Word 6.0.1 Lab Test: Microsoft Picks Up the Pace, Page 122

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New PowerPC All-in-One Mac, Page 34

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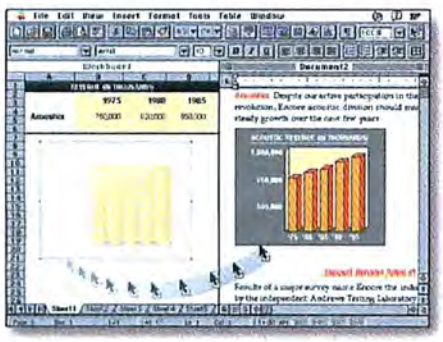

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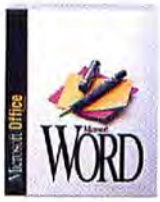

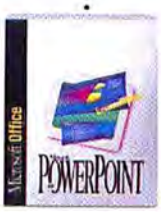

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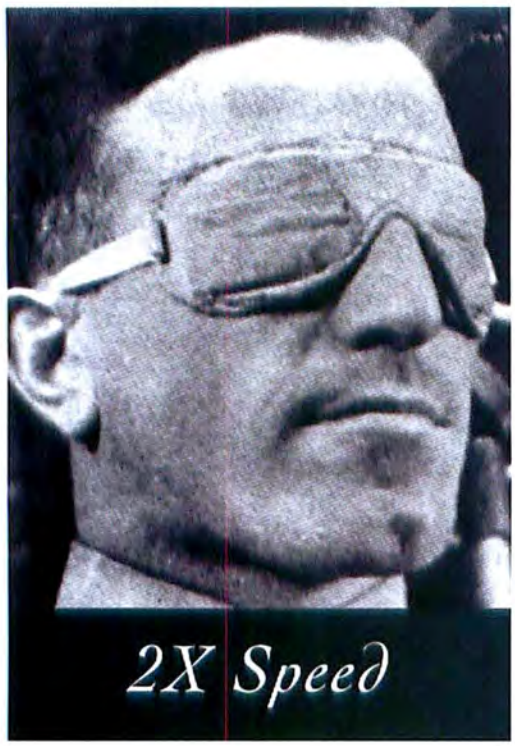

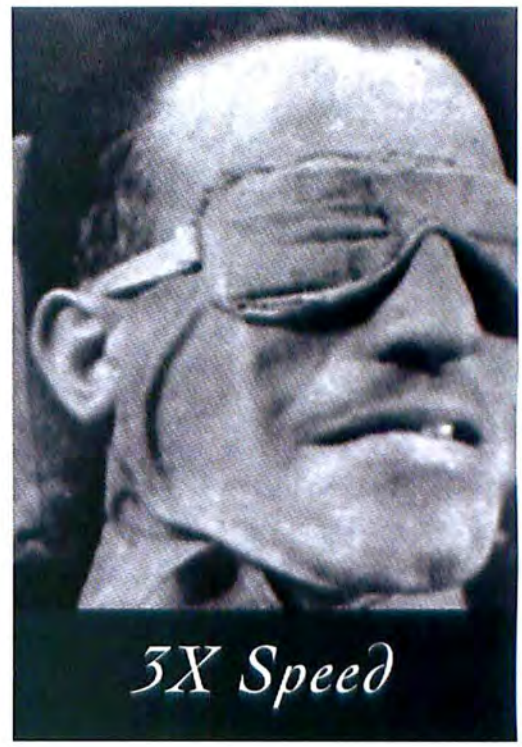

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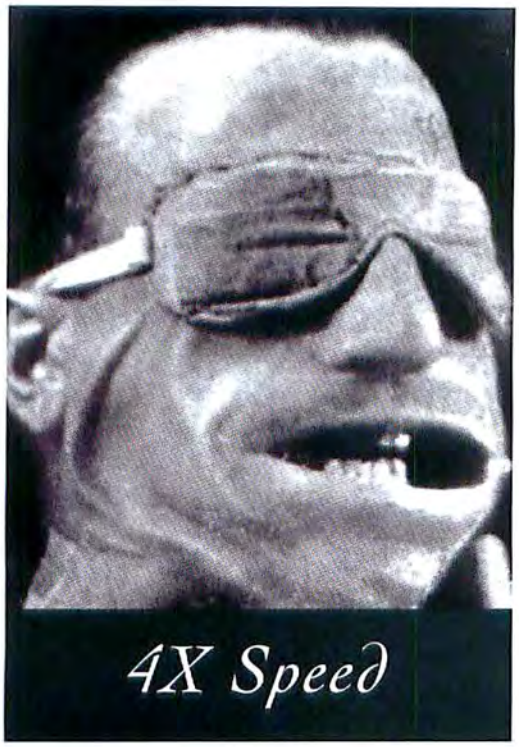

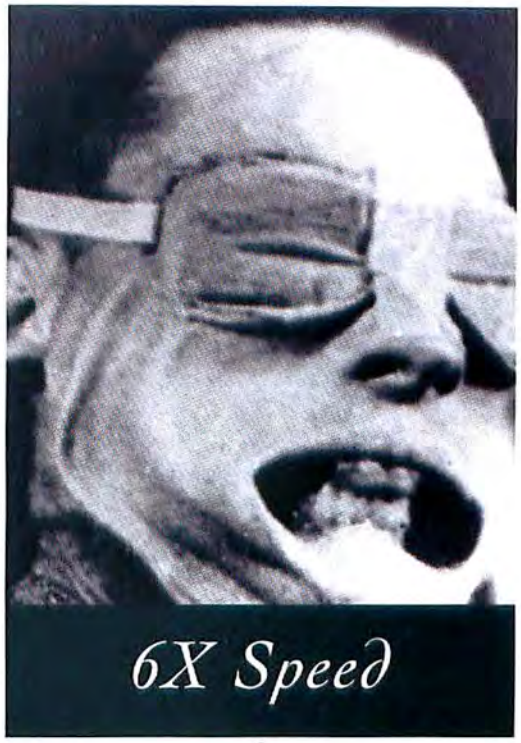

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Contents

MACWORLD THE MACINTOSH® AUTHORITY JUNE 1995

Features

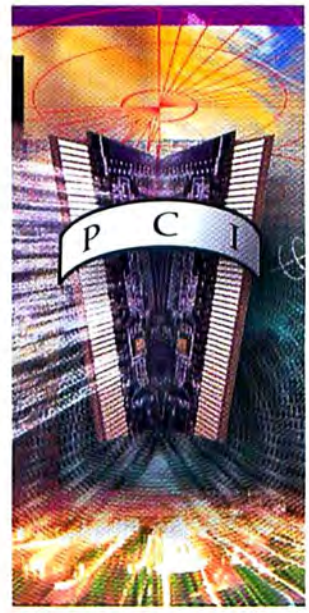
86 Top Office Printers
BY JIM HEID Macworld Lab tests 13 heavy-duty laser printers for speed, output quality, and functionality to find the performance winners.

96 System 7.5 Enhancements
BY ROBERT C. ECKHARDT Get tomorrow's System on today's Macintosh with these nine top utilities.

98 System 7.5 Secrets
BY DAVID POGUE AND JOSEPH SCHORR Cool tips on how to get the most out of what you've got with System 7.5.

104 Why PCI
BY BRETT GLASS Apple is shifting from NuBus to PCI—what will that mean for the Mac? An in-depth analysis of what's to come.

110 Quad-Speed CD-ROM Drives
BY JAMES A. MARTIN Are quad-speed CD drives worth the extra money? Macworld Lab tests seven 4× CD drives to determine if performance matches price.



PCI—why Apple thinks it's the best thing since NuBus, page 104.

Quad-speed CD drives are here—Macworld tests the latest in CD-ROM technology, page 110.

News

33 MacBulletin

34 News 603-based Power Mac 5200 • DayStar's multiprocessor Mac, first tests of Radius's clone • Beyond quad-speed CD drives, and more

41 Power Mac News Speed variations • Power Watch: PixelPaint Pro, PowerClock CPU booster, and more

43 Macworld Online Save money online • Shareware picks, and more

45 New Products

Opinion

19 State of the Mac
BY ADRIAN MELLO The Mac Classic's heir apparent.

25 Letters

147 The Desktop Critic
BY DAVID POGUE Software for mapping your family tree.

151 Conspicuous Consumer
BY DEBORAH BRANSCUM A wealth of resource gems.

236 Wise Guy
BY GUY KAWASAKI Nerd, geek, dweeb, freen—how to impress Mac programmers.

A desktop spectrophotometer for the rest of us, the Colortron, reviewed, page 56.

Graphics

116 **News** New, improved ColorSync 2.0 • Digital cameras take off • Fully posable 3-D figures, and more

118 **Expert Graphics**
BY CATHY ABES Graphics professionals share their secrets.

Networks

134 **News** PCI-based network boards • Incompatible E-mail systems, unite! • Easy tape backup, and more

143 **PowerBook Notes**
BY CARY LU An update on laptop modems.

At Work

122 **News** QuickTime videoconferencing • Macworld Lab tests Word 6.0.1 • Smaller-than-a-bread-box desktop scanners

125 **Working Smart**
BY JIM HEID Connecting to PC printers.

129 **Quick Tips**
BY LON POOLE Tips, tricks, and shortcuts.

Buyers' Tools

155 **Editors' Choice**
Top picks from our comparative articles.

157 **Star Ratings**
Hardware and software reviews at a glance.

167 **Streetwise Shopper**
Hardware and software bargains: discounts, bundles, upgrades.

14 **How to Contact Macworld**

IDG

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ON THE COVER
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Tips on where to look to uncover secret System 7.5 capabilities, page 98.

Reviews

56 **Colortron**
Desktop spectrophotometer

58 **QuickBooks 3.0**
Small-business accounting

59 **Pro Imager 4000; Pro Imager 8000**
High-bit scanners

60 **MovieFlo' 1.1**
Special-effects software

61 **BizPlan Builder 5.0; Business Plan Writer 6.0**
Proposal-writing software

63 **OneWorld Internet 1.0, 700 Series**
Internet gateway

65 **Reno Portable CD-ROM Player**
Portable CD-ROM player

67 **Gryphon Batch It 1.0**
Batch processor for graphics

67 **SpigotPower AV**
Video-compression board

69 **Disc-To-Disk**
Audio-capture utility

71 **Reli 4830T**
30-bit flatbed scanner

71 **Digital Chisel**
Multimedia authoring tool

73 **theTypeBook 4.0**
Type-specimen generator

75 **ConcertWare 1.5.7**
Music-notation software

75 **VideoDirector 1.5**
Video-editing system

77 **PixelPutty Solo**
3-D modeling program

79 **SprintScan 35**
35mm transparency scanner

79 **Theorist 2.0**
Mathematics software for students

81 **RCD 1000**
CD-recordable drive

81 **Peanuts Family Organizer 1.0**
Personal information manager

83 **DrawingSlate II**
Digitizing tablet

83 **Material World**
CD-ROM

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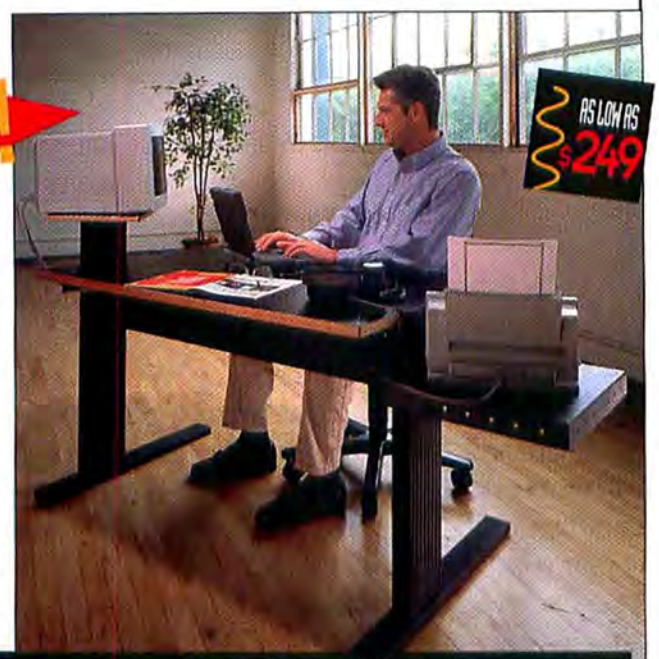

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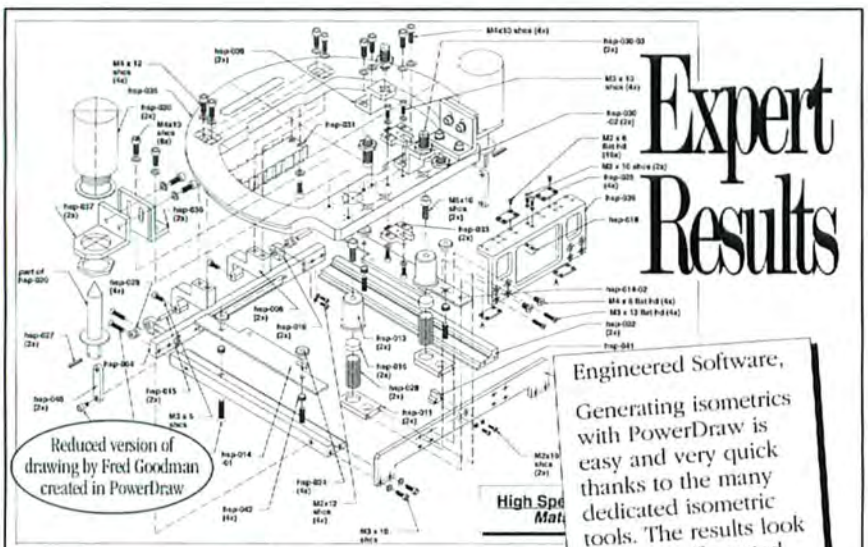

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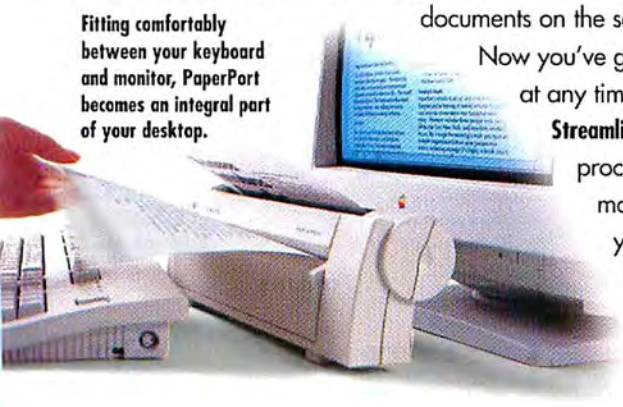

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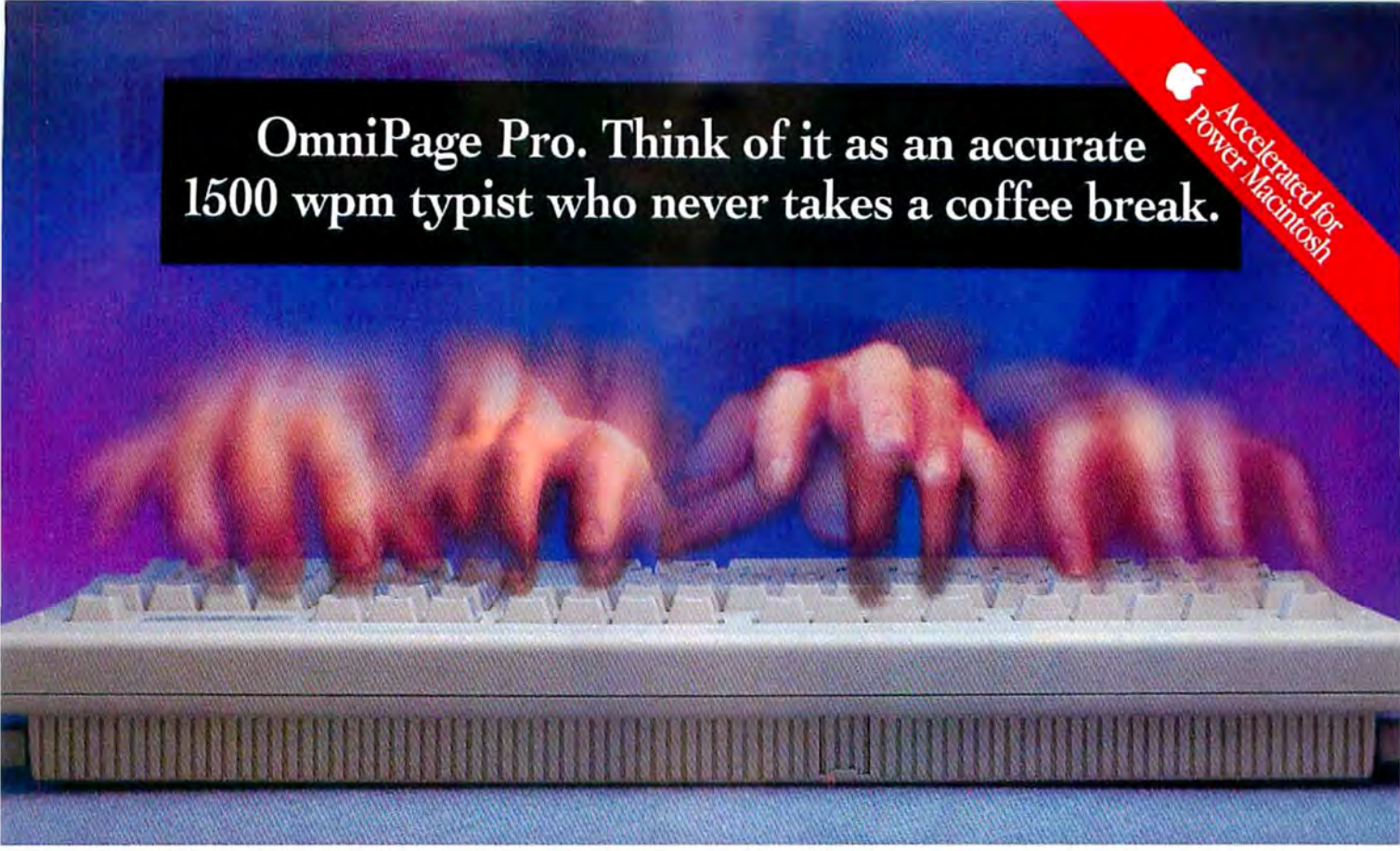

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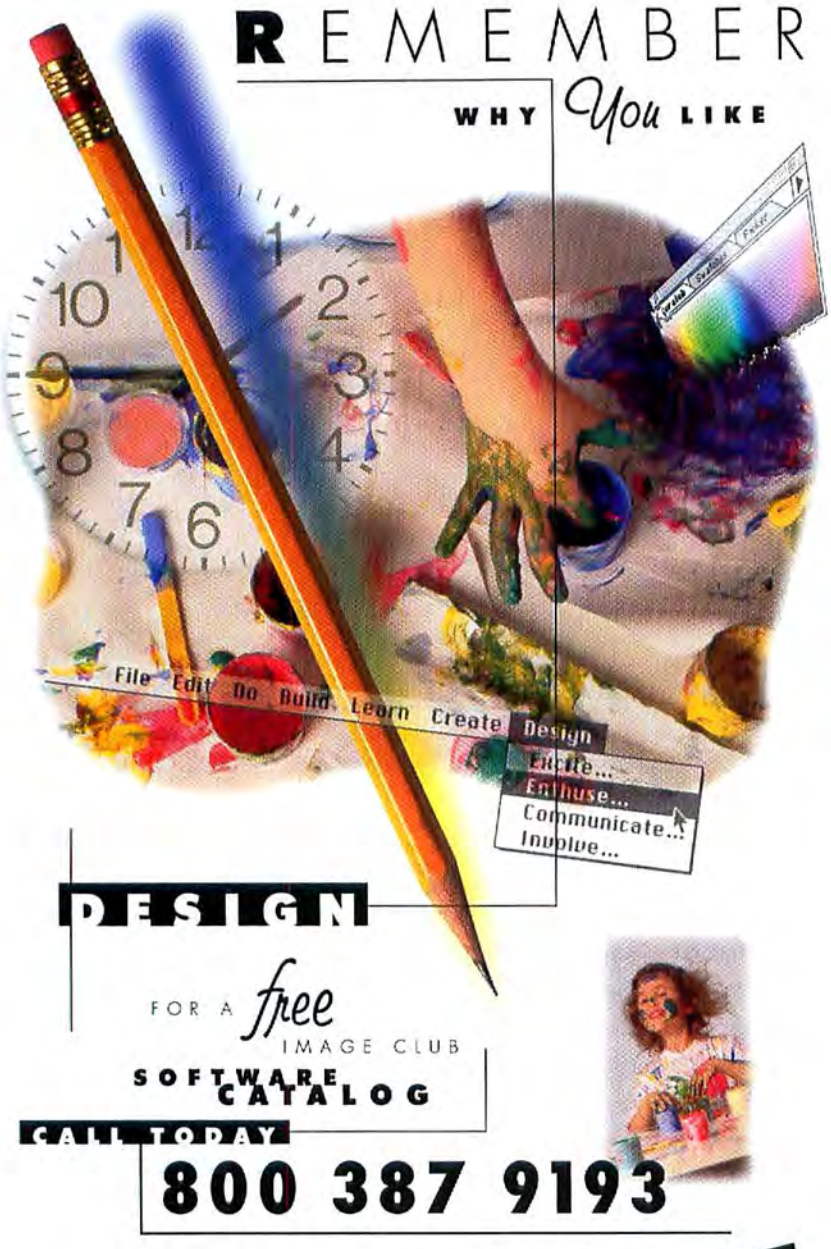

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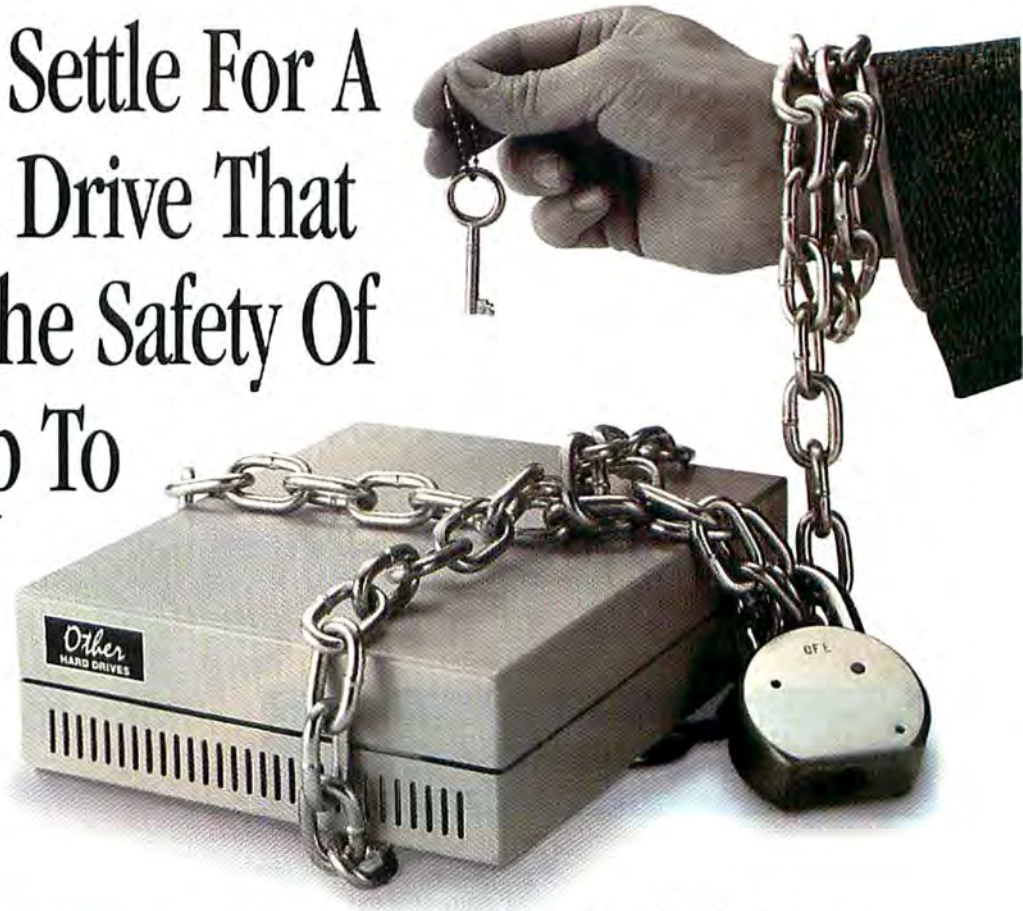

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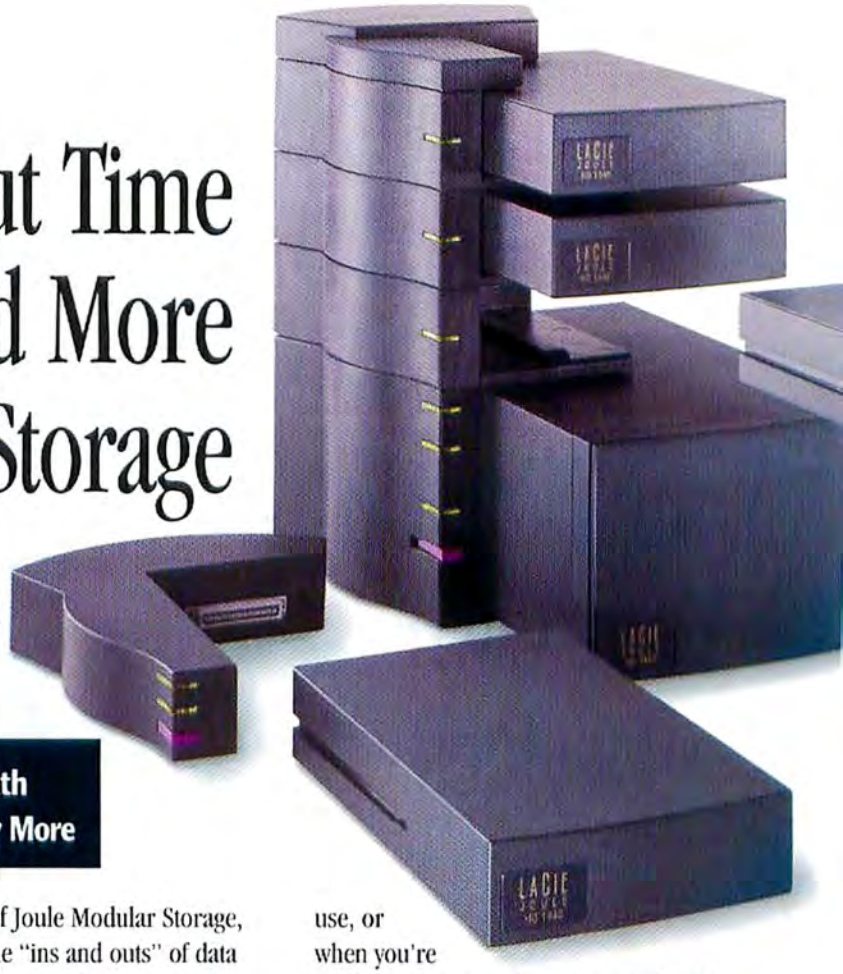

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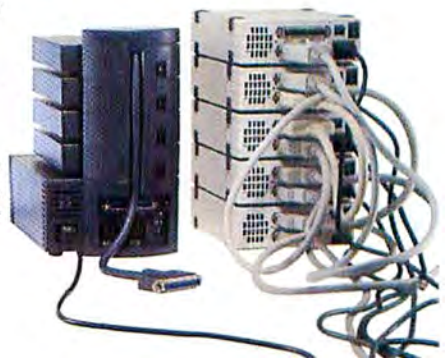

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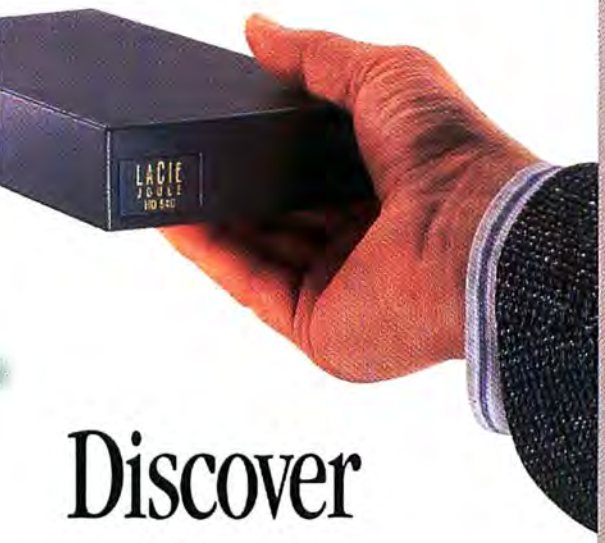

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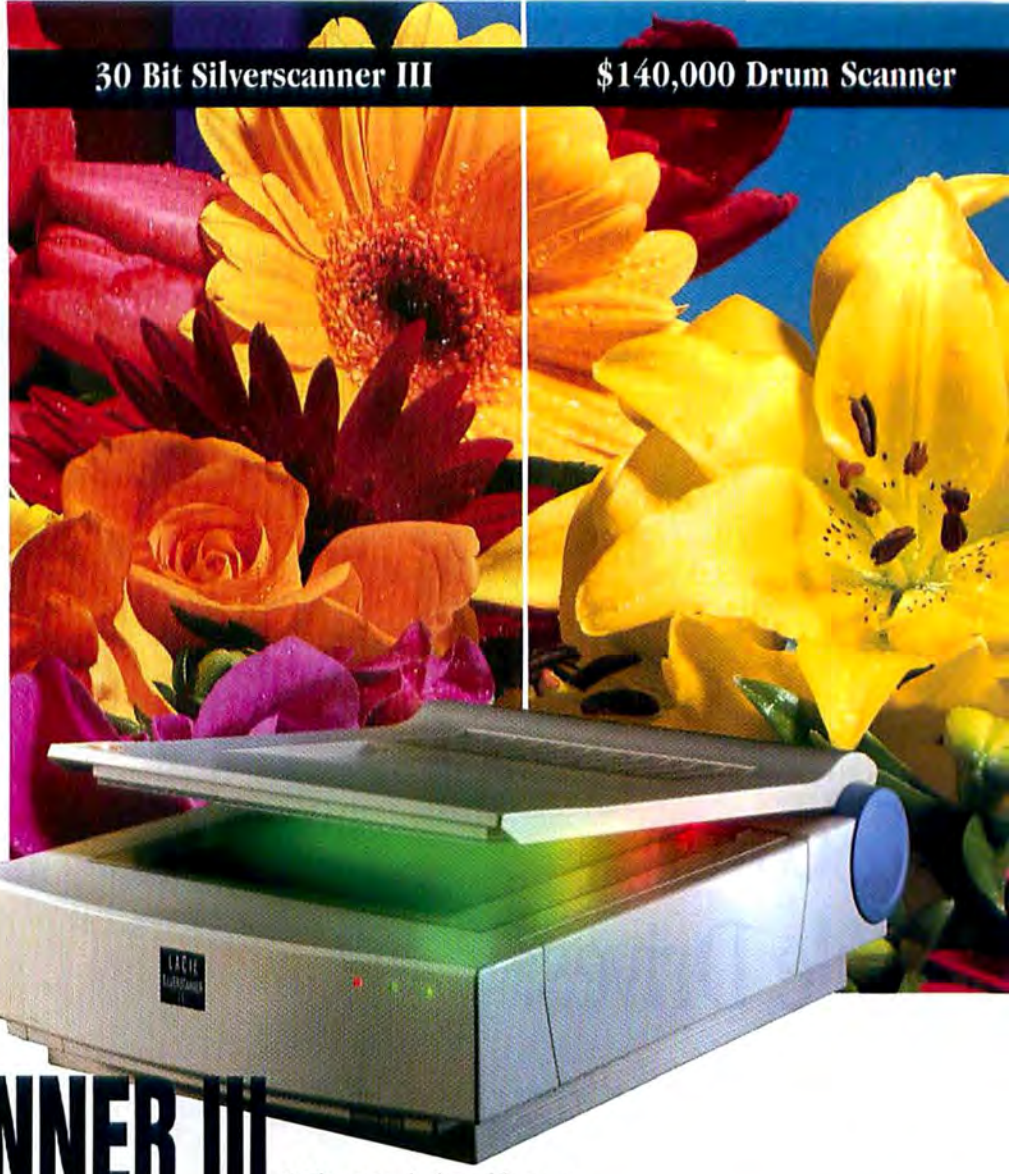

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Circle 52 on reader service card

BY ADRIAN MELLO

Heir to the Mac Classic

A new model shows how, at Apple, design is the difference

EXACTLY A YEAR AGO IN THIS column, you may recall, I was singing a lament for the passing of the Mac Classic. It was not mere nostalgia that inspired my dirge. I couldn't help but feel that although Apple undoubtedly had plenty of sound business reasons for its decision, in retiring the Macintosh's truly classic all-in-one design, the company was sacrificing something of value. Well, Apple hasn't decided to reissue the Classic, but I just may have found something to take its place—the new Power Macintosh 5200/75 LC (pictured on our cover and featured in *News* in this issue.)

The all-in-one design of the Power Mac 5200/75 LC exhibits a lot of the same spirit that Apple vested in the original Macintosh. A deceptive minimalism belies this machine's utility and value. And as any product designer worth his or her salt knows, there's an elegance in that simplicity. With the Power Mac 5200/75 LC, Apple has again figured out how to package a full-featured computer in the simplest possible shape. This computer is such a clear reflection of a computer user's desires that it makes me smile. It reminds me of the way I felt the first time I saw a PowerBook.

In fact, your first glance at the Power Mac 5200 might fool you into thinking you were seeing only part of a system. With its built-in microphone and speakers, and its tilt-and-swivel base, the 5200 could easily be mistaken for one of the new multimedia monitors. But take a closer look and you'll notice the CD-ROM and floppy disk drive openings. And the story doesn't stop there. Inside the Power Mac 5200 you will find a general-purpose Processor Direct Slot, plus an expansion slot for either a modem or an Ethernet card, and another slot for a TV tuner.

Now admittedly, the Power Mac 5200 is about twice the size and, at 47 pounds, almost three times the weight of a Mac Classic, but that's only to be expected. Its built-in multimedia capabilities demand a bigger monitor (15 inches, whereas the Classic's was only 9), a bigger hard drive (the 5200 will come standard with a 500MB internal drive), and a double-speed CD-ROM drive.

One mark of a truly elegant solution is that from the moment it comes into being, it seems so obvious and natural that you have trouble fathoming why no one came up with it earlier. The Power Mac 5200/75 LC fits that description. Its all-in-one predecessors—which include the Power Mac Performa 520, 550, 575, and now, the 580—all offer good functionality and value, but they lack the 5200's design integrity. In comparison, their efforts to mimic the appearance of a conventional three-piece desktop computer system—composed of monitor, CPU cabinet, and keyboard—just made them look clumsy.

DON ARDAY

Design Ideals

The Power Mac 5200 is an appealing computer—a small but significant step toward addressing the increasingly complex collection of user requirements—but its arrival on the scene can hardly be considered an earthshaking event. It does, however, make an important statement about Apple Computer's enlightened product philosophy.

Long the computer industry's leader in intelligent product design and packaging, Apple owes much of its remarkable success to an ability to anticipate what customers want—even before anyone has had a chance to dream up a wish list. Competitive pressures have forced Apple to become more pragmatic about its business, and clearly Apple regards its firm commitment to exploring interesting new designs as a pragmatic decision. If the Power Mac 5200/75 LC doesn't convince you, take another look at the new design concepts highlighted in our last issue (see "Inside Apple's Design," *Macworld*, May 1995).

Beyond Mechanical Machismo

Traditionally, your dyed-in-the-wool computer enthusiasts and power users have been willing to defend arcane and clumsy approaches on the basis of raw computing capability alone. After all, computers are essentially all nuts and bolts anyway, right?—not much more than an aggregate of so many megahertz, megabytes, milliseconds, and dots per inch. For years, this wire-head reasoning permitted DOS users to look down their noses at the Mac's superior graphical interface—that is, until most of those users adopted the clearly derivative Windows operating system. However grudgingly they may have learned their lesson, even the most recalcitrant naysayers now acknowledge that productivity depends on usability at least as much as it depends on power.

The Mac's user interface is only the most obvious example of Apple's design philosophy, however. Because of it, many people have failed to look beyond the appealing face, at the Mac's deeper virtues. The ideal that computers should be adapted to people's behavior, rather than the other way around, is evident throughout the Macintosh product line and has been for years—a fact that Apple has generally failed to market effectively.

continues

Recently some competitors' promotions suggest that they invented plug and play. But every Macintosh since the computer's introduction over ten years ago has offered full plug-and-play capability. And unlike its competitors, Apple can proudly point to a tremendous degree of consistency. It has always been easier to attach the Mac to printers, networks, and other devices because Apple's engineers not only made the connections work, but they also made a point of evaluating the user's experience of assembling a Macintosh system. Furthermore, while other computer makers are only now figuring out how to assemble and market multimedia-ready machines, Apple has long included features such as built-in sound, QuickTime, and CD-ROM drives. As a result, the Mac has always been less confusing to use. In this generation of Macs, the Power Mac 5200/75 LC and its all-in-one siblings are pinnacles of design achievement, demonstrating that when you opt for power and sophisticated capabilities, you need not sacrifice elegant simplicity.

Standing Out

The approach of Mac clones offering all the advantages of the Macintosh Operating System leads some observers to wonder whether Apple can compete with less expensive clones. The argument goes that lower-margin companies, unencumbered with research-and-development expenditures comparable to Apple's, will cannibalize Apple's market by offering low-cost alternatives to the Mac. Undoubtedly, Apple will lose some sales on the basis of price alone. Competition from other platforms led Apple to price the Mac more aggressively over the past two years, but recent price cuts in the PC market have upset the equation again. Still, it's unlikely that clones will offer a sufficiently large price advantage to offset the appeal of Apple's superior product design evidenced by the Power Mac 5200/75 LC and PowerBooks. While some price-sensitive customers will choose lower-cost alternatives, I'm willing to bet that the majority of customers will still prefer Apple.

Apple's competitive outlook in its own market is good as the company continues its leadership with innovative design and continues to integrate the kind of functionality that anticipates future customer applications rather than being satisfied with the status quo.

A Postscript in Passing

As Apple resurrects the spirit of the Classic in the Power Mac 5200/75 LC and other new models, it has also quietly laid to rest that cute happy Mac that appears at start-up. From the very first Mac onward, this icon let you know that the oddly shaped computer was special on the inside, too. But with the System 7.5.1 update that Apple released in mid-March, the happy Mac is no more. Instead, a large version of the new Mac OS logo appears.

It's a small thing, yet it dramatically heralds the end of the era of the proprietary Mac. Now competing as an open, licensed architecture, the Macintosh has a new, less endearing symbol to prove it. All of Apple's statements, all of its concrete actions, didn't have the same effect on me as the disappearance of that familiar happy face. The happy-Mac icon represented the soul of the Macintosh, and that soul has been replaced. Apple's changes in direction are unquestionably for the better—essential if Apple is to have a fighting chance of being a key player in the microcomputer business. But the change in symbolism is poignant nonetheless. The Mac is dead. Long live the Mac! m

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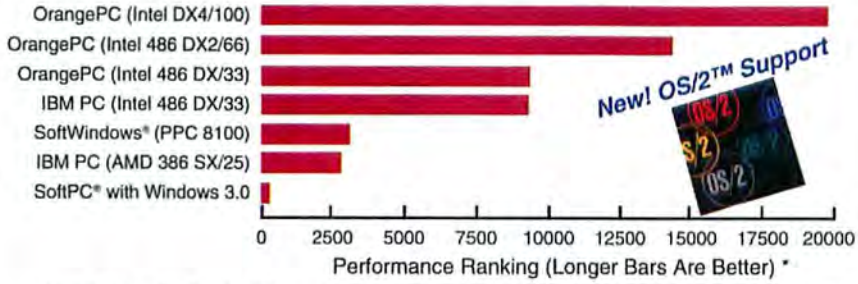

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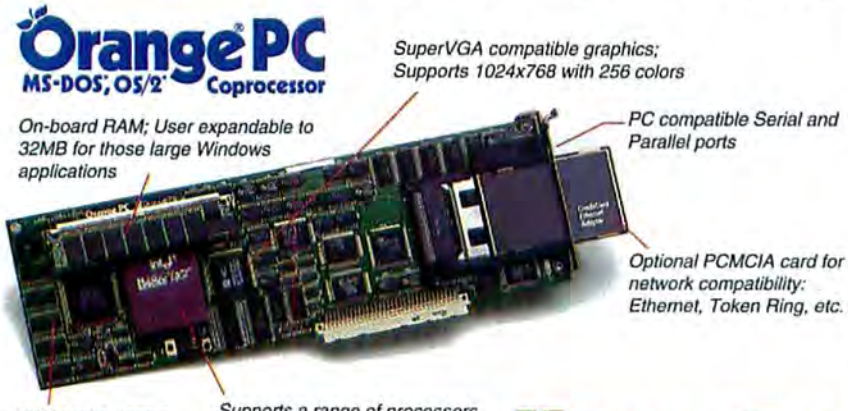

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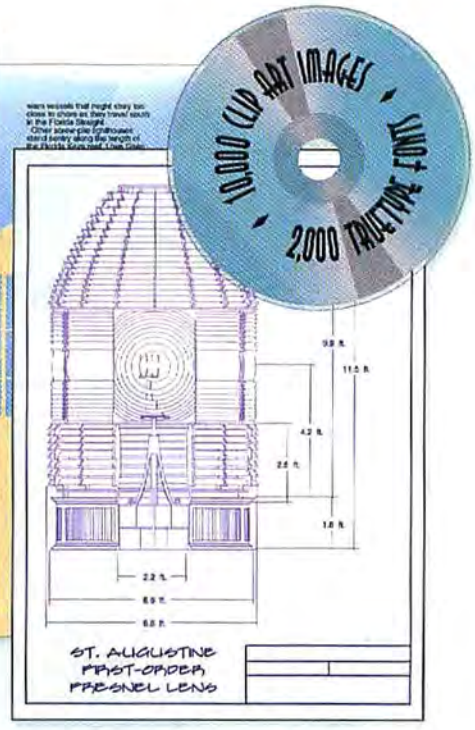

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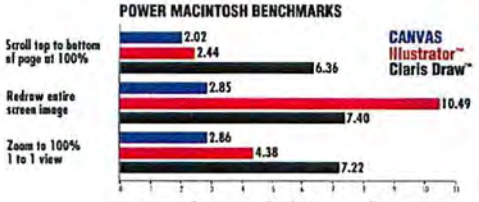

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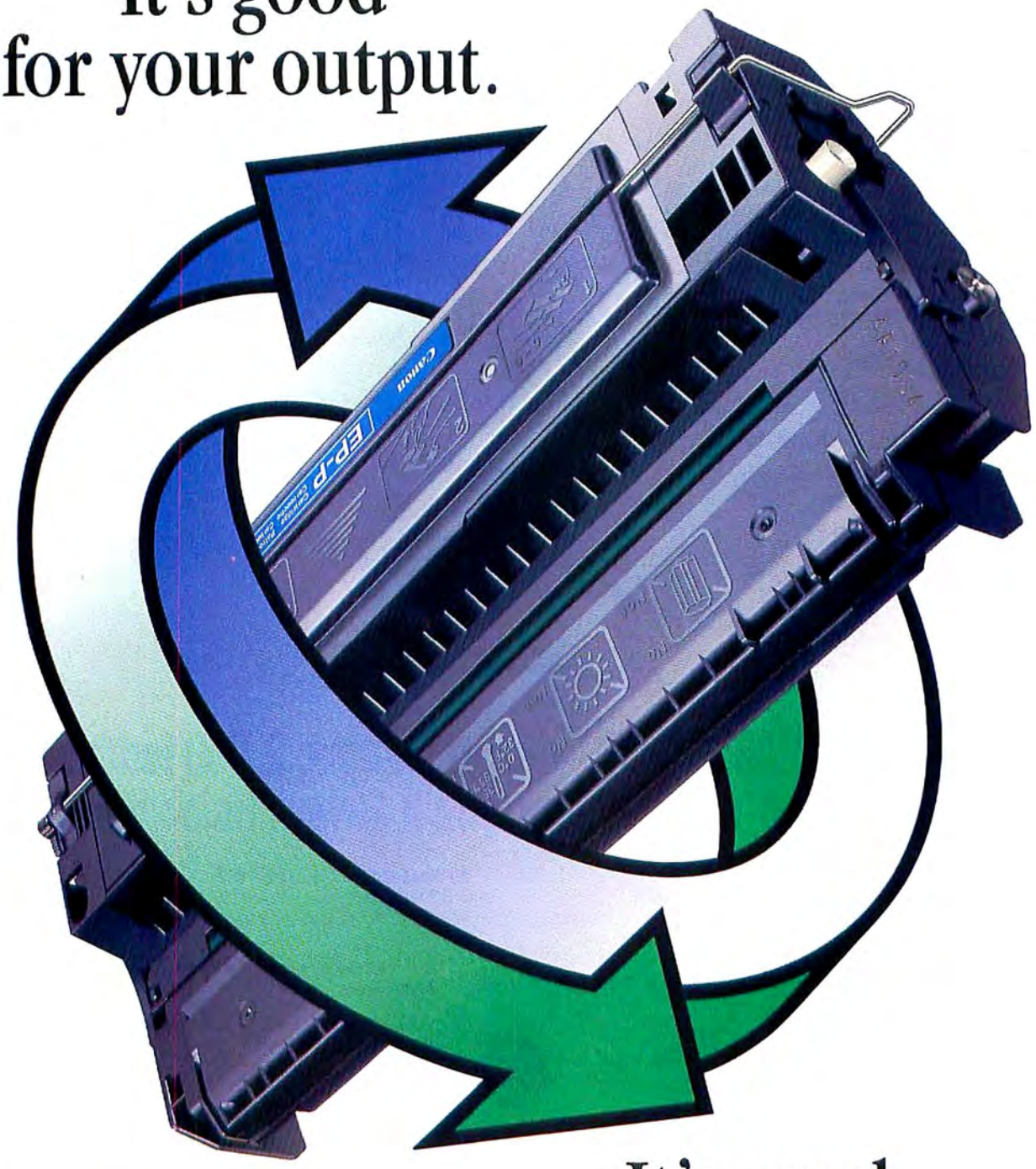

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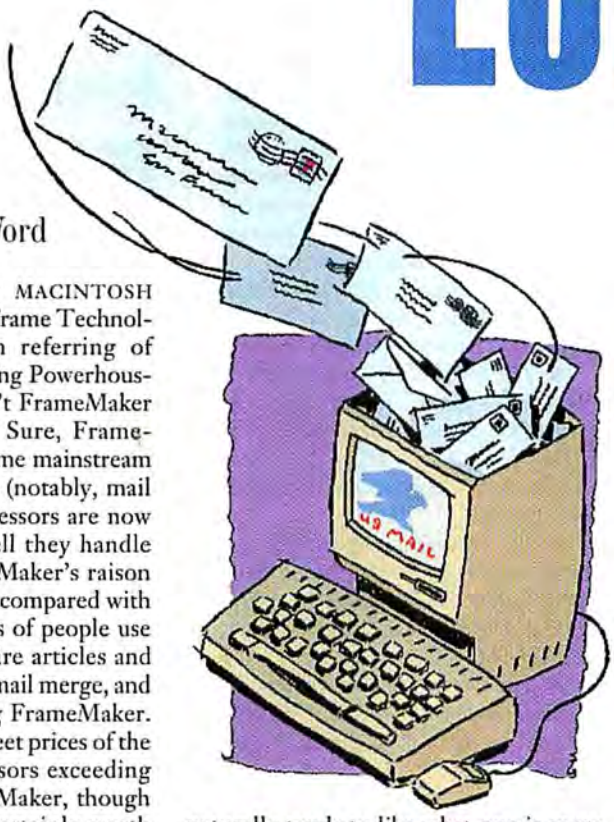
Letters



Heated Words on Word

WHAT DOES THE MACINTOSH press have against Frame Technology's FrameMaker? I'm referring of course to "Word Processing Powerhouses" (March 1995). Doesn't FrameMaker even deserve a sidebar? Sure, FrameMaker may be missing some mainstream word-processing features (notably, mail merge), but if word processors are now being judged by how well they handle long documents—FrameMaker's raison d'être—shouldn't they be compared with the standard-bearer? Lots of people use word processors to prepare articles and books, have never done a mail merge, and would be better off using FrameMaker. Furthermore, with the street prices of the mainstream word processors exceeding $300, I think that FrameMaker, though more expensive still, is certainly worth consideration as an alternative.

I'm writing a book, and I couldn't live without FrameMaker!

David Wagner
Boulder, Colorado

Macworld has always been enthusiastic about FrameMaker (see *Reviews*, March 1994, for example). But since FrameMaker is a publishing package, and it costs $895, we felt it didn't belong in a strictly word processor–oriented article.—Ed.

I WAS APPALLED AT YOUR WRITER'S incomprehensible favoring of Word's features, and denigration of WordPerfect's features, in your competitive evaluation of high-end word processors—that is, until the very end, when the reason became crystal clear.

According to the capsule bio, writer Robert C. Eckhardt has a vested interest in Word as an author of books on how to use the monstrosity. Ignoring for a moment the inherent conflict-of-interest issues, this background suggests the writer has an unparalleled familiarity with the nuances (and interface) of Word, more so than with WordPerfect. One naturally tends to like what one is more familiar with.

Your choice of a writer with such bias as author of this flawed article has profoundly shaken my confidence in *Macworld*'s value as a source of objective, discriminating information.

Warren A. Potas
via the Internet

Microsoft Corporation didn't pay Robert Eckhardt for his book—IDG Books Worldwide, a sister company to *Macworld*, did. And Word isn't Mr. Eckhardt's only program of expertise; in addition to writing the feature "Word Processing Powerhouses," he reviewed both Nisus and WordPerfect for *Macworld*. As the capsule bio pointed out, he also wrote a book on FullWrite. *Macworld* stands by Mr. Eckhardt's credibility and integrity.—Ed.

IN "WORD PROCESSING POWERhouses" you declined to issue an Editors' Choice for Slow 68040 Macs and Slower. I disagree: the best choice for those is Microsoft Word 5.1.

