTICLE on 3-D-modeling programs, you said that the movie "Toy Story" was created using custom Pixar code and rendered on 100 Sun workstations. Actually, *Toy Story*'s credits said the preliminary animation was done on Macs and the final work on Suns. Macs played a major role in the creation of this amazing movie (there was nary a PC credit to be found).

Lynette Waggoner  
via the Internet

## GX Fans, Unite!

FINALLY A REVIEW of a GX-based program that looks at the program itself and examines its strengths and weaknesses (LightningDraw GX, June '96, page 49).

QuickDraw GX is a very misunderstood technology and suffers from a case of bad first impressions. That's why I set up the QuickDraw GX Fan Club on the Web: <http://www.ixmedia.com/quickgx/quickgx.html>.

Kenneth Trueman  
via the Internet

I FOUND SEVERAL things in your review of LightningDraw GX that concerned me. These issues had to do with the portrayal of LightningDraw's (and hence other GX-based programs') compatibility with PostScript.

The review says, "Nor can it import EPS files." In fact, it can import EPS files, and a user can place, rotate, scale, and skew them. The only thing LightningDraw won't let you do is edit the contents of an EPS graphic as a LightningDraw object. Adobe Illustrator didn't offer this feature either until its most recent release (6.0). LightningDraw's support of EPS importing is comparable to that of most other PostScript-based applications.

The review also says, "Although it can output EPS files, EPS format converts GX type to line art." This is simply untrue. There is a substantial amount of code within GX's PostScript-generating subsystem to generate true PostScript text commands and manage GX fonts that can have thousands of glyphs, weights, widths, etc. If you were to look inside



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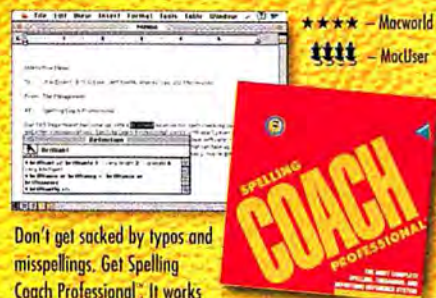
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## LETTERS

the EPS files generated by QuickDraw GX, you'd find the full range of operators (show, ashow, xshow, kshow, etc.) used to draw the GX typography. And unlike the EPS of many other "PostScript-based" applications, GX-generated EPS files can also contain Asian-language fonts.

Any difficulty applications have editing text imported from GX-generated PostScript files stems from those applications' assumptions of what PostScript subset is being used by the system that created the EPS file.

The review also says that "since no GX-based drivers yet exist for imagesetters, high-end output from LightningDraw is still a question mark." This is also untrue. As I said above, QuickDraw GX contains a full subsystem for generating PostScript that can accurately reproduce any GX type or graphic. Since most imagesetters used in the industry are based on PostScript, you could use the LaserWriter GX driver for printing to these imagesetters. There is also a product called OnPage GX (from Computer Applications), which is a GX driver that parses PPD files. Thus, given a PPD file for a PostScript imagesetter and the OnPage driver, a LightningDraw GX user can in fact print to such imagesetters.

**Daniel Lipton**

Lead Engineer, QuickDraw GX Printing, Apple  
[daniel\\_lipton@powertalk.apple.com](mailto:daniel_lipton@powertalk.apple.com)

*/ We got things a bit backward concerning LightningDraw GX's handling of EPS files: We should have said the program can import EPS files (although not edit them) but not export them. And concerning output of QuickDraw GX-based files to imagesetters: When we completed our review, QuickDraw GX users were very limited in their imagesetter-printing options. Imagesetter vendors' proprietary drivers lacked support for QuickDraw GX. And although Apple's LaserWriter GX driver worked, its lack of support for imagesetter PPDs prevented it from taking advantage of many imagesetter features, including support for varying paper sizes. OnPage GX, which enables the use of PostScript PPDs in conjunction with QuickDraw GX, is a welcome solution to that problem. / JS*

ARGH! IT MAKES ME NUTS to see an article about fonts with no mention of GX ("Fonts 'R' Us," June '96, page 101), especially when the article includes gems such as the following: "Type designs typically include 400 characters or more, but because a font made for desktop systems can have no more than 256 characters, font manufacturers are forced to eliminate some characters."

GX fonts have no such limit, and users looking for truly superior typography should check out Ready, Set, Go! GX; LightningDraw GX; or Unicorn. The GX fonts included with System 7.5 and available from Bitstream, ITC, Linotype-Hell, and others include *real* small caps, lowercase numerals, ligatures, and swashes that change depending on whether the swashes appear at the beginning or end of words. GX typography is very cool and well worth checking out. To fail to mention GX is an omission verging on the criminal.

**Brad Matter**

[mollusc@oz.net](mailto:mollusc@oz.net)

I'VE BEEN WANTING the features of GX ever since it was announced. Whenever I explain to people what would be possible with GX, they're amazed and can't understand why Apple won't push this technology into the mainstream. Instead, advanced typography still eludes the common application. I'm sick and tired of formatting ligatures and fractions by hand! Wake up, Apple! If you don't take it cross-platform soon, someone else will define the industry standard for you.

**Jeffrey Windsor**

[jcwindsor@pobox.com](mailto:jcwindsor@pobox.com)

## PDF Conversions: What Next?

"IMAGE TRICKS FOR ACRobat" (June '96, page 104) describes three steps for facilitating the creation of PDF files. The first step calls for converting vector-based illustrations to bitmaps via Photoshop. This is certainly clear. However, you fail to mention how to save the resulting files. Should they be saved as EPS, PICT, TIFF, or something else? Do they get compression and, if so, what level?

If I could get some clarification of these details, I would greatly appreciate it.

**Steve Haines**

[shaines@snet.net](mailto:shaines@snet.net)

*/ Here's the easy answer: When in doubt with Acrobat, save image files as RGB TIFFs. Acrobat will automatically compress the TIFFs when it distills the files. / JS*

## Corrections

**The correct price for Bryce 2** is \$199 ("MetaTools Creates a Brave New World," June '96, page 26).

**The correct price for Menlo the Frog** is \$39.95; the toll-free number for Windy Hill Productions is 800-850-4884 ("The Two Dads," April '96, page 120).

**The PowerPC 603** — not the 601 — is the least powerful of the PowerPC chips ("Macs and Clones," June '96, page 39).



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"Canvas 5 adds a host of new capabilities that make it far more than the solid illustration player it is today. For about \$600, you get many of the functions that would cost almost \$2,000 if you stock-piled Adobe System Inc.'s Photoshop, Illustrator and Pagemaker." Mark Hall Editor in Chief Macweek July 24, 1995

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PAMELA PFIFFNER

# The Mouse that Roared

**AS A PERSON WHOSE ROOTS** are planted in the print publishing tradition, I'm often critical of the Internet. And with good reason. Compared to print, Web pages are difficult to design and even more difficult to read if *not* designed well. Print, on the other hand, has the potential to produce stunningly beautiful works of art that educate and amaze, and its rich history provides us with an endless source of inspiration, as did the illuminated manuscripts I saw recently at an exhibition celebrating the 19th-century designer William Morris. Will there be an Internet equivalent of Morris' Kelmscott Chaucer in which words, type, and illustrations so intimately entwine? Yes, but it'll be radically different from what has come before, and before we discover it, we'll have to throw out preconceived notions about what makes compelling content.

What makes good Internet sense has been on my mind a lot recently, as we move toward an era in which print publications such as *MacUser* must make room for Internet-based publications such as, well, *MacUser*. How can *MacUser* make the most of the Internet and its graphical cousin, the World Wide Web? What can the Web provide for you, our readers, that the print magazine can't?

When pondering what kinds of content to put on the Web, it's tempting to fall back on what we know. So we have Web pages with content better suited to print and we have print content that could be more useful on the Web. Sure, we can post all kinds of stories and columns taken from the print magazine or written exclusively for the Web — and we do — but reading long articles on-screen can be tedious. That's why we at *MacUser* opt for punchy pieces written with attitude.

The pervasiveness and immediacy of the Web also make it perfect for spreading the news, such as Guy Kawasaki's entertaining Evangelist (<http://www.zdnet.com/macuser/macway/>). Every day Apple's master promoter compiles interesting facts and anecdotes about the Macintosh and sends them to thirty

thousand Mac enthusiasts. Kawasaki's approach is akin to providing a *Reader's Digest* of Mac-related news and personalities. Did you know that the new constitution of South Africa was created on a Power Mac 9500 or that Siegfried and Roy use Macs to control all



the music and lighting during their world-renowned Las Vegas show? Readers of the Evangelist do. It has become required reading for most people I know in the Mac community (to find out how to subscribe, send a message to [evangelist@macway.com](mailto:evangelist@macway.com)).

But Kawasaki's Evangelist essentially parallels a print model — it's reminiscent of acquiring a mailing list from a catalog and then using custom distribution to deliver it to a select group of potential customers. It's effective, timely, and neat, but it doesn't take advantage of the interactivity possible on the Web. The Web offers a rich environment for organizing vast amounts of information and presenting that information in a highly interactive, searchable format. And that's where *MacUser*'s Mighty Mice comes in.


## Here It Comes to Save the Day

Using Claris FileMaker Pro 3.0 and a pair of relational databases, *MacUser*'s Mighty Mice (<http://www.zdnet.com/macuser/mouse>

.html) is a collection of products that have received mouse ratings in the pages of *MacUser*. By taking an existing database of mouse-rated products and adding in all our reviews from the past two years, *MacUser* online whiz Jason Snell was able to create a dynamic superhero that squashes the static lists of rated products traditionally found in print. And unlike other Internet-based product databases, Mighty Mice is multidimensional, letting you search for products by rating, product category, company, and so on. Hyperlinks take you to reviews of other products from the same company and to the company's Web site.

And that is just the beginning: Mighty Mice's PowerSearch mode lets you view products *MacUser* reviewed as far back as 1986. If you're one of the truly curious who wants to know what rating we gave to Crystal Quest back in 1988, Mighty Mice is here for you.

Mighty Mice is only the beginning of the kind of unique, interactive material we will have online. Strengthening the bond between the print edition of *MacUser* and its digital alter ego, with this issue we're also adding an online page to the print edition of *MacUser*. On this page, you'll find out what *MacUser* is up to online, but you'll also get useful information about new Mac software that's available on the Net and find out what *MacUser* readers are thinking, via a regular online poll.

I'm not ready to give up print yet — I honestly think I'll never be — but learning how to make the best use of this new medium promises to be an exciting education. Marshall McLuhan once noted that each new medium builds on the medium before it and that inevitably we end up expressing our ideas about the new medium via the old one. Can I expect one day to see a book about the Internet designed à la Morris and printed by hand? I hope so. After all, there are already several Web sites devoted to him. 



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CIRCLE 154 ON READER SERVICE CARD



# NEWS

## OpenDoc Shows Signs of Life

Netscape leads the parade as developers begin to adopt Apple's component-software scheme.

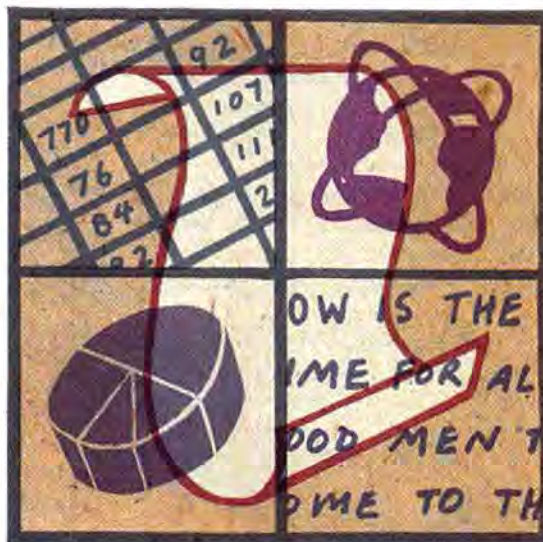
APPLE'S GOT A LOT RIDING on OpenDoc. It's not merely that Cupertino has all but issued an edict that components, rather than monolithic applications, will define the character of software in Tomorrowland. More important, Apple has pegged its current Internet strategy — and it's not exactly clear if Apple has any other strategy — entirely on Cyberdog, an OpenDoc-based collection of Internet components (see "Walking the Cyberdog," July '96, page 69). That's kinda scary, when you think about it. Bold, but scary.

And yet, Apple may have backed into a gold mine. After searching for over a year for a way to convince software developers as well as end users of the benefits of OpenDoc, Apple appears to have struck a chord with its Internet pitch. In April, Spyglass, developer of the Mosaic Web browser, caused a stir when it announced that its Web Technology Kit (WTK) will be available optionally as a collection of OpenDoc parts. Less than a month later, Netscape shocked the assembled Mac faithful at Apple's Worldwide Developers Conference by announcing that it will make its Navigator browser

OpenDoc-compliant — in fact, we learned later that Apple will replace Cyberdog's current browser with a Navigator browser part.

OpenDoc interest is cropping up in other segments of the market as well. Last fall Adobe announced that it was "fully committed to OpenDoc" — a somewhat theoretical position. In practice, what the company committed to was the delivery of a set of "companion" parts that would enable users to embed Adobe Illustrator, Photoshop, and Premiere documents as viewable and printable (but not editable) elements within OpenDoc-container documents — then Adobe promptly dropped the ball on even that minimal commitment.

Rumor has it, though, that Adobe, along with many other developers, perked up its ears at Netscape's announcement. After all, Adobe is now an Internet-savvy company too. The subject of



OpenDoc has apparently reappeared as an agenda item in some high-level meetings there.

Some interesting non-Internet-related parts are also beginning to see the light of day. Canadian-based Adrenaline Software is hard at work on a spreadsheet and 3-D-charting part, code-named Baywatch, that promises to be hot. Taking advantage of QuickDraw 3D, Baywatch will let users replace the standard 3-D bars in a chart with any 3-D objects. When the chart is rotated, the 3-D objects, scaled to accurately reflect the chart data, will rotate in place.

Of course, having lots of OpenDoc parts doesn't do much good if there aren't any decent containers to embed them in. This problem, too, is slowly beginning to get resolved. Perhaps the most significant announcement is that ClarisWorks 5.0 will be an OpenDoc container.

New companies are also throwing their hats into the OpenDoc-container ring. Digital Harbor, for example, is building its new word-processing application, Wav, from the ground up as an OpenDoc container. WorldSoft will deliver the next version of its multilingual word processor, WorldWrite, as a container. Bare Bones Software has also said that a future version of the popular text editor BBEdit will be an OpenDoc container.

The long and the short of it: OpenDoc is on the move — finally. Get ready. / HENRY BORTMAN

### FUTURE TECH

## If Apple Builds It, Will They Come?

FIREWIRE IS COMING to the Mac's motherboard — whether the world is ready for it or not. That was the message Apple put forth, loud and clear, at its recent Worldwide Developers Conference. The question remains: Who's listening?

FireWire is Apple's name for the high-speed serial data-transfer technology it developed and that has since become known more prosaically as IEEE-1394. Current implementations are 100-, 200-, or 400-mbps (megabits per second), with an 800-mbps version under study and a 1,600-mbps version an unsupported promise — impressive when compared with Apple's current serial strategies but no match for the current leader in the storage-connection-scheme war, FC-AL (fibre channel-arbitrated loop). FC-AL currently maxes out at 100 MBps (megabytes per second), with 200-MBps and 400-MBps versions on the horizon.

FireWire was originally conceived as a multimedia-connectivity technology — and since it can

guarantee the *isochronous* (time-dependent) performance essential for digital video and sound, it's ideal for these applications. What's more, its ease of use and low cost make it ideal for consumer and prosumer digital imaging. We make storage-scheme comparisons only because of Apple's claims that FireWire will be its future storage-connectivity solution.

This is an odd decision. None of the major hard-drive manufacturers currently makes a FireWire-equipped hard drive — they're still busy wringing the last few megabytes per second out of SCSI and fighting the last skirmishes of the battle of SSA (serial storage architecture) versus FC-AL. Apple claims that storage vendors will be more than willing to provide FireWire-capable hard drives if and when Apple provides them with a market. Uh-huh. More information on FireWire can be found on MacUserWeb, <http://www.zdnet.com/macuser/>, beginning July 26. / RIK MYSLEWSKI



## NEW & NOTABLE

### HARDWARE

**CTX Opto EzPro.** It weighs just 9 pounds, 4 ounces and is less than 6 inches high, yet this LCD projector can fill an 80-inch (diagonal) screen with your presentation. \$6,495. 888-289-6786 or 408-541-6060.

**Apple LaserWriter 12/640.** This 600-x-600-dpi cross-platform monochrome laser printer can output postcards as well as legal-sized paper at 12 pages per minute — even on heavy-weight paper stock. \$1,689. 800-538-9696 or 408-996-1010.

**Multi-Tech MultiModemZDX.** Over clean telephone lines, this modem, with enhanced V.34 modulation, can achieve 33.6-kbps throughput. \$399. Multi-Tech Systems: 800-328-3500 or 612-785-3500; <http://www.multitech.com/>.

**APS 11.2.** You have more room for your files and applications with this 1.2-GB SCSI-2 internal hard drive for 500- and Duo-series PowerBooks. \$699. APS Technologies: 816-483-6100; <http://www.apstech.com/>.

▼ **MountainGate Stampede Ultra Array.** Either as an independent-drive SCSI-bus storage system or as a RAID system, this array stacks eight 3.5-inch removable drives, for a combined storage



capacity of up to 36 GB. \$7,500 and up. 800-556-0222 or 702-851-9393; <http://www.mountaingate.com/>.

**Truevision Targa 2000 RTX.** Process digital-video effects in real time and generate broadcast-quality video with this PCI board. This system also includes a rack-mountable breakout box with ports for analog-video and -audio input and output. \$10,995. 800-522-8783 or 408-562-4200; <http://www.truevision.com/>.

**Panasonic LF-J100A.** Access CD-ROM titles as well as rewritable 650-MB PD disks at 4x speeds with this 100-disk autochanger. \$9,995. Panasonic Computer Peripheral: 800-742-8086 or 201-348-7000. / CAROLYN BICKFORD

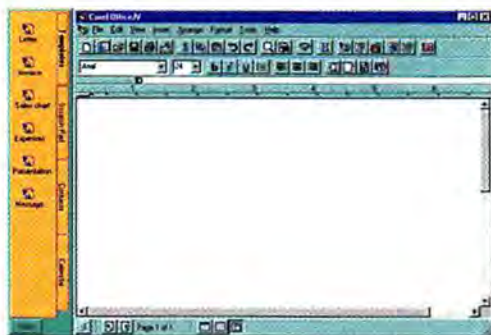
# Java May Give Your Mac a Windows Look

Lowest-common-denominator interface design may be coming.

TODAY'S WINDOWS-ONLY products will show up on your Mac next year, as developers start using platform-independent Java code to create applications. There's good and bad news about this inevitability: Applications that might otherwise never have come to the Mac may become available, but traditional Windows developers have little impetus to upgrade their products' interfaces for the Mac minority.

Corel Office for Java, a case in point, will finally bring Corel's business applications, including Corel Quattro Pro and Corel Chart, to the Mac platform in 1997. The applications will require a Java-enabled browser — although possibly only until a Java-savvy version of the Mac OS appears. The good news is that you will be able to update and extend Corel Office for Java's features easily with downloadable Java applets. In fact, the suite may end up analogous to an OpenDoc container-and-parts combination, since Corel intends to make Corel WordPerfect a document container, within which you can access the suite's other applications.

But don't expect Mac-specific features such as Apple events or OpenDoc components. Corel is lauding the new suite's interface consistency with its Windows products, and it's likely — although not yet definite — that the Windows version of



Because Java-based programs can run on any platform, they're freer to ignore nuances of the Mac interface.

Corel WordPerfect, not the Mac version, will be the model for Corel Office for Java's core application. Corel: 800-772-6735 or 613-728-3733; <http://www.corel.com/>. / CAROLYN BICKFORD

## Adobe Type Manager to Manage Type

THE NEXT INCARNATION of Adobe Type Manager — ATM Deluxe 4.0 — will finally earn its name when it ships later this summer: It will manage fonts in addition to managing font rasterizing and substitution. In fact, ATM's on-screen-type-display talents will improve in 4.0, with the addition of anti-aliasing.

But it's the font-management features of ATM Deluxe 4.0 that most distinguish this version from previous ones.

Like Suitcase, version 4.0 will find and list all available fonts on your system, both Type 1 and TrueType. It will also let users drag and drop fonts into sets that can be turned on and off. Unlike Suitcase, or even Master Juggler, when you open a document containing fonts that are on your hard disk but

aren't currently active, ATM will automatically activate them — very slick. And when you close the document, ATM will deactivate those fonts.

Adobe's Type Reunion will also receive an upgrade this summer. Type Reunion Deluxe 2.0 will offer three new features: It will allow users to modify font names on font menus; it will allow grouping of fonts into arbitrary sub-menus; and it will automatically place the names of recently



Adobe Type Manager (ATM) Deluxe 2.0 manages font libraries and provides improved on-screen display of type.

cently used fonts at the top of font menus.

Both ATM Deluxe 4.0 and Type Reunion Deluxe 2.0 will be PowerPC-native. ATM Deluxe 4.0 will retail for \$99.95, Type Reunion Deluxe 2.0 for \$60. 800-833-6687 or 415-961-4400; <http://www.adobe.com/>. / HENRY BORTMAN



## CLONE WATCH

# Cloning Gets Easier

IBM and Apple offer standardized motherboard designs.

DRAMATIC CHANGES are coming to the Mac-clone landscape. In June, IBM announced a major milestone: the availability of Long Trail, the first motherboard reference design based on the PowerPC Platform (née CHRP) specification, an open computer-system specification worked out jointly among Apple, IBM, and Motorola.

Apple has based the long-term success of its licensing strategy on the PowerPC Platform, but systems are unlikely to ship in any significant quantity this year — and when they do, they're likely to be midpriced or high-end. To fill the gap, Apple is developing a new entry-level licensable motherboard design, code-named Tanzania.

Tanzania will allow vendors to incorporate more standard parts — such as ATAPI CD-ROM drives,

IDE hard-disk drives, PS/2 keyboards and mice, and industry-standard ATI graphics controllers — than current Mac motherboard designs. What's more, Tanzania motherboards will fit into LPX enclosures, a standard for desktop PCs.

All this will make Tanzania an ideal platform on which to develop low-cost Mac OS systems. Apple itself has stated flatly that it will not ship any systems based on Tanzania. Power Computing, UMAX, and Motorola have all indicated an interest in the platform — not surprising, given that the new design will support 603e as well as 604e chips running at up to 200 MHz.

Don't look for these systems quite yet, though. Apple won't deliver its final Tanzania design kits to developers until summer's end. / HENRY BORTMAN

## Control Rowdy Plug-ins, Fonts

Pumped-up extensions manager headlines Now Utilities 6.5.

TAME YOUR FONTS and your ever growing plug-in collection while bringing warring extensions under control, with Now Startup Manager 7.0, which ships late this summer — both separately and as a part of Now Utilities 6.5. As before, this extensions manager allows you to test for conflicts, create various sets of startup files, and link interdependent extensions or change their loading order — however, now you'll also be able to apply the same control to fonts and third-party plug-ins, such as those for Netscape Navigator and Adobe Photoshop.

Other system enhancements in Now Utilities 6.5 get a face-lift as well. Now Super Boomerang, which still adds menus of recently opened files and folders to Open and Save dialog boxes, now lets you change the order of the files on the menus and, working with the free Now Mail Now Utilities plug-in, allows you to send a file from within an Open or Save dialog box to other Now Utilities users on your network. Closed folders, as well as open ones, turn into buttons when you drag them onto the Now Tabs bar. Now Utilities 6.5, \$99; Now Startup Manager 7.0, \$59. 800-689-9427 or 503-274-2810; <http://www.nowsoft.com/>. / CAROLYN BICKFORD



Put fonts and plug-ins under the same control as your extensions with Now Software's souped-up Now Startup Manager 7.0.

## XPress Yourself

PUBLISHING FOR THE WEB, automating QuarkXPress, and creating drop shadows are now easier, with new XTensions from Beyond Press, Street Logic Software, and a lowly apprentice production.

▼ **BEYOND PRESS.** Version 2.0 of the popular QuarkXPress HTML-conversion XTension from Astrobyte expands your options for preparing graphics for Web-readiness. Beyond Press 2.0 supports image cropping and scaling, duplicating the settings inside QuarkXPress; creates hot-linked image maps; and adds options for including background colors and tiles in final HTML documents. \$595. 888-278-7629 or 303-534-6344.



▼ **SCRIPTMASTER XT.** Find relief from tedious QuarkXPress tasks without having to resort to AppleScript by using ScriptMaster XT. This Street Logic Software XTension makes QuarkXPress recordable. Rather than having to type AppleScript commands to do your bidding, you can record your actions, using Apple's Script Editor application, and then repeat them with a simple double-click. \$249.

▼ **SHADOWCASTER.** Also turning 2.0 is the performance-enhanced drop-shadow tool from a lowly apprentice production. You can merge a shadow — of headline type, for example — into an underlying image. \$99. 619-438-5790.

Beyond Press 2.0, ScriptMaster XT, and ShadowCaster 2.0 are all available from XChange. 800-823-0553 or 303-229-9773. / HENRY BORTMAN

## Geek-Free Java

ACTION AND SOUND can energize your Web site, but until recently, adding them meant hacking out Java code or forcing your site's visitors to download browser plug-ins. Now two new Web authoring tools translate an animation you create within them into Java code you can simply drop into your Web page.

PowerProduction Software's WebBurst lets you draw or import an object and assign conditions, actions, and sounds to it by using buttons in the Action Controller palette. \$299. 310-937-4411; <http://www.powerproduction.com/>.

Dimension X's Liquid Motion, due to ship in late summer, also imports graphics and lets you add movement and sound, plus it lets you embed active links to other Web sites. However, you can use only one movement, action trigger, and sound per animation. \$149.99. 415-243-0900; <http://www.dimensionx.com/>. / CAROLYN BICKFORD



Animate your graphics and translate the result into Web-page-ready Java code with WebBurst, from PowerProduction.



## NEW & NOTABLE

### SOFTWARE

**PhoneDisc PowerFinder USA One.** Put all six discs of this unified database into a CD-ROM jukebox, and your workgroup can access 112 million residential and business telephone listings. \$239 and up, depending on number of users. Digital Directory Assistance: 800-284-8353 or 617-639-2900; <http://www.dda-inc.com/>.

**ZipZAPP Pro.** Find five-digit ZIP codes by town, or by street in larger cities, and calculate distances between towns with this CD-ROM. \$39. QwikINFO: 800-436-2111 or 603-298-8517.

**Great Proportions!** This proportion wheel can calculate enlargement or reduction percentages to let you easily and accurately resize documents. \$27. SGE Software: 516-424-7925.

▼ **SurfBoard.** Surf Web pages as easily as flipping channels on your TV with this bookmark



utility that looks like a TV remote and has its own sound effects. \$69. Abbott Systems: 800-552-9157 or 914-747-3116; <http://www.abbottsys.com/>.

**Computer Music: An Interactive Documentary.** With this exploratory disc, learn how modern musicians use their computers to create music in the studio and on-

stage. \$49.95. Digital Studios: 800-499-3322 or 408-688-3158; <http://www.cyberlearn.com/>.

**World Music Menu 2.0.** Select one of many non-Western scales, and World Music Menu 2.0 will map it to your Kurzweil, E-Mu Proteus, or later-model Yamaha MIDI keyboard. \$99. Free Play Productions: 310-459-8614; <http://www.freeplay.com/>.

**Words of Women: Quotations for Success.** Add a woman's opinion to your speech or essay with this database of 3,000 quotations from over 1,000 famous women. \$29.95. PowerDynamics Publishing: 800-966-3602 or 415-487-0165.

**Origins of Mankind.** Find out more about the way of life and the environment of our earliest ancestors with this CD-ROM exploration of human evolution. \$39.95. Maris: 800-336-2947 or 510-933-5630; <http://www.maris.com/>.

**U.S. News: Getting into College.** Take a quiz or sort through thorough data about admissions requirements, tuition, location, and student activities to find the right U.S. undergraduate institution. \$29.95. Creative Multimedia: 800-262-7668 or 503-241-4351; <http://www.creativemm.com/>. / CAROLYN BICKFORD

# Zippy New Midrange SyQuest Drive

Troubled storage company unveils stylish removable-cartridge drive.

TIMES ARE TOUGH for the former removable-storage king of the hill, SyQuest: bruising competition, layoffs, financial troubles, and product delays. Despite all this turmoil, however, SyQuest engineers have been busy — not only preparing the soon-to-be-released SyJET system, the hotly anticipated response to Iomega's Jaz, but also reinventing the company's midrange storage line.

The upcoming 1.3-GB SyJET system is clearly aimed at desktop-media professionals, but the new EZFlyer 230MB's prospective audience is less obvious. At a suggested retail price of \$299 (230-MB cartridges cost \$29 apiece; the EZFlyer also reads and writes \$19 EZ135 cartridges), it's half again as expensive as the current low-end-cartridge-drive leader, the Iomega Zip drive. Of course, its 230-MB cartridge holds a lot



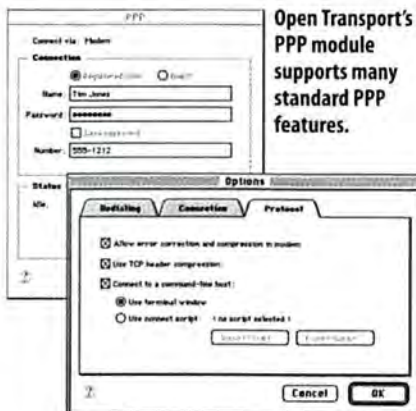
more than a 100-MB Zip cartridge, but it remains to be seen how many entry-level users need the EZFlyer's greater capacity and speed.

Small, lightweight, and sleekly designed, the EZFlyer provides style as well as simplicity in spades. Especially welcome is its drag-the-icon-to-the-Trash-and-the-cartridge-pops-out-of-the-drive ease of use — a big improvement over previous SyQuest cartridge-removal techniques.

Despite its solid design, however, the EZFlyer 230MB faces an uncertain future: It's neither a high-end nor an entry-level system, and the middle of any product line provides the opportunity for great success or dismal failure. To use an automotive analogy, the EZFlyer could be either SyQuest's Taurus — or its Edsel. / RIK MYSLAWSKI

## ARA & OT Go PPP ASAP

THE LATEST SIGN that Apple sees the wisdom of conforming to industry standards is its decision to move Open Transport (OT) and ARA to the PPP (Point to Point Protocol) serial-communication standard. PPP is the dominant protocol in dial-up ISDN and Internet access, and it also takes advantage of modem compression, thereby considerably improving data-transfer speed. PPP makes its first appearance in Open Transport, scheduled for a bug-fix release this summer. OT 1.1.1 will also add a PPP module that looks like the current ARA client software. Although not yet ready for PPP, ARA 2.1, also due this summer, will add CCL files for ISDN terminal adapters and high-speed modems.



Open Transport's PPP module supports many standard PPP features.

In the first quarter of 1997, Open Transport 1.5 will add support for AppleTalk over PPP, full scripting capability, and multihoming and multinode support for AppleTalk and TCP/IP. Next year promises more ARA developments: PPP will be integrated into ARA 3.0, which will include client software that supports AppleTalk and TCP/IP over PPP. Product managers also promise a version of ARA that will be integrated into Mac OS 8. / SHELLY BRISBIN

## ISDN Made Easy

THE END OF ISDN HASSLES: That's the promise of the RNS DataShuttle one- and two-port PCI, NuBus, and LC-PDS ISDN adapters (\$995 to \$1,395). The cards, developed by Hermstedt, of Mannheim, Germany, each include an onboard processor that allows background ISDN transfers, along with an efficient bandwidth-utilization scheme and automatic coordination with incoming calls.

EasyISDN software automatically conforms each adapter to your local ISDN type, and FileMover-Pro software simplifies file transfer. Each card is compatible with professional ISDN-management software from 4Sight and Luminous. A V.32 data/fax-modem daughtercard (\$500) and an Internet-Access Kit (\$239) are also available. RNS: 805-968-4262; <http://www.rns.com/>. / RIK MYSLAWSKI



## NET.CETERA

# Download the Future Today

Apple offers free work-in-progress versions of new Internet applications.

IT TOOK A WHILE, but the folks at Apple have finally learned what some Internet-savvy companies have known all along: Net surfers are willing to test new applications for free in return for the privilege of test-driving tomorrow's software today. In return, they'll track down bugs and provide important feedback — before version 1.0 is ever released. Although several of its latest Internet-savvy apps aren't quite ready for prime time, Apple has decided to make them available for downloading, free, from its Web site.

**APPLE E.G.** This CGI (Common Gateway Interface) for WebSTAR and other Mac Web servers lets surfers perform full-text searches of files on your site. It uses the high-performance V-Twin search engine that will be integrated into Mac OS 8's Find function. Most intriguing is its "find by example" feature, which finds files similar to those requested. <http://cybertech.apple.com/Appleg.html>.

**NETFINDER.** Another Web-server CGI, Net-Finder lets you serve files on the Web via an interface that looks like the Finder, complete with icons, size information, and even modification dates.



Project X lets you fly through a 3-D representation of 100,000 Web sites.

<http://cybertech.apple.com/AppleNetFinder.html>.

**PROJECT X.** A product from Apple's Advanced Technology Group, this navigation utility displays Web pages as icons floating in a three-dimensional space. You can zoom in and out and pan around within the space until you find a page you're interested in. Double-clicking on that page's icon causes it to be loaded into Netscape Navigator. <http://www.atg.apple.com/go/projectx/default.html>.

**MKLINUX.** A project from Apple and the Open Software Foundation to bring Linux, a free version of UNIX, to the Power Mac has also been turned loose on the world in an early form. Currently MkLinux runs only on NuBus-based Power Macs, although it will run on other Power Mac models in the future. If you have MkLinux installed, a dialog box appears when you boot your Mac, allowing you to choose whether to load the Mac OS or MkLinux. <http://mklinux.apple.com/>. / JASON SNELL

## New Tools Plug Mac Developers into the Web

It's now simpler than ever to create software that makes a trip to the Web easy and entertaining.

**BBEDIT 4.0.** This long-standing favorite of HTML coders now supports Java and color and includes script-based glossaries that automate HTML creation. \$119. Bare Bones Software: 617-676-0650; <http://www.barebones.com/>.

**FORTÉ WEB SDK.** Serious intranet developers will want this add-on to Forté's application-development environment. Web SDK (Software Developer's Kit) allows developers to call a Web browser from within a Forté application. It also includes HTML class libraries that support browser-based requests — such as formatted SQL queries — to the main application. Site license, \$20,000. 510-869-3400; <http://www.forte.com/>.

**APPWARE CGI AND WEB COMPONENTS.** These tools are designed to let developers add TCP/IP access, security, dynamic HTML, and other Internet capabilities to AppWare applications. Other components let you use AppWare to build OpenDoc parts and Netscape plug-ins. Pricing has not been announced. Network Multimedia: 801-261-8232; <http://www.networkmultimedia.com/>.

**ENTRADA!** This client/server-application builder allows developers to create Net-enabled database front ends. Entrada! Developer (\$1,496) supports ODBC, DAL, and Butler databases, whereas Entrada! Corporate (\$2,496) works with various SQL schemes. Pictorius: 800-927-4847 or 902-492-2880; <http://www.pictorius.com/>.

**CYBERAGENTS.** Now all you dedicated, never-say-die Smalltalk coders can easily build CGIs, with this object-oriented development environment

from Quasar Knowledge Systems. Price not determined at press time. 800-296-1339 or 415-728-5333; <http://www.qks.com/>. / SHELLY BRISBIN

## The Geek Beat

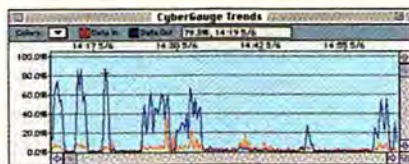
**INTERNET.** ACI US has bundled 4th Dimension and 4D Insider with four third-party tools, so 4D users can bring their databases to the Web. The bundle, 4D Web SmartServer, lets Webmasters serve databases on the Web, either directly or through Web server software. \$1,169. 800-881-3466 or 408-252-4444; <http://www.acius.com/>. A set of connectivity tools from Apple, called Newton Internet Enabler, gives developers access to standard protocols for use in creating Newton apps. The kit is free for registered Newton developers. <http://dev.info.apple.com/newton/newtondev.html>.

**NETWORK MANAGEMENT.** Neon Software's CyberGauge software monitors networked SNMP devices to discover their true throughput and bandwidth utilization. The company is marketing the product specifically to Webmasters seeking information about their servers' performance. \$139. 800-334-

6366 or 510-283-9771; <http://www.neon.com/>. EtherPeek 3.0 (\$995), from The AG Group, performs automatic IP-name resolution and supports Fast Ethernet and scriptability. 800-466-2447 or 510-937-7900; <http://www.aggroup.com/>.

**TELECOMMUNICATIONS.** Good news for telecom speed junkies: Aware is shipping ADSL (asymmetrical digital subscriber line) transceivers in small quantities, mostly to telephone companies. \$2,500. 617-276-4000; <http://www.aware.com/>.

**DEVELOPMENT TOOLS.** Apple has released version 20 of Apple ETO (Essential Tools Objects), a set of object-oriented tools for creating and debugging Mac OS software. The price has been reduced to \$195. 800-282-2732 or 716-871-6555. MacApp programs can be ported to several UNIX environments with the Latitude Cross-Platform Development Kit. Development takes place on the UNIX system. \$10,000 per UNIX platform. 415-691-4080; <http://www.latgroup.com/>. TWIN API lets Windows developers port their software to the Mac and other platforms. \$80 to \$250 per year. Willows Software. 408-777-1820; <http://www.willows.com/>. Key-Span's Smart Serial 6 SDK contains tools that allow developers to rewrite NuBus-communications drivers for compatibility with PCI. \$1,500. 510-222-0131; [keysan@aol.com](mailto:keysan@aol.com). / SHELLY BRISBIN





## NEW & NOTABLE

### RESOURCES

**PowerPac 1.** This utility collection comprises 12 Photoshop plug-ins that provide thousands of preprogrammed special effects for distressing type, saturating color, embossing images, and much more. \$199. Auto F/X: 800-839-2008 or 603-875-4400.

**Antique Maps CD.** This disc contains 100 Photo CD-format cartographic images, ranging from 17th-century diagrams of the heavens to mid-19th-century maps of cities, countries, and continents. \$79. Planet Art, distributed by Image Club Graphics: 800-661-9410.

▼ **Antique Maps of the World: 1531–1680** and **Antique Celestial Maps.** The maps in this treasure chest of Renaissance cartography can be used



in their entirety as backgrounds; selected details can serve as spot art. Each disc contains twenty-four 300-dpi images. \$169 per volume. Visual Language Library, distributed by Image Club Graphics: 800-661-9410.

**Initial Caps III.** This CD-ROM contains six new sets of hand-drawn illuminated letters, in both CMYK color and grayscale and in Adobe Illustrator and Macromedia FreeHand EPS formats. \$99. Aridi Computer Graphics: 800-755-6441 or 214-404-9171.

**The End of Print: The Graphic Design of David Carson.** Carson is a driving force behind the upheaval in contemporary graphic design and typography. This book, the first collection of his work, contains more than 350 color images. \$24.95. Chronicle Books: 800-722-6657 or 415-777-7240.

**Beyond The Mac Is Not a Typewriter.** Robin Williams' latest book is packed with tips on tweaking your type to maximize its impact, such as advice on choosing the right typeface to fit your message and techniques for increasing legibility. \$16.95. Peachpit Press: 800-283-9444 or 510-548-4393.

**HTML: The Definitive Guide.** Take advantage of some of the latest HTML features and Netscape plug-ins with this hands-on guidebook on creating Web pages. \$27.95. O'Reilly & Associates: 800-998-9938 or 707-829-0515. / HENRY BORTMAN AND CAROLYN BICKFORD

# Idiotproof Imaging

## Low-cost, point-and-shoot digital cameras from Kodak and Epson.

IT DIDN'T TAKE LONG for digital cameras to migrate from the rarified air of professional photography down to the point-and-shoot simplicity — and affordability — required for mass-market acceptance.

Kodak's new low-cost, pint-sized offering is the Digital Science DC20 — sadly, though, the DC in its name might very well stand for *don't cheer* (see review in this issue). Epson's entry, the PhotoPC for Mac (shown), is more promising.

Weighing in at less than a pound, the PhotoPC for Mac runs on four AA batteries, is in focus from 2 feet to infinity, and accepts standard camcorder lenses and filters. With automatic-

electronic-shutter speeds of  $1/30$  to  $1/10,000$  second, it automatically converts 24-bit-color images into JPEG format and stores either sixteen 640-x-480-pixel or thirty-two 320-x-240-pixel images in 1 MB

of flash memory — optional memory modules can quintuple storage capacity. Images are downloaded into your Mac over a serial cable (included); you can then retouch them, using Storm Software's EasyPhoto Mac software, which is included. You can also access the images by using a

bundled Photoshop plug-in. \$499. Epson, 800-463-7766 or 310-782-0770; <http://www.epson.com/>.

/ RIK MYSLEWSKI



## Keeping a Close Eye on the Lil' Darlings

BIG BROTHER WOULD LOVE the new Apple Network Administrator Toolkit — especially its Network Assistant feature, with which (if you're a teacher who needs to keep close tabs on your charges) you can observe the screen of every Mac in a school. As Network Assistant cycles through four screens at a time in a tiled montage, you can zoom in to any screen to check, for example, whether Johnny is downloading files from alt.binaries.pictures.unspeakable when he should be drilling phonics with Reader Rabbit.

Network Assistant works the other way around as well: You can make your screen appear on the

monitor of every Mac in the classroom. Although you can't collaborate with your students on the same documents in real time, you can delete or update files on any Mac to which you're connected.

Network Assistant's screen-sharing and observation features require an Ethernet connection — a luxury for school districts that have a hard time equipping an entire classroom with Macs. The Apple Network Administrator Toolkit also includes the Finder-restriction program At Ease 4.0 for Workgroups. 10-user pack, \$599. Apple Computer: 800-293-6617 or 408-727-8227; <http://www.claris.com/> or <http://www.apple.com/>. / CAROLYN BICKFORD

### THE OFF BEAT

## Snorkle Not Included

IF YOU THINK David Hasselhoff looks good in his wet suit, just wait until you slip your CD-ROMs into a Kensington CD Wetsuit. Even if you don't intend to take your multimedia discs scuba diving, Kensington CD Wetsuits offer an easy way to carry and organize them. Kensington Microware recently improved these stretch-neoprene beauties — available in black, blue, or purple — so that they hold more discs than before, up to 36. The best feature, though, is one the Wetsuit has always had: It's ultracompact, since the neoprene fits snugly around however many discs you choose to zip inside. Prices range from \$10 to \$20, depending on the number of CD sleeves. 800-535-4242 or 415-572-2700. / CHUCK PETERSON





# Playtime for Pippin

Developers will dictate if Pippin becomes the information appliance of the future or remains an expensive toy.

FUN TIMES WILL BE HAD — both playing games and surfing the Net — when Bandai's \$599 Pippin-based @World ships in September, and when the promised Apple-brand version appears. Problem is, you can have the same fun today with a \$400 Sega Saturn NetLink.

The @World (shown) includes a game controller, a keyboard, an external modem, and an Internet-access CD-ROM that supplies unlimited access to the Web, e-mail, and newsgroups for \$24.95 a month. Entertainment



titles under development include adventure games such as Presto Studio's Gundam and Pegasus Prime and Cyberflix's Lunicus, Jump Raven, Dust, and Titanic. Family-oriented titles include Hasbro's Mr. Potato Head, Othello, and Risk and DigiToy's Mug-o-Matic (a face-compositing toy), Movieoke (dialog-karaoke for classic film clips), and Bandai Cine-Noir (clips from film noir that you can reassemble into a new movie).

Several enhanced CDs will also be available, and Bandai may sell Online Trading Cards that automatically update sports statistics from an Internet database. Bandai predicts that an electronic encyclopedia, musical-instrument instruction programs, and CD-ROM magazines will appear for the

Pippin platform soon. Vertical-software developers are planning to make full use of the @World's Mac-like capabilities. For example, Intercare plans to use @Worlds to exchange physiological information remotely with diabetics and to interface with medical devices such as glucose meters.

For most users, however, the @World's immediate future is as a toy — and one that's more expensive than its game-system competition. For example, no developers have yet announced plans for consumer-oriented productivity applications such as an electronic checkbook or meal planner. One reason may be that such applications may require options such as extra RAM or a planned floppy drive/docking station that will connect a printer, a hard drive, or — as Apple's European Pippin licensee, Katz, has reported — an Iomega Zip drive.

More muscle may be coming, however: Sources at Bandai say the company is investigating FireWire, a 3-D-graphics engine, MPEG support, and a DVD drive — but will add them only if it can keep prices low. Bandai Digital Entertainment: 310-404-1600; <http://www.bdec.com/>. Apple: 800-263-3394 or 408-996-1010; <http://www.apple.com/>. / CAROLYN BICKFORD

## MACINTOSH PRICE INDEX

THE UNITED COMPUTER EXCHANGE index reflects average sales prices of new and used Macs as of June 3, 1996. Prices (other than those for compact models, Performas, and LCs) do not include a monitor or a keyboard. The United Computer Exchange is a national clearinghouse of used microcomputer equipment.

| MAC MODEL                                    | NEW     | USED    |
|--|---------|---------|
| Classic II (4/40)                            | •       | \$250   |
| LC III (4/80)                                | •       | \$300   |
| Performa 5215CD (8/1GB)                      | \$1,699 | \$1,300 |
| Performa 6220CD (16/1GB)                     | •       | \$1,450 |
| IIx (5/80)                                   | •       | \$225   |
| IIci (4/80)                                  | •       | \$325   |
| IIfx (4/80)                                  | •       | \$400   |
| Quadra 610 (8/160)                           | •       | \$475   |
| Quadra 630 (4/250)                           | •       | \$500   |
| Quadra 650 (8/230)                           | •       | \$700   |
| Quadra 800 (8/230)                           | •       | \$850   |
| Quadra 840AV (8/230/CD)                      | •       | \$1,150 |
| Quadra 950 (8/230)                           | •       | \$1,100 |
| Power Mac 6100/66 (8/350/CD)                 | •       | \$700   |
| Power Mac 7100/80 (8/700/CD)                 | •       | \$1,150 |
| Power Mac 7200/90 (8/500/CD)                 | •       | \$1,250 |
| Power Mac 8100/100 (16/1GB/CD)               | •       | \$1,650 |
| Power Mac 8500/120 (16/2GB/CD)               | •       | \$2,850 |
| Power Mac 9500/132 (16/2GB)                  | •       | \$3,000 |
| PowerBook 165c (4/80)                        | •       | \$850   |
| PowerBook 180 (4/120)                        | •       | \$850   |
| PowerBook 190cs (8/500)                      | \$1,499 | \$1,200 |
| PowerBook 540c (4/320)                       | •       | \$1,500 |
| PowerBook 5300cs (8/500)                     | \$2,499 | \$1,700 |
| Duo 250 (4/200)                              | •       | \$800   |
| Duo 280c (4/320)                             | •       | \$1,450 |
| Duo 2300c (8/750)                            | \$2,999 | \$2,400 |
| Power Computing Power 100 (16/1GB/CD)        | •       | \$1,150 |
| Power Computing PowerWave 604/150 (8/1GB/CD) | \$3,299 | \$2,500 |

\* = discontinued model

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

## Cocoa Helps Animate Web

WATCH OUT: Hamburger-eating alligators, mischievous squirrels, and a myriad of Pac-Man spoofs will run wild on the Web — all in the name of education — if Apple's kid-targeted simulation builder, Cocoa, catches on. Cocoa can record the actions and reactions of characters as you move them, or you can use a simple conditional-example graphical programming system to build an animation that can either be saved locally or as a Web page.