I was using Microsoft Word 5.0 and had planned to upgrade to 6.0, skipping 5.1. When I learned about 6.0's "features" (for example, its Windows interface and sluggish performance), I rushed out to get version 5.1. There are lots of mail-order houses that still have ample stock at excellent prices. If you have a slow 68040 or less (and even if you have a fast 68040 and don't need the kitchen sink full of new features), I suggest you can't go wrong with Word 5.1.

Ed Bruckstein
New York, New York

AFTER READING STEVEN LEVY'S complaints about Word 6.0 (*The Iconoclast*, March 1995), I honestly have to wonder if he wrote those Whiner-family skits on "Saturday Night Live" back in the late seventies. I have never heard a person make so many exaggerated complaints about a product. His main gripe seems to be that Word 6.0 is just too good for him. So what if Word is big? It has everything you could ever need in a word processor. If Levy doesn't like all the space it takes up, why doesn't he delete some of the wizards (does he really use the Recipe template?) or move the clip art to floppies? The tutorial is so basic, why not get rid of it? After doing these and other little tweaks, Word 6.0 takes up only about 11MB on my hard drive. And as far as the long wait at load-up time Levy moans about, why does it take only 30 seconds to load Word 6.0 on my machine (a lowly Performa 475)? I don't think a 5MHz difference in processor speed would add six and a half minutes to boot-up time.

Also, yes, I completely agree that the Mac OS is far superior to Windows, but being a computer consultant at a medium-size university, I can assure Levy that having almost identical interfaces is much more of a blessing than a restriction. If users move from a Windows machine to a Mac, they don't have to worry one bit about having to learn their way around a completely different interface. This is great in a university or office setting.

If 1995 technologies are too big and

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CORRECTIONS

- *The correct toll-free number for Optical Media International is 800/347-2664 ("Desktop CD-ROM Publishing," March 1995).*
- *The April 1995 article "Meeting the E-Mail Challenge" incorrectly states that CE Software's QuickMail won't run on Power Macs. QuickMail runs in emulated—not native—mode on Power Macs.*
- *Both our review of Nisus Writer and the article "Word Processing Powerhouses" (March 1995) incorrectly state that Nisus Writer can't generate multilevel indexes. Nisus Writer can generate both single- and multilevel indexes.*
- *The descriptions of Apple's TSOP and SOJ chips* (PowerBook Notes, *April 1995) were inadvertently reversed.*
- *The FWB SledgeHammer2000-FMF RAID system's capacity and price per gigabyte are incorrectly listed in "The RAID Option," April 1995. The correct capacity is 2.0GB, with a per-gigabyte price of $1180.*
- *The "unnamed company" that will provide support for Apple's Mobile Messaging System* (In Brief, News, *March 1995) is The National Dispatch Center, 619/654-9000.*
- *The correct toll-free number for Motorola is 800/894-7353 ("Newton with a Radio,"* In Brief, News, *April 1995).*

MW EDITORS' CHOICE

Two other drives deserved an Editors' Choice pick for RAID 0 in "The RAID Option" (April 1995). They are:

Joule RAID Competitive pricing and fast performance from an experienced storage specialist. **Company:** La Cie (503/520-9000). **List price:** $2999.

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complex for Levy, maybe he should just stick to MacWrite. It's small and only takes 10 seconds to load on a Centris 610.

William A. Hodena
Eau Claire, Wisconsin

The Scoop on MacWrite Pro

I GREATLY ENJOYED "LEAN WRITERS" (March 1995). Do you have solid information that Claris intends to continue MacWrite Pro? It's been widely rumored both in the Claris support area on America Online and in ZiffNet/Mac that the product will be either abandoned or folded into ClarisWorks 4.

Michael Jay Friedman
via America Online

According to a company spokesperson, Claris has no plans at this time to discontinue MacWrite Pro.—Ed.

Desktop CD-ROM Publishing

RECENTLY OUR COMPANY BOUGHT a Yamaha CDR-100 [the internal version of the drive featured] with Toast 2.5, and we couldn't be happier!

Unlike your findings, we did not go through many bad CDs ("Desktop CD-ROM Publishing," March 1995). We found that a bad CD gets written at the same ratio, 1:10, as a bad floppy. The software is extremely easy to use and the documentation well written (the software is from Germany and the translation was off at times, but we knew what they meant).

Your article mentions that the software is from Plasmon. The software we received is made by Astarte.

Although I haven't actually tested any other software or hardware (a little difficult at an average of $6000 a pop), I would definitely have suggested Toast as the way to go, instead of leaving the Editors' Choice open as you did.

Richard Donagrandi
via America Online

We're glad you're satisfied. We had less trouble with Toast than with some other programs, but considering its price we didn't feel it deserved selection as Editors' Choice.

As the article stated, Astarte's Toast is sold by OptImage as CD-It All. A number of companies now bundle Toast with their CD-R drives. When we wrote the article, Astarte hadn't made Toast available in the United States as a separate package.—Jim Feeley

LaserWriter Confusion

COULD YOU CLEAR UP A DISCREPancy on the LaserWriter 16/600 PS that was reviewed in the March 1995 issue of *Macworld* and in the February 1995 issue of your sister magazine *PC World* ("Laser Printers: The Price Is Right")? In *Macworld*, the 16/600 was tested as a "workgroup" printer against other "workgroup" printers, but in *PC World* it is tested as a "network" printer against other "network" printers (such as the HP 4MV, not the HP 4MPlus).

The bigger question is how there can be so much of a subjective swing that

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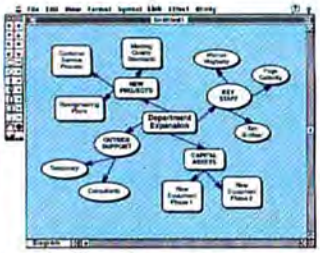

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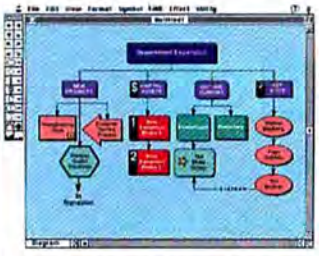

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Macworld states that there is "unimpressive" printout quality, while *PC World* states that "the LaserWriter 16/600 PS produced the best 600-dpi output of any printer. Text clarity was superb all the way down to 4 points, and scanned photographs retained subtle grays." *Macworld* did not seemed impressed by the text output upon "closer examination" or even scanned-image output after the PhotoGrade upgrade. I guess it's time for me to go check out the printer in person.

G. Yeong
via the Internet

PC World categorized workhorse (read workgroup) printers as $750 to $2000, 8 to 12 ppm, and with a paper capacity of 250 sheets or more; it categorized network printers as networkable higher-end workgroup printers with speeds from 16 to 20 ppm. *Macworld* makes no distinction between workhorse and network printers—we think all business printers should be networkable.

But to address your bigger question: why "unimpressive"? We didn't mean to imply that the output was below-standard—we just felt it should be better than that of the LaserWriter Pro 630, the printer it replaced. As our reviewers stated, the 16/600 didn't do as well as the Pro 630 on our line-art test. PhotoGrade, which should enhance scanned images, had no effect on the 16/600—again, unlike the 630. Our last gripe about the 16/600's output concerns the paper trays—350 sheets for a high-speed workgroup printer is unimpressive. We would've been more impressed if the optional 500-sheet paper tray were standard.—Ed.

MIDI on My Mind

I WAS OVERJOYED TO FIND "TWO MIDI Sequencing Programs," the first article I remember reading on serious music software for the Mac (*Reviews*, March 1995). My joy was short-lived, however, after reading the somewhat narrow-sighted review, which completely ignores Emagic's Logic, a direct competitor with both Performer and Vision. In many respects Logic exceeds both packages, with features such as audible scrubbing and real-time playback quantization, along with a fully functional notation capability that produces much better simple music printouts in a pinch.

I know that not every product can be featured in every issue; however, in a specialized market such as professional-level MIDI sequencing, the few competing players should be given an equal voice regardless of the size of the company behind them. Emagic offers the most personal support I've found from a software company—most likely because the company was formed by the programmers.

It's strange that with the Mac as the industry standard for music applications it is so hard to find hardware and software reviews in the leading consumer publications. Please don't let this review become a lone island in the sea of *Macworld*.

Brian Campbell
Denton, Texas

Our review wasn't meant to cover the entire MIDI market, just the two products reviewed, Performer and Vision. Readers who are curious about Logic can reach Emagic at 916/477-1051.—Ed.

FTP, FPU Confusion

A LETTER FROM FERNANDO LOZANO claims that a beta of Netscape is available from **ftp.mcom.com** under the **/netscape/mac** directory (*Letters*, March 1995). When I try to log on to that FTP, however, I am asked for a user name and password. Where do I get these?

Bruce Williams
Albuquerque, New Mexico

Sorry for the confusion. Here's what you do: log on as anonymous and you won't need a password. Netscape Navigator is currently version 1.0 and is free to educators and nonprofit groups.—Ed.

I NOTICED SOME PRE-POWERPC PROgrams do not recognize the Power Mac's FPU. Is there an extension or utility that can help?

Scott Proctor
via the Internet

Pay your $20 shareware fee for John Neil's SoftwareFPU and he'll send you the Power Mac–native, registered version.—Ed.

Hanover, Where?

ONE BRIEF CORRECTION TO STEVEN Levy's otherwise excellent article on digital signatures (*The Iconoclast*, February 1995): despite President Freedman's best efforts, Dartmouth is still a college, not a university.

C. Walker Page
via the Internet

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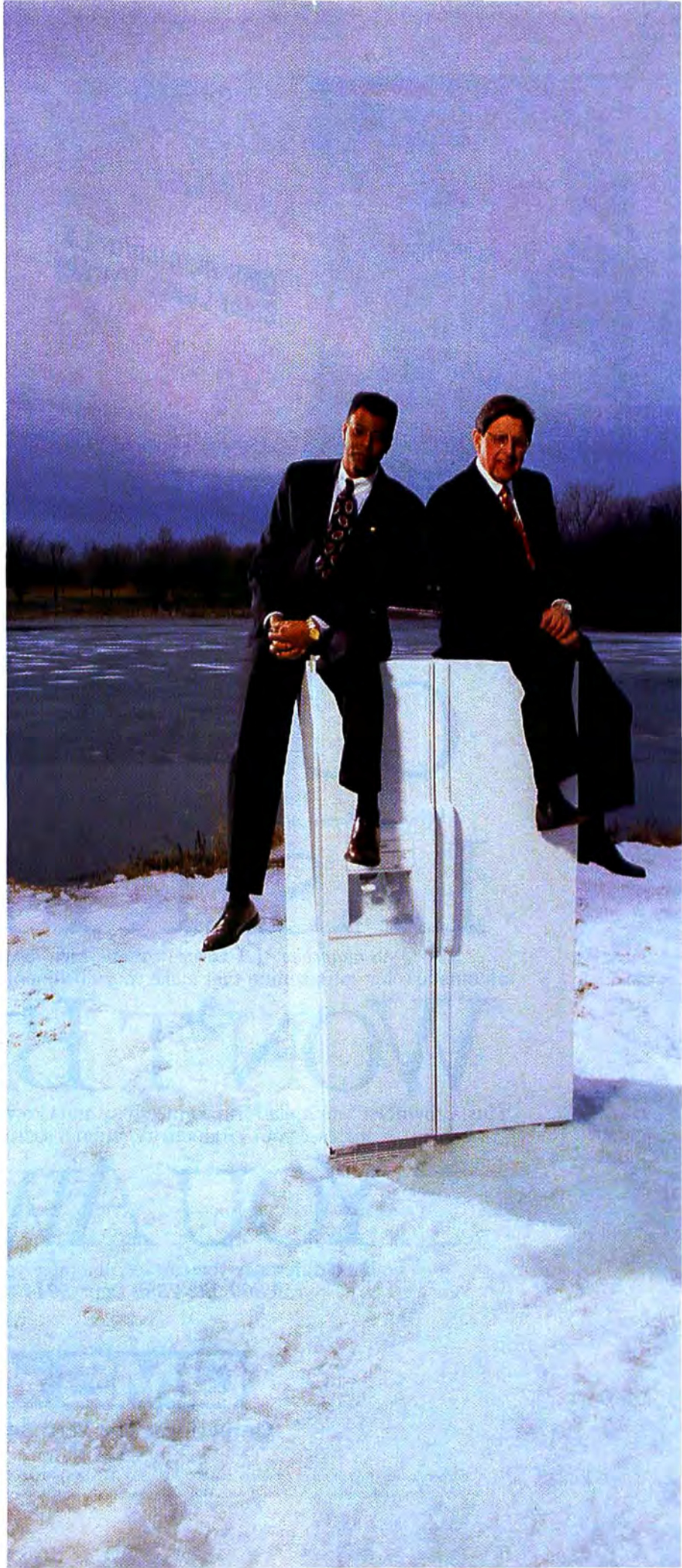

Erv Barnes (left), Director of Information Technology, and Ed Herrelko (right), Executive Vice President of Group Sales, at Whirlpool Corporation, Benton Harbor, Michigan

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–Ed Herrelko

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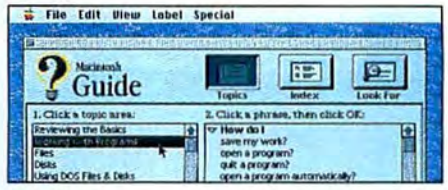

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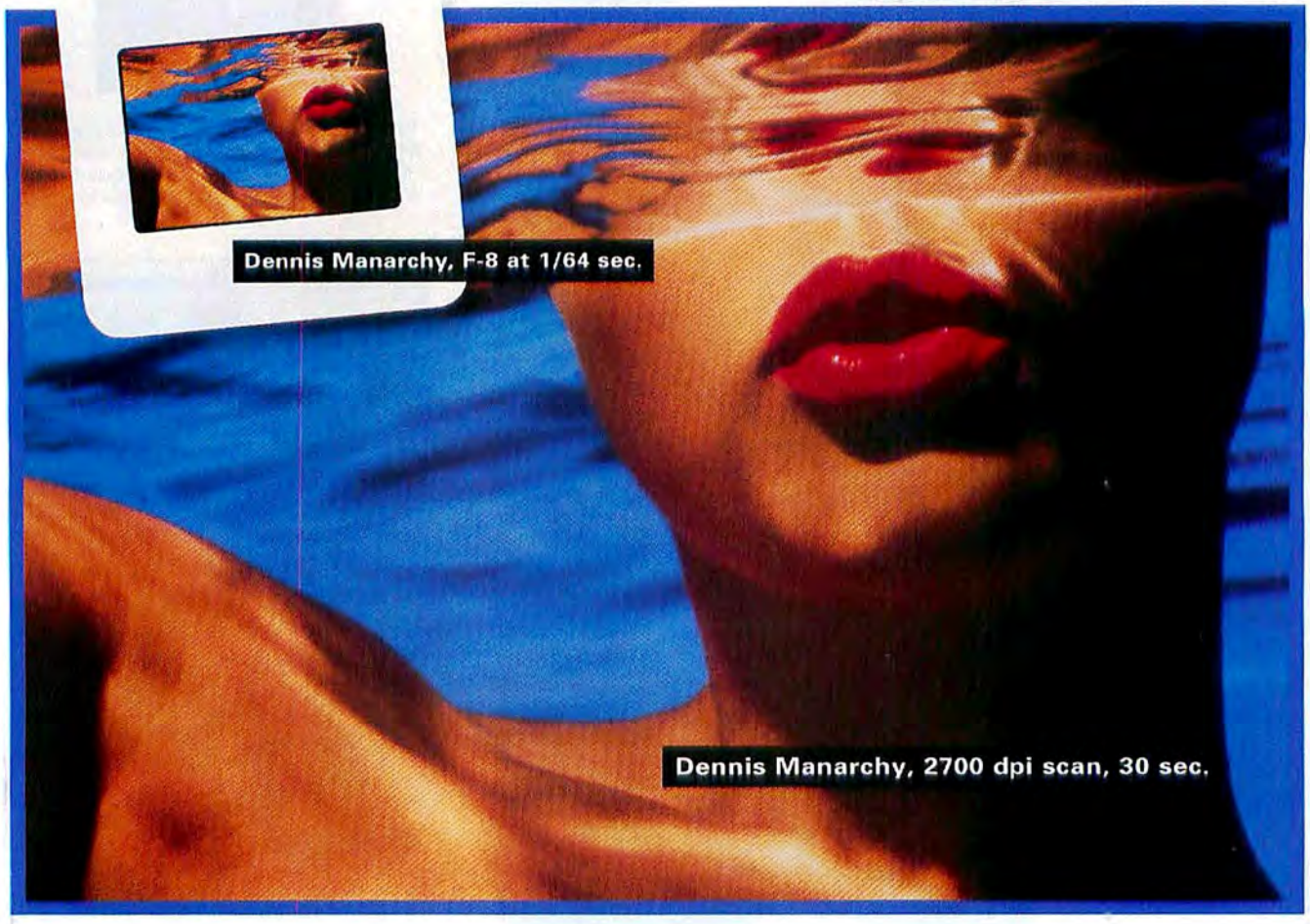
The only thing missing is the wait.



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Circle 295 on reader service card

LATE-BREAKING NEWS

MacBulletin

System 7.5 Update: Problems Abound Users report problems with Apple's system update, 7.5.1. It is incompatible with clock-boosters from KS Labs and Newer Technology and with DayStar's PowerPC upgrade card. KS Labs and Newer have released fixes; DayStar said a patch would be available in early April. With System 7.5.1 installed, Symantec's MacTools Trashback crashes at shutdown. Aladdin System's StuffIt SpaceSaver may make files invisible; SpeedyFinder 7 may not load; files on CD-ROM drives may disappear under Connectix's RAM Doubler 1.5.1; and Metrowerk's CodeWarrior PowerPC debugger conflicts with the update. Symantec and Metrowerks have updates; Connectix is working on a fix; and at press time, Aladdin had not determined the source of the problem. Aladdin, 408/761-6200; Connectix, 415/571-5100; DayStar, 404/967-2077; KS Labs, 614/374-5665; Metrowerks, 512/346-1935; Newer Technology, 316/685-4904; Symantec, 503/334-6054.

Apple Reorganizes, Diery Resigns Saying it intends to focus on its areas of traditional strength and competitive advantage, Apple Computer recently reorganized into four divisions. The areas of focus will be home, education, business, and entertainment. The divisions are worldwide marketing and customer solutions; worldwide research and development group; sales and customer support; and manufacturing and distribution. At the same time, executive vice president Ian Diery, who had been in charge of hardware at Apple, resigned.

The Fastest Mac on Earth In April Apple Computer plans to ship Apple Workgroup Server (AWS) models based on faster PowerPC 601 chips. The CPU in the new AWS 9150 will run at 120MHz, faster than any other Mac. The CPU in the revised AWS 8150 will run at 110MHz; in the 6150 it will run at 66MHz. The company estimates that prices will range from $2549 to $8709, depending on the configuration.

Adobe, Netscape Join Forces Adobe has joined with Netscape Communications to integrate Acrobat, Adobe's portable-document software, and Netscape Navigator, Netscape's browser for the World Wide Web. Adobe's Acrobat WebLink, a plug-in for version 1.1 of Netscape, will let users link Acrobat PDF (portable-document format) documents to other documents on the Internet. A future version of Navigator will display Acrobat documents. Finally, Adobe says a future version of PageMaker will output HTML documents. Adobe, 415/961-4400; Netscape, 415/528-2555.

Microsoft Countersues over Video for Windows Responding to Apple's latest copyright-infringement lawsuit (see *MacBulletin*, May 1995), Microsoft has filed a countersuit maintaining that it did not use any of Apple's QuickTime for Windows code in its rival product, Video for Windows, and Apple is trying to lure developers away by posting online notices calling it inferior to QuickTime for Windows.

Publish on the Internet or Perish Four companies recently announced plans to turn Macintosh systems into World Wide Web corporate-information servers for the Internet. Starting in May, Apple plans to bundle Web-site software with Apple Workgroup Servers. Delphic Software's ALI Internet Server ($995 to $1995 list price) is due by fall 1995. InterCon Systems' InterServer ($795 list) is due this spring. StarNine Technologies plans to ship by summer separate products that offer HTTP Web service, Web service plus commercial transaction support, and information publishing. Apple Computer, 408/996-1010; Delphic Software, 909/792-7932; InterCon Systems, 703/709-5500; StarNine Technologies, 510/649-4949. m

News

EDITED BY TOM MORAN

IN THIS ISSUE

p. 36 AOL's Piracy Response **p. 37** Beyond 4× CD-ROM **p. 37** New DOS-Equipped Mac
p. 41 PowerPC Speedup Secrets **p. 116** Improved Color Matching
p. 122 Easier Videoconferencing **p. 123** First Word 6.0.1 Tests **p. 134** Networking with PCI

The Sleekest Desktop Mac Yet

PAUL FRANZ-MOORE

Driving desktop computer design to new heights, Apple is bringing out the Power Macintosh 5200/75 LC, a 75MHz PowerPC 603–based all-in-one system that looks more like a monitor with disk drives than the expandable computer it is. In fact, the Power Mac 5200 is not much bigger than a 15-inch monitor alone.

Despite the awkward name, this mass-market Mac combines much of the sleek look of the Apple AudioVision 14 Display with a system similar in features to the 68040-based 630 series. But the Power Mac 5200 is the first Macintosh to use the new PowerPC 603 processor, a low-power variant of the PowerPC CPU line. With the 256K external cache, the 603-based 5200 offers roughly equivalent performance to that of a 60MHz 601-based Power Mac (see the benchmarks, "How Fast Is the 5200?" in this section).

603 versus 601 Why is a 75MHz 603-based Power Mac slower than a 66MHz 601-based Power Mac? There are three main reasons.

- The Power Mac 5200 transfers data from the CPU chip to memory 32 bits at a time; the other Power Macs transfer the data 64 bits at a time. Although the processor still runs an internal 64-bit bus, the 32-bit bus built into the motherboard means that many I/O functions outside the processor happen half as fast as they would with a 64-bit bus.
- The 5200's system bus runs at 25MHz, while the Power Mac 6100/60's system bus runs at 30MHz and the 6100/66's system bus runs at 33MHz. The 5200's slower bus slows down overall data transfer and thus reduces the whole system's efficiency.
- The 603 is simply not as fast as the 601, partly because of its internal cache design. The 5200, with its 603 CPU and 256K external cache, just manages to keep up with the 6100/60, which has a 601 CPU and no cache. Add a 256K cache to the 6100/60 and the performance difference becomes very apparent, as Macworld Lab's benchmarks show.

However, while the 75-MHz 5200 may not deliver as much speed as users might first expect, at an estimated

price under $2000, the 5200 compares favorably with a Power Mac 6100/66, which would cost about $2600 for an equivalent configuration.

Apple expects to begin shipping the Power Mac 5200 on April 3, 1995, as an LC model, with prices starting at $1699. The LC line is available only to education buyers. But historically, the introduction of LCs is followed by Performa models available to all consumers, usually in a few months as manufacturing volumes increase. Apple hinted this would be true also for the 5200. *Macworld* expects a Performa version before September. And while the Performa usually costs several hundred dollars more, it also includes more bundled software than the LC equivalent.

Packed with Options The 47-pound system will come with System 7.5, 8MB of RAM, a 500MB internal IDE hard drive, and an AppleCD 300i double-speed CD-ROM drive. The 5200 has the same type of communications slot, LC III–style PDS slot, video-in slot, and TV tuner slot (so you can watch TV in a window) as the Quadra 630 has. Although the 5200 system shares many fea-

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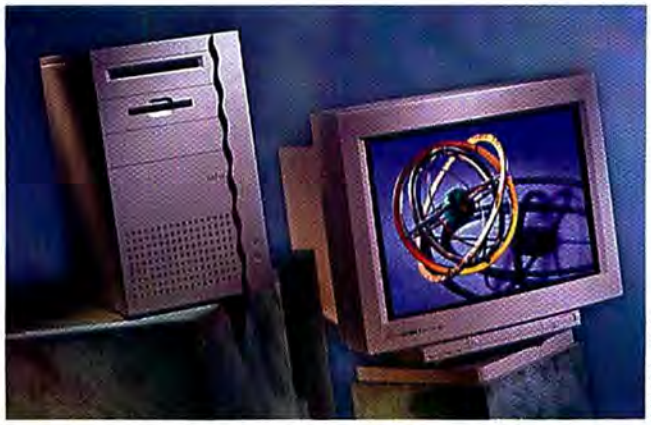

KEVIN CANDLAND

The Radius System 100, based on a Power Mac 8100/110 motherboard, is optimized for image manipulation.

Radius and DayStar Clones

FOCUS ON SYSTEMS FOR PROFESSIONAL PUBLISHERS

Apple should have some serious competition in the high-end desktop publishing market later this year as both Radius and DayStar Digital bring out Mac clones for professional publishers. Radius's first offering is aimed at image editors, while DayStar is using the first implementation of multiprocessing technology on the Mac to aid in several types of media creation.

Radius's Image-Editing Clone Macworld Lab tested a prototype of the Radius System 100, a workstation tuned for image manipulation and based on a Power Mac 8100/110 motherboard. Because it uses an Apple motherboard, the Radius Mac performed as expected—nearly identical in speed to a comparably equipped Power Mac 8100/110 (see the benchmarks "The Radius System 100: A Little Faster"). Also as expected, spot checks on compatibility revealed no problems.

The Radius system will ship in late April or early May, although it will not be available in volume until July, according to Radius. The first few systems out the door will be based on the slower, 8100/80 motherboard, but most of those will be used as dealer demo units.

The System 100 will ship with an FWB JackHammer SCSI accelerator, two hard drives (2GB and 500MB), 40MB or more of RAM (the system we tested had 40MB), a Radius Thunder IV GX-1600 video card (which replaces Apple's standard video card), a double-speed CD-ROM drive, Adobe Photoshop, and Radius Color Composer, as well as a Radius-labeled third-party keyboard and mouse.

Radius expects to sell its system for the same price as, or a little less than, a comparably configured Power Mac 8100/110. At press time, it cost about $11,000 to $12,000

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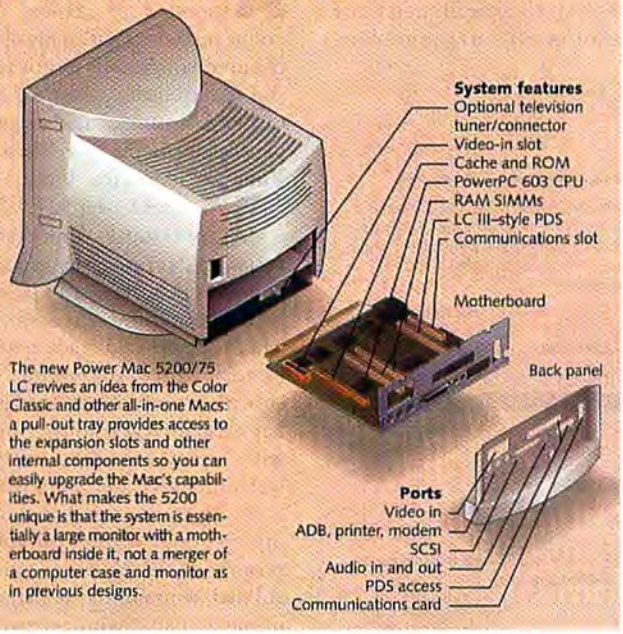
A Look Inside the 5200



The new Power Mac 5200/75 LC revives an idea from the Color Classic and other all-in-one Macs: a pull-out tray provides access to the expansion slots and other internal components so you can easily upgrade the Mac's capabilities. What makes the 5200 unique is that the system is essentially a large monitor with a motherboard inside it, not a merger of a computer case and monitor as in previous designs.

In Brief

HP Recalls OfficeJets

Hewlett-Packard is recalling 10,000 OfficeJet printers that have a manufacturing defect that could cause a severe electrical shock. HP says it detected the potential problem during routine testing and has not received any reports of related injuries. Owners of units with serial numbers beginning with US4B1 to US4B9, US4BA to US4BU, US4C1 to US4C9, and US4CA to US4CK can get a free replacement by calling 800/233-8999.

Some Prices Fall, Some Rise

Apple has reduced prices on five high-end 500-series PowerBooks by about 15 percent, cuts that are comparable to those in the PC notebook computer market. Pinnacle Micro reduced the Sierra 1.3 Gigabyte erasable optical drive by $500, to $2495. Reply Corporation has raised the price of its 66MHz 486DX2-based DOS board for 040 Macs from $599 to $699. Prices for its other DOS-on-Mac products remain unchanged. Apple, 408/942-4804; Pinnacle Micro, 714/727-3300; Reply, 408/942-4804.

New Conflict Catcher

Casady & Greene has tweaked its extension-taming software into a third version. Using the Intuition feature, users can quickly single out and test suspicious start-up files. Two new features help users be better informed: View Info displays descriptions of many start-up files, including version number, and Conflict Catcher 3 can attach name labels to start-up icons. Conflict Catcher 3 retails for $99.95. 408/484-9228.

Mouse Crashes Power Mac

Using a Kensington ADB Turbo Mouse trackball that's older than the current 4.0 version can crash your Power Macintosh, according to the company, since previous versions were designed before the Power Macs shipped. Kensington is offering special upgrade pricing to Power Mac owners. 415/572-2700.

THE AMCOEX INDEX OF USED MACINTOSH PRICES

Machine/RAM/Hard Drive	Average Sale Price	Monthly Change
PowerBook 100/4MB/20MB	$400	–$50
PowerBook 140/4MB/40MB	$675	+$25
PowerBook 180/4MB/80MB	$1525	–$25
PowerBook Duo 230/4MB/80MB	$825	$0
Mac Classic/2MB/40MB	$325	–$25
Mac SE/30/2MB/40MB	$525	+$25
Mac LC II/4MB/40MB	$400	–$25
Mac IIsi/3MB/40MB	$400	–$25
Mac IIci/4MB/80MB	$625	$0
Mac IIfx/4MB/80MB	$700	–$50
Centris 650/8MB/230MB	$1225	–$25
Quadra 900/8MB/160MB	$1900	$0

Index provided by the American Computer Exchange of Atlanta (800/786-0717). It reflects sales during week of March 20. Configurations include keyboard and exclude monitor and display board for noncompact models.

for users to build a comparable 8100/110 system by buying the components separately.

Radius is betting that publishers and digital-imaging professionals will choose Radius's preconfigured and optimized system (with specialized service and support) over the option of assembling their own system.

The company plans to announce a video-editing clone soon that could ship in July or August. That system would include special video hardware and software, and most likely Level 0 RAID storage, and would ship in rack-mounted or desktop versions. By July, Radius plans to build its own motherboards for both systems, although those boards will be nearly identical initially to Apple equivalents.

DayStar's Multiprocessor Clone DayStar Digital announced in late March that it will ship PCI-based Power Mac clones in August that use single or dual PowerPC 604 CPUs. In each instance, the CPU will reside on a daughterboard so users can easily switch to faster CPUs later. Internal Apple documents show that Apple has similar plans for its PCI systems, although the company would not confirm this. DayStar's Genesis MP tower systems—designed for compute-intensive publishing, image manipulation, animation, and rendering—will cost between $5000 and $10,000, depending on model and configuration, according to DayStar.

The DayStar dual-CPU unit, based on its nPower multiprocessor architecture, will be the only available Mac-compatible multiprocessor computer using PowerPC technology. (Radius offers its Rocket 68040 add-on cards for multiprocessing on older Macs.)

The DayStar machines will ship with 32MB of RAM (expandable to 512MB or more), three or more PCI slots, eight internal expansion bays (including those filled by the CD-ROM, floppy, and hard drives), and DayStar's Colorimeter 24 and ColorMatch software. DayStar will also include extensions to its color-management tools and Photoshop that enable multiprocessor computing. DayStar eventually intends to ship machines using up to four CPUs.

The Mac OS does not support true multiprocessing, so how does DayStar get around that problem? Its nPower creates a program interface that establishes a primary CPU to run all Mac OS toolbox operations, according to product manager David Methven. But applications updated for the purpose will be able to split up compute-intensive tasks, such as rendering and photo retouching (which typically don't make a lot of calls to the toolbox), between the two CPUs. Having the two CPUs work concurrently should nearly double performance. Because the CPU daughterboard is on the system bus, each processor has the same access to the motherboard memory; the second CPU does not have to work through the primary processor, which reduces system overhead in coordinating the two CPUs.

DayStar is targeting the Genesis MP for media publishers, which includes people who work with prepress, 3-D, and animation.—CHARLES PILLER

MATT WALTON

AOL's Piracy Woes

ATTACK AND COUNTERATTACK

America Online has responded to actions of online pirates who illegally distributed commercial software and harassed the author of an earlier *Macworld* article exposing their activities (see "Piracy Ring on America Online," *News, Macworld,* March 1995).

As previously reported, software pirates routinely abuse AOL's start-up kits to gain anonymous accounts, which they use to trade commercial software online. A subculture of young traders has arisen; rival trading rings with spicy-sounding titles welcome only members with a proven track record of anteing up good "warez" (pirated programs). Blacklists are circulated, containing the names of participants who received

MW LAB The Radius System 100: A Little Faster

Results are times as fast as a Power Mac 8100/110 (8100/110 = 1.0). Longer bars are better.

	Overall Score Indicates typical performance in a mixed-use environment, such as a company or school.	CPU-Intensive Indicates performance for most business and personal tasks.	FPU-Intensive Indicates performance for analytical, 3-D, and other specialized uses.	Disk-Intensive Indicates performance of the Mac's data-transfer capability, which affects all users.	Photoshop Shows the benefit of the DSP acceleration when using Photoshop.
Radius System 100	1.2	1.3	1.2	1.0	2.2
Power Mac 8100/110*	1.2	1.3	1.2	1.0	2.1
Power Mac 8100/110	1.0	1.0	1.0	1.0	1.0

**With a configuration similar to the Radius System 100's (Thunder IV GX-1600, SCSI JackHammer, Seagate Barracuda drive).*

BEHIND OUR TESTS

Macworld Lab tested operations in nine applications plus the Finder and then ranked the results against the performance of a standard Power Mac 8100/110. We then combined those rankings into three basic performance areas. The CPU-Intensive tasks evaluate the Mac's essential computing performance; the FPU-Intensive tasks gauge performance for tasks that take advantage of the floating-point unit; and the Disk-Intensive tasks gauge the performance you'll get for launching programs, opening and closing files, and copying files. The overall results combine the results of the CPU, FPU, and disk tests, giving the CPU results 60 percent of the overall score and the FPU and disk results 20 percent each. Macworld Lab ran 32 additional tests in Photoshop to demonstrate the performance gain with the use of DSP chips. These tests ranged from Gaussian blurs to Unsharp Mask. All three systems used 40MB of RAM, a disk cache set at 96K, and a 21-inch monitor with a resolution of 1024 by 768 in 24-bit mode under System 7.5 with standard extensions. These results are not comparable with other recent *Macworld* benchmarks.—**Macworld Lab testing supervised by Mark Hurlow and Danny Lee**

good software but failed to reciprocate. At almost all hours of the day, private electronic "rooms" are created for the purpose of trading; using a pseudonymous temporary account, *Macworld* was offered $900 worth of commercial software by E-mail within 15 minutes of arriving in such a room.

Perhaps worse, increasing numbers of these anonymous traders are graduating to hacker status. Using freely circulated instruction sheets and macro kits, they have learned to access private AOL staff areas, corrupt message areas, and even delete or cancel members' accounts. One set of hint sheets *Macworld* received provides step-by-step instructions for the following:

- obtaining new members' passwords (by convincing them that the hacker is an AOL staff member)
- obtaining working credit card numbers (to gain further free AOL access and to order equipment by mail order)
- "dubbing"—editing members' typed comments in chat rooms, to make them appear to say things they never actually said
- sending a "mail bomb"—automatically generated duplicate messages, sent to a victim's mailbox by the hundreds, until that mailbox is full
- causing another member's hard drive to thrash incessantly (on Windows PCs only)

The loopholes for hackers and freeloaders may be closing, however. America Online is reluctant to discuss specifics of its counterattack, for fear of giving miscreants advance warning. However, many of the live Mac-software trading rooms are being shut down almost as soon as they're formed; others are often visited by "narcs" posing as traders. New accounts started with phony credit cards are being cut off more promptly, and various other card-verification schemes are in place. "When we become aware of [start-up kit] certificate numbers that are continually being reused, we take appropriate action," said Pam McGraw, spokeswoman for AOL.

AOL has now developed the ability to resurrect a screen name that's been deleted by the hackers, and is rumored to have call-tracing technology in the works. And while AOL won't confirm it, a knowledgeable source told *Macworld* that several of the worst offenders have been caught and slapped with large fines. According to this source, one of the pirates even landed in jail.—MACWORLD STAFF

BUGS & TURKEYS

Illustrations copied from Macromedia FreeHand 5.0 and pasted into other apps such as Word show up on screen but not in printed documents. Macromedia says it is working on a fix. In the meantime you can save your FreeHand drawing to disk and then insert or place that file in your new document. Avoid copy and paste.

You've been slaving over an Excel 5.0 spreadsheet and saving diligently. Then your three-year-old pulls the plug on your Mac. Zap! No problem. You've been saving, right? Wrong. Excel 5.0's save function saves to a disk cache in memory and doesn't save to the hard disk until the cache is full or until you close the application or window. The fix is part of the Excel 5.0a upgrade, which Microsoft promises will be available by the time you read this. Get it online or call Microsoft at 206/454-2030.

Contrary to earlier promises, Radius doesn't plan to make its VideoSpigot and Spigot II Tape digital-video boards compatible with QuickTime 2.0. Radius technical support says that if enough users complain, Radius may change its mind. Send E-mail to **support@radius.com**. Radius still plans an April 1995 software update designed to make SpigotPower AV compatible with QuickTime 2.0.

Macworld will send you a Bug Report T-shirt if you are the first to inform us of a serious, reproducible bug that we report in this column, or a Turkey Shoot T-Shirt if we shoot your turkey in this space. See *How to Contact Macworld.*

The Latest Spin on CD-ROMs

LOOKING BEYOND 4× DRIVES

Quad-speed (4×) CD-ROM drives are beginning to arrive on the scene in force, and as a result the double-speed drive—which replaced the single-speed drive a few years back—is beginning its descent into oblivion. But as this happens, possible successors to 4× drives are on the horizon and promise to make the 2×-to-4× transition more interesting.

Plextor, for instance, has announced what it says is the first 6× CD-ROM drive. The 6Plex, an internal SCSI-2 drive based on a mechanism from Shinano-Kenshi (Plextor's parent company), promises transfer rates of 900 kilobytes per second (KBps) or more—six times that of the original single-speed, 150-KBps drives.

Plextor attributes the speed increases to a faster spindle motor. Access time should be about 145 milliseconds, the company says. (Most 4× drives' access speeds are 150ms to 200ms.)

The drive, expected to ship in April 1995, will have a 256K data buffer and will list for $599. An external ver-

continues

Apple Expands 040 Line

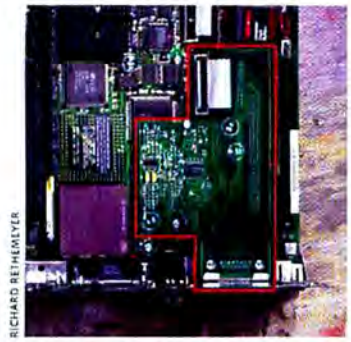
ADDS DOS TO THE 630, UPDATES THE 575

Although Apple's focus is now clearly on Power Macs, the company has also taken another cross-platform step, unveiling the Macintosh LC 630 DOS Compatible, essentially a 630 with a 66MHz 486DX2-based PC card built in. It will ship with System 7.5, MS-DOS 6.22, Windows 3.1, a 500MB IDE hard drive, 8MB of RAM on the Mac motherboard, 4MB of RAM on the DOS board, SoundBlaster, joystick port, and DOS-compatible serial and parallel ports. Its preliminary price as an LC model (for the education market) is $1899. A Performa model will likely ship by September for a few hundred dollars more.

Apple cannot offer owners of the current 630 models this DOS board: Apple put the PC video circuitry on the new 630's motherboard, not on the DOS board, and current 630 models wouldn't have this necessary circuitry.

Apple also introduced the LC 580, basically an update to the 575 with 8MB of RAM (now expandable up to 52MB), a 500MB IDE hard drive, a video-in slot (for 630-like TV), and an external video connector for mirror mode (useful for presentations or classrooms). It has a preliminary price of $1199. A Performa model should ship later this year.

The LC 580 and the LC 630 DOS Compatible should ship to the education market on April 3, 1995.—T.M.



RICHARD REINHEIMER

Two daughterboards (outlined) and on-board VGA video let this version of the Quadra 630 run PC programs.

KEVIN CANDLAND

Panasonic's new quad-speed CD-ROM drive can also read and write a new type of 650MB optical disk.

sion should be available this summer at a suggested list price of about $699, according to Plextor.

PLI expects to ship in May 1995 its $1295, 15× QuickCD system, which promises data-transfer rates up to 15 times that of a single-speed drive (2.25MB per second) and an access time under 40ms. The standard system incorporates a 4× CD-ROM drive, an internal 540MB hard drive for caching, a Motorola 68000 processor, two SCSI processors, a 1MB cache, and two SCSI-2 read channels.

The combination of these technologies should help the drive achieve 15× performance even though it uses a 4× mechanism, PLI says. This level of performance would benefit information retrieval, such as for CD-based databases. The effects on motion video would be less pronounced (mainly somewhat smoother motion and transitions), since CD titles are typically developed to run at a specific rate, and the speed of the Mac also limits the video playback (for more on 4× CD-ROMs, see the feature "Quad-Speed CD-ROM Drives," in this issue).

The QuickCD, which will ship with CharisMac driver-caching software, will automatically cache a CD's directory and other frequently requested information on the internal hard drive to accelerate performance. PLI says alternate versions of the QuickCD will also be available: a lower-price model with a 2× CD-ROM drive and a 270MB hard drive (about $1195) and a version with 4× CD-ROM drive and 670MB (about $1395), a setup that would let you cache a CD's entire contents.

Also in May, Panasonic plans to ship the PD, which the company says is the first product to give a rewritable, 650MB phase-change optical drive the ability to read CDs (and at 4× speeds). Matsushita, Panasonic's parent company, developed a new micro-optical head to handle both media within the same drive. The PD will be available in both internal ($749) and external ($849) versions.

In addition, Panasonic has announced a portable 2× CD-ROM drive, the KXL-D720, which connects to a PowerBook 500 model via a PC Card (formerly called the PCMCIA card). The new drive should retail for about $400; Panasonic expects to begin shipping it by June. Panasonic, 201/348-7000; Plextor, 408/980-1838; PLI, 510/657-2211.

—JAMES A. MARTIN

"SLEEK DESKTOP" *continued*

tures with the 630 series, Apple added a second 72-pin SIMM socket so the new all-in-one machine has a maximum RAM capacity of 64MB, versus the 630's maximum of 36MB. (One of the 5200's SIMM slots comes occupied with an 8MB SIMM, so you have to replace it with a 32MB SIMM and buy a second 32MB SIMM for the other slot to get the maximum memory possible.)

Besides the usual slots for floppy and CD-ROM drives, the faceplate has the same sound-control buttons, headphone jack, and TV remote-control sensor as the 630 does. To reduce the width of the faceplate so it would fit between the speakers, Apple's engineers laid out those controls and connectors below the floppy drive instead of outside and to the right of it. Also below the floppy drive are the brightness controls, the only addition to the system faceplate. The 5200 has a microphone built into the top center of the monitor.

The monitor is a 15-inch flat-square tridot (shadow mask) display—a departure from Apple's use of Trinitron displays in earlier all-in-one models. In recent years' consumer models, Apple has been moving away from Trinitrons to the less expensive tridot technology, a transition made possible by the quality gains in tridot displays that most display makers have achieved over the last four years. With a 0.28mm dot pitch and a 75Hz refresh rate, the 5200 can display resolutions from 640 by 480 pixels to 832 by 624 pixels, and users can change resolution without restarting the system. The 5200 has 1MB of DRAM devoted to its video-frame buffer, so it supports 16-bit color at 640-by-480-pixel resolution, or 8-bit color at 832-by-624-pixel resolution. As is true for the Quadra 630 and the various Power Mac models, there is no video RAM expansion to increase color depth at the 832-by-624-pixel resolution.

The 5200's integrated tilt-and-swivel base cleverly overcomes one of the major drawbacks of previous all-in-one Macs: you can easily adjust the angle of the monitor without having to prop up or slide the entire computer. The 360-degree swivel also makes it easy to turn the system around to add expansion cards or to change connectors on the system's back panel, which is especially convenient if you're using the 5200 as a multimedia machine.—T.M.

MW LAB How Fast Is the 5200?

= Best result in test. Results are times as fast as a Centris 650 (Centris 650 = 1.0). Longer bars are better. Products are in decreasing order of overall performance.

*without cache

BEHIND OUR TESTS

Macworld Lab tested several functions in eight key programs plus the Finder to determine real-world performance for the three critical performance areas faced by most users: The CPU-Intensive tasks evaluate the Mac's essential computing performance; the FPU-Intensive tasks gauge performance for tasks that take advantage of the floating-point unit; and the Disk-Intensive tasks gauge the performance you'll get for launching programs, opening and closing files, and copying files.

We then averaged the results, giving the CPU-Intensive score 60 percent of the weight and the FPU and disk scores 20 percent each, to derive the overall performance, which gives an accurate measure for most business users of their Mac's performance. These results are comparable with recent *Macworld* benchmarks. We tested native versions of software on the Power Macs and 680X0 versions on the 040 Macs. The software included System 7.5; Adobe Illustrator 5.5, PageMaker 5.0a, Photoshop 3.0, and Premiere 4.0; Fractal Design Painter 2.0; Microsoft Excel 5.0; Specular International Infini-D 2.6; and Wolfram Research Mathematica 2.3. Our 68040 Macs had 16MB of RAM, while the Power Macs had 24MB. All systems were run with 8-bit color on 17-inch monitors.—**Macworld Lab testing supervised by Mark Hurlow and Danny Lee**

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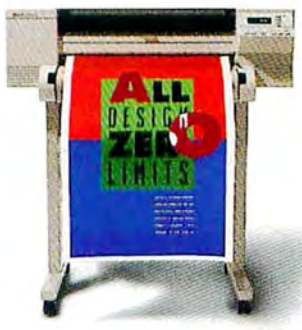

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Circle 11 on reader service card

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SEE RED.

Design: Wheeler Design
Photography: Kory Addis

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There's RED and there's RED. We see redheads and red fire engines and we paint the town red. And while a rose may be a rose, a red is not always a red. In the world of electronic publishing, this is doubly true. Scanners, monitors, and output devices define color in their own particular "languages" (called color spaces).

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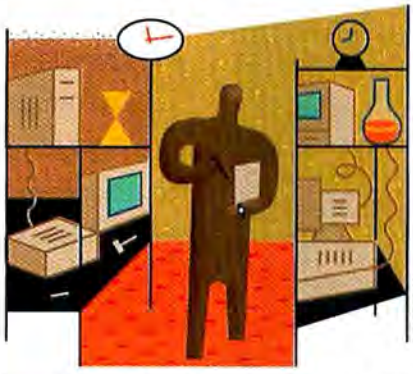
Power Mac News

Secrets of Software Speeds

WHY NOT ALL PROGRAMS RACE WITH POWERPC

With hundreds of native Power Macintosh programs now shipping, it's become clear that the performance gains compared with their 680X0 versions range from nonexistent to incredible. In a few cases, individual functions actually slow down. Why such a range of speeds on a CPU that is so much faster? Part of the reason has to do with how Apple implemented the high-compatibility 680X0-emulation environment, and part has to do with unique Power Mac speed opportunities.



DOUG ROSS

According to developers, compiler designers, and the Power Mac–tools team at Apple, three factors have big effects on speed.

• Programs that make heavy use of floating-point calculations can derive dramatic benefits from short program patches that call on a PowerPC 601's assembly language instruction to perform a single-clock-cycle multiply-and-add, says Paul Velleman, developer of the statistics program DataDesk. For example, CMYK conversion can be performed in a few clock cycles per pixel, so at 60MHz a multimegabyte color image can be processed in a small fraction of a second.

• Another numeric consideration is use of the SANE (Standard Apple Numerics Environment) toolbox—on the PowerPC it's emulated, so developers who work with native arithmetic instructions for the 601 get big speed improvements, and developers going through SANE don't.

• The third issue is leftover 680X0 code that hinders performance on a PowerPC. 680X0 programs, for example, fetch data faster from memory if the data addresses and chunk sizes follow certain rules. These alignment rules are completely different for RISC chips like the 601, and it can take four to eight times as long to swap data in memory if the 680X0 program isn't rewritten according to the new PowerPC alignment rules. If a developer merely recompiles 680X0 code for PowerPC, the compiler uses the 680X0 alignment rules; to gain the PowerPC's performance edge, developers need to rewrite, not just recompile, the code, using the native alignment rules. In the rush to get out Power Mac software, not every developer has done this. Similarly, time-honored 680X0 tricks for making faster calls to the Toolbox (the core set of built-in Mac programming routines)—once the pride of clever programmers—have to be tracked down and eliminated from Power Mac code, since the old 680X0 tricks are now much slower than direct calls to Apple's Interface Library.

According to Jordan Mattson, a software evangelist at Apple, programs that don't show the expected speed increases on computation (four to six times, and more than that on numerically intensive operations) often have problems with context switching. Apple designed the operating system to handle programs that use mixed 680X0 and native PowerPC code; thus developers don't have to port all parts of their code to native, and Apple itself hasn't yet ported some parts of the Toolbox. Compatibility isn't a problem but speed is—calling the Mixed Mode manager (context switching) from inside a section of PowerPC code uses lots of instruction cycles. If a program is written so that this kind of call occurs inside a busy loop (for example, checking during a computation to see if you have been doing anything on the keyboard or mouse), the speed penalties are discouraging.

Second-generation native programs are just now appearing—written after the desperate rush to market of the first Power Mac software—and developers have learned to avoid the pitfalls for 601 beginners. That means faster software for 601 hardware and some impressive results on the 604-based systems, which are due later this year.

—CHARLES SEITER

Power Watch

THE LATEST ON PRODUCTS FOR THE POWER MACS

Chena Software has released InfoDepot 1.2, an information-management program. 610/770-1210.

• Claris has shipped Organizer 1.0, a $99 PIM. Upgrades cost $13. 408/987-7000.