The price has not been set but should be less than \$100 when Cocoa ships later this year. Public beta versions were expected to be available at [http://www.atg.apple.com/Allen\\_Cypher/Cocoa/](http://www.atg.apple.com/Allen_Cypher/Cocoa/) this summer. Apple Computer: 800-462-4396 or 408-996-1010. / CAROLYN BICKFORD

## CD-ROMS

### Riches, Beaches, and Booze

WHETHER YOU'RE LIVING the good life or just aspiring to it, there's a CD-ROM for you.

**BEST BEACHES OF THE CARIBBEAN.** Bored with Bermuda? Tired of Trinidad? The photographs in this overview of 70 Caribbean beaches may inspire you to jet off to Jamaica this year instead. But don't toss away your tour book: This disc is decidedly on the light side — for example, its glossary defines *sand* and *beach*. \$19.95. ARC Media: 415-410-4429.

**LIFESTYLE PHOTO CD.** ▶ If your Hasselblad camera was stolen while you were snorkeling off the coast of Aruba, you can still create the illusion of an opulent vacation with these lush stock photographs of gourmet food, tropical settings, and white folks lounging around in expensive-looking resorts. \$179.99. C&L Digital: 415-981-3424.

**CHIVAS REGAL'S CAREER TOOLBOX.** Those of us who can't afford St. Barts this winter will have to drown our sorrows — er, develop ourselves professionally — with this CD-ROM's career, business, and money-management tips, supplemented with interactive tests and a demo version of an electronic calendar. It's free (except for Californians, who have to pony up \$1.20) to adults of legal drinking age who don't mind whiskey ads along with their business advice. Shipping and handling is \$4.95. Chivas Regal: 800-244-8271; <http://www.careertoolbox.com/>. / CAROLYN BICKFORD





# ONLINE

## HEARD ON THE NET

'When filling out your driver's license application, you give your IP address.'

— from "Top 10 Signs You're an Internet Addict," circulating on the Net.

## Hello, Internet Operator?

THE PHONE COMPANIES want the FCC to ban it, so why not give Internet telephony a whirl? Don't expect to be able to hear the sound of a pin dropping — this technology is still in its infancy.

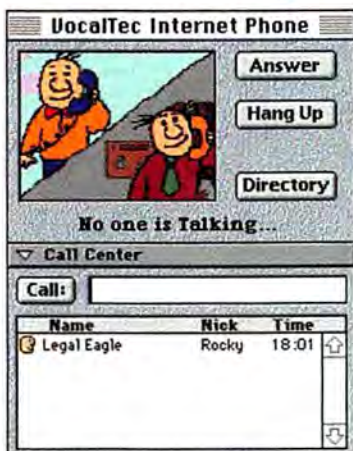


Charley Kline and Eric Scouten's free **Maven** is an audioconferencing tool that can be coupled with CU-SeeMe, a popular freeware videoconferencing tool, or used all by itself. It allows Macintosh users to commu-

nicate with Macintosh, Windows, or UNIX users who also use Maven. It requires an Internet connection, at least 4 MB of RAM, System 7, and a 14.4-kbps or faster modem (a 28.8-kbps modem is highly recommended).



The \$59 **NetPhone**, from Electric Magic (<http://www.emagic.com/>), was designed especially for use with 14.4-kbps modems. It supports the UNIX vat audio standard and hooks into Netscape Navigator via URLs beginning with `netphone://`. It requires at least a 20-MHz 68030-based machine, System 7,



Sound Manager 3.x, MacTCP, an Internet connection, and a microphone.



The \$49.95 **Internet Phone**, from Vocaltec

(<http://www.vocaltec.com/mac/web/mac.htm>), wins the prize for the coolest user interface, complete with animations showing you the old-fashioned equivalent of your digital phone call. Windows and Mac users can communicate, and links to "chat rooms" are provided, so you

can test the software right away. It requires 12 MB of RAM, System 7.5.1 or later (System 7.5.3 recommended), Apple's PlainTalk microphone, MacTCP 2.0.6 or Open Transport 1.1, PPP 2.5 or direct Internet connection, 14.4-kbps or faster modem, QuickTime 2.0, and Sound Manager 3.1. / JODI NAAS

## MACUSER UTILITY OF THE MONTH

## Know Your Web from Your Wozniak



MESS WITH YOUR HEAD with this month's utility, **You Don't Know Mac\***. Inspired by Berkeley Systems' and Jellyvision's Eddy Award-winning trivia CD-ROM, this game will test just how much you know about the computer for the rest of us. When you hear of a DA, do you think of Suitcase or Marcia Clark? Which Mac was the *original* Fat Mac? Why was Carl Sagan mocked by Apple insiders? If you have no clue, get online and download the first game **MacUser** has ever produced. Get stumped by over

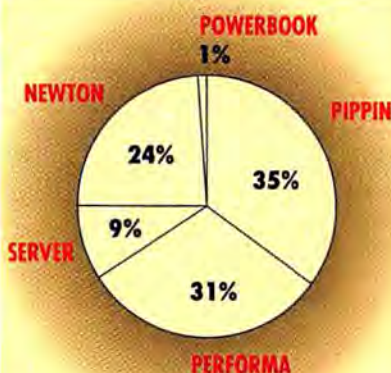
1,500 questions compiled by the editors of **MacUser** and **MacWEEK**. Try it out, and see just how DIMM you really are.

Created by Darryl Payne, **MacUser's** You Don't Know Mac is available exclusively from ZD Net on CompuServe (GO ZMC:MACUSER), on the Web at (<http://www.zdnet.com/macuser/>), and in our newly launched area on America Online (keyword: **MacUser**). Look for it July 30. / SCOTT LOVE

\*Used with permission from Jellyvision, designer of the You Don't Know Jack trivia game.

## ONLINE POLL

**Q.** If you had to force Apple to stop development of one of its products, which one of these would you drop?



To participate in **MacUser's** online polls, go to <http://www.zdnet.com/macuser/poll.html>.

## MACUSER ONLINE-EVENT CALENDAR

| DATE      | TIME       | EVENT                                |
|-----------|------------|--------------------------------------|
| August 6  | 9 P.M. EST | Henry Bortman: Mac OS 8              |
| August 9  | 4 P.M. EST | Mac Expo Roundtable                  |
| August 20 | 9 P.M. EST | Help Folder with Bob and Chris       |
| August 27 | 9 P.M. EST | Mac the Knife: <b>MacWEEK</b> scoops |

All events will take place on America Online at keyword ROTUNDA. Times and guests are subject to change. For up-to-date event information, check out <http://www.zdnet.com/zdi/talk/talkcal.html>.

## MACUSER ONLINE

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**AOL:** keyword **MACUSER**

**CompuServe:** GO

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1 Visit [www.atlantic-records.com](http://www.atlantic-records.com)  
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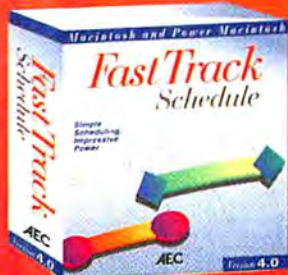
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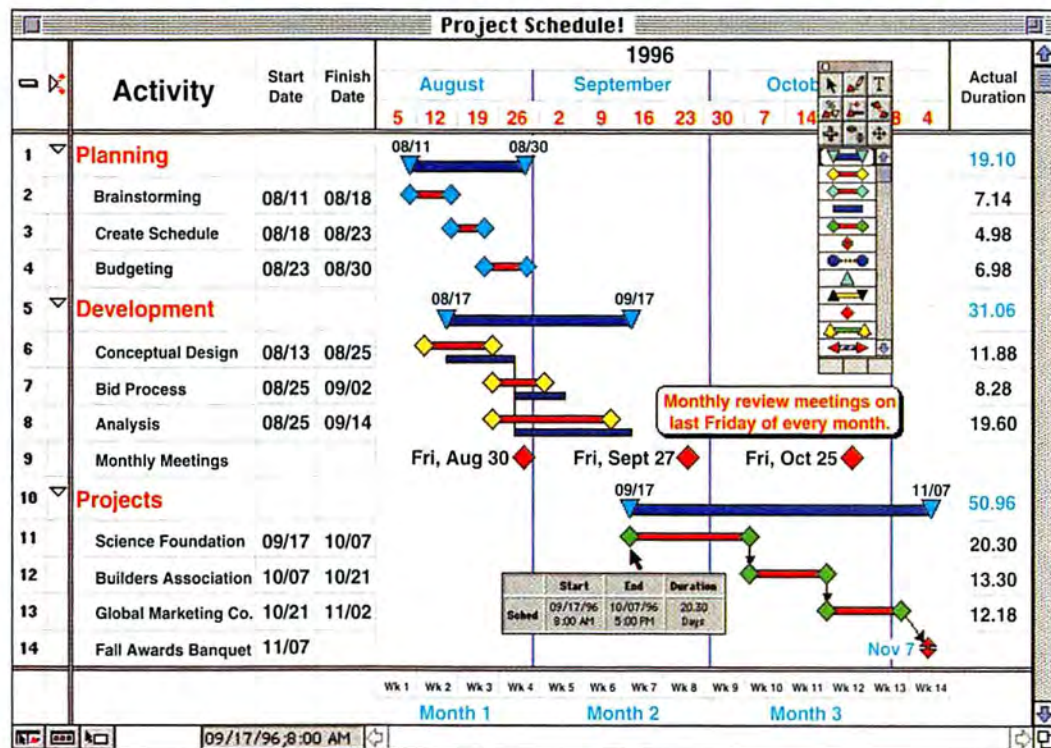


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# MacWEEK **REPORT**

*MacUser's Inside Track to Macintosh News*

## Apple COO Landi puts profits first

By Rick LePage and David Morgenstern

Saying that "the glory is not in selling the Macintosh; the glory is in profit," new Apple Chief Operating Officer Marco Landi last month laid out his rules of order for returning Apple to stability and profitability.

Landi's remarks at PC Expo in New York described his expectations for Apple's current organization. Landi was appointed COO recently to implement the ambitious restructuring plan unveiled by CEO Gilbert Amelio at the Apple Worldwide Developers Conference in San Jose, Calif.

Under that plan, Apple reorganized into four main profit-and-loss centers under new leaders: Macintosh, Frederick Forsyth; Servers and Alternate Platforms, Howard Lee; Information Appliances, James Groff; and Imaging, which is being run by Maury Austin and Tom Mager while Landi searches for a new general manager. Claris Corp. of Santa Clara, Calif. remains an independent operating unit that also reports to Landi.

Under the new organization, the heads of each hardware division are responsible for everything from product development and planning to marketing and human resources,



Landi said. Each group's success will be assessed by looking at the bottom line.

"I cannot measure by any other method than profit," Landi said.

Measurability and accountability were the key themes of Landi's talk, specifically in the context of the many mistakes he said Apple made in the past few years, including poor product focus and forecasting shortfalls. Landi placed most of the blame on the old structure's confusing lines of command, which didn't give product managers the wherewithal to make decisions quickly.

He said Apple had "restructured the business units to have all of the function they need to make quick decisions."

The new structure will help Apple evaluate its return on investment for the R&D, production and marketing costs of new products. Taking aim at Apple's chief systems competitor, he added, "The Mac division will be able to compete in the same field as Compaq." □

## NC coalition frames plans for Net boxes

By James Staten

Apple last month joined a group of industry leaders in sponsoring the Network Computer Reference Profile 1, a specification for low-cost devices that can access the Internet.

The partners, including IBM Corp., Netscape Communications Corp., Oracle Corp. and Sun Microsystems Inc., said the final specification is expected by August.

Joining an increasingly competitive new product category, the Network Computer (NC) profile will not mandate a particular hardware platform. Instead, the standard will provide a minimal set of capabilities and supported protocols.

According to CEO Gilbert Amelio, Apple's first NC, due to ship this year, will be a version of its Pippin. "It will be kind of a Pippin Plus," he said. In 1997 Apple will follow up with NC devices based on the Mac OS, Newton and future technologies, Amelio said.

In addition, Bandai Digital Entertainment Corp. of La Mirada, Calif., last month unveiled the Pippin @World, which meets nearly all the NC specifications and will likely carry the NC moniker when it ships in September, the company said.

Fall release dates should give Apple and Bandai an edge in this category; IBM of Armonk, N.Y., said it will ship NC devices before the end of the year and is currently testing several prototypes based on the PowerPC processor, but none of the other manufacturers supporting the NC specification have set 1996 U.S. delivery dates.

All NC devices must support a variety of Internet and networking standards, including HTTP (Hypertext Transport Protocol), FTP and SNMP (Simple Network Management Protocol). Security and network startup protocols are also listed in the specification but are not required.

In addition to the companies above, more than 30 others endorsed the guidelines, including Adobe Systems Inc., Corel Corp., Digital Equipment Corp., Macromedia Inc., MasterCard Corp., Motorola Inc., NEC Corp. and Visa International Inc. □

## Mac is top media box

By Leander Kahney

Macs continue to be the world's best-selling multimedia computers, according to a recent survey.

But despite selling 67 percent more multimedia machines than it did in 1994, Apple still managed to lose market share in 1995. The reason: Apple isn't growing as fast as the multimedia computer market.

According to a survey from Dataquest Inc. of San Jose, Calif., 1995 was the third consecutive year Apple outsold its rivals.

Apple shipped nearly 4 million multimedia computers, worth almost 19 percent of the total market, and nearly a million more machines than its closest competitor, Packard

Bell Electronics Inc. of Sacramento, Calif.

However, the worldwide market for multimedia computers more than doubled in 1995, exploding from 10 million units sold in 1994 to more than 20 million.

In terms of market share, the survey said, Apple slipped from owning 22.9 percent of the worldwide market to 18.8 percent, losing 4.1 percent of its share. The big gainer was NEC Corp. of Tokyo, whose market share grew nearly four percentage points from 1994.

Bruce Ryon, Dataquest principal analyst, multimedia worldwide, predicted Apple may lose a little more market share in 1996 but will still dominate with about 15 percent to 20 percent. □



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## Mac servers to board TCP/IP

By James Staten

AppleShare will soon serve much more than its usual AppleTalk fare. Sources said a major overhaul in the works for the Mac-based file server will turn it into an Internet platform with OpenDoc-based administration.

The new version, code-named FutureShare and expected to ship this fall, will deliver many types of data via the Web's HTTP as well as SMTP, Point-to-Point Protocol 3 and FTP. According to sources, FutureShare will be able to deliver its core AFP onto TCP/IP networks. This change will allow non-Mac users access to Mac files and folders via FTP without special client software.

In general, FutureShare will function over both AppleTalk and TCP/IP and will be optimized for the Mac OS' new networking architecture, Open Transport. Sources said the server software will be fully Power Mac-native and have a new caching architecture.

The new server reportedly will feature an administration interface built in OpenDoc. Called OpenAdmin, the new server-management console will provide components for configuring and maintaining FutureShare. Third-party developers will be able to add components to OpenAdmin and replace its built-in functions with their own OpenDoc parts.

Sources said OpenAdmin will provide many of the features found in the Apple Network Administration Toolkit, which was due to ship in June. OpenAdmin was originally scheduled for a later version of AppleShare but has progressed to the point that it will likely arrive with the FutureShare release.

While final testing has not been done, sources said FutureShare should be significantly faster than the current AppleShare, thanks to the use of TCP/IP for file service.

"What will really give it a boost is when the Mac file system becomes native in Copland," one source said.

Apple has not settled on pricing for FutureShare or decided whether to keep the AppleShare name.

AppleShare is sold only with Apple Workgroup Server hardware. Apple also includes Quarterdeck Corp.'s WebStar server with Workgroup Server machines in the Apple Internet Server Solution. Sources speculated that FutureShare, with its new Internet capabilities, could bump WebStar out of its premier position in the Apple bundle. Quarterdeck of Marina Del Rey, Calif., could not be reached for comment.

Apple declined to comment. □

## IBM PPCP prototype runs Win NT, Mac OS

By David Morgenstern

PC Expo attendees were offered proof last month in New York that the forthcoming PowerPC Platform is not all smoke and mirrors. In a booth co-sponsored by the PowerPC partners — Apple, IBM Corp. and Motorola Inc. — a prototype hardware system started up both the Mac OS and Microsoft Win NT.

Based on an IBM prototype, code-named Moccasin, the system ran a 133-MHz PowerPC 604 processor. It used an Intel-standard PC keyboard and two-button mouse. Hitting the On button presented users with a choice of operating systems as well as configuration options, such as adding another OS to the mix.

The demonstration ran an unreleased version of System 7.5.3, code-named Bloom County, that has been altered to work on PPCP machines. The OS-in-progress included CHRP System Enabler 1.0. The demo featured several Mac applications, including Claris FileMaker Pro and Adobe Photoshop.

IBM also showed Long Trail, its first-generation PPCP licensing design. The final version of the logic board will be available in late August, the company said. IBM and Motorola said the PPCP version of the Mac OS is expected to arrive at the same time as complete systems — by the end of 1996 or early 1997.

According to David Ryan, Essex Junction,

Vt.-based product line marketing manager with IBM Microelectronics Division, Long Trail will let developers pick between the processor daughtercard design used with many PCI Power Macs and the pin-grid array processor packaging used for many Intel-standard PC clones. The Long Trail system shown offered both PC and Mac I/O, unlike previous prototype boards that had the Mac I/O on a separate add-in card. Ryan said clone vendors expected most users to run the Mac OS, so it was more cost-effective to put ADB and Fast SCSI-2 ports on the logic board.

Mark Ireland, hardware products program manager with IBM Microelectronics, said most clone vendors will differentiate systems with variations of Mac and PC I/O. For example, manufacturers could add chips to the logic board to support Universal Serial Bus or FireWire peripherals.

In related news, Motorola said the PowerPC partners will smooth the process for PPCP certification. Instead of requiring testing for desktop models with all the PPCP OSes, clone vendors will be able to pick two. Server vendors need only qualify one OS.

According to Ryan, PPCP systems will cost less to produce than current PC clones. He also said PC-clone developers are interested in the continued brand loyalty of Mac users, the growing size of the Mac market and the advanced level of Mac technology.

"We're having to do some education on the Mac market," Ryan said. "People out in the PC world are surprised at the technology and the advanced state of the platform." □

## Apple predicts more losses

By Marty Cortinas

Apple's road to recovery doesn't look to get smoother any time soon. The company's recent filing with the U.S. Securities and Exchange Commission predicts more losses, sluggish sales and no dividends.

Apple's second-quarter filing revealed that the May recall and repair program for PowerBook and Performa models cost the company \$60 million. The program, which continues to delay sales of these machines, also contributed to a \$369 million backlog of orders by May 2, up from \$365 million by Feb. 2. Without the recall, the overall backlog would have been \$220 million, according to Apple.

In the SEC filing, dated May 13, Apple said it expects to post operating losses for the rest of 1996. It also predicted that net sales will remain below year-ago levels through the first quarter of 1997. These predictions are consistent with statements made by company officials when Apple announced its \$740 million loss in the second quarter.

Gross profit margins for the second quarter fell to 9 percent, and Apple said that it expects margins to remain under pressure through at least the third quarter of 1996.

The company also warned investors that it did not expect to resume dividend payments "for the foreseeable future." □



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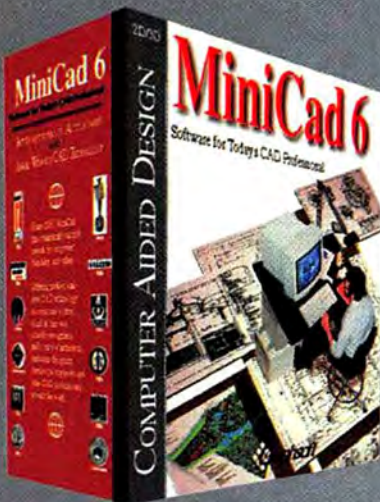
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# REVIEWS

## Mac OS Systems

|  |                    |
|--|--------------------|
| <b>PowerTower Pro 180</b>                      | ★★★★★ <sup>1</sup> |
| <b>PowerTower Pro 200</b>                      | ★★★★★ <sup>1</sup> |
| <b>PowerTower Pro 225</b>                      | ★★★★★              |
| <b>PowerTower Pro 180<br/>(with 8-GB RAID)</b> | ★★★★★ <sup>1</sup> |
| <b>PowerTower Pro 200<br/>(with 8-GB RAID)</b> | ★★★★★ <sup>1</sup> |
| <b>PowerTower Pro 225<br/>(with 8-GB RAID)</b> | ★★★★★              |

Power leapfrogs Apple — and everyone else — with fastest-ever desktop computer.



**LET'S GET RIGHT** to the point: Power Computing's new PowerTower Pros are smoking-hot machines. They scream. If you're looking for speed, don't look any further.

What makes a PowerTower Pro so fast is its processor, a PowerPC 604e. Power is the first to offer systems that use this new chip. The company is shipping models containing 180-, 200-, and 225-MHz versions of the new processor. Did we say "shipping" and "225 MHz"? We did indeed.

Intel, meanwhile, has just announced — but has *not* yet shipped — the first 200-MHz Pentium Pro. In other words, Power Computing's new PowerTower Pro 225 is not only the fastest Mac OS system ever but could also well be the fastest desktop PC ever. (There's definite T-shirt material here.)

So, just how fast are these new machines? To answer that question, MacUser Labs took a trip down to Power's headquarters, where we ran our industry-standard benchmark, MacBench 3.0, on the new lineup of systems. On the MacBench Processor test, the PowerTower Pro 225 scored a whopping 48.2. That's a full 61 percent faster than the score

turned in by Apple's flagship, the Power Mac 9500/150. Even the PowerTower Pro 180 was 40 percent faster than the 9500/150.

The PowerTower Pros excelled on other tests as well. With the 2-GB IBM internal drive that ships standard, the new Power systems were nearly twice as fast on the MacBench Disk Mix test as the 9500/150 we tested, which contained a 2-GB Seagate drive. On the Publishing Disk Mix test, the PowerTower Pros turned in a more modest gain over the 9500/150: roughly 34 percent. Keep in mind, however, that the Publishing Disk Mix test measures large-block-size reads and writes, or — put another way — raw data throughput. A 34-percent gain is nothing to sneeze at.

If 2 GB won't hold all your data or you need more speed, you might want to take advantage of the \$1,300 PowerTower Pro RAID option: an 8-GB array (two 4-GB IBM drives) connected to an Adaptec UltraSCSI PCI card. Talk about fast! On the Disk Mix test, the RAID-enabled PowerTower Pros beat out the 9500/150 by a better-

than-2.5-to-1 ratio. On the Publishing Disk Mix test, they were twice as fast as Apple's best.

The PowerTower Pros come equipped with an IMS TwinTurbo accelerated-graphics adapter with an updated driver that boosts speed significantly. Here, too, Power's new offerings blew the competition — including its own previous lineup — out of the water. The Graphics Mix scores for the PowerTower Pros averaged nearly triple those of the 9500/150. On the Publishing Graphics Mix test, the scores for the PowerTower Pros were between three and four times those of the 9500/100.

The effect of these improvements can be felt in programs requiring lots of data crunching. In Photoshop, for example, when we used the hand tool to scroll an image that fit in RAM, the program responded in real time. We were

also able to paint in real time with a 100-pixel soft-edged brush. Filter calculations also sped along at a more than acceptable pace.

Even on the CD-ROM Mix test, where Apple's Power Mac performance has remained abysmal for

### REVIEWS RATING KEY

|       |                  |
|-------|------------------|
| ★★★★★ | OUTSTANDING      |
| ★★★★  | VERY GOOD        |
| ★★★   | ACCEPTABLE       |
| ★★    | POOR             |
| ★     | SERIOUSLY FLAWED |
| ●     | DANGEROUS        |



longer than anyone cares to recall, the PowerTower Pros take a leap. Although Apple is still shipping a 4x CD-ROM drive (with a driver that is in serious need of an upgrade) in its Power Macs, Power has made the move to 8x CD-ROM mechanisms and uses a caching driver that improves performance dramatically. It's hard to believe — even painful — but the PowerTower Pros turn in CD-ROM Mix scores that are 7.5 times that of the Power Mac 9500/150.

You might be interested in the details of the PowerTower Pros' design. For starters, the PowerTower Pros have more in common with Power's discontinued PowerWave line than with its more recent and higher-speed PowerTower and PowerCenter models. (We know it's confusing, but hang in there.) PowerTowers and PowerCenters are based on the Catalyst motherboard design, which Apple uses in the Power Mac 7200. PowerTower Pros, however, are based on the Tsunami architecture, which Apple uses in the Power Mac 9500.

Tsunami-based systems have several advantages over Catalyst-based ones, including support for memory interleaving, which speeds data transfers between RAM and the main processor, and six PCI-card slots, compared to just three in Catalyst systems. Catalyst does have one performance edge over Tsunami, however: Catalyst's maximum system-bus speed is 60 MHz, compared to 50 MHz on Tsunami.

Power chose the Catalyst architecture for its PowerPC 604-based PowerTower systems because the 604 chip can run at a top speed three times that of the bus on which it sits. Power's

Catalyst-based 180-MHz PowerTower 180 was the fastest Mac OS system available — until now (see "Power Takes the Lead," July '96, page 75). The speed of the new 604e chip, however, can be pushed up to six times that of a system's processor bus (see the "When Does 200 MHz Not Equal 200 MHz?" sidebar). The microprocessor in the PowerTower Pro 225, for example, runs at five times the speed of the system's 45-MHz processor bus.

## Case Study

Power has packaged the PowerTower Pros in a new minitower case. The case looks a lot like the PowerTowers' but has more space for internal storage devices and plenty of room in which to work. Once you take off the cover — the left side panel comes off with the removal of two thumbscrews — six drive bays, six PCI slots, the processor slot, and eight DIMM slots are all easily accessible. We were able to install more RAM in less than a minute. Apple's designers could learn a thing or two here.

You might think Power would take advantage of having established such a clear performance lead over the competition by selling PowerTower Pros at a premium price. Not so. One quick comparison will demonstrate the point. A Power Mac 9500/150 with 16 MB of RAM, 512K of L2 cache, a 2-GB hard drive, a 4x CD-ROM drive, and a 2-MB ATI accelerated-graphics card can be had on the street for around \$4,800.

Consider what you'd get if you threw in an extra \$300 and made a \$5,100 check out to Power Computing instead. You could walk away with a PowerTower Pro 225, complete

with a keyboard, 32 MB of RAM, a faster hard drive, twice the L2 cache, a faster CD-ROM drive, and a faster accelerated-graphics card with four times as much VRAM as ships with the 9500/150. And don't forget the bundled software, including Nisus Writer, Now Contact and Up-to-Date, and Now Utilities. A PowerTower Pro 180 — which still knocks the socks off a 9500/150 — can be yours for \$4,400.

Power isn't just gunning for Apple's Power Mac 9500 either: A multimedia-authoring option for the PowerTower and PowerTower Pro series aims squarely at the Power Mac 8500/150. The package includes a Miro DC20 video-capture and -playback card, Adobe Premiere LE, and Adobe Photoshop LE. Power promises that this package will let you capture and output 640-x-480-pixel, 30-frame-per-second video. (The Power Mac 8500 lets you grab about 25 fps at a 320-x-240-pixel resolution.) This option must be purchased along with a system, and pricing will vary with system configuration. But if you added the bundle to a \$4,200 PowerTower Pro 180 with 32 MB of RAM and a 1-MB L2 cache, the price would be about \$5,000. That's considerably more than the \$4,400 you pay for a base-model 8500/150, but considering that the PowerTower Pro comes with a keyboard and double the RAM and L2 cache, it's an outstanding value.

## The Bottom Line

For those who haven't been watching the race, Power's new product release means that the feisty startup clone vendor has managed to not only stay a step ahead of but also actually



## BEATING THE CLOCK / we benchmark the fastest Mac OS systems ever

Power Computing's new PowerTower Pro desktop systems best Apple's fastest machine, the Power Mac 9500/150, on every metric tested by MacBench 3.0, our industry-standard benchmark for measuring system performance. MacBench 3.0 tests subsystem-level speed on tasks based on typical usage of popular application software. All PowerTower Pro systems we tested ship with 32 MB of

RAM and a 1-MB L2 cache. Base systems contain a 2-GB internal hard drive; RAID-equipped systems ship with two 4-GB internal drives. The Power Mac 9500/150 reference system was tested with 16 MB of RAM and a 2-GB internal hard drive. MacBench scores are relative to those of an Apple Power Mac 6100/60 with an internal 250-MB hard drive, which is assigned a score of 10.0 on all tests.

MACBENCH 3.0 SCORES

|   | Processor    | Floating Point | Disk Mix     | Publishing Disk Mix | Graphics Mix | Publishing Graphics Mix | CD-ROM Mix   |
|---|--------------|----------------|--------------|---------------------|--------------|-------------------------|--------------|
| Power Computing PowerTower Pro 180        | 42.1         | 39.4           | 42.5         | 21.4                | 137.1        | 86.2                    | 115.0        |
| Power Computing PowerTower Pro 200        | 46.5         | 44.1           | 40.5         | 21.6                | 140.7        | 90.3                    | 110.7        |
| Power Computing PowerTower Pro 225        | 48.2         | 49.0           | 41.7         | 21.9                | 141.0        | 90.0                    | 109.6        |
| Power Computing PowerTower Pro 180 (RAID) | 42.4         | 40.0           | 56.0         | 32.7                | 134.9        | 88.6                    | 114.4        |
| Power Computing PowerTower Pro 200 (RAID) | 47.0         | 44.0           | 56.3         | 32.8                | 145.9        | 92.0                    | 109.3        |
| Power Computing PowerTower Pro 225 (RAID) | 47.9         | 48.8           | 55.5         | 32.7                | 147.6        | 94.3                    | 113.7        |
| REFERENCE SYSTEM                          |              |                |              |                     |              |                         |              |
| Apple Power Macintosh 9500/150            | 29.9         | 30.3           | 21.8         | 16.1                | 47.6         | 25.7                    | 15.0         |
|   | SCORE BETTER | SCORE BETTER   | SCORE BETTER | SCORE BETTER        | SCORE BETTER | SCORE BETTER            | SCORE BETTER |





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## WHEN DOES 200 MHz NOT EQUAL 200 MHz?



MAC OS SYSTEMS HAVE AT LONG LAST broken the 200-MHz-processor-speed barrier, and their Wintel rivals will soon follow suit. Expect two results: exceptional system speed — and confusion. That's because several families of chips are all crashing the 200-MHz ceiling at once and their clock-rate numbers aren't directly comparable.

The 200-MHz-and-up PowerPC 604e chips featured in Power Computing's new PowerTower Pro models, for instance, are very different from the forthcoming 200-MHz-and-up PowerPC 603e chips. The two microprocessors have different performance characteristics and power requirements and, thus, different target markets: You'll find the 603e in low-cost as well as portable systems and the 604e in high-performance desktop systems.

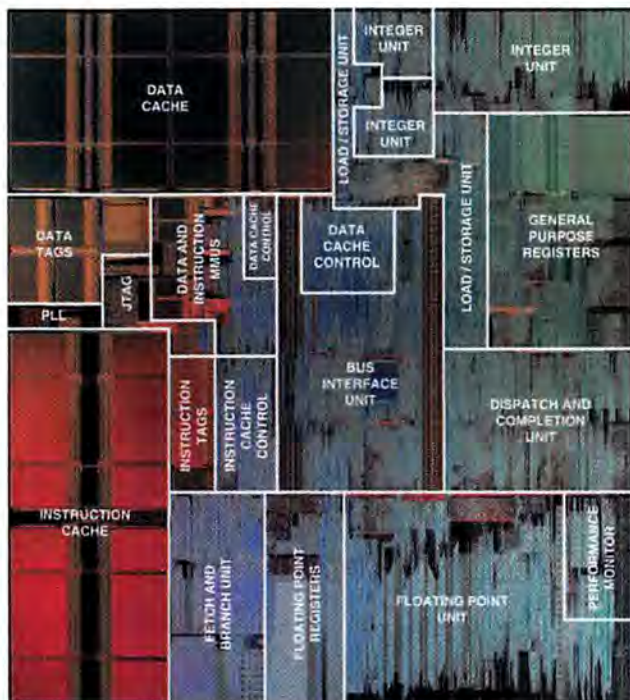
There's no real way to predict relative 603e and 604e performance by taking account of clock speed alone. In fact, it's far more realistic to compare each with its Intel competition than with its sibling. For example, a 603e's performance — megahertz for megahertz — is roughly equal to that of an Intel Pentium microprocessor. And now the 603e and the Pentium are built with the same technology: low-power, high-speed, 0.35-micron CMOS. Thus, their power consumption is also roughly equal — about 5 watts or less. One important difference, however, is their cost: A 603e is about 25 percent cheaper to build than an equivalent Pentium.

It's not fair to compare a 604e with a Pentium — the 604e leaves that Intel chip in the dust. A better comparison is with Intel's top-of-the-line Pentium Pro (née P6). Although the performance of the earlier PowerPC 604 lagged behind that of the Pentium Pro, the 604e equals or exceeds Pro performance by adding several enhancements: Most important, the 604e's on-chip data and instruction caches have been doubled, to a chubby 32K apiece. Branch handling and bus buffering have also been improved, and new load-and-store schemes improve X86-code emulation. What's more, the power consumption of the 0.35-micron-CMOS 604e is about half that of the Pentium Pro, and — here's the kicker — so is its price.

### 240 MHZ AND THE BUS-CLOCK PUZZLE

Adding yet another piece to the system-performance puzzle is the fact that the 604e can work with a wider variety of data-bus clock speeds than either the PowerPC 604 or the Pentium Pro, thus providing more flexibility to systems designers. That means that a 604e running at a given clock speed will appear in systems with various bus speeds — and various performance characteristics (see chart).

A dramatic example is provided by two prototype systems that we recently tested in an exclusive first look at Power Computing's labs, where engineers have pushed the 604e chip to an unheard-of speed of 240 MHz. What's more, they have managed



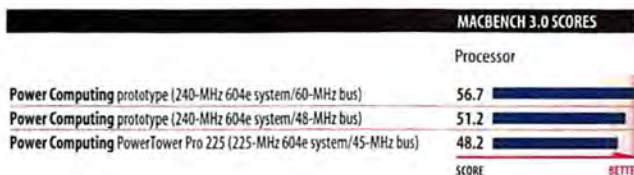
The PowerPC 604e chip's beefed-up caches boost performance at a variety of clock and system-bus speeds.

to do so on Tsunami-based motherboards running at two bus speeds: 60 MHz (a feat that Apple said could not be accomplished) and 48 MHz.

Our testing shows that bus speed can have a significant impact on a computer's performance: On a 48-MHz bus, the 240-MHz 604e chip scored about 6 percent higher on the MacBench Processor test than a 225-MHz 604e running on a 45-MHz bus. But the same 240-MHz chip on a 60-MHz bus saw a speed jump of 10 to 11 percent.

The MacBench boost produced by increasing system-bus speed scales very well with the gains you might expect to see when rendering a 3-D image or calculating a Photoshop filter.

Lest you get overly excited, however, we must issue a note of caution: What we saw was strictly a technology demonstration. Getting one processor on one motherboard with one fast bus-clock crystal to work is an exciting achievement, and it points to a bright future for the 604e. But it's a far cry from shipping a stable, supportable product. / Rik Myslewski and Henry Bortman



System-bus speeds significantly influence MacBench 3.0 Processor test results on two prototype 240-MHz systems from Power Computing: The score of a system with a 60-MHz bus is about 10 percent higher than that of a system with a 48-MHz bus.

lap Apple. Power was the first to ship a 150-MHz system, the PowerWave 150, back in November 1995. Then, in April of this year, just when it seemed that — with the introduction of the 9500/150 — Apple had caught up, Power surged ahead, releasing its PowerTower 180.

Now Power has widened the gap further.

Power has the clear and undisputed edge over Apple in both price and performance. If you're looking for ultimate speed, there is no choice. You want a Power Tower Pro. Apple should be embarrassed. / Henry Bortman

PowerTower Pro 180, \$4,400; PowerTower Pro 200, \$4,700; PowerTower Pro 225, \$5,100; PowerTower Pro 180 (with 8-GB RAID), \$5,700; PowerTower Pro 200 (with 8-GB RAID), \$6,000; PowerTower Pro 225 (with 8-GB RAID), \$6,400 (all prices are direct). Company: Power Computing, Round Rock, TX; 800-370-7693 or 512-246-7807; <http://www.powercc.com/>. Reader Service: Circle #401.



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# Kodak Digital Science DC20



It's smaller than a disposable camera, but don't throw away your money.



**THE FIRST THING** you notice when you unpack the Kodak Digital Science DC20 digital camera is, well, its lack of substance: Without the supplied 3-volt battery installed, the cigarette-pack-sized camera weighs just over 4 ounces. Even with the battery in place, the camera is still smaller and lighter than those disposables you can pick up at Wal-Mart — but this one costs about \$350 instead of ten bucks. We found ourselves asking two questions: "Could this finally be the compact, easy-to-use digital camera we've been longing for?" and "Can something that feels like a Cracker Jack toy possibly take a decent picture?" Unfortunately, the answer to both questions is, "Not really."

The DC20 is Kodak's attempt to create a digital Instamatic — a foolproof, affordable camera that you can tuck in your pocket and that anyone can use. Well, as we've already mentioned, its size certainly fills the bill. And the DC20 is affordable, at least by digital-camera standards. Furthermore, the camera design couldn't be simpler. As with the original Instamatics, the DC20's lens and exposure settings are fixed, so there's nothing for you to adjust. (There isn't even a flash.) And there are only three buttons on the camera — one turns the camera on and off, one snaps the shutter, and one erases all the stored photos.

Connecting the camera to your Mac to preview and download images is also easy: Plug one end of the supplied Mac serial cable (a PC cable is also provided) into your computer and the other end into a minijack on the side of the camera. Install the easy-to-use supplied image-editing software (PhotoEnhancer Special Fun, from PictureWorks), turn on the camera, and pull up the images on the program's Acquire menu.

Once the images are downloaded, you can use PhotoEnhancer to retouch, crop, and adjust them and even add them to templated greeting cards, flyers, and posters. You can also mutate them in the supplied limited edition

of MetaTools' Kai's Power Goo, an addictive program that lets you warp and distort images like so much taffy.

## So, What's the Problem?

Unfortunately, the DC20 package as a whole is less than the sum of its parts. For starters, the camera seems bent on preventing you from getting the shot you want: The well-intended auto-shutoff feature, which kicks in after 90 seconds of inactivity, practically guarantees that the camera won't be on at the moment of truth. (To be fair, the battery-management scheme is definitely doing something right; we used the supplied battery for weeks, through scores of shots and downloads, and it was still going strong.)

Even in instances when the camera is powered up, an annoying lag between when you touch the shutter button and when the picture is snapped can still spoil the shot. (We frequently found ourselves wishing we could use the Erase button to undo near-misses, but

compression artifacts such as jaggy lines. The quality of many images was so poor that they weren't even suitable for low-resolution on-screen display — as on a Web page or in an interactive presentation. When we printed them at a higher resolution on a home-caliber color inkjet printer, such images looked even worse.

Overriding the camera's automatic white-level setting to optimize for natural, incandescent, or fluorescent lighting helped a bit, but it's not a particularly convenient option, since you can change that setting only from within PhotoEnhancer (in other words, only when the DC20 is connected to your computer; switching image resolutions also requires you to be hooked up to the Mac).

PhotoEnhancer's image-correction tools — which include sharpening, color correction, and exposure correction — are quite extensive. The By Example mode, which lets you apply corrections by choosing among eight variously adjusted versions of your image, is



**The Kodak Digital Science DC20** is lighter and more compact than a disposable single-use camera.

unfortunately, it erases all the stored images simultaneously.)

The camera holds as many as 16 shots at 320 x 240 pixels and a meager 8 shots at the higher (and bafflingly nonstandard) resolution of 493 x 373 pixels. We'd be willing to chalk the limited image capacity up to the camera's low cost and small size if it weren't for the incredible slowness required to download images and "change rolls": Every image must be downloaded separately and must first be previewed on the Mac in a window that redraws excruciatingly slowly. Downloading 16 shots takes about 30 minutes of tedious clicking and waiting. A batch-download option should be a must in the next generation of the DC20.

Finally, the quality of the DC20 images was decidedly unimpressive, in the high- as well as the low-resolution mode. Images tended to be poorly exposed and fuzzy, evidencing

particularly good. But even the best retouching couldn't salvage many of the DC20 images, especially those taken in low-resolution mode.

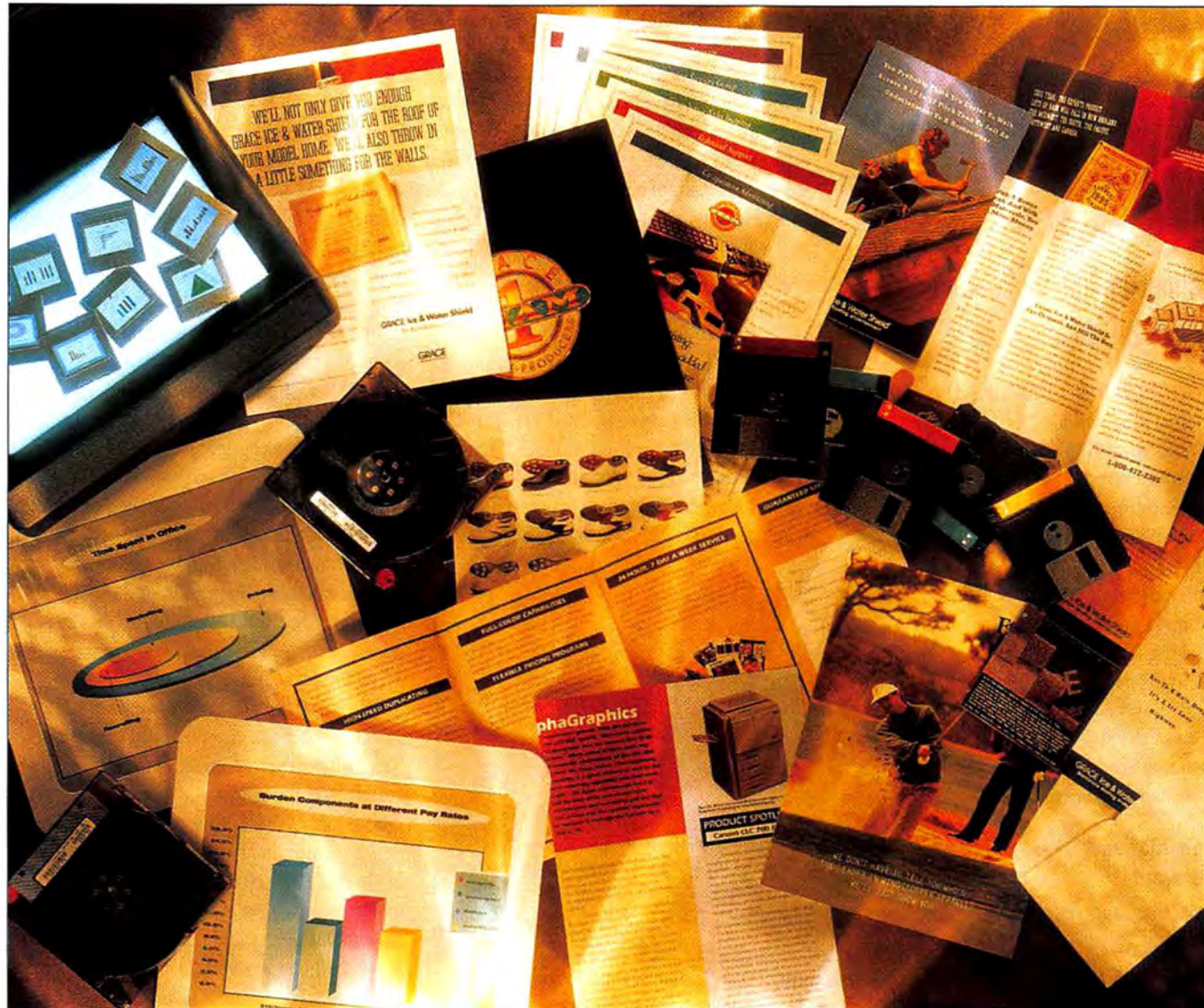
## The Bottom Line

The Kodak Digital Science DC20 is appealingly pocketable and offers an impressive software bundle that's both fun and useful. It clearly hints at the direction consumer-level digital cameras must take in the future. But poor image quality, limited image-storage capacity, and annoyingly complicated interaction between the camera and its software make it a nuisance to use. Until it's as easy to use as Kodak's foolproof standard cameras, the DC20 just isn't worth its admittedly attractive price.

/ Jim Shatz-Akin

**Kodak Digital Science DC20**, \$349 (estimated street).  
**Company:** Eastman Kodak, Rochester, NY; 800-235-6325 or 716-724-4000; <http://www.kodak.com/>.  
**Reader Service:** Circle #402.





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## Type-Creation Tools

**LogoMotion 2.0.1** ★★★★★

**StrataType 3d 2.5** ★★★

Enhancements make it easier to create 3-D type.

**TWO RECENTLY UPDATED** 3-D-type-design tools — Specular's LogoMotion 2.0.1 and Strata's StrataType 3d 2.5 — offer different ways to extrude 2-D type into 3-D shapes. LogoMotion lets you animate 3-D type in QuickTime movies, and its update includes a brand-new interface and enhanced rendering to make composition easier and better looking. The latest version of StrataType 3d is PowerPC-native and linked to QuarkXPress through an XTension that makes adding 3-D type to a layout much easier.