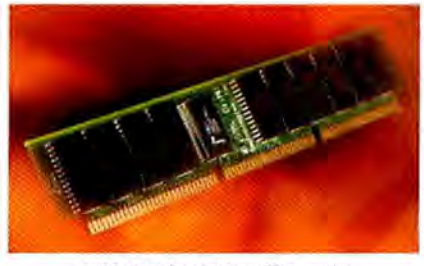
• DiiMO Technologies offers a $189 256K cache card for all Power Macintosh models. A $389 512K card and a $589 1MB card shipped in March 1995. 512/335-0421.

• MacProducts USA is shipping a CPU booster for the Power Mac 6100 and 7100. The PowerClock costs $129. The speedup will vary from system to system, based on the capabilities of the individual PowerPC CPU, but MacProducts says many systems should be accelerated to 80MHz. 512/892-4070.

• Multimedia Design has shipped mPower 2.0.1, a $295 multimedia presentation program. 704/523-9493.

• Pixel Resources has released PixelPaint Pro 3.02, a $379 image editor. 404/449-4947.

• Waterloo Maple Software has shipped Maple V Release 3, a $795 mathematical analysis program. 519/747-2373.—GALEN GRUMAN



TOM GIBSON

DiiMO Technologies offers cache cards in several capacities for Power Macs.

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Apple

*"Macintosh" and Windows users can access shared files and network printers via AppleShare and AppleShare Client for Windows software. Client software comes bundled with all Workgroup Servers. **DAT drives available on selected configurations. †Server trial program ends September 29, 1995. © 1995 Apple Computer, Inc. All rights reserved. Apple, the Apple logo, AppleShare and Macintosh are registered trademarks of Apple Computer, Inc. Mac is a trademark of Apple Computer, Inc. PowerPC is a trademark of International Business Machines Corporation, used under license therefrom. Windows is a trademark of Microsoft Corporation. All Apple products are designed to be accessible to individuals with disability. To learn more (U.S. only), call 800-776-2333 or TDD 800-833-6223.

Macworld Online

by Macworld Online Staff

Online resources may seem nearly bottomless, but your wallet isn't. No matter what your original reason for logging on—work, pleasure, a sense of community—the novelty wears thin if you're shelling out bucks waiting for screens to redraw or files to download. And if, after patiently drumming your fingers on the desktop, the resulting information is disappointing, you might be tempted to throw in the cyber towel. Take heart. Adventurers of any new frontier need maps, tools, and a willingness to back out of the odd dead end. This month, Macworld Online offers suggestions on how to optimize your online time.

Getting Your Money's Worth

This may sound obvious, but check to make sure you are logging on at the fastest speed your online service allows; purchasing a faster modem could save your pocketbook and sanity in the long run. Also, try to log on during off hours; access during peak evening hours can be ridiculously slow. And take the time to familiarize yourself with any features your service may offer that allow you to do some business offline.

Take E-mail, for example. Sending and receiving electronic missives can be a great time and money saver. You choose when to read and respond to your mail, and you can generally be more succinct online than on the telephone. For additional time savings, consider composing messages before logging on—why pay to use your service provider as a word processor? You can also have sets of E-mail addresses prepared for those inevitable batch mailings. Finally, take advantage of tools on the various online services that allow you to automate the sending and receiving of mail (FlashMail on America Online, Automated Courier on eWorld, and Navigator on CompuServe, for instance).

Just a little forethought can pay big dividends when you are searching for information online. At Macworld Online, we believe that search algorithms are second only to plumbing in advances in civilization, but it is important that you narrow your search criteria; broad searches garner unwieldy results. Similarly, when you are posting a question to carbon-based search engines (that is, other people) on a message board, be specific. Courtesy and a modicum of humor further sweeten the pot.

The vast selection of shareware online is a boon, but learn to be picky. Even a bit of modem-based sleuthing reveals that not all online content is equal. Don't be afraid to be critical. Spend your time where you consistently get the most satisfaction. Bottom line: subject your online expenditures to the same scrutiny you apply to any other budget item.

LIVE-EVENTS CALENDAR

Macworld Online continues to host real-time digital forums that feature the leading lights in the Macintosh community. We're bringing editors and writers, artists and visionaries directly to your desktop. Please come armed with questions, comments, and critiques. America Online events are on Thursdays, and eWorld events are on Wednesdays. All events are at 6 p.m. Pacific standard time.

Ask Cary Lu
May 3, eWorld
In his monthly *PowerBook Notes* column, contributing editor Cary Lu covers mobile- and remote-computing issues. Online, Cary addresses a wide variety of computing topics.

Troubleshooting with Pogue
May 4, AOL
Desktop Critic columnist David Pogue knows the deepest secrets hidden inside your Macintosh. Meet him for this monthly troubleshooting free-for-all. Bring along your extension conflicts, strange bugs you have found, and off-the-wall questions.

Guy Kawasaki
May 11, AOL
Just about everyone in the Mac community has an opinion about *Macworld* columnist Guy Kawasaki, but that's OK, because Guy's got opinions on just about everything else. And he's not shy about sharing them, so join us for an hour with *Macworld*'s Wise Guy.

Costa's Clinic
May 17, eWorld
Join Macworld Online's own Steve Costa for a walk-in Mac clinic. Steve will help you tune up your computer, choose great shareware, and give you the lowdown on all things Macintosh.

Macs Meet the Avant-Garde
May 18, AOL
Performance artist Matt Heckert has relied on Macs to control everything from Survival Research Labs' metamachines to Mechanical Sound Orchestra performances (audio CD on Catasonic Records). Drop by to learn more about the interface between Macs and servomotor art.

Jim Heid Q&A
May 25, AOL
Contributing editor Jim Heid is a multimedia Mac maven. His columns and features for *Macworld* and his books are chock-full of great information and tips. Join Jim for an hour of Q&A on the AV Macs and more.

Shareware Picks

Shareware can serve as excellent productivity tools; witness the sampler below.

Scorpio 1.0 from Abbott Systems is a very small, very fast word processor that offers full-color text and graphics, a spelling checker, search and replace, word and character counts, and more. Scorpio runs native on Power Macs and, remarkably, it even costs less than a hardcover book (243K; $19.95).

Bill Baldridge did us all a favor when he compiled VendorDA, an easy-to-search database listing the phone and fax numbers and mailing addresses for 1368 Macintosh-related product vendors (16K; $10).

Guy Fullerton's HoverBar keeps programs and Clipboard data at your fingertips by storing your favorite apps and info along bars that float on top of open applications (44K; $5).

Maui Software's TimeTracker 2.5.1 lets you record how long you spend on a particular project or application. The fine manual helps you configure multiple time-sessions (264K; $25).

Remember, Macworld Online sez: Honor the modest requests for fees, thereby keeping these shareware authors happy and coding. m

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Keyword is Macworld

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New Products

THE LATEST MACINTOSH RELEASES

by Jim Feeley
and Joanna Pearlstein

THIS SECTION COVERS MACINTOSH PRODUCTS FORMALLY ANNOUNCED BUT NOT YET EVALUATED BY *MACWORLD*. UNLESS OTHERWISE STATED, ALL PRICES ARE SUGGESTED RETAIL AND THE MINIMUM REQUIREMENTS FOR OPERATION ARE A MAC PLUS WITH 1MB OF RAM, RUNNING SYSTEM 6. A ◐ SIGNIFIES THAT A NATIVE POWER MAC VERSION OF THE PRODUCT IS AVAILABLE. ALL INFORMATION AND PERFORMANCE CLAIMS ARE SUPPLIED BY THE PRODUCT VENDOR AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY *MACWORLD*. PLEASE CALL VENDORS FOR INFORMATION ON AVAILABILITY.

HARDWARE

Accel-a-Writer 812

Tired of getting jagged text and muddy photographs from your printer? The Accel-a-Writer 812 offers 1200-by-1200-dpi laser output and 600-by-600-dpi output in draft mode. In addition to offering special screening technology, the 812 lets users adjust an image's gamma curve before printing to fine-tune gray tones. Built around Canon's 8-pages-per-minute LBP-EX engine, this printer includes a SCSI port, ships with 16MB of RAM (upgradable to 64MB), and has a 350-sheet paper tray that handles paper up to 8½ by 14 inches. An Ethernet option that supports EtherTalk and TCP/IP is available. $3495. Xanté, 205/476-0526, 800/926-8839; fax 205/476-9421.

◐ DVC Equalizer 8100/100

Does your brand-new 8100/100 not run fast enough for you? You can accelerate it from 100MHz to 120MHz. The DVC Equalizer 8100/100 provides this speed boost by overriding the Mac's built-in clock crystal. According to the company, the device is easy to install and requires no modification of your Macintosh. $79.95. DVC hardware, 417/889-5113, 800/889-5137; fax 417/889-7980.

FS-3600A

Aimed at the networked printer market, the FS-3600A is an 18-pages-per-minute LED printer offering true 600-by-600-dpi output for about 7 cents per page. The PostScript-compatible printer includes a PCMCIA slot, a 25MHz 68040 processor, and 2MB of memory (upgradable to 66MB). Instead of a toner cartridge, the FS-3600A uses Kyocera Ecotone containers, each with enough toner for 10,000 pages. The imaging drum is rated at 300,000 pages. $3924 including AppleTalk and Ethernet board. Kyocera, 908/560-3400, 800/232-6797; fax 908/560-8380.

HP LaserJet 5MP

This low-cost laser printer offers true 600-by-600-dpi resolution with 120 gray levels, at 6 pages per minute. It can output to any size and type of medium, from 3-by-5-inch cards to legal-size paper and transparencies, and has an optional straight-through paper path for handling tricky media. The printer's built-in infrared sensor responds to print commands from nearby laptops and handheld devices—and may someday be supported by Newtons and PowerBooks. The printer includes PostScript Level 2, 3MB of RAM, and two paper trays—a 250-sheet cassette, and a 100-sheet multipurpose tray for paper and envelopes. $1299. Hewlett-Packard, 208/323-2551, 800/527-3753; fax-back service 800/333-1917.

Master CD Pro

This 4X CD recording system lets you record your own 650MB CD-ROMs in under 20 minutes. Master CD Pro comes bundled with Toast CD-ROM Pro 2.5 recording software from Astarte. Toast supports Macintosh HFS, ISO 9660, CD-ROM XA, Mac/ISO Hybrid, mixed mode, and audio formats. According to MicroNet, the system does not require a dedicated hard drive. $4995. MicroNet Technology, 714/453-6000; fax 714/453-6001.

Master CD Pro

Mirror 17-inch Trinitron Display

Good news: prices for Trinitron-technology monitors continue to drop. Mirror's low-cost 17-inch tube offers a nice crisp image (comparable to 0.25mm dot pitch). It supports Macintosh built-in video; VGA, SVGA, and XGA formats; and resolutions up to 1024-by-768 pixels at a vertical refresh rate of 75Hz. The monitor is treated with an antiglare coating and complies with the Swedish MPR II guidelines. According to Mirror, the display's microcontroller technology allows advanced color matching. $899. Mirror, 612/832-5622, 800/654-5294; fax 612/832-5709.

MultiSync XM37 and XP37

When you're performing on screen before an audience of 30 people, a 21-inch monitor just doesn't cut it. These two 37-inch behemoths are made for presentations to a large audience. Both support Mac video at pixel resolutions of 640 by 480, 832 by 624, and 1024 by 768. The XP37 adds support for 1152-by-870-pixel images. XM37 $7995; XP37 $10,995. NEC Technologies, 708/860-9500, 800/632-4636; fax-back service 800/366-0476.

PanaSync C-1591E

PanaSync C-1591E

Panasonic's 15-inch color display features a 0.27mm dot pitch and produces resolutions up to 1280 by 1024 pixels at a 69Hz vertical refresh rate. The C-1591E's on-screen control system lets you adjust image size, geometry, and color. Antiglare coating is standard, and the monitor conforms to both the EPA's Energy Star and the Swedish MPR II guidelines. $499. Panasonic Communications & Systems, 201/348-7000, 800/742-8086; no fax.

Paragon 1200 Combo

This high-resolution, low-price, 24-bit color flatbed scanner ships with an adapter for use with negatives and transparencies. The adapter has an 8-by-10-inch scanning area; the scan area for reflective images is 8½ by 14 inches. The scanner offers an optical resolution of 600 by 1200 dpi, a hardware resolution of 1200 by 1200 dpi, and a software-interpolated resolution of 2400 by 2400 dpi. The scanner bundles MicroFrontier's Color-It 3.0 and an Adobe Photoshop plug-in Acquire module. $999. Mustek, 714/250-8855; fax 714/250-3372.

RAIDbank

RAIDbank

This big box-o-gigabytes will suck up your data at a sustained rate of 6.2 MBps. Its support for RAID levels 0, 1, 3, and 5—together with support for up to six SCSI-2 Fast and Wide drive modules—makes this hot-swappable array an appealing candidate for use in networking, prepress, multimedia, and graphics environments. The cabinet—available in tower, rack-mount, and desktop configurations—includes two power supplies. Cabinet $2675; 2GB drive $1795; 4GB drive $3149. MicroNet Technology, 714/453-6100; fax 714/453-6101.

TXM-5201D

Toshiba's economical external 3.4X CD-ROM drive offers a 150ms seek time and a sustained data-transfer rate of 510 Kbps. The drive includes a SCSI-2 interface and supports multisession Kodak Photo CD. $275; XM-5201B (internal version) $200; Mac interface kit $80. Toshiba, 714/457-0777; no fax.

SOFTWARE

◐ Conflict Catcher 3

Solve INIT mysteries with the new version of Conflict Catcher from Casady & Greene. Version 3 adds descriptions of start-up files, the intelligence to guess which files might be causing conflicts, and the ability to save a conflict test in progress and resume it later. Conflict Catcher also scans for damaged files and lets you pause, restart, or shut down during start-up. Requires System 7. $99.95. Casady & Greene, 408/484-9228, 800/359-4920; fax 408/484-9218.

continues

If you spend your day creating with Media-Publishing applications then you need the maximum in speed and productivity. If you make your living at graphic design, page layout, prepress, 3D, animation or multimedia, DayStar's PowerPC upgrades are just what you need to make your aging Mac brand new again. From early '030 Macs to Quadras, name your Mac and we'll speed it up.

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CribKeeper

Keep track of your tool inventory with CribKeeper, a tool-tracking system. Targeted at large sites, such as manufacturing and construction businesses, large companies, and universities, as well as at systems integrators, the product is most effective when used in conjunction with DataDesigns' bar-coding hardware. CribKeeper scans bar-coded tools being issued to employees and keeps a log of when and to whom a tool was issued, who received it, and what project it was for. CribKeeper lets you issue receipts when tools are returned. Requires 4MB of RAM, 14-inch color monitor. $1495. DataDesigns, 210/697-0780, 800/706-0780; fax 210/697-9429.

CribKeeper

Faxcom for Macintosh

Biscom's Faxcom provides a client-server fax solution for workgroups. Users send faxes by printing them to a Macintosh server, which then processes the fax request and sends the fax to Biscom's fax server. Faxcom sends faxes from within other applications or from Faxcom itself, and prints received faxes or routes them to the designated recipient. Requires 030-based Mac, 4MB of RAM, System 7.1. License for up to 10 users $495; 50 users $1495; 100 users $2495; 250 users $4995. Biscom, 508/250-1800, 800/477-2472; fax 508/250-4449.

FontChameleon 1.5 Starter Kit

Assert your individuality with your own font set. FontChameleon 1.5 comes with 47 font descriptors that can be used to generate new font combinations. The new version also has a revised interface, supports true italic fonts, and is able to create and print type samples before you build and install fonts. Users can now adjust the heights on ascenders and descenders, capital letters, and numbers. Requires Mac II, 4MB of RAM, System 7. $55. Ares Software, 415/578-9090, 800/783-2737; fax 415/378-8999.

FontChameleon 1.5 Starter Kit

In Control for Workgroups

Groups that are trying to get their acts together may find a solution in Attain's In Control for Workgroups, a network version of the company's project-management and scheduling software. Groups can manage projects, assign tasks, and share calendars. Changes

In Control for Workgroups

made from remote locations automatically update coworker's files when the remote user hooks up again to the office network. Requires 2MB of RAM, System 7. $149.95 company's estimated price; ten-pack $949.95; upgrades $34.95. Attain, 617/776-1110, 800/925-5615; fax 617/776-1626.

LAN WorkPlace for Macintosh

Better brush up on your networking acronyms. Version 2.0 of Novell's LAN WorkPlace for Macintosh, a TCP/IP connectivity package, supports AppleScript; scripting for Telnet sessions; plus drag-and-drop file transfers between DOS, Unix, NetWare, and FTP servers. LAN Workplace now supports MacTCP, so that Macintosh users can have IP addresses. The product also includes a terminal-emulation application. Requires 2MB of RAM, 1.4MB floppy disk drive. $399; 10 users $1995; 100 users $12,995. Novell, 801/429-7000, 800/526-7820; fax 801/228-6177.

PhotoDisc Volume 14: Business and Transportation, Volume 15: Families and Lifestyles, and Volume 16: US Landmarks

These stock-photography volumes contain 24-bit TIFF images in 72-dpi and 300-dpi formats. Volume 14 (Business and Transportation) includes images of ships, trains, cars, subways, planes, and the people who use them. Volume 15 (Families and Lifestyles) contains photographs of people at home and at play, with an emphasis on ethnic and generational diversity. Volume 16 (US Landmarks) has photos of famous sites ranging from the Golden Gate Bridge to the Empire State Building. $299 each. PhotoDisc, 206/441-9355, 800/528-3472; fax 206/441-9379.

Plottergeist, PowerPlot, and PowerPlot/LT

These GDT Softworks products pave the path to more pleasing plotter output. PowerPlot lets users print detailed images on HPGL/2 or RTL plotters directly or over a network. PowerPlot/LT provides connectivity for plotters lacking a LocalTalk interface. And Plottergeist works with leading large- and small-format plotters, supports built-in fonts, and enhances pen or cutter speed. All packages include the software and all necessary cables or adapter cards. All require 8MB of RAM, System 7. Plottergeist $399; PowerPlot $599; PowerPlot/LT $799. GDT Softworks, 604/291-9121, 800/663-6222; fax 604/291-9689.

Pocket Quicken for Newton

If you're one of the many Quicken users who forget to update their records after each visit to the ATM, Intuit has a solution: Pocket Quicken for Newton.

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Why the Best Artists Use Live Picture

"Live Picture gives life to my best ideas. It's the power behind my imagination," says Chicago digital imager John DeSalvo, who embellished this compelling image "Jazz Man" from a photograph by famed portrait photographer Marc Hauser.

"Frankly, Live Picture is the first digital tool that keeps pace with my creative impulses," adds DeSalvo. "With its layering capabilities, selective focus and other controls, it lets me really explore the boundaries of an idea, experiment with different versions and discover new possibilities. This freedom just isn't possible with standard image editing software like Adobe Photoshop."

"Electronic tools add strength and boldness to even my strongest images," says Hauser, "pushing my ideas beyond what was possible with the camera."

See us at COMDEX/Spring '95 Atlanta, April 24-27, 1995, Booth #N4754 and Digital World, Los Angeles June 5-7, 1995, Booth #1101

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LIVE PICTURE

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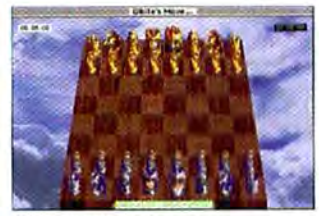
Designed around a wallet metaphor, Pocket Quicken has the same basic features as Quicken for desktop computers, but you can take it anywhere. It records spending information on electronic receipts, which it then sorts according to categories you set. Business travelers can track their expenses and view expense reports. Pocket Quicken comes bundled with the Newton MessagePad 120, but other users can buy it for $69.95. Intuit, 415/322-0573, 800/624-6930; fax 602/295-3015.

Print Tools-XT

DataStream Imaging Systems' Print Tools-XT simplifies printing from QuarkXPress. This print utility also gives you options such as the ability to specify discontinuous pages for printing, print multiple plates, save selected items or areas as EPS files, and convert spot colors to process colors at print time. Users can also define hot keys for switching between the Page Setup and Print dialog boxes. Requires QuarkXPress 3.3. $39. DataStream Imaging Systems, 606/255-6686; fax 606/259-1541.

Sargon V: World Class Chess

If chess is your gambit, check out Sargon V, a popular chess game now available for Macintosh. The product lets you play through actual games and provides instruction. You can choose either a novice or an expert opponent—or watch Sargon V replay famous games by the masters. You can even take on the role of the Masters trying to guess the moves they made. Requires 2.5MB of RAM, System 6.0.7 for black and white; Mac LC, 4MB of RAM, 8-bit color for color and music. $19.95. Activision, 310/207-4500, 800/477-3650; fax 310/820-6131.



Sargon V: World Class Chess

SnapMail 2.0

Version 2.0 of this electronic messaging package includes an address book, folders for organizing incoming messages, the ability to enclose folders in mail messages, the ability to change fonts and font sizes, and support for "carbon" copies and blind copies. The new version is compatible with Information Access Technology's HoloGate gateway for the Internet, through which you can access UUCP, QuickMail, Microsoft Mail, FirstClass, and NovaLink gateways. The product includes 30 days of free HoloNet access. Requires System 6.0.4, AppleTalk or Ethernet network. 5 users $200; 10 users $320; 50 users $1440. Casady & Greene, 408/484-9228, 800/359-4920; fax 408/484-9218.

Spaceward Ho 4.0

World domination just got easier. The latest version of Delta Tao's network-savvy conquer-the-galaxy strategy game includes more ships, smarter computerized opponents, improved network speed, and cooler graphics and sounds. You can now join ongoing games, send messages to other players, and get statistics on your progress. Requires 2MB of RAM, System 7. $39. Delta Tao Software, 408/730-9336; fax 408/730-9337.

three by five 2.0

Organize your business, your thoughts, or your life with three by five 2.0, formerly known as Corkboard, from MacToolkit. This package lets you design and arrange 3-by-5-inch cards to contain and link miscellaneous information, including text, graphics, charts, and QuickTime movies. You can categorize cards and view them individually or in outline mode. Version 2.0 adds style sheets, a template editor, and lets you drag and drop cards between windows. $149. MacToolkit, 310/395-4242, 800/231-4055; fax 310/393-7747.

three by five 2.0

TransJammer

QuickTime users can improve their transitions with TransJammer, a collection of 100 transition effects from Elastic Reality. The entire collection operates as a plug-in for use within Adobe Premiere. Effects are antialiased and resolution-independent. In addition to simple effects such as cut and dissolve, TransJammer offers three-dimensional, animated transitional effects. An included QuickTime player permits users to view movies without additional presentation software. Requires FPU, 8MB of RAM, System 7.1, Adobe Premiere 2.0. $149.95. Elastic Reality, 608/273-6585, 800/329-4424; fax 608/271-1988.

TransJammer

TurboCAD 2.0 and TurboCAD 3D 2.0

You may think "easy-to-use CAD" is an oxymoron, but the new versions of IMSI's two- and three-dimensional CAD programs have just gotten easier to use. Plus, they're faster. TurboCAD 2.0 is up to 50 percent faster than previous versions. It includes a new symbols library, new tools, menu-assignable macros, and an online selection mode. TurboCAD 3D enables users to create 3-D wire-frame objects and surfaces, and to draw and edit in three dimensions. Requires Mac II,

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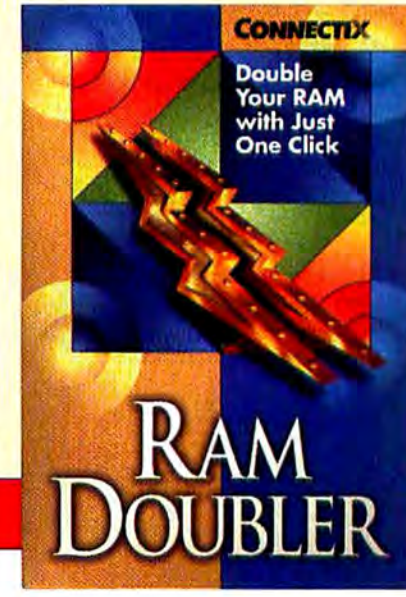
System Requirements: Macintosh equipped with a 68030, 68040 or PowerPC microprocessor. System 6.05 or later, including all versions of system 7 • 4 MBs required (hard disk required for machines with 4 to 6 MBs) • Not compatible with Mac SE, original Mac Classic, original Mac LC or PowerBook 100 or Mac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



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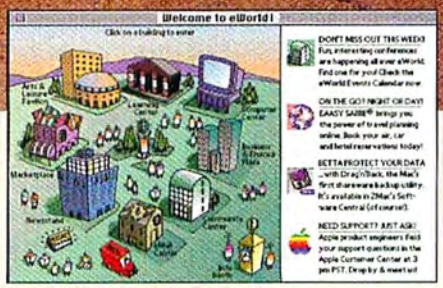
Your parents'
anniversary gift
arrived. 2 days early.

Your kid got an A in
current events.



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4MB of RAM, System 7; FPU recommended. TurboCAD 2.0 $149.95; TurboCAD 3D 2.0 $295.95. IMSI, 415/454-7101, 800/833-8082; fax 415/454-8901.

CD-ROMS

DigitArt Volume 30 and Volume 31

Art imitates life in these clip-art volumes from Image Club. Volume 30, Art Jam, includes upbeat graphics ranging from critters to tools to rocket ships and TVs. Volume 31 (Worldbeat America) contains traditional images from North and South American aboriginal groups, including images of animals, deities, religious icons, and activities. Designed in Adobe Illustrator and saved in EPS format, these images can be placed and edited in Illustrator, FreeHand, and Canvas. $99 each. Image Club Graphics, 403/262-8008, 800/387-9193; fax 403/261-7013.

The Internet for Everybody

If you're among the millions who know by now that the Internet is cool but don't yet know how to use it, check out The Internet for Everybody. This CD-ROM uses video instructions and guided tours to explain Net basics. Sold by Emerging Technology Applications (ETA), a sister company to *Macworld*, The Internet for Everybody demonstrates electronic mail, file transfer, the World Wide Web, and other Internet functions. $49.95. ETA, 508/879-0006, 800/285-3821; fax 508/820-4396.

The Merck Manual

Now, healthcare professionals and laypersons can access medical information on CD-ROM with The Merck Manual. The CD version of the 16th edition of this well-known medical reference features hypertext linking, color illustrations, and tables. The disc includes a section on pharmacology, reference guides for calculating dosages, and descriptions of therapy for each disorder listed. $95. CMC ReSearch, 503/242-2567, 800/854-9126; fax 503/242-0519.

Multimedia Dogs

Trying to decide between Rin Tin Tin, Old Yeller, White Fang, and Lassie? This CD-ROM, subtitled "The Complete Interactive Guide to Dogs," includes information about 130 breeds, as well as dog nutrition, health, and training. A Fetch function helps you choose the best breed: tell the program what size dog you want, the amount of living space you have, the disposition and activity level you prefer, and the amount of training you're willing to do, and Fetch suggests the perfect pooch. $39.95.

Multimedia Dogs

Inroads Interactive, 303/444-0632; fax 303/444-0734.

Wild Africa: Serengeti, Ngorongoro, and Tarangire

Wild Africa: Serengeti, Ngorongoro, and Tarangire

Tour Tanzanian national parks without leaving your desk with Sumeria's Wild Africa. This CD-ROM includes photography and video shot on location in Serengeti, Ngorongoro, and Tarangire, plus information about the ecology of the region and more than 90 species of birds, reptiles, and mammals. Users can explore the three parks and see how animals interact. A field guide provides information on habitat, range, feeding, communication, and social behavior. $49.95. Sumeria, 415/904-0800, 800/478-6374; fax 415/904-0888.

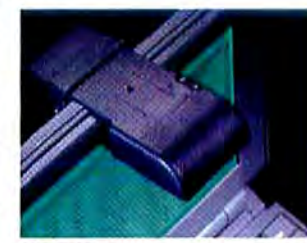
ACCESSORIES

I.R.I.S. DataPen

This pen-size hand-held scanner with built-in OCR recognizes up to 100 characters per second, letting you directly enter text from magazines, letters, or memos into many Macintosh applications. The I.R.I.S. DataPen lets users input individual numbers, words, or lines of text. It connects to the serial port and includes trainable omnifont OCR software. $435. I.R.I.S. America, 407/395-7831; fax 407/347-6267.

NCL 480

It was a dark and stormy night. Snoopy couldn't see the keys on his PowerBook. Too bad he didn't have the NCL 480 clip-on notebook computer light, which would have illuminated his keyboard and nearby papers. The NCL 480 includes four NiCd rechargeable batteries, three Ektron bulbs, an AC adapter/charger, and a carrying case. $39.95. ASF Associates, 516/868-3638, 800/771-3600; fax 516/868-6897.



NCL 480

QuickTake 150

Apple's 1-pound digital camera stores up to 32 standard, or 16 high-quality, 24-bit color images at 640 by 480 pixels. A detachable close-up lens enables you to

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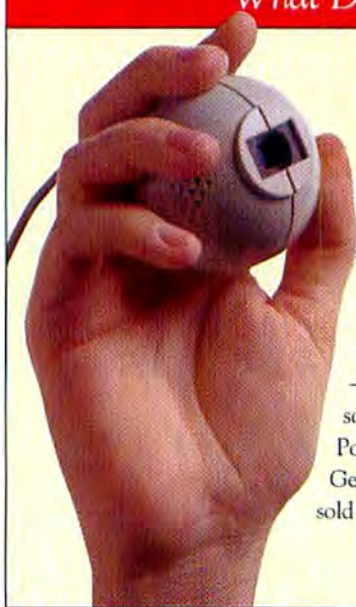
What Do You Do With A $100 Digital Video Camera?



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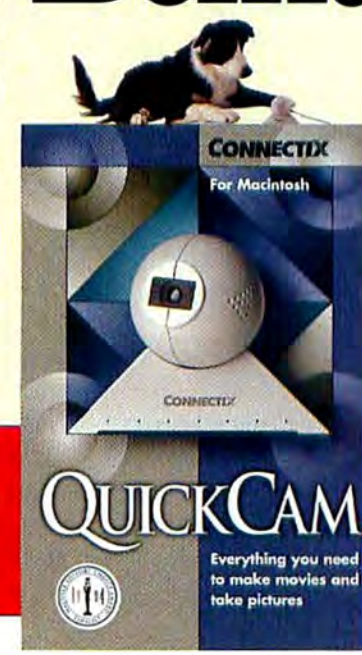

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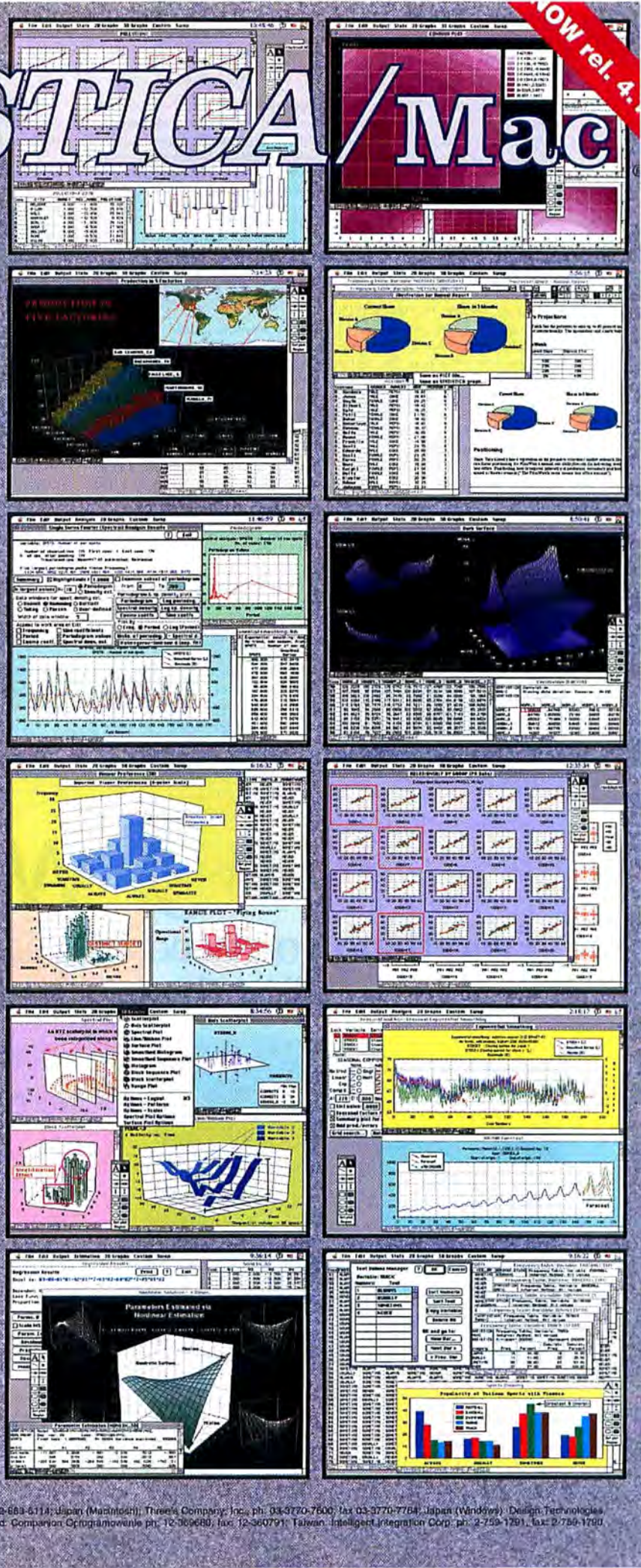
STATISTICA/Mac



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photograph objects 8 to 14 inches from the camera. Bundled with three AA lithium batteries and PhotoFlash 2.0 software, the QuickTake 150's other features match those of the QuickTake 100. $749. Apple Computer, 408/996-1010, 800/538-9696; no fax.

SE-4M15D-8-A-L

Maintaining a bunch of network servers can be a dangerous waltz through the wires, turning from one keyboard and monitor to another. The SE-4M15D-8-A-L switch box lets you control as many as eight Macs from a single keyboard, monitor, and mouse. The switch can be up to 250 feet away from the computers. Controls let you switch from computer to computer. $2310. Network Technologies, 216/562-7070, 800/742-6324; fax 216/562-1999.

Vivid 3D Speakers

Enter the world of three-dimensional surround sound with this set of two self-powered speakers. Vivid 3D Speakers use the same Sound Retrieval System (SRS) found in Sony's Trinitron XBR and RCA's Home Theater televisions. In addition to sporting the usual volume-control knobs, these speakers add controls for adjusting the width of the sound and emphasizing one aspect of a recording, such as the singer. The speakers, which connect to the audio port of a Macintosh, offer 10 watts or true RMS per channel. $199. NuReality, 714/442-1080, 800/501-8086; fax 714/852-1059.

Vivid 3D Speakers

BOOKS

The Complete Guide to ClarisWorks

Published by the same fine folks who bring you the *ClarisWorks Journal*, this collection of 46 articles is more than a replacement for the ClarisWorks manual. Rather, the book shows you better ways to use the program. Tips on using macros; improving databases; and producing newsletters, reports, and trifold flyers fill the book's 439 pages. The book includes a disk of ClarisWorks templates. $39.95. ClarisWorks Users Group, 313/454-1969; fax 313/454-1965.

Living at Light Speed

Danny Goodman, cyberCassandra, attempts to demythologize and accurately define the positive and negative aspects of the information superhighway. Rather than solve all the world's problems, he claims, the system of interlinked communication technologies could reduce us to "sitting ducks for government and commercial tracking of our every move." Goodman also suggests steps consumers can take to avoid the pitfalls of the information superhighway. 256 pages. $21. Random House Electronic Publishing, 212/940-7394.

Multimedia Demystified

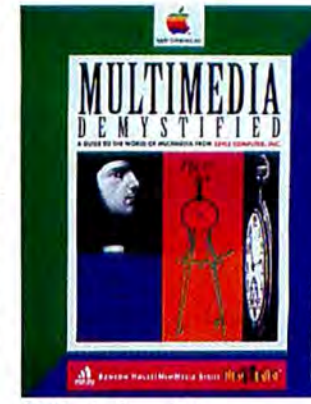
The second edition of this Baedecker to creating multimedia walks you through planning, designing, producing, and distributing multimedia titles. Aimed at beginners and intermediate users, this comprehensive book includes interviews with multimedia professionals and case studies. It defines the skills and technologies involved in producing any kind of multimedia content. Edited by Randy Haykin. 304 pages. $30. Random House/New Media, 410/848-1900 ext. 3000, 800/733-3000; no fax.

QuickTime

This book-and-CD-ROM package guides beginning users through the capabilities and uses of Apple's digital-video system extension. Authors Judith Stern and Robert Lettieri discuss viewing, recording, editing, compressing, and distributing QuickTime movies. The CD-ROM includes QuickTime 2.0, MoviePlayer 2.0, VideoShop 2.0.3, and QuickFlix 1.1.1. 343 pages. $45. Hayden Books, 317/581-3500, 800/428-5331; fax 317/581-3550.

Scripting the Scriptable Finder

AppleScript has been lurking in the shadowy corners of the Mac community for a couple of years now. This book, by Steve Michel—a well-known authority on scripting—illuminates how to use AppleScript to automate the System 7.5 Scriptable Finder. Potential readers should have a general knowledge of AppleScript. The book includes a disk that contains scripting utilities, over 100 scripts, and a scripted FileMaker Pro database. 98 pages. $49. Heizer Publishing, 510/943-7667, 800/888-7667; fax 510/943-6882. m



Multimedia Demystified

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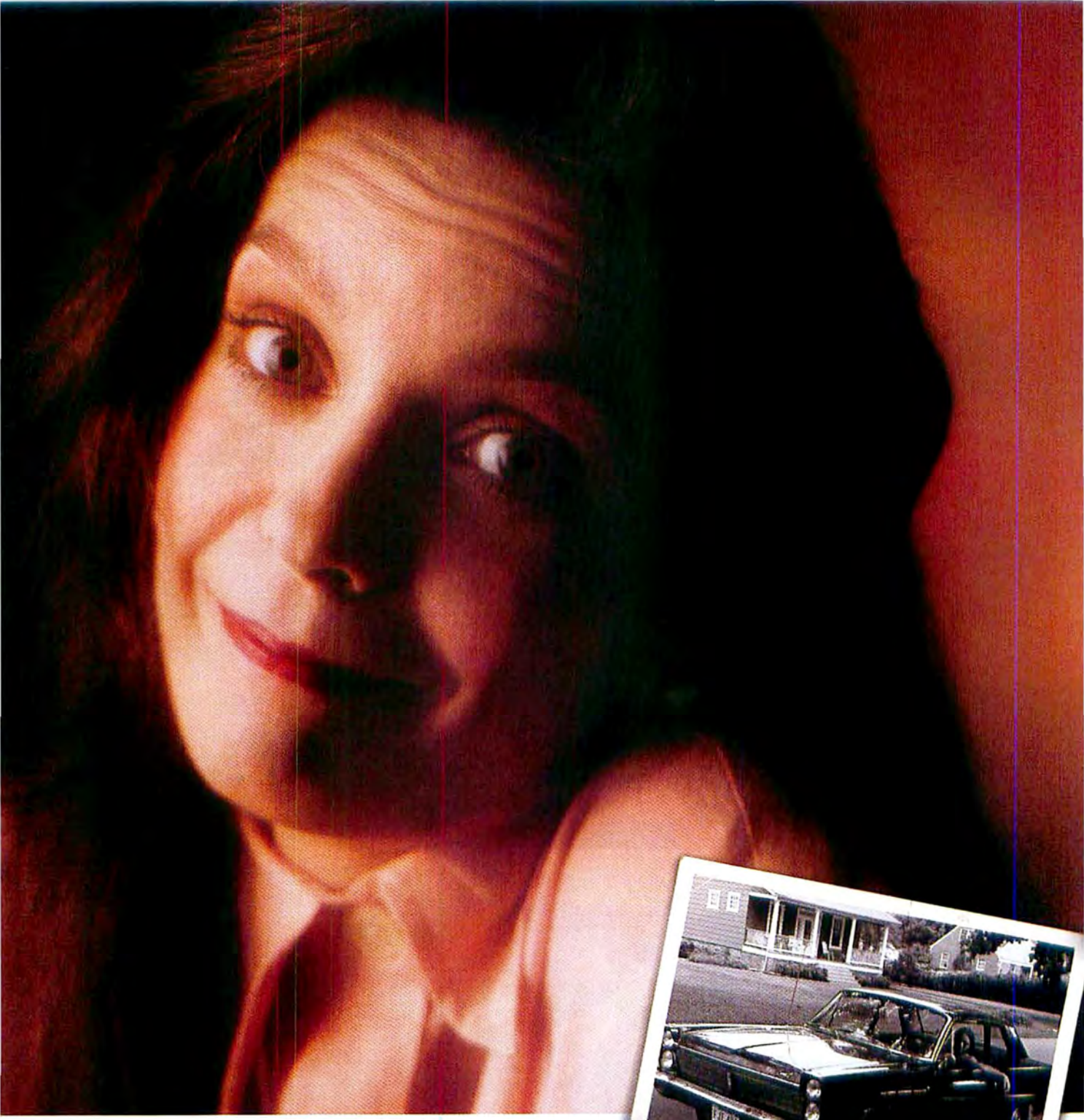

Laura J. Kirk

Reisterstown, Maryland

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Reviews

Colortron

Desktop Spectrophotometer

PROS: First low-cost implementation of this technology; easy to use; outstanding documentation; measures both transmissive and reflective sources. **CONS:** Some useful functions still under development. **COMPANY:** Light Source Computer Images (415/925-4200).
LIST PRICE: $1195.

MW ★★★★

KEVIN CANDLAND

HOW OFTEN HAVE YOU PREPARED digital images, carefully adjusting the colors to look just so, only to be disappointed when your output came back from the printer or service bureau? Having worked in the high-end prepress business and now working as the editorial production manager for *Macworld*, I've experienced this problem firsthand.

When you print to a color device, you can't count on getting consistent results, even if you always follow the same exacting procedures. Color reproduction is sensitive to minute variations, which can occur at any point in the cycle. Input devices, monitors, ambient lighting, and imaging devices all play a role, and unless you identify where the variations occur and control them, they can give you big-time headaches.

Traditionally, color professionals have relied on spectrophotometry to take precise measurements of the light reflected or transmitted by color samples. They then use this spectral data to adjust the dyes, inks, or pigments used in their particular industry, to obtain consistent color. The hardware required to take these measurements, however, costs in the tens of thousands of dollars, ruling it out for all but the most mission-critical purposes. Until now. The Colortron, a hand-held spectrophotometer from Light Source Computer Images, brings accurate color analysis to the Macintosh desktop, for $1195 list price.

The Colortron yields an extremely precise measurement of the spectral data of whatever sample you give it—ink on paper, say, or a piece of plastic. (For more information on the inner workings of the Colortron, see the feature story "The Color You Expect," *Macworld*, May 1995.) Each color you measure has its own unique description, which the Colortron's ten software modules use in a variety of ways.

At this juncture it's difficult to speculate on all the possible applications people will find for this device. Light Source expects its initial audience to be people who purchase or produce color for commercial print reproduction, and the software that ships with the unit reflects this assumption. The Colortron also has potential for calibrating video-display monitors and for quality control in the paint, print, plastics, and textile industries.

Hardware

The Colortron's design is both elegant and utilitarian. Curved to fit comfortably in the hand, the unit weighs in at 9.5 ounces. The two cordless-phone–type batteries that power the unit can be charged slowly by drawing power from the ADB, or you can use the supplied AC adapter. A light on top of the unit turns off to let you know when the unit is fully charged.

The Colortron ships with one foot, which attaches easily to the bottom of the unit for measuring reflective and transmissive samples. Color Source expects to ship a foot for measuring ambient light in the future, and a monitor-calibration foot is in development.

Light Source recommends calibrating the Colortron daily. This simple 30-second procedure includes "zeroing out" the unit—setting its measurements for absolute black and absolute white. Each unit comes with a laminated, lithographed target manufactured by Light Source.

The company calibrates each Colortron-target pair before shipping, so any variations are relative to the target. The calibration target fits in a pocket inside the cover of the manual for easy access and protection from fading.

The Colortron is durable. When I accidentally caught my arm on the ADB cable and sent the Colortron crashing down on a cement floor, I was relieved to find it undamaged—no cracks in the lens or chassis, no dislodged pieces inside. I took this opportunity to test the included hardware-diagnostic software, which returned the welcome message, "No problems have been detected in the optics, electronics, or alignment of the instrument." And fellow color professionals will appreciate the significance of this test: density readings I made of lithographic film were still accurate to ±0.02, from a 7-millimeter spot on my light table, equipped with four 5000-Kelvin bulbs.

Taking a Reading

To begin the color-analysis process, you place the Colortron's 3mm aperture over the color you want to measure, and rock the device forward slightly, thereby switching on two tungsten lights inside. The light reflects off of a series of mirrors and a diffraction grating and focuses on a sensor that gathers data in 32 equal steps along the visible spectrum.

Internal light sources permit the Colortron to measure reflected light, such as from a press sheet, a photograph, a piece of fabric, or a kitchen tile. With reflective measurements, each reading takes only about 3 seconds. The device can also measure transmitted light, such as through lithographic film or a color transparency on a light table. (With my light-table setup, each reading took about 15 seconds.) Then the Colortron sends the spectral data to the Mac via the ADB port (a serial-port option is available for $25). The Colortron application stores spectral data, in the form of color swatches, in a palette. You can name each color as you like and save palettes for use in other applications, such as image-editing and page-layout programs.

Software

Light Source has taken full advantage of the expandability of System 7.5's Color Picker, which works something like the Chooser. (If you are not running System 7.5, the Colortron automatically installs the extensible Color Picker.) The Colortron tools appear in the Color Picker as extensions, giving you access to them—though only to one tool at a time—from any application that supports the Color Picker. This is handy if, for example, you need to take a reading but you've allocated all of your RAM to Adobe Photoshop. The main Colortron application controls and manages the ten tools, which operate something like plug-ins. Each tool you add to the application adds an icon to the toolbox.

With my printing background, I appreciate the Dot Area tool, which lets you determine the size of halftone dots in a screen tint. If you use the Colortron to read test strips, you can then use the Dot Area tool to linearize imaging devices and analyze dot gain from contact equipment and presses. The Density tool, which displays the numerical density of CMYK or absolute black and white, is particularly useful for quality control on process-color work and lithographic film.

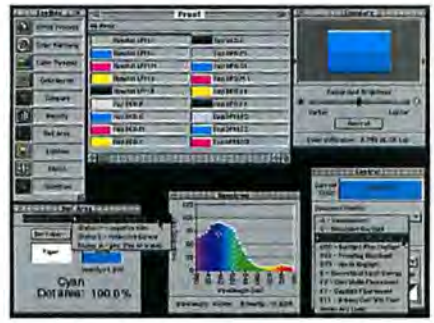
The Spectrum tool displays spectral data as a bar graph. I used it with the Density and Compare tools to compare *Macworld*'s printing stock to different proofing substrates. The Compare tool measures the difference between two colors in Δ-E, 1.0 being the smallest perceivable difference. It was interesting to note that while the density of 100 percent cyan on three different substrates from the same manufacturer varied by only ±0.04, the Δ-E difference was as much as 8.4. For people in the printing industry, this is valuable information that used to be unobtainable without expensive spectrophotometers.

The Match tool picks the closest match from one of four Pantone libraries for any color the Colortron reads. This is handy for anyone who specs colors, and it's much easier and more accurate than searching through swatch books.

The CMYK Process tool is promising, but doesn't yet live up to the manual's claim that it would enable me to measure the color of, say, a leaf, and calculate the best process screen mix for producing that color on a chosen printer. I measured a solid swatch of 100 percent cyan from an imagesetter proof. When I selected "150 line imagesetter—Pantone" from the pull-down menu, I expected to see a recommended mix of 100 percent cyan. Instead the tool recommended 73 percent cyan and 24 percent magenta. How could this be?

For the CMYK Process tool to operate ideally, you need the ability to create profiles that exactly match your own devices, instead of the generic profiles the manufacturers provide. If and when end users can develop their own device profiles (which I predict will be soon), the CMYK Process tool will become invaluable in process-color work.

I found the remaining tools limited in their usefulness. The Lighting tool simulates on screen how a given color will appear under particular lighting conditions. Its reliability depends on having a correctly calibrated monitor. The Color Tweener tool simulates mixes of two colors. The manual warns against using this tool to gauge ink mixes because it uses additive calculations—the type you'd use for slide transparencies—rather than subtractive, as you'd use for inks. There's a Color Harmony tool that might be useful to designers, decorators, and students of color theory. And the Colorimeter tool converts spectral-data readings to any of eight common color spaces—CIE Lab, CIE Luv, CIE xyY, CIE XYZ, HSB, NTSC RGB, PAL RGB, and RGB—enabling you to communicate measured color information to other applications. You can save this color information to Colortron palettes, or export it in tab-delimited or PICT format.



Tons of Tools This composited screen shot shows some of the Colortron's more powerful options, available from pull-down menus. Clockwise from the Toolbox (upper left), which acts as a launcher for the ten tool modules; the Proof window, where measurements are stored; the Compare tool; the Control palette, showing the most recent measurement; the Spectrum tool; and the Dot Area tool.

Newcomers to spectrophotometry will need to bone up a bit on color science, as well as learn to operate the Colortron. The well-organized manual provides a wealth of information about color theory and its application in design and the printing industry. It even provides in-depth detail such as the mathematical formulas used for color-space conversions, and explanations of the many color-industry standards.

The Last Word

It's been a long time since I've been this excited about an industry development. The Colortron gives the everyday user exceptional tools for managing color, and a few weeks' use taught me more about color than I learned in my first year as a scanner operator. Even if you use only one or two of its tools, the Colorton is a worthwhile investment.—JEFF SACILOTTO

QuickBooks 3.0

Small-Business Accounting

PROS: Simplifies double-entry accounting; enhanced data entry; numerous reports and informative graphs; good value. **CONS:** Not entirely Mac-like; major errors shown as a code rather than as messages; dull forms; Mac and Windows versions incompatible. **COMPANY:** Intuit (415/322-0573). **LIST PRICE:** $119.

MW ★★★

QUICKBOOKS 3.0 MAKES DOUBLE-entry accounting accessible to small-business owners. Yet this is a full-featured accounting program, with invoicing, project- and job-costing, budgeting, purchase orders, inventory tracking, and payroll, plus the usual accounts payable, accounts receivable, and general ledger functions.

QuickBooks collects most data by way of forms that mimic checks, credit card slips, invoices, and bills, and interprets this data as debits and credits, maintaining your balances. On the rare occasions that conventional accounting terms must be used, the manual and help system explain in layperson's terms what's going on.

When you create a set of books, QuickBooks conducts an on-screen interview to determine your accounting needs. You select an invoice format, choose a chart of accounts from the dozens provided, and then indicate whether or not you need to manage inventory, pay sales tax, and have a payroll. After that, you select a start date, edit the chart of accounts, and begin entering data. You can transfer data from Quicken 3.0 or a later version, or import Intuit Interchange Format data files. Note, however, that the Mac and Windows versions of QuickBooks are incompatible.

It's a good idea to experiment with the sample data, read the manual, and get familiar with the program, especially if you're new to accounting. Otherwise, you're likely to make mistakes and miss—or misuse—important features. If you do make errors, QuickBooks lets you edit, void, or delete transactions. You can also make adjusting entries in the general ledger, as some accountants prefer. An audit-trail option records every change made for a transaction. Finally, you can use passwords to authorize only certain individuals to change prior data.

Data Entry

QuickBooks has several features that speed data entry. For example, when writing checks, you can either type names or select them from hierarchical submenus. If you type a name, QuickBooks tries to complete it for you. Then the program presents for editing a copy of the last check written to that company or person. When you write a check to a new company, you can add the company's name to your vendor list, or you can pause and enter the address. Then the program automatically uses this information in all new transactions for that company.

QuickBooks can also memorize recurring transactions—monthly bills or quarterly invoices, for example—and present them on the appropriate dates or automatically enter them for you. In the case of a recurring bill for a consistent amount (a monthly mortgage payment, say), QuickBooks can automatically create the transaction for you each month; you just print the check. For variable payments like phone bills, you just fill in the amount when the next check is due.

Reports and Forms

QuickBooks offers dozens of reports, organized according to category—profit and loss, balance sheets, accounts receivable and payable, budgeting, and so on. While working in a register (accounts receivable, for example), you can generate an activity report covering the transactions for a selected customer or vendor. Double-clicking on many line items shows the underlying transaction(s). QuickBooks also provides six graphs to help you quickly evaluate your financial position, including income and expenses,

Custom Reports By choosing different time frames and applying filters (to display only a particular customer classification, for example), you can construct almost any kind of report.

net worth, and budget versus actual. For each graph, you can specify a date range and how you want the data broken down—by account, customer, inventory item, sales rep, and so forth. Clicking on various graph elements zooms you to a graph showing the breakdown for that element.

Every form and report in QuickBooks has its own Printer Setup command; before printing any one for the first time, you must first set generic print options for it. You can customize individual reports and optionally save formats as templates, but you cannot directly manipulate the elements other than to change column widths. Although you can add a logo, you can't specify its placement or dimensions. While customizing via dialog boxes is simpler for computing novices, it may frustrate Macintosh users who expect a more hands-on approach.

A Few Foibles and One Big Flub

QuickBooks isn't always Mac-like in operation. It won't let you just look at submenus; even if you try to avoid selecting any item by dragging away from the list, QuickBooks selects one and puts it in place. If you delete an invoice containing links to reimbursable expenses, you cannot simply link those expenses to a new invoice; you must first delete and then reenter each expense from scratch. Finally, the help system comes straight from Windows and uses some conventions that may be alien to Mac people.

Far more serious was a data-corruption problem I encountered. The day I set up the program, I received a cryptic error "message" containing a code number—no explanation. Things seemed to be functioning normally, so I ignored it. When I mentioned the message to Intuit's technical support several days later, however, it turned out the error was serious. After running a special Verify procedure, we discovered that my data was corrupted. On a whim, I also checked the sample data file and found that it , too, was corrupted. But I'd never received a warning message regarding this.

While occasional data corruption is an unfortunate fact of life, QuickBooks' handling of the situation is unacceptable. Every error message should identify the problem (if possible) and either recommend calling technical support or explain how to correct the problem. To its credit, QuickBooks includes its own backup routine. It won't prevent data corruption, but at least you'll have a usable backup.

The Last Word

QuickBooks is about as painless to use and as understandable as a double-entry accounting program can be. It combines easy setup, helpful data entry functions, and powerful reporting. Small-business owners who take the time to learn how to use the program correctly will be able to examine their financial data in ways they once only dreamed of.—STEVE SCHWARTZ

Imaging

High-Bit Scanners

Pro Imager 4000

PROS: Built-in transparency adapter; effective tonal-correction tools; color-separation software included; relatively inexpensive. **CONS:** Excessive noise in shadow areas; obtuse controls for scaling/resolution and for gamma setting in Prepress mode; no histogram while scanning; some compatibility problems. **COMPANY:** PixelCraft (510/562-2480). **LIST PRICE:** $2995.

MW ★★

Pro Imager 8000

PROS: Excellent scan quality; very high resolution; large image area; fast; effective tonal-correction tools; color-separation software included. **CONS:** Expensive; obtuse controls for scaling/resolution and for gamma setting in Prepress mode; no histogram while scanning; some compatibility problems. **COMPANY:** PixelCraft (510/562-2480). **LIST PRICE:** $12,995; Pro Imager TX (transparencies up to 8 by 10 inches) $795; Pro Imager TX Jr. (up to 4 by 5) $495.

MW ★★★★

PIXELCRAFT HAS A REPUTATION AS a purveyor of high-quality scanners for demanding prepress users. That description perfectly characterizes the $12,995 Pro Imager 8000, with its 11.7-by-17-inch scanning area, 12-bit-per-pixel bit depth, and up to 4000-pixels-per-inch optical resolution. PixelCraft now enters the midrange too, with the $2995 Pro Imager 4000—a 10-bit, 600-by-2400-ppi scanner with an 8.3-by-11.7-inch image area and a built-in transparency adapter.

Scan Quality

The Pro Imager 8000 delivers the kind of scans you'd expect from a $13,000 scanner—equal to or better than any of the scanners I tested recently for a roundup feature in *Macworld* (see "Scanning beyond 24 Bits," March 1995). The scans exhibit excellent tonal sensitivity and very little noise—even in the shadow areas—resulting in good detail throughout the tonal range and easy-to-correct images. The overall speed is impressive as well, nearly as good as that of the fastest unit in our scanner roundup.

The 8000's optical resolution is aided by a lens that provides up to 4000-ppi scans (which actually makes the optional transparency adapter a useful investment, since transparencies require high resolution), though at that resolution you can't scan an image wider than 4 inches.

The 4000, on the other hand, doesn't match up to equivalently priced high-bit scanners—the Umax PowerLook and Agfa Arcus II—or even to my midrange choice, the Epson ES-1200C. The 4000 delivers excellent highlight detail but produces horrendous noise in the shadows—worse than any other scanner I've tested—resulting in speckling that obliterates subtle shadow detail. It's also slower than any comparable scanner except the glacial Agfa offerings—the 4000 took 186 seconds to scan an 8-by-10-inch gray-scale image.

Both scanners come with QuickScan scanning software, plus Color Access, PixelCraft's advanced color-adjustment and -separation software. These two packages combine some great features with some disappointments. QuickScan makes it easy to scan a batch of images at once, for instance, but its scaling/resolution controls are ridiculously obtuse unless you switch to Film Recorder mode (which lets you choose resolution, scaling, aspect ratio, and image size, and doesn't try to second-guess you).

Tonal Correction

QuickScan's tonal-correction tools are not exceptionally robust (there's no histogram, for instance, and the densitometer tool doesn't show before and after values during correction), but they offer the essentials and do a good job of tapping the scanners' downloadable tonal correction.

In Prepress mode, QuickScan provides an unsurpassed method to select highlight and shadow points. You move a tool around the preview image to see where the scan is being clipped to white or black—much as in Adobe Photoshop's Levels dialog box. But to set gamma in Prepress mode, you must either resort to the Maximum Print Density setting in the QuickScan Options dialog box, or use the custom tone-curve to set shadow, midtone, and highlight values. You can't set those values numerically, only by clicking on arrows, and you can't save and load tone curves. In Standard mode you can set gamma and white point but not black point.

Finishing Off

Once you understand all that, you can with very little effort make your tonal corrections and pull nice scans with this software. You still need Photoshop or Color Access for finishing off your scans, however, for a number of reasons. The Sharpen filters (available only on the 8000) aren't up to the level of control in Photoshop's or Color Access's Unsharp Mask filters. QuickScan has no color-management functions for matching your original image. And while Color Access conveniently lets you scan directly to a disk file (and names it automatically), QuickScan requires you to save and name files within Photoshop.

Color Access

Color Access is a full-blown professional color-correction and -separation program, and it merits a review in its own right. Color Access is designed for color shops and printers, not designers. If you're not pulling densitometer numbers off your press sheets, you'll probably find its impressive controls frustrating rather than enabling. And it won't even open or acquire gray-scale files.

A few other quirks and omissions: QuickScan crashes my PowerPC-upgraded Centris 650 when Connectix Corporation's RAM Doubler is installed. PixelCraft says it works on other systems, but I couldn't test it. When scanning into Photoshop, image size is limited by the amount of RAM you have allocated (not true with Color Access). Color Access balks at opening an LZW-compressed TIFF file from Photoshop, and a bug in its network copy-protection caused Color Access to crash.

SCOTT PEERSON

The Pro Imager 4000 from PixelCraft

The Last Word

Even with its quirks, I still recommend the Pro Imager 8000 for high-end shops that need its large image area, excellent tonal sensitivity, and high resolution. The Pro Imager 4000 is another story. Other scanners in the same price range give you better (and faster) scans—and better software.—STEVE ROTH

MovieFlo' 1.1

Special-Effects Software

PROS: Powerful, professional-quality features; useful partial-undo feature; can handle huge hi-res files. **CONS:** Expensive; badly edited, incomplete manual; complex. **COMPANY:** The Valis Group (415/435-5404). **LIST PRICE:** $899.

MW ★★★

MOVIEFLO' IS A POWERFUL, WELL-designed program for twisting, morphing, or distorting images—either still photos or QuickTime movies. The results can be grotesque, hilarious, or—if you're a plastic surgeon or a movie-effects expert—useful.

Four straightforward tools let you tug, twist, slide, or pinch any part of an image (usually a scanned photo) on the screen. In seconds, the program produces a new image, in which the distorted part is realistically filled in. The hideous deformation—or comely improvement—looks as though it had been in the original image or movie frame.

Pro Features

Because it's difficult to predict the actual outcome of each flesh-molding tug, the program offers the planet's best undo feature. You can undo multiple actions, one by one, all the way back to the original image. What's more, there's a button called Do %—it's a kind of partial-undo feature. If you decide you inflated a forehead too much, you can redo it with only, say, 50 percent as dramatic a change. Change it to 200 percent to exaggerate the distortion; change it to a negative number to distort in the other direction (make the forehead cave in).

If you're attempting to distort a multimegabyte, high-res image, MovieFlo' lets you substitute a small, low-res version while you work. You reap huge benefits in speed and memory requirements. When you're ready to create the final output, you can swap in the full-size image. You can use the same trick with digital movies: do your setup work with a tiny, low-frame-rate version of your QuickTime movie, then substitute the enormous, 30-frames-per-second digital movie just before rendering.

As in similar programs, rendering isn't quick. Fortunately, there's an estimated-time-remaining counter, and the program renders in the background. On a Quadra 800, it took 90 minutes to produce a 12-second QuickTime movie in the background.

Multiple layers and masking, while complex concepts to learn, give you amazing powers. For example, using three layers, you can easily make the big stone mouths of the Mount Rushmore presidents move in conversation. Similarly, somebody's nose could grow so long that it stretches in front of somebody else in the image; without layers, such effects would be impossible.

Monster Movies

The primary advantage of MovieFlo' over its predecessor, MetaFlo', is that your raw material for distortion can be a QuickTime movie, not just a still image (for more on MetaFlo', see *Reviews*, August 1994). Working with two-dimensional still photos is already complicated, especially if you add the third dimension of layers. When you work with QuickTime movies, you add a fourth dimension: time. The scientifically inclined have a distinct advantage using MovieFlo'.

For example, suppose you've made your sister's mouth open preposterously wide. But in the next few frames, she turns her head to the side. Unless you help MovieFlo' understand what's happening by diligently establishing reference frames, its distorted area will wind up superimposed on her ear, making her look like Dumbo.

Otherwise, working in MovieFlo' is exactly the same as working with still photos in MetaFlo'. You can still work with layers and masks—but now you can create traveling masks, based on an alpha channel or on a designated color of the movie. As in MetaFlo', you can do more than just twist people's heads like taffy; you can also create morphs, provided your two source QuickTime movies are similar enough, frame by frame, in subject and positioning. QuickTime movie elements can interact with still images, and faces can morph as they warp. Also useful is the Morph to Template command, which makes one image (or area of a QuickTime movie) play inside another.

Horror Flick Working with QuickTime movies is more challenging than working with stills. You scroll through your movie, creating key frames containing the peaks of distortion (bottom window); MovieFlo' automatically generates in-between frames for smooth movement.

Overflo'ing Each of these distortions (of the original photo, top) took less than five minutes to create, and each required only a few strategic mouse-drags.

The Last Word

The Valis Group sends a mixed message: the steep price indicates that the program is aimed only at professionals—yet the thrown-together manual is anything but professional. Why doesn't the company cut the price in half—more in line with the $395 Elastic Reality, say—and sell twice as many copies?

Even so, the software itself is powerful, smooth, and sophisticated. If your career involves making movie magic, the innovative design of MovieFlo' makes monster- and morph-making much more manageable.—DAVID POGUE

Business-Plan Templates

Proposal-Writing Software

BizPlan Builder 5.0

PROS: Comprehensive; easy-to-follow plan; includes model proposals with formatting; financial ratios included within spreadsheets. **CONS:** Marked emphasis on raising money rather than planning a business strategy. **COMPANY:** Jian (415/254-5600). **LIST PRICE:** $129.

MW ★★★★

Business Plan Writer 6.0

PROS: Extensive, useful tips; financial ratios included within spreadsheets. **CONS:** Confusing guidance leaves too many details to the user; sample plan text lacks formatting. **COMPANY:** Graphite Software (301/984-1100). **LIST PRICE:** $99.

MW ★★★

BANKERS, VENTURE CAPITALISTS, even family members trustful enough to consider loaning you money all ask the same question: What's the plan? BizPlan Builder 5.0 and Business Plan Writer (BPW) 6.0, two similar programs, take a tutorial approach to developing your answer into a business plan—a 15-to-50-page proposal complete with financial analysis, marketing plans, and the all-important executive summary (the 2-page distillation that makes a 20-plus percent return sound inevitable). Of the two, BizPlan is more tightly focused, is adaptable to a greater variety of businesses, and better coaches you through to a finished plan.

Both programs are simple templates that you import into your spreadsheet and word processor (files are supplied in three formats: Rich Text Format, Microsoft Excel 2.2, and SYLK). This cuts down on your learning time by letting you use products you're already familiar with. Plus you gain flexibility because of the advanced features already in most word processors and spreadsheets.

Similar Advice

With no applications to learn, the reviewable part of these programs boils down to the quality of the advice given and how well it's presented. In some ways the programs are extraordinarily similar. Each takes a conversational approach, guiding you along lines recommended by how-to manuals.

The general sequence is to create a picture of your business in five sections. You begin with a description of the firm, continue by describing its products and/or services, then explain your marketing plan (including competitive analysis), and finish with a detailed profile of manufacturing or services implementation. As you work through each heading, the programs help you pick and choose from subheadings appropriate to your business. A business plan for a service company, for example, would include all of the subsections on marketing, while a plan for a wholesale manufacturer would provide a subsection on fulfillment.

Profit Picture

Finally, there is the financial-analysis section, where the hard numbers give your proposal the foundation it needs to secure a loan. (If you're looking for business-plan software that emphasizes planned growth and strategy options rather than raising money, check out Palo Alto Software's Business Plan Toolkit, an Excel add-on.) Both BizPlan and BPW offer strong financial analysis, including statements, projections out to five years, balance sheets, income statements, ratio analysis, cash flow from operation, revenue and profit projections, capital requirement, deal structure, and risks. The spreadsheet templates contain embedded formulas to calculate such ratios as cost of goods, net profit on net sales, and current liabilities to tangible net worth. Like the text of your proposal, the worksheets can be customized to reflect your business. If, for instance, your target lender is a venture capitalist, you're urged to pay special attention to repayment schedules and exit clauses enabling partners to cash out within a few years.

BizPlan Builder 5.0 The RTF templates are importable into virtually all word processors. All you do is fill in the blanks, retaining sample formatting.

The advice of the programs varies only slightly. In a discussion of personnel records and corporate milestones, for example, both stress the importance of employee achievement over product uniqueness with the quip that "investors will bet the jockey, not the horse."

Different Tactics

The two programs part company when it comes to actually writing a proposal. Well aware that entrepreneurs are talkers and doers, not writers, BizPlan never leaves you facing a blank page. Whereas BPW typically offers sparse directions, such as "show the cash flow" or "describe your company's vision," BizPlan illustrates each task with concrete examples that allow no room for misinterpretation or head scratching. In the Executive Summary, for example, BizPlan's text opens with utterly clear direction. The first sentence reads, "In 19[xx], [Company] was [formed/created] to produce and distribute [x], take advantage of [x], fill the void of . . . [describe the goal of your business]." Once you've filled in the blanks, you proceed to the next paragraph. And you don't even have to futz over page design; titles, subheads, and body text are preformatted in a businesslike style. It's a spoon-fed approach, but a solid one.

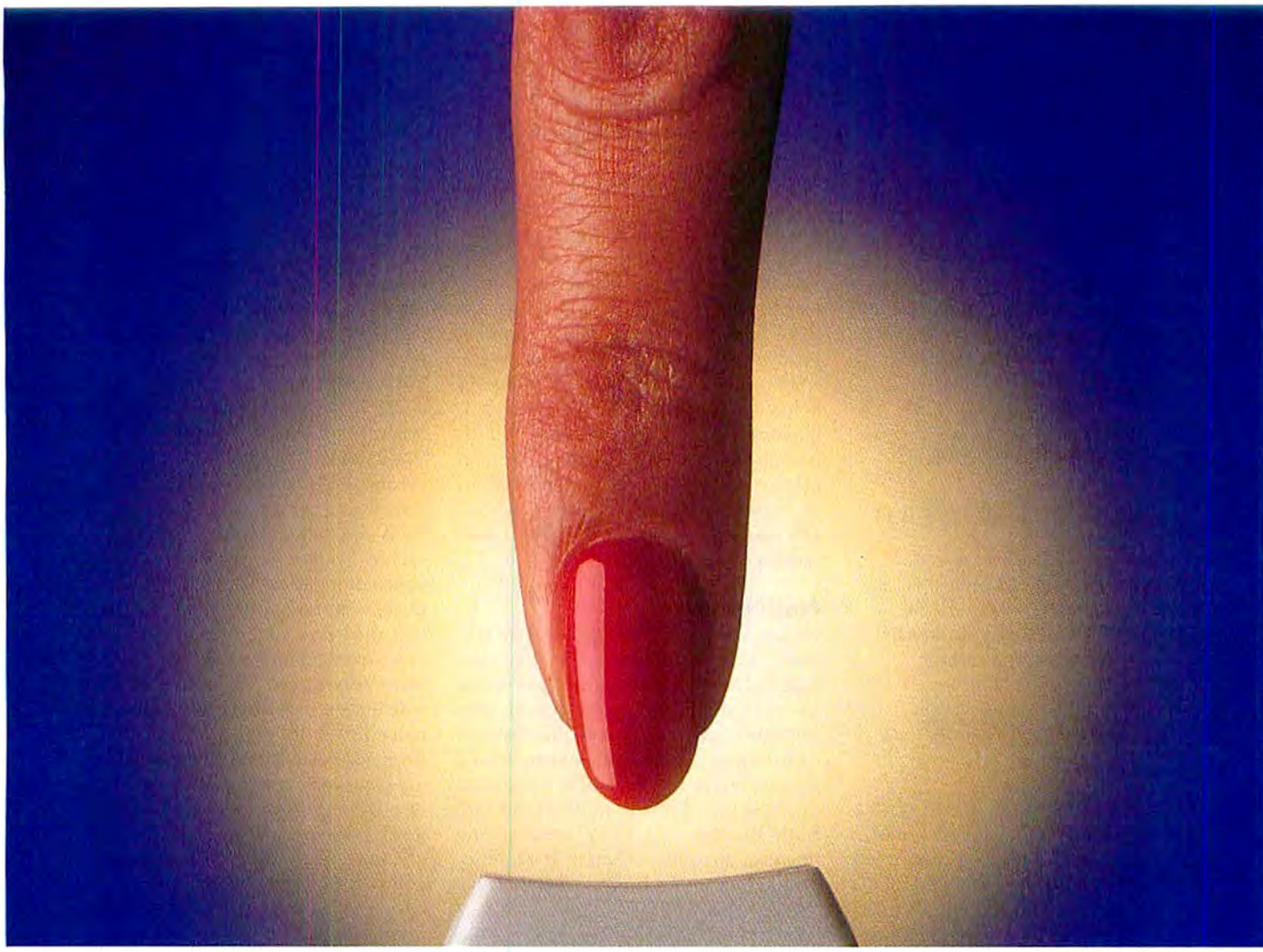
BPW, on the other hand, offers much less help. Essentially, the manual has been digitized into stark templates (files are named with DOS-style acronyms). There is no sample text styling, just content suggestions written in single-space, hard-to-read italics. For a businessperson unfamiliar with the niceties of page layout, let alone the arcane language of finance, the lack of a well-designed presentation is a big omission. Also, instead of folding advice into the pertinent text, BPW needlessly separates useful tips in a printed list. This is misguided handling of otherwise solid information.

The Last Word

Despite the similarities in structure and specific advice, Business Plan Writer falls short of BizPlan's surefooted ability to lead novice proposal writers through a long and difficult process. For businesses ranging in size from garage-based tinkering start-ups to large concerns with a profitable history and a battery of vice presidents, BizPlan offers an excellent, easy-to-follow blueprint for a money-raising proposal that even gimlet-eyed bankers will respect and perhaps fund.

—JEFF S. DAWSON

Anderson & Lembke, Inc.



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OneWorld Internet 1.0, 700 Series

Internet Gateway

PROS: Provides easy and relatively cheap Internet services for multiple users over an Ethernet network; no IP or Unix knowledge required; simple to install; great documentation. **CONS:** No advance notification to end users of Internet-access disconnection; administration software must reside on QuickMail server. **COMPANY:** Global Village Communication (408/523-1000). **LIST PRICE:** $1699, plus monthly service fees.

MW ★★★★

MW LAB WHILE OBTAINING INTERNET access is relatively easy and inexpensive for an individual user, providing access to a network of users can cost a bundle and frustrate even the most dexterous network manager. Thankfully, Global Village Communication has just released OneWorld Internet (OWI). This tiny box, no bigger than a midsize dictionary, is your golden ticket to providing Internet E-mail and file services across your LAN.

OWI provides a LAN-based, V.34, 28.8-Kbps, PPP (Point-to-Point Protocol), dial-up connection to Global Village's Internet server. (Future versions of the product will include options for speedier ISDN connections.) Accessing the Internet via Global Village's server simplifies the process and reduces hassles. Network newbies who cringe at the thought of tangling with IP addresses or configuring complicated E-mail gateways can breathe a sigh of relief; you don't need to know Unix to install OneWorld, and the process takes mere minutes. OneWorld Internet easily integrates into your existing network infrastructure.

On-ramp in a Box

Installation procedures for OneWorld Internet are easy to understand. The succinct documentation leads you through each phase, including installing a new QuickMail mail center (OWI uses QuickMail to send and receive Internet E-mail) and installing the administration software (GlobalCenter Manager) used to control the OWI server.

When first launched, GlobalCenter Manager provides a straightforward electronic questionnaire that polls you for information, including your means of payment (Visa, MasterCard, American Express, electronic funds transfer, or company purchase order) and your preferred domain name. The information is transmitted to Global Village Communication for processing, and within seconds you're ready to land your saucer on the electronic frontier.

OneWorld: Two Internet Services

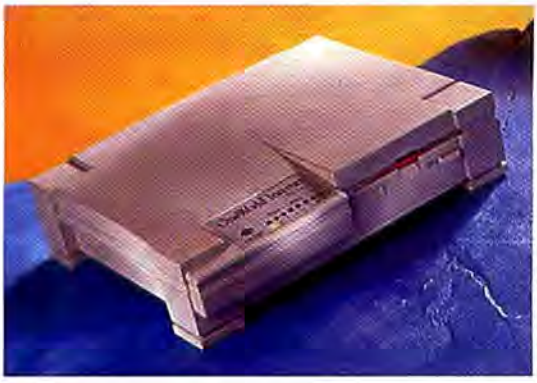
OneWorld Internet provides two distinct services: E-mail and direct Internet access. Each has its own performance and feature issues.

The E-mail portion of the service is easy to use and administer. Through GlobalCenter Manager you access administration options, including restricting access to Internet mail and granting users the ability to send urgent E-mail (see "Letters Online"). End users need only learn how to address an Internet message from the QuickMail client. Plenty of users' guides are provided to help them with this task.

The administration options for direct Internet access are sparse. You can enable or disable direct access and limit the network group's total access time per day in minutes (see "Net Rations"). Global Village says it considered adding more-robust Internet-access accounting, but the additional code would have required more overhead in RAM and disk space.

One major problem with the way OneWorld Internet limits users' access time is that they aren't notified until after they've been disconnected. Global Village Communication is working on a desktop utility that will inform users of the time remaining for their Internet connection. It will be available during the spring of 1995 and will be sent at no cost to registered OWI owners.

Unfortunately, it is not possible to administer OneWorld Internet remotely. This liability is especially cumbersome because the administration software must reside on the QuickMail mail center, and most administrators prefer to tuck their servers away in less than accessible locations.



RICHARD RETHMEYER

Letters Online OneWorld Internet's administration software provides just enough options to make E-mail management a snap. Options exist for restricting access to Internet E-mail as well as determining the level of urgency with which it's forwarded over the Net.

Speed Bumps on the Infobahn

One clear advantage of OneWorld Internet is that it provides transparent access to the Internet. OWI users do not have to cope with modem strings, dialog boxes, and other egregious annoyances; the Internet simply appears on the individual user's desktop via his or her company's network. No dialing out is necessary. For users, this, in and of itself, is worth the price of admission.

To determine the performance of OneWorld Internet, I ran real-world tests. I sent vast amounts of E-mail to various locations across the Internet, including addresses on online services such as CompuServe. I was generally pleased with the speed at which E-mail was handled and forwarded, although a couple of messages took several hours to reach their destination. (Due to the server hopping that takes place on the Net, it's not possible to pin the blame for this on OWI.)

For Net surfing, Global Village provides GlobalCenter Web, a no-frills application for logging on to Web pages and browsing FTP sites. However, our panel of experts preferred Netscape Navigator from Netscape Communications as a means of navigating the World Wide Web (415/528-2619; reviewed in *Macworld*, May 1995).

To gauge direct Internet access performance, I enlisted the aid of six coworkers who pounded away at various Web pages and FTP sites. FTP performance sagged dramatically when we were all pulling files from the Net. Web brows-

continues

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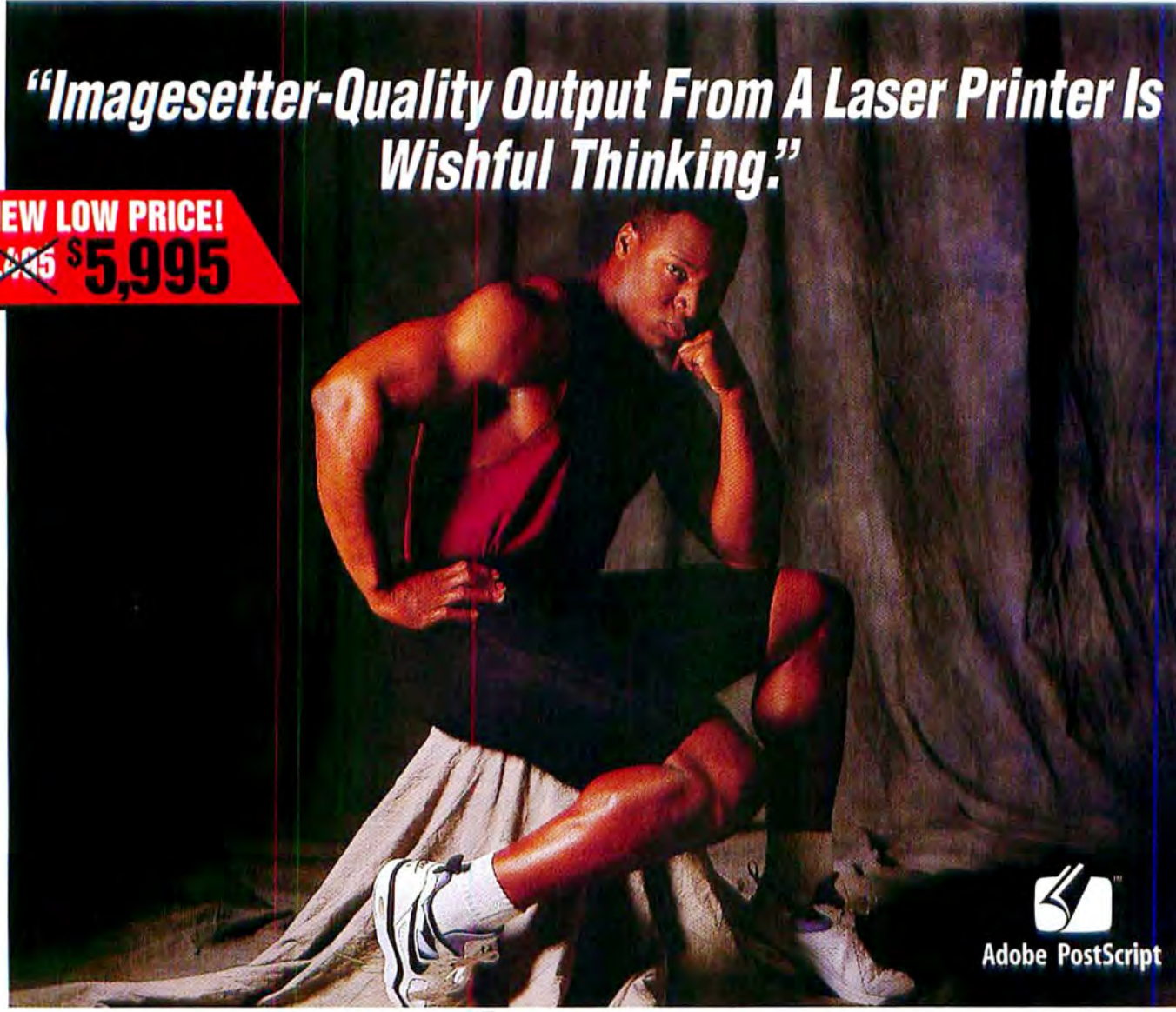

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ing did not suffer as significantly, primarily because of the different bandwidths Web browsing and file pulling command. Web browsing is basically online reading; downloading a file is 100 percent data transfer.

What Price the Info Superhighway?

The pricing for OneWorld Internet separates E-mail services from general Internet access. The monthly fee for E-mail starts at $49 for ten or fewer users, while the cost is $4 per user for 11 to 25 users, and $3 per user for 26 to 50 users. On a per-user basis, this is relatively inexpensive, as Internet E-mail is a fast, useful, cost-effective means of communication.

OWI charges $3.95 per hour for Internet file services such as FTP, Gopher, and Web-browsing, or a flat fee of $249 per month for unlimited access.

Net Rations Limiting daily Internet-use time is a simple safeguard for keeping costs in check. Future versions should have expanded accounting functions to check up on excessive cruising.

This might sound high, but multiple users can access the Net over this connection simultaneously. Also, you establish the PPP connection over an 800 number, so there are no long-distance charges.

The Last Word

Global Village Communication has great plans for OneWorld Internet. These include increasing the number of E-mail packages that OWI works with, as well as building more business-oriented Internet browsing tools.

Meanwhile, the E-mail aspect of OWI is an outstanding resource for end users. On the other hand, the direct Internet aspect suffers from a few problems: the administration tools provide an on/off switch to the Internet for your entire organization only; a more robust model that could dole out individual-user access would be better. OWI also needs to support remote administration.

Still, OWI is a solid solution for small to midsize networks. If you need Internet E-mail and access to the world's largest information base, then get OneWorld Internet.—MATT CLARK

Reno Portable CD-ROM Player

Portable CD-ROM Player

PROS: Easy to set up and use; carrying-case design and drive's battery placement aid use as portable CD-ROM drive or stand-alone audio-CD player; includes adapter to connect with PowerBook SCSI; CD controls are easy to access. **CONS:** Short battery life.
COMPANY: MediaVision (510/770-8600).
LIST PRICE: $349.

MW ★★★★

MW LAB MEDIAVISION'S RENO PORTABLE CD-ROM Player is lightweight, easy to use, and versatile. Although designed with PowerBook users firmly in mind, the Reno has a major drawback for them: short battery life. Still, in terms of portability, the Reno has no serious competitors. It is ideal for people who work in a hotel room while on the road or who share a CD-ROM player between work and home.

The Reno player has two parts: a consumer-style portable CD player and a SCSI-2 interface adapter called a dock. These parts snap together with ease, connected by a parallel port sandwiched between them. Like many portable audio-CD players, the Reno opens on the top and requires no caddy. Without the SCSI dock, the Reno plays only audio CDs.

Reno users will appreciate the well-labeled controls and front-panel LCD. The LCD shows the current track, flashes "busy" when sending data to the computer, and reports status such as "on," "open," and "no disc." Volume controls and a stereo miniheadphone jack are both located near the front panel. A line-out stereo minijack on the dock provides connection to a set of external speakers. A mechanism on the front locks the lid and disables the front-panel buttons so a bumpy flight doesn't disturb playback.

ROBERT PERRY

The Reno includes a spiffy carrying case complete with shoulder strap. Stereo headphones and a PowerBook SCSI adapter are also included. The manual is simple, clear, and concise. The driver, an older version of FWB's CD-ROM ToolKit, includes software caching to complement the Reno's 64K hardware cache.

The Reno Portable is not fast. The double-speed mechanism performs at roughly the same speed as Apple's internal double-speed CD-ROM drive. As always, speed is not that important: such drives are slow no matter how you slice it, and faster mechanisms typically do not benefit multimedia applications (see the feature "Quad-Speed CD-ROM Drives," in this issue).

The Reno can easily be used on a plane or train, but short battery life and inadequate power management complicate matters. Both the CD player and the dock take AA batteries—the player takes four, and the dock, eight. (The Reno uses the player's four batteries only when operating as a stand-alone CD player.) Tests showed that, on a PowerBook 520, rechargeable nickel-cadmium batteries provide only 20 to 30 minutes of use, and standard alkaline batteries, about an hour. These results might suffice in a pinch, but given the added weight of batteries and a recharger, I favor waiting until I am in a comfortable hotel room and then using the Reno with its AC power adapter.

My only other complaints are minor. If you dismount a CD, you must open and close the Reno's lid to remount the disc; attempts to mount CDs through software fail. Also, MediaVision doesn't offer a DC-lighter adapter for use in a car.

Because of an inventory problem, MediaVision was in bankruptcy last year, but the company is back on its feet now. I am not aware of any complaints about poor-quality products or poor technical support, and when I called support it was slow but helpful. The company is emphasizing customer support in hopes of returning to the distinguished position MediaVision held in 1993.

The Last Word

With the Reno, the Macintosh at last has a viable portable CD-ROM player. While its lamentable battery life doesn't give you the option of working with CDs on long flights or long commutes, users can easily carry the Reno along on trips or between work and home. For anyone who uses CDs while on the move, the Reno proves an excellent choice.—TIM WARNER

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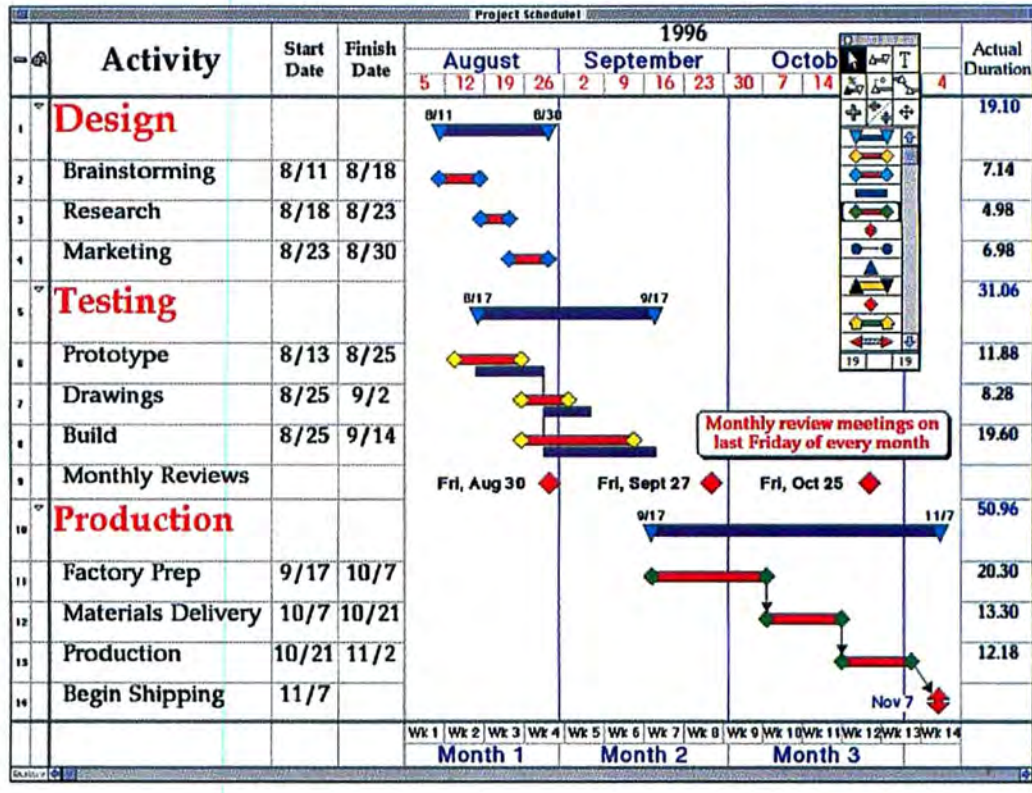

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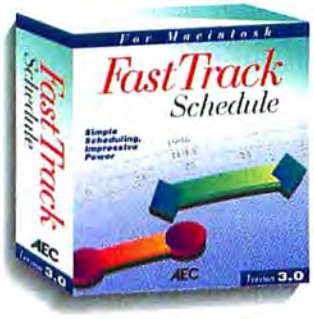

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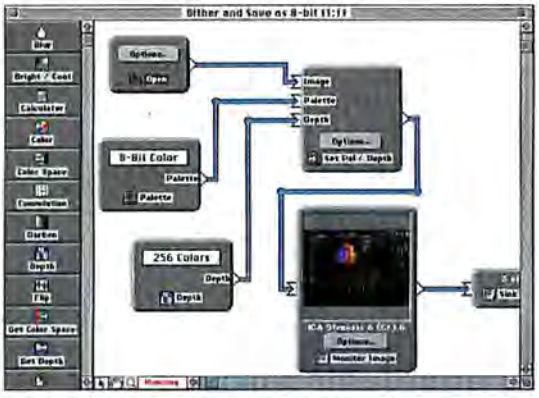
Gryphon Batch It

Batch Processor for Graphics

PROS: Straightforward, visual interface; compatible with Photoshop filters. **CONS:** No conditional statements; tiles not functional when work area is zoomed out. **COMPANY:** Gryphon Software (619/536-8815). **LIST PRICE:** $199.

MW ★★★

WHETHER YOU'RE CROPPING simple black-and-white drawings on a Mac Classic or applying Photoshop filters to 32MB images on a Power Mac 8100, if you need to perform the same sequence of operations on hundreds of files, Batch It may be for you. Batch It 1.0, a new utility from the developers of Morph, is designed to take the drudgery out of repetitive graphics processing jobs. Batch It runs on any Mac with System 7.1 or higher and has a minimum RAM allocation of 3500K.



Batch Mode This Batch It network opens 24-bit color images and converts them to an 8-bit depth.

To make batch processing accessible to beginners, Batch It avoids the need for a scripting language by using a visual approach that is similar to flowcharting. To define a sequence of operations, you select tiles from a scrolling palette and drag them into a work area on the right (see "Batch Mode"). (Gryphon refers to Batch It tile sequences as *networks*, not to be confused with hardware networks like Ethernet.) Each tile represents a single function, whether it's opening a file, getting an image's color depth, or converting an image to gray scale. The program ships with more than 30 different tiles, including one tile that enables you to apply Photoshop filters to images. You can place tiles anywhere in the work area, as long as individual tiles remain separated by at least 25 pixels.

Although the Batch It interface is appealing, it's not without a few deficiencies. For instance, it's all too easy for even modest networks to overwhelm small monitors. Batch It does let you zoom out to view more tiles, but you cannot modify or move tiles when you're in zoom mode. I also found that tiles became distorted when I dragged them into the work area in zoom mode and then reverted to normal magnification. Finally, because the work area is essentially infinite, the only way to find your tiles if you get lost is to scroll or pan around—Gryphon should include a function that would let you automatically jump back to your network.

The flow of data between tiles is determined by lines called *links* that connect tiles to one another. Depending on its function, a tile may have a number of input ports, which accept information from other tiles, and one or more output ports, which send data to other tiles. (Alas, there is no real support for conditional processing, so you cannot design a single network to process 8-bit images one way and 24-bit images another way, for example.) Creating a link is as simple as clicking on the appropriate ports of two files. Unfortunately, if you try to define an invalid link (by connecting an image output to an input that accepts only numerical values, say), Batch It simply refuses to create the link, without letting you know what's wrong.

Batch It networks always begin with an Open tile, where you specify which files to process. You can tell Batch It to search for files within any volume, and you can limit your search by name, label, date, or file type. (Batch It can open Photoshop, PICT, GIF, and TIFF files, and it is compatible with Apple Easy Open file translators.) A Save tile is usually last, since it determines where and under what name to store the processed images. When you are ready to go, you just select Run from the Batch menu to start the network running in the foreground or background. (Gryphon recommends additional memory for background processing.)

The Last Word

Despite a few quirks and deficiencies, Batch It is very handy to have around. It comes with more than ten useful preset networks to handle a variety of common image processing tasks, and customizing new networks is simple and fun once you get the hang of it.—FRANKLIN TESSLER

SpigotPower AV

Video-Compression Board

PROS: Excellent full-screen movie quality; modest storage requirements. **CONS:** Some limitations due to Apple AV architecture. **COMPANY:** Radius (408/541-6100). **LIST PRICE:** $999.

MW ★★★★

APPLE'S AV-SERIES MACS are ready-made for video production—almost. Although Apple builds video-digitizing circuitry into the AV models, it uses digitizing chips that are woefully inadequate for anyone except the QuickTime tinkerer. Forget making full-screen movies at the standard 30 frames per second (fps). However, the AV Macs contain a special connector, called the Digital Audio Video (DAV) slot, which provides direct access to the video data generated by the AV's digitizer. That's where Radius's SpigotPower AV comes in. It's a compression/decompression board that works with the AV's on-board digitizer to enable you to make full-screen, 30-fps flicks.

The SpigotPower AV works with the Quadra 660AV and 840AV and the Power Mac 7100AV and 8100AV but not the Power Mac 6100AV, whose expansion slot is used by Apple's AV Technologies board. The SpigotPower AV is compatible with the Power Mac 7100/66, but the slow NuBus-transfer rates may require the use of lower-quality settings for 30-fps movies. According to Radius, the Power Mac 7100/80 doesn't have this limitation.

For software, the SpigotPower AV includes an extension that adds two compressor/decompressor (codec) settings to QuickTime; a utility that plays back SpigotPower AV movies; and Print to SpigotPower AV, a plug-in module that lets you output final movies within Adobe Premiere. The SpigotPower AV does not include software for recording movies; you'll need the AV Macs' Fusion Recorder application or a program such as Adobe Premiere.

The SpigotPower AV software is not compatible with Apple's QuickTime 2.0; you must use version 1.6. (A 2.0-compatible version should be available by the time you read this.) Radius will also ship a free XCMD (external command) for playing full-screen SpigotPower AV movies within HyperCard and Macromedia Director. The XCMD and new extension will be available from

continues

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the Radius forum on America Online.

The SpigotPower AV does such a good job of compression that any drive with sustained throughput of at least 2.5MB per second works fine. (I used a 1.2GB Quantum Empire drive.) You need a hard disk whose driver software supports the AV Macs' SCSI Manager 4.3 software, and think big—expect to burn roughly 100MB to 150MB per minute for full-screen, 30-fps movies.

The SpigotPower AV is a breeze to use—connect video and audio gear to the jacks on the Mac and use the standard QuickTime dialog boxes to choose the SpigotPower AV codecs and quality settings. (The SpigotPower AV provides two codecs, both variants of JPEG.)

The SpigotPower AV complements an AV Mac's audio capabilities nicely—you can record in 44kHz, 16-bit stereo while capturing full-screen video. (Use Adobe Premiere 4.0.1—earlier versions contain a bug that results in loss of audio sync when using a 44kHz sampling rate.)

Although the SpigotPower AV is not designed for it, you can create full-screen, 30-fps computer animations using programs such as Pixar Typestry or Strata's StudioPro. When making the final animation, just select one of the SpigotPower AV's codecs in your animation application.

The SpigotPower AV captures movies in full 24-bit color, but because of Apple's AV architecture, the number of colors you can display during playback depends on the amount of video RAM (VRAM) you have. On a Quadra 660AV, you're limited to 256 colors, so movies look grainy and dithered. If you upgrade an 840AV to 2MB of VRAM, you can play back in 16-bit color. The Power Macs' AV card includes 2MB of VRAM and thus also plays back SpigotPower AV movies in 16-bit color.

The new SpigotPro AV ($1599), which will have its own 24-bit video-output circuitry, is scheduled to ship by April 1, 1995.

The Last Word

The SpigotPower AV was designed for CD-ROM movie production and for off-line editing—creating rough versions of videos whose final versions will be produced on high-end equipment. It excels at these tasks but is also suitable for creating in-house training or presentation videos, demonstration tapes, and other projects that require full-screen, full-motion video but don't demand broadcast-quality results. In short, the SpigotPower AV is a tremendously versatile board that puts the *V* in an AV Mac.

—JIM HEID

Disc-To-Disk

Audio-Capture Utility

PROS: Clear, crisp digital recordings from your CD-ROMs and audio CDs; easy, friendly interface. **CONS:** Cannot play a selection while recording it; lacks sound processing capability. **COMPANY:** Optical Media International (408/376-3511). **LIST PRICE:** $199.

MW ★★★★

DISC-TO-DISK, FROM OPTICAL MEDIA, offers an elegant solution to the problem of getting sound off a CD—any CD—onto your Mac's hard drive. (As with other copyrighted material, you should not copy sounds from a CD without first obtaining permission.) The program's simple, accessible interface lets you capture sounds with split-second precision and store them on your hard drive in a number of sound formats. The formats include SND (System 7's sound resource format), AIFF/AIFC (for use with sound-editing software), QuickTime movie, Sound Designer II (compatible with Digidesign professional sound-editing equipment), and Windows WAV.

Sounds may be recorded at any of six sampling rates (which affect the quality of the sounds you capture). The lowest resolution setting (11kHz, 8-bit sound) is fine for speech and basic sound effects on any Mac's speaker. For high-quality productions, you need CD-quality audio or the 44kHz, 16-bit setting; but you pay the price for this quality in hard drive space. It takes about 10MB to save a minute of sound. Two file-compression schemes, 3:1 and 6:1, allow you to make your files smaller, but there's a clearly audible sacrifice in sound quality. The only other sound processing tool provided is a volume control.

Disc-To-Disk Command Center You can direct the sound-capture process from a window with clearly labeled controls.

Disc-To-Disk's main window displays your selection's start and stop points. You can add a graphical waveform display if you prefer to select your material visually. You select the start and end points of a selection by dragging markers, or by using the arrow keys to choose the exact times in the numeric display. You can also enter your start and stop points via keyboard command while listening to a selection in Preview mode.

The program's Add to List feature lets you capture multiple sound bites and merge them into a single, uninterrupted production. Using System 7's drag-and-drop feature, you can drag an individual track from a CD onto Disc-To-Disk's application to launch the program and load that particular track.

The manual is brief and to the point, but most of what you need to know is included in a quick-reference card. The manual does contain helpful advice on using copyrighted material; you should read it before incorporating CD sounds into your multimedia projects.

The program ships on a CD that includes not only the Disc-To-Disk software, but also several dozen musical backgrounds and sound effects. These selections are well produced, but none are truly distinctive enough to use in any but the simplest presentations.

The program is able to capture sounds with split-second accuracy. I used selected sound bites from audio CDs, games, and multimedia CDs and easily assembled them into single files. When I compared the playback of sound files made in the 44kHz, 16-bit mode with the original material (using a high-quality multimedia sound system), reproduction was audibly indistinguishable. Recording is in real time, which means that a five-minute production takes five minutes to capture to a file. Although you can preview your work over and over again to be certain that the sounds you've selected will be recorded properly, you can't listen to your material while it's being saved.

The Last Word

There are other ways to record sound from a CD, of course. For example, if you have the latest versions of QuickTime and an Apple CD-ROM player, you can import the sounds into a movie-player program. But Disc-To-Disk's ease of use, simple selection of start and stop points, fast merging of multiple selections to a single file, and ability to save sound in a number of different formats make it an excellent tool for multimedia authors.

—GENE STEINBERG

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Reli 4830T

30-Bit Flatbed Scanner

PROS: Clear, crisp, high-quality scans; comes with huge bundle of software (some Power Mac–native); easy setup. **CONS:** Slow performance; quirky scanning software. **COMPANY:** Relisys (408/945-9000). **LIST PRICE:** $1699.

MW ★★★

THE BEST OF THE NEW GENERATION of 30-bit scanners can cost around three grand (see "Scanning beyond 24 Bits," *Macworld*, March 1995). If you want high-quality scans at a more affordable price, you may want to take a look at Relisys's Reli 4830T. This flatbed scanner offers 30-bit scanning and a hardware resolution of 400 by 1600 dots per inch.