### LogoMotion Moves Forward

Specular has succeeded in making LogoMotion 2.0.1 much more approachable for novice 3-D users than earlier versions. Gone are many of the interface complexities inherited from Infini-D, Specular's full-featured 3-D-design package. The excellent Sequencer window, which shows you the application of camera motion and other effects over time, remains, as does the Camera window, your primary view on a scene. But a new horizontal control panel under the menu bar unites several dialog boxes and menu-bar commands that were scattered throughout version 1.5.

At the far left of the tool bar is an iconic pull-down menu that lets you select from among six operating modes: Object Information, which provides data on objects' sizes and positioning; Surfaces, which lets you change objects' appearances; Bevels, which governs the depth of your 3-D type and the shape of its beveling; Atmosphere, which lets you control the ambiance around your letters; Stage-Hands, which places lights, cameras, backgrounds, and even animated props in your scenes; and Rendering, which lets you view your text at any of six quality settings.

Beyond easier access to tools, other areas of the program have been made friendlier: To change the surface of your letters or add lights or props to a scene, you preview options in the tool bar and then drag your selection into the Camera window. The text-creation dialog box now shows the text in the chosen font. A new color picker with a Photoshop-like sample area and RGB sliders makes it easy to select surface colors for your type.

LogoMotion 2.0.1 also offers an enhanced rendering mode, including support for texture maps, so you can wrap any PICT image around your text. Specular supplies a handful of textures, including stone and wood, which allows for far greater variety than was possible with the plastic and metallic surfaces in ver-



Texture-wrapping is a new feature of LogoMotion 2.0.1, which also sports a completely revamped interface.

sion 1.5, although you still can't get bumpy or transparent surfaces.

LogoMotion's preset camera motions and lighting setups make it easy to create impressive flying-logo QuickTime movies right away, but we do have a few complaints about some of the program's operations. Getting the spacing of the text blocks right still requires tediously moving each individual character in the work space. Specular added nudging controls to make this easier, but we'd still like to see tracking or letterspacing controls, or at least an option for automatically adding space to fit a bevel setting, thus avoiding character overlap because of bevel size. Specular should also add a tool for applying different surfaces to the bevels and sides of a text object. We'd appreciate a camera-lens-setting control too.

### StrataType XPresses Itself

The latest version of StrataType is less of a departure than LogoMotion's. New anti-aliasing controls improve output quality, and

Strata has boosted the program's typographic capabilities by hooking StrataType 2.5 into QuarkXPress via the 3D XT XTension.

StrataType has basic controls for creating single blocks of text. For example, you click on the text tool and a dialog box comes up for inputting your text and choosing a font, a bevel, and even a layout. As in previous versions, the 3-D-effects option lets you select from a set of layouts that simulate text on a path in 3-D space. Also, you have letterspacing options for adding even spacing between characters.

New rendering options let you anti-alias the rendering at a higher level for both the 3-D characters and the textures applied to them. Anti-aliasing results in noticeably better output, although it does double the rendering time. You don't really need it for 266- or 300-dpi output, and StrataType automatically reduces the anti-aliasing setting when you render at high resolution.

The most interesting part of the package is 3D XT. It lets you export text you've manipulated within QuarkXPress, extrude it, add a surface texture, render it, and then reimport it into QuarkXPress. This lets you use the superior kerning and tracking controls available in QuarkXPress to adjust your type. It also means you can get around StrataType's biggest limitation, its inability to lay out text in more than one block at a time or to include line breaks. For example, if you wanted to create a 3-D version of a two-line "Don't Walk" traffic light, you couldn't do it in StrataType.

### The Bottom Line

Specular's LogoMotion works great. With a fast PowerPC-based machine, you can create a simple full-screen flying logo in just a few minutes. Despite a few limitations, the package offers novice and intermediate users everything they need in order to create animated logos. StrataType with 3D XT makes a nice package for QuarkXPress users. For those who frequently need 3-D type to make a price or headline stand out, we recommend StrataType with 3D XT. If you're looking just to create 3-D type and don't own QuarkXPress or another illustration package, opt for LogoMotion instead. / Sean J. Safreed

**LogoMotion 2.0.1**, \$99 (list). **Company:** Specular, Amherst, MA; 800-433-7732 or 413-253-3100; <http://www.specular.com/>. **Reader Service:** Circle #411.

**StrataType 3d 2.5 with 3D XT**, \$99 (list). **Company:** Strata, St. George, UT; 800-678-7282 or 801-628-5218; <http://www.strata3d.com/>. **Reader Service:** Circle #412.



# Apple Newton MessagePad 130



New Newton: You could even say it glows — dimly . . .

**THE NEWTON MESSAGEPAD** has come a long way since its 1993 debut. A major update to the operating system last winter transformed the Newton user experience and went a long way toward resolving limitations that caused Apple's PDA to be a favorite subject of cartoon satire.

So, it is with a little irony that we say Apple's latest revision of its Newton hardware, the MessagePad 130, offers some good news and some bad news for potential buyers. The good news is that the 130 adds several much needed refinements to the MessagePad design. The bad news is that what the MessagePad really needs is to be replaced by a more up-to-date PDA.

## The Indiglo Newton

Although the MessagePad 130 is largely the same as its predecessor, the MessagePad 120, the 130 adds several new features that enhance its usability, most notably more RAM for running applications. It also offers something no other device in its class has — a backlit screen.

The 130 uses screen technology called *transflective LCD* with an EL (electroluminescent) backlight. The 130's display can illuminate on-screen images by reflecting ambient light, just as the reflective screen in the 120 does, or by using a backlight. You toggle the backlight on and off by holding down the MessagePad's power switch.

The EL layer is located between the screen's reflective panel and liquid-crystal matrix. When the backlight is switched on, it casts a soft, greenish light. (The green glow is reminiscent of the light of an Indiglo watch, which also makes use of EL technology.) When the backlight is switched off, ambient light passes through the EL layer, and the screen appears

identical to that of the MessagePad 120.

The ability to turn the backlighting on and off lets you balance screen visibility against battery life, and our tests suggest you'll want to use backlighting sparingly. Leaving the backlight on all the time cut battery life by a minimum of 50 percent. However, under what Apple describes as "normal" use, where backlighting is on 10 percent of the time, battery life is diminished only by 10 percent. Because Apple made no changes in the 130's power subsystem, battery life with backlighting off is the same as with the MessagePad 120 — roughly eight hours of continuous use with the rechargeable NiCd battery pack.

Although we agree with Apple's assessment that backlighting is seldom required, having



**The Apple MessagePad 130's** backlit screen improves usability — at significant cost in battery life.

backlighting on made the PDA's display easier to read even in a well-lit room. We would have liked it if the 130 had been able to power the backlight for several hours of uninterrupted use. Unfortunately, even with longer-lived alkaline batteries, we couldn't squeeze more than a few hours out of a constantly backlit 130.

The 130's new screen adds one other refinement — an antiglare coating that helps screen readability. It also makes the writing surface less slippery, giving users a more paperlike feel when they write on the screen.

## A Heap of Space

On the 130, the heap space has been doubled, to 1.2 MB. The *heap space* is that part of internal RAM the MessagePad sets aside for

executing instructions; it's roughly equivalent to RAM in a Mac. The remainder of the MessagePad's internal RAM is used for storage, much like a hard disk.

The heap-space boost allowed us to install almost twice as many applications on our 130 as we could on a 120. (On a Newton, each application takes up some heap space even if it isn't in use.)

An unexpected dividend of the larger heap space was a noticeable — and welcome — speed boost. The 130 uses the same 20-MHz ARM 610 RISC processor as the 120, so we can attribute the 130's perceptibly snappier speed only to the extra memory allocation.

The 130 comes with NBU (Newton Backup Utility), which, as the name suggests, is good only for backups. For editing, importing, and exporting, Apple recommends its Newton Connection Utility, which won't ship before September. The only alternatives are application-specific tools, such as Now Software's Now Sync, or general utilities, such as Revelar's RCU (Revelar Connection Utility).

## The Bottom Line

Three years is a long time in the computer business. Although the 130 adds several nice enhancements, especially the new screen, these tweaks seem like Band-Aids when measured against what the MessagePad's competitors are offering. With products such as U.S. Robotics' tiny Pilot PDA hitting the scene, the MessagePad now seems too big to be considered a pocket organizer. And, with its 320-x-240-pixel display, it's not big enough to be a notebook-computer replacement (even with the optional keyboard). The MessagePad's single Type II PC Card slot and lack of an internal modem are also limitations of the older design we'd like to see go away.

And then there's the price. A MessagePad 130 with 2.5 MB of internal RAM, some Mac and PC serial cables, the Newton Backup Utility, and a copy of Pocket Quicken costs \$799. That price strikes us as just a bit steep.

If you've got a Newton with the 2.0 version of the OS, we'd recommend passing on the 130 unless you're really desperate for backlighting or extra heap space. However, if you don't have a Newton, the 130's backlight might be just the excuse you've been waiting for to pick up your first MessagePad. / Andrew Gore

**Apple Newton MessagePad 130**, \$799 (estimated street). **Company:** Apple Computer, Cupertino, CA; 800-776-2333 or 408-996-1010; <http://www.apple.com/>. **Reader Service:** Circle #413.



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# Bryce 2



Powerful, flexible landscape creator gets faster and easier.

**IF YOU CAN'T GET AWAY** for a vacation this year, you can still bore your guests with dramatic photos of faraway lands, thanks to the new version of Bryce, MetaTools' 3-D-landscape-creation application. Bryce 2 sports a new interface and useful new features.

Bryce 2's interface is surprisingly streamlined: In place of the original program's array of floating palettes, there's a single large tool bar you toggle to choose from three sets of tools — for creating objects, editing them, and generating sky and fog effects. Users of other MetaTools products, such as Kai's Power Tools, won't be surprised to hear that Bryce's tool bars are not Mac-standard: Tool icons remain ghosted until you roll your cursor over them; then they "light up."

## Scene Building

Starting a scene is as simple as selecting primitives from the Create tool bar. Bryce provides primitives for terrains (fractal-based mountainous shapes); infinite planes of ground, water, or clouds; and simple geometric solids, including cones, pyramids, blocks, and spheres. A new Rock primitive lets you easily create realistic boulders and rocks (although you don't have much control over their appearance).

Scene building is still performed in wire-frame mode, but the view has been greatly improved. Wire-frame meshes are now anti-aliased, for a smoother appearance, and Bryce provides helpful depth cues by displaying more-distant meshes in fainter shades.

One of the best additions to Bryce's modeling arsenal isn't even 3-D. The new PICT Object primitive lets you import 2-D PICT images for placement in scenes. Bryce now imports 3-D models in the DXF format, so you can place objects created in other programs in your scenes. Unfortunately, Bryce 2 does not provide DXF export.

Once placed in a scene, all objects can be rotated or scaled easily, and new tools make it easy to align objects' edges or centers along any axis and to scatter objects randomly in a scene.

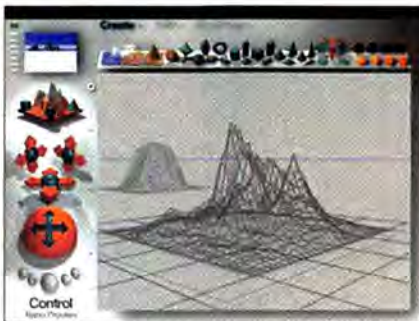
Four new types of lights are provided, on

the Create tool bar. Radial (point) lights, spotlights, square spotlights, and parallel lights all can be placed in your scene and scaled, rotated, and positioned like any other object.

Bryce has only one image window, which can make lighting and positioning objects somewhat tedious, compared to 3-D programs that let you view a scene in multiple perspective windows simultaneously. In most cases in Bryce, you have to position your object along one axis and then switch to another perspective to align the other axes.

## World Building

Bryce 2's Terrain Editor may be the program's best new feature. If you have a PowerPC system, this editor lets you paint 2-D grayscale images in a window and see a continuous,



**Adding objects** to a scene in MetaTools' Bryce 2 is as simple as dragging items from the tool bar to the image window.

updated thumbnail of the resulting extruded shape, as darker shades of gray are translated into higher elevations. In addition, the Terrain Editor provides a slew of controls for creating erosion, mounds, spikes, and other natural-terrain features.

Bryce 2's ray tracer renders subtle atmospheric effects and reflections beautifully, is noticeably faster than the one in the original, and competes favorably with other programs'.

## The Bottom Line

MetaTools has greatly improved an already impressive product. Whether you actually need a high-quality landscape generator is probably questionable. But Bryce is fun to play with — although at \$299, it's a pricey toy. Professional users who need Bryce's power only occasionally may find that the nonstandard interface requires a frustrating reorientation at each use. But for users who want to fiddle and explore, there's a lot to play with. / Ben Long

**Bryce 2**, \$299 (list). **Company:** MetaTools, Carpinteria, CA; 800-472-9025 or 805-566-6200; <http://www.metatools.com/>. **Reader Service:** Circle #418.

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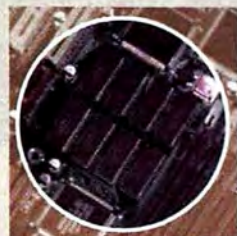


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# CyberSound VS



Transform your PowerPC system into a MIDI synthesizer.

**IS THIS THE PERFECT SETUP** for a Mac/MIDI musician, or what? Software that turns your PowerPC system into a MIDI synthesizer capable of playing 512 high-quality 16-bit instrument sounds without any additional hardware. Now imagine you could play and record those sounds in real time, using a MIDI keyboard and interface. Sound too good to be true? Well, to an extent, it is. InVision Interactive's CyberSound VS promises these miracles but falls short.

CyberSound VS has three parts: The CyberSynth control panel, where you load sound banks and configure memory; CyberPlayer, the application you use to play, record, and edit sequences that employ the CyberSynth sounds; and a QuickTime driver that lets you replace the sounds in Apple's QuickTime Musical Instruments with higher-quality CyberSound voices.

Let's turn first to CyberSynth. The control panel organizes MIDI sounds in 16 tracks, corresponding to the 16 instrument voices that can be played within CyberSound VS at any one time. The 512 voices, or programs, supplied with CyberSound are in nine banks — libraries such as the 128-voice General MIDI collection and the 83-voice Orchestra set. To assign a voice to a track, you use pop-up menus. You can audition these sounds from within CyberSynth.

The CyberSynth control panel also lets you specify the amount of CPU power and RAM to devote to CyberSynth. Typically, you must devote 60 percent or more of your CPU power and at least 6 MB of RAM to CyberSynth. If you don't have a PowerPC 604-based computer, lots of fiddling may be required to get CyberSound to produce all the notes in a sequence or to avoid notes cutting off early.

The CyberPlayer application is a General MIDI player/recorder with powerful editing options: You can quantize notes (force the music to align to a rhythmic grid), transpose tracks, and edit individual notes and MIDI events. This editor is powerful, but it's far from intuitive. It forces you to edit MIDI data in a long, rather cryptic text list. Fortunately,

CyberSound's instruments can be used with sequencer programs, such as Opcode's MusicShop and Mark of the Unicorn's FreeStyle, that support graphical editing.

The third component, CyberSound's QuickTime driver, works with the open MIDI architecture in QuickTime 2.5, which should be available by the time you read this. In applications that normally employ QuickTime Musical Instruments' ultracheesy 8-bit sound set, you can simply select CyberSound's superior 16-bit instruments instead.

CyberSound's voices are no substitute for a hardware synthesizer. Strings, basses, and brass sounds, especially in the General MIDI bank, tend to be thin, with unnatural sustain.



**Look, Ma — no hardware!** The CyberSynth control panel allows you to play over 500 sounds from your Mac's keyboard or a MIDI controller.

In the area of live performance, CyberSound needs work. There's a noticeable lag between the time you press a key on your MIDI controller and when you hear the instrument. This is true even with the Pro bank of sounds InVision released on the heels of CyberSound VS 1.0's debut to address complaints of sluggish keyboard response. CyberSound is a capable MIDI-sequence player, but don't take it onstage or to the studio.

## The Bottom Line

Provided your PowerPC system packs the necessary punch, CyberSound is an acceptable substitute when you can't get to a real synthesizer. But until the program delivers higher-quality General MIDI sounds, bundles a real sequencer, and eliminates the triggering delays, we'll hang onto our old-fashioned hardware synthesizers. / Christopher Breen

**CyberSound VS**, \$249 (list). **Company:** InVision Interactive, Palo Alto, CA; 800-468-5530 or 415-812-7380; <http://www.cybersound.com/>. **Reader Service:** Circle #419.

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# StuffIt Deluxe 4.0



Compression utility adds many features but still needs work.

**ALADDIN SYSTEMS' STUFFIT DELUXE** is an indispensable tool for anyone who transfers files online or needs to compress file archives, and StuffIt Deluxe 4.0 adds welcome new features. However, it hasn't kept pace with the growing needs of its users.

Like past versions, StuffIt Deluxe 4.0 includes the StuffIt application, which can be used to compress files and folders into archives; decompress compressed files; and translate data to and from standard Mac binary format to a variety of cross-platform formats. Also included are drag-and-drop applications that perform some of StuffIt's more common tasks; StuffIt SpaceSaver, which works in the background to compress files automatically; and the Magic Menu feature, which lets you invoke StuffIt functions from a pull-down Finder menu.

Among StuffIt 4.0's advantages is unprecedented integration of StuffIt with the Finder: The new Archive Browser feature lets you open StuffIt archives by double-clicking, just as you'd open a folder in the Finder. Dragging files from an archive to the desktop (or any unstuffed folder) decompresses the data; dragging an unstuffed file into an archive compresses it. For users who can't be bothered with dragging files or selecting menu commands, StuffIt now allows the stuffing of files. Alternatively, you can make them self-extracting archives by appending .sit or .sea to their filenames. Handy.

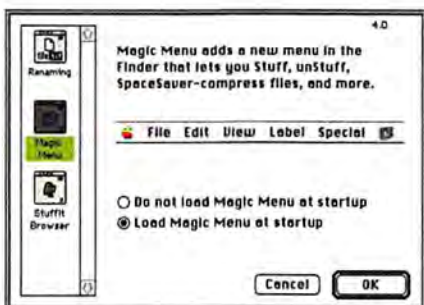
StuffIt's drag-and-drop applications — DropStuff, DropConvert, and StuffIt Expander — make it easy to select a group of files and perform StuffIt operations on all of them simultaneously. A new drag-and-drop tool, Drop Segment, adds the ability to quickly create large archives that span multiple floppy disks or other removable media.

Translation formats have been expanded to include ARC (.arc), tar (.tar), UUencode (.uu), and BinHex (.hqx), among others. Some e-mail capabilities have been added as well: Magic Menu brings up mailers for Microsoft Mail, QuickMail, and Eudora; StuffIt Deluxe supports PowerTalk mailers from within its application. Getting StuffIt to recognize your

mail applications can be tricky, but compressing and mailing files by issuing one simple menu command is a real boon.

Aladdin has improved the other main part of the StuffIt Deluxe package, SpaceSaver. Compressed files' icons (both large and small) now sport a StuffIt tag that gives users clear feedback about which files have been automatically compressed, and users have more control over which files get compressed during idle time. StuffIt-engine speed improvements have tempered the system slowdown users experience when using SpaceSaver.

StuffIt 4.0's interface enhancements accompany an overall engine upgrade: Compression



**StuffIt Deluxe 4.0** consolidates extensions and control panels from previous versions into the True Finder Integration control panel.

speeds show as much as a 20-percent improvement over StuffIt 3.5, and StuffIt Expander is faster in all operations.

Despite these improvements, Aladdin has missed the boat on a few basic functions that Internet users may miss. When BinHex-encoding multiple archives that are already compressed as .sit files, StuffIt stupidly recompresses them, despite preference settings to the contrary. Furthermore, StuffIt is dumb in its handling of UUencoded and BinHex files that have been broken into segments: StuffIt can translate the segments without difficulty, but it can't reassemble them — a feat that's well within the capabilities of other utilities, such as the shareware uued.

## The Bottom Line

StuffIt Deluxe is a vital tool, but basic omissions force you to use additional compression tools. Overall, StuffIt Deluxe is as necessary as a modem if you spend much time in cyberspace, but it needs improvement before it can be your only compression tool. / Scott Love

**StuffIt Deluxe 4.0**, \$129.95 (list). **Company:** Aladdin Systems, Watsonville, CA; 800-732-8881 or 408-761-6200; <http://www.aladdinsys.com/>. **Reader Service:** Circle #417.



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## Let's K.I.S.S.



'Simple' spreadsheet program complicates some operations.

**THE INTENTIONS OF** Casady & Greene's new program Let's K.I.S.S. (Let's Keep It Simple Spreadsheet) are admirable: It aims to be a spreadsheet program for the rest of us, without complicated equation syntax, arcane macros, and bells and whistles. It succeeds to a point, but in its laudable bid to shed complexity, it strips away some of the essential usefulness of a spreadsheet program as well.

Let's K.I.S.S. dispenses with standard spreadsheets' rows-and-columns arrangement of cells into which data and mathematical formulas are entered. Instead, it adopts a flowchartlike approach. You arrange tiles containing numbers, mathematical operators, and charting functions in a workspace window and then use your mouse to link them to specify the order of operations.

Let's K.I.S.S. comes with an impressive variety of preset templates and macros (dubbed

Smart Operators) for personal-finance, basic statistics, geometry, and even a few engineering tasks. Once you've created a file, you pull the tiles you need from a set of tool bars: You create rows, columns, or arrays into which you'll enter data and then grab the various math operators. Complex operations can be built in a series of simpler math operations and then collapsed into a new Smart Operator you can save for reuse.

When you perform a math operation on a set of data, Let's K.I.S.S. automatically generates an appropriate results tile: If you've added up a column of numbers, the results tile contains a single entry, the sum; if you've asked for a percentage markdown on a price list of prices, the results tile will contain discounted counterparts to each number in your input tile. You can change entries in an input tile at any time, but results tiles cannot be edited, to prevent you from accidentally overwriting the results of a calculation.

Forcing you to segment operations in this way lessens the likelihood that you'll get lost in a tangle of nested equations, but it also prevents you from doing some desirable things: You may want to have a total at the bottom of a stack of numbers, but in Let's K.I.S.S., the

numbers and sum must stay in separate tiles.

Let's K.I.S.S. operator tiles include text blocks and tools for creating bar, pie, and scatterplot charts and line graphs. These tools are easy to use but inflexible. You have no control over color, for example, and text cannot be entered within a chart. You must place a text window on top of the chart if you wish to add any titles, labels, or notes.

Let's K.I.S.S. allows you to create multiple Reports, or views, in a single data file. Different views let you highlight data by hiding unneeded information. This is great for personal organization, but Let's K.I.S.S.'s limited graphics tools prevent professional presentations.

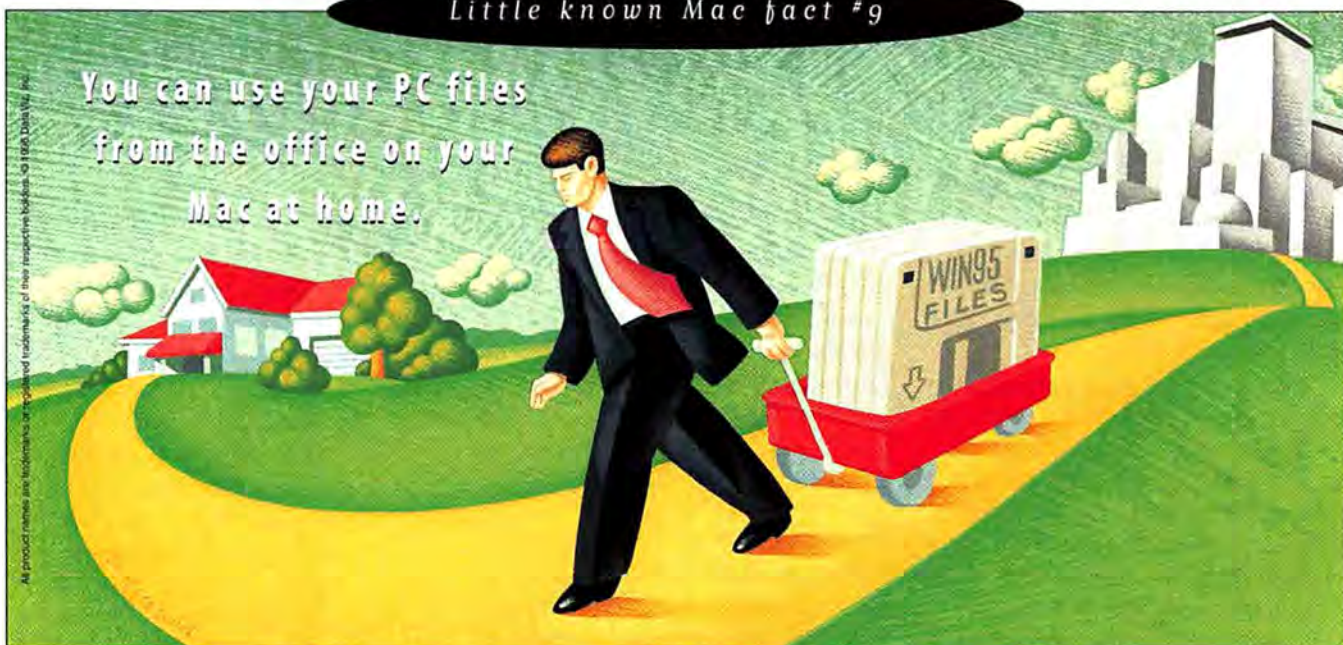
### The Bottom Line

If you're bewildered by conventional spreadsheet programs and need a tool to help you analyze personal data, Let's K.I.S.S. may meet your needs. But if you need a tool for displaying information to number-crunching pros, Let's K.I.S.S. won't cut it. / Jim Shatz-Akin

**Let's K.I.S.S. 1.0**, \$189.95 (list); competitive upgrade, \$79.95 (direct). **Company:** Casady & Greene, Salinas, CA; 800-359-4920 or 408-484-9228; <http://205.179.133.2/C&G/Welcome.html>. **Reader Service:** Circle #420.

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## ResumeMaker Deluxe



Weak at making résumés, it's still a useful job-hunting tool.

**LANDING THE CAREER** of your dreams requires patience, preparation, and a good résumé. ResumeMaker Deluxe helps you create correctly formatted résumés and also delivers interview-preparation and job-hunting guidance. However, it lacks the polish that could make it a first-class product.

### Career Advice Online

You choose from one of three résumé types: chronological, functional, and performance. You have to consult the manual to get the pros and cons of each type; we'd have preferred on-screen assistance. Once you've chosen a type, ResumeMaker offers tips for creating an effective résumé as it prompts you for information in each résumé section.

ResumeMaker's layout tools are basic:

You can change the order of sections in a résumé type, change the font and typestyle, and adjust margins. But you get little more than an outline to fill in. A good book on résumé making would have more detailed information. Also, you get more layout options with a word processor.

Besides a résumé-design tool, ResumeMaker includes a bare-bones word processor and a basic contact manager. Guided Letters, a well-designed series of professionally composed form letters, is well integrated with the word processor and contact database: You can easily address a prebuilt thank-you note or query letter to any contact and customize the text.

ResumeMaker Deluxe's real strength isn't résumé generation at all. Its hidden gem is the Winning Edge Workshop, over six hours of interactive video instruction on planning and executing a career search. Particularly useful is the Virtual Interview section, which steps you through a typical job interview.

### The Bottom Line

If you've never entered the job market or are returning after a long hiatus, ResumeMaker's résumé generator can be useful. However,



**Prepare for your interview with ResumeMaker Deluxe's Winning Edge Workshop.**

it falls short of meeting the needs of experienced job hunters. The Winning Edge Workshop offers excellent advice that's worth ResumeMaker Deluxe's price, but the product would be even more useful if instead of making its users rely on an anemic built-in word processor and contact manager, it allowed them to preview its Guided Letters and import them into a word-processing or page-layout program. / Edward D. Prasek

**ResumeMaker Deluxe**, \$39.95 (estimated street).  
**Company:** Individual Software, Pleasanton, CA;  
800-822-3522 or 510-734-6767. **Reader Service:**  
Circle #421.

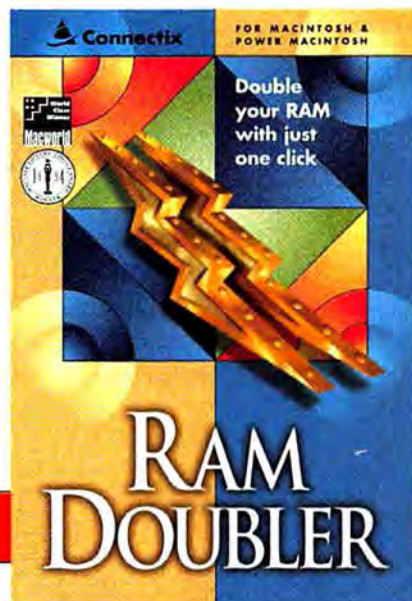
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System Requirements: Macintosh equipped with a 68030, 68040 or PowerPC microprocessor, System 6.05 or later, including all versions of system 7 • 4 MBs required (hard disk required for machines with 4 to 6 MBs) • Not compatible with Mac SE, original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



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# PosterWorks 4.0



Take messages beyond medium  
— to extra-extra large.

**POSTERWORKS CAN TAKE** TIFF, Scitex, or EPS files and tile them across multiple pages to create images of up to 10,000 square feet. Version 4.0 introduces several new layout tools, EfiColor support, and new features that speed creation of complex poster layouts.

## Getting Started

Creating a poster in PosterWorks is a simple process of specifying the size of your layout, placing and positioning elements on the page, and printing to any monochrome or color PostScript-compatible printer, including large-format poster printers.

To create a PosterWorks document, you first specify the overall size of your poster, using either pages or measurements. The new Layout Assistant feature helps you configure the margins and page size and define a layout that fits the poster size you want.

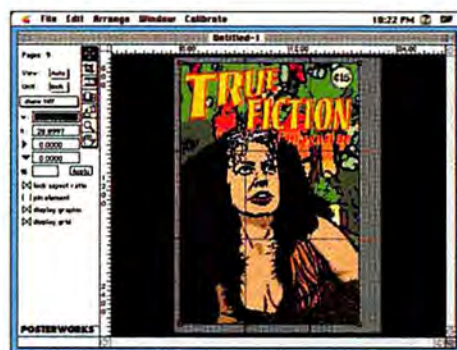
Once you've created your layout, you import TIFF, EPS, or Scitex images. New in version 4.0 is a tool for rotating placed images. Unfortunately, the program can rotate objects only in 90-degree increments and once you've rotated an element, PosterWorks no longer displays it as it will print; it displays only a bounding box.

PosterWorks' layout tools automatically position and optimize image placement to achieve maximum coverage on each sheet of paper, or "tile," in PosterWorks parlance.

## Printing Out

PosterWorks' printing controls are outstanding. You get complete control over PostScript Level 1 and 2 printing options, halftone screens and separations, and a built-in font-downloading utility. We found PosterWorks' print quality consistently impressive, even on 300- and 600-dpi black-and-white printers.

You also get a thorough, robust set of color-correction tools, with curves controls for CMYK and grayscale as well as advanced features such as Under Color Removal and Gray Component Removal. New to version 4.0 is support for EfiColor profiles for color correction on EfiColor-compatible devices.



PosterWorks 4.0 makes it about as easy to print a billboard image as it is to print a newsletter.

Assembling a poster is simple, thanks to PosterWorks' overlapping printing and crop and registration marks.

## The Bottom Line

PosterWorks does a great job of providing a vast range of complex, specialized functions in a streamlined interface. If you simply want to print large-scale images and banners, you'll find the program easy to use; those with more-sophisticated needs, such as making billboard displays, will find it just as easy. / Ben Long

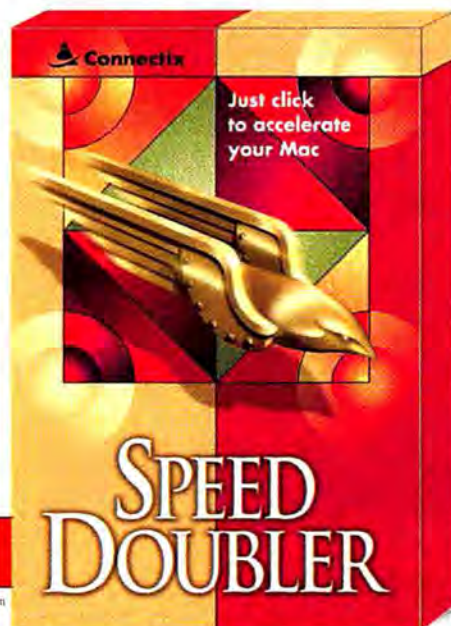
**PosterWorks 4.0**, \$495 (list). **Company:** S. H. Pierce, Cambridge, MA; 617-338-2222; <http://www.posterworks.com/>. **Reader Service:** Circle #422.

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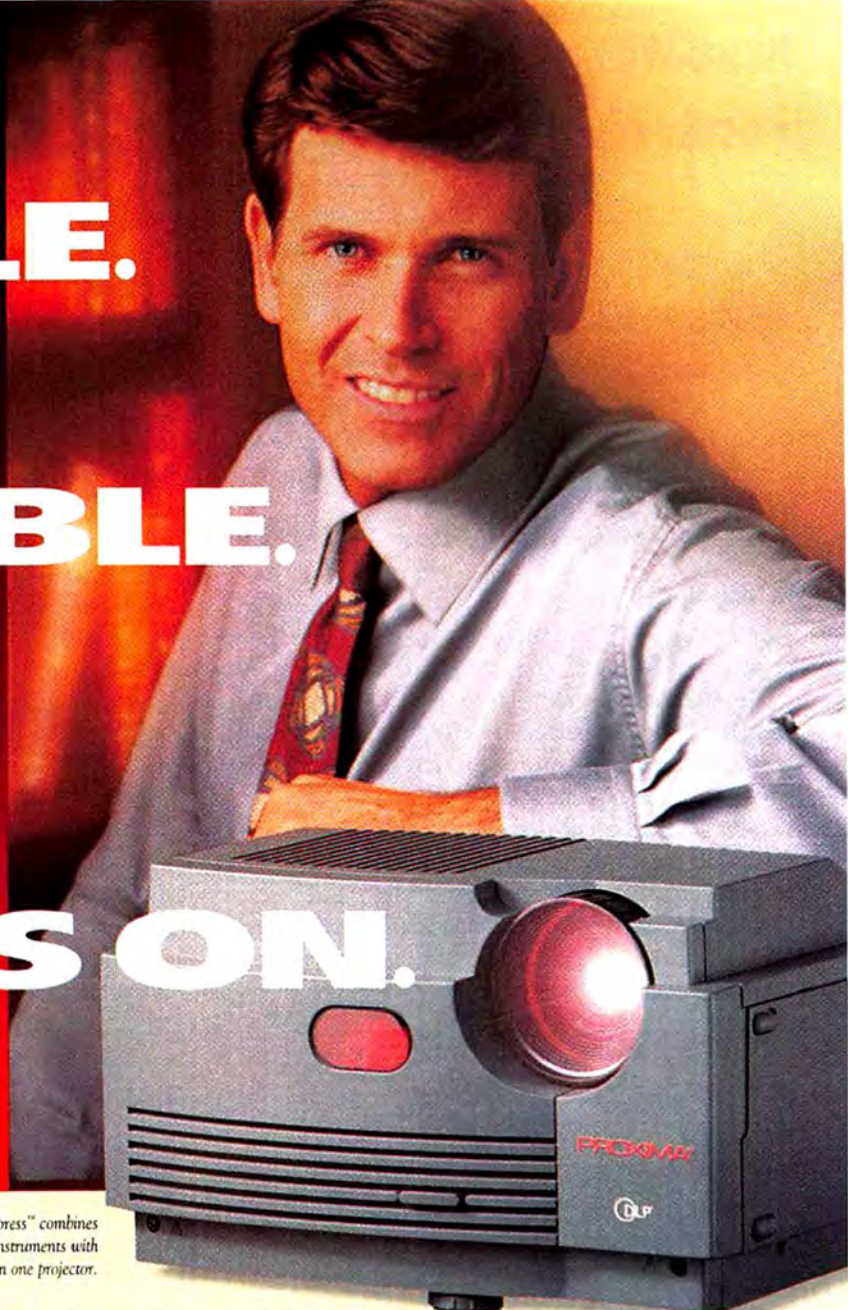
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# MacPublisher

Cheap page-layout program is no bargain.

**IF IT SOUNDS TOO GOOD** to be true, it probably is. MacPublisher, a \$25 page-layout program for creating personal and small-business newsletters, brochures, and more, has a clean, elegant interface and features — such as spot-color separation, style sheets, and text kerning — that you'd expect in a more expensive product. But it's a mess, riddled with inconsistent behavior and other problems that make it nearly impossible to use.

MacPublisher's menu-bar commands and standard icons look appealingly straightforward at first glance, but their behavior is bizarre. For instance, red text takes up more space in a text box than green, since color affects text size in MacPublisher. If you duplicate a custom style sheet, the name of the original custom style sheet will either disappear or be replaced with a dingbat. If you use the zoom tool, you have to draw a rectangle

around the area you'd like to zoom into, or else it will erratically zoom in by irregular increments: say, 50 percent one time, 400 percent another. There are two locations for turning Balloon Help on and off, but doing so at one location has no effect on the other. The manual isn't much help either: For instance, it tells you to choose the Spell command on a nonexistent Utilities menu. On the other hand, maybe you're better off not knowing where the spelling checker is: One of its options is to allow "space before punctuation," contrary to standard usage.

MacPublisher includes a CD-ROM containing clip art and decorative fonts, even though having the additional fonts can slow the program to a crawl. With only 20 fonts, MacPublisher was slower than any other page-layout program we've seen. It also quit unexpectedly several times until we allocated 4 MB of RAM to it, rather than the 2 MB suggested. No matter how much RAM we allocated, however, elements in a layout, such as text in a text box, sometimes simply disappeared. The elements reappeared only when we restarted the program.



The desktop-publishing program MacPublisher is packed with features, almost all of which are problematic.

## The Bottom Line

MacSoft publishes good products, so we're surprised to see it sell such a shoddy one as MacPublisher. The firm acknowledges the bugs and plans to release a free bug fix by the time this review appears, but MacPublisher has so many problems, of which we've been able to mention only a few, that it's doubtful if a quick update could make this program worth even its low price. / Carolyn Bickford

**MacPublisher 1.0.3**, \$24.99 (list). **Company:** MacSoft, Plymouth, MN; 800-229-2714 or 612-559-5140; <http://www.wizworks.com/>. **Reader Service:** Circle #423.

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# Removable Drives

## MicroNet DataDock Systems



## MegaDrive Enterprise Systems



Take your data on the road (or just down the hall).

**REMOVABLE STORAGE** typically suggests cartridge-based devices such as SyQuest, magneto-optical, and tape drives. But another type of removable storage is gaining steam: modules containing fixed-platter hard drives or cartridge drives that are easily removable from desktop docking bays.

MicroNet and MegaDrive, two longtime players in the Mac storage arena, each offer flexible removable-drive product lines. Both MicroNet's DataDock line and MegaDrive's Enterprise series offer hard-drive modules of various capacities, as well as DAT, magneto-optical, and Iomega Jaz drives. Both let you "hot-swap" modules without powering down the docking bay or your Mac. Also, both ship with software that lets you create a RAID Level 1 or 0 array across drives within a docking bay and insert the arrayed modules into the bay in any order without disrupting the array.

### Meet the DataDock

MicroNet's DataDock systems offer three types of docking bays: The DataDock 350 and 525 hold two 3.5-inch or two 5.25-inch drives, respectively. An optional horseshoe-shaped adapter allows 3.5-inch drives to fit into the 525's docking bay. For occasional DataDock-module users, the single-bay DataDock Express is also available.

The DataDock bays are intelligently designed, made of durable metal, and come in Macintosh platinum or high-tech black. The drive modules have a rigid integrated handle wide enough to grasp comfortably and a recess that accommodates supplied job labels.

Keep an eye out for the DataDock 7000, a new seven-bay system capable of storing up to 1.5 terabytes of data. It promises to do everything from automatically dimming its

digital display in low light to paging you if a drive fails or the system overheats.

DataDock drive configuration is via two software packages: Power Raven Utility is powerful but unwieldy RAID software. Selecting the disk volumes across which you want to stripe data requires lots of unnecessary scanning of SCSI buses and mounting and unmounting of volumes that feels unnecessary. Although you can use Raven Pro to format media as well as to set up arrays, the supplied MicroNet Utility is easier to use for formatting.

### Enterprising Storage

The MegaDrive Enterprise series has a sleek, contoured shape and comes only in black. The E-8 model holds up to eight 3.5-inch modules or up to four 5.25-inch modules. Removable guide rails let you mix and match both drive types within the same bay.

Multiple LED indicators line the top panel of the E-8's tower case, and the unit ships with



The MicroNet DataDock 525 (left) and the MegaDrive Enterprise E-8, with removable-drive modules.

removable heavy-duty fans. The drive modules' SCSI IDs appear in a small illuminated display, and you can set IDs manually or have the system do it for you automatically.

The E-8's smaller counterpart — the E-2 — holds two 3.5-inch drive modules or one 5.25-inch module. MegaDrive's modules are made of high-impact, antistatic plastic, and their pullout handles recess when not in use. Enterprise-system media formatting and RAID configuration are accomplished with the Remus Light disk utility, an unglamorous but straightforward tool that's easy to use.

### What's Best at What?

The DataDock and Enterprise systems can both accommodate many different types of storage devices, but the former boasts a few

more options than the latter, offering SyQuest, CD-recordable, and CD-player modules.

One of the best features of the two systems being reviewed here is a locking mechanism built into the DataDock that prevents removal of drive modules until they are completely idle. This adds an extra measure of protection for the drive module and ultimately for the data itself.

The absence of a similar safety feature from MegaDrive's Enterprise systems is disturbing, especially with respect to hard-drive modules, which typically have motor speeds of 5,400 to 7,200 rpm. Removal from the docking bay of a drive running at that speed can easily result in serious platter damage.

Another important safety concern is general durability — how much of a shock a removable module can tolerate. MegaDrive's marketing material touts the company's specially engineered shock-resistant drive modules — it even encourages "knocking them around" but warns against dropping them. But we were curious about MegaDrive's special shock mounting, so we opened the outer shell of one of the modules to have a look. Aside from the shock mounting built into the enclosed Quantum hard-drive mechanism, we found no additional protection.

### The Bottom Line

If you're looking for a stylish, cost-effective system, a MegaDrive Enterprise will fill the bill. Its removable guide rails save you the cost of adapters when adding 5.25-inch drive modules. However, the fact that you can pull a running Enterprise drive from its bay means that sooner or later, someone will.

MicroNet's engineering department definitely did its homework on the DataDock systems. The company's unique locking system offers outstanding data safety; its wealth of drive-module options ensures flexibility; and the Raven Pro software is easy to use.

Either of these systems will meet your needs for portability and expandability, but the choice comes down to style or safety. We'll take safety every time. / John Christopher

**MicroNet DataDock 350** with 8-GB disk array, \$5,265; DataDock 525 with 8-GB disk array, \$5,304 (list). **Company:** MicroNet, Irvine, CA; 800-800-3475 or 714-453-6100; <http://www.micronet.com/>. **Reader Service:** Circle #424.

**MegaDrive Enterprise E-2** with 8-GB disk array, \$4,559; E-8 with two 4.2-GB hard drives, \$6,549 (list). **Company:** MegaDrive, Beverly Hills, CA; 310-247-0006; <http://www.megadrive.com/>. **Reader Service:** Circle #425.



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CIRCLE 90 ON READER SERVICE CARD



4:45<sup>PM</sup>

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Color calibrating? Three clicks, all done.  
Traps and overprints? They all showed up.  
Revisions? OK, so I'm a little obsessive.  
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5:00<sup>PM</sup>

"What's next? I'm out of here."

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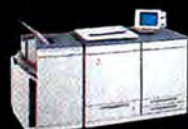


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APPLE'S LITTLE SYSTEM EXTENSION TAKES A BIG STEP FORWARD.

**A**LREADY THE LEADING FORMAT for development and delivery of multimedia applications to desktop computers — Macs as well as Windows machines — QuickTime is a key ingredient in Apple's recipe for success. The latest version, 2.5, boasts sophisticated new multimedia features yet retains the cut, copy, and paste simplicity that has distinguished Mac technology since day 1.

At its most basic level, QuickTime is a system extension for capturing, editing, and playing back video — no expensive analog editing equipment is required. But in the



# QUICKTIME

BY JEFFY MILSTEAD AND ANDREW GORE



## QUICKTIME PLUGGED IN / Apple's technology hits the Web

BETTER LATE THAN NEVER. Months after Netscape introduced a plug-in architecture for its Navigator browser, Apple has finally released a QuickTime plug-in for Navigator. Although several other companies beat Apple to the punch by releasing similar QuickTime plug-ins some time ago, Apple's version boasts unique features that make it the definitive plug-in for QuickTime on the Net.

Apple's QuickTime plug-in lets Web authors embed QuickTime movies in their pages. A set of HTML tags lets authors specify whether movies will play automatically upon loading and whether they will loop continuously or play only once. Movie viewers can play, pause, and fast-forward movies. And because QuickTime is more than a video format, the plug-in also allows the browser to automatically play background music, whether it's digitized or in the form of compact MIDI information.

The most noteworthy feature of Apple's QuickTime plug-in is Fast Start. Timing is everything with Fast Start. It allows the plug-in to measure the speed at which movies are

delivered over the Net and to start playing a movie before it's been completely downloaded. By the time the plug-in has reached the end of the movie, the file should be

completely downloaded.

In reality, this technology will probably make a difference only if you have a very fast connection (an ISDN line, for example) and if you're viewing a very long movie. In our tests of a 17-second movie downloaded at 28.8 kbps, the Fast Start feature saved us only 6 seconds out of a 4-minute-long download. Not much to write home about.

More intriguing is the addition of QuickTime VR support. Previously it was almost impossible to use QuickTime VR on the Net. Now Web authors can embed QuickTime VR scenes in their Web pages. QuickTime VR scenes are small enough to make download times reasonable, even with slow connections. The only thing that's missing is the ability to embed hyperlinks in QuickTime VR movies, a feature that would open up endless virtual-tour possibilities. Stay tuned — according to Apple, that feature will be coming in a future version of QuickTime VR. / Jason Snell



WITH APPLE'S NEW QUICKTIME plug-in for Navigator, you can view movies that are embedded in Web pages. In addition, sophisticated soundtracks can play as background music. This page includes a movie plus a looping animated logo.

scheme of all things Apple, it's much more. QuickTime is an all-encompassing data architecture and universal file format for creating, storing, editing, and delivering media-rich content.

That's the small and large of it, but what exactly is in the QuickTime software? A major component is a set of codecs that ensure that any computer equipped with the QuickTime extension will be able to play a file encoded with one of QuickTime's built-in compressors. And QuickTime is extensible. With the addition of drop-in codecs, it can support new video-capture and -compression hardware as well as any new software compression schemes that come down the pike.

New components in 2.5 make QuickTime more talented and versatile. It is now truly multiplatform (see the "ActiveMovie" sidebar). Software-based MPEG decoding provides powerful video-playback capabilities, without requiring special hardware. QuickTime's musical capabilities have been beefed up, and QuickTime has made its debut on the Web (see the "QuickTime Plugged In" sidebar). Apple has also made QuickTime much more attractive to video pros.

### MPEG for the Rest of Us

Even if you possess only a passing knowledge of QuickTime, you know it has everything to do with playing movies on your Mac. Most of the QuickTime movies on today's CD-ROMs are encoded with QuickTime's Cinepak, a video-compression algorithm that can deliver playback rates as high as 30 fps (frames per second). Frame-playback rates are a key factor influencing how smoothly a movie plays.

MPEG, QuickTime's newest built-in video-compression algorithm, delivers better image quality than Cinepak does. The quality is comparable to what you get with standard VHS tape. As an industrywide standard for motion-video compression, MPEG is the basis for the technology in such common household products as DirectTV, those minisatellite TV systems you find in the local consumer-electronics emporium.

To compress a movie, MPEG uses the keyframes at the start and end of a sequence — where there is the least motion — and discards the frames in between. When the sequence is played back, MPEG

## The Evolution of QuickTime



1991

DECEMBER

Video tracks and soundtracks

1992

OCTOBER

Text tracks

1993



interpolates between the two keyframes, so the movie plays at the correct length.

In the past, playback of MPEG files, which are compute-intensive, usually required dedicated hardware, such as Apple's MPEG Media System for Performas. The beauty of having MPEG built into the QuickTime software is that no additional hardware is required. You do, however, need a PowerPC-based system to run the QuickTime MPEG extension. With MPEG integrated into QuickTime, you can cut and paste MPEG movies, just as you would any other data type.

### Sound in Motion

Sound on the Mac has been inextricably linked to MIDI since the addition of a MIDI track to QuickTime 2.0, in June 1994. The good news was that MIDI's compactness enabled game developers to add impressive soundtracks to their products. But there were limitations: The MIDI track could play only through the QuickTime MIDI synthesizer, which was limited to the 43 built-in instruments and sounds licensed from MIDI-keyboard manufacturer Roland. Because Apple didn't publish the spec for its instrument format, many existing sound libraries available for other MIDI products couldn't be used with QuickTime.

But all that has changed with QuickTime 2.5. Apple's spec is now available, so developers can create MIDI voices by using additional third-party high-quality instrument and sound libraries. And QuickTime can play back MIDI files at 16-bit, 44-kHz stereo. Also worth noting is the new Settings control panel, which lets QuickTime connect its MIDI stream to external instruments, using either Apple's MIDI Manager, Opcode's Open Music System, or Mark of the Unicorn's FreeMIDI system.

These advances, combined with Apple's QuickTime plug-in for Netscape Navigator, allow sophisticated musical interludes to play in the background as graphics-intensive Web pages are loaded. Because MIDI files are tiny compared to their digital-audio counterparts, it takes only seconds for a Web page to deliver an entire Mozart concerto over even the slowest connection (for an example of background MIDI, check out the Mozart page at <http://enuff.apple.com/users/chris2x/quicktimeplugin/movies/mozart.html>).

### The Third Dimension

MIDI is an important non-Apple technology that's gradually been integrated with QuickTime. But look for Apple to use QuickTime to bring its own technology into the mainstream. Case in point: QuickDraw 3D.

Apple's QuickDraw 3D rendering system provides real-time feedback for 3-D modeling and a comprehensive interchange file format for describing model geometry. It has support for dedicated rendering hardware that will reportedly be built into future Apple machines and, like QuickTime, is extensible. In essence, QuickDraw 3D aims to

## ActiveMovie / Microsoft's answer to QuickTime

MICROSOFT'S FIRST STAB at a multimedia standard, Video for Windows (VfW), suffered from less-than-stellar performance. But Microsoft is nothing if not tenacious and is currently working to turn its media fortunes around. Later this summer, it plans to ship ActiveMovie, a new extensible media architecture that bears a striking resemblance to Apple's QuickTime.

ActiveMovie was created with two goals in mind: the ability to play existing multimedia files and the ability to play multimedia files efficiently over the Net. In addition to support for a variety of existing audio, AVI, and QuickTime files, ActiveMovie offers software-only MPEG playback similar to what QuickTime's MPEG extension offers.

In true Microsoft fashion, ActiveMovie borrows heavily from Apple's media brain trust. Like QuickTime, ActiveMovie sports a component-based architecture that allows for efficient handling of video data streams. Also like QuickTime, it eases the integration of third-party hardware and software by providing a media API, which is backward-compatible with VfW at the application and driver level. However, unlike VfW, with its mix of low-level and high-level APIs, ActiveMovie offers a single API that's easier to program.

Architectural similarities aside, ActiveMovie is more than a QuickTime clone. It comprises a group of individual processing elements (or filters) that can be interconnected in a flexible fashion. According to Microsoft, the filters let ActiveMovie determine if the data stream it's delivering will overwhelm the receiver — if that's the case, it will send a message "upstream" telling the filter supplying the data to slow down.

The stream-based approach may give ActiveMovie an edge over

QuickTime in playing files over the Net. Apple's solution for playing video over the Net, QuickTime's Fast Start, caches movies frame by frame on the receiving computer and begins playing a movie only when enough of it has been cached to guarantee that playback won't be interrupted (see the "QuickTime Plugged In" sidebar). By contrast, ActiveMovie actually communicates with the receiving computer, determining throughput over the network and scaling the quality of the movie accordingly.

Microsoft intends to make ActiveMovie a ubiquitous cross-platform standard. To that end, the company plans to make a Macintosh version available later this year. However, anyone using ActiveMovie to play QuickTime movies may be disappointed with the results. According to Apple, Microsoft's new media technology does not support the rich array of data types supported by QuickTime. As a result, text, sprite, MIDI, 3-D, and other specialized QuickTime data may be lost when played back by Microsoft's media extension. By the end of this summer, ActiveMovie will have an additional challenge in its effort to gain multimedia dominance, when Apple brings QuickTime 2.5 to Windows.

Because QuickTime 2.5 is based on core code, it's easy to port to multiple platforms. Apple plans to move QuickTime 2.5 to Windows 95, Windows NT, and even Windows 3.1 by the end of this summer (when it ships, ActiveMovie will not support Win 3.1). The current version of QuickTime for Windows allows users only to play movies, not to create them. But with QuickTime 2.5, Windows users will get all the same features as Mac users, including QuickTime authoring capabilities.

/ Jeff Milstead and Andrew Gore





do for 3-D visualization what QuickTime has done for multimedia.

With QuickTime 2.5, you can import and paste QuickDraw 3D objects into QuickTime movies. Full integration means not only that QuickDraw 3D works transparently with existing QuickTime applications but also that 3-D objects placed into QuickTime movies retain all their characteristics: You can resize, edit, or rerender them without affecting other movie tracks.

### QuickTime for Pros

In the past, professional video editors have turned to non-QuickTime-based high-end systems, because of QuickTime's limitations for serious video work. Version 2.5 has several features that will make it more attractive to pros. For starters, it offers a common file format for Motion JPEG (MJPEG), the preferred compression algorithm for professional video editing. Unlike MPEG, which works its compression magic by interpolating between keyframes, MJPEG retains information about each individual frame in a movie — important to video pros.

Currently, there's a multitude of video-capture cards that allow professionals to digitize video from tape. All these high-end cards save digitized video in the MJPEG format, but unfortunately, each card uses a different flavor of MJPEG, so

users can't exchange video among systems equipped with different cards.

To address this problem, QuickTime 2.5 includes two new codecs that recognize two common flavors of MJPEG. Out of the box, QuickTime 2.5 can open MJPEG files and convert them to one of the two common flavors, facilitating exchange among systems.

Professional video editors also need speed, and one of the best ways to get it is to divide compression tasks among multiple processors. With this in mind, Apple has added multiprocessing support to QuickTime 2.5. Cinepak compression is now more than twice as fast on a DayStar Genesis MP 600, which is equipped with four processors, as on an otherwise equivalent single-processor machine such as a Power Mac 9500/150.

Among the other professional-video enhancements is support for fields within QuickTime. In NTSC and PAL video, two interlaced fields comprise a single frame. Because QuickTime can now recognize and tag these fields, video-editing tools will be able to accurately convert movies captured from video at 30 fps to film at 24 fps.


Last, reliable synchronization of video and sound has been an issue with very long QuickTime movies used in video production. Version 2.5 aims to address this problem too, by including a new clock component that should make synchronization easy.

### Additional Goodies

One of QuickTime 2.5's coolest new features is a Photoshop compression algorithm, which preserves the transfer modes in Photoshop alpha channels. Apple has also made working with QuickTime's text track easier in version 2.5. Using third-party tools such as MovieStar Maker, from Intelligence at Large, you can now modify such text attributes as typeface, color, fade-in/out, and scrolling.

Support for closed-captioned text has also been added. As the video signal from a TV broadcast is digitized, any closed-captioned text embedded in the signal can now be captured and stored in QuickTime's text track. This feature will initially be supported by Apple's TV-tuner card.

### Multimedia Landmark

Although many Apple technologies have come and gone, QuickTime has been a solid, consistent performer that has dominated the multimedia landscape. And QuickTime just keeps getting better. Version 2.5 is more than just another milestone on the QuickTime highway — it marks the beginning of a brave new open-platform world. If you don't believe it, look where the QuickTime team now resides in Apple's new org chart. With the most recent restructuring, Apple CEO Gil Amelio has placed QuickTime in the Alternative Platforms division — where it truly belongs. 

Jeffy Milstead is a senior project leader for MacUser Labs who specializes in video hardware and software. He's been waiting his entire life for the ability to play back ActiveMovie files on his Mac. Andrew Gore is the editor of *MacUser*.

BOOKMARK

FOR MORE INFORMATION or to download the latest version of QuickTime, go to Apple's QuickTime site at <http://www.quicktime.apple.com/>.

## COMING ATTRACTIONS / QuickTime will make cameras smart, movies interactive



RIGHT NOW, QuickTime 2.5 delivers big on multimedia features. But plans call for even more tricks in the QuickTime bag. Future versions of QuickTime will serve as an operating system for digital cameras. You'll also see tools for building interactivity into QuickTime movies.

As we went to press, Apple declined to comment on which camera companies will adopt its QuickTime IC (Image Capture) operating system for digital cameras or on exactly when such devices will arrive. But the company was very forthcoming about

the advantages that QuickTime IC will offer.

Combining a multitasking OS with APIs for capturing images to a processor embedded in the camera, QuickTime IC can be used in digital cameras that, all by themselves, can accomplish many of the image-processing tasks that currently require a computer. For example, Apple claims that QuickTime IC-based cameras will be able to connect directly to the Internet to transmit images and will do in-camera time-lapse photography. You'll also be able to connect the cameras, via modem, to service

bureaus that will receive your photos and turn them into postcards. And last, QuickTime IC will enable a camera to directly control the motorized rig required for creating QuickTime VR pictures.

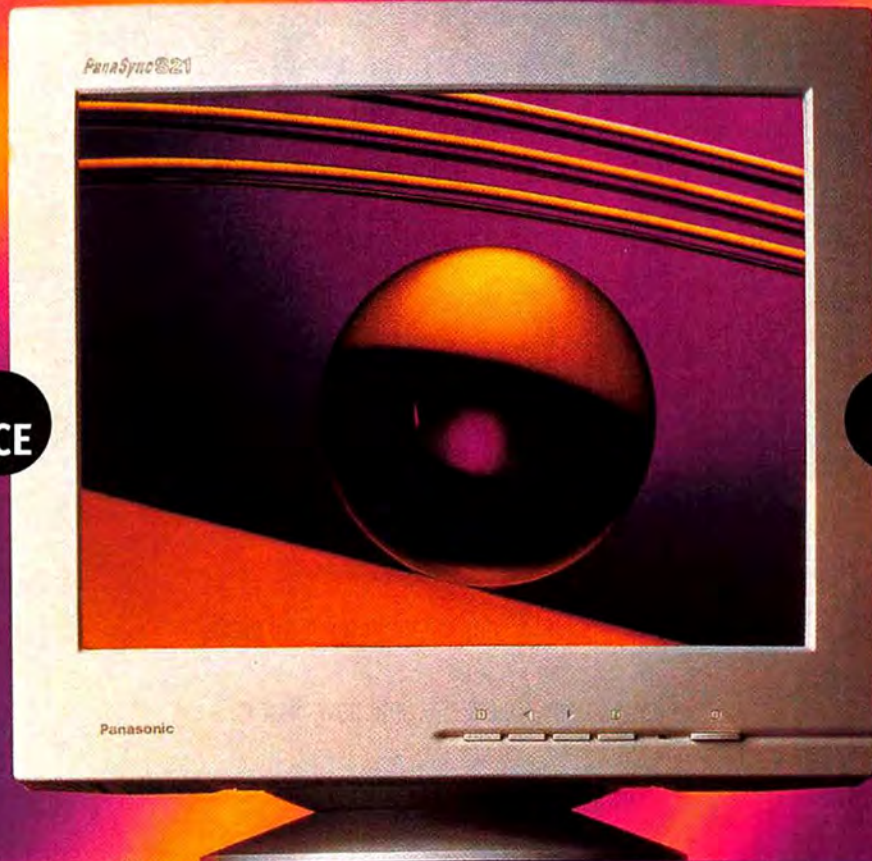
On another front, future QuickTime architectures will allow moviemakers to easily build interactivity into their work. Controls will let users click on "hot zones" that will determine which parts of the movie will play. Or by clicking on sprites, users will be able to control their behavior.

As part of its effort to build interactivity into QuickTime, Apple will

also recast HyperCard, the company's venerable end-user programming toolkit. The next version will be based on QuickTime, so cards will be able to relate directly to particular frames. That means you'll be able to use HyperTalk commands to move among frames. HyperCard is being completely rewritten to make it fully PowerPC-native and to make it implement modern programming techniques. Apple says that this will make the next version of HyperCard more efficient at working with the diverse range of media types supported by QuickTime. / Andrew Gore



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CIRCLE 80 ON READER SERVICE CARD

MN12-MAC



The graphic features the word 'mTropolis' in a large, black, serif font at the top. Below it, the word 'UPSTAGES' is written in white, bold, sans-serif capital letters inside a dark blue rectangular box. At the bottom, the word 'Director' is written in a large, black, serif font. The background is a grayscale image of a city skyline with tall buildings. The entire graphic is enclosed in a thin red border.

# mTropolis UPSTAGES Director

Director has been the only show in town for serious multimedia developers — until now, that is.

Upstart mTropolis not only alters the playbill but also outdoes Director in more ways than one.

**T**HEATER DIRECTORS AND MULTIMEDIA DEVELOPERS have quite a lot in common. Whether they're producing a play or a CD-ROM title, they're working with a stage, a variety of sets and scenes, and a cast of characters. So it's no accident that the first tool for creating multimedia productions was dubbed Director. Based on a theater metaphor, Macromedia's powerful authoring package has reigned supreme in the multimedia arena for years, with no real challengers.

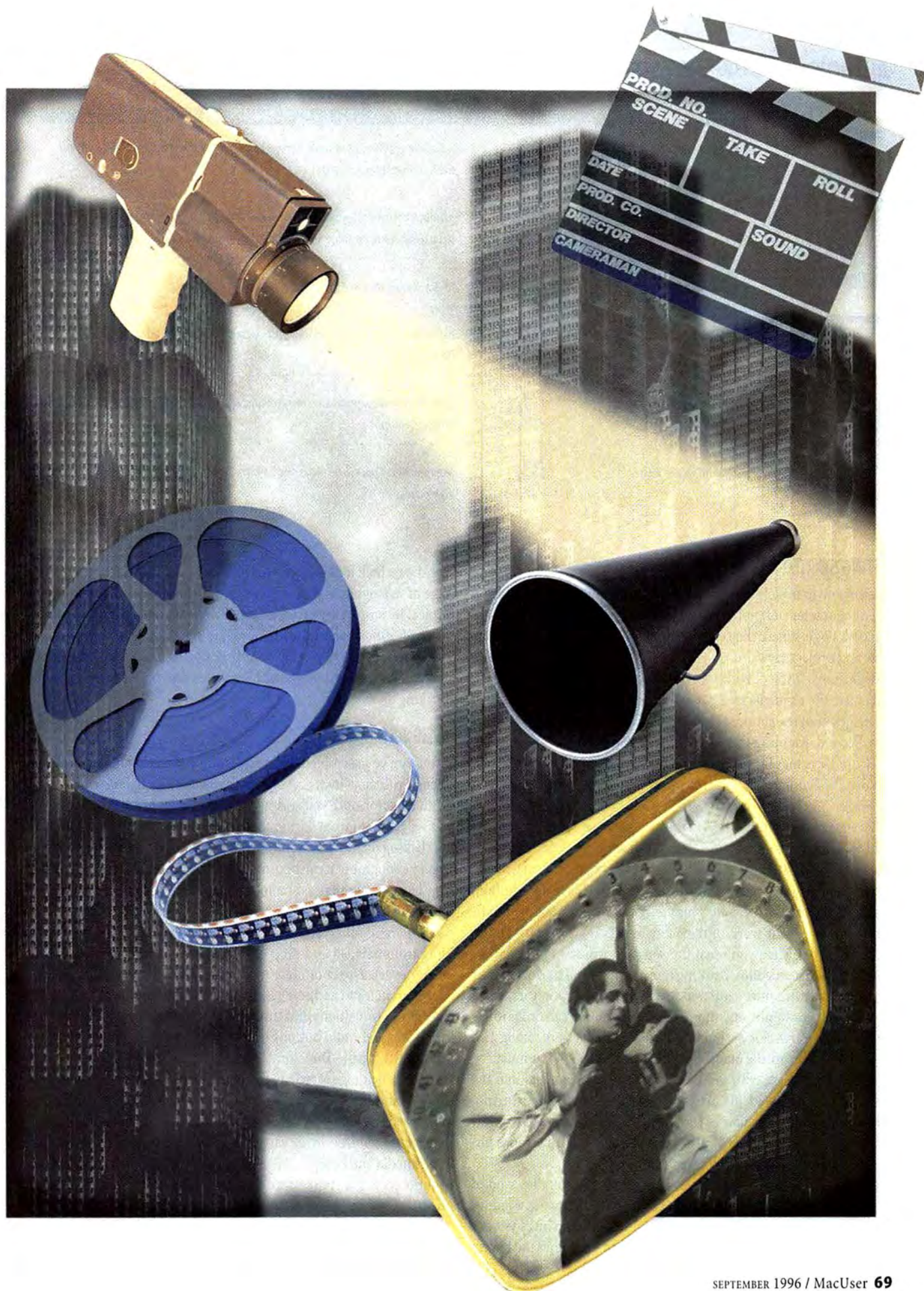
But that's changed. With the recent introduction of mFactory's mTropolis, multimedia developers now have a choice. And Director and mTropolis do use very different paradigms. Director is old-school,

providing a timeline as the basic framework for projects and a scripting language for controlling objects. mTropolis is a state-of-the-art object-oriented program, which means that each object in a production contains the code that tells it how to act. It's also pricey — at \$4,995, it's much more expensive than the \$1,195 Director.

The proponents of mTropolis have been quick to tout its advantages over Director — they claim that mTropolis helps you create better interactive titles faster and that it's easier to learn than Director. True or false? To answer that question, we used each program to construct an interactive application and compared the programs' strengths and weaknesses for each step of the authoring process.

By Matt LeClair and Donnie O'Quinn













## AUTHORING PROGRAMS SQUARE OFF / MTROPOLIS STEALS THE SHOW

## MTROPOLIS 1.1



## DIRECTOR 5



| MULTIMEDIA-PRODUCTION PHASE | ADVANTAGE   | COMMENTS   |
|-----------------------------|---|--|
| Getting started             |  | mTropolis provides a full view of project screens as you're creating and modifying them, minimizing screen clutter.                                      |
| Assigning behaviors         |  | mTropolis' object-oriented approach allows many complex properties and behaviors to be assigned to an object in one operation, rather than individually. |
| Building interactivity      |  | No scripting is required with mTropolis.   |
| Animating objects           |  | mTropolis offers greater flexibility, because it's not restricted by timelines and frame rates.  |
| Adding text and graphics    |  | Director supports anti-aliased text, kerning, and tracking and provides a basic graphics editor.   |
| Moving to the Web           |  | Macromedia's Shockwave technology allows the embedding of Director movies in Web pages.  |

## GETTING STARTED

Director and mTropolis are similar in the way they assemble a project's cast of characters, organize the project into scenes, and arrange action on a stage. Where they differ is in the convenience of their interfaces and project views.

Beginning a project with Director involves two basic steps. First, you create the elements or assemble preexisting ones (elements can be images, movies, sounds, or text) and import them into Director's Cast. Second, you drag them to the Stage and sequence them, using the Score, Director's frame-by-frame visual version of a musical score. You use the Score to synchronize and composite all the elements on the Stage.

Because the Score organizes all this control in one place, it's a powerful tool. But it dictates an abstract approach to project design, because you work with textual representations of your project elements rather than with the elements themselves on the Stage. In addition, the Score window can obscure your view of the Stage, making it difficult to see how your work in the Score affects the project. Another problem is that when you open the separate windows required for Director's Cast, text editor, painting tools, scripts, and playback, your screen quickly becomes cluttered. Even with large monitors, you'll find yourself constantly opening and closing windows in order to see what you're doing. For serious multimedia developers, using two monitors — one for the Stage and one for the tools — is a must.

To begin a project with mTropolis, you import elements into the Asset Palette (almost identical to Director's Cast) and drag them into the Layout window (similar to Director's Stage). The Layout window provides a WYSIWYG view of your current scene — you arrange objects on the stage simply by dragging and dropping.

In all, mTropolis provides three main windows that allow you to view your project in various ways. In addition to the Layout window, there's the Structure window, which provides a hierarchical view of all of a project's scenes and the elements within them, and the Layers

window, which looks similar to Director's Score. However, the advantage of mTropolis is that you can do most of the work of building a project by employing just the Layout window and a couple of diminutive Modifier palettes, which provide selections for setting object properties and behaviors. Not only does this give you plenty of on-screen elbowroom but you can also view the project while you are working on it.

## ASSIGNING BEHAVIORS

After you've assembled your cast and organized your project into scenes, you must instruct your cast and crew how to look and behave. With Director, once you've dragged cast members onto the Stage, you can select them from within the Score and assign attributes to them by clicking on radio buttons and selecting from pop-up menus. This is easy enough, but it can become time-consuming and awkward when you have numerous cast members — every trait must be assigned individually.

With mTropolis, your project is governed by modifiers, which you drag from palettes and drop onto objects. You'll find a modifier for nearly every aspect of creating a project, from setting background transparencies to assigning drag-and-drop properties for objects to specifying transitions and timing. You select most modifier settings by clicking on radio buttons or choosing from pop-up menus — as easy as working in Director.

A key advantage of mTropolis' object-oriented approach, however, comes into play as you're assigning modifiers to objects. Being an object-oriented program, mTropolis supports class relationships and inheritance. Objects in the same class share the same properties. Since multimedia authoring is, in general, all about repetition, if you have eight objects that possess all the same properties, you need define those properties for only one object. The remaining objects in the class can then inherit those properties. This method delivers a big boost to productivity.



And you can quickly and easily create new object classes. Objects in a brick class, for instance, would have specific properties of size, shape, weight, color, and hardness. You could then easily create a new class of bricks — without having to start from scratch — by specifying that the new class inherit the properties of the original brick class but have different qualities of hardness and “bounceability.” The result? A new class of rubber bricks.

mTropolis provides several options that help you take further advantage of class relationships and inheritance. You can group multiple modifiers to create a single behavior and then assign that behavior to an object — meaning that you can assign a complex combination of properties and actions to an object in one fell swoop.

In the early stages of a project, if you're not sure how you want a group of objects to behave, you can create an alias of a modifier and copy the alias throughout your production. Later, after you've decided on the properties and actions for the group, you can make changes to any one copy of the alias and all objects that have been assigned that alias will be updated automatically. This is a real boon for developers, because it lets them efficiently make sweeping changes to projects.

For those who develop several projects at once, mTropolis boasts another advantage. Unlike Director, it lets you open multiple projects simultaneously, so you can easily drag and drop modifiers between one project and another. Additionally, you can store modifiers in a library for future use or for team collaboration.

The bottom line is that mTropolis saves you considerable time and effort by letting you assign multiple properties and behaviors to multiple objects with a single operation, whereas with Director, you must specify properties and behaviors for each object individually.

## BUILDING INTERACTIVITY

Interactivity is what makes multimedia applications so intriguing. It can be as simple as a button that makes a movie play when you click on it or as complex as a logic puzzle you must solve before you can move to the next scene. It's also the most difficult aspect of designing multimedia applications. Director and mTropolis use very different methods for creating interactivity — overall, mTropolis gets the nod for offering the smoother path.

Creating complex interactivity with Director requires use of Lingo, the program's extensive scripting language. You can use Lingo to program objects to behave in a certain fashion or to send messages to other objects that trigger actions. You can also apply scripts to frames in the Score, so that a specific action — such as clicking on a button or selecting the correct answer — moves the user to another scene. Lingo makes Director incredibly powerful, but the flip side of its power is a steep learning curve.

A major difference between Director and mTropolis is that Director began life as an animation tool and Lingo was added after the fact, to provide a way of creating interactivity. mTropolis was built from the ground up as an interactive-multimedia authoring tool. The process of building interactivity into a project mirrors this difference — with Director you create scripts and apply them to objects after you've created the objects, whereas with mTropolis you build interactivity into objects as you're creating them.

Like Director, mTropolis allows you to give objects the ability to communicate with one other, but again, this ability has been built into objects from the very beginning, which allows for complex and variable interactions that don't have to be individually thought out

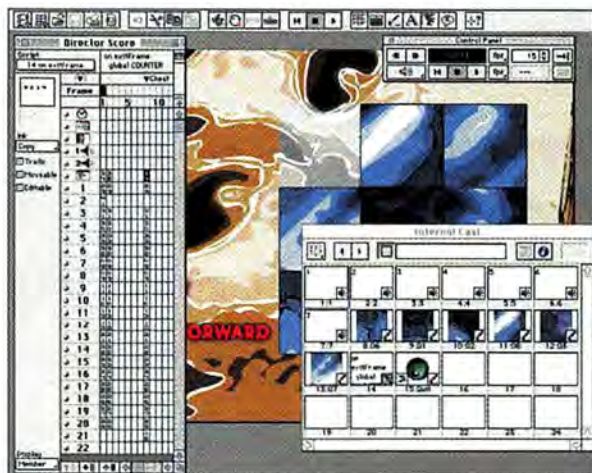
# MAKING THE SCENE

## PROJECT VIEWS IN DIRECTOR AND MTROPOLIS

IN ORDER TO EXAMINE the major differences between Director and mTropolis, we used each program to create a series of interactive Joseph's puzzles (remember those little plastic puzzles made of movable tiles?). The puzzle pieces make a different pattern each time you scramble them, and each piece plays a sound when you move it. An animation plays when you solve a puzzle in the allotted time frame.



In Director, the Stage (top) presents a view of your project as you're creating it. But because you work mainly with Director's Score as well as with a variety of other windows in order to synchronize and composite all the objects onstage, your view of the Stage is often obscured (bottom).



mTropolis presents a view of your project in the Layout window (top). You can do most of your work by using this window plus several small Modifier palettes (bottom), so your screen remains uncluttered and you can see your project as you're working on it.





## FEATURES OF MULTIMEDIA AUTHORIZING SOFTWARE

|   | DIRECTOR 5         | ✓ MTROPOLIS 1.1       |
|---|--------------------|-----------------------|
| List price  | \$1,195            | \$4,995               |
| <b>AUTHORIZING-SYSTEM SUPPORT</b>   |                    |                       |
| Power Mac   | ●                  | ●                     |
| 68040 Mac   | ●                  | ●                     |
| Windows 95 PC   | ●                  |                       |
| Windows NT PC   | ●                  |                       |
| Windows 3.1 PC  | ●                  |                       |
| <b>PLAYBACK-SYSTEM SUPPORT</b>  |                    |                       |
| Power Mac   | ●                  | ●                     |
| 680x0 Mac   | ●                  | ●                     |
| Windows 95 PC   | ●                  | ●                     |
| Windows NT PC   | ●                  |                       |
| Windows 3.1 PC  | ●                  | ●                     |
| <b>BUILT-IN EDITORS</b>   |                    |                       |
| Animation   | ●                  | ●*                    |
| Graphics  | ●                  |                       |
| Text  | ●                  | ●                     |
| <b>KEY FEATURES</b>   |                    |                       |
| Text kerning and tracking   | ●                  |                       |
| Text anti-aliasing  | ●                  |                       |
| Text-to-bitmap conversion   |                    | ●                     |
| Multiple open documents   |                    | ●                     |
| Drag-and-drop between documents   |                    | ●                     |
| Multiple color palettes   |                    | ●                     |
| Extensibility   | ● <sup>†</sup>     | ● <sup>‡</sup>        |
| Object messaging  |                    | ●                     |
| QuickDraw 3D support  | ●                  |                       |
| QuickTime VR support  | ●                  | ●                     |
| No. of supported file formats   | 21                 | 10                    |
| <b>SUPPORT</b>  |                    |                       |
| Built-in help system  | ●                  |                       |
| Online  | ●                  | ● <sup>§</sup>        |
| Phone   | ●                  | ● <sup>§</sup>        |
| Free  | 90 days**          | 30 days <sup>††</sup> |
| <b>COMPANY</b>  |                    |                       |
|   | Macromedia         | mFactory              |
|   | San Francisco, CA  | Burlingame, CA        |
|   | 800-945-9354       | 888-622-8669          |
|   | 415-252-2000       | 415-548-0600          |
|   | 415-626-0554 (fax) | 415-548-9249 (fax)    |
|   | http://www         | http://www.mfactory   |
|   | .macromedia.com/   | .com/                 |
| ✓ MacUser BEST BUY  |                    |                       |
| *Uses a proprietary animation format called mToon.  |                    |                       |
| †Available via plug-ins.  |                    |                       |
| ‡Users can modify code.   |                    |                       |
| §Tech support is \$750 per year for online support and \$1,500 per year for online and phone support. |                    |                       |
| **Tech support is \$249 per year after the first 90 days.   |                    |                       |
| ††Installation only.  |                    |                       |

and created manually. For instance, you could give a sun object the ability to broadcast the message "I'm shining" to all other objects in a scene. The other objects could have the ability to react in appropriate ways when the sun shines — a plant object, for example, could trigger an animation of itself growing and a vampire object could burn.

The important thing to remember is that the objects themselves dictate the messages and the reactions. There is no script for them to follow. Furthermore, much of what requires scripting in Director can be achieved in mTropolis simply by the dragging and dropping of modifiers and the specification of settings via pop-up menus.

mTropolis also has a scripting language, called Miniscript. Unlike with Director, however, you can accomplish so much without it that many users will be able to avoid using it entirely. It's mainly for setting the values of variables, creating IF/THEN statements, and sending multiple messages.

## ANIMATING OBJECTS

When it comes to adding motion to objects, mTropolis benefits again from its state-of-the-art status. Director, which began life as an animation program, relies on timelines and frame-by-frame sequencing — time-honored tools of the animation trade but somewhat outdated by today's computer-driven standards. mTropolis' approach is more flexible and takes better advantage of your Mac's power — its Simple, Vector, and Path Motion modifiers allow an object to specify movement at run time, so you're not bound to a timeline or restricted to a set number of frames.

Director offers two types of animation — one moves an object from point A to point B on the Stage; the other animates stationary objects. The Score is tailor-made for creating frame-based animations, which can be as simple as step recording or as complex as cel animation using sequenced frames generated by other programs.

To facilitate step recording, Director's In-Between command fills in a series of frames from a starting point to an ending point, which you define. Properties such as fade-in and fade-out, curved paths, and tempo changes can be built into In-Betweened animations. You can also import a series of PICT images from another program, link them to create an animation, and turn the animation into a cast member.

Without a timeline, how do you animate objects in mTropolis? You use either modifiers or mTropolis' proprietary animation format, called mToon. With modifiers, you have three options: Simple Motion moves an object into or out of a scene in a straight line, Path Motion moves an object along a path you specify, and Vector Motion moves an object in a particular direction at a set speed.

For more-sophisticated animation effects, you use mToons. mToons let you link a series of PICT images and import them as a single object into mTropolis. The object has all the properties of a graphic object, so you can enhance it in a variety of ways — give it a transparent background or drag-and-drop properties, for example. In addition, the object has all the properties of a movie — it can play the PICT-image sequence at any frame rate you specify. And because the movie exists as an object in mTropolis, you have more control over how it behaves than you do with Director movies.

## ADDING TEXT AND GRAPHICS

Traditionally, the addition of text has presented a real obstacle to multimedia developers. In most cases, you had to create it with a word processor; bring it into an illustration program and convert it to paths;



and then pass it along to Photoshop, where it was rasterized and anti-aliased with a background image. Dealing with text can add weeks to the development time if you're working on a large interactive project.

Director 5's ability to create anti-aliased text almost solves this problem. For starters, the new version can import RTF (Rich Text Format) files, which means that you can format your text quickly and easily in your word processor and Director will preserve all the formatting (including tracking, kerning, and leading). It can also anti-alias the text.

What it can't do is embed the text, so if a user doesn't have the fonts you used, the text won't display properly. To get around this problem, you can either limit yourself to system fonts or convert all the text into a graphic element. However, text converted into a graphic element loses its anti-aliasing.

Director's graphics editor is very basic — it hasn't changed much since the program was created. Although it now supports Photoshop filters, it doesn't have an anti-aliased brush, which means that anything you create with it will look like MacPaint art. Still, it is useful for occasional quick-and-dirty pixel editing and at least it's there — mTropolis has no graphics editor at all. Although this may seem like a glaring omission, most multimedia developers who want the best-quality text and graphics will use a full-fledged image-editing program and a drawing program for creating project elements.

Text in mTropolis is treated like any other object. The program's text editor has one redeeming feature: It can convert text into a bitmap on the fly as it creates a player file. This approach has two advantages — text remains editable in the project file, and viewers of your project

won't encounter font problems. But the bad news is that mTropolis produces the same blocky, non-anti-aliased text that has plagued multimedia applications for some time now.

## FINAL ACT

Before the introduction of mTropolis, multimedia pros really had only one choice for developing applications. Director was, and still is, a powerful tool, but its Score paradigm quickly becomes awkward for large, complex projects and its Lingo programming language is a bear to learn.

As an object-oriented program, mTropolis was built from the ground up to handle large, sophisticated, highly interactive applications. Its support for object classes and inheritance and the ability to easily recycle behaviors from one project to another help make it the obvious choice for developers of complex commercial applications.

For many users, however, mTropolis is overkill, offering far more than they need and costing far more than they can afford. Director remains a solid choice for those developing more-manageable applications. And its documentation and online help have mTropolis beat hands down. In the end, mTropolis may be getting all the curtain calls, but veteran Director — with its legions of longtime users — still knows the score, the script, and the multimedia scene. ☞

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# MOVING TO THE WEB

## MACROMEDIA TAKES THE LEAD

AS THE GRAPHICAL SIDE of the Internet coin, the Web offers both rich content and sophisticated design. But as we move closer to the second millennium, Web surfers can also expect to see elements that move and talk back.

One of the pioneers of multimedia on the Web is Macromedia, with its Shockwave technology for compressing and playing back Director movies. Shockwave is a plug-in that lets Netscape Navigator 2.0 and Microsoft's Internet Explorer play Director movies. Preparing Director movies for the Web involves processing them with Macromedia's Afterburner application, which compresses them by as much as 50 percent and then creates single, multiplatform files that can be embedded into Web pages. Both the Afterburner application and the Shockwave plug-in are available free from Macromedia's Web site.

So why not use Shockwave to simply repurpose CD-ROM content for distribution over the Web? Well, don't break out the popcorn yet. The problem is, in a word, *bandwidth*.

Downloading a single 640-x-480-pixel RGB graphic that's about 900K in size will try the patience of even those with the highest-speed modems.

True, developers can designate items in Director to preload, so users can view one item as others download. But all but the simplest animations and interactive

pieces take a painfully long time to arrive in memory and on-screen.

Web developers can get around this hurdle, however, by thinking about how to enhance standard Web pages by the addition of multimedia elements

and by being smart about the elements they choose. For example, a simple Director animation, using several small-sized images of a rotating cog and a sound file of grinding gears, could be used as a button to spice up a Web page.

The latest version of Director boasts several features that make it especially Web-savvy. Support for multiple casts means that Web developers can create a separate cast for each of several languages. Another intriguing feature is the ability to create hybrid titles that combine traditional interactive CD-ROMs with Internet interactivity.

Although it has nothing like Shockwave available yet, rival mFactory plans to make plug-ins for Netscape Navigator and Internet Explorer available in the third quarter of this year. mFactory's plug-ins will be similar to Shockwave but with a few interesting twists. According to the company, mTropolis on the Net will support object streaming and fragment loading, which means that ob-

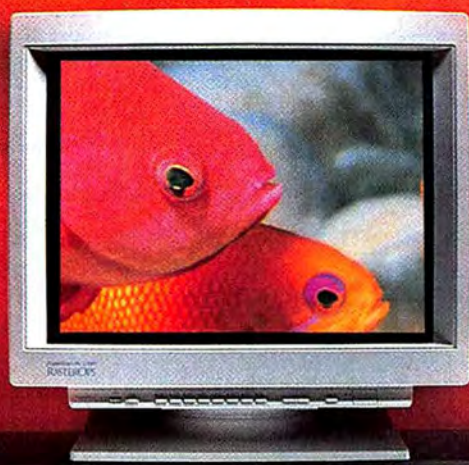
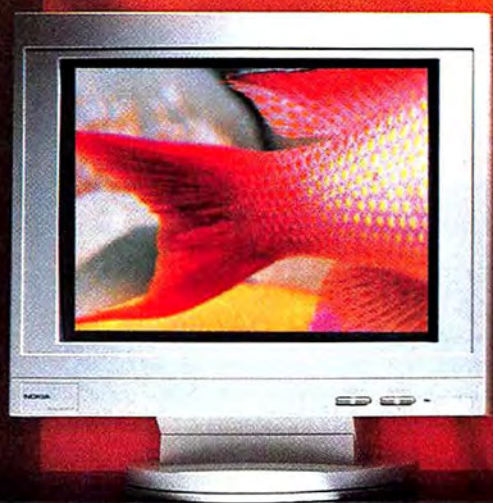
jects will selectively download based on users' actions. Even more noteworthy, mTropolis' messaging system will be converted to support TCP/IP, which will allow for collaborative interactivity over the Net. This feature will fuel the development of multiuser interactive games and interactive worlds.



Simple animations, powered by Shockwave-processed Director movies, make this Web site — currently under development by M/BI for the French band Deep Forest — come alive.

TO SEE SHOCKWAVE in action, check out ShockR at <http://www.shockr.com/shockr/cool.html> for links to many of the cool sites currently using Macromedia's technology.









# PROFESSIONAL COLOR MONITORS

**SUPER-RESOLUTION MONITORS GIVE IMAGING  
PROS THE BIG PICTURE. OUR EXPERTS PICK  
THE BEST OF THE BUNCH.**



FOR ADOBE PHOTOSHOP PROS, time is of the essence. Even a task as simple as scrolling through an image can waste precious time. The more image you can fit on the screen, the better — and that's why Photoshop users set their monitors to the highest possible number of pixels on the screen. But even at 1,280 x 1,024 pixels (the highest setting for most monitors), you can't see a large image at a 1:1 ratio, so you still need to do some scrolling. Unless, that is, you have one of today's state-of-the-art super-resolution monitors.

Super-resolution monitors support a resolution of 1,600 x 1,200 pixels at 24 bits of color (8 bits per channel of red, green, and blue). Super resolution (the term was coined by the now defunct company SuperMac) is a big payoff if you use Photoshop, because it lets you view large images at a 1:1 ratio, which means you spend less time scrolling through an image.

**BY BRUCE FRASER**

PHOTOGRAPHY / JIM KARAGEORGE; SCREEN IMAGE / MARC CHAMBERLAIN © TONY STONE IMAGES



But imaging pros demand more from a monitor than the ability to display an entire image. Accurate and stable color quality, easy-to-use controls, and a color-calibration system for color management are equally important. With that in mind, we tested monitors that include some kind of software or hardware monitor-calibration kit for color accuracy.

To determine which of the nine super-resolution monitors available today offer imaging pros the best picture quality and color accuracy, we put them through an exhaustive battery of tests. And since you need a special card to use super resolution, we also reviewed the three PCI graphics cards that support 24-bit color at super resolution (see the "Super-Resolution Graphics Cards" sidebar). Our results show that the Radius PressView 17 SR has the best image quality, but if you use the Radius ProSense hardware/software calibrator, you can get good performance from some of the other monitors we tested. We also found that a couple of the monitors aren't suited for the specific needs of imaging pros.

## ON THE SPOT

Our first set of tests involved taking a variety of measurements, such as those for convergence and pincushion error, with a Microvision SpotSeeker III spot meter. We then used a Minolta Color Analyzer

## THE BOTTOM LINE

IMAGE QUALITY, vital to prepress pros, was the most important factor when we rated each monitor. We evaluated each monitor for image quality at a 1,600-x-1,200-pixel resolution with 24-bit color at a D50 color temperature, the prepress standard. We also considered the hardware and software controls as well as calibration, vendor support, and price.

+/ OUTSTANDING      ● / ACCEPTABLE      - / POOR

| RATING | PRODUCT | PRICE | IMAGE QUALITY | CONTROLS/CALIBRATION | SUPPORT |
|--------|---------|-------|---------------|----------------------|---------|
|--------|---------|-------|---------------|----------------------|---------|

★★★★★ **Radius PressView 17 SR** - + + -  
 The "outstanding" rating we gave the Radius PressView 17 SR (\$2,499 list, \$2,100 estimated street) for image quality is simply an understatement. Its on-screen images came the closest to matching our printed images. The bundled ProSense calibrator is so technologically advanced that it can improve even monitors that have poor image quality.

|       |                             |   |   |   |   |
|-------|-----------------------------|---|---|---|---|
| ★★★★★ | Mitsubishi Diamond Pro 21TX | + | + | ● | ● |
| ★★★★★ | Radius PressView 21 SR      | - | + | + | - |
| ★★★★★ | RasterOps SuperScan Mc 21   | ● | ● | ● | ● |
| ★★★★★ | ViewSonic PT810             | + | ● | - | ● |
| ★★★★★ | RasterOps SuperScan Mc 21HR | ● | ● | ● | ● |
| ★★★★★ | ViewSonic PT770             | + | ● | - | ● |
| ★★★★★ | Eizo Nanao FlexScan F2*21   | ● | - | - | ● |
| ★★★★★ | Nokia Multigraph 445X       | ● | - | ● | ● |

LISTING IS ALPHABETICAL WITHIN GROUPS OF EQUAL MOUSE RATINGS.

CA-100 to measure brightness, color tracking, color range, and color uniformity. All of our tests were performed with the monitor set to a color temperature of D50 (5,000 degrees Kelvin), the graphic-arts-industry standard. We set each monitor to D50 by using its front-panel controls.

The Radius PressView 17 SR was our overall spot-meter winner. It's the more expensive of the two 17-inch monitors we tested, but the ProSense calibrator and software that come bundled with it make for a complete package that's worth the price.

The Mitsubishi Diamond Pro 21TX had the brightest display. The Radius PressView 21 SR uses the same tube as the Mitsubishi monitor but comes with some valuable calibration hardware and software (the Radius PressView 17 SR comes with the same hardware/software bundle). The PressView 21 SR's scores on the pincushion-error and spatial-uniformity tests prevented it from getting a better overall image-quality score.

The RasterOps SuperScan Mc 21 had the highest score for spatial uniformity (even brightness across the screen), but it also displayed the greatest amount of color variation. Its more expensive sibling, the RasterOps SuperScan Mc 21HR, surprised us by scoring lower overall than the SuperScan Mc 21.

Using the 17-inch ViewSonic PT770 at the 1,600-x-1,200-pixel setting simply overtaxes it. The PT770's refresh rate of 66 Hz at 1,600 x 1,200 pixels was the lowest of the bunch, and the monitor had a noticeable flicker. Its display also wasn't bright enough for it to work well at a D50 color temperature. The PT770's 21-inch sibling, the ViewSonic PT810, also suffered from insufficient brightness at D50 and scored badly on the convergence and color-uniformity tests. However, although they aren't up to the standards required by imaging pros, we do think the PT770 and the PT810 are good general-purpose monitors.

The Eizo Nanao FlexScan F2\*21 and the Nokia Multigraph 445X trailed the rest of the pack by a considerable margin. The Eizo Nanao monitor's display suffered from a lack of brightness and from very poor convergence, resulting in fuzzy, smeared-looking type. The Multigraph 445X's display had good brightness, but the monitor's pincushioning, spatial-uniformity, and color-tracking performance was poor.

The spot-meter measurements gave us a good idea of each monitor's basic strengths and weaknesses, but these numbers don't tell the whole story. We also had to see the quality of the images on-screen with our own eyes.

## JUDGE AND JURY

After collecting the spot-meter measurements, we subjected the monitors to the most stringent test of all: putting them in front of a jury of *MacUser* monitor experts. We hooked each monitor up to a Power Mac 7500/100 with a Radius ThunderColor 30/1600 PCI graphics card and set it at super resolution and 24-bit color. We then used the calibration kit that was bundled with each monitor (or offered as an option) to calibrate for color accuracy at a D50 color temperature and a gamma of 1.8 (the recommended value for print proofing). The experts compared three on-screen images on each monitor with corresponding Matchprint proofs displayed on a GTI Model SOFV-1 print viewer.

When we compared the spot-meter measurements with the jury results, we found that the monitors that gave us poor spot-meter



## MAKING SENSE OF THE PROSENSE / WHY IT OFFERS TOP-NOTCH COLOR MATCHING

SCREEN-TO-PRINT matching presents a special challenge to monitors. The industry-standard color temperature for lighting used to view printed pieces is 5,000 degrees Kelvin, known as D50. The challenge lies in the fact that D50 is not a native color temperature for most monitors — that lies somewhere between 6,500 and 9,300 degrees Kelvin.

All monitor calibrators work basically the same way: They reduce the brightness of one or more of the electron guns in the monitor (usually the blue gun) to bring the color temperature down to D50. In doing so, they make the monitor lose brightness. The hard part in using a monitor at D50 is maintaining reasonable brightness. If the display isn't bright enough, white appears as a dingy yellow.