The Reli 4830T comes with Adobe Photoshop 3.0.1; Caere's OmniPage Direct 2.0; HSC Software's Kai's Power Tools 2.1; MicroFrontier's Color It 2.3; and a scanning program, Art-Scan Professional from Jetsoft Electronic Imaging Systems, that comes in both 680X0 and PowerPC versions. A transparency adapter is also included at no extra cost.

Setting up the 4830T is relatively simple. The only drawback is that the SCSI ID selector uses DIP switches (so you have to consult the manual to set it), and you can reach the switches only by removing a small cover at the bottom of the scanner with a screwdriver.

The image-scanning software installs as a plug-in for Adobe Photoshop and includes a decent selection of image-adjustment tools. Art-Scan Professional's most notable features are autorotation, descreen/dewave (to remove halftone dots), sharpen/unsharp mask, dot gain adjustment, and flip image (for use with slides). Other features include highlights, shadows, midpoint (gamma), saturation, and separate color-adjustment tools, as well as eyedroppers and histograms to fine-tune your scans. The program provides two automatic image-adjustment settings and offers batch scanning.

The 4830T has three speed settings. The fastest produces barely acceptable images but is useful if you need to scan artwork for position only. The speed difference between the other two settings isn't drastic, so I stayed with the slowest speed for the best possible image quality.

Art-Scan has an interesting feature, SpeedLiner, that autotraces line art and saves it as an EPS file. While this capability works well, it's unbearably slow. It took more than ten minutes to tackle a simple 3-inch-long piece of line art.

Despite its wealth of features, the scanning software was a bit of a bear to work with. The version of Art-Scan Professional packaged with the scanner, 3.51, crashed consistently on my Power Macintosh 8100/80. A phone call to Relisys and then to Jetsoft got me a later version (3.53R). The new version was better behaved, but it crashed a couple of times when I tried to scan a letter-size line drawing.

Gray-scale and color photos reproduce well, although you can almost always get better results by adjusting the artwork further in Photoshop. Line art comes out sharp and relatively free of jagged edges.

The price you pay for this quality is slow performance. The 4830T ran at less than half the speed of my old, well-worn Hewlett-Packard ScanJet IIc. Previews took a minute or longer, depending on image size. I gave up on Art-Scan's full-automatic function—which previews, scans, and provides the finished scan in a Photoshop window—because it was unable to crop to the size of the artwork. In automatic mode, the scanner head traverses the full 14-inch length of the 4830T even for a small piece of artwork, and it produces a 14-inch-deep document window. Optical character recognition is also slow: it took more than a minute to scan a single letter-size page.

ROBERT PERRY

The Last Word

For the money, the Reli 4830T is a bargain. You get good-quality scans of line-art, gray-scale, and color images, and there's a lot of useful software to work with, too. The 4830T's biggest problems are slow performance and quirks in the Art-Scan Professional software. But if you can accept these limitations, this is one scanner you may really learn to like.

—GENE STEINBERG

Digital Chisel 1.2

Multimedia Authoring Tool

PROS: Built-in quiz functions; automatically compiles database of user responses; good range of interactive controls. **CONS:** Quirky, non-Mac interface; weak painting, drawing, and text tools. **COMPANY:** Pierian Spring Software (503/222-2044). **LIST PRICE:** $199.95, site license $995.

MW ★★★

DIGITAL CHISEL IS AN ENTRY-level multimedia tool designed especially for creating educational presentations. Like most authoring tools, this package lets you combine text, graphics, sounds, animation, and QuickTime movies into integrated, self-running presentations. But Digital Chisel also contains tools to create interactive quizzes and compile the results in a database. Unfortunately, the program's decidedly non-Mac interface can make designing presentations awkward and confusing.

Projects consist of screens, or slides. Digital Chisel includes a set of basic drawing and painting tools for creating layouts. You can create fields for text, which you type in or import. In addition you can add PICT graphics, AIFF sounds, and QuickTime movies to screens. You can navigate using the VCR-like controls on the navigation palette.

Overall, the Digital Chisel design tools operate in nonstandard ways. For example, when you select the paintbrush and click it on the screen, it doesn't apply paint as you might expect; only after you drag out a rectangle does the paintbrush start acting like a paintbrush. The program has other weaknesses: there's no zoom tool to change magnification; the paint palette includes a spray can, but you can't adjust the flow of paint; many of the program's menu commands, such as Reshape and Rotate, remain undimmed and accessible even when they can't be used on a selected object. Also, adding text to screens is awkward; to add even a simple title, you have to draw a rectangular text field using the pointer, then switch to the browse tool before typing.

These failings aside, Digital Chisel comes equipped with some very appealing features. For example, you can use modes such as ghost, transparent, and reverse to create better-than-average graphic effects. The program's library feature is also strong; you can import media files into a library and then add the files to a project simply by dragging them

continues

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from the library palette onto a screen.

When you're authoring a project, the program can be used in either normal mode or advanced-user mode. In normal mode, the program's features are limited, while the advanced-user mode lets you tap into the real multimedia features, such as adding path animations.

Despite its weaknesses, Digital Chisel is an appealing tool for setting up interactive projects, thanks to a set of powerful, ready-to-use interactive templates that allow you to set up question-and-answer training projects without scripting or programming.

Each template is designed for a specific type of question—multiple choice, true or false, and so on—and has interactivity built in, so that you don't have to set up individual button links. You replace the templates' dummy text with your questions and answers and then select the correct answer for each question. When the project is played back in user playback mode, the program automatically grades the users' responses.

Even better, you can set Digital Chisel to record user performance. You set up a database of user names and link it to the presentation. When a user launches a project, Digital Chisel records each answer, calculates the percentage of right answers, and even records the time it took for the user to complete the test.

The program's quiz functions and other capabilities can be linked to create interactive effects. For example, you can set up a project so that if a user gives a wrong response to a question, the program jumps to a screen that provides additional information on the subject.

Pop Quiz Digital Chisel's interactive templates allow you to set up quiz-style screens. The check mark indicates the correct answer.

The Last Word

Due to its nonstandard interface, Digital Chisel takes longer to understand than entry-level multimedia tools such as Gold Disk's Astound. But for authoring test-style educational programs, it's a superb tool, with sophisticated interactive capabilities that are easy to manage and that can produce polished and professional results.—JOSEPH SCHORR

theTypeBook 4.0

Type-Specimen Generator

PROS: Numerous customization options. **CONS:** You have to print out the manual from disk. **COMPANY:** Rascal Software (805/255-6823). **LIST PRICE:** $59.95.

MW ★★★★

IF YOU OWN A LOT OF FONTS, YOU might wish you had the services of a type librarian—someone who would catalog your collection so you could more easily find the fonts you need for a particular job. theTypeBook is the next best thing. It offers several layouts so you can print a catalog of your PostScript and TrueType typefaces.

The program includes six layouts, which you can print or view on screen. The Sample Page layout was best for my most frequent publishing task—choosing a text face for a newsletter, brochure, or the like. Each Sample Page displays a partial character set for a single font (upper- and lowercase letters, numbers, and a few symbols) in 9 sizes ranging from 6 point to 48 point. It also displays text samples with different combinations of point size and leading and gives copyfitting information such as capital-letter height and characters per pica for different sizes.

Type at a Glance theTypeBook offers six styles of on-screen or printed type-specimen pages. Shown here is the on-screen version of the Line Showings layout.

theTypeBook lets you print a keycaps table showing the characters produced by each keystroke or keystroke combination (especially handy for pictorial fonts); a complete character set (1 font per page); a partial character set (up to 15 fonts per page); a character-set/text-block combination (6 fonts per page); or an index, with one line of sample text per font.

Show Me Your Face

You can select all your faces at once, include or exclude bitmap fonts, or select just the faces you wish to print. Then, pick the layout you want, customize layout features such as page margins and footer text if you wish, and sit back while theTypeBook prints your typeface reference book.

Unlike a competing product, Agfa's TypeChart ($99), theTypeBook lets you customize point size and leading for the text blocks in the Sample Page layout, which is very helpful for showing the overall "color," or density, of a face at different ratios of point size to leading. The program also allows you to customize your catalog, adding a logo to the header, for example, or the font foundry's name to the page header. Another handy option lets you assign a face an alternate name—changing AJenson (for Adobe Jenson) to Jenson, say—so the specimen pages appear under *J* rather than *A* when you print your catalog.

But theTypeBook has a few disadvantages as well. My main beef is that you have to print out your own manual, which is included as a file on the program's disk. This endeavor costs you approximately 15 minutes of your time and 40 sheets of paper—time and paper that could be better used for printing type samples. When I spend $60 for a program, I expect a printed manual. (Tiny type and scaled-down figures make reading the manual on screen an unpleasant experience.) Parts of the documentation could stand to be clearer and more concise, and an index would be nice. The company assures me that a new and improved manual will be included with version 4.0.1, which is scheduled to be released shortly.

One more complaint: though you can customize the Sample Page's footer—displaying your company name and logo, for example—you must first enter a password. The manual states that this "prevents unauthorized modifications by supporting members of your staff," but I *am* my staff, so I would rather that this feature were optional.

The Last Word

For push-button simplicity in a type-specimen generator, TypeChart is a better choice. But if you don't mind navigating theTypeBook's lengthy manual (not to mention printing it out), you'll be rewarded with customization options that should allow you to create a type-specimen book that meets your needs.—ERFERT FENTON

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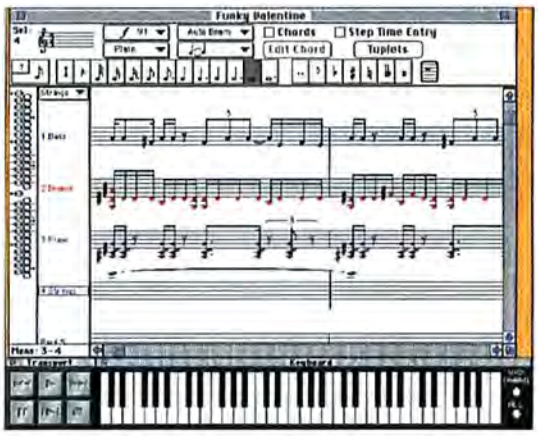
ConcertWare 1.5.7

Music-Notation Software

PROS: Excellent value; easy to use. **CONS:** Slow editing features; mediocre part-extraction function. **COMPANY:** Jump Software (415/917-7460). **LIST PRICE:** $159.

MW ★★★

TIME WAS WHEN CONCERTWARE was a cutting-edge product. Today, the first Mac program to permit note entry from a MIDI keyboard lags way behind the competition, which includes Opcode's Overture, Passport Designs' Encore and MusicTime, and Coda's Finale and Finale Allegro. While ConcertWare is not presently in the same league as those leaders in terms of performance or features, its price and ease of use make it a viable notation package, especially for the budget-wise.



Playback and Tools ConcertWare's interface offers you on-screen keyboard and transport controls for recording and playback of notated files plus all the tools required for music entry and editing. You select pitches from the stack of notes on the left, and you choose durations from the note values across the top.

ConcertWare's documentation states that the program requires the venerable but buggy Apple MIDI Manager, but I had no trouble running the program without it on a Mac IIsi and a Quadra 605. All the screen and printer fonts necessary for its operation come in the box, in Type 1 and TrueType versions. The sparse but well-written documentation covers all the program's features, and the included example files are helpful to the new user.

Note Entry

ConcertWare has always been strong in the note-entry department, and the latest version carries on that tradition. MIDI files import flawlessly, and it's easy to notate by step entry (a note or a chord at a time), using either a MIDI keyboard or ConcertWare's on-screen ersatz keyboard; and real-time recording is especially straightforward, with some of the practical click-and-move recording features you find in sequencing programs.

ConcertWare's scheme for handling quantizing notes—"rounding" them in recorded performances to account for human rhythmic error—is easy to figure out. You simply set limits (nothing shorter than an eighth note, say) by clicking on a note-value button in the Record menu's dialog box. Since you can play back tracks recorded in real time before inserting them into a score, you can decide whether you want to rerecord—a nice option.

Editing Scores

ConcertWare is maddeningly slow, even on an 040-based Mac, whenever editing requires any scrolling or screen redrawing. On the other hand, adding lyrics, titles, and guitar tablature is straightforward, and scores scroll during playback—handy for isolating problem areas. To help you keep intertwined parts straight in your mind, you can assign color values to note heads in musical lines.

Part extraction—separating a score into the musicians' individual parts—is the bane of many midrange music-notation programs, including this one. ConcertWare's part-extraction printout shows the score with all other parts blocked out. To simply deliver the goods to the music stands, this approach may suffice, but it's not up to publication standards.

ConcertWare continues to offer three unique capabilities. Its Instrument Maker invites you to experiment with sound waveforms, which you can play back through your Mac's internal speaker. If you need to add your score to another program that can read PICT files, you can import ConcertWare screen displays with their PostScript font information intact. And you can save files as HyperCard scripts for running sound devices through your MIDI interface.

The Last Word

ConcertWare has more features per dollar than any midrange notation program. It's much more robust than MusicTime, at the same outstanding list price, and it's easy to learn and use. Though it's due for an upgrade to take care of its slow performance and substandard output, it's worth checking out.—RICHARD FENNO

VideoDirector 1.5

Video-Editing System

PROS: Interface is similar to home-video equipment; can organize and categorize clips. **CONS:** Infrared controller does not work with some VCRs and Macs. **COMPANY:** Gold Disk (408/782-0200). **LIST PRICE:** $199.95.

MW ★★★

IF YOU'RE LIKE MANY WEEKEND VIDEOgraphers, those camcorder shots of the kids in the pool are gathering dust on a shelf somewhere. VideoDirector is designed to help you log and organize this priceless footage. (For a look at VideoToolKit, another videotape editor, see *Reviews*, *Macworld*, September 1993.)

VideoDirector is aimed primarily at home users with consumer-level video equipment, although schools and other institutions may find it useful. Using the included Smart Cable, you can copy material from a source deck (typically a camcorder) to a record deck (usually a VCR). To control the source, VideoDirector uses an interface called Control-L, common on Sony camcorders and some other brands. The Mac end of the cable plugs into either serial port. VideoDirector also requires audio and video connections between the source and record decks, and you'll need a television or monitor to see what you're editing.

VideoDirector operates the record deck by sending it infrared signals from a small transmitter on the Smart Cable. The package's programmed codes work with most VCRs; if your VCR is incompatible, you should be able to train VideoDirector to control it using your deck's hand-held remote control. Unfortunately, I couldn't get my two Zenith VCRs—both of mid-1980s vintage—to respond to VideoDirector, even after months of trying and repeated calls to tech support. (Gold Disk claimed that my machines were the only VCRs it knows of that don't work with VideoDirector, but I have seen online reports of other incompatible VCRs and Macs.) A high-end Sony model fared much better, after a few glitches in getting the VCR to respond consistently to pause signals from VideoDirector.

Once you've set up the hardware, video-editing is straightforward. First you scan your tapes and log the clips you want to keep; VideoDirector's software emulates the controls on many VCRs, so it's fairly easy to master. As you go, you mark the start and end points for each segment.

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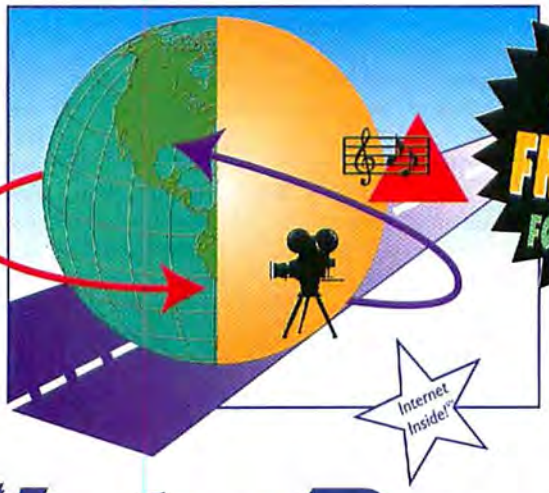

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Circle 95 on reader service card

The manual recommends that you give your shots recognizable names like "Junior Eats a Fly." (You can also identify clips by capturing single frames with a QuickTime-compatible digitizing board.)

The more precisely that VideoDirector can identify the start and end points of your clips, the better the finished product will be. Alas, most camcorders do not provide frame-accurate data (although VideoDirector is compatible with some higher-end home decks that include time-code information). To improve accuracy, VideoDirector lets you specify calibration events that last for only a single frame. Every tape must include at least one calibration frame, and it often helps to have more than one, especially for long tapes.

As you log each clip, an entry showing the clip's attributes appears in the Tape Library window. You can limit the display to clips with specific names or dates, or include only the clips in an assigned category. After you have logged the tapes, you create an Event List that specifies the order in which clips will appear in the final tape. You drag clips to the Event List from the Tape Library window. It's easy to review clips and fine-tune their start and end points. VideoDirector takes the clips in the Event List and automatically copies them to the record deck, pausing only to let you recalibrate the source deck whenever it encounters a calibration event.

Final Assembly VideoDirector automatically pauses the record deck while it searches for the next clip on the source tape.

The Last Word

VideoDirector does as well as can be expected with low-end video hardware. The quality of your edited tapes depends on the type of equipment you have and on how carefully you've logged the source clips. You can't perform fades, wipes, and other special effects, but VideoDirector isn't designed to compete with professional digital-video systems. VideoDirector is an acceptable choice for routine editing; just make absolutely sure you can get your money back if you run into problems.—FRANKLIN TESSLER

PixelPutty Solo

3-D Modeling Program

PROS: Capable spline-based modeling tools; affordable. **CONS:** Needs other programs for image output; still has some operational glitches; hit-and-miss manual. **COMPANY:** The Valis Group (415/435-5404). **LIST PRICE:** $349.

MW ★★★

IF YOU WANT TO DO SOPHISTICATED 3-D modeling but can't afford to spend thousands of dollars, PixelPutty Solo may be the program for you. Derived from the PixelPutty plug-ins for Pixar's Showplace/MacRenderMan, PixelPutty Solo is a full-fledged, stand-alone modeling program that lets you manipulate 3-D objects as if you were working with clay.

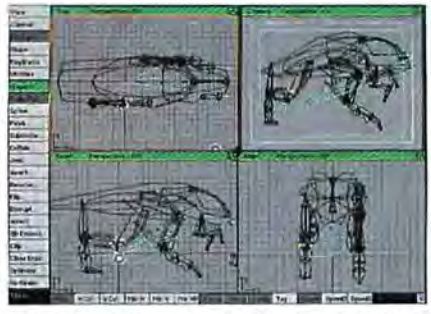
Simple Environment

PixelPutty Solo's modeling environment is straightforward. The buttons of its immovable, context-sensitive tool palette have names rather than icons. Pushing buttons activates tools and deploys tool subpalettes.

You can extrude, lathe, and loft objects from 2-D spline curves, or assemble models from PixelPutty Solo's collection of editable primitives. You can edit every object at every vertex; a button bar below the workspace lets you isolate individual points or splines for precise manipulation. All objects are built with internal spline backbones.

PixelPutty Solo builds objects using nine spline types, and it can combine diverse splines when building the surface mesh of an object to provide exceptional object-editing flexibility.

PixelPutty Solo includes some interesting modeling tools. The Disrupt tool produces random distortions of the surface mesh. The 3D Emboss tool uses PICT images to deflect the surface mesh. And the Collide tool produces Boolean effects by computing the interaction of overlapping objects and building a new surface mesh.



Spline Modeling A spline-based modeler, PixelPutty Solo excels at producing organically shaped objects, like those used to assemble this insect.

The program includes simple but effective keyframe animation tools to produce surface deformation and morphing effects. It also has a flip-book feature for adjusting object motion, but it's not a full-featured animator.

PixelPutty Solo produces quick test renderings in its camera view using flat-shading, Gouraud, and Phong techniques, but it can't save files from these images. For image output, you must either export your models or have MacRenderMan installed in your system.

The program exports models in DXF, RIB, and 3DGF formats, letting you transfer files to other rendering and animation packages such as Specular International's Infini-D. If you have MacRenderMan, you can use PixelPutty Solo's Render Setup command to gain access to MacRenderMan's setup dialog boxes. And PixelPutty's Render command displays options for PICT and RIB output, as well as for previewing MacRenderMan images in the camera window.

PixelPutty Solo is not difficult to learn and use, but it can feel a little unfriendly. This is due largely to a barebones interface that lacks prompts and offers little feedback. Moreover, PixelPutty Solo doesn't always behave like a Macintosh program. For example, to select objects you must ⌘-click on a vertex. Also, I found it impossible to select multiple vertices, whether on parallel splines or as a subset of a single spline—neither the ⌘-drag technique suggested in the manual nor the Mac's standard shift-click worked.

Sadly, the manual isn't very helpful. It overlooks the operational guidance that novices need, it lacks informational depth, and its tutorials are hampered by poor graphic reproduction. At least the manual is a well-organized menu and tool reference. I suggest reading all of it.

Finally, system requirements are fairly steep. For serious work, I recommend doubling the suggested minimum of 8MB of RAM and using a fast Mac. However, PixelPutty Solo is not yet Power Mac native, and its floating-point coprocessor requirement prevents it from running in emulation mode.

The Last Word

PixelPutty Solo is a competent modeler that represents a good value for frugal 3-D designers. And if you're already using Showplace/MacRenderMan, PixelPutty Solo lets you expand your modeling capabilities while preserving your rendering investment.—CARLOS DOMINGO MARTINEZ

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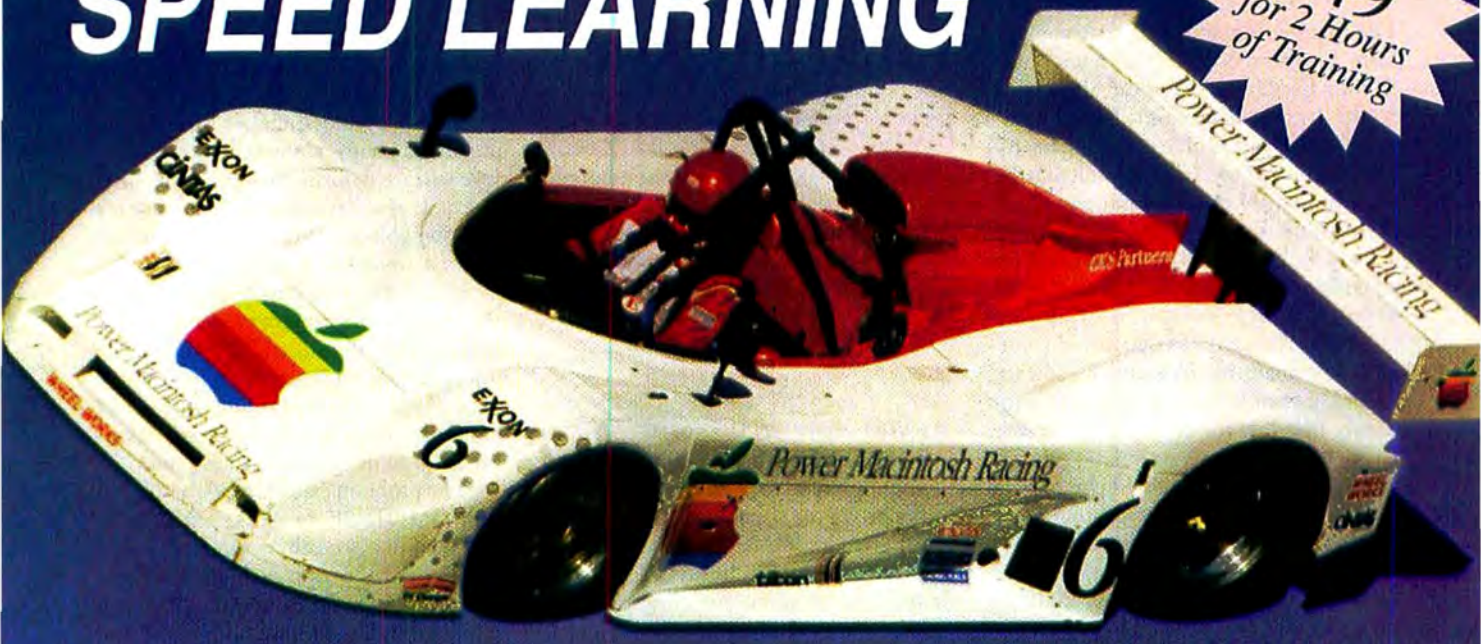

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SprintScan 35

35mm Transparency Scanner

PROS: Easy to set up and use; faithful image capture. **CONS:** Noisy fan. **COMPANY:** Polaroid (617/386-2000). **LIST PRICE:** $2495.

MW ★★★★

POLAROID'S NEW SPRINTSCAN 35 lets you conveniently transfer images from 35mm slides or negatives to a Mac. With a footprint not much larger than that of many external disk drives, the SprintScan is compact enough to find a place even on a crowded desktop. (Unfortunately, the SprintScan's contoured case makes it hard to stash loose slides and other small objects on top of the scanner.) The back panel sports a standard power-cable receptacle, an on/off switch, two 50-pin SCSI connectors, and a tiny rotary dial that lets you select the SCSI ID number. A recessed slot at the front of the SprintScan accepts 35mm slides in standard 2-by-2-inch mounts. You can also scan unmounted strips of film by inserting them into a hinged plastic carrier that loads into an opening on the right side of the SprintScan. As you push the carrier through the scanner, you feel a slight click as each image on the strip moves into the proper position for scanning.

The SprintScan installer program loads the driver software and a plug-in acquisition module onto your hard drive. The module lets you scan images directly into Adobe Photoshop and into applications that support Photoshop plug-ins; a limited edition of Photoshop comes with the package. Polaroid's software allows you to customize various scanning parameters, including scaling, cropping, brightness, contrast, gamma, and color saturation. There's even a control for sharpening or softening the image, and settings can be saved for later use. (For those who prefer not to tinker, the SprintScan's autoexposure button does an excellent job of adjusting brightness and exposure automatically.) You select the scan resolution from a pop-up menu, and another pop-up lets you choose from 19 popular types of transparency and print film. (You can also choose from generic settings for color and black-and-white slides and negatives.)

I put the SprintScan through its paces with a variety of mounted and unmounted positive and negative images, including under- and overexposed subjects, and got uniformly impressive results. (The scanner samples at 10 bits per color and produces output with 8 bits per color.) The SprintScan was consistently able to capture subtle differences in tone and shading, and detail was excellent at the scanner's higher-resolution settings. Scanning times were acceptably low, ranging from less than 30 seconds at 150 dpi, the scanner's lowest resolution, to 2 minutes at the high end (2700 dpi).

My only complaint is that the SprintScan's fan is loud enough to be bothersome in a quiet room. The manual is thorough and clearly written, although it describes a feature that would let you adjust tonal balance graphically but that hasn't been implemented. The SprintScan carries a one-year warranty, and technical support is available via a toll-free number.

The Last Word Although a trifle noisy, the SprintScan 35 offers a cost-effective way to get 35mm images into your Mac with a minimum of fuss. I recommend it highly.—FRANKLIN TESSLER

SCOTT PETERSON

Theorist 2.0

Mathematics Software for Students

PROS: Fast, palette-based equation entry; easier graphing than with other programs; short learning curve; runs on any Mac. **CONS:** Less capable than Maple or Mathematica on big problems. **COMPANY:** Waterloo Maple Software (519/747-2373). **LIST PRICE:** $299.

MW ★★★★

THEORIST, ONE OF THE first symbolic-math programs for the Mac, has found a new home at Waterloo Maple Software. Theorist 2.0 offers a nice assortment of features that make it a first choice for mathematical exploration by students.

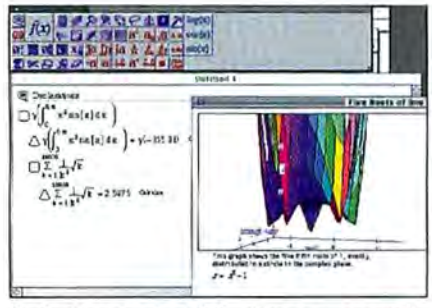
In fact, for a student taking a freshman calculus class in college, this is a great application. It doesn't automatically resolve complicated symbolic integrals—you have to do some manipulation yourself—but this very fact makes it a great complement to traditional classroom work. However, as a tool for a practicing theoretical physicist, Theorist wouldn't be very useful. One can deduce the relative target market by comparing Theorist's manuals, where Bessel functions are considered an advanced topic, with the manual for Wolfram Research's Mathematica, where tensor algebra is considered advanced.

But even though Theorist isn't intended for high-end users, it has a great strength: its interface. Once you get accustomed to the sometimes quirky palette conventions (what would you guess the hammer icon does? The lightning flash?), you can enter an equation with just a few clicks, graph or simplify the equation with a single click, and tinker with it endlessly. The interface encourages exploration, and the tutorial makes this exploration easy and entertaining and clearly reflects lots of feedback from users. Maple's claim that Theorist 2.0's "click-and-solve" technique means you don't have to learn a programming language to do useful math work is justified.

On a Power Mac 6100, Theorist calculates sums of 20,000 terms in a series as quickly as you can press the return key. Perhaps even more impressive than its calculation powers is Theorist's willingness to run on any Mac, from a Plus up. This makes symbolic math accessible to high-school classes, many of which don't have the hardware to run behemoths like Mathematica.

Theorist's excellent table feature is a joy to use at Power Mac speeds, and graphing is an instant, one-click operation. Symbolic math works significantly more slowly than numerics, however, and the built-in symbolic-expression library hasn't been expanded much over that of Theorist 1.5. For example, if you want to do most fancy trig integrals, you have to set up integration by parts yourself. Still, if you're taking a calculus course, that's part of your education.

The Last Word With Theorist, your old SE can solve serious engineering math problems, and your Power Mac will rip through them as fast as you can click. It doesn't handle the kind of big problems that call for Maple or Mathematica, but you can learn Theorist in an afternoon and take on any challenges in the undergraduate math curriculum.—CHARLES SEITER



Math, Graphs at a Click Once you get used to Theorist's palettes (lightning means transform, hammer means expand), you can set up, solve, and graph equations with minimal typing.

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RCD-1000

CD-Recordable Drive

PROS: Reasonable price; easy-to-use software; supports multisession recording; 2× recording speed. **CONS:** Software quits randomly; drive is noisy. **COMPANY:** Pinnacle Micro (714/727-3300). **LIST PRICE:** $1995.

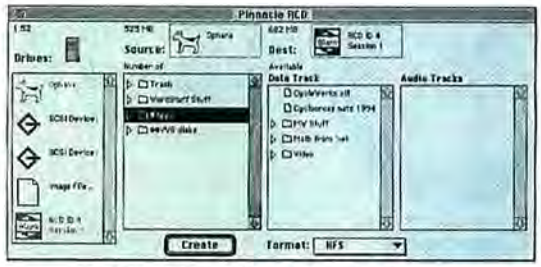
MW ★★

WHEN *MACWORLD* EVALUATED recordable CD drives ("Desktop CD-ROM Publishing," March 1995), no drive had the speed, ease of use, and price we were looking for. The RCD-1000, the first Mac CD-R hardware-and-software system for under $2000, comes closer, but it's currently a tool for specialized uses and not convenient for regular data backup.

The RCD-1000 includes a 1MB cache and can record 600MB of data in about 30 minutes when running at its faster 2× speed. But the RCD-1000's software needs work.

To create a CD using the *RCD-1000*, you first drag the icon of the hard drive containing the data into the software's source window. Next you drag the files to be recorded from the source window into the destination window. Then you choose the format (HFS, ISO 9660, disk image, file image, or audio) and press the Create button. So far, so good.

Unfortunately, in my tests the software quit numerous times. While some crashes were random, others seemed to happen when I tried to record several QuickTime, application, and text files. My first crash occurred while writing a CD-R disc. The crash interrupted the data flow to the disc and rendered it unreadable. Since I couldn't predict which files would cause the problems, I always ran the software's test mode, which simulates writing data to a CD-R disc without actually doing it. When the test mode succeeded, I could record data onto a disc. This data testing doubled the amount of time it took me to create a CD-R disc but reduced the number of ruined discs.



Clever but Unfinished The RCD-1000's interface lets you set up a CD-R recording session in a minute.

The RCD-1000 didn't record every time, however. For example, I could not record all of the folders that contained 10 to 40 short sound files, but I was able to back up these files to a SyQuest and to tape.

Some CD-ROM drives, including Apple's standard 300i and 300 Plus, could mount only the first session of the multisession discs I created with the RCD-1000. The data on later sessions was inaccessible.

According to the company, the problems are caused by the Mac's HFS file structure. It recommends recording the data from a fast, dedicated hard drive to the RCD-1000 in a disk-image format, thus creating a block-by-block copy of your hard drive. Pinnacle also recommends using multiple disk images to create multisession CD-ROMs that most CD-ROM drives can read.

The Last Word The RCD-1000 performed satisfactorily as a device for creating one-off CDs and for archiving most data in a single session. But its inability to record all of the standard Macintosh data that I threw at it, and the lengthy testing process required to ensure successful writing, limit the RCD-1000's usefulness as a day-to-day backup device. The promise of inexpensive random-access data backup remains unfulfilled.—JIM FEELEY

Peanuts Family Organizer 1.0

Personal Information Manager

PROS: Cute; inexpensive. **CONS:** Feature-poor; slow printing; can't read events in monthly view. **COMPANY:** Individual Software (510/734-6767). **LIST PRICE:** $19.95.

MW ★★

THE PEANUTS FAMILY ORGANIZER is a cute and cuddly calendar/address-book program featuring cartoons of Charlie Brown, Snoopy, and other "Peanuts" characters. It's a basic organizer for families, so it doesn't need the sophistication of a full-blown business PIM. But it's so feature-poor that most adults—and plenty of Mac-savvy children—will find it too limited, especially when compared with other low-cost organizers.

Each member of a family can have his or her own calendar and address book. The Family Schedule screen (the main interface window) shows the daily calendars for all family members side by side, so you can easily spot scheduling conflicts. You can also view individual calendars in expanded daily, weekly, monthly, and yearly views.

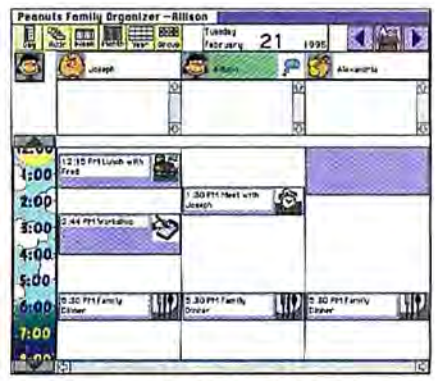
For scheduling family events, the program allows a family member to post events to other users' calendars, pending their approval. When other family members open their calendars, a dialog box appears asking them to accept the posted event. If they accept, the event automatically appears on their own calendars. The program also includes a message center, so family members can send messages to each other.

The organizer interface is pleasant. Up to 12 family members can each be represented by a "Peanuts" character icon. The time bar on the daily calendar is decorated with sunshine and clouds during the day and a starry night sky as you scroll into the evening. The program displays a new "Peanuts" cartoon daily, but there's no animation or sound, and the graphic quality of the art could be better.

The program's limitations are numerous. Weekly views show only event titles, not times or notes. The monthly view is worse: only the number of events scheduled each day is visible. Text is limited to black 12-point Chicago. You can't password-protect or otherwise restrict individual calendars or address books. The program also has a few glitches. Highlighted buttons sometimes don't work when you press return, and printing to a StyleWriter is slow.

The address-book functions are equally sparse. The layout contains fields for one address, notes, and three phone numbers. You can't categorize entries, autodial telephone numbers, or search by anything other than name.

The Last Word The Peanuts Family Organizer is inexpensive and has a few endearing features, but its performance is below that of even a basic program such as Claris Organizer. If Individual Software combined the program's cheerful interface with more-impressive PIM functions, it would become a far more useful and fun family computing tool.—JOSEPH SCHORR



Lucy Does Lunch The Family Schedule screen, shown here, displays the daily calendars of all the family members.

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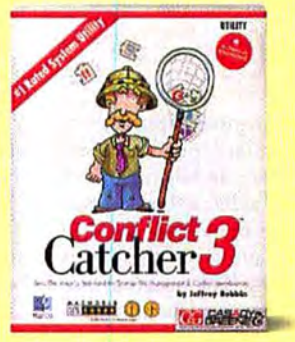

B. Conflict Catcher

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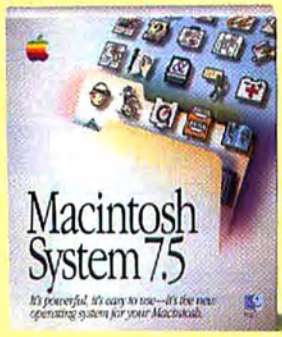

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DrawingSlate II

Digitizing Tablet

PROS: Light pen-pressure response; user-definable macro keys. **CONS:** Hard to differentiate between buttons on pen's barrel. **COMPANY:** CalComp (602/948-6540). **LIST PRICE:** $395.

MW ★★★½

COMPUTER-AIDED ILLUSTRATORS AND artists turn to graphics tablets as a more natural way to draw. Currently the artist's-tablet market is dominated by Wacom's ArtZ. However, the sketch-pad-size DrawingSlate II is a worthy challenger.

The DrawingSlate II measures approximately 10 by 11 inches, weighs less than 2 pounds, and comes with a nonskid backing. It offers a 6-by-9-inch active area (larger than the ArtZ's 6-by-8-inch area), pressure-sensitive operation, and a cordless stylus, so there's no tablet-to-pen wire to trip up your creative impulses.

The DrawingSlate uses a battery-powered stylus that goes to sleep if left unattended for several minutes. Consequently, this pen is neither as light nor as thin as the battery-less ArtZ stylus. However, the DrawingSlate stylus is not objectionably large; it's comparable in size and weight to a felt-tip marker. For some tastes, a heftier stylus may be a plus. In use, the DrawingSlate's stylus has a light, responsive feel, and it handles more like a ballpoint pen than a pencil. Pen feel is a matter of taste, so that's not a criticism. I quickly acclimated to the DrawingSlate.

In addition, this stylus has two buttons on the barrel, to which you can assign functions such as double-clicking. However, these buttons are small and don't stand out much from the barrel surface, so it's difficult to differentiate between them. You may need to get used to their location before you assign functions to both buttons.

A control-panel extension lets you adjust pressure sensitivity, assign functions to stylus buttons, set tablet-to-screen mapping, and assign macros to the row of keys above the tablet's active area.

The 18 user-definable keys accept macros from programs like CE Software's QuicKeys, or you can set the keys to do program-specific ⌘-*key* sequences—great for executing functions in Fractal Design's Painter 3. Six additional buttons come programmed to perform standard Mac functions (such as cut, paste, save, and undo).

The DrawingSlate II tracks stylus movement accurately and functions well as a pointing device, as when dragging to menu selections. However, you might want to increase threshold pressure if you use the tablet in lieu of a mouse.

ROBERT PERRY

A dual-plug cord lets you connect the tablet to the Mac's ADB port and provides a receptacle for attaching your keyboard and mouse—increasingly important with new Macs that provide only one ADB port. The DrawingSlate's manual is easy to read and does a good job of explanation.

The Last Word With user-definable keys; a responsive, pressure-sensitive stylus; and a large active area in a small, light package, the DrawingSlate II is an excellent tablet for artists and illustrators.

—CARLOS DOMINGO MARTINEZ

Material World

CD-ROM

PROS: Fascinating content; beautiful photographs; gorgeous design. **CONS:** Can't use other applications while viewing the CD; QuickTime movies of varying value. **COMPANY:** StarPress Multimedia (415/274-8383). **LIST PRICE:** $59.95.

MW ★★★½

TERMITES FOR BREAKFAST, LOADED guns in bedrooms, scheduled blackouts, a mattress for a barricade—the world looks complex, fascinating, and at times scary in Material World: A Global Family Portrait. This CD-ROM adaptation of Peter Menzel's coffee-table book (narrated by Charles Kuralt) is a multimedia journey through diverse cultures. It takes you into the homes and lives of 30 statistically average families (selected using demographic data from the United Nations) around the globe.

Users can view statistics about the countries—including population, life span, birth rate, caloric intake, and average income—and can answer the same 64 questions that were asked of each family. Countries represented include Japan, China, Vietnam, India, Western Samoa, Thailand, Ethiopia, South Africa, Argentina, Brazil, Guatemala, Cuba, Haiti, Israel, Iraq, Kuwait, Iceland, Russia, Germany, Great Britain, Bosnia, and the United States.

At start-up, you have four choices: Families, Countries, Lifestyles, and Questionnaire. In the Families section, each family is photographed with all of its possessions arranged outside its house. (A Chinese family appears on a small boat with its house in the background; an Israeli family on a platform held by a crane.) Each family completed a questionnaire about family size, income, interests, religion, and lifestyle. For many families in developing nations, the most valued possession is a TV set.

As you move it over a photo, the cursor sometimes changes to a movie camera or still camera; clicking the mouse at that point brings up either a short QuickTime movie or more photos, respectively. Unfortunately, you have to move your cursor over each photo to find more stuff. In some cases, the movies are abruptly short and of questionable value; the clips of a Mongolian inspecting what looks like an animal carcass and of a Thai child playing a video game are too short and choppy. But the movies of the Malians dancing and the Haitians praying do provide a window into their worlds.

The Countries section shows a world map with each family's location marked.

World View The clipboard in the upper-left corner lists the Bhutanian family's possessions. Items in red can be clicked on for more information.

You can peruse the families' questionnaire responses and read the photojournalist's comments. In the Lifestyles section, you can view statistics and photos of houses, food, and transportation in each country. Clicking on the Leisure button brings up a list of the countries' national holidays.

The CD ran flawlessly on my Quadra 700. Colors were beautiful in both 8-bit and 24-bit color. Material World requires a 68030 or higher Mac and cannot run other applications in the background.

The Last Word Material World is gorgeously designed, informative, incredibly interesting, and inexpensive. It's one of the coolest CD-ROMs I've seen.

—JOANNA PEARLSTEIN

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Top Office Printers

Macworld Lab compares 13 high-resolution, network-ready printers

by Jim Heid

MW LAB

The first Macintosh laser printer was designed with workgroups in mind; its LocalTalk port allowed up to 32 Macs to take advantage of its then-revolutionary text and graphics printing prowess. A decade later, the vast majority of Mac-compatible laser printers are still designed to be shared. The rest of the workgroup printer landscape has changed, however—and for the better.

Output resolution has soared from a relatively coarse 300 dots per inch to 600 and even 1200 dpi. Speed has climbed from 8 pages per minute (and pioneering printers rarely reached that pace) up to 20 ppm. Networking options have expanded to include faster data pathways, such as Ethernet. And prices? That's the best news—it's easy to find a workgroup workhorse for between $1300 and $3000.

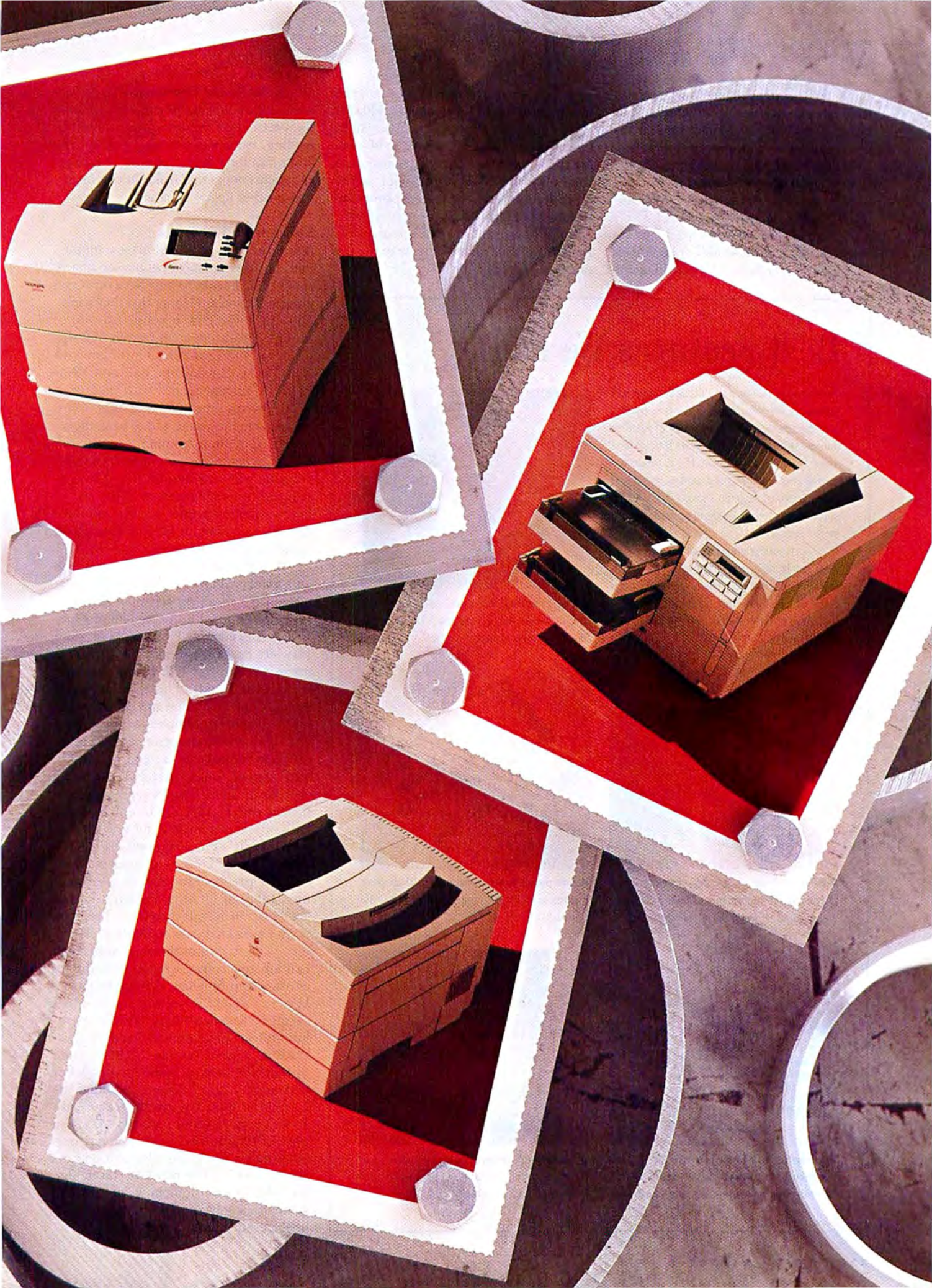
What constitutes a workgroup printer? To be eligible for this Macworld Lab comparison, a printer had to provide a print engine capable of turning out at least 8 ppm. A slower printer might suffice for a small workgroup with writer's block but would cause lines to form in most offices. And because big offices have big appetites for paper, the printer had to provide a capacity of at least 250 sheets. In recognition of the trend toward sharper output, we required a resolution of at least 600 dpi. We also insisted on compatibility with the industry-standard PostScript page-description language. And needless to say, a LocalTalk connection was a must, with Ethernet preferred.

Casting this net harvested 13 printers for testing, ranging in list price from $1599 to $5299; Macworld Lab put them through a battery of performance and quality tests. The table "Comparing Workgroup Printers" lists the vital statistics of these printers, as well as of some machines that were unavailable for testing.

The low end includes machines such as Texas Instruments' microLaser Pro 600, which at $1399 (list), blurs the boundary between workgroup and personal printers. At the high end, printers such as Lexmark's $3298 (list) Optra Lx, Apple's $2299 (company's estimated price) LaserWriter 16/600 PS, and Dataproducts' $4495 (list) Typhoon 20 provide a range of high-speed networking options and the kind of performance that can meet the demands of a large office.

Recommended Among tabloid-size printers that Macworld Lab tested, the Hewlett-Packard LaserJet 4MV stood out (right). The Lexmark Optra Lx (left top) and Apple LaserWriter 16/600 PS (left bottom) led in the legal-size category.

PHOTOGRAPHS BY MARK JOHANN



A few printers make you work too hard or wait too long, but the best of today's workgroup machines show a happy combination of innovation and polish. Resolutions of 600 to 1200 dpi enable these machines to do justice to scanned images. You may not always see that output faster, however—Macworld Lab's tests showed that 1200-dpi machines are often slower than their 600-dpi counterparts. It's no wonder: a 1200-dpi machine must process and position four times the number of dots per square inch: 1,440,000 versus 360,000. Fortunately, it's easy to downshift a 1200-dpi machine to 600 dpi for those times when speed means more than good looks. With 600-dpi as the baseline, our tests show today's printers to be faster as a group than the crop we tested in "Workgroup Printers" in our February 1994 issue, thanks largely to the use of faster processors.

In the fit-and-finish department, we noticed little improvements that mean a lot: paper trays that make for foolproof feeding, front-panel menu systems that don't require a degree in code-breaking, and access doors that make adding memory or other upgrades easier.

Sharper and Sharper

Many printer specifications are important, but the one most people see first is resolution. Thanks to improved print engines and the plastic toner that they apply, 600 dpi is the new baseline for workgroups. Dataproducts offers an 800-dpi machine, and Lexmark's Optra line and Xanté's Accel-a-Writer 812 and 8200 hold the current record with their true 1200-dpi resolution. (Note that some printers require you to add to base memory to reach their resolution potential.) These higher resolutions make for a more versatile printer—besides being able to crank out spreadsheets and memos, a high-resolution printer can also produce camera-ready output for in-house newsletters and low-budget catalogs.

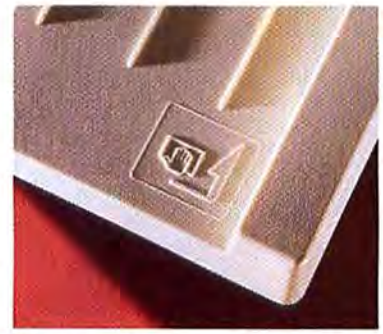
But resolution specs don't tell the entire story. Many manufacturers use resolution-enhancement schemes; examples include Apple's PhotoGrade and FinePrint, Lexmark's PictureGrade, and Hewlett-Packard's Resolution Enhancement Technology (RET, the one that started the trend). These technologies vary in implementation and effectiveness, but conceptually, they're identical: each plays games with the printer's laser beam to finely control the size and position of each dot of toner, thereby improving sharpness. Technologies such as PhotoGrade and PictureGrade enhance the look of scanned images and gray shades, while Apple's FinePrint and HP's RET sharpen text and object-oriented graphics.