There are two approaches to achieving a D50 color temperature. The less common but superior way is to directly control the red, green, and blue electron guns in the monitor through voltage amplifiers. This technique is used in the RasterOps SuperScan Mc 21 and Mc 21HR — both monitors have D50 as a preset color temperature. The Radius PressView monitors also have voltage amplifiers, but control is via a serial cable and the ProSense calibrator.

The more common way vendors achieve D50 is via the use of a lookup table that's stored inside the video circuitry's DAC (digital-to-analog converter). To reach D50, the vendor turns the blue channel down so that it has fewer possible shades. For our testing, we used Radius ThunderColor 30/1600 PCI graphics cards, which have three 10-bit DACs. The calibrator can bring the 10-bit DAC for the blue channel down while still delivering a full range of 256 shades. However, we found that only the Radius ProSense calibrator took advantage of the 10-bit DAC.

When we relied solely on the calibration kits provided by the vendors,



**The Radius ProSense calibrator**, teamed with a Radius ThunderColor 30/1600 PCI graphics card, can vastly improve your color monitor's images at a D50 color temperature.

only the two Radius monitors provided a truly accurate screen representation of the Matchprint proofs. The other systems all gave an overly optimistic view of what happens to a deep blue when it's printed, failing to show the purplish hue that results. This effect is caused by the routines Photoshop performs for color matching. When Photoshop displays CMYK files, it looks to its own separation tables to get device-independent Lab color equivalents for the CMYK colors and then it looks at the monitor's color gamut to figure out the RGB values that would represent those colors accurately on the monitor.

Thus, effective monitor calibration is only one of three components necessary for a good match between printed output and on-screen images when you're using Photoshop. You also need a way to report the monitor's color gamut to Photoshop's Monitor Setup preferences and an accurate

separation table for converting the CMYK data to an accurate RGB representation for the monitor.

Of all the vendors whose products we tested, Radius was the only one that provided all three components of the color-calibration equation with Photoshop. We created several custom Photoshop separation tables, using a variety of third-party utilities, and came quite close to matching the Matchprint proofs on-screen. But we found that Radius' separation tables gave us a closer match, so we used them in our evaluations of screen-to-print matching to ensure that the only variable in our juried image-quality testing was the monitor calibration.

The ProSense calibrator is offered as a stand-alone product for \$799 and comes with a set of preconfigured separation tables for monitors other than the Radius PressViews. Specific tables for various makes and models of monitors are available; you can also use the ProSense to create one.

measurements also got low marks from our jury. More important, we found that the monitor is only one of the necessary components of a color-accurate, high-resolution display system. Calibration software and hardware, the graphics card, and the method used to display files on-screen are also important parts of the color-accuracy equation.

Screen-to-print matching is important to imaging pros. For example, you want the purple on your monitor to match the purple output from your printer, to eliminate the guesswork from your editing. Both your printed output and your screen image should eventually match the real-life image. To coordinate the monitor and printer colors, you need to calibrate your output devices.

Both of the Radius PressView monitors had the best image matching; the calibrated on-screen images were a near-perfect match with our Matchprint proofs (the PressView monitors use the ProSense calibrator to calibrate color). Viewing an image *made of light* emitted

from a monitor will never be exactly the same as viewing an image on a printed page, which *reflects light*, but the PressView displays came closer than any we've ever seen to matching printed material. Moreover, they did so at a brightness level sufficient for viewing in normal lighting. The hood supplied with the monitors helps keep ambient glare away from the screen, but the monitors' displays are intrinsically very bright at D50 (the PressView 17 SR's was brighter and sharper than that of its 21-inch sibling).

We were extremely impressed with how well Sonnetech's Colorific software calibrator worked on the Mitsubishi Diamond Pro 21TX (Mitsubishi calls Colorific DiamondMatch) and the RasterOps SuperScan Mc 21. Colorific relies on the user's eye rather than on a hardware measuring device, and it's the first eye-reliant system that inspires any degree of confidence. The color matching wasn't as good as that achieved by the Radius monitors calibrated with the ProSense, but Colorific did a better job than either the ViewSonic ViewMatch



VM16A or the Eizo Nanao FlexColor hardware calibrators. If screen-to-print color matching isn't critical to you but you simply want to keep your color quality consistent, Colorific seems to work as well as some of the hardware-based options.

The Mitsubishi Diamond Pro 21TX and the RasterOps SuperScan Mc 21 were the only monitors besides the Radius PressViews with enough brightness for use in ambient lighting. The other monitors appeared washed-out and lacked contrast. Using a hood like the one that comes with the Radius monitors helps considerably — you can easily make one from a cardboard box painted with flat-black paint. But even when we set the lighting in the booth we used to view our printed output at its dimmest setting, the overall contrast on the monitors (with the exception of the Radius PressViews, the Mitsubishi Diamond Pro 21TX, and the RasterOps SuperScan Mc 21) was still too flat.

Our jury disliked the ViewSonic PT770's quality at super resolution and D50. When calibrated with the ViewSonic hardware calibrator, the PT770 images lacked brightness at D50; had a dingy, yellow cast; and seemed fuzzy. The ViewSonic PT810 had a similar appearance. We did find that the ViewSonic monitors were decent performers at lower resolutions and higher color temperatures.

The Eizo Nanao FlexScan F2\*21/FlexColor-calibrator combination was also disappointing. The Eizo Nanao monitor showed noticeable ghosting on vertical lines and text that we were unable to correct. The color matching was reasonably good, but the contrast was too flat. When we attempted to improve the contrast by lowering the black level, the hues shifted drastically into the yellow range. It also displayed color-uniformity problems.

The Nokia Multigraph 445X's jury results correlated with the shortcomings we noted in the spot-meter tests. The monitor's display had very poor color uniformity and suffered from noticeable hot spots (areas that seemed brighter than the rest of the display). The front-panel white-uniformity control simply moved the hot spots to different locations on the screen instead of eliminating them.

## JURY RETRIAL

None of the other monitors we tested were able to replicate the overall excellent quality of the Radius monitors. To find out just how much of the PressViews' success was due to the monitors themselves and how much could be attributed to the ProSense calibrator, we went back and calibrated some of the non-Radius monitors with ProSense 1.6.5, Radius' stand-alone calibration kit (\$799) for use with non-Radius monitors. The results were quite surprising.

When we used the ProSense calibrator, the Mitsubishi Diamond Pro 21TX and the RasterOps SuperScan Mc 21 produced images that came very close to the quality of the Radius PressView 21 SR's. The hues were more accurate in both monitors using the ProSense calibrator than with the Colorific software calibrator that is bundled with each monitor.

The ViewSonic PT810 display looked completely different when calibrated with the ProSense. It had enough brightness to use in a well-lit room and had no trace of the dingy yellow it had previously displayed when it was calibrated with its own calibrator.

The ProSense calibrator even improved the display on the Eizo Nanao FlexScan F2\*21, but not enough for use in prepress imaging. We manually adjusted the green-cutoff level in order to achieve

## SPOT CHECK / HOW THE MONITORS PERFORMED IN OUR TESTS



A SUPER-RESOLUTION MONITOR needs to do more than display a large-sized image on the screen. It should provide excellent color quality, project a bright image, look sharp, and produce straight lines that never waver.

To test each monitor for image quality, we ran a variety of tests. We used a

Microvision SpotSeeker III spot meter to test for convergence and pincushion error. For our Brightness and Color Quality tests, we used a Minolta Color Analyzer CA-100. All of our tests were performed with the color temperature set to D50. If necessary, we made other image-quality adjustments by using the monitor's front-panel controls.

|                                  | OVERALL IMAGE QUALITY   | BRIGHTNESS   | COLOR QUALITY  | CONVERGENCE   | PINCUSHION ERROR   |
|----------------------------------|---|--|--|---|--|
|                                  | We combined the results of all our individual tests to calculate an overall score. The Radius PressView 17 SR consistently scored near the top of our tests, thereby accumulating the best overall score. | We set each monitor to D50 (5,000 degrees Kelvin), the prepress standard for color temperature, and tested each monitor's brightness. If a monitor isn't bright enough at D50, white looks more like a dingy yellow. | To calculate these scores, we used the results from three tests: Color Range, Color Tracking, and Color Uniformity. The tests were performed at D50 with noncalibrated monitor output. | Our Convergence test measures the ability of the monitor's electron guns to precisely overlay red, green, and blue at specified positions. The tests are done at five positions and the results averaged. | Absence of pincushioning means that straight lines actually look straight and that curves aren't exaggerated. The spot meter measures the deviation of a line of pixels on-screen. |
| ✓ MACUSER BEST BUY               |   |  |  |   |  |
| ■ BEST PERFORMER(S) IN EACH TEST |   |  |  |   |  |
| ✓ Radius PressView 17 SR         | 1.63  | 25.6   | 1.37   | .09   | .29  |
| Mitsubishi Diamond Pro 21TX      | 1.58  | 30.3   | 1.41   | .11   | .37  |
| RasterOps SuperScan Mc 21        | 1.46  | 24.6   | .97  | .10   | .43  |
| Radius PressView 21 SR           | 1.43  | 24.0   | 1.40   | .10   | .49  |
| ViewSonic PT 770                 | 1.42  | 23.4   | 1.60   | .13   | .47  |
| ViewSonic PT 810                 | 1.38  | 17.4   | 1.19   | .37   | .38  |
| RasterOps SuperScan Mc 21HR      | 1.34  | 23.1   | 1.18   | .09   | .44  |
| Eizo Nanao FlexScan F2*21        | 1.26  | 20.7   | 1.23   | 1.07  | .45  |
| Nokia Multigraph 445X            | 1.04  | 24.8   | .96  | .56   | .70  |
|                                  | SCORE BETTER  | FOOTLAMBERTS BETTER  | SCORE BETTER   | MISCONVERGENCE IN MILLIMETERS WORSE   | MILLIMETERS WORSE  |



# SUPER-RESOLUTION GRAPHICS CARDS / TRADE-OFFS IN SPEED AND COLOR QUALITY

BEFORE YOU BUY one of the super-resolution monitors we tested, you'll surely want a graphics card that supports 1,600-x-1,200-pixel resolution at 24 bits of color. Three PCI graphics cards fill the bill: the \$1,199 IMS TwinTurbo-128M8, the \$999 Number Nine Imagine 128 for Power Mac, and the \$2,499 Radius ThunderColor 30/1600. We put each card through an extensive battery of tests. Our results show that if you're looking for speedy performance at super resolution, you'll want to check out the Number Nine card. If color quality and accuracy are at the top of your list, the Radius card is your best bet. It's pricey, but Photoshop users get an extra boost in speed for some operations, due to the card's four digital signal processors (DSPs).

## NUTS AND BOLTS

The Number Nine card sports a 128-bit memory bus, 24-bit-color table, and 8 MB of VRAM. The IMS card also uses 8 MB of VRAM and a 24-bit-color table, but it uses a pair of 64-bit interleaved buses. The Radius card comes with 6 MB of VRAM and uses a 96-bit memory bus, which causes it to take a speed hit compared to the other two cards. However, the Radius card comes with the ColorEngine: four DSPs on a daughtercard that speed the processing of common Photoshop functions, including resizing and Gaussian Blur plus a variety of other filters.

When it comes to color accuracy, the Radius card has one big advantage — it uses a 30-bit-color table, which provides a wider range of colors than the other two cards' 24-bit-

color tables. When used in conjunction with the Radius ProSense calibrator, the Radius card delivers top-notch color matching.

Each card comes with an easy-to-use control panel and an extension. The control panels let you switch resolutions and bit depth on the fly, and each supports pan and zoom options, using keyboard and mouse combinations. IMS' zoom software, however, doesn't redraw instantly, as the Number Nine and Radius programs do, when you zoom in or out. When you use the IMS software's zoom, your monitor syncs out for a couple of seconds and then the magnified image appears.

The most robust control software comes from Number Nine. Its Hawk-Eye utility set provides tools the other products don't: on-screen controls for activating and deactivating graphics acceleration, adjusting the size of your font cache, modifying power-saving settings, and performing gamma adjustment.

## OFF TO THE RACES

To test the speed of the cards, we installed each one in a Power Mac 9500/132 running System 7.5.3. The first two tests we ran were MacBench 3.0's Graphics Mix and Publishing Graphics Mix tests. The other three tests were application-based: We scrolled through an Adobe Photoshop 3.0.5 image in CMYK mode and then scrolled through a Microsoft Word 6.0.1 document and a Microsoft Excel 5.0 document.

Our tests showed that, in general, the IMS and the Number Nine cards

really zip along but excel at different tasks. The IMS card was the fastest in our MacBench tests and at scrolling in Excel, each of which measures, to a large extent, the speed of line and text drawing. The Number Nine card did well in the Word- and Photoshop-scroll tests, because they emphasize such calls as CopyBits, FillRect, and PaintRect.

The Radius card came in a distant third in every test, due to its single 96-bit memory bus. However, keep in mind that it comes equipped with the ColorEngine for accelerating many of Photoshop's functions — the ColorEngine doesn't improve scrolling speed, though. Those who don't want the Photoshop-acceleration hardware can get the Radius Thunder 30/1600 PCI graphics card. It costs \$1,199, and it's exactly the same card as the ThunderColor 30/1600, without the daughtercard.

## THE BOTTOM LINE

Although we found that the IMS and the Number Nine cards were both speedy, the Number Nine Imagine 128 for Power Mac offers the best combination of control software and speed for editing large images. If you favor color consistency over speed, you'll want to consider the Radius ThunderColor 30/1600. And Photoshop users will find Radius' ColorEngine, which speeds up a variety of common Photoshop functions, to be icing on the cake. But remember, for color consistency, the Radius card gives the best results when you use it in conjunction with the ProSense calibrator. / Roman Loyola



**IMS TwinTurbo-128M8**

RATING: ★★☆☆

PRICE: \$1,199 (list).

COMPANY: Integrated Micro Solutions, San Jose, CA; 408-369-8282.



**Number Nine Imagine 128 for Power Mac**

RATING: ★★★★★

PRICE: \$999 (list).

COMPANY: Number Nine Visual Technology, Lexington, MA; 800-438-6463 or 617-674-0009; <http://www.nine.com/>.



**Radius ThunderColor 30/1600**

RATING: ★★☆☆

PRICE: \$2,499 (list).

COMPANY: Radius, Sunnyvale, CA; 800-227-2795 or 408-541-6100; <http://www.radius.com/>.

# DISPLAY-CARD DERBY / SPEED-TESTING SUPER-RESOLUTION PCI CARDS



TO EVALUATE THE SPEED of the three graphics cards, we performed five tests: MacBench 3.0's Graphics Mix and Publishing Graphics Mix tests and scrolling tests in Microsoft Word, Microsoft Excel, and Adobe Photoshop. We ran all the tests on a Power Mac 9500/132 running System 7.5.3 with a monitor setting of 1,600 x 1,200 pixels at 24 bits (millions of colors). The MacBench 3.0 results are relative to the speed of built-in video in a Power Mac 6100/60, which has a score of 10.0.

| MACBENCH 3.0 SCORES                    |              | APPLICATION-SPECIFIC TESTS |                |                |                |                |
|--|--------------|----------------------------|----------------|----------------|----------------|----------------|
| <div>BEST PERFORMER IN EACH TEST</div> |              |                            |                |                |                |                |
|  | Graphics Mix | Publishing Graphics Mix    | Word Scroll    | Excel Scroll   | CMYK Scroll    |                |
| IMS TwinTurbo-128M8                    | 69.5         | 42.8                       | 24.8           | 30.6           | 23.3           |                |
| Number Nine Imagine 128                | 59.1         | 34.7                       | 22.7           | 35.3           | 20.9           |                |
| Radius ThunderColor 30/1600            | 21.0         | 15.5                       | 41.5           | 40.5           | 32.6           |                |
|  | SCORE BETTER | SCORE BETTER               | SECONDS SLOWER | SECONDS SLOWER | SECONDS SLOWER | SECONDS SLOWER |



## FEATURES OF SUPER-RESOLUTION MONITORS

✓ MACUSER BEST BUY

|                                      | EIZO NANAO<br>FLEXSCAN F2*21   | MITSUBISHI<br>DIAMOND PRO 21TX   | NOKIA<br>MULTIGRAPH 445X  | ✓ RADIUS<br>PRESSVIEW 17 SR  |
|--------------------------------------|--|--|---|--|
| List price                           | \$2,299  | \$1,899  | \$2,575   | \$2,499  |
| Estimated street price               | \$2,081  | \$1,700  | \$2,125   | \$2,100  |
| Display technology                   | Invar shadow mask  | aperture grille  | Invar shadow mask   | aperture grille  |
| Active screen size (diagonal)        | 19.8 in.   | 19.7 in.   | 19.7 in.  | 15.5 in.   |
| Vertical scan rate                   | 55 – 160 Hz  | 50 – 152 Hz  | 50 – 120 Hz   | 50 – 152 Hz  |
| Horizontal scan rate                 | 30 – 90 kHz  | 30 – 93 kHz  | 30 – 102 kHz  | 30 – 93 kHz  |
| Refresh rate at 1,600 x 1,200 pixels | 72 Hz  | 75 Hz  | 80 Hz   | 69 Hz  |
| Power consumption                    | 160 watts  | 165 watts  | 130 watts   | 160 watts  |
| Bundled calibration kit              | Colorific; FlexColor (\$274)   | DiamondMatch (Colorific)   | Colorific   | ProSense   |
| Automatic D50 setting                |  | ●  |   | ●  |
| Mac adapter                          | ●  | ●  | ●   | ●  |
| Antiglare treatment                  | ●  | ●  | ●   | ●  |
| Money-back guarantee                 |  |  | ●   |  |
| Warranty                             | 3 years  | 3 years  | 3 years   | 1 year   |
| Company                              | Eizo Nanao Technologies<br>Torrance, CA<br>800-800-5202<br>310-325-5202<br><a href="http://www.eizo.co.jp/welcome">http://www.eizo.co.jp/welcome</a> | Mitsubishi Electronics<br>Cypress, CA<br>800-843-2515<br>714-236-6352<br><a href="http://www.mela-itg.com/">http://www.mela-itg.com/</a> | Nokia<br>Sausalito, CA<br>800-296-6542<br>415-331-4244<br><a href="http://www.nokia.com/">http://www.nokia.com/</a> | Radius<br>Sunnyvale, CA<br>800-572-3487<br>408-541-6100<br><a href="http://www.radius.com/">http://www.radius.com/</a> |

FOR MORE INFORMATION on the Radius PressView line of monitors and the Radius ProSense calibrator, check out Radius' Web site at <http://www.radius.com/>

BOOKMARK

better image quality, but the images were still woefully lacking in contrast and black still had a green cast. The ProSense, it seems, can do only so much.

Three factors contribute to the Radius ProSense's ability to match color. First, the measuring instrument is a generation beyond

that of other calibrators; it's the latest in a long line of colorimeters from Sequel Imaging, and it's the most accurate to date for the price. Second, the ProSense takes advantage of the three 10-bit digital-to-analog converters (DACs) on the Radius ThunderColor 30/1600 PCI graphics card, which allows it to provide a full range of levels in the blue channel (see the "Making Sense of the ProSense" sidebar). The PressView monitors are the only ones that are affected by the ProSense's taking advantage of the 10-bit DACs, since the ProSense controls the monitor voltage directly and goes through the lookup table on the graphics card. Third, and most important, is the Radius calibration software. The software uses algorithms that achieve the maximum amount of brightness and attain the requested color temperature. The software's effect can be seen by comparing the performance of the Radius and ViewSonic calibrators. Both set the color temperature of the monitor to D50, and when we checked the chromaticity values in Photoshop, the results were virtually identical — however, the displays of the Radius monitors were brighter than those of the ViewSonic monitors.

We reached several conclusions regarding color matching. First of all, it's possible to attain a very high degree of correspondence between an image on-screen and its printed equivalent. Second, color matching isn't simply a function of the monitor. The monitor, calibrator, software, and graphics card (see the "Super-Resolution

Graphics Cards" sidebar) each have a role to play. And third, building a complete display system that provides accurate color is not a trivial undertaking.

## THE FINE PRINT

We also evaluated the monitors for readability of 12-point text. On the ViewSonic PT770, the type was virtually unreadable, partly due to convergence problems and partly due to type size — on a 17-inch monitor at 1,600 x 1,200 pixels, it's simply too small. On the other 17-inch monitor, the Radius PressView 17 SR, the type was sharp and had good contrast, but again, its small size made it hard to read. If you can get used to the tiny size — 12-point type measures about 6 points at 1,600 x 1,200 pixels — the type is quite readable.

Among the 21-inch monitors, the Radius PressView 21 SR and the Mitsubishi Diamond Pro 21TX needed more sharpness but their contrast was good. The only monitor that produced clearly unacceptable results was the Eizo Nanao FlexScan F2\*21, which showed ghosting and convergence problems that varied across the screen.

But while you're considering the results of our text-readability tests, you need to think about how *practical* it is to view a text document at 1,600 x 1,200 pixels. For example, Microsoft Excel's default font is 10-point Geneva, which looks like 4-point type at super resolution.

## USABILITY

No matter which monitor you use, you'll need to make adjustments to image quality, so we checked the ease of use of each monitor's image-quality controls.

The Radius monitors have excellent controls that are accessible through the front-panel switches. The controls are even easier to use in the PressView software, which communicates with the monitor



| RADIUS<br>PRESSVIEW 21 SR  | RASTEROPS<br>SUPERSCAN MC 21   | RASTEROPS<br>SUPERSCAN MC 21HR   | VIEWSONIC<br>PT770   | VIEWSONIC<br>PT810   |
|--|--|--|--|--|
| \$3,999  | \$2,199  | \$2,349  | \$945  | \$1,995  |
| \$3,400  | \$1,949  | \$2,199  | \$875  | \$1,895  |
| aperture grille  | Invar shadow mask  | Invar shadow mask  | aperture grille  | aperture grille  |
| 19.5 in.   | 20 in.   | 20 in.   | 16 in.   | 20 in.   |
| 50 – 152 Hz  | 50 – 160 Hz  | 50 – 160 Hz  | 50 – 130 Hz  | 50 – 120 Hz  |
| 30 – 86 kHz  | 31 – 85 KHz  | 31 – 95 kHz  | 30 – 82 kHz  | 30 – 96 kHz  |
| 69 Hz  | 68 Hz  | 76 Hz  | 66 Hz  | 76 Hz  |
| 120 watts  | 135 watts  | 135 watts  | 130 watts  | 130 watts  |
| ProSense   | Colorific  | Colorific  | ViewSonic ViewMatch VM16A  | ViewSonic ViewMatch VM16A  |
| ●  |  |  | ●  |  |
| ●  | ●  | ●  | ●  | ●  |
| ●  | ●  | ●  | ●  | ●  |
| 1 year   | 3 years  | 4 years  | 3 years  | 3 years  |
| Radius<br>Sunnyvale, CA<br>800-572-3487<br>408-541-6100<br><a href="http://www.radius.com/">http://www.radius.com/</a> | RasterOps<br>Westwood, MA<br>800-441-4832<br>617-461-8300<br><a href="http://www.rasterops.com/">http://www.rasterops.com/</a> | RasterOps<br>Westwood, MA<br>800-441-4832<br>617-461-8300<br><a href="http://www.rasterops.com/">http://www.rasterops.com/</a> | ViewSonic<br>Walnut, CA<br>800-888-8583<br>909-869-7976<br><a href="http://www.viewsonic.com/">http://www.viewsonic.com/</a> | ViewSonic<br>Walnut, CA<br>800-888-8583<br>909-869-7976<br><a href="http://www.viewsonic.com/">http://www.viewsonic.com/</a> |

through the printer port or modem port via a serial cable. The Radius ProSense was also the easiest calibrator to use: It's the only one that provides numeric feedback on the position of the brightness and contrast controls, the correct setting of which is critical for good calibration. In fact, it has numerical values for *all* the monitor settings, which can be extremely useful when you're trying to make fine adjustments. A final nice touch is that you can lock and password-protect all your settings in software.

The Mitsubishi monitor offers software for image control, but only after you send in the warranty-registration card. When we finally got our software in the mail, it was a Windows version — a quick call to Mitsubishi's tech support fixed the problem.


The Eizo Nanao FlexScan F2\*21 also offers software controls in addition to those on the front panel. Like the PressViews, it forces you to sacrifice a serial port for communication between the monitor and the software. The front-panel controls feature a nifty mouselike knob-and-button combination that lets you navigate quickly through the on-screen menus and adjust the numerous interacting parameters. This feature is convenient, but we found that the lack of numerical feedback made adjustments more difficult than necessary. The Flex-Color calibrator uses a colorimeter that attaches to the screen and some inelegant software that caused us occasional head scratching.

All the other monitors are controlled through switches on the front panel, with an on-screen display of the parameters you're adjusting. The ViewSonic monitors have hardware calibration, and we noticed that the on-screen display of the front-panel controls occasionally obscured the color swatches we were supposed to refer to on-screen when we made adjustments. The software-only calibration of the Mitsubishi, Nokia, and RasterOps monitors was easy to use and surprisingly effective.

## MIX AND MATCH

For those who are performing prepress imaging work, the Radius PressView monitors are by far the most complete display systems — each encompasses not only the monitor but also an extremely sophisticated calibrator. You even get a black cape to wear while you're doing color-critical work so that you aren't distracted by reflections from your clothing on the screen. The PressView 17 SR is a great monitor — we recommend it without reservation. The 21-inch PressView monitor is less spectacular, and we suspect that most users would be happier with the 17-inch version, because it has better image quality.

If you can deal with color quality that's not as accurate as the Radius monitors', then the Mitsubishi Diamond Pro 21TX and the RasterOps SuperScan Mc 21 are good picks. The Diamond Pro 21TX has the better color quality of the two, and the SuperScan Mc 21 has better text and line quality.

The best bargain, though, may be to get a stand-alone Radius ProSense calibrator (which includes the Photoshop display tables) and a monitor such as the Mitsubishi Diamond Pro 21TX. Not only will you get better image quality than you would with Mitsubishi's bundled calibration kit but you'll also get image quality that rivals that of the Radius PressView 21 SR and you'll save around \$1,000 to boot. 

Contributing editor Bruce Fraser is coauthor of *Real World Photoshop 3.0*, from Peachpit Press. MacUser Labs Senior Project Leader Jeffrey K. Milstead and Technical Specialist Martin Wong managed the testing for this report.



MacBench 3.0, the benchmark software used for tests in this report, is available online on ZD Net from Ziff-Davis Benchmark Operation at <http://www.zdnet.com/zdbop/>.



# QUICK LABS

Late-Breaking Reviews of Printers, Monitors, and Storage Systems

## HP Printer Flexes Its Muscle

Designed for small workgroups, the \$1,799 Hewlett-Packard LaserJet 5M laser printer features several improvements that help it print faster and produce higher-quality output than its predecessor, the Hewlett-Packard LaserJet 4M.

The physical design of the LaserJet 5M is similar to that of the LaserJet 4M, but several improvements are evident here as well. The printer is smaller than the LaserJet 4M, and the built-in handles on the sides make hauling the LaserJet 5M from one side of the office to the other a lot easier. An easy-to-use control panel makes navigating through the printer's menus and options a breeze.

The LaserJet 5M has a maximum output resolution of 600 dpi with REt (Resolution Enhancement technology), which gives you smoother line art and text. The HP printer has a rated engine speed of 12 pages per minute. The standard 4-MB memory configuration is expandable to 52 MB via standard SIMM modules. The printer comes with built-in Adobe PostScript Level 2 software and 35

ROM-resident fonts. An HP JetDirect card for Ethernet and LocalTalk printing is standard. The printer also has a serial port for connecting an optional HP Infrared Connect module (\$79), for people who want to print from their laptop computers with built-in infrared devices. You can then print from your laptop without the hassle of using cables.

The main paper tray handles letter- and A4-sized paper only; the manual-feed tray can handle envelopes and paper as large as legal-sized. Additional accessories include a duplexing unit for double-sided printing (\$679); a 500-sheet universal-paper-tray attachment (\$299); and a 250-sheet universal paper tray (\$99), which replaces the standard pullout tray.

### Simple to Complex

To test speed and output quality, we printed several pages of text, line art, and grayscale graphics. We timed the production of a variety of documents from simple files, which print quickly, to complex files, which take longer to

complete. In our testing, we used the types of documents typically produced by business workgroups, the target audience for HP's latest laser offering.

Overall, we were impressed with the printer's output quality. Thanks to HP's REt, text was sharp, with smooth edges on all the characters. Graphics were equally impressive — the detail we saw was clear and distinct. The light and dark grays in our grayscale ramps blended together quite nicely.

Output quality aside, however, we were surprised at how long the LaserJet 5M took to print our graphics-heavy Adobe PageMaker document. With the standard 4 MB of RAM, it took a sluggish 12 minutes to print the 5-page PageMaker file — more than double the time it took most of the workgroup printers we've



The HP LaserJet 5M workgroup printer offers a good combination of speed and output quality.

reviewed in past Quick Labs. According to Hewlett-Packard, if your workgroup often prints grayscale graphics, you should go with a higher RAM configuration than the standard 4 MB. The LaserJet 5M had no problem churning out text documents at a fast pace, however.

REVIEWER / MARTIN WONG TESTER / RICK OLDANO

| PRODUCT        | ESTIMATED STREET PRICE | COLOR OR MONOCHROME | TECHNOLOGY | MAXIMUM RESOLUTION | WARRANTY | TEXT QUALITY | GRAPHICS QUALITY | PAPER HANDLING | SUPPORT | COMMENTS  | PAGES PER MINUTE |
|----------------|------------------------|---------------------|------------|--------------------|----------|--------------|------------------|----------------|---------|---|------------------|
| HP LaserJet 5M | \$1,799                | monochrome          | laser      | 600 dpi            | 1 year   | +            | +                | ●              | +       | Excellent grayscale output. Prints text at a fast clip. | 0 4 8            |

+ / OUTSTANDING ● / ACCEPTABLE - / POOR



# Quantum Quorum of Wide Hard Drives

In the storage category, we feature three new hard drives that each use a Quantum mechanism and a Wide SCSI-2 data path. The \$1,199 CMS Enhancements Platinum PL4000W and the \$1,099 MacProducts Magic Quantum Atlas 4.3GB Wide each have a Quantum Atlas mechanism. The \$1,406 Optima Discovery 4100W has a Quantum Fireball mechanism.

Adobe Photoshop users who spend lots of time waiting for large files to open or who

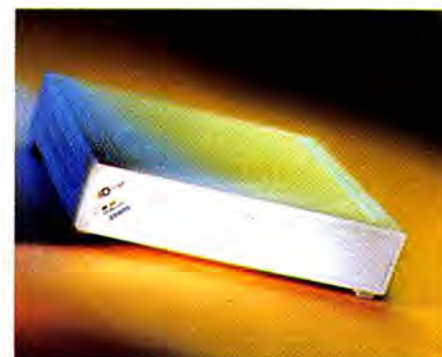
perform Photoshop operations that often access the disk will appreciate the speed of the CMS and MacProducts drives. The Optima drive offers good speed, but it isn't as fast as and costs more than the CMS and MacProducts drives.

Since Wide drives use a SCSI-2 connector and require a SCSI-2 interface card, it helps if the manuals contain specific information about Wide drives, but none of the manuals

had any — they were all written for drives that have a narrow data path and a traditional 50-pin SCSI connector.

A Wide SCSI-2 bus makes as many as 15 SCSI IDs available, but the Optima drive is the only one that comes in a case that supports 15 IDs. This means that you can connect as many as 15 SCSI devices, compared to the 7-device limit of a built-in Mac SCSI bus.

REVIEWER / KRISTINA DE NIKE TESTER / CHRIS MORENO



The Optima Discovery 4100W is the only Wide drive we tested that supports 15 SCSI IDs.

| PRODUCT   | ESTIMATED STREET PRICE | WIDE SCSI | FORMATTED CAPACITY | PRICE PER MEGABYTE | WARRANTY | CASE | SOFTWARE/MANUALS | SUPPORT | COMMENTS   | MacBench 3.0 Disk Mix Score |
|---|------------------------|-----------|--------------------|--------------------|----------|------|------------------|---------|--|-----------------------------|
| ★★★★ CMS Enhancements Platinum PL4000W          | \$1,199                | yes       | 3.9 GB             | \$.31              | 5 years  | +    | -                | +       | Documentation lacks information on Wide SCSI-2.      | 18                          |
| ★★★★ MacProducts Magic Quantum Atlas 4.3GB Wide | \$1,099                | yes       | 3.9 GB             | \$.28              | 5 years  | +    | -                | ●       | Documentation lacks information on Wide SCSI-2.      | 18                          |
| ★★★★ Optima Discovery 4100W                     | \$1,406                | yes       | 3.9 GB             | \$.36              | 1 year   | ●    | -                | ●       | Only Wide drive we tested that supports 15 SCSI IDs. | 15                          |

LISTING IS ALPHABETICAL WITHIN GROUPS OF EQUAL MOUSE RATINGS.

# Sampo Monitor Stands Out

The \$649 Sampo AlphaScan 17mx and the \$649 Pacom 7Fgs each has a standard set of controls and good image quality, but neither has the diversity of controls nor the image quality that imaging experts require. We ranked the Sampo monitor higher than the Pacom one because it came out ahead of its similarly priced rival in our image-quality tests.

The \$999 ArtMedia TN1885T and the \$1,099 LG Electronics Studioworks 78i scored well in our image-quality tests, but imaging experts will find their image controls limited. You can also attach an optional speaker set (\$79) to the LG Electronics monitor to enhance the sound of multimedia CD-ROMs.

The \$399 Mag InnoVision DX1595 suffers from several drawbacks. It is missing such

necessary controls as trapezoid adjustment and rotation control. We needed this latter control in our tests, because the on-screen images were horizontally misaligned. Also given a pincushion error we could not correct and its strictly analog controls, the DX1595 is a 15-inch monitor we recommend you avoid.

REVIEWERS / RICK OLDANO AND ROMAN LOYOLA  
TESTER / BRIAN FIKES



The \$649 Sampo AlphaScan 17mx is a good monitor for home-office and business use.

| PRODUCT                             | ESTIMATED STREET PRICE | SCREEN SIZE | MAXIMUM RESOLUTION   | WARRANTY | MANUALS | SUPPORT | CONTROLS | COMMENTS  | IMAGE-QUALITY SCORE |
|-------------------------------------|------------------------|-------------|----------------------|----------|---------|---------|----------|---|---------------------|
| ★★★★ Sampo AlphaScan 17mx           | \$649                  | 17 in.      | 1,152 x 870 pixels   | 2 years  | ●       | ●       | ●        | Good all-purpose monitor at a great price.            | 1.2                 |
| ★★★★ ArtMedia TN1885T               | \$999                  | 17 in.      | 1,600 x 1,200 pixels | 3 years  | -       | ●       | ●        | Could be good for DTP, but needs better control set.  | 1.0                 |
| ★★★★ LG Electronics Studioworks 78i | \$1,099                | 17 in.      | 1,152 x 870 pixels   | 3 years  | ●       | ●       | ●        | Could be good for DTP, but needs better control set.  | 1.0                 |
| ★★★★ Pacom 7Fgs                     | \$649                  | 17 in.      | 1,152 x 870 pixels   | 3 years  | ●       | +       | ●        | Good all-purpose monitor.                             | 1.0                 |
| ★★★ Mag InnoVision DX1595           | \$399                  | 15 in.      | 1,280 x 1,024 pixels | 3 years  | ●       | ●       | -        | Lacks controls necessary for adjusting image quality. | 0.8                 |

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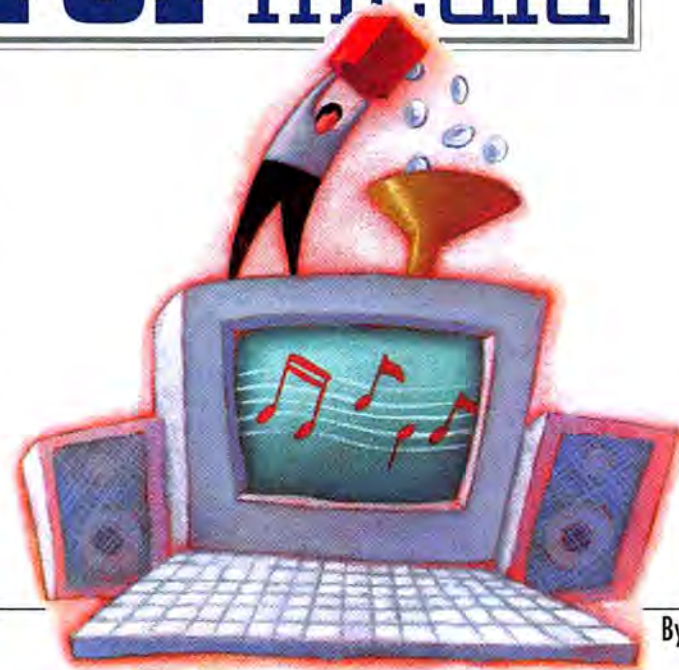
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# DESKTOPmedia

Investing in the right sound-editing tools can provide big payoffs when you want to create professional-sounding music and multimedia content.



By Christopher Breen

## Sound Investments

**MIXING-BOARD JOCKEYS** of old depended on perfect takes, well-timed flicks of the Mute button, and a deft hand with a razor blade to create their sound productions. But that was before AV Macs, PowerPC-based systems, and today's proliferation of sound-editing software. Audio engineers can now slice and dice sound tidbits (displayed as *waveforms*); copy, clone, and paste them to different locations in the track; seamlessly fade one tidbit into another; selectively add effects; and mix the whole kit-'n'-caboodle down to stereo — all without destroying the original source material.

Incredible, yes? Ah, but wait, there's more: Some of these sound-editing systems even fall within the budget of the most parsimonious multimedia dabbler and run on Macs that aren't 16-bit-capable. If you've got a hankering to be heard, listen up.

### The Basics

Today's "basic" sound editors are a big step above Apple's *truly* basic Sound control panel. In fact, multimedia producers whose documents contain a limited number of audio snippets often rely on these tools. Basic sound editors let you record and edit 8- and 16-bit

audio files at a variety of sample rates (22 and 44.1 kHz are the most common), apply effects, convert sample rates, and save the resulting files in any of several formats. Generally less expensive than their multitrack counterparts, these applications don't require a 16-bit-capable Mac.

**Audioshop 2.1** (\*\*\*; \$150 list), from Opcode (800-557-2633 or 415-856-3333), provides not only a capable stereo sound editor but also a front end for playing audio CDs on your CD-ROM drive. Its ability to create playlists comprising digital-audio as well as audio-CD tracks is a handy option for sound-only presentations, since it means you don't have to devote massive amounts of disk space to digitized music tracks — just play 'em off the CD. As with the other basic sound editors discussed here, Audioshop includes such effects as Echo, Normalize, and Flange; allows the direct importing of audio-CD files through QuickTime; and offers batch processing.

**SoundEdit 16 2.0** (\*\*\*; \$399 list), from Macromedia (800-326-2128 or 415-252-2000), is the seasoned veteran of the basic bunch and is also the most flexible, but there's a catch — as a stand-alone application, its \$300 street price is a little dear. A much better

deal is to purchase the SoundEdit 16 plus Deck II bundle. With an estimated street price of \$400, this bundle is a terrific deal if you have only the slightest need for Deck II. Even as a stand-alone program, SoundEdit 16 may well be worth the extra bucks if you need QuickTime synchronization, an important feature for multimedia producers. In addition to QuickTime sync, SoundEdit 16 offers these goodies that Audioshop doesn't: more than two audio tracks, a drag-and-drop batch-processing component, and the ability to accept plug-in effects such as InVision Interactive's CyberSound FX (see the "Effective Plug-ins" sidebar).

Those who can do without QuickTime sync and have loads of RAM may want to consider the new kid on the block (still in beta when we took it for a spin): **SoundMaker** (\$150 projected list), from MicroMat (800-829-6227 or 707-837-8012). Being RAM-based, SoundMaker doesn't accommodate enormous sound files, as do Audioshop and SoundEdit 16, which use "swap files" created on the hard disk to store audio material. Like SoundEdit 16, SoundMaker provides more than two editing tracks, spectral display of audio data, and the ability to mix numerous tracks down



to a single track or a stereo pair.

Multimedia users seeking a plethora of onboard effects will discover that SoundMaker has them in spades. Among the three dozen effects included in the beta version were those found in SoundEdit 16 plus such exotic extras as Ring Modulator, Tone Dialer, Robotize, and Doppler. If you're not satisfied with the included effects, you're welcome to create your own by combining the program's basic effect modules.

### Virtual Multitrack Editors

Multimedia producers as well as musicians will find these more professional programs, which imitate real-world multitrack hardware, extremely useful. The strength of such programs lies in their ability to assemble a large number of audio snippets within each track. Depending on the processing power of your AV Mac, PowerPC-based system, or add-on audio card, you can have some of these programs play up to 16 tracks concurrently.

If you've ever worked with a multitrack cassette recorder, you'll feel right at home. These applications have interfaces that look like that old mid-'80s-era Fostex multitrack gathering dust in your garage. They come complete with on-screen tape-transport controls, volume and pan sliders on a virtual mixing board, and a Tracks window where waveforms are displayed. The applications also provide synchronization to MIDI programs, automated mixing controls, a limited number of effects, and some form of EQ (picture the bass and treble controls on your stereo). The three less expensive multitrack programs we examine here also support QuickTime synchronization.

The first low-cost, entry-level multitrack editor out of the chute was Alaska Software's **DigiTrax 1.2** (\$\$\$; \$199 list; published by Opcode). Using the built-in sound of your PowerPC-based machine, DigiTrax gives you six tracks of 22- or 44.1-kHz audio. Although six tracks is less than what you get in other multitrack editors, you can make the most of the tracks by combining (or *bouncing*) them into a single mono track or stereo pair, freeing up the source tracks for new material.

Included in the program are five proprietary effects plug-ins — Normalize, Reverse, Invert, Chorus, and Flange. Regrettably, the Chorus and Flange plug-ins are not currently compatible with PowerPC-based systems and the program does not accept third-party plug-ins. Additionally missing from DigiTrax is a dedicated cross-fade function that you would

## Effective Plug-ins / software add-ons supply snappy sound effects

THE ADVANTAGE OF PLUG-IN EFFECTS is obvious: They're easy to use and built right in. Simply select the audio you want to process, choose an effect, preview and tweak the sound, and let 'er rip. Here's a glossary of some common sound-effect terms:

**chorus:** Makes a sound seem thicker, as if produced by more than one source.

**compressor:** Smooths a sound by decreasing the volume of the loudest portions and increasing the volume of the quiet bits.

**delay:** Echoes a sound.

**EQ (equalization):** Lets you reduce or boost particular frequencies (akin to the bass and treble controls on your stereo).

**flange:** Gives a sound a psychedelic, swirling quality.

**gate:** Won't let sound pass through unless the sound's volume is at a user-defined level. Gated sounds seem suddenly truncated. Think of Phil Collins' drum sound.

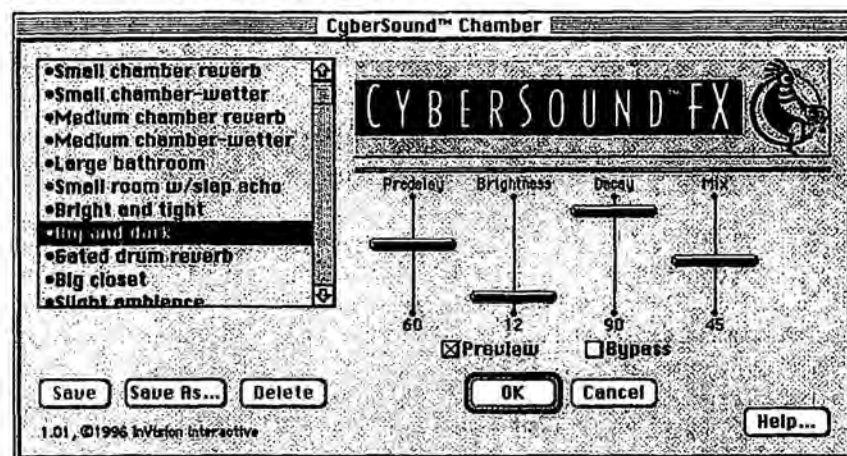
**normalize:** Increases the overall volume of the sound so that the loudest portions are at the maximum level (without being so loud as to distort).

**reverb:** Produces the reverberating sound you'd hear in a cavernous, empty building.

Two excellent plug-in collections are available to help you achieve such effects:

**CyberSound FX 1.01** (\$\$\$; \$129 list), from InVision Interactive (800-468-5530 or 415-812-7380), is a handy bundle of 15 common effects, including Reverb, Chorus, Delay, Flange, Normalize, and EQ. The plug-ins come in two flavors — one for Deck II and other Adobe Premiere-compatible applications, the other for SoundEdit 16. Although CyberSound lacks the sound quality of a high-end external effects unit, its effects are an affordable and useful collection for multimedia projects.

If CyberSound can't handle your EQ, limiting, and audio-compression/gating needs, you can turn to the higher-end **AudioTrack 1.0** (\$\$\$; \$300 list), from Waves (423-689-5395). This multieffects plug-in includes less complete versions of single-effect plug-ins Waves sells separately for \$400 to \$650 each. Waves' plug-ins are not cheap but produce remarkable results.



use for fading one audio section into another.

DigiTrax would have garnered our recommendation as the low-priced multitrack leader had Digidesign (800-333-2137 or 415-842-7900) not reduced the cost of its full-featured multitrack editor, **Session 2.0** (\$\$\$; \$199 list). Session offers more playback tracks — as many as 8 tracks on a 60-MHz PowerPC-based system, as many as 12 tracks on an 80-MHz machine, and as many as 16 tracks on a 100-MHz system. Using Digidesign's 16-bit Audiomeia II digital-audio card, Session supports four playback tracks on NuBus-based Macs (on PCI-based systems, it would use Audiomeia III). In contrast, DigiTrax is currently not compatible with Digidesign cards. Other Session goodies not found in DigiTrax are a host of fade options that control how your sounds enter, exit, and cross-

fade, as well as more-flexible EQ and sample-rate-conversion options (for changing a sound's resolution, say, from 44.1 to 22 kHz).

Like more-expensive multitrack programs, Session provides MIDI-device-based control of the on-screen volume and pan sliders. This feature lets you move these virtual faders with an external MIDI controller — a lifesaver when your mix demands the type of quick fader moves your mouse can't handle.

But unlike DigiTrax and our other multitrack editors, Session supplies no plug-in effects. To add effects to your Session session, you either have to route your sound files out of the Mac, into a mixing board connected to a hardware-based effects unit, and back to the Mac or you have to send the Session sound files to a program that includes effects.