To assess output quality, we assembled a jury of 13 *Macworld* editorial and art department staff members. The Lexmark Optra Lx did consistently well in all tests, with its output showing more detail and a better contrast range than that of another top finisher, the Apple LaserWriter 16/600 PS (see the photo output samples "Scanned Image: Higher Resolution Beats Enhancement" and the illustration output samples "Illustration: Speed, Not Quality, Differentiates"). For text quality, top finishers included the Lexmark Optra Lx, Hewlett-Packard's LaserJet 4Si MX and LaserJet 4MV, and QMS's 1060 Print System (see text output samples "Text: High Resolution Levels the Field"). The two LaserJet models and the QMS 1060, however, earned some of the lowest marks in the scanned-image evaluation.

Best Features We Found

Performance results and output samples are valuable tools for comparing printers, but it's also important to look at the kinds of features that don't show up on a stopwatch or under a magnifying glass. As Macworld Lab tested the current crop of workgroup printers, we noted those features, large and small, that make a printer easier to use, easier to upgrade, or just more versatile.

Tip: If your printer lacks which-side-is-up? icons on its paper tray and manual-feed slot, consider making your own—indicate on a piece of peel-and-stick label stock or even transparent tape which side of the paper should face up.



An orientation icon on the manual-feed tray of the TI microLaser Pro E shows what direction to insert paper.

A hinged door on the side of the Lexmark Optra series printers eliminates screws, making it easy to add memory or other upgrades.

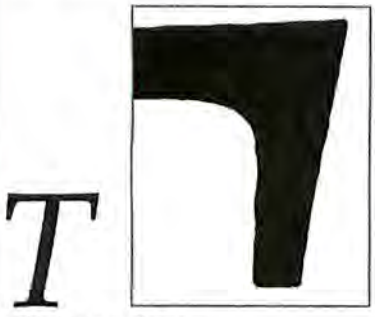
Front-panel buttons and an LCD display provide easy-to-use menus for controlling the Lexmark Optra series.

A telephone jack for a PostScript fax modem on the Apple LaserWriter 16/600 PS enables the printer to receive and print faxes.

A paper-remaining gauge on the front of the LaserWriter 16/600 PS's paper tray shows how much paper is loaded.

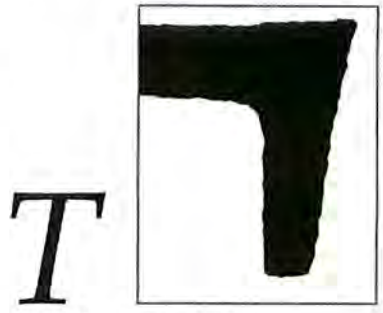
Text: High Resolution Levels the Field

With maximum resolutions of 600 dpi or higher, the printers that Macworld Lab tested for this article all produce acceptable text output; most users will be hard-put to see significant quality differences among documents with smaller fonts when viewing them at a normal reading distance. However, when you view output samples with a loupe at 12× magnification, differences are more apparent, especially with larger fonts. Both the 1200-dpi Lexmark Optra Lx and the 600-dpi Hewlett-Packard LaserJet 4MV did very well in our quality tests. Compare their 72-point Palatino Italic samples to the lower-scoring 600-dpi Texas Instruments microLaser Pro E output, which shows stair-stepping (jagged edges) on round and slanted character edges.



1200-dpi Lexmark Optra Lx

600-dpi HP LaserJet 4MV



600-dpi TI microLaser Pro E

In general, we saw far more variation in quality with scanned images than with text. That wasn't surprising, given the range of resolutions and the fact that some printers lack image-enhancement technologies. Also, scanned images impose stiffer demands on a printer's engine—if the printer doesn't move the paper precisely, horizontal or vertical bands appear across the output. (We noted very slight banding from the Lexmark Optra Lx, the HP LaserJet 4M Plus, the QMS 1060, and the Apple LaserWriter 16/600 PS. We noted moderate banding from the Xanté 8200, the HP LaserJet 4MV, the HP LaserJet 4Si MX, the GCC Elite 600, the QMS 1660, and the TI microLaser models.)

Pushing Paper

Paper trays aren't as glamorous as laser beams, but they're at least as important. Printers that mutilate envelopes, run out of paper often, or have trays that load awkwardly will boost workers' blood pressure instead of their productivity.

Large or prolific offices will want a printer that provides at least two paper trays. You can configure a multitray printer to link its trays so that when one runs out, the other kicks in. Or you can put letterhead in one tray and second sheets in the other, or high-quality paper in one tray and cheap bond in the other. Of the printers tested, the paper-handling champion is HP's LaserJet 4Si MX, which includes two 500-sheet trays and accepts an optional duplexer that enables the printer to print on both sides of a sheet. Lexmark's Optra series includes one 500-sheet tray and accepts a second 500-sheet tray as well as a duplexer. HP's LaserJet 4M Plus also accepts a duplexer. Texas Instruments' microLaser printers are the low-cost paper handling leaders, each providing two 250-sheet trays as standard equipment. The trays themselves are well designed and easy to load.

Paper capacity is one thing; paper size is another. Most workgroup printers have a maximum paper size of 8½ by 14 inches—legal size. But several can print on sheets up to 11 by 17 inches. These larger machines are ideal for publishing or proofing tabloid-size newsletters. They're also good for king-size spreadsheets. GCC's SelectPress 600 takes the paper-size prize, with the ability to feed sheets up to 12 by 19 inches. This oversize capability enables publishers to print tabloid-size pages containing bleeds (lines or graphics that run to the edge of the page). HP's LaserJet 4MV, QMS's 1660 Print System, Xanté's Accel-a-Writer 8200, and Dataproducts' Typhoon 20 can also print full tabloid bleeds, as can the Typhoon 8 and Typhoon 16, both of which had just shipped at press time.

Straightforward, well-designed paper-handling features are especially important for workgroup printers, which are far more likely than personal printers to be used by people who aren't familiar with a machine's care-and-feeding routine—temporary employees, for example. Given this, it's surprising how many manufacturers fail to include the simple—and inexpensive—niceties that make for foolproof feeding.

One example is an icon stamped into a paper tray to indicate whether you should insert a stack of paper face-up or face-down. Loading a stack of letterhead the wrong way means wasted paper and another trip to the printer. The only tested printers whose trays include such an icon are the TI microLaser series, the HP LaserJet 4MV, the QMS 1660, and the Xanté Accel-a-Writer 8200.

A which-way-is-up? icon is essential on a manual-feed slot. Fortunately, all the machines tested provide one except for HP's LaserJet 4Si MX, QMS's 1060 Print System, and GCC Technologies' Elite 600. The Elite 600 has another manual-feed flaw: you have to press a Manual Feed button on the printer's front panel after inserting a sheet of paper. It's a superfluous step that only one other printer imposes: GCC's SelectPress 600.

One common candidate for a manual-feed slot is the envelope. Of the printers tested, only one—Lexmark's Optra Lx—was consistently able to print envelopes without creasing them. The Optra Lx boasts an envelope-conditioning feature that eliminates creasing by briefly opening and closing the printer's fusing rollers (which use heat and pressure to affix the plastic toner onto the paper) as the envelope travels through them. The mechanism makes a *kerchunking* noise that's just loud enough to annoy anyone sitting next to the printer. Perhaps that's why you can disable the feature with the printer's front panel. As for the remaining machines, the worst envelope performer was QMS's 1610 Print System, whose envelopes looked like the U.S. Postal Service had already gotten to them.

The paper trays in the Xanté 812 as well as in HP's and Apple's printers provide another convenience: a mechanical gauge that shows a rough approximation of how much paper is in the tray. A quick glance at the front of the tray tells you whether it needs a refill before you send off a big print job.

Fast Times

Those pages-per-minute speed ratings that printer manufacturers cite are only

part of the performance picture. Ultimately, a printer's speed depends on its controller, the built-in computer that receives and interprets PostScript instructions from the computers on the network. The controller's PostScript interpreter also creates fonts from master outlines, processes scanned images, and controls the print engine's laser. These are calculation-intensive tasks, especially on high-resolution printers.

Among printers whose maximum page size is 8½ by 14 inches (legal size), HP's LaserJet 4Si MX and Apple's LaserWriter 16/600 PS tied for first place in average performance (see the benchmark "Testing Workgroup Printers"). A cluster of machines followed: Texas Instruments' microLaser PowerPro, HP's LaserJet 4M Plus, Lexmark's Optra Lx (in 600-dpi mode; in 1200-dpi mode, it was somewhat slower), and QMS's 1060 Print System. These four turned in average scores that ranged from 112 to 125 seconds—not enough difference to be significant.

Finishing at the bottom of the pack were TI's microLaser Pro E (average time 143 seconds) and GCC's Elite 600, which, with an average performance time of 180 seconds, was the slowest 600-dpi machine we tested.

In the tabloid arena, four printers crossed the overall-performance finish line at about the same time: HP's LaserJet 4MV, Dataproducts' Typhoon 20, QMS's 1660 Print System, and Xanté's Accel-a-Writer 8200. The LaserJet 4MV and Typhoon 20 did particularly well with a typographically complex document, while the QMS 1660 Print System outpaced the pack in the Illustrator and PageMaker tests. GCC's SelectPress 600 brought up the rear, with the slowest times in four out of five tests; for example, in the PageMaker test, it took more than twice as long as the top two finishers.

Macworld Lab's testing showed that the speed difference between different resolutions is most apparent in jobs containing scanned images or a large variety of fonts and sizes. We also noticed a bigger performance gain when using a 1200-dpi printer in 600-dpi mode than when using a 600-dpi printer in 300-dpi mode. For example, the 1200-dpi Lexmark Optra Lx's average score was nearly a minute faster when the printer was in 600-dpi mode. But the 600-dpi TI microLaser Pro E's overall score was less than 20 seconds faster in 300-dpi mode. The lesson here: with a 1200-dpi printer, the speed benefit of switching to a lower resolution is much more significant than with 600-dpi machines.

Another way to speed up a workgroup printer is to connect it to a SCSI hard drive, which can store fonts that would otherwise have to be downloaded from the Mac, a process that can take up to 30 seconds or so over LocalTalk. A SCSI hard drive also boosts a printer's overall performance with typographically complex documents.

Good Connections

LocalTalk ports used to be the standard for Mac workgroup printers; today, they're a bare minimum. Ethernet ports are becoming increasingly important, given that most Macs now include Ethernet—and that Ethernet is a good choice when Macs and DOS/Windows computers coexist. Ethernet's superior data-transfer rate is also important when you're printing scanned images. Of the machines tested, only four include Ethernet: GCC's SelectPress 600, and HP's LaserJet 4M Plus and 4Si MX have built-in ports; Apple's LaserWriter 16/600 PS uses a transceiver. With all of the remaining machines, it's an option that usually sells for a few hundred dollars.

PostScript printers and drivers for

Comparing Workgroup Printers

Company	Phone	Product	Tested by Macworld Lab	List Price/ Company Estimate[A]	RAM (base/ maximum)	Fonts Included (PostScript/ TrueType)	Page-Description Languages Supported[B]
Apple Computer	408/996-1010,	LaserWriter 16/600 PS	yes	NP/$2299	8MB/32MB	35/29	PS2, PCL5
	800/767-2775	LaserWriter Select 360	no	NP/$1499	7MB/16MB	35/29	PS2, PCL5
Dataproducts	818/887-8000,	Typhoon 8	no	$3199/NP	4MB/68MB	35/0	PS2, PCL5, HPGL
	800/980-0374	Typhoon 16	no	$4199/NP	12MB/68MB	35/0	PS2, PCL5, HPGL
		Typhoon 20	yes	$4495/NP	8MB/72MB	35/0	PS2, PCL5
GCC Technologies	617/275-5800,	Elite 600	yes	$1479/$1350	4MB/20MB	35/0	PS2, PCL5, HPGL
	800/422-7777	Elite XL 808[E]	no	$3799/$3199	12MB/64MB	35/250	PS2, PCL5, HPGL
		SelectPress 600	yes	$4499/$3800	8MB/64MB	80/0	PS2C, PCL5
Hewlett-Packard	208/323-2551,	LaserJet 4MV	yes	$3549/NP	12MB/44MB	35/10	PS2, PCL5
	800/752-0900	LaserJet 4M Plus	yes	$2479/NP	6MB/38MB	35/10	PS2, PCL5
		LaserJet 4Si MX	yes	$5299/NP	10MB/26MB	35/10	PS2, PCL5
Lexmark	606/232-2000,	LaserPrinter 4039 10 Plus	no	$1698/$1498	2MB/16MB	39/10	PS2C, PCL5
	800/891-0331	Optra Lx[F]	yes	$3298/$2749	4MB/64MB	39/10	PS2C, PCL5
QMS	205/633-4300,	1060 Print System	yes	$2699/NP	4MB/64MB	39/0	PS2C, PCL5, HPGL
	800/523-2696	1660 Print System	yes	$5099/NP	12MB/64MB	39/0	PS2C, PCL5, HPGL
		1725E Print System	no	$4999/$4599	8MB/64MB	39/0	PS2C, PCL5, HPGL
Texas Instruments	512/794-5970,	microLaser Pro 600	no	$1399/$1149	3MB/19MB	23/0	PS2, PCL5
	800/848-3927	microLaser Pro E	yes	$1599/$1399	3MB/19MB	23/0	PS2, PCL5
		microLaser PowerPro	yes	$1899/$1599	6MB/22MB	67/0	PS2, PCL5
Xanté	205/476-8189,	Accel-a-Writer 812	no	$3495/$3495	16MB/64MB	35/0	PS2, PCL5, HPGL
	800/926-8839	Accel-a-Writer 8200	yes	$4495/$4495	12MB/64MB	35/0	PS2, PCL5, HPGL
Xerox	716/256-4444,	4510ps	no	$2075/$1618	6MB/16MB	35/10	PS2, PCL5
	800/349-3769	4520mp	no	$4805/$3748	8MB/52MB	35/10	PS2, PCL5

Technical-support ratings are based on a series of calls made to each company by Macworld staffers (posing as customers) to gauge the accessibility, helpfulness, and accuracy of the company's whose products Macworld Lab tests. [A] *Actual prices could be higher or lower than the estimated street price provided by the company. NP = not provided by company.* [B] *PCL5 = Hewlett-F = PostScript fax; L = LocalTalk; P = parallel; S = serial; T = Token Ring.* [D] *Tabloid+ means the printer supports oversize tabloid sheets to print full bleeds. The SelectPress 600 takes paper pages per minute; the Optra Rx provides more memory and a faster controller. The $2598 Optra L uses a slower controller than the Optra Lx model tested.* [G] *Ethernet is standard on the*

Scanned Image: Higher Resolution Beats Enhancement

When it comes to getting the best output quality, higher resolutions often beat resolution-enhancement techniques. A scanned image printed by the 1200-dpi Lexmark Optra Lx has a more pleasing contrast range and shows more detail than the output of the 600-dpi Apple LaserWriter 16/600 PS using PhotoGrade resolution enhancement. The LaserWriter 16/600 PS output also suffers from vertical streaking, which is an artifact of the printer's engine. However, the LaserWriter 16/600 PS with PhotoGrade handles midtones (see the woman's face) and contrast better than the Hewlett-Packard LaserJet 4MV, another 600-dpi printer with gray-scale enhancement. The 4MV's output also shows horizontal banding.

1200-dpi Lexmark Optra Lx

600-dpi Apple LaserWriter 16/600 PS with PhotoGrade

MICHAEL KRASOWITZ/FPG

600-dpi HP LaserJet 4MV

them are commonplace in the DOS/Windows world, but many businesses prefer to use other printer languages, most notably HP's Printer Control Language (PCL), the native tongue of the HP LaserJet family and many DOS/Windows-oriented laser printers. All of the printers tested provide built-in PCL emulation—they handle documents from PCL drivers just as ably as they handle PostScript jobs. Some printers can also understand the Hewlett-Packard Graphics Language (HPGL), the standard command set for Hewlett-Packard plotters. A printer with HPGL support might be useful in businesses that use CAD programs.

A few years ago, you had to manually configure a printer's language. Today most printers provide automatic emulation sensing: they scan incoming data and switch to the appropriate language. But

Ports[C] (standard/optional)	SCSI Port for Hard Disk	Output Enhancement (text/gray-scale)	Maximum Resolution (in dpi)	Pages per Minute	Maximum Paper Size[D]	Standard Paper Trays/Capacity per Tray (in sheets)	Additional Tray Capacity (in sheets)	Technical-Support Rating
L, E, P, S/F	yes	yes/yes	600	16	legal	1/350	500	poor
L, P, S/E, F	no	no/no	600	10	legal	1/300	250 or 500	
L, P, S/E, T, F	yes	yes/no	600 (1200 optional)	8	tabloid+	1/250	250 or 500	acceptable
L, P, S/E, T, F	yes	yes/no	600	16	tabloid+	1/250	250 or 500	
L, P/E, T, S, F	yes	yes/no	800	20	tabloid+	2/250	250	
L, P, S/E	yes	no/no	600	8	legal	1/320	250	acceptable
L, E, P, S/none	yes	no/yes	800	8	tabloid+	1/300	250 or 500	
L, E, P, S,/none	drive included	no/no	600	8	tabloid+	1/250	250	
L, P/E	no	yes/yes	600	16	tabloid+	1/350	500	acceptable
L, E, P, S, T	no	yes/yes	600	12	legal	1/350	500	
L, E, P/T	no	yes/yes	600 × 300	17	legal	2/500	1500	
L, P/ E, T, S	no	yes/yes	600	10	legal	1/200	500	acceptable
L, P/ E, T, S	drive optional	yes/yes	1200	16	legal	1/500	500	
L, P, S/E[G], T	yes	no/no	600	10	legal	1/650	500	excellent
L, P, S/E[G], T	yes	no/no	1200 × 600	16	tabloid+	1/350	500	
L, E, P, S/T	yes	no/no	600	17	legal	2/500	1500	
L, P/E, S	optional	no/no	600	8	legal	2/250	none	acceptable
L, P/E, S	optional	no/no	600	12	legal	2/250	none	
L, P/E, S	optional	no/no	600	12	legal	2/250	none	
L, P, S /E	yes	no/yes	1200	8	legal	1/350	500	acceptable
L, P, S /E	yes	no/yes	1200	16	tabloid+	1/350	500	
L, P, S/E, T	no	yes/no	600	10	legal	2/250 and 50	250 or 500	not rated
L, E, P, S/T	no[H]	yes/no	800	20	tabloid	3/250	1500	

support technicans. Macworld uses a point system, including bonuses and demerits, to derive the final rating. Ratings are for companies, not individual products, and we call only those companies Packard Printer Control Language Level 5; PS2 = Adobe PostScript Level 2; PS2C = PostScript Level 2 clone (non-Adobe interpreter); HPGL = Hewlett-Packard Graphics Language. [C] E = Ethernet; up to 12 × 19 inches. [F] The Elite XL 608 ($2599 list) has 6MB base memory, 600-dpi resolution, optional Ethernet, and 80 downloadable fonts. [I] The $2048 Optra R and $2698 Rx print 12 QMS 1060E and 1660E models. [H] The Xerox 4520mp accepts an optional IDE port for a hard drive.

the switching process isn't always instantaneous; in Macworld Lab's tests, the Lexmark Optra Lx took 13 seconds to switch between PCL emulation and PostScript. Dataproducts' Typhoon 20 took 8 seconds. These aren't cobweb-forming delays, but they add up if you constantly switch between languages.

One of the most interesting ports a printer can provide is a telephone jack for an internal PostScript fax modem. A PostScript fax modem enables a printer to receive faxes and print them on plain paper, and a PostScript fax modem enables everyone on the network to send documents to any fax machine. If the fax machine at the receiving end of the line also happens to be a PostScript fax printer, it prints documents at full resolution using its own fonts—none of that chunky, 200-dpi stuff. If you routinely transmit faxes to a branch office, equipping both offices with a PostScript fax printer is a great way to improve the look of your documents—and cut down on eyestrain. Of the printers tested, only Apple's LaserWriter Pro 16/600 PS and Dataproducts' Typhoon 20 accept an optional PostScript fax modem. The LaserWriter Select 360, Typhoon 8, and Typhoon 16 also accept a fax modem.

Finally, there's the port that impacts your monthly electric bill—the power connection. I'm pleased to report that most of the printers tested meet the Environmental Protection Agency's Energy Star guidelines, which include, among other things, energy-saving modes that reduce an idle printer's thirst for juice. The exceptions: Dataproducts' Typhoon 20, GCC's SelectPress 600, and Xanté's Accel-a-Writer 8200.

Upgrade Adventures

PostScript fax modems, memory upgrades, and optional network interfaces each install in their own internal expansion slots. But it's surprising how difficult some manufacturers make it to get to those slots. The upgrader's worst nightmares are GCC's SelectPress 600 and QMS's 1660 Print System. With both machines, accessing the controller board requires removing numerous screws (15 with the QMS printer), disconnecting cables, and removing parts. And you haven't experienced fishing until you've dropped a screw inside a laser printer. Slightly better, but still far from easy, are Xanté's Accel-a-Writer 8200 and HP's LaserJet 4MV.

Dataproducts' Typhoon 20 earns fair marks for ease of upgrading. There are no screws to lose, but you do have to disconnect some cables to slide out the controller board. TI's microLaser machines take a better approach: their slide-out controller boards seat themselves in an internal connector.

The easiest machines to upgrade are those whose controller boards are mounted vertically on one side of the case: the Apple LaserWriter 16/600 PS, the HP LaserJet 4M Plus, and the Lexmark Optra Lx. The Lexmark machine takes the gold medal, thanks to a hinged side-panel door that does away with screws.

The Last Word

For legal-size printing, Lexmark's Optra Lx is a great choice. This is a carefully

MW LAB Testing Workgroup Printers

Best result in each category for each test. Times are in seconds. Shorter bars are better. For each category, products are listed in order of overall performance from fastest to slowest.

	Multiple Fonts Print speed for a typical 7-page Microsoft Word 6.0 document with a variety of fonts, sizes, and styles.	Single Font Print speed for a 20-page Word 6.0 document with double-spaced 12-point Courier text in plain, bold, and italic.	Adobe Illustrator 5.5 Print speed for a complex graphic with special PostScript effects. The illustration included nonlinear blends and Bézier cuves.	Adobe PageMaker 5.0 Print speed for a 4-page newsletter with several fonts, two PICT images, an EPS graphic, and a gray-scale TIFF image.	TrueType Print speed for a 2-page Word 6.0 document with 5 TrueType fonts in various sizes.
Legal-Size Printers*					
HP LaserJet 4Si MX (600 x 300 dpi)	82	99	242	64	38
Apple LaserWriter 16/600 PS	63	101	241	79	41
Apple LaserWriter 16/600 PS**	54	102	239	85	45
TI microLaser PowerPro	74	119	240	90	39
HP LaserJet 4M Plus	85	124	246	90	45
Lexmark Optra Lx	65	129	263	91	55
QMS 1060 Print System	115	136	243	87	45
TI microLaser Pro E	125	135	286	119	48
GCC Technologies Elite 600	113	151	384	195	58
Lexmark Optra Lx (1200 dpi)	112	188	346	158	67
Tabloid Printers*					
HP LaserJet 4MV	51	104	244	62	37
Dataproducts Typhoon 20	49	93	251	63	47
QMS 1660 Print System	71	107	237	53	40
Xanté Accel-a-Writer 8200	58	104	256	61	39
Dataproducts Typhoon 20 (800 dpi)	58	95	255	77	49
QMS 1660 Print System (1200 dpi)	83	107	239	66	43
Xanté Accel-a-Writer 8200 (1200 dpi)	102	123	268	95	41
GCC Technologies SelectPress 600	93	181	289	133	51

*At 600 x 600 dpi unless otherwise noted. **With PhotoGrade and FinePrint resolution enhancement on.

BEHIND OUR TESTS

Macworld Lab used several real-world documents designed to show the printer speed for various tasks. For example, we printed a 20-page single-font document, a common task in an office environment, to measure a printer's engine speed, and we printed a PageMaker 5.0 document, typical of a newsletter, to see how the printers handled a mix of text and graphics. We tested on a Centris 650 with 16MB of RAM and an internal Quantum 230MB hard drive, running System 7.5, and using LaserWriter driver 8.1 and the PPD files supplied with the printers. Background printing was inactive. To illustrate the speed gain of switching to lower resolutions, we repeated our tests on the three 1200-dpi printers in 600-dpi mode.

We performed several additional tests, the results of which are discussed in the main article: We tested a couple of 600-dpi printers in 300-dpi mode. We examined how printers operated on a peer-to-peer Ethernet network versus a peer-to-peer LocalTalk network. On printers that provide Hewlett-Packard LaserJet emulation, we switched between PostScript (via Ethernet) and PCL5 (via the parallel port) and measured the additional time for mode switching. To assess print quality, a panel of *Macworld* editors and designers looked at how well each printer printed solid areas, text characters, photographic gray-scale images, fine lines, and gradients.

—Macworld Lab testing supervised by Mark Hurlow and Danny Lee

Illustration: Speed, Not Quality, Differentiates

Printing an Adobe Illustrator 5.5 file doesn't tax a printer's engine as much as printing a scanned image does. As a result, we saw less of a range in the quality of the illustration output samples than with the photo samples. However, fine lines are clearer in output from the 1200-dpi printers such as the QMS 1660, while the gradients appear smoother in output from the 600-dpi Apple LaserWriter 16/600 PS. If you commonly print illustrations, also consider a printer's speed. The QMS 1660 was the fastest tabloid printer, while the LaserWriter 16/600 PS led the legal-size printers. In contrast, the GCC Elite 600 finished last in the speed test and near the bottom in the quality test. Note the coarseness of the Elite 600 output and the vertical banding (an artifact of the engine).

1200-dpi QMS 1660 Print System

600-dpi Apple LaserWriter 16/600 PS without PhotoGrade

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600-dpi GCC Technologies' Elite 600

engineered machine, from its envelope-conditioning mechanism to its hinged logic-board door to its elegant front-panel menu design, which is the best I've seen in over ten years of reviewing laser printers. It's also reasonably fast, and its output was our jury's favorite.

Alas, the Lexmark machine doesn't accept a PostScript fax board. If you want a printer that does, look at Apple's LaserWriter 16/600 PS. Its overall performance was faster than the Lexmark machine's, and its 600-dpi output got high marks from the Macworld jury. Note that this printer, unlike the Optra Lx, does not accept a duplexer option. (Another excellent contender among duplex-capable machines is HP's LaserJet 4Si MX. This ruggedly built, 106-pound beast is superbly suited to heavy-duty printing.)

If you opt for the LaserWriter 16/600 PS, buy from a knowledgeable dealer, because Apple's telephone technical support was poor in our tests—not only was the advice we received incorrect or incomplete, we had trouble just getting through. (The recorded message suggesting that we browse Apple's "award-winning manuals" instead of waiting on hold wasn't exactly consoling.) Indeed, of the eight companies whose support we tested, most earned only acceptable ratings. The sole exception: QMS, whose prompt and accurate answers earned the company an excellent rating. (At press time, QMS announced an additional legal-size offering: the 1725E Print System, a 17-ppm, 600-dpi printer that costs $4999, list.)

A printer to avoid is GCC's Elite 600, which was the slowest 600-dpi legal-size printer tested. Among low-cost workgroup printers, the Texas Instruments microLaser models and the Apple LaserWriter Select 360 are better buys. The LaserWriter Select 360 even accepts a PostScript fax board. (While we did not test the LaserWriter Select 360 for this article, Macworld Lab has tested it previously; in *Reviews*, *Macworld*, April 1994, the product rated five-stars.)

Among tabloid machines, HP's LaserJet 4MV takes first place—it's fast and its output is beautiful. The Dataproducts Typhoon 20 didn't do as well with our output jury, but it is speedy and, unlike the HP machine, accepts a PostScript fax card. GCC's SelectPress 600 was the slowest tabloid machine tested, but it is unique in its ability to accept 12-by-19-inch paper.

In all, the latest crop of workgroup printers contains some terrific choices. The best of them provide the kind of performance that lets a workgroup work instead of wait. PostScript fax options extend these printers' capabilities beyond your building. And their prices will leave you with more of your favorite paper stock—the kind with the presidential portraits on it. **m**

Contributing editor JIM HEID (**jim_heid@macworld.com**) has reviewed over 150 laser printers since Hewlett-Packard's original LaserJet appeared in 1984.

WORKGROUP PRINTERS

MW EDITORS' CHOICE

Today's workgroups demand sharp output, fast performance, and competent paper handling from their printer. Among tabloid-size printers, one machine, HP's LaserJet 4MV, stands out. Two machines lead the legal-size pack, with the choice boiling down to your budget and your need for PostScript faxing capabilities.

Tabloid-Size Printers

LaserJet 4MV This machine combines fast performance and fine output quality with the ability to print on oversize tabloid stock. **Company:** Hewlett-Packard. **List price:** $3549.

Legal-Size Printers

Optra Lx This superbly engineered printer provides 1200-dpi output and excellent paper-handling options. **Company:** Lexmark. **List price:** $3298.

LaserWriter 16/600 PS Although its output is not in the Lexmark league, the LaserWriter 16/600 PS provides true Adobe PostScript output; the printer accepts a PostScript fax board; and, based on the companies' estimated prices, it costs less. Note that Apple's technical support was poor in our tests. **Company:** Apple Computer. **Company's estimated price:** $2299.

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THE BEST PRODUCTS TO IMPROVE THE MAC OS

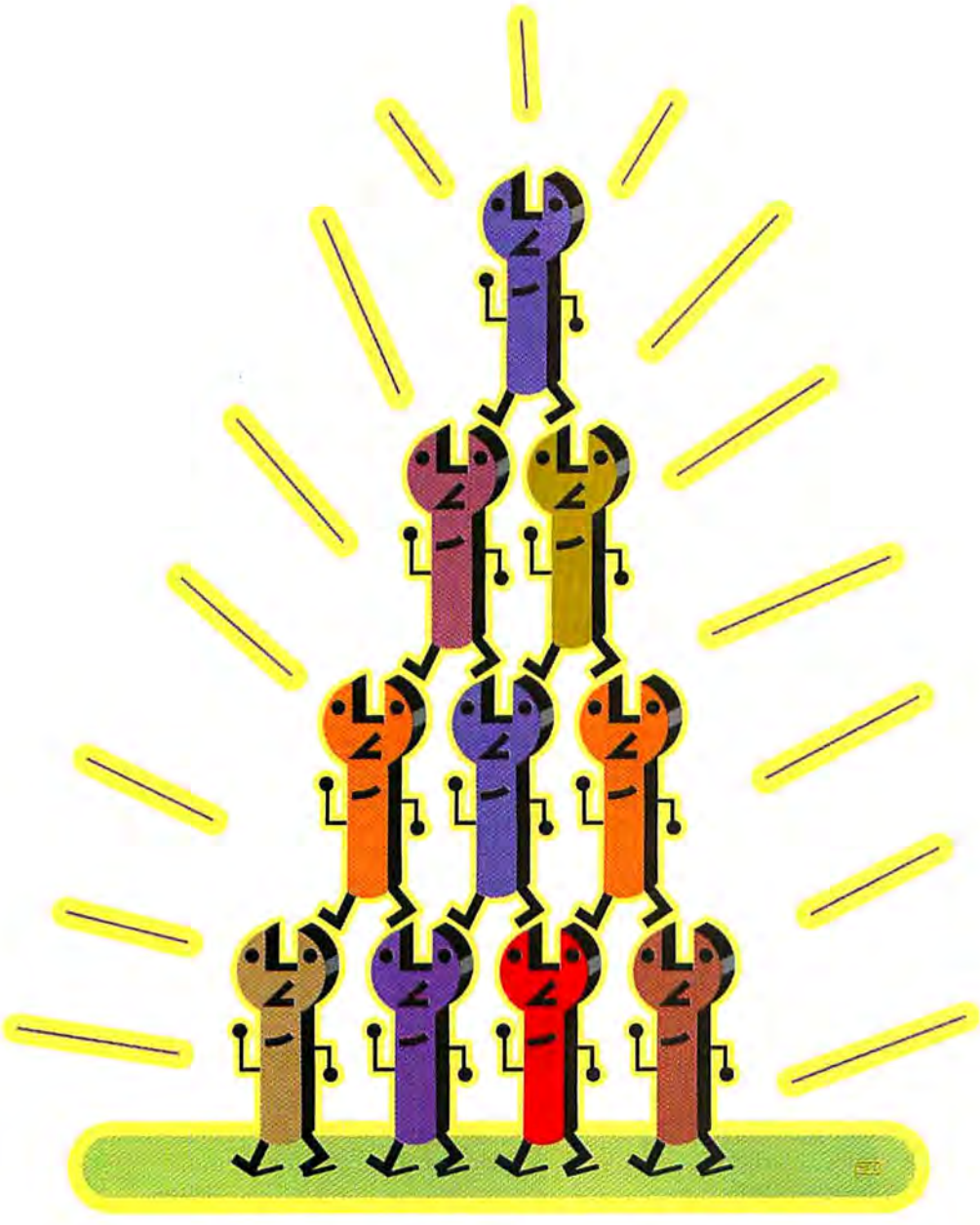
System 7.5 Enhancements

MACINTOSH USERS CANNOT LIVE BY System 7.5 alone. Despite offering many useful improvements over its predecessor—better networking, collapsible windows, drag and drop, the highly addictive sticky notes, built-in AppleScript and PC Exchange, Apple Guide, and a hierarchical Apple menu, to name but a few—System 7.5 falls shorts in several critical areas. As with all system software—past, present, and future—in 7.5 Apple avoided some issues and (in these difficult economic times) shortchanged others. Thus a utility survival kit is as important now as ever, and not surprisingly, the utilities we deem the most essential enhancements to Apple's efforts bear more than a passing resemblance to essential utility collections of days gone by. Those who are still using System 7.1 (or, yikes!, System 6) will therefore find much that is useful in our survival kit as well. And whatever system you're using, if you're looking to work at top productivity, these utilities will move you dramatically in that direction; they'll help you create the most productive system—a dream system, if you will.

RAM Shortage Solved

I resisted trying RAM Doubler ($99 from Connectix, 415/571-5100) for a long time. It must have a fatal flaw, I reasoned; RAM Doubler couldn't possibly trick a Macintosh into thinking it has twice as much RAM as it actually does. But I finally broke down and bought it at a recent Macworld Expo sale, and I haven't been disappointed.

In my experience, RAM Doubler doesn't have any noticeable performance penalties (except, possibly, in conjunction with Microsoft Word 6, but that's another story)—just install it once and forget about it. RAM Doubler isn't recommended for anyone dedicating the entire amount of doubled RAM to a single application; it conflicts with some CD-ROMs and causes some slowdowns



JOHN HERSEY

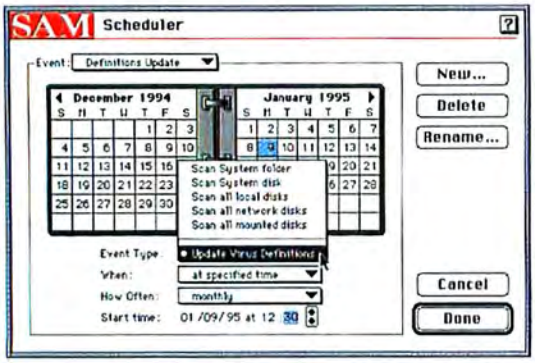
with older Macs (see "Virtual Memory Realities," *Macworld*, June 1994). Despite those caveats, though, RAM Doubler is perfect for those who frequently switch between a variety of simultaneously running applications. And it's cheaper than buying more RAM.

Viruses Be Gone

One of the dirty little secrets Apple never tells you is that computer viruses are still alive, multiplying, and thriving. Although Apple doesn't include an antivirus program in its system, this should be on everyone's utility list. Happily, SAM (Symantec Antivirus for Macintosh, $99 from Symantec, 503/334-6054) makes safe computing easier than ever. In addition to providing the standard forms of viral prevention and cure, SAM's installer now scans for viruses before installation and creates a decontamination start-up disk specifically for your Macintosh model. Better yet, Symantec has automated SAM's viral-defense updating (see "Safe Computing").

But some find SAM's in-your-face antiviral activism irritating; for them, and for those with tight budgets, Disinfectant (freeware written by John Norstad and available through online services and user groups) is a good alternative. Disinfectant cannot detect HyperCard viruses or so-called Trojan horses, however, does not prevent infections by unknown viruses, is slower than SAM, cannot scan compressed files, and must be replaced with an updated version of the program each time a new virus is discovered. The price, on the other hand, is right.

by Robert C. Eckhardt



Safe Computing If you're the forgetful sort, SAM has something to put you at ease: after you tell it your area code, dialing prefix, and modem type, SAM can automatically call Symantec's virus hotline for the latest update according to the schedule you specify in the Scheduler dialog box.

Menu Magic

System 7.5 added submenus and file, application, and server lists to the Apple menu. But there's more room for improvement. For truly up-to-date menu mechanics, add Now Utilities' Now Menus ($89.95 from Now Software, 503/274-2899) to your System Folder. Now Menus has autodrop menus that open—and stay open—without your fingering the mouse button; a customizable Apple menu; and create-your-own menus that you fill with favorite applications, files, or you name it (see "Appetizing Menus").

Finding Folders Easily

Digging your way out of one deeply buried folder only to have to burrow into another is a pain—one that's easily relieved by PopupFolder 1.5 ($59.95 from Inline Software, a division of Focus Enhancements, 617/935-1515). A click on any drive or folder icon opens a pop-up hierarchical menu of that folder's contents (see "Fast Track").

You can use the pop-up menu and its submenus to reach any file within a folder quickly, no matter how deeply it's buried. PopupFolder also adds convenient pop-up menus to the title bar of Finder windows and to the drives and folders listed in Open and Save dialog boxes. Although I prefer PopupFolder, if you already own Now Utilities, Now FolderMenus is quite similar and more than an adequate substitute. If you're using PopupFolder with Now Menus, by the way, be sure to turn off the Apple-menu portion of PopupFolder.

A Superior Clipboard

If you've ever wished the Clipboard could hold more than one item at a time, you'll want to get your hands on MultiClip Pro 3.1 ($59 from Olduvai, 305/670-1112). Using special MultiClip key commands,

System 7.5 Secrets

by David Pogue and Joseph Schorr

THE WORLD MAY BE FULL OF UTILITIES THAT ENHANCE System 7.5 (see the main text, "System 7.5 Enhancements"). But what about the utility of System 7.5 itself? This revamped operating system harbors more deeply-rooted improvements than most people realize. Copying files, launching programs, switching applications, and emptying the Trash are all faster. The Stickies are invaluable, popping up each morning to remind you of calls to make or ideas you've had. Macintosh drag and drop makes manipulating text and graphics jaw-droppingly simple. And if you don't install QuickDraw GX and PowerTalk, System 7.5—contrary to popular belief—takes up little more RAM than System 7.1.

Yes, System 7.5 gives you a faster, more flexible, more powerful computer. Let us count some ways—most of which don't appear in the manual.

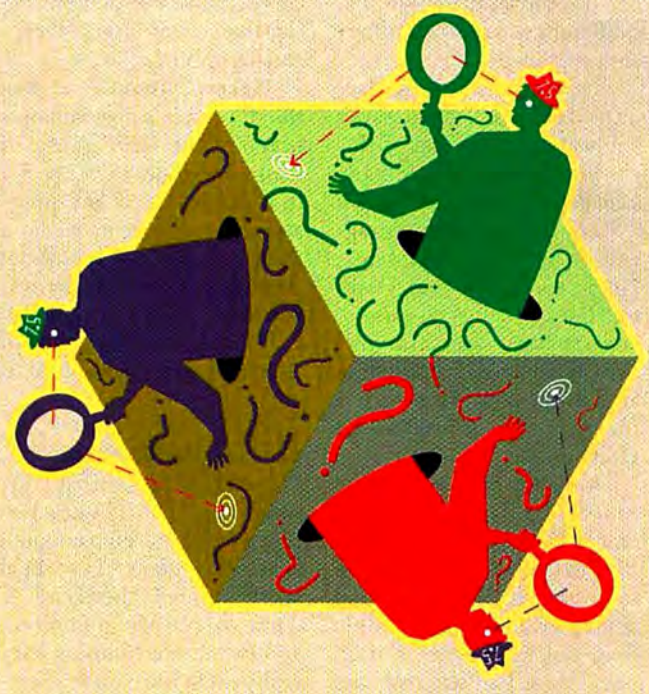
The Find Command

The new Find command, located in the File menu and as Find File in the Apple menu, is fast, shows you all found files in one window, and is filled with undocumented features. But if, for some bizarre reason, you happen to prefer the old System 7.1 Find commands, you can still use them: simply press the shift key as you choose Find or Find Again from the File menu, or as you use their keyboard equivalents, ⌘-F and ⌘-G.

Manipulating Found Files

The Find File program concludes its search by opening a window with a list of found files. You can do any of the following to items in the list:

COOL FEATURES THAT APPLE FORGOT TO MENTION



JOHN MERSEY

• Double-click on one to launch it.

• Press ⌘-E to open an item's folder.

• Drag one to a new location—to the Trash, another disk, or another folder, for example.

• ⌘-drag it to a new location to make an alias.

You can also perform any of the above actions on a group of files—shift-click on files to select more than one. Incidentally, if some of these tricks don't work, you're missing the Finder Scripting Extension. Run the System 7.5 Installer again.

Searching Inside Files If you press the option key while choosing from the criteria pop-up menu, a new mini menu of additional choices appears at the bottom (see "Finding It All"). Most dramatic among them is the Contents item: for the first time in Macintosh history, the system software can search for words inside your files. Even if you can't remember the name of a file, you can now find it by searching for a word or phrase you remember having typed or read in the file. This searching option is slow but extremely useful.

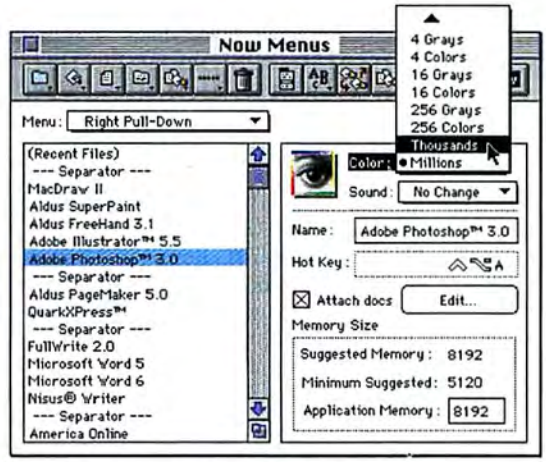
Quick Search Criteria You don't have to type anything or use any pop-up menus to specify most search criteria. Instead you can drag icons from the desktop onto blanks or menus in the Find File dialog box. The appropriate information will be extracted and typed in for you—a first for the Macintosh interface. For example, if you have several drives online, you can use this feature to restrict your search to one drive by dragging its icon onto the pop-up menu that lists mounted drives. Or drag the icon of you can copy to your heart's content, and each copy is added to the contents of the MultiClipboard. You can then paste items in the order you copied them, in reverse order, or select specific items from a pop-up list or from the MultiClipboard window. MultiClip can store graphics (including PICT and EPS), which can be cropped and scaled; editable text (formatted or not); aliases (to conserve memory); editions (to quickly publish and subscribe); sounds; and QuickTime movies (see "Endless Copies"). MultiClip names each clipboard item automatically; you can change the name and/or add keywords for easier recall later, you can crop or scale graphics, and you can edit text.

One thing that bothers me about MultiClip is that it runs as a separate application requiring a full megabyte of RAM. Then again, with RAM Doubler installed, I can afford to give MultiClip the RAM it needs. Anyone with less memory to spare, less money to spend, and more modest clipboard ambitions may want to try Clipfolio ($15 shareware from Ootinta Software, available online) instead. Clipfolio can store up to 20 of your last copies or cuts, and you can paste any of the 20 at any time.

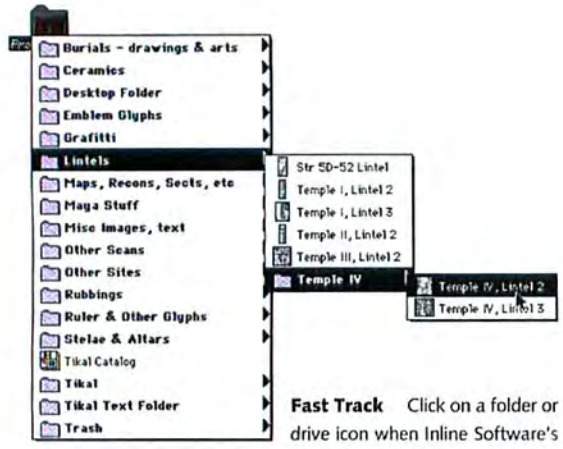
Macros Made Easy

AppleScript may be able to automate virtually any task, but who will "automate" the script-writing process? You will, after spending numerous hours learning how it works, trying to think like a programmer, and . . . well, you get the idea.

But why go to all the trouble when there's QuicKeys ($119 from CE Software, 515/221-1801)? It's true that Quic-



Appetizing Menus Are you obsessed with organization, or do you just want to work more efficiently? Menus created in Now Menus can list specific applications, folders, and documents, as well as recently opened ones. For each application, you can specify, among other things, a monitor color setting, sound volume, and a submenu of documents.



Fast Track Click on a folder or drive icon when Inline Software's PopupFolder is active and a hierarchical menu of its contents pops up; you can turn off menu icons for faster menu opening.

Keys 3.0 is a bit of an antique (it wasn't upgraded for System 7.5 and hasn't been upgraded for some time), and it isn't nearly as powerful as AppleScript. But it still works fine with System 7.5 and fulfills many people's everyday needs. It is the easiest way I know of automating common tasks performed time and again from multistep formatting changes to downloading electronic mail from all those online dating services you belong to.

Catching Conflicts

I nearly fainted when I saw all the start-up documents in my 7.5 System Folder—about 80 of 'em, thanks to Apple's Installer. Adding a batch of my third-party favorites would push the total to well over the century mark. Apple's idea of controlling this mess is to throw its Extensions Manager at it, but you should just throw this baby in the Trash. Extensions Manager can turn start-up items on and off and group them in sets, but that's it. Your best bet to sort out this kind of mess is to get your hands on an industrial-strength extension manager like Conflict Catcher II ($79.95 from Casady & Greene, 408/484-9228).

Recipient of a rare five-star rating from *Macworld* (*Reviews*, October 1994), Conflict Catcher II allows you to change the order in which start-up items load to help you avoid the conflicts they sometimes have with each other (see "Order out of Chaos"). You can link items so that turning on one start-up document turns on an entire group, so that turning on one item turns off any others that are incompatible, or so that specific items always load in a specific order. Finally, when start-up conflicts occur, Conflict Catcher can help you determine the source of the problem.

By the time you read this, a major upgrade to Conflict Catcher should be

SYSTEM 7.5 SECRETS continued

a 530K file onto the Size blank, and the blank changes to read 530.

Drag and Drop

Instead of using copy and paste, you can use Macintosh drag and drop. This feature lets you simply drag any selected text or graphic from one place to another—even to a different window or a different program.

Of course, you need Macintosh drag-and-drop–savvy applications to make this work, and there aren't many available yet. Most of System 7.5's own programs are drag-and-drop–smart: Scrapbook, Note Pad, SimpleText, Desktop Patterns, Jigsaw Puzzle, and Stickies, for example. WordPerfect 3.1 does drag and drop, too. Here are a few examples of how useful D&D can be.

E-Mail Reader If you use America Online or other online services, you no longer have to launch the application to read text files or E-mail you've saved to disk. Simply drag the file's icon into an open Note Pad window; the text instantly appears in the Note Pad.

PICT Viewer Here's a little-known bonus: System 7.5 includes a free utility for viewing PICT files without wasting the time or RAM needed to launch a real graphics program. It's called the Jigsaw Puzzle.

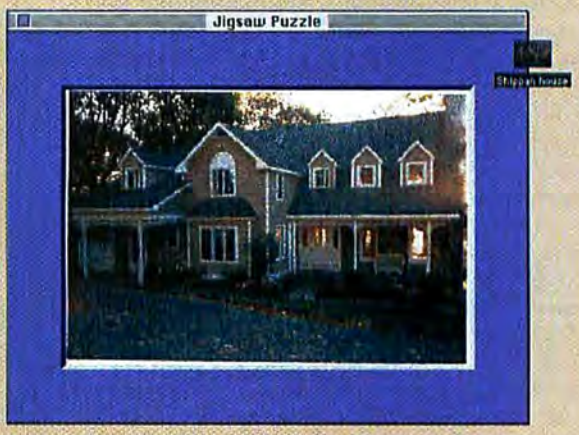
Choose Jigsaw Puzzle from the Apple menu, then drag a PICT file's icon onto the puzzle window. (You can also use the Open command in the File menu to pull in the PICT you want to look at.) If the picture is scrambled, choose Solve Puzzle from the Options menu (see "Drag-and-Drop Vision").

Secret "About . . ." Box No. 1 Apple's programmers haven't lost their sense of whimsy. Under System 7.5 (not 7.5.1), open any drag-and-drop program, such as the Note Pad. Type **secret about box**. Highlight the text and drag it to the desktop. Instantly a live, color game of Breakout appears! (Click to end the game.)

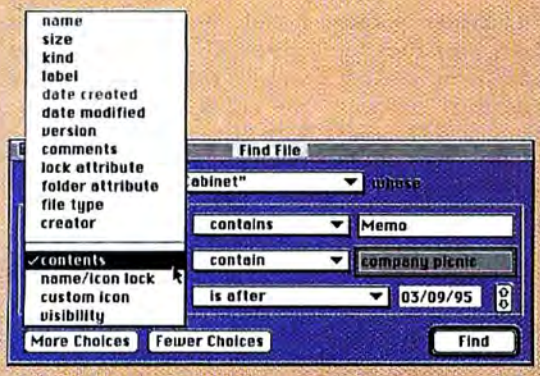
Control-Panel Power

Skeptics have scoffed that some of System 7.5's new features are merely coopted shareware gems. Let them scoff; though the Date & Time, Apple Menu Options, and Extensions Manager control panels were once shareware, they're still gems, and they're now more polished.

Paint Your Desktop With earlier versions of the Mac System, creating a new desktop pattern meant editing an 8-by-8-pixel tile in the old General Controls panel. With



Drag-and-Drop Vision Under System 7.5, you can drag information between Macintosh drag-and-drop–savvy applications. In this case, an unopened PICT file has been dragged to the Jigsaw Puzzle, which displays its contents.