Although Session outpaces DigiTrax, a



better choice yet — for those with an extra 200 bucks in their budget — is Macromedia's **Deck II 2.5** (\$\$\$\$; bundled with SoundEdit 16 for \$499 list). For the track-hungry, Deck II ups the ante by making the number of available tracks dependent on processor speed and SCSI transfer rate. According to the manual, a Power Mac 6100/66 with a fast hard drive that has a defragmented disk can play up to 10 tracks and an optimized Power Mac 8100/110 with plenty of RAM can achieve 24 tracks. Your mileage may vary, though — we could coax no more than 8 tracks from an accelerated 6100/66.

New in version 2.5 of the program is support for Adobe Premiere-compatible audio plug-ins (see the "Effective Plug-ins" sidebar). There's no need to rely solely on third-party plug-ins, however. Deck II includes Gain, two delays, Chorus, and three varieties of EQ (including a seven-band graphic equalizer). As with earlier versions, you can normalize and reverse each track.

Deck II also sports robust synchronization capabilities (QuickTime, MIDI, and live video), the scrolling of tracks during playback, and the ability to create work tracks (areas where you can record and store additional audio material for possible inclusion in your play tracks). If you want to hear your work and your play tracks together, issue the Virtual Mix command; to combine them, bounce them down to one or two tracks. For a modestly priced software-only package, multimedia users would be hard-pressed to find a finer utility.

Of course you can do a bit better with Digidesign's more than modestly priced **ProTools PowerMix 3.2** (\$\$\$\$; \$795 list). Don't be confused: Digidesign also offers a hardware-based digital-audio system, ProTools III, which is the most popular in the land. Listing for just under 7,000 smackers, it makes the software-only version seem like a bargain. But is ProTools sans hardware worth hundreds of dollars more than Deck II? It depends.

The immediate advantage goes to those who will eventually use their ProTools files with Digidesign hardware. These users will find it possible to edit their work at another computer — no more waiting to jump onto a Mac connected to a ProTools system. Just load the software onto a Power Mac 7100/80 or better that has a minimum of 24 MB of RAM, call up your session, and edit away. Obviously, users seated at a Mac actually attached to a Digidesign hardware system will enjoy other

advantages. For example, they'll have access to more input tracks — using Digidesign's ProTools Project (\$2,495 list), you can record eight separate audio tracks simultaneously. (A PowerPC-based Mac OS system can record only two tracks at a time through the machine's sound-input port, which makes the system a less-than-ideal tool for recording multiple instruments concurrently.)

The software-only version also lacks other important ProTools-with-hardware features — Digidesign's proprietary TDM plug-ins and audio scrub, for example, don't work without Digidesign iron. The company is working on a series of plug-in effects for the software-only version of the product, but they were still under development as we went to press.

Still, the software-only version of ProTools does offer some advantages over Deck II. For example, instead of operating MIDI-sequencer and digital-audio programs separately and synchronizing the two, you can record MIDI data directly into ProTools, from which you can adjust such aspects as MIDI panning, instrument selection, and volume. More-complex MIDI editing must still be performed in a dedicated sequencer program. ProTools also improves on Deck II's scheme of work tracks. In ProTools, the work tracks (called virtual tracks) are dynamically allocated so that when a space opens up in one of the play tracks — say, a vocalist gives way to an instrumental solo — you can have the audio contained in the first work track "poke

through" and play until a new audio tidbit appears in the play track.

ProTools is a wonderful audio-editing environment for those who can afford it and who want to transfer their sound files to a system linked to Digidesign hardware. For those who don't fit into either category, Deck II is still a solid choice.

## The Sound and the Jury

For basic sound editors without QuickTime sync and disk-based editing, we like what we've seen in the beta version of MicroMat's SoundMaker. If QuickTime's your thing and you want to grab a great bundle for a good price, check out Macromedia's SoundEdit 16/Deck II offering.

Deck II is the all-around winner in the multitrack-editor category — although Session is worth a look if you're on a budget — and ProTools is a must if you've got the machines and the money. Bias' Peak sample editor (see the "Sonic Samplers" sidebar) is worth a long look for serious sound editing, as are Waves' high-end effects plug-ins. Users shopping for a capable collection of affordable plug-ins will be pleased with CyberSound FX.

No matter which tools you decide on, with this kind of variety and power, sound won't be relegated to a supporting role in your next production. □

*Contributing editor Christopher Breen occasionally takes time out from his Help Folder duties to muck about in his digital-audio/MIDI project studio.*

## Sonic Samplers / tools for cleaning and fine-tuning sounds

MULTITRACK EDITORS EXCEL at stringing together and mixing a multitude of sounds, but they're not the best tools for such intricate procedures as removing audio clicks and pops or changing the duration of a sound file. For these tasks, consider employing a sample-editing package such as **Alchemy 3.0** (\$\$\$\$; \$495 list), from Passport Designs (415-726-0280), or **Peak 1.0** (\$\$\$\$; \$299 list), from Bias (800-775-2427 or 415-331-2446).

The RAM-based Alchemy lets you fine-tune a variety of mono and stereo files: AIFF, the default format for professional audio applications and QuickTime; Sound Designer II; the Mac's native System 7 format; and .WAV, the Microsoft Windows format. By fine-tuning, we mean using such capabilities as audio-loop creation, time compression and expansion, sample-rate conversion, merging, cross-fades, hand-drawn waveforms, and support for MIDI samplers. The program shows its age, though, in its inability to support external plug-ins, import audio files from CDs, and adjust loops during playback. For these goodies, take a peek at Peak.

Peak performs many of Alchemy's tricks and tosses in a few of its own. As a disk-based editor, Peak can handle larger files than Alchemy can. And because it's PowerPC-native, Peak is also faster than Alchemy on PowerPC-based systems. It supports Adobe Premiere-compatible effects plug-ins and allows importation of audio-CD files via SCSI (on those CD-ROM drives that support audio extraction). For peace of mind, Peak also offers unlimited Undo. And it lets you make edits (cut, copy, and paste), adjust loops, and invoke effects, all while the program continues to play a sound file.

If you were prescient enough to purchase Peak prior to July 1, 1996, you received all of Peak's Accessory Paks — the Composer/Audio Pak, Audio Pro Pak, Audio Librarian Pak, and Sampler Pak — at no extra charge. The Audio Pro Pak contains such necessary plug-ins as Sample Rate Conversion and Repair Click, but you now have to pay \$129 (the list price for each individual pak) to get these features already found in Alchemy — making the otherwise attractive Peak a bit steeper than it might appear from a distance.



# Designing in Designer

Make your image stand out by using Fractal Design's Ray Dream Designer and Adobe Photoshop.

**M**ODELING AND RENDERING programs attempt to imitate the look and feel of a photograph — a 3-D world represented in a 2-D image. Without careful attention to lighting and texture, though, rendered images can look flat and sterile — a pale imitation of the real world. As a Ray Dream Designer user, I have come up with some useful techniques for making my images stand out.

You may have seen A.T.A.M., the All-Terrain Armoured Mouse, gracing Ray Dream Designer's packaging after the image won an award in Ray Dream's yearly artists contest. I used Adobe Illustrator's drawing tools to create the basic outlines of the 3-D shapes, Ray Dream Designer 4 to model and render the image, and Adobe Photoshop to retouch and output the final image. Follow these step-by-step instructions to learn the techniques I used to create A.T.A.M., and apply them to your own Ray Dream Designer creations.

*Johnathan Banta is an independent artist who creates traditional matte paintings as well as 3-D renderings.*



## STEP BY STEP

**1. CREATE THE OUTLINES.** Creating images in Ray Dream Designer requires you to build a model and then take a virtual snapshot of it. If you're a novice modeler, you may want to use an object from Ray Dream Designer's library of 3-D models and start at step 2. If you need to create a model from scratch, try creating a single complex object instead of multiple objects, to save time, as I did with A.T.A.M.

The model looks more intricate than it actually is, because I created a few complex pieces and used them repeatedly to speed the model-building process. For example, I based the shoulder and hip joints on one piece that I created very quickly by using a single, complex, revolved object instead of multiple independent objects. I created the outlines for this object's sweep path and extrusion envelope by using Adobe Illustrator's superior drawing tools and saved the paths as EPS files.

In Ray Dream Designer, I began creating the shoulder/hip joint by opening a new free-form object (Edit: Insert: Free-form object). In the modeling window, I created a small circle centered along the model's sweep path (the pink line). Then I imported the EPS sweep path and the EPS path for the extrusion envelope (the blue lines) into Ray Dream Designer (File: Import). The result of revolving the extrusion envelope

around the sweep path is a single complex object with slots that would have taken longer to put together using several separate parts.

Notice that the final object has many rounded edges. By introducing a slight roundness to the edges of an object, you can make the highlights and shadows look more complex and realistic than if you used simple, hard edges.

**2. SET UP THE LIGHTS.** Once you've finished the model, you add lights to your scene, just as you would in a photo studio. Ray Dream Designer has several settings for adding lights to a scene.

To add interest to the lights, color them in complementary tones. For example, I created two lights in yellow and blue (A and B). I positioned the first light behind the camera and to the left and the second light high above and behind the A.T.A.M. model. Notice that the shadows are fairly light but dark where they cross (C).

**3. APPLY REALISTIC TEXTURES.** You can use textures to add detail to surfaces that would otherwise be difficult to model. You can also use rendering effects to enhance the look of a surface.

Ray Dream Designer can combine an unlimited number of texture maps (2-D images) and shaders (mathematically defined images) to add



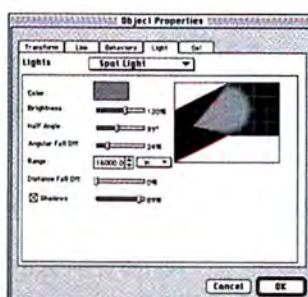
## 1. CREATE THE OUTLINES



## 2. SET UP THE LIGHTS



A



B



C

## 3. APPLY REALISTIC TEXTURES



A



B

## 4. ADD PHOTOGRAPHIC EFFECTS



A



B

color, bumpiness, reflections, glows, or other effects to an object's surface. To add extra grooves to A.T.A.M.'s chrome surface, I altered the standard chrome shader in Ray Dream Designer (in the Shader Browser), as follows: I double-clicked on the chrome shader and clicked again to access the Bump channel. In the Bump channel, I added the Mix operator (Shader: Components: Operator: Mix). Following these steps allows you to combine several colors with a shader. To make grooves in a surface, you choose black as one color, choose white as the other, and then use the Wires pattern function. This same grooved look can be added to any object's surface, whether it is wood, plastic, or marble.

To enhance the look of chrome or any other reflective surface, add a reflected background to your scene. The more objects that reflect in the chrome, the more realistic it will appear. I added a sky-and-ground effect to enhance the chrome (Render: Effects: Reflected Background). When you do this, choose the Bi Gradient option, which creates the sky-and-ground effect (A). This option imitates the artificial reflections found in airbrushed artwork. The addition of the blueprints and table in the A.T.A.M. image makes the surface look more complex (B).

The final step is to render the image, by using the Rendering controls

(Render: Render: Use Current Settings). I rendered the final image at 300 dpi for print purposes.

**4. ADD PHOTOGRAPHIC EFFECTS.** Traditional photography creates artifacts such as lens flare, film grain, and image burn on film. To heighten realism, you can re-create such artifacts by burning out highlights, adding a glow, and giving the image grain.

For A.T.A.M., I retouched the highlights of the image, using Adobe Photoshop, to make it look as if the lights were reflecting in the chrome. To do this with an image of yours, open the rendered image in Photoshop and choose the Dodge brush. Paint over each of the white highlights so it looks as if it glows. Then select the highlights and surrounding areas, using the elliptical selection tool. Setting the feather to 10 pixels (Select: Feather) should work on most images.

The next step is to introduce a lens flare into each of the major highlights. Using the Photoshop Lens Flare filter, position the center of the flare over the brightest part of the highlight and adjust the slider so the flare barely overlaps the brightest area (A). The lens flare should never call attention to itself, so don't use too high a setting — for example, I used a setting of 70 percent to get this effect (B).



# Zip or Zap? ISDN or Internet?

When it comes to sending files to the print shop, getting there is half the fun.

**YOU'VE JUST FINISHED** laying out the pages of your client's project, and now it needs to get to the print shop. How will the files get there? On Zip discs (how many)? On SyQuest cartridges (which size)? On magneto-optical discs (which format)? On punched cards (yeah, right)? Hey, what about doing away with media altogether by sending them electronically?

If you've ever transferred files over a phone line, you know how slow and unreliable that can be. But thanks to fast telecommunications hardware and smart data-compression software, we can harness the technology to move really big graphics files from one place to another.

In the simple case of sending files, the average prepress shop is no longer limited to using modems, which, even at a blazing 28.8 kbps, are often too slow. ISDN — which is about four to five times as fast as your phone line — is affordable in many areas of the country. But using ISDN to transport files is often easier said than done.

One of the problems when it comes to sending files via ISDN (aside from getting the phone company to install the ISDN line in a timely fashion) is that several companies have developed ISDN cards for the Mac, which means that compatibility problems crop up if you don't have the same cards in the computer at each end of the ISDN line. Is there any way around this, apart from buying the same cards for each computer?

One solution is to use ISDN Manager software, from 4-Sight (515-221-3000). ISDN Manager addresses cross-card incompatibility by mediating the idiosyncrasies of different hardware. For point-to-point file transfer, ISDN Manager is relatively simple to install and implement. It's also flexible: It lets you link as many as four cards (for a total of eight lines!), to make a real information interstate. That's eight times 64 kbps, or 512 kbps — somewhat faster than your average modem, but this setup costs much more. But it's just the ticket for industrial-strength file transfer.

On the other end of the price spectrum is using the Internet — and what column in the waning years of the millennium would be complete without mentioning the Internet? There are plenty of examples of graphics-arts shops exchanging work over the Net. However, it can be a dicey proposition. Given the nature of the Internet, there's no way of knowing on which pathway, through how many different computers, the files will travel, and on the Internet, you're only as fast as the slowest machine. Without being able to control and predict the route a file takes, transferring files this way may cost more in the long run.

Will we all be sending our print jobs (if, as some pundits wonder, there are any left) over the Internet one day? In the next year, almost certainly not. How would you like to send your 400 MB's worth of page layouts and scans at the speed of a Web browser? No thanks! But within two to three years, as the bandwidth of the Internet backbone and of the pipeline into our offices continues to increase — absolutely.

## Phony Express

Don't forget that simple changes in workflow can sometimes make a big difference in transmission times. We're not talking technology here, just common sense. For example, if page layouts for a catalog or a brochure are completed well before prices are finalized, consider sending the layout files and hi-res images by conventional means (overnight service, regular mail, pony express) and sending just the last-minute prices over the phone lines. Of course, that assumes you and your output-service provider have agreed on this.


Once you have a bit of bandwidth to spare, you can consider procedures that are more exotic than simple file transfer. Remote proofing (wherein the service provider edits your images and then sends them to a printer in your office), remote markup (wherein you can

annotate files online), videoconferencing (wherein you can talk to your designer live) ... these kinds of solutions are an order of magnitude less expensive than they were even



two years ago. Collaborative workflow is made possible by such products as Group Logic's Imagexpo (703-528-1555), which not only transfers files but also contains a digital "whiteboard" so a user at each end can see what the other person is doing to an image.

There was a time when Macs weren't capable of much in the way of high-speed transmission without special hardware. These days, the combination of Power Macs and the latest version of Open Transport (which may well be 1.0.2.1.5.9 by the time you read this) is rapidly making the performance penalties of the Mac OS a thing of the past. If the telecommunications companies and cable guys ever get their acts together with high-speed affordable bandwidth, high-end-Mac users will be ready for them.

In the future, of course, we'll have subspace transmission, which will let us send an entire *MacUser* issue across the galaxy instantly. But until then, explore your data-transmission options, and remember that their extra expense may be offset by time and courier charges saved. 

*Bob Schaffel is emerging-technologies consultant for R. R. Donnelley & Sons. Chuck Weger is a graphic-arts consultant and a partner in Genex Media, a company specializing in new media and Web design.*



# Bumper Crop of Special Effects

**THE ONE-PERSON STUDIO** has arrived. Broadcast-quality animations that used to require teams of several people, hardware costing half a million dollars, and over a month to produce can now be done in less time by a lone animator and a couple of Macs, given the right software. New York-based illustrator Nick Ericson used ElectricImage 2.5.2 to cut down significantly on rendering time for the eye-catching special effects in his 30-second "bumper" (an animated station identification) for cable TV's Sci-Fi Channel. Rendering 900 frames of video on his Power Mac 9500 and Power 100 took just four days. "Unlike previous versions, ElectricImage 2.5.2 handled over 700 objects in a scene with no noticeable speed penalty," notes Ericson.

Beating the clock was only half of the challenge in creating an

animation for TV. Ericson also called upon a wide range of tricks, as explained in the sections below, to make interesting effects while maintaining the exact look of the Sci-Fi Channel logo.

The animation begins with a small sphere that transforms into a flying robot with a camera lens. The viewer's perspective changes from looking at the robot in a corridor to looking through the camera lens from inside the robot. The robot gets sucked into outer space, where you see the Sci-Fi Channel logo rotate into view. / Sean J. Safreed

## WHAT:

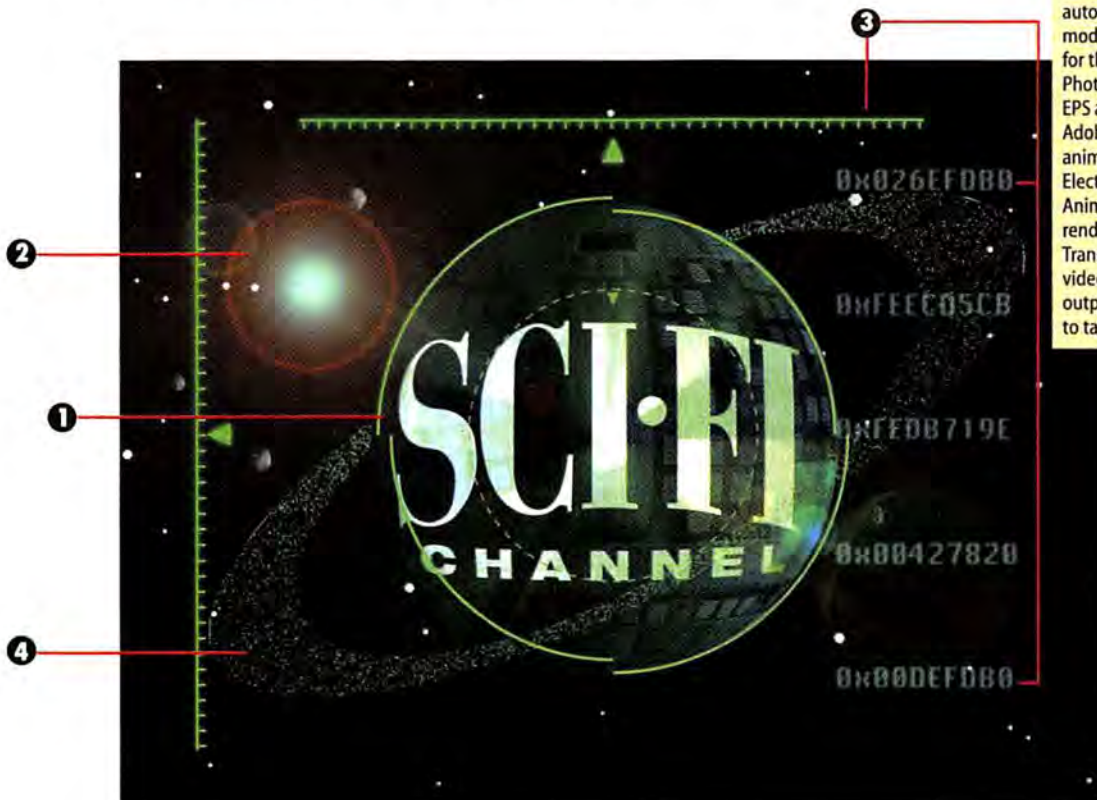
Video-short for the Sci-Fi Channel.

## COMPANY:

Nick Ericson Studios, New York, NY; 212-337-0089; <http://www.nickstudio.com/>.

## TOOLS:

auto-des-sys' form-Z, for 3-D modeling; Adobe Illustrator 5.5, for the video overlay; Adobe Photoshop 3.0.5, for converting EPS artwork to bitmap layers; Adobe After Effects 3.0, for animating the video overlay; Electric Image's ElectricImage Animation System 2.5.2, for 3-D rendering and animation; Data Translation PCI-based Media 100 video-editing system, for outputting the final animation to tape.



**1. LOGO.** One restriction when working with a logo is that you must preserve its exact look. In this case, Ericson had to create a layer on a sphere without distortion. Rather than put the letters onto a two-dimensional surface and put it into a three-dimensional space — which would make the letters look flat — he created a 3-D model of the letters. As a result of that technique, the logo looks exactly as it should, even when it rotates.

**2. LIGHTING EFFECTS.** Ericson applied a trick used in stagecraft to make a supernatural-looking strobe emanate from an object — in this case, the planet.

Theater folks put a device called a gobo (a type of shutter) in front of a light source to make the light flash. Ericson duplicated this trick by using a sphere with star-shaped holes to surround a globe of light. When he spun the sphere, the star-shaped holes made the light look as if it were pulsing.

**3. CAMERA LENS.** Just so you wouldn't forget you were inside a camera, Ericson added on top of all the other elements a two-dimensional layer of animated glowing effects — similar to what you see when you look through some real camera lenses. Applying After Effects' Glow effect to the green lines and arrows

made them stand out, and using the Numbers effect, a random-number generator, made it possible to put a column of changing numbers down the right side of the frame to simulate the effect of the camera calculating its position.

**4. SPACE DEBRIS.** No space scene would be complete without a glittering ring of particles revolving around a planet. To create such a ring, Ericson turned to Northern Lights Productions' Dante plug-in for ElectricImage. He used another Northern Lights plug-in — Big Dipper — to generate stars and spinning asteroids in the background.



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# NETWORKING

It's possible to communicate like the Jetsons do, but you'll need good equipment and realistic expectations to make videoconferencing work well for you.



By Nancy Peterson

## In Conference

**T**HE PREDICTIONS THAT every desktop would have a videophone by the mid-1990s have not come true. However, inexpensive video cameras and powerful Macs have made it possible to transmit your mug across the Internet, conduct meetings, collaborate on designs, and share documents in real time. What equipment you need for your videoconferencing setup depends on your communication needs, your budget, and your expectations.

It's not an exaggeration to say that the range of prices and features available in videoconferencing products is wide and deep. From a \$100 black-and-white QuickCam attached to your Macintosh's serial port all the way up to a \$20,000 (or more) conference-room system that makes its connections via WAN or satellite links, you'll find lots of choices. In most cases, you can construct a conferencing system by selecting components that meet your needs for image quality, speed, collaborative power, and flexibility. Here's a look at the basic parts of a conferencing system — the camera, computer, connection, accessories, and software — and how to choose the correct ones for your applications and budget.

### Choosing a Camera

The cute little QuickCam, from Connectix (800-950-5880 or 415-571-5100) — now available in color as well as black-and-white models — offers a great introduction to videoconferencing. Simply combine it with CU-SeeMe (freeware) or the \$100 enhanced version, from White Pine (<http://www.cuseeme.com/>), and a connection to the Internet, and you'll be able to establish a rudimentary link with friends or colleagues quite inexpensively.

Chances are, though, if you plan to hold videoconferences regularly or if you need to see details — of an X ray, for example — you'll want a higher-quality camera. Many good cameras are available for around \$500, including the Color TeleCamera (\$580), from Howard Enterprises (516-328-5960).

Specialty cameras can cost you a pretty penny but may be necessary in specific circumstances. For instance, cameras that have remote-control pan, tilt, and zoom — such as the VC-C1 (about \$2,400), from Canon (516-328-5960) — are often not a luxury but a necessity for large groups. Cameras that can greatly magnify images, such as Canon's Vizcam 1000 (around \$1,300), a remote-

control scientific camera that can display microscopic images, can make the difference between frivolous and fruitful videoconferencing for scientists.

### The Right Mac

The Mac you use for videoconferencing won't make images crisper, but it can have a dramatic impact on frame rate as well as on your choice of video equipment. We found that Power Macs deliver a higher frame rate than 680x0-based machines, regardless of the camera you use. You'll probably see little improvement if you use a 28.8-kbps connection.

Your choice of camera can narrow your Mac options even further. If you use a camcorder or other video camera that was not specifically designed for videoconferencing, you'll need a Mac with input ports for NTSC or S-video, two standards for video connections in the U.S. AV Macs (both PowerPC- and 680x0-based) and machines equipped with optional multimedia cards support NTSC and S-video. To use a non-AV Mac, you either need to choose a camera (such as a QuickCam or a Color TeleCamera) that plugs into the serial port or pick a videoconferencing system that provides NTSC and S-video ports of its own.



The ERIS (about \$4,000), from RSI (612-896-3020), provides these ports — along with an ISDN modem and a speaker — in a box that plugs into your Mac's SCSI port. The ERIS works with any 68040 or better Mac.

## Getting Connected

Put your money where your connection is. Having even the best video camera and fastest Mac around won't do you much good if you have a slow network or phone connection.

Your choices are to use an analog-modem, an ISDN, or a network connection.

**Modem conferencing.** Using a modem for videoconferencing is the cheapest and easiest way to go. Unfortunately, the video frame rate for a 28.8-kbps modem connection hovers around 1 or 2 frames per second and sound lags well behind real time.

**ISDN.** If you intend to use videoconferencing as a substitute for face-to-face meetings or as a means of collaborating on documents, you

should consider investing in an ISDN line. In many cases, you'll achieve video frame rates of around 15 frames per second, assuming fast Macs and a good camera. Sound may be a second or two out of sync, which isn't so bad that it stands in the way of communication. If you plan to do a great deal of conferencing, consider adding more ISDN channels and using them together to improve speed.

**Network connection.** If your videoconferences will take place among offices in one building or campus, you may be tempted to send images over Ethernet. An Ethernet connection works well if collaboration is more important than the contents of the video window.

What's so bad about Ethernet-based video? Even though Ethernet's bandwidth (10 Mbps) is much greater than that of ISDN (56 to 128 kbps), the Ethernet link is usually shared among all networked devices (Macs, printers, servers, and so on), so a videoconferencing application must compete with other traffic for scarce bandwidth. ISDN connections are usually dedicated to the task of conferencing.

On an Ethernet network, you can isolate conferencing by dedicating network segments to video — not exactly practical for desktop-to-desktop connections but possible if you plan to connect conference rooms or labs. If your company already has a T-1 or other high-speed connection to a branch office and/or to the Internet, you can use that WAN link for videoconferences.

## Conferencing Accessories

Your Mac and/or camera probably comes with a microphone and a speaker suitable for small conferences. For large meetings, count on spending a few hundred dollars to get high-quality computer speakers and still more on a microphone that can capture many voices in a room and that can limit feedback. You may also want to add a large monitor to the conference-room Mac, so all participants can see video and document windows on-screen.

Choosing hardware is fairly straightforward — get the best you can afford. Software requires a different approach. The trick is to match video software to the work you need to do. Whether you're working in a small group or a large one, whether or not you're collaborating on a project, whether you need to share software, and whether you need to work cross-platform are among the important things to consider before you choose software.

You can count on getting at least two basic features from almost every Mac conferencing

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package: a video window (often called a *talk-head*, since it's the window that shows your face or the people you're conferring with) and a shared window for typing messages.


Additional features distinguish software packages from one another. Some come with an on-screen "whiteboard." A whiteboard lets you write and draw by using an electronic "marker." Some packages also let you cut and paste images onto the board, which can be useful for collaboration.

Another differentiating feature relates to communication with users of other computer platforms. The software that comes with the ERIS and the ShareVision Mac3000 (\$1,000), from Creative Labs (408-428-6600), lets you send files between Macs and PCs and view them on two machines simultaneously. To collaborate on a document, use conferencing software that lets you share applications as well as files. The ShareVision Mac3000's software shares applications between two Macs or two PCs but not cross-platform.

You can share Mac and PC screens by using Timbuktu for Networks (\$199 for two users), from Farallon (510-814-5000). Although it's not a videoconferencing application per se, Timbuktu can be used along with a camera and software for collaboration and training.

Like most computer-sharing applications, videoconferencing software is limited by proprietary schemes that make it necessary for every conference participant to have the same equipment and videoconferencing software. That's beginning to change as more vendors embrace video standards. If you want to confer with people using alien platforms, make sure the software you buy supports H.320 (the international standard for video and audio compression and decompression) and complies with T.120 (the standard for whiteboards). The latter standard is newer, so many videoconferencing-software vendors are still in the process of upgrading their software to comply with it.

## Conferencing in Focus?

It's fair to say that videoconferencing has left its infancy, but the technology is only now beginning to walk on its own. No single element — hardware, connectivity, or software — is ready for prime time, but faster Macs and networks as well as the adoption of video standards are likely to make conferencing more viable in the months to come. 

Nancy Peterson is a MacUser associate editor.

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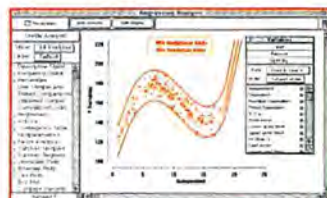
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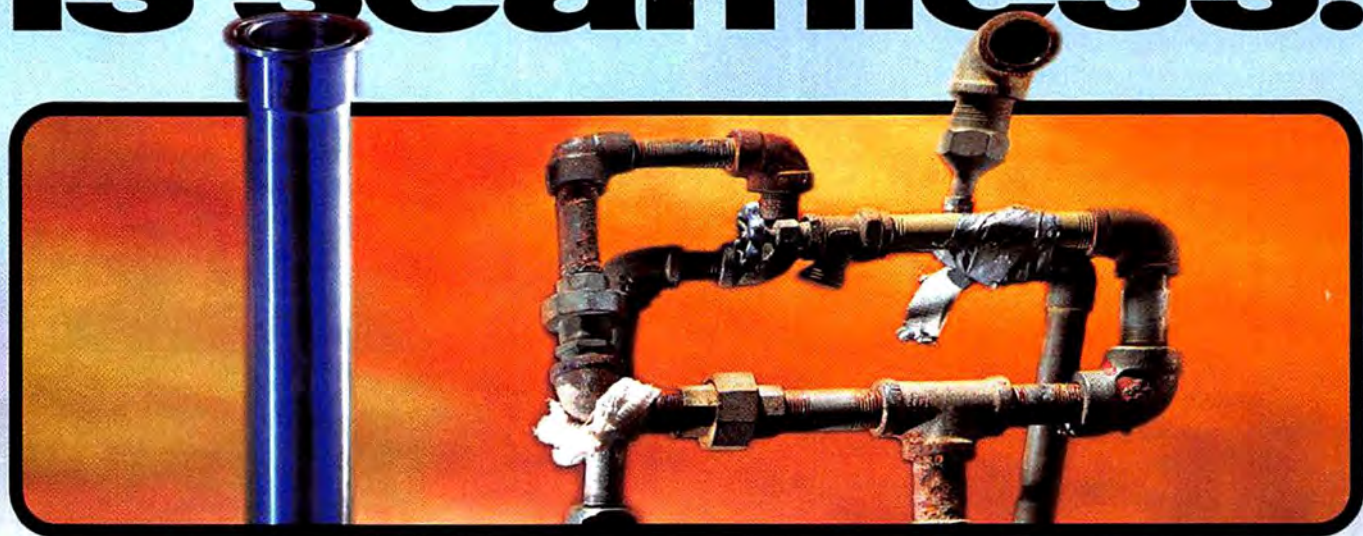
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# The Pinstriped P.I.

It can take detective work to ferret out corporate info on the Net.

**YOU WANT THE GOODS** on a certain company: Let's call it Acme Widgets. Maybe you're a widget engineer looking for work. Or maybe you're thinking about investing or just plunking down some cash for a new widget, and you want to know about Acme's future. Maybe you want general advice on investing in the widget market or listings of widget-engineering positions in your town. There's an amazing amount of useful business information on the Net, but finding it can be a challenge.

**Ask the Horse.** Interested in a particular company? Find the company's Web sites (note the plural). Finding the main company site is usually a no-brainer. Acme will almost certainly have registered *acme.com* (or maybe *acme-widgets.com* or *acmewidgets.com*) as its domain name; if Acme has a Web page, it will probably reside at <http://www.acmewidgets.com/>. If it's a big company with lots of divisions or offices, there may be more sites. If you use a search engine to locate Acme references, you might find out that the folks who run the SuperWidgets division (the one headquartered in your town) have a Web site of their own.

**News and Numbers.** In addition to publishing the *Wall Street Journal* online (<http://bis.dowjones.com/bizpubs/ws-j-interactive.html>), Dow Jones News/Retrieval (<http://bis.dowjones.com/>) trolls dozens of business databases and over a thousand publications to provide its custom clipping and research services — for a price. And Dialog, accessible at <http://www.dialog.com/>, serves up business news and information from many sources, including Dun & Bradstreet, Standard & Poor's, and Moody's.

Looking for investment information or the cold, hard facts about a company? Maybe you used to consult Hoover's Profiles on eWorld. It's still available (<http://www.hoovers.com/>) and lists company contact information, basic financial data, number of employees, the name of the CEO, SEC filings, and stock quotes and charts. You'll find profiles of some 10,000

companies, all for free; for a fee, you'll be rewarded with detailed financial stats and analysis. If Hoover's doesn't have everything you're looking for, you can zoom in on SEC fil-



ings, and other government info about companies, at EDGAR (<http://www.sec.gov/edgarhp.htm>).

Entrepreneurs may find useful tools and advice at Microsoft's Small Business Resource (<http://198.105.232.4/smallbiz/>), at Entrepreneurial Edge (<http://edgeonline.com/>), and at AT&T's Resource for New Business (<http://www.att.com/rnb/>). But you might get just as much information, and encounter less self-promotion, at the All Business Network (<http://www.all-biz.com/>).

**Job Search.** In the old days, job seekers pored through classified ads in the local newspaper. For a look at how that inky tradition has been morphed by the Net, check the job listings in the online arm of Silicon Valley's "local" paper, the *San Jose Mercury News* (<http://www.sjmercury.com/talentscout/>). If you make your home somewhere outside the Bay area, check out CareerPath.com, which features searchable classifieds from major newspapers around the country (<http://www.careerpath.com/>). E-span (<http://www.espan.com/>) provides a lot of job-search tools — from career

advice to interview techniques — as well as listings by job title, salary, experience, geographical area, and keyword.

E-span's jobs lean toward the computer industry; a good place to obtain information about jobs in the sciences is [gopher://cwis.usc.edu:70/11/Other\\_Gophers\\_and\\_Information\\_Resources/Gopher-Jewels/Istuff/employment](mailto:gopher://cwis.usc.edu:70/11/Other_Gophers_and_Information_Resources/Gopher-Jewels/Istuff/employment). Gopher sites catering to all manner of other careers can be found at the Rice University Gopher ([gopher://riceinfo.rice.edu:70/11/Subject/Jobs](mailto:gopher://riceinfo.rice.edu:70/11/Subject/Jobs)). If you know where you want to work, go straight to the company's Web site. The firm behind <http://www.microsoft.com/jobs/> is always hiring.

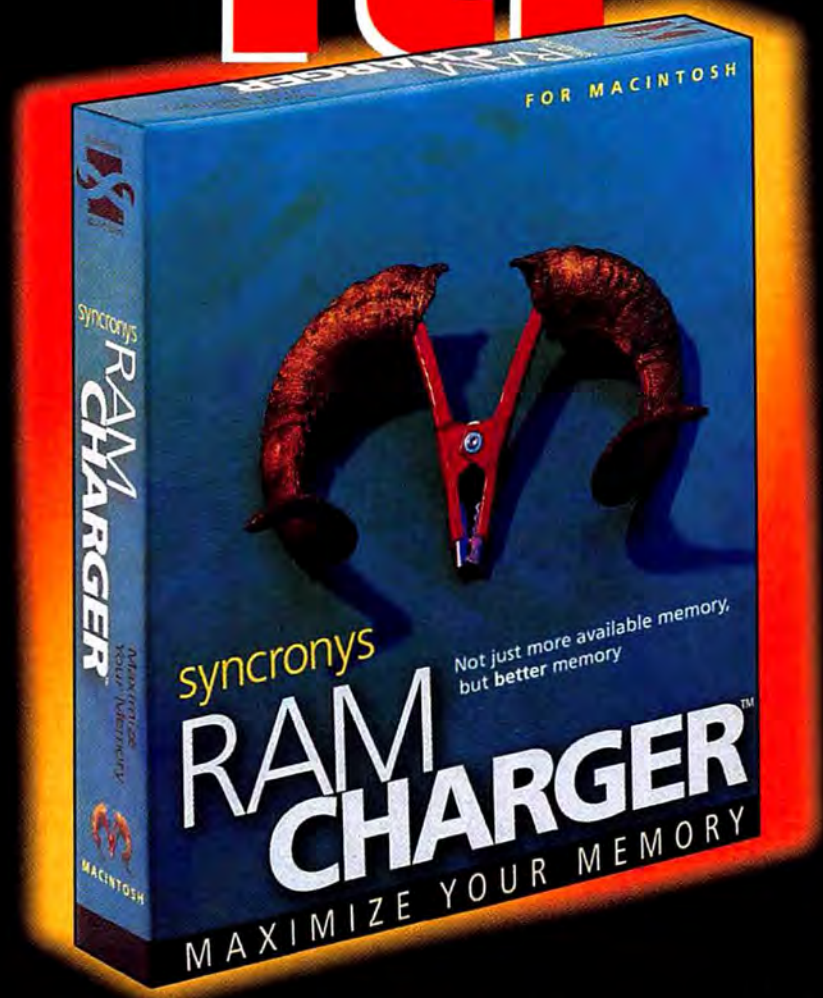
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## Don't Know IP from an IPO?

*MacUser* maintains a list of frequently asked questions (FAQs) about the Internet, *MacUser* itself, and this column specifically. Send mail to [faq@macuser.com](mailto:faq@macuser.com). *MacUser's* address on the World Wide Web is <http://www.zdnet.com/macuser/>. You can reach me at [traveler@macuser.com](mailto:traveler@macuser.com). ☺



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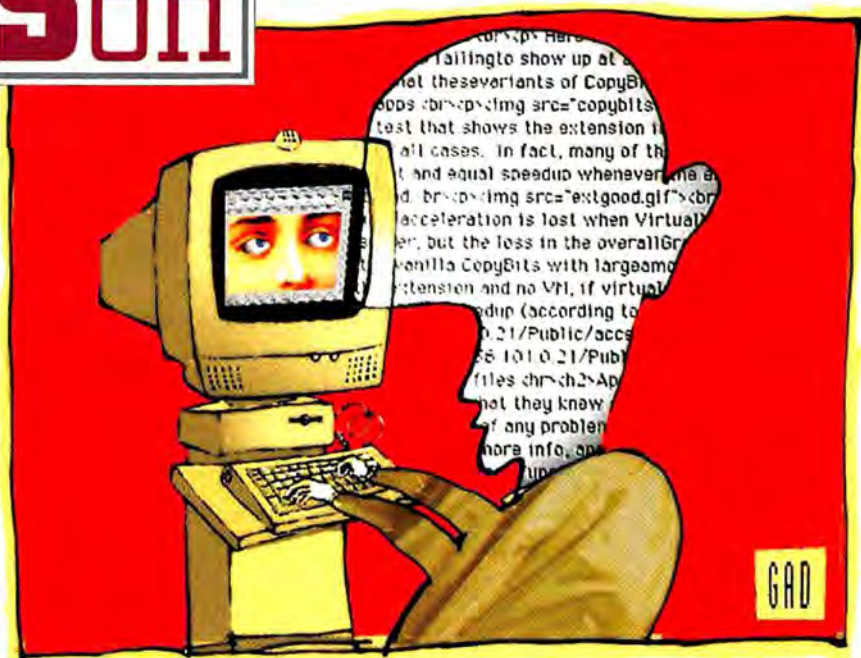
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# HANDS on

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own home page.



By Gregory Wasson

## Instant Home Page

**IF IT'S JUST FEAR OF** programming or Internet-service-provider technobabble that has kept you from building a Web home page, let us put out the welcome mat. To make one, just customize our home-page template and use the America Online (AOL) no-brainer method to post your page on the Net. That's also an inexpensive method, since AOL gives you 10 MB of space for no extra charge beyond your monthly subscription fee.

### Borrow Our Blueprint

Our HTML code is your HTML code, with modifications, of course. To acquire the code rather than retype it from our graphic (on the next page), go to our sample home page at <http://members.aol.com/gregwasson/> and use the feature in your browser that allows you to access source code. The way to utilize this feature depends on the browser you're using. For instance, in Netscape Navigator, go to our site, choose Save As from the File menu, and then choose Source from the Format pop-up menu that appears in the Save As window. That will create a text document of the HTML code, which you can then open in any word processor or Web authoring tool such as PageMill.

### Start Construction

Once you have the HTML code, you can ignore it and concentrate instead on the text between the blocks of code (the red text in our graphic). Those are probably the only parts you need to change.

We've built in room for the essentials any home page needs — info that lets visitors get to know you, links to other Web sites, and a way to contact you via e-mail — as well as some extras that add sophistication.

### Hang a Self-Portrait

We used both descriptive text and graphics to let visitors familiarize themselves with our home-page host — Albert the cat. To customize the page to feature information about yourself, modify the red text in our HTML template, replacing both the title (between the <TITLE> tags) and the introductory paragraph (between the <BLOCKQUOTE> tags) with your own words.

The next step is to substitute your graphics (in GIF or JPEG format) for ours. Choose graphics that are about the same dimensions as ours to keep the home-page construction simple. Put the graphics files you want to show on your home page in the folder where

you'll store all the files for your home page. We chose to keep graphics in a separate folder, called *images*, within the main home-page folder to help speed up access to our Web page. If you opt *not* to create a separate graphics folder, delete *images/* (after <IMG SRC=>). Next, substitute the name of your graphics files for ours.

Change the red text at the end of the lines of code containing the graphics information to short descriptions of your graphics. This text will show only if the person viewing your page turns graphics off.

### Throw an Open House

To build your own links to other Web sites into your home page, replace all the red text in the Internet-links section of our HTML code with your own information: Put Web-site addresses and names between the <TD> tags. And, because our links are arranged in a tidy table, you'll need to replace our table column headings with your own (between the <TH> tags near the top of the Internet-links section).

If you use PageMill 1.0, which doesn't support tables, don't fear — there is a workaround that will let you use our table. Copy all the text from <TABLE BORDER=0>



through `</TR></TABLE>`, paste it into your PageMill document, and format it as raw HTML. PageMill 1.0 won't show this as a table, but your browser will, and that's what counts.

## Add Finishing Touches

The most common way to allow your visitors to contact you is by providing an e-mail link on your Web page. To do this, replace our Internet e-mail ID with your own. If you're using America Online, your Internet e-mail address is `screenname@aol.com` (be sure to remove any spaces from your screen name). If you're using CompuServe, your e-mail ID is `useridnumber@compuserve.com` (replace the comma in your number with a period).

A fancy twist, if you post your home page through America Online, is to add a counter that tells you how many times your page has been visited. Replace the screen name shown with your own (minus any spaces). If your home page is not posted through America Online, remove the line of code that contains this information. Make any other tweaks you want in order to customize your page, and you're ready to post it on the Internet.

## Install the Wiring

So how do you put your site up on the Web? Two of the easiest ways are to find an Internet service provider (ISP) that will do the work of uploading your page for you at little or no cost or by posting the page yourself through AOL. We can't help you find such a generous ISP, but we can tell you how to use AOL to post your page. Be forewarned that although the process is simple, it has tedious portions.

To get started, go to My Place (keyword `myplace`), click on the Go to My Place icon, and then click on Upload. In the Upload window, select the ASCII option for the file that contains your customized HTML code, the Binary option for graphics, and MacBinary for any applications you upload. Here's the tedious part: You have to upload each file separately. There's no way, for instance, to load multiple graphics files at once.

If you've created a separate folder on your hard disk for images, be sure to create one also in My Place, using the Create Directory button of the My Place window. Double-click on the directory you've created, and then upload your images — again, one at a time. To

leave that directory and return to the main My Place window, click on the directory window's close box.

When you're all done uploading, start the AOL browser (switch to Browser, on the Windows menu) and type in the address of your site (`http://members.aol.com/screenname/`). Remember to remove any spaces in your screen name. If you ever want to alter a page, edit it on your hard disk and just reupload it.

## Your Home Page Is Your Castle

Once you've tried *MacUser's* instant-home-page method, you'll probably want to learn some HTML programming so you can create more-sophisticated home pages or complex Web sites. Be sure to check out AOL's online resources, such as Web Diner (keyword `Web Diner`) and Web Page Toolkit (keyword `HTML`), if you're a subscriber; or visit your local bookstore's computing section. The world of Java, CGI scripts, animated GIFs, and much more awaits you. ☺

Gregory Wasson is a *MacUser* contributing editor and the former Webmaster for NetCarta. You can contact him at [gregwasson@aol.com](mailto:gregwasson@aol.com).

## HOME-PAGE TEMPLATE / use our code to create your presence on the Web

BEHIND EVERY PRETTY HOME PAGE (at right) is a lot of unattractive programming code (at left). Rather than learn what all the code means, you can simply replace

the red text of our template with your own information. See the article for details on customizing our code to fit your needs.

**PERSONAL INFO**

```
<HTML> <HEAD><TITLE>Albert's Home Page</TITLE></HEAD> <BODY BGCOLOR="#ffffff">
<IMG SRC="images/albert.gif" WIDTH="175" HEIGHT="197" ALIGN=bottom ALT="Albert's Face">
<IMG SRC="images/ALBLOGO.gif" WIDTH="321" HEIGHT="82" ALIGN=bottom ALT="Albert's Logo">
<BLOCKQUOTE>My name is Albert and I'm a cat....</BLOCKQUOTE> <HR>
<CENTER>
<TABLE BORDER=0>
<!-- Row 1 (Column Titles) -->
<TR ALIGN=LEFT>
<TH>Cat Friends</TH> <TH>Abbys Online</TH>
<TH>NetVet</TH> <TH>Favorite Web Sites</TH>
<BR></TR>
<!-- Row 2 -->
<TR> <TD><A HREF="bruce.html">Bruce</A></TD>
<TD><A HREF="http://www.cfainc.org/">C.F.A.</A></TD>
<TD><A HREF="http://www.zmall.com/pet_talk/cat-fags/">Cat Info Online</A></TD>
<TD><A HREF="http://www.audubon.org/audubon/">Audubon Bird Page</A></TD> <BR></TR>
<!-- Row 3 -->
<TR> <TD><A HREF="hepzibah.html">Hepzibah</A></TD>
<TD><A HREF="http://www.taylrsnuffs.com/~wacc/">Abby Cat Club</A></TD>
<TD><A HREF="http://web.vet.cornell.edu/public/fhc/diabetes.htm">Feline Diabetes</A></TD>
<TD><A HREF="http://petstation.com/kitexpo.html">Kitty Express</A></TD> <BR></TR>
<!-- Row 4 -->
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<TD><A HREF="http://www.netlink.co.nz/~monpa/">Why Cats Paint</A></TD>
<TD><A HREF="http://www.netlink.co.nz/~monpa/">Why Cats Paint</A></TD>
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</TABLE> <HR>
Contact me by <A HREF="mailto:gwasson@aol.com">e-mail. </A>
You are visitor <IMG SRC="/cgi-bin/counter?GregWasson" ALIGN=bottom>
<P></CENTER> </BODY> </HTML>
```

**INTERNET LINKS**

**COUNTER E-MAIL**



By Bob LeVitus and Christopher Breen

# Help Folder

Gold-plated memories, foreign film, and tricky zippers.