Finding It All The new Find File command can search for text inside files if you choose contents as a criterion. Found files are displayed in a single list, and from there they can be moved, deleted, and so on.

System 7.5, you can pick from dozens of far more impressive, 256-by-256-pixel textures in the Desktop Patterns control panel. "Yes," the uninitiated cry, "but we can't make our own patterns anymore!"

Actually, you can. Create a stunning image in any graphics program, or scan in a photo. Select your artwork, copy it, and paste it into the Desktop Patterns window—you've added it to the pattern collection. (If your tile is too big, the Mac shrinks it to a 256-pixel square.) Double-click to apply it to your desktop.

Paint Your Utilities If you press option, the button at the bottom of the Desktop Patterns window says Set Utilities Pattern. Click it to change the window pattern in System 7.5's built-in utilities, such as the Calculator, Find File, Jigsaw Puzzle, Key Caps, and Scrapbook.

The Disk Cache Secret In the dark days before System 7.5, the Disk Cache (a setting in the Memory control panel) was an obscure, poorly understood speed enhancement. No wonder it was so hard to grasp—the rules were too complicated. For maximum speedup, you were supposed to set it to 32K for each megabyte of RAM in your Mac. But if you set it higher than 512K, your machine would slow down.

That's all changed with System 7.5's rewritten Disk Cache. From now on, it works just as you'd imagine—no formulas needed. The more RAM you can surrender to it, the faster your Mac will go.

Launcher Power

The Launcher made its debut in Apple's Performa computers. This control panel proved so useful—providing single-click, no-folder-burrowing access to your most frequently used files and programs—that Apple made it part of System 7.5 for all Macs.

Making Launcher Buttons You can make your own Launcher topic buttons and fill them with icons that open a set of related applications and files. Each topic button in the Launcher window actually corresponds to a subfolder inside the Launcher Items folder in the System Folder. So to create a new topic button, just create a new folder inside the Launcher Items folder—name the new folder whatever you want, but don't forget to precede its name with a bullet. (You create a bullet by typing option-8.) Then place the applications and files you want to appear together (or aliases of them) inside your new folder. Now when you open Launcher, you'll see topic buttons for each subfolder you've added, plus a topic button called Applications, which contains all the icons not grouped in subfolders.

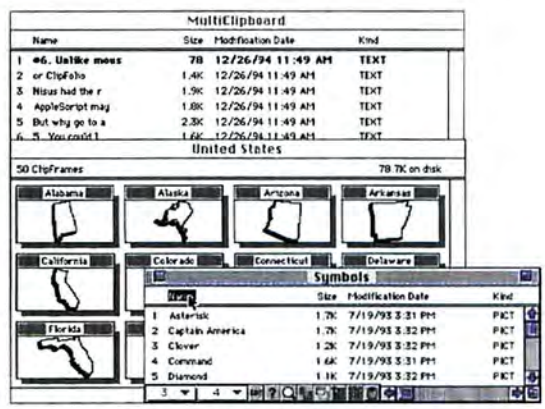
available. According to Casady & Greene, Conflict Catcher III will, among other things, display the name of the start-up set being loaded and label each start-up icon so you can clearly see what's going on during start-up. You will be able to stop the start-up sequence at any time and prevent others from changing your start-up sets.

Ending Font Frenzy

Like start-up documents, fonts can quickly outnumber the coat hangers in your closet. If you have a lot of fonts, you know just how irritating scrolling up and down the Font menu can be. Although MenuFonts ($69.95 from Dubl-Click Software, 503/317-0355) is most famous for its ability to display fonts in their own faces in the Font menu, its other abilities are actually much more valuable (see "Face to Face"). It can, for example, strip Adobe fonts of their prefixes (such as BL) so they all list alphabetically. It can group font families or any user-defined collection of fonts into submenus. It indicates whether fonts are TrueType or PostScript. Best of all, it quickly scrolls to any part of the Font menu when you type the corresponding letter key.

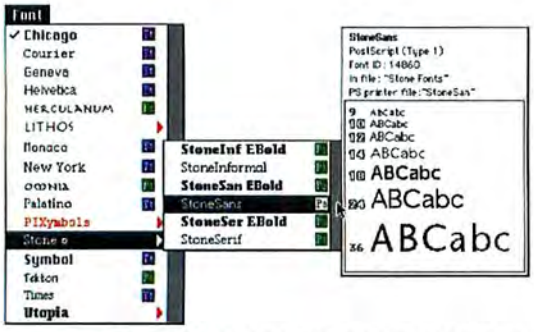
Good-bye, Jaggies

If you're using TrueType fonts, then Adobe Type Manager, or ATM ($39.95, or a $29.95 upgrade for ATM GX owners, from Adobe Systems, 415/961-4400), is irrelevant. But if you use PostScript Type 1 fonts, ATM is a must. That's because if you don't have ATM, your on-screen fonts, especially at large font sizes, suffer from ragged-edge syndrome; and what you see won't be what you get when you print. ATM also allows you to use PostScript fonts on any printer (PostScript or not).



Endless Copies MultiClip Pro's substitute clipboard puts System 7.5's Clipboard to shame. With MultiClip Pro permanent collections can be viewed as an array of thumbnails or in a Finder-like list that can be sorted by name, date, file type, or size.

Order out of Chaos In Conflict Catcher II, you can view your start-up items in three ways: loading order, alphabetically, or by type of file. You can also get basic information on the selected file and open control panels to change your settings.



Face to Face When MenuFonts is installed, dragging the pointer into the bar along the edge of the Font menu displays samples of and information about the selected typeface.

If you're on a tight budget, you can use ATM GX, the version that is included with System 7.5, even if you don't install QuickDraw GX (a memory hog with limited utility at the moment). But ATM GX lacks the full set of features included in the current QuickDraw GX–compatible versions of ATM and SuperATM. Both, for example, are accelerated for Power Macs and come with a nice selection of Adobe fonts. SuperATM can also automatically generate substitute fonts—simulations of fonts you don't have but that are used in documents created by others.

The Last Word

If the rumor mill is correct, System 8 is going to have some of the enhancements provided by *Macworld*'s top picks. Of course, System 8 is still just a rumor, and some of the top utilities' enhancements won't make it till System 8.5 or later. So don't just sit there. Put a little of that hard-earned cash to work and have tomorrow's System today. m

When contributing editor ROBERT C. ECKHARDT is not perusing the latest utilities, he can be found exploring Maya ruins.

SYSTEM 7.5 SECRETS continued

Direct Launcher Access Having read the previous tip, you're probably not looking forward to the hassle of opening your System Folder and then the Launcher Items folder every time you want to add new items to a Launcher topic button.

You don't have to. If you press the option key while your cursor is on a Launcher topic button, it turns into a tiny folder. If you click now, you'll be teleported directly into that topic's folder.

With the System 7.5 bug-fix, Update 1, installed, the Launcher becomes even more flexible. It lets you add icons to your favorite launching bay simply by dragging them there; remove an icon by option-dragging it; change icon sizes by ⌘-clicking the window; and so on. (Update 1 is available online; see its Read Me file for information on other new Launcher stunts.)

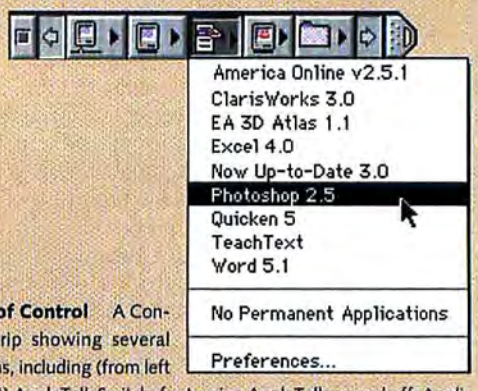
Secret "About . . ." Box No. 2 Who wrote the Launcher program, anyway? Under System 7.5 (not 7.5.1) you can find out by ⌘-option-clicking on the gray background behind the topic buttons.

Control Stripping

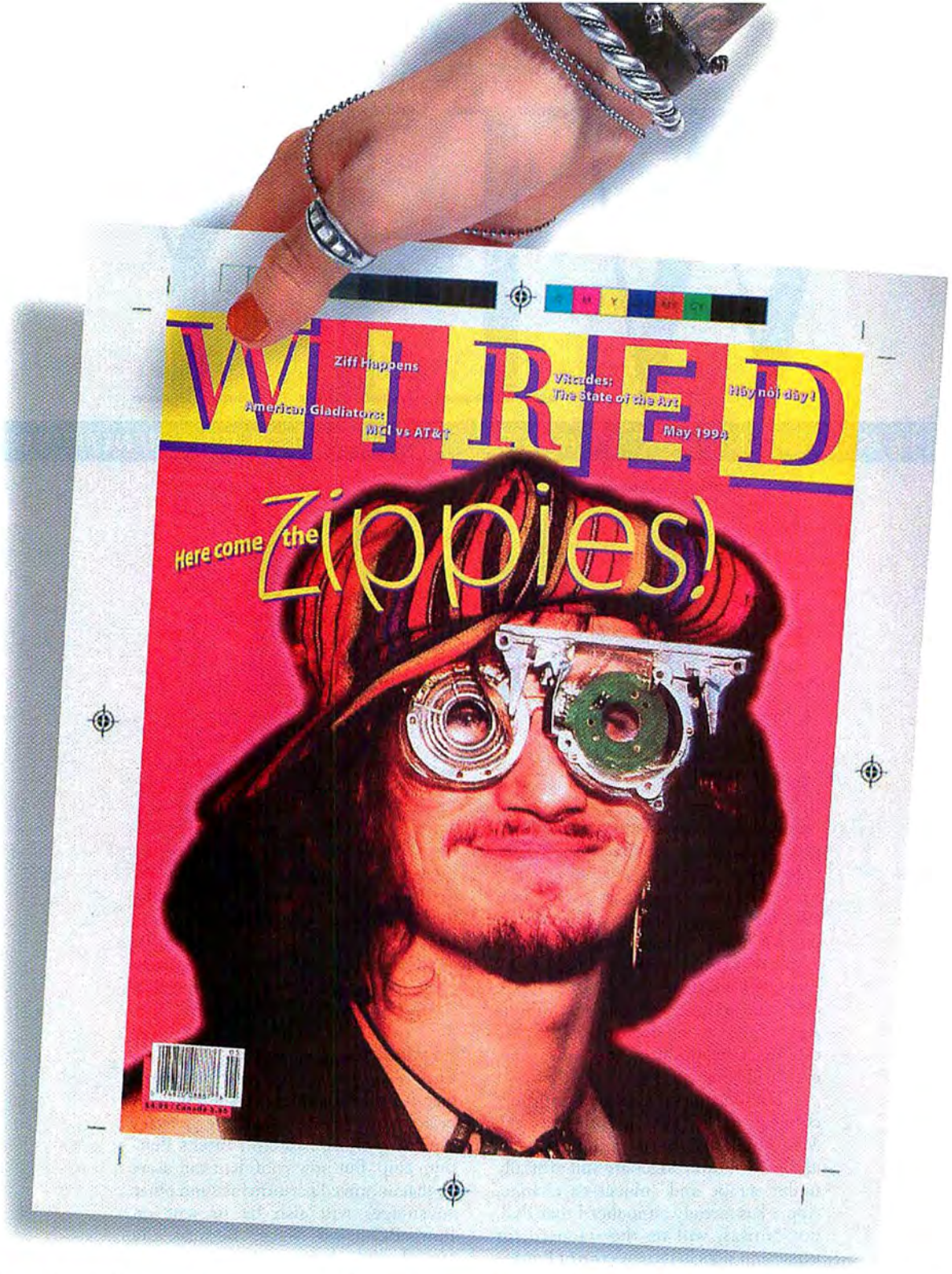
System 7.5 also provides a dramatic interface improvement called the Control Strip, a floating row of pop-up icons intended for PowerBooks but useful on desktop Macs as well. With one click on Control Strip icons, you can adjust the speaker volume, put the hard drive to sleep, and so on (see "Strip of Control"). And the Strip can be configured to meet the most exacting users: click on the tab to collapse the Strip; drag the tab to shorten the Strip; option-drag to move the Strip; or option-drag the icons to rearrange them.

Desktop Control Strip For Control Strip convenience on your desktop Mac, download Control Strip Patcher from America Online or another online service and follow the instructions that come with it. Then load up your Strip with free and shareware plug-in modules, also available online—time-savers like Audio Strip, which controls music CDs; BunchOfApps, which lists or launches the last 25 programs you've used; CS Monitor BitDepth, for switching your monitor's color mode; and CS Terminator, which quits programs with one click. And don't forget Magic 8-Ball, a mystical seer with answers for yes/no questions. m

Contributing editor DAVID POGUE and JOSEPH SCHORR are the co-authors of the best-selling *Macworld Mac & Power Mac Secrets*, second edition (IDG Books Worldwide, 1994), which contains about 2500 tricks like the ones here.



Strip of Control A Control Strip showing several plug-ins, including (from left to right) AppleTalk Switch, for turning AppleTalk on and off; Application Menu, for switching between open applications; the application-launcher BunchOApps, with its menu pulled down; Control Strip Terminator, for quitting applications and restarting; and File Sharing, a plug-in for turning file-sharing on and off.



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WHY PCI

APPLE IS DROPPING NUBUS. HERE'S HOW THE SWITCH WILL BENEFIT YOU.

Have you ever dreamed about plugging in a board that provides real-time, 24-bit video? Does the idea of accessing a network at dramatically faster speeds than current Macs can manage sound appealing? Or how about the notion of having a Mac that could also start up as a Windows NT machine—not just emulate one, but actually start up as one? If Apple's next technological gamble pays off, these capabilities and more may eventually come to pass.

The Peripheral Component Interconnect, or PCI, bus is coming to the Mac. While the details of the next generation of Power Macs are still officially under wraps and subject to change, Apple has already announced that PCI, not NuBus, will be the standard for expansion slots in its new crop of PowerPC-based machines. Apple is betting that this move will bring significant speed improvements, a wider range of hardware and operating-system choices, easier creation of licensed Mac clones, and less expensive peripheral boards.

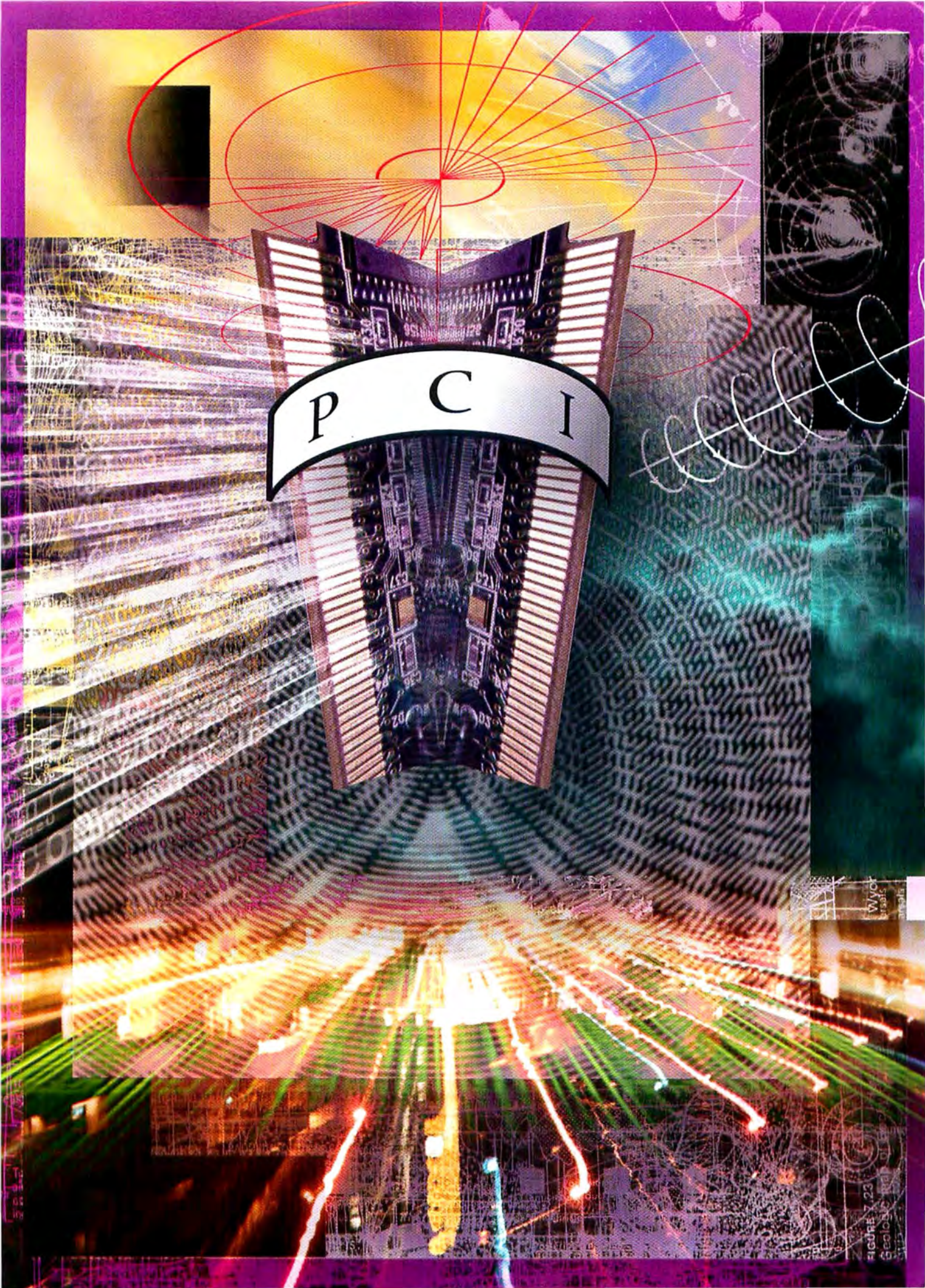
On its face, the decision makes sense. PCI, a more widely accepted standard than the predominantly Mac NuBus, offers the potential for delivering two to three times the performance of NuBus for graphics, video, and networking (for more on PCI network boards, see *Networks* news, in this issue). (Developed by Intel, PCI is used in virtually all systems that include Intel's Pentium processors and enjoys support from many third-party peripheral board vendors. Ironically, PCI was actually created to help Intel dominate the PC-compatible motherboard market.)

Possible Advantages

Because it was created using modern bus-design techniques, PCI offers good performance on many existing systems, especially those based on Intel's Pentium chip. But how confident can users be that improved performance and other advantages will also be present on PowerPC-based Macs? Because the same boards designed for PCs might also be usable in Macs, vendors could in theory realize economies of scale that would let them sell boards for less. And given increased competition if many new vendors begin to sell boards for the Mac, Mac PCI boards might be developed faster than NuBus equivalents have been in the past.

But at this point in the PCI development cycle it's not clear how soon Macintosh users will enjoy PCI's many possible advantages—or how dramatic

BY BRETT GLASS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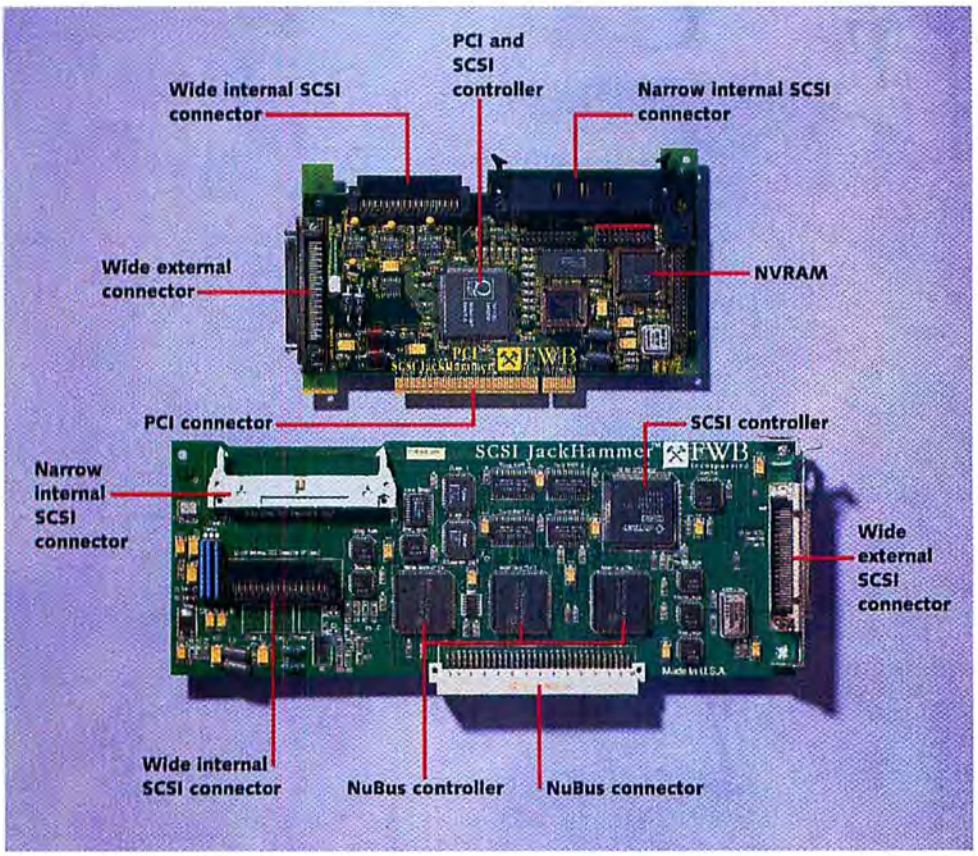
those advantages might prove.

In practice, it remains to be seen whether the move to PCI will bring about substantial price advantages. Some vendors may need to modify their hardware—including the custom chips they use on their boards—for optimum performance in the new Power Macs. For example, ATI Technologies, which has already announced its intention to support Mac PCI systems, will sell a different board for the Power Macs than for IBM-compatible PCI systems, even though the graphics engine in both boards will be the same. Other vendors, such as Matrox, intend to produce boards that work both in Macs and in PC-compatibles—a strategy that will result in more favorable economies of scale. However, these revised boards, which will include special hardware to adapt them to the Mac, may take some time to come to market.

Board vendors new to the Mac will doubtless have to hire Mac experts to design driver software, and Mac engineers to support user calls, and are likely to pass these costs on to Macintosh users. Most vendors are also painfully aware that these users have higher standards for usability, configurability, and ease of installation than other users and will thus demand more-polished products. Therefore, even if the same board serves both markets, the Mac version of the complete package—including the drivers, manuals, and tech support—may still cost more than the equivalent one for the PC. (This is already true of many external modem packages for the Mac, which contain the same modem as the PC version but different bundled software.)

Finally, according to developer documentation released by Apple, at least some of the new Power Macs will have video-in, video-out, and SCSI interfaces built into the motherboard. Third parties may hesitate to enter the market for fear that most users of these machines will stick to the hardware that comes with the machine.

A NEW LOOK FOR MAC ADD-ON BOARDS



PHOTOGRAPHS BY PAUL FRANZ-MOORE

Because they were designed to fit painlessly into IBM PC clones, PCI boards are about as tall as an IBM peripheral board (a little less than 4 inches). In length, PCI boards vary widely; some are as short as a few inches; others are as long as the slot (about 14 inches). As with PCs, you plug a PCI board into the Mac's motherboard, then attach the rear mounting bracket with a single metal screw. (Unfortunately, this one-point mounting system can allow the board to come loose if the machine is shipped or handled roughly, so it's good idea to open the case and push all the boards back into place after moving a PCI-based Power Mac.)

Power consumption will vary widely between boards, with boards that have lots of RAM (such as 24-bit video accelerators) and SCSI boards (which provide termination power) soaking up the most wattage. PCI boards don't run significantly hotter than current NuBus boards of the same type, though, so no extra cooling will be required.

The boards shown here, FWB's JackHammer (PCI, top, and NuBus, bottom), show some significant changes due to PCI. The much larger NuBus version uses four chips to control NuBus and SCSI; the PCI board needs only a single chip as a dual PCI and SCSI controller. The PCI version also adds NVRAM, used only on PCs and allowing the board to be sold across platforms. The PCI board will also be far less expensive—$499, compared with $799 for its NuBus sibling.

The Best Bus?

While PCI is light-years ahead of the aging NuBus, it remains to be seen whether PCI will offer technical advantages over other state-of-the-art buses Apple might have picked as its next-generation bus. PCI is no more sophisticated, nor is it faster, than the IEEE's FutureBus, Sun's S-Bus, or the VESA Local Bus (popular on 486-based PC clones). And when compared with the Processor Direct Slots on current Power Macs, PCI will almost certainly be slower. (Although in fairness to Apple, the PDS is not intended as an expansion slot on most Macs.)

Not Native to PowerPC

Because PCI isn't precisely

tuned to work with the PowerPC chip, it will probably run at a slower pace than the processor's native bus. And PCI may impose some overhead that a PowerPC-specific bus would not. Although most PCI-board developers expect Macintosh PCI boards ultimately to run far faster than NuBus equivalents, they say it's too early to know how significant any overhead slowdowns might be, or how effectively PCI-based Macs will compete with PCI on Pentium-based PCs.

Open Firmware PCI does have one novel feature that will certainly aid system configuration, however—the IEEE P1275 Open Firmware specification. Each board conforming to this standard has a ROM chip containing code written in Forth, a processor-independent interpreted language. This code initializes the board and communicates its capabilities to the host system. This feature makes it easier to implement plug-and-play capabilities on any system that accepts PCI boards; it also makes the boards somewhat—though not completely—OS independent.

This is certainly good news to PC users, who often endure migraine-inducing conflicts when adding new peripherals. Macintosh users have enjoyed automatic configuration almost since the Macintosh has had slots and may not find these improvements to be so impressive. But Open Firmware also offers the ability to actually operate from a different OS. PCI Power Macintoshes will even be able to display a dialog box at startup asking which OS you'd like to use. If these plans are executed effectively, you could have, for example, a Pentium-based PCI board and use a control panel to start up as a Windows computer.

Intel Legacy On the other hand, PCI suffers from one major technological disadvantage in the Macintosh world—a disadvantage that could reduce the performance of PCI boards and scare some PCI vendors away from the Mac platform. Because PCI was designed for Intel processors, the PCI bus arranges some of its data almost exactly backward from the way Mac software and hardware require it. In a term reminiscent of Swift, the PCI bus is *little-endian* (that is, it writes numbers into memory with the rightmost digit at the lowest-numbered address and successive digits at higher-numbered addresses), while Mac video systems and software always order their data in a *big-endian* format (with the rightmost digit at the highest memory address and successive digits at lower addresses).

Because the little-endian PCI bus doesn't fit the conventions that have been used in Macs since 1984, Apple will have to build special circuits into its motherboards to

PCI is light-years ahead of the aging NuBus but may not offer technical advantages over other state-of-the-art buses Apple might have picked

FIRST OUT OF THE PCI GATE: LIKELY CANDIDATES

Although some PCI-board makers are not ready to commit to the Mac platform, a range of companies plan to support the Mac. Vendors that have announced their intentions include the following.

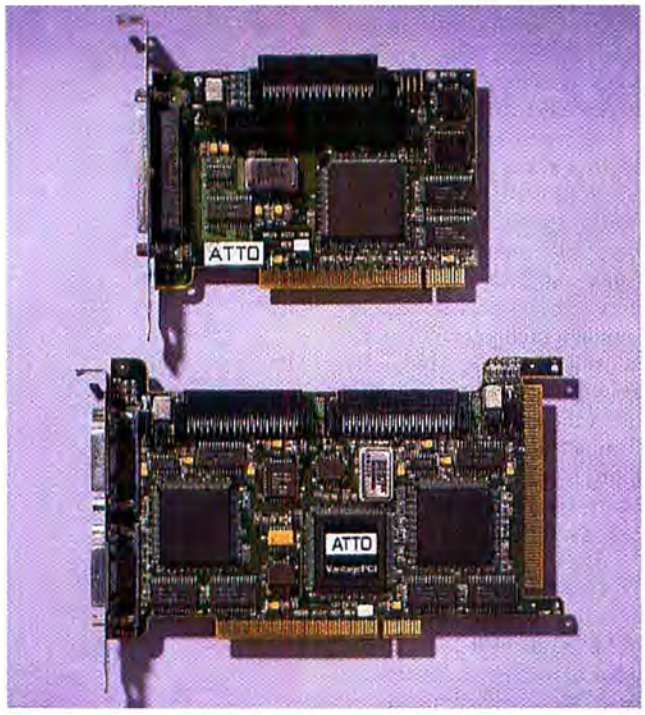
- ATI Technologies and Diamond Multimedia Systems, two leading PC-video-board manufacturers, are launching graphics accelerators for PCI Macs; they should be available soon after PCI Macs ship. The products will be priced competitively with comparable NuBus accelerators.
- Mac mainstay Radius will produce PCI versions of its graphics accelerator and digital-video adapter lines. EA Research will also sell PCI graphics accelerators.
- Adaptec, a leading provider of PC SCSI products, and FWB, a Macintosh mass-storage and backup specialist, both expect to ship high-speed PCI SCSI adapters for RAID, high-speed backup, and CD-ROM authoring. Adaptec's line covers Fast, Wide, and differential SCSI standards. FWB's existing line of disk arrays and AV drives, along with its disk-management Toolkit software, will also take advantage of PCI's higher speeds.
- Matrox and Genoa Systems, PCI mainstays, will provide at least driver support and may adapt their boards' hardware for the Mac.
- A wide range of networking vendors, including Fore Systems, Asanté Technologies, Dayna Communications, Digital Equipment Corporation, Farallon Computing, Interphase, and 4-Sight International, plan to bring out high-speed LAN and WAN PCI boards (see *Networks* news, in this issue).

Growing pale with the thought of your five-figure investment in NuBus boards? Austin, Texas–based Second Wave will sell a PCI-to-NuBus expansion chassis that will enable users to continue using NuBus boards with PCI Power Macs.

—Brett Glass with Mel Beckman

rearrange the data and recalculate memory addresses on the fly. (This is roughly equivalent to surgically modifying one's feet so that the left shoe can go on the right foot and vice versa.)

And according to Apple's early design documents, vendors may have to revise board or chip designs to support big-endian access to pixels. Finally, vendors who write Mac drivers for PCI boards will probably need to include special PowerPC software instructions that rearrange the data. Unfortunately, using these instructions can be tricky and confusing, and their creation requires special development tools.



Atto will jump into the PCI market with ExpressPCI SC (single-channel, top) and ExpressPCI MC (dual-channel, bottom) SCSI accelerators.

Nonstandard Video

There's another potential problem with the new Mac PCI slots—one of Apple's own making. If Apple adheres to early design notes (distributed by Apple to developers), it plans to make some of the slots on the new Power Macs only partially compliant with the PCI specification. In particular, Apple's Video PCI (called VCI) slots may not support *parity*—an error-detection scheme. If this is the case, manufacturers may have to redesign their boards so that parity checking can be disabled before they will work with a Mac.

Also missing is bus master flow control, which paces transfers into and out of memory. (Apple omitted flow control in its early implementations of SCSI and came to regret this choice after it caused serious compatibility glitches.) And only certain types of PCI bus cycles are supported.

If a vendor's graphics-accelerator chip relies on any of the missing features to achieve top performance, boards built with that chip may run more slowly on a Mac than on a PC. And Apple's unique, Mac-specific Digital Audio Video (DAV) multimedia architecture may not be supported even by dual-platform boards. (Apple declined to comment on how it plans to address these or other potential problems, or any other aspect of PCI.)

Who Will Sell?

Whatever the good or bad points of PCI might be, Apple has committed to it in a big way. Beyond the next generation of Power Macs, PCI will be the standard for the converged hardware-reference platform that's being developed with IBM and Motorola. That makes PCI a key part of the Macintosh for the foreseeable future.

As one might expect, some well-known players, such as Adaptec, ATI, RasterOps' Truevision division, Diamond Multimedia, Matrox, and Genoa Systems already plan to provide at least driver support (and, possibly, modified or enhanced hardware) for PCI-based Power Macintoshes. An extra-cost adapter may be required to use some boards with an Apple monitor. And, of course, a wide range of companies that already make Mac peripherals are expected to release PCI designs (see "First out of the PCI Gate: Likely Candidates").

But most PCI-board manufacturers are taking a wait-and-see stance or are refusing to comment. Given the tiny size of the Mac market relative to the PC market, the potentially daunting problems of implementing PCI on the Mac could deter PC-board vendors who are considering bringing their products to the Mac. For example, Boca Research, a board maker whose aggressive pricing strategies have fostered a great deal of competition in the PC marketplace, says it has no plans whatever to support the Mac. Ditto DTC and Future Domain, whose products are well respected in the PC world. Sigma Designs (popular for its MPEG boards), Nth Graphics, and Colorgraphic have said flat out that they have no plans to enter the Mac market.

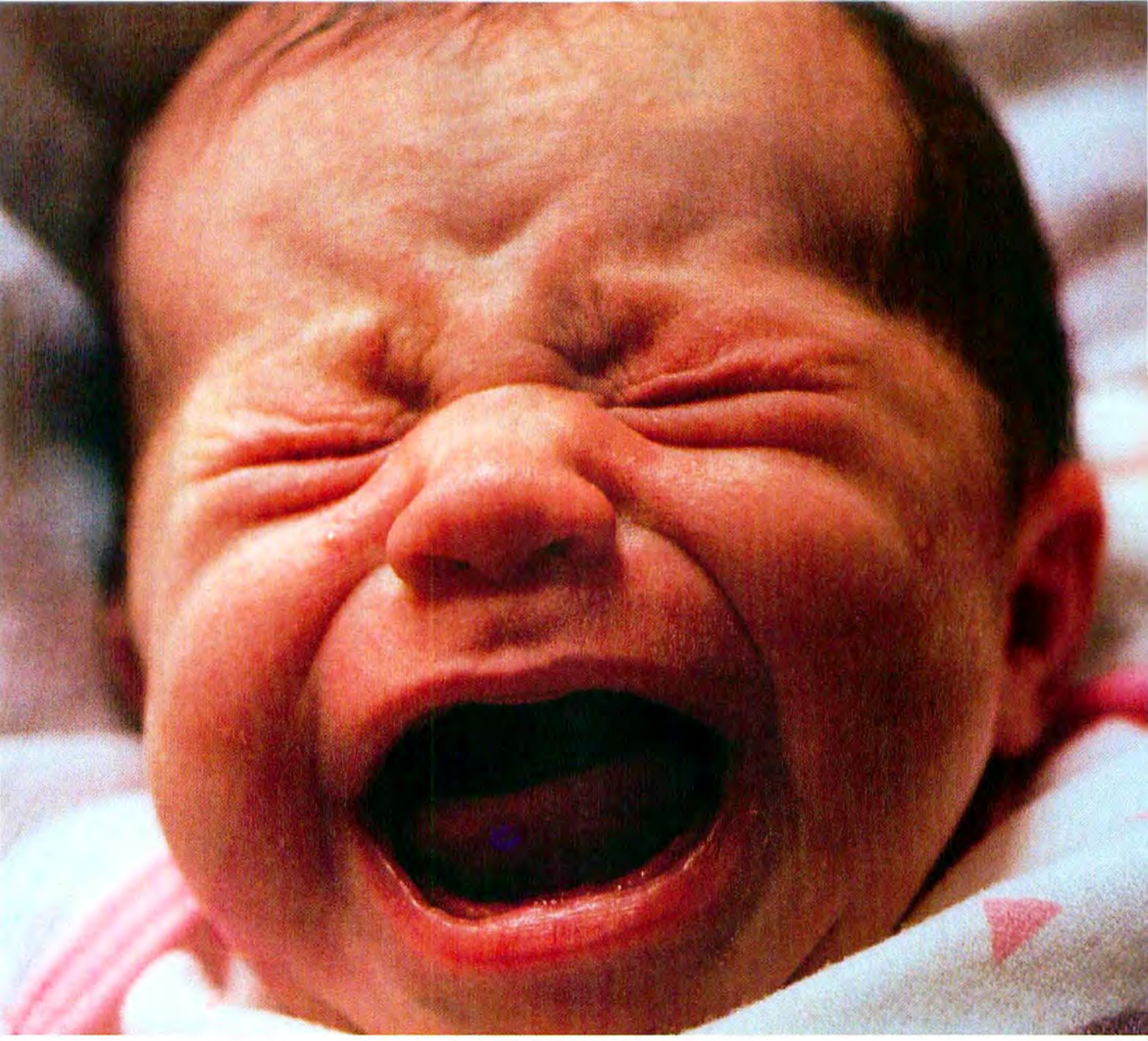
The Last Word

It is too early to tell whether Apple's move to PCI, rather than a different state-of-the-art bus, will prove to be the smashing success Apple hopes it will be. If implementation problems cause disappointing performance, or if a substantial number of PCI vendors don't jump on the bandwagon, PCI may only cause the next generation of Power Macs to be perceived as generic machines that lack the technological innovations Apple must have to survive.

But this much is clear: even if PCI is no panacea for expansion, for performance PCI will eventually be far better than NuBus for many kinds of applications. And given how critical this bus change is to Apple, the company will probably do everything in its power to make sure that a critical mass of Intel-based PCI vendors eventually develop for the Mac. If they do, PCI could truly reinvigorate the Mac market. **m**

BRETT GLASS, an electrical engineer and software consultant, was one of the first Mac programmers. His columns appear regularly in *InfoWorld* and *PC World*.

Research assistance by JIM FEELEY.



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APS
NEC
MultiSpin 4X
CD Technology

QUAD-SPEED CD-ROM DRIVES

DOES THE HIGHER SPEED JUSTIFY THE EXTRA COST? MACWORLD LAB INVESTIGATES.

BY JAMES A. MARTIN

YOU'D THINK SHOPPING FOR A CD-ROM drive would be fairly straightforward. After all, as computer peripherals go, CD-ROM drives are simple to install and operate, and there aren't many differentiating features to consider between drives.

The reality is, however, that deciding on a CD-ROM drive these days can be confusing. Recently, for example, I dialed a CD-ROM vendor's toll-free sales number, as any prospective customer might, to get the price on the company's new quad-speed drive. "It's $540," the salesman said. "But you know what? Our double-speed drive bundle is only $399, and that drive is usually faster than the quad-speed."

Before I could ask a question, the salesman continued. "With multimedia, you don't really see much difference between double- and quad-speed drives anyway. And with other kinds of applications, the double-speed is frequently a little faster, or sometimes a little slower, but just by a couple of seconds. So why spend that extra money if you don't get anything out of it?"

Why, indeed. That's precisely the question Macworld Lab was pondering as we compared the performance of seven external quadruple-speed CD-ROM drives against a single-speed, a double-speed, and a triple-speed drive. For the most part, the sales pitch wasn't far from the mark. Our test results show that in three out of five tasks, Apple's internal 300i double-speed CD-ROM drive fared better than at least one of the quad-speed drives (for complete results, see the benchmarks, "How Fast Are Quad-Speed CD-ROM Drives?"). In a fourth task, a word search performed on a CD-ROM encyclopedia, the Apple drive trailed behind the majority of its quad cousins by a mere 3 to 5 seconds. In only one test, a 4th Dimension database search, was there a dramatic speed improvement in the quad-speed drives' favor.

Despite often anticlimactic performance gains, there are still some reasons to consider a quad-speed drive over a double-speed model. Price, for one thing. True, most quad-speed drives carry suggested retail prices above $500, versus a typical double-speed drive price of about

MW LAB

KEVIN CANDLAND

$200 to $300. At press time, however, a couple of quad-speed models had begun selling for $300 to $400, and more drives are expected to follow suit. Apple, for example, has announced the AppleCD 600e quad-speed drive, which should begin shipping in May for $349 (the drive wasn't available for review). Meanwhile, multimedia soothsayers predict that by the end of 1995, we'll begin to see multimedia CD titles optimized to run at top speed on quad-speed drives. The bottom line: If you don't own a CD-ROM drive, spending a little extra money now buys you some insurance that your investment will last a few years. (At press time, Plextor had announced the first internal 6X drive for $599; see *News*, in this issue.)

To help you decide if a quad-speed drive is right for you, we evaluated the driver software that ships with each CD-ROM drive, rated the quality of the drive vendors' telephone technical support, and along with our benchmark results, took into account a drive's price and other selling points such as physical size, weight, and bundled software titles.

The Truth about Transfer Rates

Quad-speed, or 4×, CD-ROM drives are so called because they promise transfer rates that are four times as fast as the rates of the first-generation CD-ROM drives. Transfer rate refers to the speed with which a CD-ROM drive moves data from the disc through the drive's read head and controller to the Macintosh. A drive's transfer rate is most important in handling large, complex files such as graphics and full-motion video. The faster the data-transfer rate, in theory, the greater the chance that a QuickTime video will not drop frames or audio as it plays.

The first CD-ROM drives, now called single-speed drives, had data-transfer rates of 150 kilobytes per second (KBps). Double-speed drives got their name because they offer transfer rates of 300 KBps, or double the speed of their predecessors. The faster transfer rates were achieved by redesigning the drive's spindle motor to spin faster, upgrading the controller, and in most cases, adding a buffer to handle the increased flow of data from the drive to the Mac. By late 1994, nearly a dozen CD-ROM vendors were offering drives for the Mac with average transfer rates of 600 KBps—four times the rate of the 150-KBps drives. But to put that in perspective, even the fastest CD-ROM drives are significantly slower than hard drives, which offer an average transfer rate of about 2MB per second.

Although CD-ROM hardware speeds have been increasing, multimedia software has been slow to catch up. In fact, some of the current multimedia titles aren't even optimized to take full advantage of the double-speed transfer rate. Multimedia developers, for obvious reasons, want their products to run smoothly on as many CD-ROM drives as possible. For now, that means developing titles with video optimized for the industry-standard double-speed drive.

To avoid flooding the data pipeline, developers often optimize video conservatively to ensure that the CD runs in slow environments. For instance, the majority of QuickTime videos from Vicarious Entertainment's CNN Time Capsule CD for 1994 are optimized to play at transfer rates from 104 KBps to 198 KBps—well under the 300-KBps double-speed ceiling. Macworld Lab tests of QuickTime playback performance from several multimedia CDs confirmed the role of optimization, showing little variation between the double-, triple-, and quad-speed drives. But with its 150-KBps capacity, the single-speed drive frequently choked on the CNN videos, dropping frames and audio along the way to keep up.

So why don't multimedia titles contain video optimized to run at 1×, 2×, 3×, and 4× speeds? Technically, it's possible. But such a project would require additional development time and would benefit a minority of potential users. More important, developers would have to include four versions of the same video clips—given video's appetite for storage, this solution would quickly limit the amount of video that would fit on a CD.

With graphics files, we discovered

Quad-Speed CD-ROM Drives

	APS Technologies	Bottom Line Distribution	CD Technology	DynaTek Automation Systems	FWB	Liberty Systems
Product name	APS T3501	Magic Toshiba 4X CD-ROM	PortaDrive T3501	CDS654	HammerCD 4x	115 4X CD-ROM
Phone	816/483-6100	512/892-4070	408/752-8500	416/636-3000	415/474-8055	408/983-1127
Toll-free phone	800/235-2753	800/990-5792	none	none	none	none
Mechanism	Toshiba XM3501	Toshiba XM3501	Toshiba XM3501	Toshiba XM3501	Plextor PX43-CH	Toshiba XM3501
Suggested retail price	$299.95	$449 [A]	$500	$529	$839	$599
Performance ranking [D]	1	2	7	6	not tested	not tested
Driver software	PowerTools Drive Controls	CharisMac's AutoCache	CDT 1.8	Compass Pro 3.0 [E]	FWB CD-ROM ToolKit 1.5	FWB CD-ROM ToolKit 1.5
Data buffer size	256K	256K	256K	256K	1MB	256K
Size (w × h × d, in inches)	6.9 × 2.25 × 10.0	9.8 × 2.5 × 10.25	5.75 × 1.75 × 9.5	8.5 × 2.5 × 10.85	9.0 × 2.0 × 9.0	6.75 × 1.9 × 9.0
Weight (in pounds)	4.45	5	3.42	5.4	5	3
SCSI termination	internal, active	internal, active	external, passive	external, passive	external, passive	internal, active and external, active
Money-back guarantee	30 days	30 days	30 days	none	none	30 days
Warranty	1 year	1 year	1 year	1 year	1 year	1 year
Tech-support rating	very good	unacceptable	poor	very good	not rated	not rated
Toll-free tech support	yes	yes	no	yes	yes	no
Free tech support	unlimited	unlimited	90 days	unlimited	unlimited	unlimited
CDs bundled	none	Software Toolworks Presents The Animals; US Atlas; World Atlas; Space Shuttle; Oceans Below	none	none	none	none

Technical-support ratings are based on a series of calls made to each company by Macworld staffers (posing as customers) to gauge the accessibility, helpfulness, and accuracy of the company's support not individual products, and we call only those companies whose products Macworld Lab tests. [A] *Includes headphones, external speakers.* [E] *Vendor's estimated street price, no suggested retail price for detailed performance results.* [I] *Tested with Compass Pro; now ships with FWB CD-ROM ToolKit 1.5, which does offer caching.*

some disparity between the 2× and 4× drives, but the differences weren't significant. NEC's Multispin 4Xe, the fastest drive in the Graphics Retrieval test, opened a 1.4MB Adobe Photoshop file from the Apple Color Graphics Sampler CD in 7 seconds. By comparison, the Apple 2× drive came in eighth, completing the same task in 9 seconds; the single-speed AppleCD 150 straggled in at 15.4 seconds—taking more than twice as long as the Multispin.

Our Photo CD Retrieval test, in which we generated an on-screen contact sheet of thumbnail images using Kodak's Photo CD Access utility, showed virtually no difference between the drives. The fastest drive in this task, Optical Access International's CD/Allegro 4X, finished the job only 4.7 seconds faster than the single-speed drive. The differences were so slight because this task is heavily dependent upon decompressing Photo CD files, and the decompression speed is determined more by the Mac's processor than by the simple transfer of the file from the CD to the Mac. Creating a contact sheet from a Photo CD disc is a real-world task, and our results show that a CD-ROM drive's transfer rate makes no difference in this application.

Understanding Access Speeds

Although it receives less attention than the transfer rate, a CD-ROM drive's access speed is also an important factor to consider. Access speed is measured in milliseconds (ms) and takes into account seek time, or the time it takes a drive to locate and move to a track on the CD to be read, and latency, the amount of time it takes for the correct sector to spin under the drive's read head. The faster the access speed, the quicker you can search a database on a CD, among other things. Most 2× drive mechanisms offer access speeds of 200ms to 240ms, while 4× device speeds are usually 150ms to 200ms. By comparison, many hard drive access speeds are about 10ms to 20ms.

Unlike our transfer-rate tests, our Database Search test uncovered some significant differences in access speeds between 2× and 4× drives. With the prices of both CD-ROM drives and recordable CD devices dropping, some businesses are distributing certain types of internal information—employee manuals, databases that don't require frequent updating, and the like—on compact discs. For a real-world test, we searched for a single word in a nonindexed field of a 30MB, 96,775-record 4th Dimension database. Despite the fact that six of the seven quad-speed drives we tested use the same Toshiba mechanism, they completed the task in times ranging from 715 seconds (about 12 minutes) for APS Technologies' APS T3501 to 1110 seconds (about 19 minutes) for CD Technology's PortaDrive T3501. The AppleCD 300i double-speed drive, in contrast, concluded the same search in 1542 seconds (about 26 minutes). Those differences are mostly due to driver software and caching—clearly, access speed is not the major factor in CD-ROM throughput.

We achieved fairly similar results when performing a word search in the 1994 version of Grolier's Multimedia Encyclopedia CD, with the APS drive in first place and the AppleCD 300i next to last. But these two tests showed minor anomalies in performance between the quad-speed drives. For example, the Optical AccessCD/Allegro 4× ranked fifth in the 4D test but fourth in the Grolier's word search. Again, the discrepancy can be attributed largely to the different ways in which the two applications handle searches—how they compare data and display it on screen being two possible differences.

A Little Cache on the Side

Each CD-ROM drive ships with driver software that enables it to communicate with the Mac. Usually, the driver also offers some level of data caching—that is, storing data that is likely to be accessed soon in memory, where it can be retrieved more quickly than from the CD-ROM. For example, most CD-ROM driver software automatically transfers certain types of data, such as a CD's directory of files and other frequently read information, from the CD into RAM. The memory used for caching includes a data buffer on the CD-ROM drive and some memory from your system's RAM.

Small caches can aid performance for some tasks, while large caches can increase the speed of other tasks. For example, a small cache (32K) can help QuickTime performance slightly, because QuickTime moves small chunks of data frequently. Database searches, which frequently involve reading the same information more than once, can be hurried along with larger cache settings (a large cache can contain more of the frequently read information than a small one). In an informal test, for instance, I shaved three minutes off the 4D database search by setting the APS PowerTools Drive Controls driver cache to 192K.