## Memories Are Made of This

**Q.** I've been told by computer-store salespeople that I need gold-plated, 72-pin, 70-ns SIMMs to upgrade my Power Mac 7100/66. Can I use plain-old PC SIMMs instead? They're cheaper, you know, and have a parity chip onboard.

**Mike Muyal**  
Montreal, PQ, Canada

**CHRIS:** I'm afraid you've been given a load of bad information. A cynic might even venture the opinion that some of that information was imparted in order to relieve you of more of your hard-earned dollars than necessary.

Because I believe that humans are inherently good but tend to chomp down on the first shiny idea that floats by — much like trout that swallow rubber-and-glue representations of insect larvae cast by hip-booted fisherfolk — I doubt that these salesbots were actively trying to rip you off. They were probably just misinformed.

**BOB:** Let's start with the part they got right. Yes, the 7100 requires 72-pin SIMMs, but your Mac needs them only to run at 80 ns. If you get faster RAM, fine. It won't speed things up, because your Mac can't take advantage of it, but it won't hurt.

**CHRIS:** Want some clarity on parity? Forget it. The explanation would bore you into a comalike slumber. Suffice it to say that your Mac doesn't care one jot, tittle, or whit about parity.

**BOB:** Regarding gold plating: Gold doesn't corrode and is therefore a great conductor. It also happens to be worth its weight in itself.

**CHRIS:** And is therefore pretty darn expensive

stuff. Fortunately, you don't need it.

Here's a little game you can play with the next salesperson who hands you the gold-plated line. Ask this emporium authority whether the connectors in the Mac's RAM slots are likewise gold-plated. After all, if the SIMMs must be gold-plated, shouldn't the internal connectors be as well? If you're feeling particularly cruel, ask said authority to open up the Mac to check.

Practice your look of incredulous surprise for the moment when you both discover shiny silver connectors in the RAM slots.

## Maybe AVI, You'll Be True

**Q.** Is there any way to view a Windows AVI video file on a Mac?

**Neal Pasciak**  
via the Internet

**CHRIS:** You'd think by now the Powers That Be would understand that computer users have to swap files among various flavors of computers — particularly when the Internet is such a whizzily dominant, if amorphous, entity used by computers of all stripes. This swapping process would be a heck of a lot easier if we had one format and a cross-platform application or two to open files in that format. Ya know, just as you can read ASCII text files on any computer? Wouldn't it be ducky if movies could likewise come in one variety?

**BOB:** Hang on a minute. They do. QuickTime works for both Windows and Mac.

**CHRIS:** You're right as rain. But you know as well as I that Microsoft doesn't dig any technology sporting the Apple moniker and that QuickTime movies don't always work as well on PCs as does Microsoft's proprietary video format, AVI.

**BOB:** And lemme guess: QuickTime doesn't open AVI files.

**CHRIS:** Score 2 for you. Hope isn't completely lost, however. Although QuickTime's MoviePlayer doesn't open AVI files, there are a couple of ways for you to view them — provided, of

course, that you have the proper tools.

We begin our journey by taking an Internet stroll to Microsoft's Web site, <http://www.microsoft.com/>, where we'll download a copy of Microsoft's Internet Explorer Web browser. Now hold your horses; like many of you, I still prefer Netscape Navigator over the IE as my browser of choice. But IE maintains at least one advantage over Netscape: If you drag and drop AVI files onto its icon, those Microsoft movies play back flawlessly. Explorer even



## Tips / Menu Magic

### Windows Envy

Apparently Microsoft's Windows 95 ad campaign has been successful enough to penetrate the crania of Mac users who ought to know better. I've received a couple of letters from readers looking for Mac equivalents to Windows' sticky menus (you know, click once on a menu, and it sticks in place). This is something to get excited over?! Ho hum... OK, here's how:

Download either Andreas Atkins' postcardware ClickLock or Michael J. Conrad's \$15 shareware program AutoMenus Pro. ClickLock can be configured to always lock menus or to do so only when a modifier key is held down. AutoMenus Pro is a bit more comprehensive than ClickLock. This control panel allows you to drop menus automatically (no clicking necessary — just place your cursor over the menu name), exclude applications from AutoMenus' magic, and create custom cursors. The program even makes a swooping noise when menus descend.

Show these utilities to your Windows-ridden friends, yawn discreetly, and ask what else is new.

**Christopher Breen**  
MacUser contributing editor

## WRITE TO HELP FOLDER/TIPS

c/o MacUser  
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Don't want to wait for an answer? Post your question on the MacUser Forum on CompuServe or send e-mail to [helpfolder@macuser.com](mailto:helpfolder@macuser.com) or [tips@macuser.com](mailto:tips@macuser.com). We pay \$25 to \$100 for any undocumented tips we publish.



offers a Save As function that converts AVI movies to QuickTime. Nifty-good idea.

If you prefer not to use Microsoft's browser, you can download a copy of Microsoft's Vfw 1.1 Utilities from the usual places (see end of article). The AVI to QT Utility component lets you translate — in a less than perfect way — AVI files to QuickTime movies.

**BOB:** Less than perfect is right. I had no problem converting movies containing video only, but files with soundtracks lost sync. The sound always seemed to be delayed by a second or so.

**CHRIS:** I had the same problem. I was able to fix it by opening the movie in Macromedia's SoundEdit 16 and shifting the soundtrack, but it's not the kind of operation I'd care to perform on hundreds of files.

**BOB:** So our advice is?

**CHRIS:** We recommend that you use Internet Explorer to reliably view AVI files; go with AVI to QT Utility to make flawed conversions; and pray that by the time you read this, there will be a better solution.

## Modem Muddle

**Q.** I have a Performa 6200CD with an internal 14.4-kbps modem, and I'd like to move up to 28.8 kbps. How do I go about it?

**Raul E. Rodriguez**  
via the Internet

**CHRIS:** I can tell you one way *not* to go about it. Don't try shoving a serial cable through the little plastic cover over the external-modem port on your Performa in what you will soon find is a futile attempt to connect an external modem to the Mac. Although I thoroughly

believe that brute force is an absolute requirement for bowling, boxing, and billiards, it doesn't help much in matters technological.

**BOB:** What Chris might be getting at is that the plastic cover over your external-modem port is there for a reason. When an internal-modem card is installed in the Communications slot, it disables the external-modem port. Apple kindly puts a cover over the port so you won't be tempted to use it.

**CHRIS:** What Apple fails to do is place a pink neon sticker over this port containing an explanation of why it's covered. Of course, if all things were apparent in the Mac universe, we'd be out of a job, so we heartily endorse this lack of signage.

**BOB:** To free the port, open the Mac, pull the internal-modem card from its roost, and pop out the plastic plug covering the external-modem port. With no card in the slot, the modem port will once again work as intended (see figure 1).

**CHRIS:** You can now either pray that Global Village decides to sell its internal 28.8-kbps modem card to regular schmoes like us — it's currently bundled in the Performa 6300s but not available separately — or use an external modem. If I were making the decision, I'd go with the external modem. Yes, it will take up a *liiiiittle* more space on your desk, but you'll have access to both serial ports — a wonderful thing if you later decide to use other serial devices.



**figure 1** / To use an external modem with the Performa 6200CD, remove the internal-modem card (at right) and then pop out the plastic plug on the back of the machine.

## Old and Here to Stay

**Q.** We have a Mac IIcx we'd like to upgrade but find that most accelerators specify support for the IIci, omitting the IIcx. Aren't the two machines the same as far as upgrades go?

**Patricia Kerner**  
via the Internet

**CHRIS:** Ah, the venerable IIcx: an oldie and not so goodie, as far as upgrades are concerned.

Pat, although the IIci and the IIcx look exactly the same from the outside — aside from the one-letter difference on the front of the case — the two diverge on the inside in unfortunate ways.

**BOB:** At the top of the laundry list is this: The cx has "dirty ROMs." This means that it won't recognize more than 8 MB of RAM unless you have MODE32 software installed. When 32-bit-clean addressing first came on the scene (at about the time the IIci came out), there was a huge stink over these dirty ROMs: a stink so big, in fact, that Apple had to give away MODE32 — at the time, a commercial product from Connectix — in order to avoid a nasty class-action lawsuit.

If you intend to use more than 8 MB of memory, be sure to download a copy of MODE32, available online in any of the usual places, and then switch on 32-Bit Addressing in the Memory control panel.

**CHRIS:** Now to acceleration: the IIci is dead-easy to accelerate, because it has a cache slot — the IIci was the first Mac model to carry one of these suckers. Just plug the accelerator card into the cache slot, and you're done. The IIcx, on the other hand, is dead-hard to deal with, because, besides lacking a cache slot, it

## Tips / CD-ROM Games

### Play Without the CD-ROM

Today's big-budget computer games eat up hundreds of megabytes of storage space. Because of their gargantuan size, these games are distributed on CD-ROM and traditionally require that you copy a small portion of the game over to your hard disk, leaving most of the game data on the CD-ROM, where it can be accessed as needed. Many users would like to copy the entire game to their hard disk for faster play and — for PowerBook users without the necessary CD-ROM drive — portability. Unfortunately, whether you access the darned thing or not, most of these games require that the CD-ROM actually be in the drive. Here's how to get around the problem:

Download a copy of Chad Magendanz's ShrinkWrap 2.0 from any of the usual places. New to version 2.0 is the ability to create a disk image of removable media — the process we'll undertake.

Boot ShrinkWrap, and in the Preferences dialog box, choose where you want to save the disk image of the CD-ROM. In all likelihood, you'll need a *lot* of space — perform a Get Info on the CD-ROM to see just how much. Now select Create Image from Disk, from the Image menu. Select the CD-ROM, and then click on Save.

The contents of your CD-ROM are now a disk image. To mount the image, drag its icon to ShrinkWrap 2.0 or, from within ShrinkWrap, type Command-M. Once the image is mounted, you should be able to play the game as if the CD-ROM were still in the drive.

Note: Certain games, such as Descent, that use Redbook audio files for background music won't be able to access those files from the disk image and will therefore play without music.

**Christopher Breen**  
MacUser contributing editor



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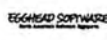


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CIRCLE 12 ON READER SERVICE CARD





**figure 2** / This two-tiered accelerator board replaces the Ilcx's original 68030 processor with a relatively speedy 68040.

has its processor soldered in place.

To soup up the Ilcx, you have to jam the accelerator into the hole reserved for the main processor, where, as I hinted earlier, said processor has taken up semipermanent residence (check out figure 2 for an inside look at the accelerated Ilcx). To allow the addition of an accelerator, the processor must be ripped from its comfy home — a job that should be performed only by a certified Processor Ripping Technician (PRT).

If you buy a DayStar Turbo 040, for example, this means extracting the motherboard from the cx; bagging and boxing it; and shipping it off to DayStar, where a PRT installs a socked processor.

**BOB:** What a pain! Who'd bother?

**CHRIS:** I guess I should fess up. I've done these things. Even though I own a Power Mac and use it for such necessary applications as Photoshop, FileMaker Pro, and Marathon 2, I still use the accelerated Ilcx for word processing and telecommunications — heck, Bob, I'm writing and e-mailing these words to you with ol' Mabel right now! With its DayStar 040 accelerator and 20 MB of RAM, Mabel's been running like a top for years.

Sure, if I were considering a speed increase today, I'd probably opt for buying a used Power Mac rather than going the accelerator route, but for those on a tight budget...

**BOB:** And we mean *seriously* tight.

**CHRIS:** ... experience tells me that adding an accelerator is a reliable way to go.

## Special Delivery

**Q.** We can't figure out how to reliably send graphics files via the Internet or from one online service to another. We've purchased

StuffIt Deluxe, but file transfers still don't work: We can't open the files once they've been transferred. Can you help?

**Dan Wagner**  
via the Internet

**BOB:** Piece of cake. You're doing fine so far — StuffIt Deluxe is most likely the best tool for tackling this job.

**CHRIS:** Here we go — this procedure will work no matter what kind of file you're sending: First "stuff" your document, which will create a compressed (and therefore smaller) ".sit" file. Name the file Doc.sit. Next choose BinHex4:Encode from StuffIt Deluxe's Translate menu and

select Doc.sit in the Open dialog box. StuffIt Deluxe will cogitate for a moment and then offer you a Save dialog box and suggest you name the file Doc.sit.hqx. (The .hqx suffix means the file is a BinHex file.) Do so.

**BOB:** Doc.sit.hqx is a plain-old text file (see figure 3) containing a BinHex-encoded representation of your document. Since it's plain-old text, you can copy and paste it into a standard e-mail message. The result looks like unintelligible garbage, but when the message is received by someone on another online service, the BinHex portion can be saved as text and then decoded with StuffIt Deluxe, the freeware StuffIt Expander (which can only decode), or the shareware BinHex 5.0 (which can both encode and decode).

**CHRIS:** Although you can make your compressed .sit file as large as you like, you'll have to experiment to discover the optimum e-mail-message size for successful transmission from one service to another. Some services have a limit of 28K or 32K, which means you'll have to split up large files into multiple text messages, a pain in the you-know-what but nevertheless doable.

**BOB:** Another option is to invest in Claris Emailer, which retrieves mail from most online services and the Internet and handles the conversion to BinHex on both ends transparently and automatically.

## Tips / System 7.5.3

### Hidden Features

Some of the best new surprises in System 7.5.3 are accessible only with a little help from a clandestine extension that activates cool stuff Apple "turned off" before releasing System 7.5.3. What are these hidden gems? First is Reveal Original (Command-R), which takes you directly to the original file when you select an alias (meaning that you don't need to access the Find Original button in the Get Info windows). You can also create an alias by holding down the Control key while you drag a file's icon. And when you want to delete a selected file, Command-Delete automatically moves it to the Trash.

To get at these great features, all you need is a freeware extension, either Secret Finder Features or Finder Alias Extensions Enabler. Download them from fine freeware libraries everywhere.

**Ted Landau**  
MacUser contributing editor

### Expanding Across Platforms

**Q.** Is there a program that expands and compresses files on Macs as well as PCs? Also, if I use a Mac to download a PC file or application, do I have to do any kind of conversion to get it to work on the PC?

**Robert Nasirx**  
via the Internet

**BOB:** Ziplt is a full-featured Mac zip archival program that's compatible with PKZip and other zip implementations. Zip, for the Mac-centric among you, is the standard compression format in the PC world.

Version 1.3.5 supports AppleScript and Macintosh Drag and Drop and can zip Mac files without losing any Mac-specific data. It also supports multisection archives and runs native on PowerPC-based systems. It's \$15 shareware by Thomas A. Brown, available



**figure 3** / After compressing a file with StuffIt Deluxe, encode it with BinHex4. Your BinHex-encoded text looks like this.



## What *was* on your PowerBook?

Amazing where you'll find PowerBooks these days. On the road. In the air. At the beach. Everywhere.

Only thing is, they're traveling around with important files that don't exist anywhere else. And every disaster that can happen to a Mac in the office is multiplied when you take a PowerBook into the world. Like cocktails in the keyboard. Or when it gets hijacked at the airport. Voltage spikes. Gorilla bellhops. The unfortunate farewell when you leave it behind in a cab.

With Retrospect Remote® 3.0, PowerBooks get the protection they need. It backs up PowerBooks automatically when they

connect to the network. So even when your PowerBook's not connected, you still have peace of mind.

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*It's unanimous. MacWeek says Retrospect is "the best of the breed." MacWorld writes "Retrospect leaves the competition in the dust." And MacUser reports "no other backup utility can match its breadth or depth."*



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**CIRCLE 28 ON READER SERVICE CARD**



## Tips / Online

### Shortcut

Tired of typing those endless `http://www.blah-blah-blah.com` URLs? Our friends at Netscape have hidden a shortcut in version 2.0 of the Navigator browser. If the URL you're looking for fits the `http://www.something.com/` convention, just typing the *something* in the location field may get you there.

I now get to Yahoo by typing *Yahoo* and to MacUserWeb by typing *MacUser* (actually, I'm directed to ZD Net — Web Central for all Ziff-Davis magazines — but that's still pretty close).

**Bryan Anderson**  
via the Internet

online from all the usual places. It's worth every penny.

**CHRIS:** We'd be remiss not to tell you that both the aforementioned commercial StuffIt and the freeware StuffIt Expander can unzip files, but neither one can zip them.

**BOB:** In answer to your other question: If you download a PC software file using a Mac, all you have to do is copy the file to a floppy disk you've formatted for use with a PC (choose Erase Disk on the Finder's Special menu, and then choose DOS 1.4 MB from the pop-up menu).

**CHRIS:** Of course, you must have the PC Exchange control panel present and accounted for in order to read and format floppies of the PC persuasion.

### Zip-Boot-Dee-Doo-Da

**Q.** Are Iomega Zip cartridges bootable? I would like to create a super emergency disk containing a full working System Folder and my repair programs to use when my system goes down hard.

**Richard Cooper**  
via the Internet

**CHRIS:** Piece of cake.

**BOB:** We're always saying that. How 'bout slice of pie.

By the way, did you notice that this makes two questions this month about stuff called Zip that have nothing whatsoever to do with one another? What do you suppose that means?

**CHRIS:** I'd say it doesn't mean zip. Because we're feeling particularly generous, we'll provide you with not one, not two, but *three* ways to boot with that Zip cartridge:

(1) If your Mac isn't in an unhappy state and boots successfully from the regular ol' hard disk, you can simply shove the cartridge

containing a valid System Folder into the Zip drive, designate it as the boot volume in the Startup Disk control panel, and restart — and you're in Zip heaven.

**BOB:** (2) In emergencies wherein the hard-disk drive is hosed, hold down the Delete-Option-Command-Shift (think: DOCS) keys at startup to boot from the Zip. Keep in mind that other external SCSI devices will also be accessed during startup. If one of these has a valid System Folder on it, that's the device from which you're likely to boot first.

**CHRIS:** (3) Just in case the DOCS trick doesn't work (or, more likely, when invoking DOCS you've pressed the right-delete key that sits under the Help key on your extended keyboard instead of the chunky Delete key up there next to the + key, as a sometimes-over-tired *MacUser* columnist has done on more than one occasion), make a copy of your Disk Tools floppy, trash Disk First Aid and HD SC Setup (on the *copy*), and copy the Startup Disk control panel and Iomega driver to the System Folder on the floppy.

When things go blooey, you can start up from the floppy, insert the Zip cartridge, select it in the Startup Disk control panel, and restart.

**BOB:** These techniques also apply to other varieties of removable media — SyQuest, magneto-optical, and CD-ROM. As long as the cartridge, disk, or disc has a viable System Folder, you will be able to use it for starting up your Macintosh.

### Department of Corrections, Amplifications, and Clarifications

**BOB:** In our June column, we explained how to tell which of your programs are PowerPC-native.

**CHRIS:** We raved about Casady & Greene's commercial program Conflict Catcher but neglected to mention two excellent (and free) utilities that can help you discern which of your programs, control panels, and extensions run in native mode on PowerPC-based systems.

**BOB:** Tom Hopper was the first reader to e-mail us about our oversights. The embarrassing part is that one of these utilities, PowerPeek, is a *MacUser* exclusive. PowerPeek is an extension/application combination that lists the PowerPC-native files on your

system and tells you which extensions and control panels patch traps, which traps they patch, and more. The report is an easy-to-read, graphical TeachText document. Best of all, the extension puts a red or green light in the upper right corner of your screen that tells you when you're running in emulated (red) or native (green) mode.

**CHRIS:** TrapsPeek, a freeware utility by Chris Thomas, also creates a text file that lists system traps by name and by what patches have been applied.

**BOB:** Although none of these programs — Conflict Catcher, PowerPeek, or TrapsPeek — really explain what all this mumbo-jumbo about system traps and patches means, they go a long way toward helping you identify non-native culprits that are slowing your PowerPC system down.

**CHRIS:** On a different note, several readers wrote to tell us that older, antiquated Macintosh software can often be found at Sun Remarketing, the famous used-Macintosh dealer in Utah. Not only does it have copies of early MacWrite and MacPaint software but it also has old Macintosh parts and antique system software. It's at 800-755-3360 or 801-755-3360; [sales@sunrem.com](mailto:sales@sunrem.com); <http://www.sunrem.com/>.

*Bob LeVitus is the author of 20 computer books and is a columnist for the Houston Chronicle. Christopher Breen recently coauthored The Macintosh Bible Guide to Games, published by Peachpit Press.*



You can find the shareware and freeware programs that are referenced in this article at MacUser's Software Central (<http://www.zdnet.com/macuser/software/>). You can also find them in the MacUser Forum on CompuServe. See How to Reach Us for instructions on accessing our online services.

## Tips / A Little Light Hacking

### Return of the Crisper Apple Menu

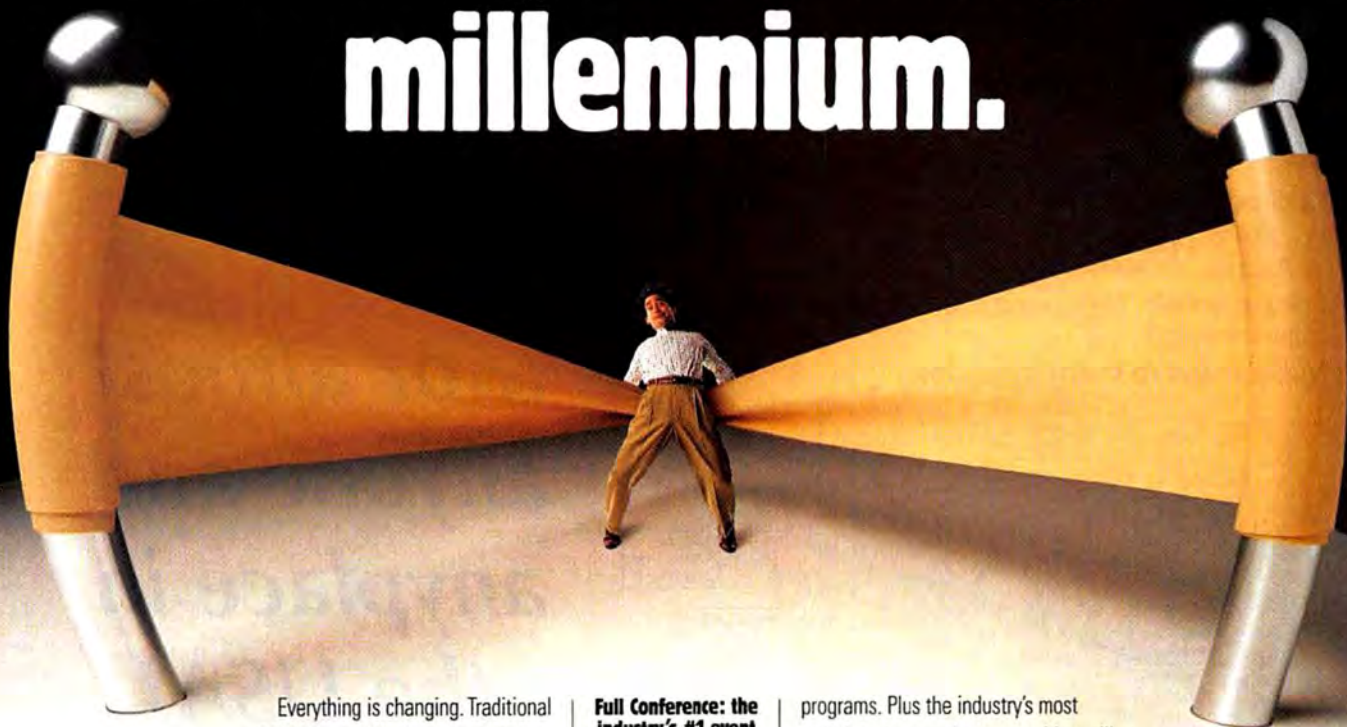
I love the Crisper Apple Menu tip (Help Folder, August '95, page 120), which explains how to create — on the Apple menu — a single folder that contains all your recently used items: applications, documents, and servers. Unfortunately, System 7.5.3's Apple Menu Options Prefs file lacks the all-important TMPL resource you need in order to create a combined folder. Thankfully, using ResEdit, you can copy the TMPL resource from a pre-7.5.3 Apple Menu Options Prefs file, paste it into the new prefs file, and hack to your heart's content.

If you'd prefer not to attempt the ResEdit hack yourself or don't have an old prefs file, you can download one that's been pre-hacked, from <ftp://members.aol.com/wwwstuff/AppleMenuOptionsPrefs.sea>.

**Michael Slavin**  
via the Internet



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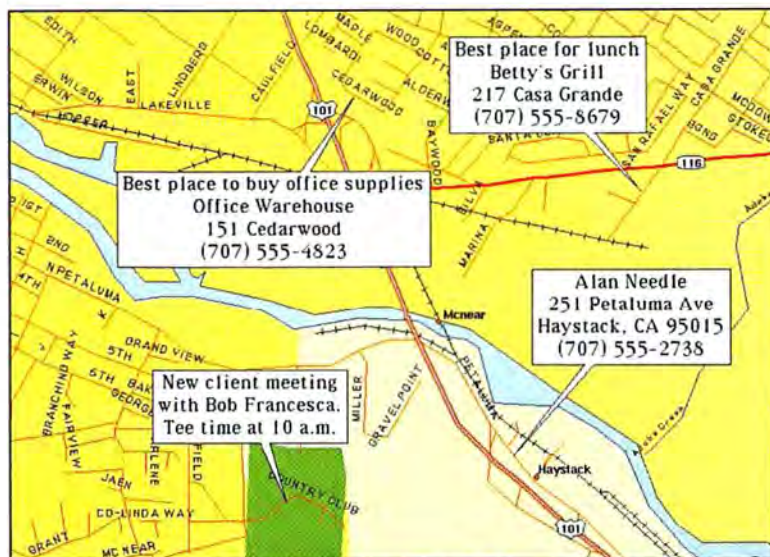
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# PERSONALmac

The best electronic accessory for going off to college is no longer a stereo — it's a well-equipped Mac.



By Sharon Zardetto Aker

## A Freshman's Guide to Computing

**PREPARE YOURSELF**, if you're entering college this year, for all the baggage likely to accompany being part of the Class of 2000: hokey, theme-emphasizing class mugs; extremely pompous graduation speeches; and the pressure of being a Symbol of the Future. Fortunately, being a Symbol of the Future isn't all bad — for

instance, you can easily justify your need for a well-equipped Mac to provide that crucial technological edge in your studies *and* your social life. Here's a guide to help you get that Mac, equip it, use it wisely, and keep it from getting snatched by an envious fellow Symbol of the Future.

### Back-to-School Shopping

If you're buying a new Mac, you may well want to wait until you get to school. If your college has an Apple University Purchase Plan, you'll be able to get discounted education-only Apple equipment, usually through the college's bookstore or computer center.

You'll be hard-pressed to find a better deal in a new desktop Mac than the Power Mac 5400/120 — available *only* through educational channels (see "Mini Macs Grow Up," August '96, page 76). For about \$2,300, you get a powerful (120-MHz 603e), easily upgradable Mac with 16 MB of RAM, a 1.6-GB hard drive, a quad-speed CD-ROM drive, and a 10BASE-T Ethernet card (yes, some dorms actually *are* wired for Ethernet). Because it's an all-in-one design, with monitor and speakers built in, it's less hassle for those frequent dorm-to-home-to-dorm moves. And the sound is audio-CD-

quality — perfect for interactive audio CDs such as Primus' *Tales from the Punchbowl*.

Of course, another obvious choice for students might be a Duo setup: You get a truly lightweight portable for taking to class, to the library, and on trips home; back in your room, you can slide it into a Duo Dock connected to a larger screen and a full-sized keyboard. Bear in mind, though, that you'll pay at least \$1,000 more than for a comparable desktop Mac, even before you add in items such as a monitor and a CD-ROM drive.

Duo-type systems or 5400s are great if you can afford them, but most course work doesn't require a state-of-the-art system. You can build a very capable, reasonably priced system around a used Mac (for the latest prices, check out United Computer Exchange's used-equipment price list at <http://www.uce.com/>). Of course, you

don't want to underestimate your needs either; here are some recommendations:

**Computer.** PowerPC-based system preferred; 68040 minimum.

**Memory.** 16 MB preferred; 8 MB minimum.

**Hard drive.** 500 MB preferred; 200 MB minimum. (Graphics-arts students will need more — about 1 GB, which can be external.)

**CD-ROM drive.** Quad-speed preferred; double-speed minimum (with an upgrade to quad-speed within two years).

**Modem.** 28.8 kbps preferred; 14.4 kbps minimum.

**Ethernet.** Ethernet capability is important if your dorm is wired for the college's network; most college networks use Ethernet wiring. Get it built in or add it as a card.

**Printer.** Apple's inkjet StyleWriters are perfect for students: low-cost, compact, and quiet enough not to annoy sensitive roommates.

(Graphics-arts students should get a PostScript printer such as the Personal LaserWriter 320.)

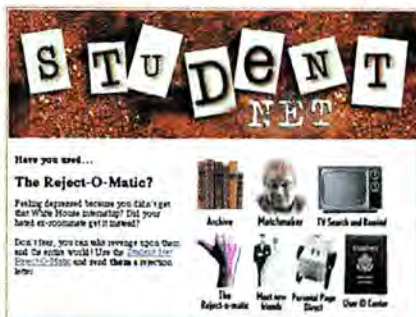
### Stocking Up on Software

You'll probably use your Mac at college for three main activities: word processing, research, and procrastination — *er, stress-relieving study breaks*. You'll find that most of your software needs can be met on a shoestring budget.

If **ClarisWorks** (\$129 from Claris) didn't come bundled with your Mac, get it from Claris (408-987-7000) or from your campus store at a big discount. You'll have all the word-processing power you need for your college career, along with a slick database program, a spreadsheet program, and basic graphics and layout capabilities for really good-looking term papers.

Next, offline research: a general encyclopedia, a dictionary/thesaurus, and a literature roundup





should be the core of your software library:

- **Compton's Interactive Encyclopedia** (\$69), from SoftKey (617-494-1200), is one of the best.
- **The American Heritage Talking Dictionary** (\$50), from SoftKey, pronounces about a third of its 200,000 entries for you and provides helpful links to synonyms and similar words.
- The dictionary and encyclopedia in **Microsoft Bookshelf** (\$100), from Microsoft (206-882-8080), can't match the stand-alone products, but they're fully linked to the thesaurus, atlas, almanac, and book of quotations on the same disc.
- **Monarch Notes on CD-ROM** (\$32), from Thynx (609-514-1600), includes everything from Aeschylus and Ovid to Joyce and Kafka; you'll get synopses of the works as well as critical commentaries and bibliographies. The overhaul of the dismal interface is due before the end of the year, but the content is invaluable even in its current form.

If you can get only one game, get **You Don't Know Jack** (\$30), from Berkeley Systems (510-540-5535), a slyly funny send-up of a TV quiz show with an obnoxious host. It works for one, two, or three players at a time, so it's a great way to lure curious bystanders into your dorm room and get to know them.

## Plugging In

For wide-ranging research, e-mail to distant family and friends, and the most potent of procrastination tools, you'll want online access. Many colleges provide workstations in computer labs or libraries where you can jump online, but to get there from your Mac, you'll need a modem and a phone hookup — unless your dorm is wired for the college network, which generally means you'll need an Ethernet card or built-in Ethernet in your Mac.

The software you need depends on whether you're accessing the Net through an online service (such as

AOL or CompuServe), an Internet service provider, or a college-provided account. Online services provide proprietary access software (both for the Net and for their own resources, such as databases and online conferencing) when you subscribe, and Internet service providers can point you toward free sources for

browser software and related Net necessities. Netscape Navigator (<http://www.netscape.com/>) is free to students. To dial into a college-provided e-mail account, you generally need only a generic telecom program, such as the module in ClarisWorks.

Don't assume that just because your school provides a free e-mail account, you can surf the Web for free; many colleges provide text-only service to cover e-mail and some text-based Internet capabilities, but not graphical Web surfing. For the latter, you may have to get a separate account with an online service or a service provider.

## Troubleshooting Your Future

So there you are, the intrepid freshman Symbol of the Future, owner of a well-stocked, Web-wired Mac your fellow SOFs can only envy... exiled from your dorm room while your roommate entertains a sleazy "study partner" late into the night.

Fortunately, your peace of mind is not destroyed. First, you've password-protected all the important files on your Macintosh with **FolderBolt Pro** (\$159), from Kent-Marsh (713-522-5625), so roomie and sleazeball can't get at anything of yours during their heavy-duty study session. For more on Macintosh security, see "For Your Eyes Only," April '96, page 82). Second, you've bolted down and padlocked the Macintosh to your desk with the **Apple Security System** (\$50), from Kensington (415-572-2700), so they can't hock your system to finance any spur-of-the-moment romantic getaways. Finally, you know right where to go online, once you're back at your keyboard: to **StudentNet** ▲ (<http://www.student.net/index.html>), where you can send a scathing Reject-O-Matic rejection letter to your roomie and search for simpatico SOFs whose friendship will help you survive the SOFmorehood to come. ☺

# The Two Dads

BY RIK MYSLEWSKI AND JIM SHATZ-AKIN

RIK: Another summer coming to an end without a vacation in sight.

JIM: It's your own fault, workaholic.

RIK: I haven't noticed you taking any time off either.

JIM: Of course not. Bailey just turned *one* — a vacation would be more trouble than it'd be worth. No, this year our little family simply cuddled up in front of our Power Mac and vacationed by CD-ROM.

RIK: Sounds pretty pathetic — practical, but pathetic.

JIM: Seriously, though, there are some great travel-inspired CD-ROMs. You should take a look at two from MECC, the Oregon Trail people: **Africa Trail** and **Explore Yellowstone** ▶.

RIK: Africa Trail — that's the classy game based on an actual bicycle expedition down the length of the continent.

JIM: That's the one. Hey, I'll bet your 11-year-old, Carey, liked its nifty cycling-simulator game.

RIK: Yep, Miss Competitive. All she needs is the chance to defeat her sister, and she's in heaven.

JIM: Then show her the well-thought-out quizzes in **Explore Yellowstone**. They do a great job of motivating kids to learn the wealth of nature info in that movie- and image-packed disc.

RIK: Rox, my eight-year-old, does better at noncompetitive projects, such as the ones in ▼ **Ozzie's Travels . . . Destination: Mexico**.

JIM: Ozzie's projects are great, but the rest of the disc is a bit of a yawner — and not everyone will be amused by the thickly accented Mexican cartoon characters.

RIK: Speaking of yawners, tell me what you think of **Crosscountry USA, Home Edition**.

JIM: I think its "find stuff in location A and truck it to location B" approach is pretty simplistic, but it does an OK job of teaching kids U.S. geography.

RIK: My kids found it about as exciting as a nonstop drive across Nebraska.

## Africa Trail ★★★★★

Ages: 10 – 16.  
 Price: CD-ROM, \$49.95 (list).  
 Plan and execute your own reenactment of an actual bike expedition down the length of Africa. Beautiful graphics. Authentic music. Strong blend of strategy, education, and arcade games.  
 Company: MECC, Minneapolis, MN; 800-215-0368 or 612-569-1500; <http://www.mecc.com/>.  
 Reader Service: Circle #426.

## Crosscountry USA, Home Edition ★★

Ages: 10 – 15.  
 Price: CD-ROM or floppies, \$29.95 (direct).  
 It teaches basic U.S. geography, but this simple long-haul-trucking game is graphically primitive, somewhat difficult to play, and — with only 18 preset games — limited in scope.  
 Company: Didatech Software, Seattle, WA; 604-299-4435.  
 Reader Service: Circle #427.

## Explore Yellowstone ★★★★★

Ages: 8 and up.  
 Price: CD-ROM, \$34.95 (list).  
 There's much more to Yellowstone than geysers and grizzlies, and this well-produced collection of maps, images, animations, QuickTime movies, and inventive quizzes provides every wild detail.  
 Company: MECC, Minneapolis, MN; 800-215-0368 or 612-569-1500; <http://www.mecc.com/>.  
 Reader Service: Circle #428.

## Ozzie's Travels . . . Destination: Mexico ★★★

Ages: 5 – 10.  
 Price: CD-ROM, \$13 (estimated street).  
 Entertaining and educational away-from-the-keyboard activities are the best things about this exploration of our southern neighbor's culture. On-screen activities are uneven.  
 Company: Digital Impact, Tulsa, OK; 800-775-4232 or 918-742-2022.  
 Reader Service: Circle #429.





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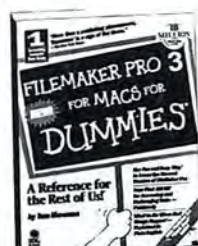
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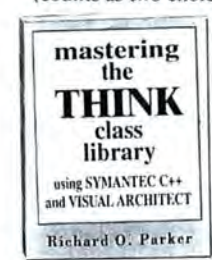
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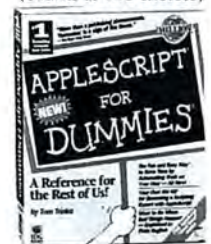
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**NEWBRIDGE**

Mac User 9/96



# The Game Room

BY BOB LEVITUS AND THE MACUSER EDITORS

**ONE OF THE BEST WAYS** to explore space is to play Mac games. But be careful which ones you choose — each of this month's space-exploration games has its set of serious flaws.

## Space Quest 6: Roger Wilco in the Spinal Frontier

It could be pure coincidence, but one of the humorous voice-overs (delivered by *Laugh In's* Gary Owens) in *Space Quest 6* is also an apt description of the game — "That wasn't a bad idea. Not a right idea, but not bad." This sixth game in the *Space Quest* series isn't all bad — in fact, the graphics are better than in any of the others in the series. But it's not the right idea either — the plot and puzzles don't meet the standards set by a slew of better adventure games.

The plot revolves around Roger Wilco, a janitor who manages to

become a space explorer. On special assignment, he is shrunk to microscopic proportions and injected into corpseman Stellar Santiago's bloodstream. Wilco has to track down an evil character before it destroys Santiago's brain.

The interface isn't inventive, but it gets you where you need to go. You spend most of your time exploring the main window by clicking on items to interact with them — and watching the characters walk way too slowly across the screen, even when you're using a Power Mac.

We didn't find the game's potty humor entertaining, but we were amused by some of the special effects. For instance, when was the last time you saw a jockstrap morph into a spaceship and fly away? The spoofs on famous sci-fi-movie scenes, such as the alien-bar scene in *Star Wars*, are semiclever. And the booming voice-overs from *Laugh In* are good for at least a chuckle, although they become increasingly annoying.

## The Dig

Unlike with a good novel, we had no trouble putting *The Dig* down. We expected this game to be a gem; after all, it features special effects from Industrial Light & Magic, dialogue from award-winning sci-fi novelist Orson Scott Card, and Steven Spielberg's name in the credits. But this adventure game about a team of space explorers stranded on an alien planet is spoiled by clichéd characters, bad graphics, and a tendency to keep you waiting too often.

We don't expect the best graphics



from a fast-moving action game, but we do from its slower cousin — the adventure game. The *Dig* unfortunately has pixelated characters who move stiffly and in straight lines. More important than the unsophisticated motions is the fact that the characters move slowly even on a speedy Mac. In general, we found ourselves waiting too long for characters to move, for scenes to change, and for the plot to develop.

The plot setup isn't without potential and, in fact, is downright interesting in those portions where the pace of the game is quickened. You play Commander Boston Low, a crusty NASA veteran accompanied by power-hungry geologist Ludger Brink and humorless journalist Maggie Robbins. You set out to blast an asteroid out of Earth's path but get sidetracked when the asteroid turns out to be an alien spaceship that carries you to a faraway planet. As you dig for clues that will help you return to Earth, you uncover information about the planet and its ghostlike alien inhabitants.

Unfortunately, the not-so-witty repartee among *The Dig's* characters gets old fast. Their clichéd personalities make their interactions predictable from the start, but you can't skip their lines without missing important plot development.

The puzzles are better integrated in this game than in *Space Quest 6*, but they still seem senseless at times and require too much backtracking, making an already slow game even slower. *The Dig's Official Player's Guide*, from Infotainment World Books (around \$20; 800-985-8227 or 415-472-3400), is a valuable guide, but we would think twice before investing that much in this game.

## Star Trek: The Next Generation "A Final Unity"

This long-awaited *Star Trek* title has finally arrived on the Mac. However, just like a traveler who has crossed the huge expanses of space without the benefit of a Warp drive, *A Final Unity* has arrived a little worse for the wear.

The premise of the game is simple: You control the officers of the Federation Flagship *Enterprise* as they stumble through a series of loosely connected adventures.

The voices of the crew are stiffly performed by the cast of the TV show. We were



baffled that, unlike in other recently released adventure games, animation instead of live action was used to render the characters. Then we remembered that *A Final Unity* had hit several delays on its way to the Mac.

Even keeping in mind that the game was state of the art for 1993, we still found *A Final Unity* to be less than inspired. True, it was cool to be aboard the *Enterprise* — although what would have been cooler were ship controls usable by 20th-century humans. Unfortunately, the controls were so unfathomable that it turned out the only way to survive a battle was to let the computer run everything.

The puzzles were, for the most part, pretty simple. We rarely had to restart a scenario to reach the "right" conclusion. Which brings us to the biggest failing of *A Final Unity*: It's another adventure-on-rails. It really is impossible to do much if you don't follow the game's script.

*A Final Unity* isn't all bad. There are some well-done QuickTime-based cut scenes, and some of the adventure plots, although clichéd, are entertaining.

Bob LeVitus is a MacUser contributing editor and the Mac columnist for the Houston Chronicle.

## The Tip-Off

### The Dig

Having to backtrack makes for a game that's too slow. To avoid doubling back, whenever you find an object you can pick up, put it in your tool chest to carry with you. Also, ask Ludger or Maggie for advice when you're stuck; they often have clues in their scripts.

### Space Quest 6: Roger Wilco in the Spinal Frontier

Price: \$55 (estimated street).

Company: Sierra On-Line, Bellevue, WA; 800-757-7707 or 206-649-9800.

Reader Service: Circle #430.

### The Dig

Price: \$50 (estimated street).

Company: LucasArts Entertainment, San Rafael, CA; 800-985-8227 or 415-472-3400.

Reader Service: Circle #431.

### Star Trek: The Next Generation "A Final Unity"

Price: \$60 (estimated street).

Company: Spectrum HoloByte, Alameda, CA; 800-695-4263 or 510-522-3584.

Reader Service: Circle #432.



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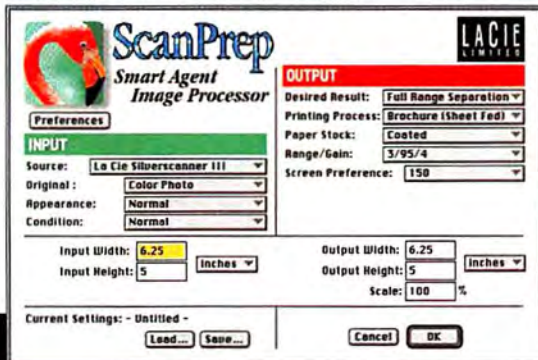


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| 3.2GB Quantum Fireball TM | 5 yr. warr. | <b>*499</b> |
| 4.3GB Quantum Atlas       | 5 yr. warr. | <b>*838</b> |

Brackets available for \$10 with internal hard drive purchase. \*While supplies last.

## EXTERNAL DRIVES

### TSUNAMI

**\$327**

Quantum 1280 MB

Tsunami External Drives

|                           |             |             |
|---------------------------|-------------|-------------|
| 1080MB Quantum Fireball*  | 3 yr. warr. | <b>*299</b> |
| 1280MB Quantum Fireball   | 3 yr. warr. | <b>*327</b> |
| 2160MB Ultrastar ES       | 5 yr. warr. | <b>*489</b> |
| 2.1GB Quantum Fireball TM | 5 yr. warr. | <b>*489</b> |
| 3.2GB Quantum Fireball TM | 5 yr. warr. | <b>*589</b> |
| 4.3GB Quantum Atlas       | 5 yr. warr. | <b>*919</b> |

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| 2.1GB Quantum Fireball TM | 5 yr. warr. | <b>*659</b> |
| 3.2GB Quantum Fireball TM | 3 yr. warr. | <b>*759</b> |

## TOWER JOULE DRIVES

3.5" Drives with Mount

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|---------------------------|-------------|-------------|
| 1280MB Quantum Atlas      | 3 yr. warr. | <b>*399</b> |
| 2.1GB Quantum Fireball TM | 5 yr. warr. | <b>*659</b> |
| 3.2GB Quantum Fireball TM | 3 yr. warr. | <b>*759</b> |

Joule Bases - Supports Stacks Up To 6 Drives High

|                           |             |             |
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| 2.1GB Quantum Fireball TM | 3 yr. warr. | <b>*689</b> |
| 3.2GB Quantum Fireball TM | 3 yr. warr. | <b>*789</b> |

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Joule RAID

Quantum drives bundled with Trillium Research Software configurable to levels 0, 1, 4 & 5.

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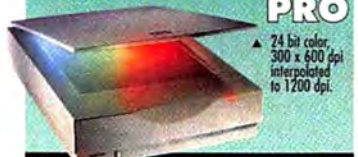


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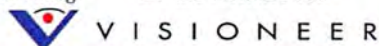
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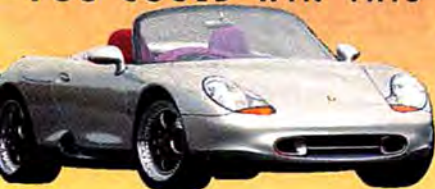
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- GCC 608 600dpi, 11x17 Printer
- 12x12 Graphics Tablet

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- Radius ThunderColor 1600 PCI Video Card
- Yamaha 4x/2x CDR with Toast & Director
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- 40MB RAM
- 1GB hard drive
- Extended keyboard
- ATI Xclaim 4MB PCI Video Card
- Sony 20SFI Monitor
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| Omni Page Professional v5.0 CD OEM | \$149        |
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| JVC 4x/2xCDR with Toast               | \$799         |
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|                       |                |
|-----------------------|----------------|
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|   |              |
|---|--------------|
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| <b>FREE</b> 200MB External/with 2 carts | <b>\$399</b> |

## SyQuest Cartridges

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Internal configuration  
Quantum™



It's like getting an additional gigabyte for FREE. The new APS Q 3200 is priced lower than many 2GB SCSI drives, yet it delivers an 3000MB of reliable storage. The drive uses MR heads and an advanced PRML read channel to fit its 3GB into a 3.5" low profile SCSI drive that's rated at 400,000 hours MTBF.

### 1.2GB OF POWERBOOK STORAGE APS I 1.2

**\$699<sup>95</sup>**

- ✓ Uses IBM's No-ID™ sector technology to increase capacity by reducing overhead
- ✓ 1.2GB capacity lets SCSI PowerBooks run today's storage-intensive applications
- ✓ SCSI-2 interface

Internal configuration  
IBM

At 4900 rpm, the APS I 1.2 drive gives you the performance you need from your PowerBook. It uses IBM's No-ID sector formatting technology to increase capacity by reducing drive overhead as well as MR heads to pack 1.2GB into a 2.5" 17mm form factor drive.

### 2GB STORAGE FOR ONLY APS Q 2100

**\$399<sup>95</sup>**

- ✓ Reliable 4500 rpm mechanism
- ✓ MR heads and PRML read channel
- ✓ Exceptional value among 2GB drives
- ✓ 3-year warranty

Internal configuration  
Quantum™



Give your Mac the extra storage space it needs by installing the new APS Q 2100. At only 20¢ per MB for an internal configuration, the APS Q 2100 is the value leader among 2GB SCSI hard disk drives. Its transfer rates are a good match with most applications, and it is backed by a 3-year warranty with a 400,000 hour MTBF.

#### Yamaha System 45

- Enhances any multimedia application
- Adds thumping, deep bass response to your computer
- Magnetically shielded
- Includes a pair of YST-15 speakers and a thundering subwoofer



106359

**\$209<sup>95</sup>**

#### Jabra for Macintosh

- Turn your Power Mac or AV Quadra into a hands-free telephone workstation
- Comfortable, lightweight earpiece
- Provides clear, consistent audio input and output



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**\$139<sup>95</sup>**

#### Kodak Digital Science DC50 Zoom Camera

- 3X zoom and close-up
- 756 x 504 pixel resolution in 24-bit color
- Holds up to 22 photos with compression, or 7 high-resolution images
- Optional 4MB PCMCIA card holds even more images



105388

**\$998<sup>95</sup>**

| APS DESKTOP DRIVES                     |                          |                     |                     |
|--|--------------------------|---------------------|---------------------|
| Model                                  | Capacity/Awards          | Internal            | SR2000              |
| APS Q 1280<br>Quantum Fireball II 1280 | 1222MB<br>K.A.B.S. ★★★★★ | \$249 <sup>95</sup> | \$349 <sup>95</sup> |
| APS Q 2100<br>Quantum Fireball TM      | 2100MB<br>★★★★★          | 399 <sup>95</sup>   | 499 <sup>95</sup>   |
| APS I 2160<br>IBM Ultrastar ES         | 2063MB                   | 449 <sup>95</sup>   | 549 <sup>95</sup>   |
| APS Q 3200<br>Quantum Fireball TM      | 3200MB<br>★★★★★          | 499 <sup>95</sup>   | 599 <sup>95</sup>   |



These products are performance-matched for optimal performance in the PowerPC environment.

| APS HIGH-PERFORMANCE DRIVES                       |                          |                     |                     |
|---|--------------------------|---------------------|---------------------|
| Model   | Capacity/Awards          | Internal            | SR2000              |
| APS MS 2000<br>Micropolis 4421                    | 2000MB<br>★★★★★          | \$469 <sup>95</sup> | \$569 <sup>95</sup> |
| AV available for an additional \$100.00           |                          |                     |                     |
| APS Q 4.0<br>Quantum Atlas XP3430                 | 4101MB<br>K.A.B.S. ★★★★★ | 899 <sup>95</sup>   | 999 <sup>95</sup>   |
| APS MS 4.0 W<br>Quantum Atlas XP3430              | 4101MB<br>★★★★★          | 999 <sup>95</sup>   | 1099 <sup>95</sup>  |
| AV Fast/Wide available for an additional \$100.00 |                          |                     |                     |
| APS ST 4300<br>Seagate Barracuda ST34371N         | 4148MB<br>★★★★★          | 999 <sup>95</sup>   | 1099 <sup>95</sup>  |
| APS MS 9.0<br>Micropolis 1991                     | 8669MB<br>★★★★★          | 1899 <sup>95</sup>  | 2099 <sup>95</sup>  |
| AV available for an additional \$100.00           |                          |                     |                     |

| POWERBOOK DRIVES                       |                    |            |                     |
|--|--------------------|------------|---------------------|
| Model                                  | Capacity/Features  | Drive Type | Internal            |
| APS PB 230 MO<br>Fujitsu               | 217MB              | IDE        | \$399 <sup>95</sup> |
| APS Q 1.08<br>Quantum Europa           | 1037MB<br>3800 rpm | Fast ATA2  | 399 <sup>95</sup>   |
| APS I 1.2<br>IBM Travelstar DPBS-21215 | 1200MB<br>4900 rpm | SCSI-2     | 699 <sup>95</sup>   |

- 30-day money-back guarantee on all APS brand products. Your risk is the cost of shipping.
- Drive-for-Drive Repair or Replacement Warranty. APS will, at its discretion, replace or repair products found to be defective according to the terms of the product's warranty.
- Refused orders subject to 20% restocking fee.
- Listed capacities are formatted.
- Actual data compression and tape capacity vary greatly depending on the type of data recorded, other system parameters and environment.
- Prices and specifications are subject to change without notice.
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**APS Jaz**

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✓ Choice of AC-powered portable or an SR 2000 enclosure

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SR 1000 case as shown

The immense 1GB capacity of its removable media is reason enough to buy the new APS Jaz. Factor in the drive's performance which rivals many hard drives, and the decision to invest in the APS Jaz is easy to make.

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\$599.95 in SR 2000 enclosure



**INCREDIBLE 8X CD-ROM PERFORMANCE**

**APS CD-8**

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✓ Great for home and office CD-ROM use

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- Hardware-only solution

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| APS QIC & DAT BACKUP SYSTEMS                     |                 |          |        |                                       |
|--|-----------------|----------|--------|---------------------------------------|
| Model  | Capacity/Awards | Internal | SR2000 |                                       |
| APS HyperQIC™ 8GB Travan 4 Conner QIC 3095 Mech. | 8GB N/A         |          |        | \$499 <sup>95</sup>                   |
| APS HyperDAT® 8GB DDS-2 Compression Mech.        | 8GB             |          |        | \$849 <sup>95</sup> 899 <sup>95</sup> |
| APS HyperDAT® Pro 8GB DDS-2 High Speed Mech.     | 8GB             |          |        | 949 <sup>95</sup> 999 <sup>95</sup>   |

| APS MO DRIVES |                   |        |                     |
|---------------|-------------------|--------|---------------------|
| Model         | Capacity/Features | Awards | SR2000              |
| APS 230MB MO  | Up to 217MB       |        | \$449 <sup>95</sup> |
| APS 2.6GB MO  | 4MB cache         |        | 1799 <sup>95</sup>  |

| APS CD-ROM DRIVES                    |          |                     |
|--------------------------------------|----------|---------------------|
| Model                                | Internal | SR2000              |
| APS CD-8 8X CD-ROM                   | N/A      | \$299 <sup>95</sup> |
| APS CD-8 Pro Professional 8X CD-ROM  | N/A      | 399 <sup>95</sup>   |
| APS PD4 4X CD-ROM/Optical            | N/A      | 499 <sup>95</sup>   |
| APS CD-R Recordable CD-ROM           | N/A      | 599 <sup>95</sup>   |
| APS CD-R Plus 2X record/4X read CD-R | N/A      | 899 <sup>95</sup>   |
| APS CD-R Pro 4X4 performance CD-R    | N/A      | 1799 <sup>95</sup>  |

| APS REMOVABLE DRIVES |                 |                     |                     |
|----------------------|-----------------|---------------------|---------------------|
| Model                | Capacity/Awards | SR 1000             | SR 2000             |
| APS SQ 5200 194MB    |                 | N/A                 | \$349 <sup>95</sup> |
| APS Jaz 1GB          |                 | \$499 <sup>95</sup> | 599 <sup>95</sup>   |

To receive an automated fax listing of all APS documents, call 800-374-5802 from any touch-tone telephone.

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| 105039 8mm 160 Cartridge   | 14.95      |                        |            |
| 60M DAT                    | 5.95       | <b>SONY SALE PRICE</b> |            |
| 90M DAT                    | 9.95       | CD-R 74 Min            | \$9.95     |
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|----------|--|--------|
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| 99509    | StudioPro 1.75                                 | \$84   |
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| Ray Dream Designer 4.0<br>Ask for item # GRA 1203                            | \$99.95  |
| Macromedia Director 5 Upgrade<br>Ask for item # UPG 0248 (Mac CD-ROM)        | \$399.95 |
| Ask for item # UP 3348 (Win. CD-ROM)   | \$399.95 |
| Microsoft Office 4.2.1 Upgrade with FREE Comanche<br>Ask for item # BND 1168 | \$289    |
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|               | DOSMounter '95                  | \$89 - \$29 w Jaz! |

| Basic Systems         |                                  | Price  |
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| 8500/132 16/1.0GB/CD  | w/ 20" monitor, XKeyboard, Mouse | \$5499 |
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|------------------------|--|--------|
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| 8500/150 /16/2GB/CD    |  | \$4349 |
| 8500/132 /16/1GB/CD    |  | \$3549 |
| 7600/120 /16/1GB/CD    |  | \$2749 |
| 7200/120 /16/1GB/CD    |  | \$2059 |

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- 4MB VRAM
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- Extended keyboard
- **\$899** Sony 17" slll multisync monitor
- **\$379** Microtek ScanMaker E3, 300 x 600 dpi, scanner
- **Omega Jaz drive**
- Apple Color StyleWriter 2500 (w/ toner cartridge and two AppleTalk connectors)
- ISDN digital modem
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- 2GB internal hard drive
- Extended keyboard
- Sony 20" Trinitron monitor
- Twin Turbo 128, 4MB 1600x1200 video card
- **\$3899** TrueVision Targa 2000 PCI digital video
- **\$2799** FWB Jackhammer SCSI-3 Fast&Wide PCI controller w/FWB RAID Toolkit
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- Extended Services

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|              |              |              | EZ 135         | \$22    |
|              |              |              | 88MB           | \$42/39 |
|              |              |              | 44MB           | \$38/34 |

|               |              |              |       |
|---------------|--------------|--------------|-------|
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| 1.0GB Jaz     | 100MB Zip    | 1.0GB Jaz    | \$125 |
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|----------------|-------|--------|--------|---------|
| <b>Optical</b> |       |        |        |         |
| DSC 128MB      | \$11  |        |        |         |
| DSC 230MB      | \$22  |        |        |         |
| DSC 650MB      | \$49  |        |        |         |
| DSC 1.2GB      | \$73  |        |        |         |
| Sony 1.3GB     | \$85  |        |        |         |
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| 4MB            | \$89  | -      | -      | -       |
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|----------|-----------|---|---------|----------|----------------|----------------|
| 420 MB   | DT-420TB  | Quantum                                 | 11ms    | 2 yrs    | \$150          | \$225          |
| 850 MB   | DT-850TB  | Quantum                                 | 11 ms   | 2 yrs    | \$199          | \$275          |
| 1.0 GB   | DT-1080FB | Quantum                                 | 11ms    | 3 yrs    | \$269          | \$344          |
| 1.05 GB  | DT-51080  | Seagate <b>NEW PRODUCT!</b>             | 10 ms   | 3 yrs    | <b>\$269</b>   | <b>\$344</b>   |
| 1.05 GB  | DT-31230  | Seagate <b>NEW LOW PRICE!</b>           | 9.0 ms  | 5 yrs    | <b>\$355</b>   | <b>\$430</b>   |
| 2.0 GB   | DT-4421   | Micropolis <b>NEW LOW PRICE!</b>        | 10.0 ms | 5 yrs    | <b>\$459</b>   | <b>\$545</b>   |
| 2.0 GB   | DT-4221   | Micropolis <b>NEW LOW PRICE!</b>        | 8.0 ms  | 5 yrs    | <b>\$595</b>   | <b>\$670</b>   |
| 2.1 GB   | DT-32550  | Seagate Barracuda IILP                  | 8.0 ms  | 5 yrs    | \$705          | \$780          |
| 4.3 GB   | DT-3243   | Micropolis <b>NEW LOW PRICE!</b>        | 8.5 ms  | 5 yrs    | <b>\$899</b>   | <b>\$999</b>   |
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| 4.3 GB   | DT-15230  | Seagate Hawk 4 <b>NEW PRODUCT!</b>      | 9.0 ms  | 5 yrs    | <b>\$899</b>   | <b>\$975</b>   |
| 9.0 GB   | DT-1991   | Micropolis <b>NEW LOW PRICE!</b>        | 12 ms   | 5 yrs    | <b>\$1,899</b> | <b>\$1,999</b> |
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|----------|-------------|---------------------------------------|--------|----------|---------------|----------------|
| 1.05 GB  | DT-51080AV  | Seagate                               | 9 ms   | 3 yrs    | \$269         | \$330          |
| 2.0 GB   | DT-4221AV   | Micropolis <b>NEW LOW PRICE!</b>      | 8.5 ms | 5 yrs    | <b>\$650</b>  | <b>\$725</b>   |
| 2.1 GB   | DT-32550AV  | Seagate Barracuda                     | 8.0 ms | 5 yrs    | \$705         | \$780          |
| 4.3 GB   | DT-3243AV   | Micropolis <b>NEW LOW PRICE!</b>      | 8.5 ms | 5 yrs    | <b>\$950</b>  | <b>\$1,025</b> |
| 4.3 GB   | DT-15150AV  | Seagate Barracuda                     | 8.0 ms | 5 yrs    | \$1,050       | \$1,125        |
| 9.0 GB   | DT-1991AV   | Micropolis <b>NEW LOW PRICE!</b>      | 12 ms  | 5 yrs    | <b>\$1975</b> | <b>\$2,075</b> |
| 9.0 GB   | DT-410800AV | Seagate Elite 9 <b>NEW LOW PRICE!</b> | 11 ms  | 5 yrs    | <b>\$1950</b> | <b>\$2,050</b> |

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|----------|------------|----------------------------|------|----------|----------|----------|
| 2.1 GB   | DT-32550W  | Seagate Barracuda 2LP Wide |      | 5 yrs    | \$799    | \$899    |
| 2.1 GB   | DT-4221W   | Micropolis 4221Wide        |      | 5 yrs    | \$650    | \$750    |
| 4.3 GB   | DT-15150W  | Seagate Barracuda 4 Wide   |      | 5 yrs    | \$1,125  | \$1,225  |
| 4.3 GB   | DT-3243W   | Micropolis 3243Wide        |      | 5 yrs    | \$999    | \$1,099  |
| 9.0 GB   | DT-1991W   | Micropolis 1991Wide        |      | 5 yrs    | \$2,000  | \$CALL   |
| 9.0 GB   | DT-1991AW  | Micropolis 1991AWide       |      | 5 yrs    | \$2,075  | \$CALL   |
| 9.0 GB   | DT-410800W | Seagate Elite 9 Wide       |      | 5 yrs    | \$2000   | \$CALL   |

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|---|-------------|---------------------------------------|--------|----------|----------|
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| 8.0 GB  | DT-15150W-2 | Seagate - Fast/Wide Barracuda 4 (2)   | 4.0 ms | 5 yrs    | \$3099   |
| 18.0 GB   | DT-1991WAV  | Micropolis - Fast/Wide 1991AV (2)     | 4.5 ms | 5 yrs    | \$5199   |
| <b>CALL FOR MORE INFORMATION ON DIRECTTECH DISK ARRAYS!</b> |             |                                       |        |          |          |
| ATTO Silicon Express IV                                     |             | Nubus Fast/Wide Accelerator           |        |          | \$599    |
| ATTO Express PCI  |             | Dual Channel - PCI - Fast/Wide        |        |          | \$699    |
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| Capacity | Model No. | Internal | PHASER I |
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| 88 MB    | SQ5110C   | \$299    | \$350    |
| 200 MB   | SQ5200    | \$410    | \$460    |
| 270 MB   | SQ5270    | \$410    | \$460    |

## CD ROM RECORDABLE

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|----------------------------|---------|
| JVC Personal Archiver (2X) | \$999   |
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| 4-8 GB   | IIP-1533A    | DDS-2  | \$1,299  |
| 5-10 GB  | Exabyte-8505 | 8mm    | \$2,150  |
| 15-30 GB | DLT-2000XT   | DLT    | \$3,295  |
| 20-40 GB | DLT-4000     | DLT    | \$4,725  |

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INCLUDES ANUBIS  
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| 230 mb   | Fujitsu   | 30 ms | \$675    |
| 1.3 GB   | IIP-C1716 | 23 ms | \$1,999  |
| 2.6 GB   | Maxoptic  | 18 ms | \$1,999  |

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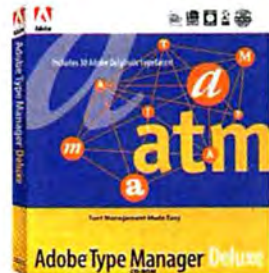
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| 4.0 GB 1/4" Tape Tandberg Panther      | \$535  |
| 2.0 GB DAT Hewlett Packard PC35470     | \$895  |
| SCSI 15MB/min., 4mm media              |        |
| 3-5 GB DAT Hewlett Packard C35480      | \$995  |
| SCSI 45MB/min., 4mm media              |        |
| 4-8 GB DAT Hewlett Packard dos-2 C1533 | \$1065 |
| SCSI2, 60MB/min.,                      |        |
| 8 GB DAT Sony 7000                     | \$1295 |
| SCSI2, 90 MB Per Minute                |        |
| 24-48GB SCSI Auto Tape Loader          | \$2995 |
| HP1553, 60MB/min., 4mm media           |        |

### Exabyte

| Capacity | Model  | Media | Int.   | Ext.   |
|----------|--------|-------|--------|--------|
| 2-5 GB   | 8205XL | 8mm   | \$1395 | \$1485 |
| 14 GB    | 8700   | 8mm   | \$1419 | \$1479 |

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| DLT2000XT                                       | \$2575  |
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| DLT4000   | \$3615  |
| 40GB Capacity • TRANSFER RATE 180 MB PER MINUTE |         |
| DLT4500 • 200 GB Capacity                       | \$9895  |
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| DLT4700 • 280 GB Capacity                       | \$11395 |
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|--|----------|----------|
| Quantum 270 MB 4500RPM, 14 ms seek, 128K cache, 2 year warranty              | \$99     | \$159    |
| Quantum 535MB 9ms Seek 5400 RPM, 512K Buffer 5 Year Warranty                 | \$155    | \$215    |
| PDI 2.2GB Ultra XP MR Heads 7200RPM, 512K Buffer, 8ms seek, 5 year warranty  | \$495    | \$555    |
| Quantum Atlas 4 GB 1034300, 7200, 7.9 ms seek, 1024K cache, 5 year warranty  | \$875    | \$935    |
| Seagate 9.0GB ST410800, 5400RPM, 11ms seek, 1024K cache, 5 year warranty.    | \$1845   | \$1945   |
| Toshiba 6x CD ROM 120 MS seek, 256K Cache, 1 MB/Sec. Sustained Transfer Rate |          | \$289    |

## PCI/NUBUS FAST & WIDE ACCELERATORS



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| 535 MB Performance 1 9 ms Seek 5400 RPM 512K Buffer | 155      | 215      |
| 850 MB Value! 14 ms Seek 4500 RPM 128K Buffer       | 185      | 245      |
| 1280 MB Fireball II 10ms Seek 5400 RPM 128K Buffer  | 259      | 319      |
| 2.2 GB Saturn 8.5ms Seek 5400 RPM 512K Buffer       | 445      | 505      |
| 2.0 GB Atlas 8ms Seek 7200 RPM 1024K Buffer         | 625      | 685      |
| 4200 MB Grand Prix 8.6 ms Seek 7200 RPM 512K Buffer | 875      | 935      |
| 4.3 GB Atlas 7.9ms Seek 7200 RPM 2048K Buffer       | 875      | 935      |
| <b>Fast &amp; Wide SCSI AV Drives</b>               |          |          |
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| Toshiba 4x CD ROM 140 MS Seek  | \$189  |
| Toshiba 6x CD ROM 102 MS seek/256 K Cache                            | \$289  |
| Panasonic PD 4 x/650MB NEW! 4 x CD ROM & 650MB Optical Drive in one! | \$625  |
| Yamaha 4x CD Writer CDE100   | \$1205 |
| Pioneer 4x CD Writer DW-5114X  | \$1225 |
| 4x CD writer/Reader/1024K Buffer/Multisession                        |        |
| Pinnacle RCD 5040 2 x CD Writer                                      | \$1099 |
| Combination 2x CD Writer/4x CD ROM 1MB Cache                         |        |
| Pinnacle Vertex 2.6GB Optical  | \$1279 |
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| 4MB 70NS  | 152  |
| 8MB 70NS  | 303  |
| 16MB 70NS | 520  |

#### PC SIMMS

|          |      |
|----------|------|
| 1MB 70NS | \$29 |
| 4MB 70NS | 63   |

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FOR Q 605/630, 610, 650, 700, 800/840AV,  
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|----------------|---------|
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| 8MB 70NS/60NS  | 65/70   |
| 16MB 70NS/60NS | 136/140 |
| 32MB 60NS      | 277     |

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|-----------|------|
| 4MB 70NS  | \$87 |
| 8MB 70NS  | 187  |
| 16MB 70NS | 300  |
| 32MB 70NS | 675  |

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| 64MB | 643   |

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### POWERBOOK SERIES

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|------|-------|------|-----|
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| 16MB | 276 ✓ | 32MB | 285 |

#### PB2300

|      |      |      |     |
|------|------|------|-----|
| 4MB  | \$99 | 8MB  | 165 |
| 16MB | 199  | 20MB | 280 |
| 32MB | 385  | 36MB | 389 |

#### PB190 SERIES

|      |      |           |     |
|------|------|-----------|-----|
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#### PB DUO 210/230

|      |       |      |      |
|------|-------|------|------|
| 4MB  | \$157 | 8MB  | 259  |
| 12MB | 473   | 14MB | 543  |
| 20MB | 777   | 28MB | 1161 |

### FPU'S/MATH COPROCESSOR/ VRAM/CACHE

|                       |       |
|-----------------------|-------|
| CENTRIS FPU 25MHZ     | \$186 |
| FPU 33MHZ DUO/P600    | 51    |
| FPU COL CLASSIC 16MHz | 49    |
| LC575 33MHz FPU       | 238   |
| LCIII FPU 25 MHz      | 238   |

#### POWERMAC 6100, 7100, 8100 VRAM/CACHE

|                |      |
|----------------|------|
| 256K 80NS VRAM | \$17 |
| 512K VRAM      | 22   |
| 256K CACHE     | 70   |
| 512K CACHE     | 279  |
| 1MB CACHE      | 789  |

#### POWERMAC 72/75/85/9500 VRAM/CACHE

|                     |      |
|---------------------|------|
| 1MB VRAM 72/75/8500 | \$55 |
| 2MB VRAM 9500       | 227  |
| 256K CACHE DIMM     | 86   |
| 512K CACHE DIMM     | 148  |

### POWERBOOK ACCESSORIES

#### BATTERIES

|  |       |
|--|-------|
| VST PB5300 BATTERY,<br>CHARGER, AC ADAPTER | \$319 |
| VST PB2300 INT. TYPE III                   | 97    |
| VST PB500 INT. BATTERY                     | 125   |

#### HARD DRIVES

|  |               |
|--|---------------|
| VST EXP. BAY HARD DRIVE<br>540/810MB/1.2GB | \$482/615/769 |
|--|---------------|

#### MODEMS

|  |         |
|--|---------|
| GLOBAL VILLAGE POWERPORT<br>PLATINUM 28.8 V.34 | \$337   |
| SUPRA 14.4/28.8 PB                             | 163/187 |
| MEGAHERTZ CRUISE CD 14.4                       | 135     |

### MEDIA

#### Syquest

|                               |         |
|-------------------------------|---------|
| EZ135MB SYQUEST CART.         | \$19    |
| EZ135MB SYQUEST CART. -10 PK. | \$20/22 |

#### THE ORIGINAL SYQUEST CARTRIDGE!

|             |      |      |      |
|-------------|------|------|------|
|             | 1-4  | 5-9  | 10+  |
| 44MB 5.25"  | \$42 | \$41 | \$40 |
| 88MB 5.25"  | \$43 | \$42 | \$41 |
| 200MB 5.25" | \$63 | \$62 | \$61 |
| 270MB 3.5"  | \$49 | \$48 | \$47 |
| 105MB 3.5"  | \$52 |      | \$51 |

#### Sony

|                              |         |
|------------------------------|---------|
| RECORDABLE CDROM 640MB       | 8       |
| RECORDABLE CDROM 640MB 10 PK | 73      |
| 3.5" 230MB OPTICAL/MAC       | \$20/22 |
| 650MB OPTICAL                | 52      |
| 2.3GB/2.6GB OPTICAL          | 86/86   |

#### Verbatim

|                              |      |
|------------------------------|------|
| 3.5" 128MB OPTICAL           | \$21 |
| 3.5" 1230MB OPTICAL          | 28   |
| RECORDABLE CDROM 640MB       | 8.50 |
| RECORDABLE CDROM 640MB 10 PK | 83   |
| 25DD 3 1/2 10PK DISK         | 7.50 |
| 4MM/60M DATA CART            | 7    |
| DATA 4MM CD 295 FT           | 9    |
| DATA 8MM DC 367 FT           | 7    |
| DC 2120 120MB QIC80          | 12   |

#### Iomega

|                            |         |
|----------------------------|---------|
| ZIP 100 MB CART.           | \$19.50 |
| ZIP 100 MB CART. - 10 - PK | 139     |
| ZIP 100 MB CART. - 3 - PK  | 45      |
| JAZ 1GB CART/5 PK          | 123/490 |
| JAZ 540MB CART/5 PK        | 69/294  |

### SCANNERS & PRINTERS

#### Visioneer

|              |       |
|--------------|-------|
| PAPERPORT VX | \$295 |
|--------------|-------|

#### Umax

|              |         |
|--------------|---------|
| POWERLOOK II | \$1989  |
| VISTA S-12   |         |
| PRO+/LE+     | 908/808 |
| VISTA S-6 E  | 549     |

#### Nikon

|                      |        |
|----------------------|--------|
| COOLSCAN II EXTERNAL | \$1379 |
| SUPER COOLSCAN       | 1999   |

#### Agfa

|                 |       |
|-----------------|-------|
| STUDIOSCAN IISI | \$795 |
| ARCUS II        | 1941  |

#### Polaroid SPRINTSCAN

|    |        |
|----|--------|
| .. | \$1555 |
|----|--------|

#### Apple

|                        |       |
|------------------------|-------|
| COLOR STYLEWRITER 2500 | \$375 |
| LW 4/600               | 895   |
| LW 16/600              | 2249  |

#### Hewlett Packard

|                 |        |
|-----------------|--------|
| LASERJET 5M     | \$1785 |
| DESKWRITER 660C | 289    |

#### Epson

|                             |        |
|-----------------------------|--------|
| STYLUS COLOR PRO XL PRINTER | \$1795 |
| PRO XL BLACK/COLOR CART.    | 19/35  |

#### Printer Supplies

|  |            |
|--|------------|
| HP DESKJET/WRITER COLOR CART.                            | \$29       |
| HP DESKJET/WRITER BLACK CART                             | 26.50      |
| HP LASERWRITER 4V/4M TONER                               | 152        |
| HP LASERWRITER 4V/4M TONER                               | 116        |
| APPLE LW 12/600 BLACK TONER                              | 95         |
| APPLE LW 12/600 COLOR TONER<br>(CYAN, MAGENTA OR YELLOW) | 110 (EACH) |
| APPLE COLOR STYLEWRITER HIGH<br>PERFORMANCE BLACK CART.  | 29         |
| APPLE COLOR STYLEWRITER<br>2400 BLACK & COLOR CART.      | 44         |
| CIRCLE 146 ON READER SERVICE CARD                        |            |

### MODEMS

#### Global Village

|                               |       |
|-------------------------------|-------|
| TELEPORT PLAT. 28.8 V.34      | \$203 |
| POWERPORT IXX PLAT. 28.8 V.34 | 337   |
| POWERPORT PLAT. PC CARD 28.8  | 349   |
| POWERPORT PLAT. PC CARD PRO   | 519   |

#### Supra

|                        |       |
|------------------------|-------|
| EXPRESS 28.8 EXT V.34  | \$159 |
| 14.4 EXPRESS           | 98    |
| 28.8 PB FAX/MODEM      | 187   |
| 28.8 V.34 S/R FAX MOD. | 205   |

#### Motorola

|                    |       |
|--------------------|-------|
| ISDN BITSURFER PRO | \$369 |
|--------------------|-------|

#### US Robotics

|                          |       |
|--------------------------|-------|
| 28.8 V.34 INTERNET BNDL  | \$193 |
| 28.8 SPORTSTER EXT VOICE | 225   |

#### Zoom

|                           |      |             |     |
|---------------------------|------|-------------|-----|
| 2400 BPS                  | \$65 | V.FAST 28.8 | 189 |
| VFX 14.4 V.32BIS S/R FAX  |      |             | 169 |
| VFXV 14.4 V.32BIS W/VOICE |      |             | 148 |
| 14.4 EXTERNAL S/R V.42    |      |             | 79  |

### MONITORS & VIDEO

#### Monitors

|  |           |
|--|-----------|
| APPLEVISION 1710AV                               | \$1069    |
| NEC MULTISYNC XV15+/17+                          | 523/889   |
| NEC MULTISYNC XE15                               | 620       |
| NEC MULTISYNC XE17                               | 1099      |
| NEC MULTISYNC XE21                               | 1845      |
| NEC MULTISYNC XP17/XP21                          | 1135/2140 |
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#### Video

|                                 |                |
|---------------------------------|----------------|
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| RADIUS THUNDER IV               |                |
| GX-1152/1360/1600               | 1635/1875/2040 |
| RADIUS THUNDER 24 GT            | 490            |
| ATI XCLAIM 4MB/2MB CARD         | 489/365        |
| NUMBER NINE IMAGINE             |                |
| 128 PCT 4MB/8MB CARD            | 869/1149       |
| IMSII TWIN TURBO 128 4MB/2MB CD | 555/362        |

### DRIVES

#### Apple Ext. Drives

|       |     |
|-------|-----|
| 1.2GB | 435 |
| 2.0GB | 765 |

#### Quantum

|                      |      |
|----------------------|------|
| INT. AND EXT. DRIVES |      |
| 1.2GBEXT. FIREBALL   | 359  |
| 2.1GB EXT. ULTRASTAR | 599  |
| ATLAS 4.3GB EXT.     | 1079 |

#### Rumi Syquest

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|----------------------|-------|
| 200MB SYQUEST W/CART | \$479 |
|----------------------|-------|

#### NEC

|                |       |
|----------------|-------|
| 6XE MULTI-SPIN |       |
| CD-ROM DRIVE   | \$515 |
| 4XC 7-CHR      |       |
| CD-ROM DRIVE   | 359   |
| 4X 4V INT.     |       |
| CD-ROM DRIVE   | 176   |

### ACCELERATORS

#### Daystar

|                         |        |
|-------------------------|--------|
| POWERPRO 601 80MHZ      |        |
| W/RAM CACHE             | \$1441 |
| POWERPRO 601 100MHZ     |        |
| W/CACHE                 | 1231   |
| TURBO 040 40MHZ         |        |
| W/CACHE                 | 679    |
| TURBO 040I 33MHZ        |        |
| W/CACHE NO FPU          | 605    |
| TURBO 601 66MHZ         |        |
| FOR ICI, IISI W/ADAPTER | 851    |
| TURBO 601 66MHZ         |        |
| FOR IIVX, IIVI, P600    | 851    |
| TURBO 601 100MHZ        |        |
| FOR ICI, IISI W/ADPTR   | 1165   |
| TURBO 601 100MHZ        |        |
| FOR IIVX, IIVI, P600    | 1165   |
| POWERCARD 601 100MHZ    | 946    |

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160-175

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176-177

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| Bar Coding              |         | 160        |
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| CD-Rom                  |         | 162        |
| Computer Systems        | 151     | 162        |
| General                 |         |            |
| Input/Output Devices    |         |            |
| Multi-Media             |         |            |
| Peripherals             | 152     | 171        |
| Powerbook Products      | 154     |            |

## SOFTWARE

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|------------|---------|------------|
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| Business   |         |            |

|                               | Premier | Classified |
|-------------------------------|---------|------------|
| CAD/ CAM                      |         |            |
| CD-Rom                        | 155     |            |
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| Scientific/Engineering        |         |            |
| Security                      | 158     |            |

|                               | Premier | Classified |
|-------------------------------|---------|------------|
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| Computer Insurance            |         | 174        |
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| <b>MISCELLANEOUS</b>          |         |            |
| Accessories                   | 181     | 174        |
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Northeast

**Alexandra D'Anna**  
212-503-5941  
Midwest

**Annuradha Kumar**  
212-503-3802  
Northwest

**Gina D'Andrea**  
212-503-5863  
Southwest

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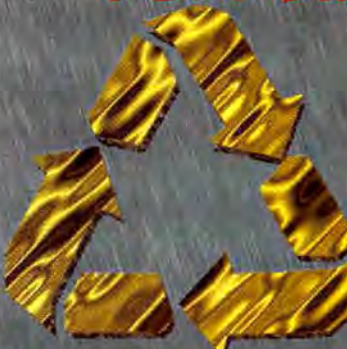
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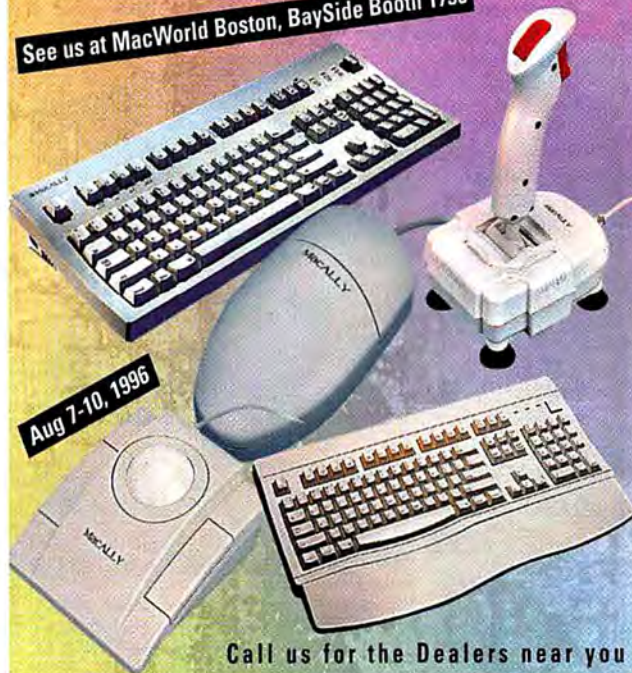
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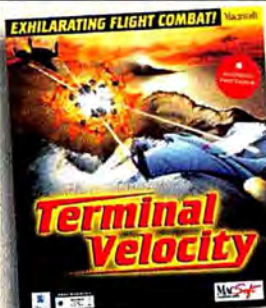


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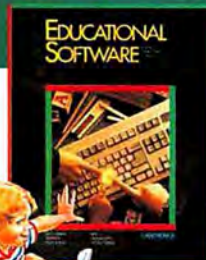
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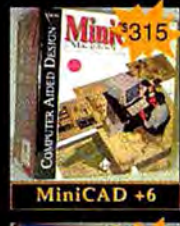
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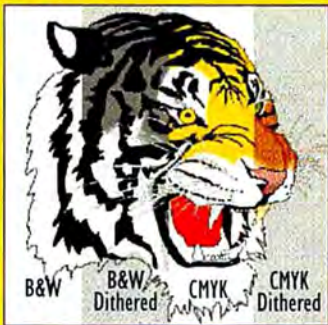
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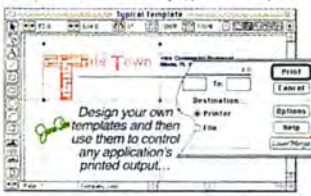
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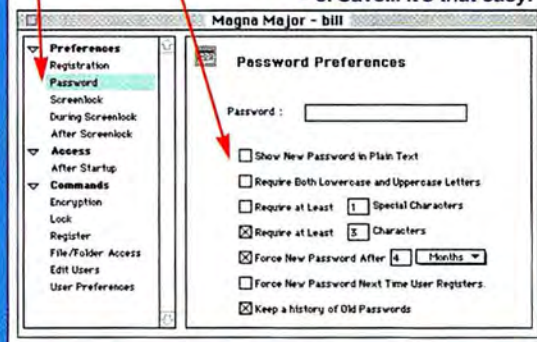
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| 6200       | 8/1GIG/CD           | 1499/1049* |
| 6116       | 8/700/CD            | 1179/899*  |
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| SW 1500/2500                 | 249/369     |
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| Apple Personal Laser 320     | 599         |
| Apple LaserWriter Select 360 | 1149        |
| Apple LaserWriter 4/600PS    | 849         |
| Apple LaserWriter 12/600PSC  | 5699        |
| Apple LaserWriter 16/600PS   | 2099        |

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| 4M Plus           | PS 600dpi Laser | 1499 |
| DeskJet 1600CM    |                 | CALL |
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| DeskWriter 850C   |                 | 449  |
| DeskWriter 660C   |                 | 379  |
| DeskWriter 600    |                 | 239  |
| HP 5MP PostScript |                 | 979  |
| STYLUS PRO XL     |                 | 1599 |
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| Apple 1710AV / 1710 | 949/899    |
| Apple Multiscan 20" | 1799/1299* |

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## NEC MONITORS

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| PRECISION VIEW 17"     | 949   |
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| MULTIVIEW 21"          | 1699  |
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| THUNDER COLOR 30/1152  | 1499  |
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| THUNDER 8/1600         | 429   |

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| GCC XL 616            | ..\$2420 |

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| Apple Performa 631 8/500/CD .....  | \$749.  |
| Apple Performa 637 8/250/CD .....  | \$699.  |
| LC630/DOS 12/500/CD .....          | \$849.  |
| Apple Performa 6100 8/250/CD ..... | \$799.  |
| Apple Performa 6205 8/1GB/CD ..... | \$999.  |
| Centris 650 4/0 .....              | \$649.  |
| Quadra 605 4/160 NEW .....         | \$679.  |
| Quadra 660av 4/0 .....             | \$649.  |
| Quadra 840av 0/0 .....             | \$1049. |
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| Radius TPD 21" mono .....            | \$549.  |
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| Apple LaserWriter IIfx .....          | \$899.  |
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| Apple LaserWriter 4/600PS .....       | \$649.  |
| Apple Color Printer new .....         | \$699.  |
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| <b>PowerBook 5300C</b><br>16/750           |  | 190 4/500 \$999           |
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|                          | 20" MultiScan \$1799   |
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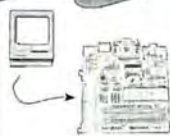
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# MacUser





ANDY IHNATKO

# Time for the Gold-Watch Cursor

**A MOMENT OF SILENCE**, sensation seekers, so that I may pay tribute to a trusted and valued member of my organization.

Lilith, my much abused but ever reliable PowerBook 100, was and is the most expensive impulse purchase of my life. Come with me back to the heady days of the Early Nineties, way back when Bush was President and Duran Duran was making its second attempt at a comeback.

To set the stage, so to speak, that was back during the long-forgotten time when Apple was in some sort of financial trouble, you see, and was taking enormous and highly public steps to reorganize. Toward that end, Apple decided to kill two birds with one stone by practically giving away its inventory's huddled masses yearning to be sold, and experimenting with new retail outlets. A fellow faculty member burst in to tell me that the camp's Ethernet had collapsed, forcing a dozen classes to close and a hundred students to go home, and also that a chain of warehouse stores would be selling PowerBooks at truly desperate prices, straining the very next day.

It was this second piece of information that grabbed my immediate interest; after all, it was a nice day out and the students could use a day off. Ignoring the fact that I'd gone about 22 hours without sleep, I piled into my battered Gran Fury and wove my way to the nearest Price Club, and two hours later it was mine. I pulled into a nearby McDonalds drive-through for restoratives and, while waiting for my Big Mac to be cauterized and bagged, broke the PowerBook out and fired it up. It was the first Mac I owned that had a Control key and the first time I heard a Macintosh of mine open with a chime instead of a bing. Maybe it was the giddiness of new ownership, maybe it was the now 24 hours of straight activity, but I sang a cheery tune all the way back along I-90 — even as I sent car after car

tumbling over the embankments.

She was quickly named Lilith, for like her mythological namesake, she went forth into the world and spawned countless demons to



confound and irritate humanity. Well, I've never been terribly confident about the stuff I write on the road.

Through this, the final decade of the millennium, she's simply taken pride in always being there for me. Even when brand-new, she was merely a redressing of the Macintosh Portable, which was itself merely a redressing of 1986 Macintosh technology. All the same, she ran the very latest version of the system software with nary a flicker in performance. A fine example of Apple design, she was built to last and engineered for impromptu field service — like the time I thought I could be more productive if I tried to write from a floating pool chair. Not only did Lilith not complain when I finally fished her from the drink but she also seemed refreshed and grateful for the new experience. Countless times she allowed herself the indignity of being taken apart with my Swiss-army knife, such as the time a little rubber ball for relieving hand stress burst open and emptied a cup of sesame seeds into her keyboard one hour before a deadline.

And let's not forget the defining moment of our relationship, when I took Lilith aside last summer and told her I was going to disassemble her as I'd never disassembled her before, strictly for the purpose of giving her outer casing a blue, green, and metallic-purple

paint job. She was stoically silent, trusting implicitly in my ability to put her back together, unlike certain computers and robots in certain TV shows and movies I could mention. Yes, Commander Data, I'm talking to you.



tion. Yes, Commander Data, I'm talking to you.

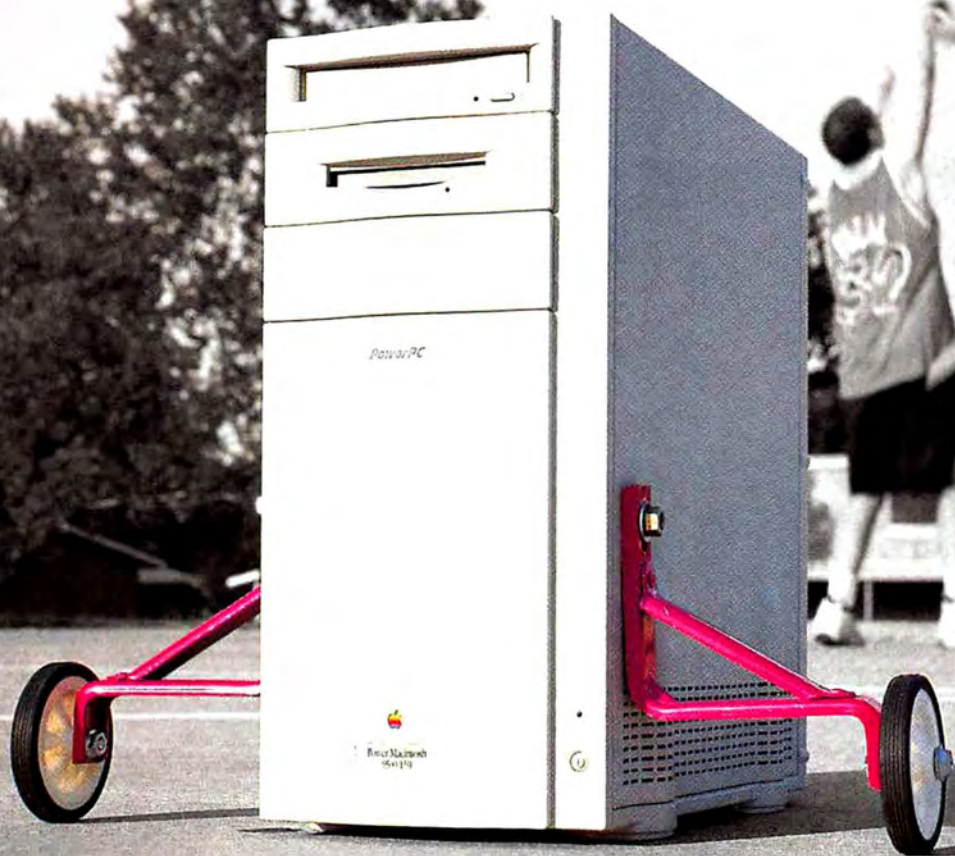
Sadly, her day came this past spring. As I was packing for a speaking engagement in Alaska, Lilith attempted gamely to store the many files and software I would need in order to work on those critical projects on the road; oh, how she bravely strained at the yoke! But it wasn't to be. Lilith, the computer that never gave up, had been given up on by the harsh and unfeeling software industry, which arbitrarily began to insist that their software not run on 68000 processors.

## Early Retirement

Still, had Lilith not been forced into retirement, she surely would have worn herself into silicon dust without complaint, helping me write my books, columns, articles, and e-mail. Lilith has earned the right to unshoulder her heavy burden and spend the rest of her functional cycle taking it easy, living the good life. If only I could give her the lasting monument she so richly deserves, such an important part of my creative career she has been. Nonetheless, she will assume a place of honor in the living room next to the good couch, and her only task will be to help me compose and send on-the-spot reactions to ABC concerning its fine and wholesome prime-time programming. She will also advise my other hardware on its duties and responsibilities. She has earned as much; her commitment to duty and excellence will serve to inspire the Power Macs and, indeed, myself.

Or, I might just take her apart and install her in the Fury. That might be kind of cool, having a Mac in the car — I don't know. ☐





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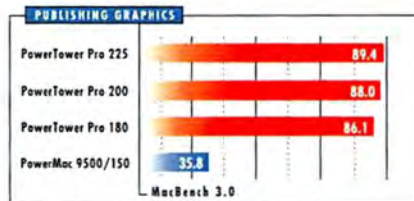
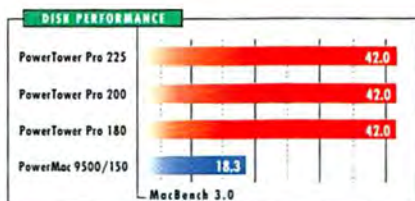
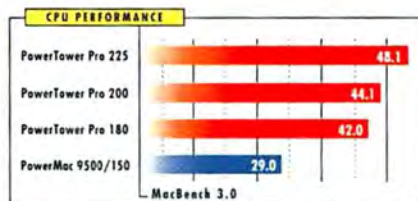
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