As a rule, Macworld Lab found that driver software caching does help a drive's performance. The two 4× drives we tested that didn't offer driver caching, CD Technology's PortaDrive T3501 and DynaTek Automation Systems' CDS654, ranked last in overall performance among the 4× drives (at press time, DynaTek had begun bundling different software that does provide caching). Of the software

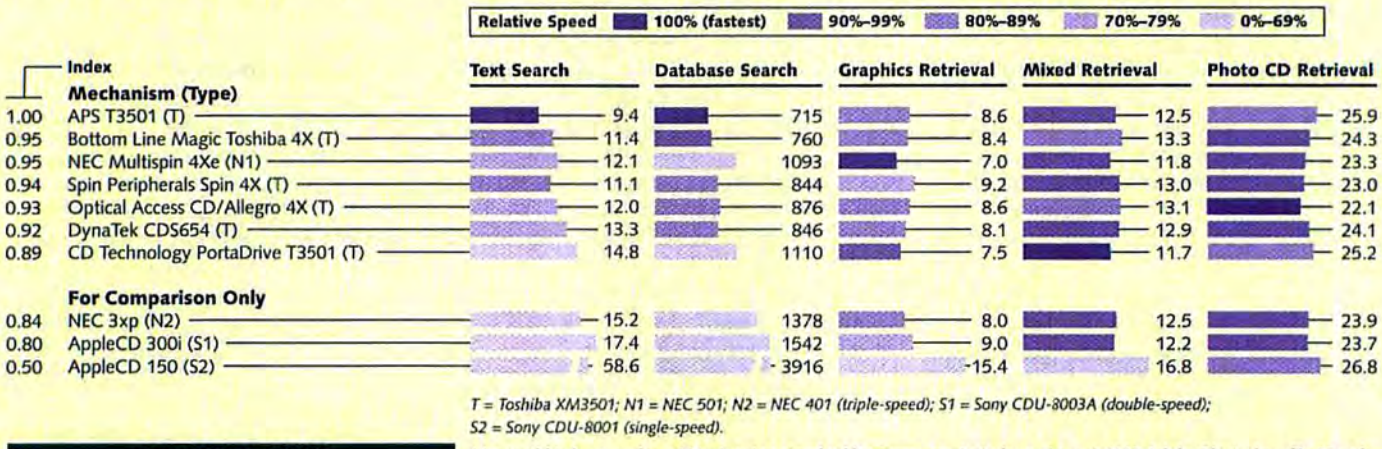
NEC Technologies	Optical Access International	Pioneer New Media Technology	Plextor	Spin Peripherals
Multispin 4Xe	CD/Allegro 4X	Pioneer DRM-604X	4Plex PX-45CH-16 SCSI	Spin 4X CD-ROM
708/860-9500	617/937-3910	310/952-2111	408/980-1838	617/965-9882
800/632-4636	800/433-5133	800/444-6784	800/886-3935	800/945-0549
NEC 501	Toshiba XM3501	Pioneer DRM-604X	Shinano-Kenshi	Toshiba XM3501
$515[B]	$449	$995	$599	$499[C]
3	5	not tested	not tested	4
DriveCD NEC 5.0A	SuperCache 2.7.2	CLD Access 3.0	FWB CD-ROM ToolKit 1.5	Red Line 2.5.1
256K	256K	128K	1MB	256K
6.9 × 3.0 × 13.0	9.75 × 2.25 × 11.2	8.3 × 4.1 × 14.6	7.0 × 2.24 × 12.03	6.25 × 2.3 × 11.75
6.4	5	14	6.2	3.5
internal, active	external, passive	internal, active	external, passive	internal, active
none	30 days	determined by retailer	none	30 days
2 years	1 year	1 year	2 years	2 years
poor	very good	not rated	not rated	acceptable
yes	yes	yes	yes	yes
unlimited	unlimited	unlimited	unlimited	unlimited
Microsoft Encarta 1994; NEC Tutorial	none	none	none	The 1995 Grolier Multimedia Encyclopedia; Prehistoria

technicans. Macworld uses a point system, including bonuses and demerits, to derive the final rating. Ratings are for companies,

[C] Includes headphones, external speakers; $399 without. [B] See the benchmark "How Fast Are Quad-Speed CD-ROM Drives?"

How Fast Are Quad-Speed CD-ROM Drives?

Mechanisms are listed in order of overall performance from fastest to slowest. Times are in seconds. Shorter bars are better.



Index	Mechanism (Type)	Text Search	Database Search	Graphics Retrieval	Mixed Retrieval	Photo CD Retrieval
1.00	APS T3501 (T)	9.4	715	8.6	12.5	25.9
0.95	Bottom Line Magic Toshiba 4X (T)	11.4	760	8.4	13.3	24.3
0.95	NEC Multispin 4Xe (N1)	12.1	1093	7.0	11.8	23.3
0.94	Spin Peripherals Spin 4X (T)	11.1	844	9.2	13.0	23.0
0.93	Optical Access CD/Allegro 4X (T)	12.0	876	8.6	13.1	22.1
0.92	DynaTek CDS654 (T)	13.3	846	8.1	12.9	24.1
0.89	CD Technology PortaDrive T3501 (T)	14.8	1110	7.5	11.7	25.2
	For Comparison Only					
0.84	NEC 3xp (N2)	15.2	1378	8.0	12.5	23.9
0.80	AppleCD 300i (S1)	17.4	1542	9.0	12.2	23.7
0.50	AppleCD 150 (S2)	58.6	3916	15.4	16.8	26.8

T = Toshiba XM3501; N1 = NEC 501; N2 = NEC 401 (triple-speed); S1 = Sony CDU-8003A (double-speed); S2 = Sony CDU-8001 (single-speed).

BEHIND OUR TESTS

Macworld Lab ran real-world tests using standard business and graphics programs to determine each drive's relative performance. To compare access speed and cache efficiency, we searched Grolier's Multimedia Encyclopedia for "America AND history," retrieving 295 articles (Text Search), and queried a nonindexed field in a 96,775-record 4th Dimension database for one word (Database Search). In both tests the slowest quadruple-speed (4X) drive took slightly more than half again as long as the fastest to complete the task. To determine raw throughput, we tested opening a 1.4MB Adobe Photoshop file (Graphics Retrieval), and turning pages in the Nautilus CD version of our January "1994 Macintosh Game Hall of Fame" story (Mixed Retrieval). A final test, loading a contact sheet in Kodak's Photo CD Access, involves decompressing images and so is really a CPU-intensive task (Photo CD Retrieval). In these three tests the double- and triple-speed drives proved faster than the slowest 4X drives. **—Macworld Lab testing supervised by Tim Warner**

drivers that ship with the drives we tested, CharisMac Engineering's AutoCache—bundled with Bottom Line's Magic drive and also available separately for $79.95—offered the most useful caching controls. The software comes with preset caches for a number of popular CD titles, including Brøderbund Software's Myst, Just Grandma and Me, and Living Books; Compton's Interactive Encyclopedia; and The Software Toolworks' Oceans Below; as well as for databases, Photo CD files, and other applications. You can adjust the preset caches, or simply turn the driver's automatic cache on. (For more information on AutoCache, call CharisMac at 916/885-4420.)

A Few Subtle Differences

As a rule, a CD-ROM drive is a CD-ROM drive. All of the drives we tested, for instance, include a headphone jack, RCA stereo output jacks, volume control, eject button, and busy indicator light on the front panel. And none of the drives tested use the new CD loading tray, which is much more convenient than the case caddy mount still widely in use.

We found a few differences between drives, though. The front panel of NEC's Multispin 4Xe includes a backlit liquid crystal display and push-button controls that let you play audio CDs, skipping back and forth between music tracks, when your Mac is off. Those controls cease to work, however, once the computer is on.

All of the CD-ROM drives we tested were simple to operate, but there are a few nuances to watch for. External SCSI termination allows you to place a CD-ROM drive anywhere on a SCSI chain, for example; internal termination forces you to put the drive at the end of the chain.

The Last Word

If you use CD-ROMs only occasionally, you only want something for your child to play games on, or you just want to spend as little money as possible, don't hesitate to buy one of the least expensive double-speed drives. As of this writing, it's not hard to find a 2× drive in a mail-order catalog for $200. And by the time you read this, double-speed drive prices will probably have dropped even lower, perhaps down to $100 to $150, as vendors phase them out in favor of 4× models.

For $300, you can buy APS Technologies' quad-speed drive, our overall top performer. That's money well spent for anyone who regularly searches CD-based databases or who doesn't want to have to replace the CD-ROM drive later when 4×-optimized multimedia titles appear. At this point, I don't think it makes sense to spend any more than $300 on a 4× drive, due to the mostly insignificant performance differences between them and the likelihood that 4× drive prices will begin to drop this year as competition and production increase.

So if you need a CD-ROM drive now and don't mind paying a little more for a 4× model than you would a 2× device, by all means buy the APS T3501 for $300. At the least, you won't have to worry that you paid too much for something that will soon be obsolete. And with computer equipment, which seems to change on a daily basis, what better recommendation can you hope for? **m**

San Francisco–based author JAMES A. MARTIN frequently writes about CD-ROM hardware and software for *Macworld*, *PC World*, and other publications.

QUAD-SPEED CD-ROM DRIVES

EDITORS' CHOICE

To determine the best 4× drives, *Macworld* compared price, performance, tech support, ease of use, and other factors. Only one quad-speed CD-ROM drive excelled in all areas.

APS T3501 The least-expensive quad-speed drive was also our fastest overall performer. The tech-support rating of very good was among the highest, the driver software offered attractive caching controls, and the manual was among the most readable. **Company:** APS Technologies. **Suggested retail price:** $299.95.

QUAD-SPEED CD-ROM DRIVES

DOES THE HIGHER SPEED JUSTIFY THE EXTRA COST? MACWORLD LAB INVESTIGATES.

BY JAMES A. MARTIN

YOU'D THINK SHOPPING FOR A CD-ROM drive would be fairly straightforward. After all, as computer peripherals go, CD-ROM drives are simple to install and operate, and there aren't many differentiating features to consider between drives.

The reality is, however, that deciding on a CD-ROM drive these days can be confusing. Recently, for example, I dialed a CD-ROM vendor's toll-free sales number, as any prospective customer might, to get the price on the company's new quad-speed drive. "It's $540," the salesman said. "But you know what? Our double-speed drive bundle is only $399, and that drive is usually faster than the quad-speed."

Before I could ask a question, the salesman continued. "With multimedia, you don't really see much difference between double- and quad-speed drives anyway. And with other kinds of applications, the double-speed is frequently a little faster, or sometimes a little slower, but just by a couple of seconds. So why spend that extra money if you don't get anything out of it?"

Why, indeed. That's precisely the question Macworld Lab was pondering as we compared the performance of seven external quadruple-speed CD-ROM drives against a single-speed, a double-speed, and a triple-speed drive. For the most part, the sales pitch wasn't far from the mark. Our test results show that in three out of five tasks, Apple's internal 300i double-speed CD-ROM drive fared better than at least one of the quad-speed drives (for complete results, see the benchmarks, "How Fast Are Quad-Speed CD-ROM Drives?"). In a fourth task, a word search performed on a CD-ROM encyclopedia, the Apple drive trailed behind the majority of its quad cousins by a mere 3 to 5 seconds. In only one test, a 4th Dimension database search, was there a dramatic speed improvement in the quad-speed drives' favor.

Despite often anticlimactic performance gains, there are still some reasons to consider a quad-speed drive over a double-speed model. Price, for one thing. True, most quad-speed drives carry suggested retail prices above $500, versus a typical double-speed drive price of about

MW LAB

KEVIN CANDLAND

$200 to $300. At press time, however, a couple of quad-speed models had begun selling for $300 to $400, and more drives are expected to follow suit. Apple, for example, has announced the AppleCD 600e quad-speed drive, which should begin shipping in May for $349 (the drive wasn't available for review). Meanwhile, multimedia soothsayers predict that by the end of 1995, we'll begin to see multimedia CD titles optimized to run at top speed on quad-speed drives. The bottom line: If you don't own a CD-ROM drive, spending a little extra money now buys you some insurance that your investment will last a few years. (At press time, Plextor had announced the first internal 6X drive for $599; see *News*, in this issue.)

To help you decide if a quad-speed drive is right for you, we evaluated the driver software that ships with each CD-ROM drive, rated the quality of the drive vendors' telephone technical support, and along with our benchmark results, took into account a drive's price and other selling points such as physical size, weight, and bundled software titles.

The Truth about Transfer Rates

Quad-speed, or 4×, CD-ROM drives are so called because they promise transfer rates that are four times as fast as the rates of the first-generation CD-ROM drives. Transfer rate refers to the speed with which a CD-ROM drive moves data from the disc through the drive's read head and controller to the Macintosh. A drive's transfer rate is most important in handling large, complex files such as graphics and full-motion video. The faster the data-transfer rate, in theory, the greater the chance that a QuickTime video will not drop frames or audio as it plays.

The first CD-ROM drives, now called single-speed drives, had data-transfer rates of 150 kilobytes per second (KBps). Double-speed drives got their name because they offer transfer rates of 300 KBps, or double the speed of their predecessors. The faster transfer rates were achieved by redesigning the drive's spindle motor to spin faster, upgrading the controller, and in most cases, adding a buffer to handle the increased flow of data from the drive to the Mac. By late 1994, nearly a dozen CD-ROM vendors were offering drives for the Mac with average transfer rates of 600 KBps—four times the rate of the 150-KBps drives. But to put that in perspective, even the fastest CD-ROM drives are significantly slower than hard drives, which offer an average transfer rate of about 2MB per second.

Although CD-ROM hardware speeds have been increasing, multimedia software has been slow to catch up. In fact, some of the current multimedia titles aren't even optimized to take full advantage of the double-speed transfer rate. Multimedia developers, for obvious reasons, want their products to run smoothly on as many CD-ROM drives as possible. For now, that means developing titles with video optimized for the industry-standard double-speed drive.

To avoid flooding the data pipeline, developers often optimize video conservatively to ensure that the CD runs in slow environments. For instance, the majority of QuickTime videos from Vicarious Entertainment's CNN Time Capsule CD for 1994 are optimized to play at transfer rates from 104 KBps to 198 KBps—well under the 300-KBps double-speed ceiling. Macworld Lab tests of QuickTime playback performance from several multimedia CDs confirmed the role of optimization, showing little variation between the double-, triple-, and quad-speed drives. But with its 150-KBps capacity, the single-speed drive frequently choked on the CNN videos, dropping frames and audio along the way to keep up.

So why don't multimedia titles contain video optimized to run at 1×, 2×, 3×, and 4× speeds? Technically, it's possible. But such a project would require additional development time and would benefit a minority of potential users. More important, developers would have to include four versions of the same video clips—given video's appetite for storage, this solution would quickly limit the amount of video that would fit on a CD.

With graphics files, we discovered

Quad-Speed CD-ROM Drives

	APS Technologies	Bottom Line Distribution	CD Technology	DynaTek Automation Systems	FWB	Liberty Systems
Product name	APS T3501	Magic Toshiba 4X CD-ROM	PortaDrive T3501	CDS654	HammerCD 4x	115 4X CD-ROM
Phone	816/483-6100	512/892-4070	408/752-8500	416/636-3000	415/474-8055	408/983-1127
Toll-free phone	800/235-2753	800/990-5792	none	none	none	none
Mechanism	Toshiba XM3501	Toshiba XM3501	Toshiba XM3501	Toshiba XM3501	Plextor PX43-CH	Toshiba XM3501
Suggested retail price	$299.95	$449[A]	$500	$529	$839	$599
Performance ranking[D]	1	2	7	6	not tested	not tested
Driver software	PowerTools Drive Controls	CharisMac's AutoCache	CDT 1.8	Compass Pro 3.0[E]	FWB CD-ROM ToolKit 1.5	FWB CD-ROM ToolKit 1.5
Data buffer size	256K	256K	256K	256K	1MB	256K
Size (w × h × d, in inches)	6.9 × 2.25 × 10.0	9.8 × 2.5 × 10.25	5.75 × 1.75 × 9.5	8.5 × 2.5 × 10.85	9.0 × 2.0 × 9.0	6.75 × 1.9 × 9.0
Weight (in pounds)	4.45	5	3.42	5.4	5	3
SCSI termination	internal, active	internal, active	external, passive	external, passive	external, passive	internal, active and external, active
Money-back guarantee	30 days	30 days	30 days	none	none	30 days
Warranty	1 year	1 year	1 year	1 year	1 year	1 year
Tech-support rating	very good	unacceptable	poor	very good	not rated	not rated
Toll-free tech support	yes	yes	no	yes	yes	no
Free tech support	unlimited	unlimited	90 days	unlimited	unlimited	unlimited
CDs bundled	none	Software Toolworks Presents The Animals; US Atlas; World Atlas; Space Shuttle; Oceans Below	none	none	none	none

Technical-support ratings are based on a series of calls made to each company by Macworld staffers (posing as customers) to gauge the accessibility, helpfulness, and accuracy of the company's support not individual products, and we call only those companies whose products Macworld Lab tests. [A] *Includes headphones, external speakers.* [D] *Vendor's estimated street price; no suggested retail price. for detailed performance results.* [E] *Tested with Compass Pro; now ships with FWB CD-ROM ToolKit 1.5, which does offer caching.*

Before you buy a color printer, you'd better double-check your facts.

STANDARD FEATURES	PROFESSIONAL COLORPOINT 2 MODEL 4/14	TEKTRONIX PHASER 440/480
DUAL TECHNOLOGY	✓✓	
ADOBE POSTSCRIPT LEVEL 2	✓	✓
33 MHZ RISC PROCESSOR	✓	
135 ADOBE TYPE 1 FONTS	✓	
AUTO TRIM (Automatically cuts paper/OHP)	✓	
INTERNAL HARD DISK (No additional RAM needed)	✓	
4-COLOR FULL-BLEED PRINTING (Right out of the box!)	✓	
INDUSTRY-STANDARD COLOR MANAGEMENT	✓	
DCS FILESUPPORT	✓	

Do the research and you'll discover that the Professional ColorPoint 2 is twice the printer of any of its competitors. It has all the features you want standard, so you can print full-bleed, 4-color pages right out of the box. Plus, with Seiko Instruments' unique Dual Technology, it's like getting two printers for the price of one.

Dual Technology means the Professional ColorPoint 2 can output both thermal wax transfer and dye sublimation prints. Use the thermal wax transfer mode to output inexpensive ad, collateral, and packaging comps, or rough drafts of brochures and presentations. Then switch to dye sublimation mode when you're ready to print high-quality, photorealistic final output. So instead of being tied to the higher cost of materials with a dye sub-only printer, you'll save thousands of dollars on supplies by using thermal wax transfer during your proofing stages.

Check it out for yourself. For free sample output and a brochure on how the Professional ColorPoint 2's Dual Technology can save you up to forty thousand dollars a year in output costs, or for a free demonstration, call **800-888-0817.**

SII
Seiko Instruments

Circle 93 on reader service card

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EDITED BY CATHY ABES

Graphics

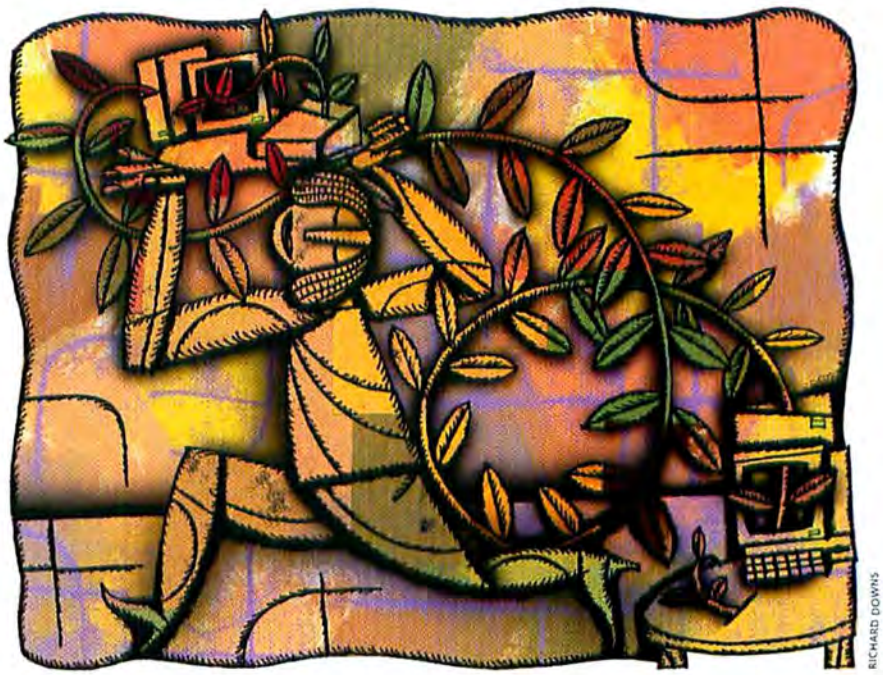
THE LATEST IN DESIGN, PUBLISHING, AND PREPRESS

Apple Sets New Color Standards

APPLE'S POWER MAC–native ColorSync 2.0 promises to be a major step up from the company's original color-management software, which received limited support from the publishing industry. Expected to be fully supported by all the major color-graphics vendors (including Adobe, Canon, DayStar, Linotype-Hell, Quark, and Radius), ColorSync 2.0 includes technology from Linotype-Hell's LinoColor 3 color-transformation engine. The new version will support ICC cross-platform color profiles plus high-end color-separation and prepress capabilities in applications such as QuarkXPress and Adobe Photoshop and PageMaker. Apple plans to release ColorSync 2.0 at the Seybold Conference in late March 1995.

Unlike ColorSync 1.0, which required that separate color profiles accompany documents, ColorSync 2.0 stores color profiles within documents, enabling it to automatically adjust images for other devices. (For example, simply by opening a file in a ColorSync 2.0–compatible program, you can simulate on your monitor the colors a given printer is capable of outputting.) And ColorSync 2.0's ability to input and output eight component colors will produce more accurate output with a wider range of colors. And because it supports remote proofing, you can send a file electronically over a network or via modem for viewing on another monitor that's running ColorSync.

Providing support for LaserWriter, PostScript, and QuickDraw GX drivers, ColorSync 2.0 itself is supported by the current version of GX (1.1.1), released in March. And accelerator boards designed to work with ColorSync 2.0, such as Linotype-Hell's MacCTU, will speed up the program's color transformations. Apple Computer, 408/996-1010.—C.A.



RICHARD DOWNS

Digital Cameras Take Off

WITH NEW OFFERINGS FROM Eastman Kodak, Canon, and Fuji that feature removable PCMCIA storage cards (now called PC Cards), flash memory, and the ability to shoot high-resolution images at very high speeds, the professional digital camera market continues to gain momentum.

Kodak is introducing the EOS•DCS 5, developed with Canon and based on the Canon EOS-1N camera. Featuring a full-frame imager, 36-bit color, a 1.5-million-pixel CCD sensor, and a built-in microphone for recording sound clips, the $11, 995 EOS•DCS 5 can capture up to 10 images in just over 4 seconds. Canon's version of the camera, the $17,000 EOS•DCS 3, captures 1.3 million pixels at film speeds up to the equivalent of ISO 1600. Both cameras are due in late April.

Fuji's Fujix DS-505 and DS-515 cameras, developed jointly with Nikon, can capture the full viewfinder image area with an effective ISO of 800, using a 1.3-million-pixel CCD. With the Fuji PC Card, the $11,835 DS-505 can take up to 84 continuous shots at 1 frame per second, while the $14,835 DS-515 can capture up to 7 continuous shots at 3 frames per second. Due April 10, both cameras include an RS422 digital output terminal for downloading images, plus a video-output terminal for monitoring exposed images. Canon U.S.A., 516/488-6700; Eastman Kodak, 716/253-0740; Fuji, 914/789-8253.—C.A.

Digitally Designing Human Forms

WHETHER YOU'RE AN artist already working in the 3-D world of modeling or an illustrator or graphic designer more familiar with drawing, painting, or image processing programs, you'll likely find a use for Poser, Fractal Design's new program for designing and posing human figures.

After choosing from seven figure types, such as male body, female skeleton, or mannequin, you can view your models in silhouette, outline, wire-frame, hidden wire-frame, or flat-shaded mode. You can scale, taper, and position each body part individually just by pulling on it. Similarly, you can lock any body part into position, so you can move the arms without moving the torso, for instance. There are also many predefined poses, such as sitting or "Superman landing." Poser will ship with libraries of poses for special activities, such as dance or sports.

Once you've defined the body structure, you can apply a texture map to define surface properties as well as a bump map for muscle contours (or you can render using the program's built-in muscular structure). You can change the camera angle, modify the three ambient light sources by changing color and position, and use perspective tools such as vanishing lines. Imported PICT files can function as backdrops for your figures.

Poser lets you save files in PICT format—automatically generating an alpha channel, DXF for export to 3-D programs, or RIB for rendering programs. Poser will also support Apple's QuickDraw 3D metafile format when it becomes available, which will allow you to drag and drop, copy and paste, and manipulate Poser figures in any application that supports QuickDraw 3D.

Fractal Design's Poser lets you design, position, and render a variety of human figure types for use in 2-D and 3-D applications.

Requiring an FPU and 6MB of application RAM, Poser is expected to ship on April 21 as a combined Power Macintosh and 680X0 package retailing for $199. For the first four months Poser's introductory price will be $99. Fractal Design, 408/688-5300.—C.A.

IN BRIEF

■ Digital Color Control By the end of March, X-Rite expects to ship the Digital Swatchbook, a $1095 hardware-software system for providing color consistency that connects to the Mac's serial port and will support ColorSync 2.0. Software features include on-screen color specification and precise CMYK equivalents, the ability to blend and manipulate colors, and automatic storage and indexing of colors used. 616/534-7663.

■ Faster Color Servers Electronics for Imaging has announced the first two models in a new line of network color servers, the Fiery XJ170 (under $20,000) and the XJ300 (about $30,000), whose RIP-while-print feature (optional on the XJ170) allows continuous printing and processing to boost performance, while EFI's Memory Multiplier technology minimizes memory requirements. Both models are due to ship by the end of March. 415/286-8600.

Automated Layout

PIANZHANG, A COMBINATION QuarkXTension and stand-alone application, lets QuarkXPress users streamline the production of long, complex publications like books and directories by automating page makeup and pagination.

After setting up a job, you import and prepare text (from a word processor or database); assign and edit layouts and styles; and paginate the document using QuarkXPress style sheets. Pianzhang simplifies such tasks as picture placement, page numbering, footnote definition and placement, page-depth adjustment, and extracting page references for indexes and tables of contents. A Power Mac version of the $895 Pianzhang is due in March; the 680X0 version is shipping now. Miles 33 International, 203/846-9933.—C.A.

One-Stop Shopping for Stock Photos

ART DIRECTORS, MULTIMEDIA developers, and photo researchers will soon have another online source for digital photos. The Media Photographers' Copyright Agency (MPCA), a division of the American Society of Media Photographers, will soon launch an online service that promises to simplify the process of searching for, obtaining the rights to, and downloading digital photos.

MPCA In View is said to be the first stock-photo agency set up exclusively for licensing and distributing electronic photos. Through its online service, MPCA In View will make available thousands of Photo CD–format images representing the works of its 525 member photographers. Subscribers will use their modems to dial the service's toll-free number; perform keyword searches; download thumbnails or watermarked preview files in TIFF; and place an order based on usage restrictions—there's no need to negotiate with a separate stock agency, as is often the case with other online stock-photo services. After placing your order, you will have to reconnect by dialing a different phone number to download a Photo CD image-pack file, which contains both high- and low-resolution versions of a photo.

MPCA In View isn't expected to go online until spring of 1995. In the meantime, subscribers can request images over the phone and receive thumbnails, previews, and Photo CD files on CD-ROM. The agency expects to have a CD-ROM catalog containing some 4000 low-res images by year's end. Licensing and subscription fees weren't available at press time. MPCA, 609/799-8300 or 817/346-1890.

—JAMES A. MARTIN

STUART BRADFORD/STOCK IMAGES; REAGAN BRADSHAW; ROBERT CLARK; DOUG MENUEZ/REPORTAGE

Expert Graphics

GRAPHICS PROFESSIONALS SHARE THEIR SECRETS

by Cathy Abes

Artist: Kent Manske is an artist, based in the San Francisco Bay Area, who uses both traditional and digital media to create limited-edition prints, monoprints, and artists' books. He also teaches art and visual communication at Foothill College in Los Altos Hills, California.

How It Was Done: For this image, titled *Commitments*, Manske began by scanning all the elements that would make up the composition: a piece of tree bark on which he'd spray-painted the silhouette of a keyhole, a drawing of a face and hand he'd done with crayon and gesso, a photo of his own hand with simulated stigmata, a traditionally constructed collage consisting of leaves he'd found in his garden arranged around a piece of rope to simulate a vine, and a photograph of a cloudy sky that he'd taken at Yosemite National Park.

After scaling each image in Photoshop to the appropriate size, he pasted each one on a separate layer. Next, he applied Photoshop's Posterize filter separately to each individual leaf and to the rope. However, because Manske typically finds the colors produced by Photoshop's posterizing unappealing—and this case was no exception—he substituted his own custom colors. To select areas of a leaf whose color he wanted to change, Manske used the magic wand with Tolerance set to 1, then used the Similar command to select all the areas in the rest of the leaves containing that same shade. Next he chose a different shade with the Color Picker and filled those areas with the new color. As a finishing touch, he painted the leaves in Photoshop with the pencil tool and the brush set to Normal, and in Painter with Colored Pencils set to Cover and Soft Cover.

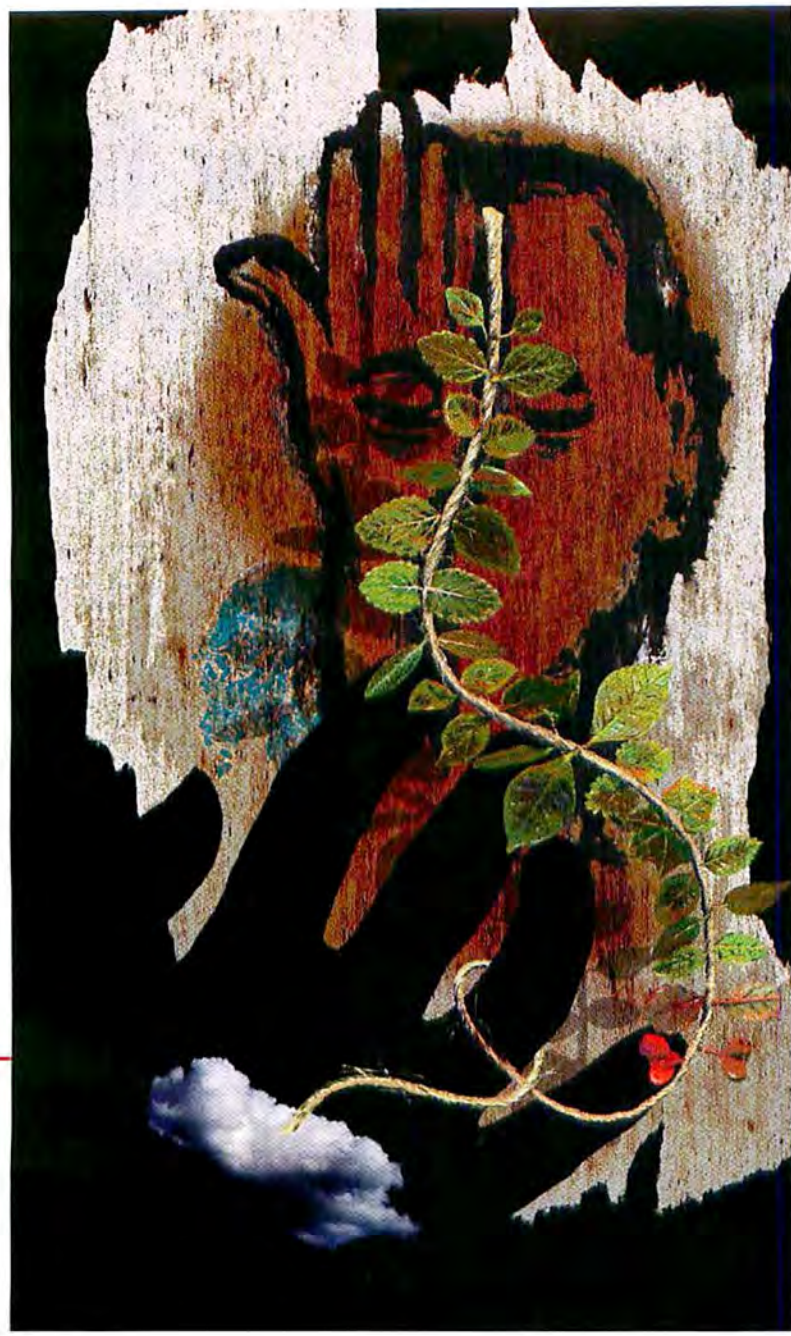
After experimenting with different filters, Color Balance, and various other effects on the scan of the hand, Manske *still* wasn't satisfied. Ultimately, he decided the hand should be a black silhouette. Finally, after compositing all the original layers, he added a sixth layer—shadows of the leaves. **m**

1 The scanned tree bark on which Manske spray-painted a keyhole shape. After posterizing the image to 5 levels, he boosted the brightness to +12 and the contrast to +27 and used Color Balance to remove magenta and red.

2 The crayon drawing of the face and hand scanned in Grayscale mode, which enabled Manske to retain the shading, texture, and uneven edges of the original sketch. Manske used Curves and the magic wand (set to 60) to remove the gray background.

3 The photo of Manske's own hand (with pseudostigmata), scanned in RGB mode. After trying a variety of effects on it, he eventually decided that it worked much better as a black silhouette.

4 The scanned photo of the cloudy sky Manske shot at Yosemite National Park.



5 A detail of the collage Manske assembled from leaves and a piece of rope on paper, scanned into Photoshop.

6 The leaves and rope after Manske applied Photoshop's Posterize filter individually to the rope (to 5 levels) and each leaf (to 4, 5, 6, or 7 levels).

7 After replacing various shades of color produced by Photoshop's posterizing process with customized colors, Manske painted the leaves and rope in Photoshop (with the pencil and brush tools) and in Painter (with Colored Pencils set to Cover and Soft Cover).

8 A section of the finished vine after all the posterizing, color adjustments, and paint strokes were applied.

THE TOOLS

Hardware: Power Mac 8100/80 with 40MB of RAM and a 250MB internal hard drive; La Cie Silverscanner II; Radius IntelliColor Display 20E; Wacom ArtZ ADB Tablet; 88MB SyQuest removable-cartridge drive.
Software: Adobe Photoshop 3.01; Fractal Design Painter 3.0.

No matter how fast can't outrun a power

New Back-UPS™: reliable power for your Mac

Just don't have the time for power problems on your Mac? Don't worry. They'll always make the time for you. It's not if a power problem will occur, but when. Due to household appliances, poor wiring, bad weather or even other office equipment, power problems are as inevitable as death and taxes. You can't run, but you can hide, behind APC protection.

In the next three months, more than 30,000,000 PCs will be hit by power problems...

Who needs power protection? If you use a computer, you do. A study in a recent *PCWeek* showed that the largest single cause of data loss is bad power, accounting for almost as much data loss as all other causes combined. Every Mac plugged into an outlet is vulnerable. In fact, you have better odds of winning the lottery than of escaping the sting of power problems. One study found a typical computer is hit 100 times a month, causing keyboard lockups, drive damage, or worse.

Simply put, if power problems are the least of your troubles, you've got one chance to keep it that way. You insure your car and home with the best policy you can afford. It just doesn't make sense to leave your Mac (which is at far greater risk) vulnerable to loss or damage.

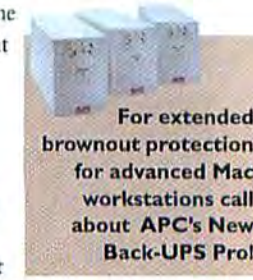
Source: Contingency Planning

Source: Bell Laboratories

Power problems are the leading cause of computer data loss, while the most frequent type of power problems are undervoltages and blackouts, which surge suppressors alone are powerless to protect against.

Why a $119 APC UPS costs less than a $9.99 "surge protector"...

Contrary to most people's belief, a Mac alone has more protection built into it than a low-end "surge suppressor," which is usually nothing more than a well-packaged extension cord. In other words, going without protection is as good as under-spending on one of the most important computer decisions you'll make.



And since sags and blackouts represent more than 90% of power problems likely to hit your Mac, even quality, high-performance surge suppressors are literally powerless to protect your Mac from data loss.

That's why you need instantaneous battery backup power from an APC Uninterruptible Power Supply to prevent keyboard lockups, data loss, and crashes. With an APC UPS, you get six times the protection of a high-end surge protector for little more than twice the price. And $119 is much less expensive than false piece of mind.

APC UPSs carry up to a $25,000 lifetime guarantee against surge damage to your properly connected equipment, and can suit any application, from servers and PCs, to fax and satellite systems.

More than 3,000,000 satisfied customers count on APC reliability

Modern Press President Stephen Hopkins explains, "I protect my Mac Performa with a Back-UPS 400 and the unit works great. The Mac handles all bookkeeping, administrative and estimating functions for the company. It is a critical piece of my business. Unfortunately, we are located in an industrial park... a nice way of saying that our power fluctuates a great deal. After five years of reliable performance from my Back-UPS, power problems are no longer my concern. I can focus my energy on my business instead."

At Cellophane Square, Seattle's best known independent and alternative rock record store, Steve Marcus, Product Buyer, counts on APC to keep his Mac II SI and POS terminals running reliably. "The building where we started out was ancient and full of power problems. I lost lots of purchasing and product related information... until we invested in APC. I chose APC because they offer the most reliable product. I haven't been proven wrong yet. Problems continued in the building, but they were no longer a problem for us."

"We have over 30 APC units on our Macs," says Tim Girvin, principal of Tim Girvin Design, Seattle, WA. "Why do we protect every computer in the firm with an APC? As design consultants working on projects throughout the United States and Asia, 100% productivity is critical to project management. We cannot afford lost files due to power outages because of the complexity of many of the design programs we manage. Lost projects due to unprotected files is simply irresponsible. With APC in place, power problems are not even an issue, we are protected."

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your Mac is, it problem

starting at $119

PROTECT YOURSELF OR KICK YOURSELF...

It's been said that there are two types of computer users: those who have lost data, and those who are about to. Prevent the single largest cause of computer problems and join a fast-growing third category: those who protect their PCs with the most reliable protection they can buy: APC UPSs. So ask for APC at your favorite reseller. At just $119, an APC UPS is serious protection no Mac user should be without.

MacWEEK *"Ultimately, it's more a question of when - and not if - you should buy a UPS... UPS power protection has never been cheaper or more convenient"*

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- $25,000 lifetime Equipment Protection
- 10 minute runtime with specified applications. For longer runtimes choose next largest unit.

	Model	Application	Sugg. List
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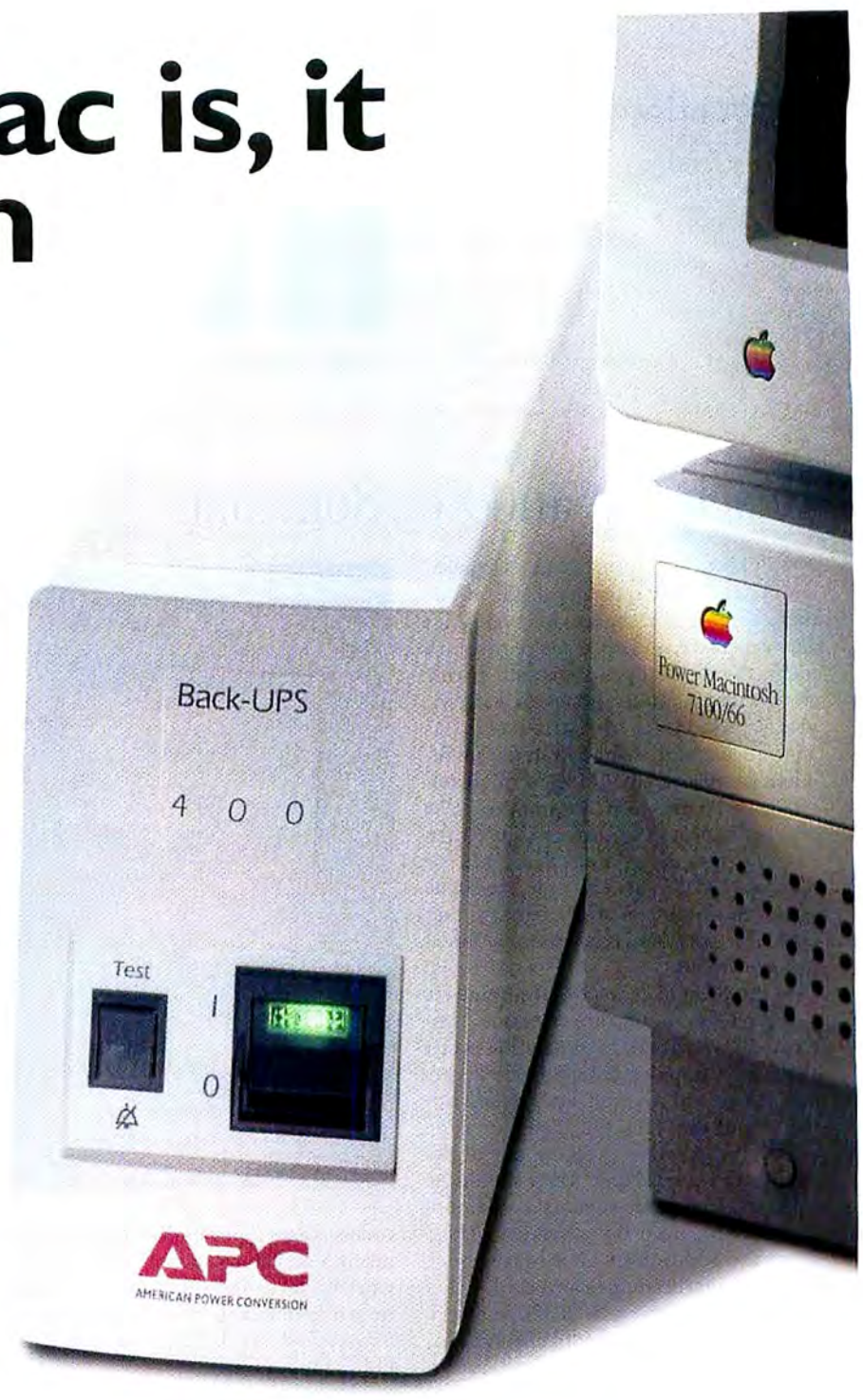
NEW!	280	Desktop systems	$139
	400	MultiMedia	$199
	450	Quadra	$254
	600	PowerMacs	$359
	900	Longer runtime applications	$529
	1250	Multiple systems	$689



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Circle 72 on reader service card

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At Work

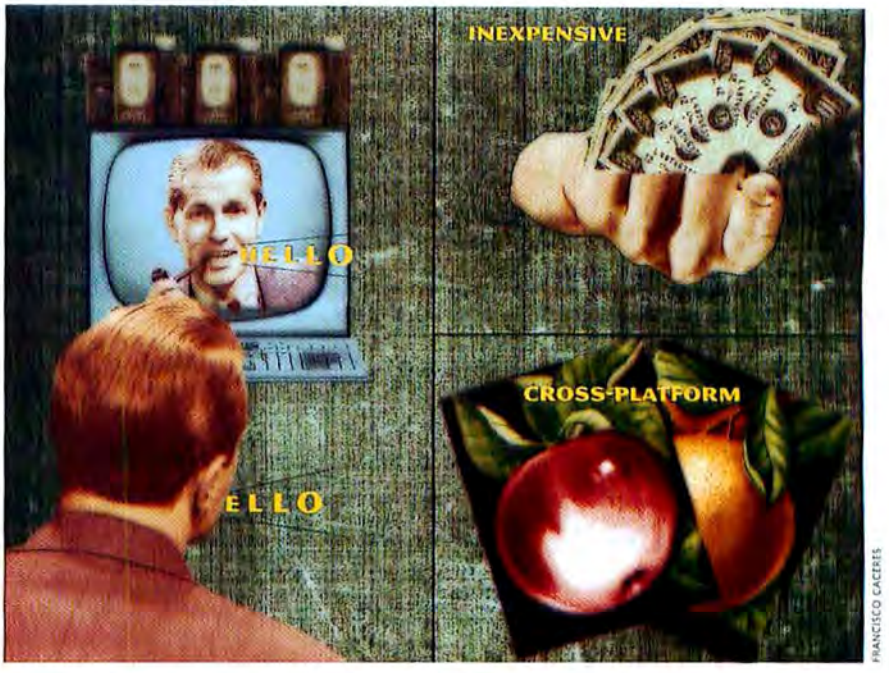
THE LATEST TOOLS FOR BUSINESS COMPUTING

Reach Out and See Someone

SETTING UP A VIDEOCONFERENCING system is like traveling to the moon: there are lots of technical difficulties, it's very expensive, and once you're there it's tough to talk to anyone you didn't bring along with you. In an attempt to bring the goal a little closer to Earth, Apple has announced and demonstrated QuickTime Conferencing (QTC), a videoconferencing architecture that promises to be cheaper to install and easier to use than current systems—either dedicated or desktop. QTC is also intended to break down the communications barriers that currently exist between desktop conferencing systems.

One of QTC's major advantages is that it's a system software extension (System 7.5 is required), so installation is just a matter of dropping the appropriate parts in a folder and it's well-integrated with the rest of the Mac. QTC supports the H.261 compression protocol out of the box, so QTC-equipped Macs should be able to talk to other vendors' conferencing systems, even on other platforms. With the addition of a hardware codec (compression/decompression) card, QTC also supports the popular H.320 standard. And Apple is working with IBM, AT&T, and other vendors to ensure that their systems are compatible with QTC. To further ease compatibility, QTC can work over nearly any network configuration. The first release will support Ethernet, Token Ring, and ISDN connections.

Apple didn't skimp on the whizbang technology—QTC supports multiuser conference calls, a feature usually found only in large, dedicated systems. QTC users can also create broadcast connections, where a single source workstation broadcasts content to one or more receptor workstations. In an attempt to ease the drain on network resources, Apple has developed client- and router-based protocols that pipe QTC data only to machines that request it. Apple is also working on monitoring software so that network administrators can control the maximum network bandwidth available to QTC applications.



FRANCISCO CACERES

From a business perspective, QTC has two big pluses: it's scalable and it's relatively cheap. Users can install the basic package for under $200 and run audio-only calls with a shared data space (for collaborating on documents) on 16MB 68040 Macs with built-in microphones. Of course, that's like saying that you can run System 7 in 4MB of RAM. As a minimum QTC workstation Apple recommends an AV Mac with 16MB of RAM, and anyone in search of a higher-fidelity virtual experience should expect to step up to a Power Mac, hardware compression cards, and high-speed network support. On the plus side, your hot-rod video systems will remain compatible with less capable machines.

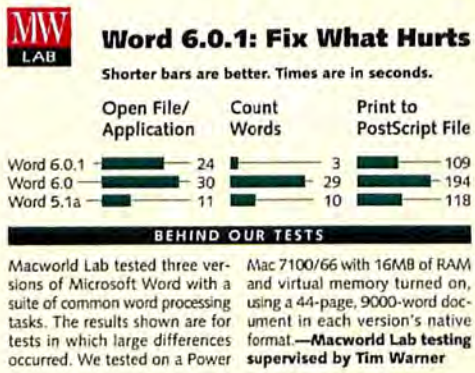
Apple is planning to offer three bundles. The Apple Media Conference Kit will be priced under $200 and comes with QTC, Apple Media Conference (Apple's bare-bones videoconferencing/collaboration software), and a third-party video camera. An AV Mac or third-party digitizing card is required to use the camera. The Media Conference Pro Kit (for AV Macs only) will add a combination H.320/ISDN NuBus card and retail for less than $1750. The Media Conferencing System will go for less than $6000 and include a Power Mac 7100AV 16/700/CD-ROM, 17-inch monitor, keyboard, microphone, and speakers. Apple expects to ship some of these products this summer.—C.C.

Microsoft Ships Word Patch

AFTER MONTHS OF TAKING HEAT from users over Word 6.0, Microsoft has shipped Word 6.0.1, a maintenance release intended to address speed and incompatibility problems. Macworld Lab testing confirms that Word 6.0.1 is faster, although the improvements appear mostly in features where Word 6.0 received the harshest attacks, such as printing to a PostScript file and launching the application; other basic word processing tasks show minimal speed gains.

Microsoft responded to complaints about sluggish performance on 030-based Macs by changing the system requirements for 6.0.1. The company now recommends a 68040 or Power Macintosh, calling the 68020 and 68030 "the minimum processors required to run the application."

Microsoft also claims that Word 6.0.1 resolves all known extension conflicts with Word 6.0. To get the maintenance release free of charge, call Microsoft at 800/315-5081.—C.C



FoxPro in Database Soup

WHILE ORACLE STEWS A MAC VERsion of its SQL database server (see "Power Mac Drives Database Action," *At Work* news, May 1995) and Claris spices up FileMaker with some nonprogrammable relational capabilities, Microsoft has moved the next version of FoxPro for Windows into beta testing, and though Microsoft won't comment, a similar version for the Mac is certain to follow.

The biggest change in the new version, which is dubbed Visual FoxPro 3.0, is a new object-oriented programming (OOP) environment that provides the standard OOP capabilities of inheritance and polymorphism. Objects can be programmed by coding or through a new diagramming interface, and developers can mix Xbase code and version 3.0 objects in one application, avoiding the need to rewrite old code or to learn the intimate details of the new language immediately.

Other major changes include a data-dictionary structure that propagates throughout an application the controls and relationships set for a table in one place; client/server tools that permit local batch-processing to reduce network traffic, and that increase options for connecting to external databases; and more Wizards for automating programming tasks. Version 3.0 will run applications created with earlier versions of FoxBase and other Xbase databases.

When will Visual FoxPro 3.0 for the Mac ship? Good question. Microsoft says the Windows version will ship this spring, but the spread between Windows and Mac versions of Microsoft's products is unpredictable, and generally several months or more. No pricing has been announced yet. Microsoft, 206/882-8080. —DAN LITTMAN

A Scanner on Every Desk

SCANNERS WERE ONCE THE SOLE domain of graphic artists, but a new class of scanner is emerging. Smaller and cheaper, these guerrilla scanners are designed to quickly image business documents for OCR, for adding context to E-mail, for transmission via desktop fax modems, and for storage in electronic document-management systems.

SCOTT PETERSON

Fujitsu's (left) and Umax's (right) desktop scanners are intended for everyday business use.

Fujitsu has announced a Mac version of its ScanPartner Jr. ($499), a 6-ppm, 256-level gray-scale, 300-dpi desktop scanner roughly half the size of a shoe box. Available now, the product handles media from business cards to sheets of legal-size paper and comes with Xerox's TextBridge OCR software. Visioneer's PaperPort ($399) is a monochrome, 300-dpi scanner that comes with Calera's WordScan OCR software as well as the company's electronic document-management software. The PaperPort is truly tiny, little bigger than a (hefty) rolled-up newspaper, and can scan a single page in ten seconds (see *Reviews*, May 1995).

Some companies are selling units dedicated to specific purposes. Umax's BizCard Reader for Macintosh (BCR Mac; $249) is specifically designed to scan business cards; it comes with software from Maxsoft that automatically extracts contact information and separates it into fields for export to PIM software. Fujitsu, 408/432-6333; Umax, 510/651-8883; Visioneer, 415/812-6400.—C.C.

IN BRIEF

■ **Data In Striking Distance** I.T. Designs' Viper Instant-Access software presents selected data from large corporate databases in a flat-file, read-only format—fast. The company claims access times under a second. You create a tab-delimited file with the desired data on the Viper server; users then search and retrieve the data with client software. A single server can hold several databases. A 20-client starter pack retails for $895. 408/995-3019.

■ **HP's SOHO LaserJet** The newly announced 600-by-600-dpi resolution, 6-ppm LaserJet 5MP has an infrared port that accepts wireless communications from portable computers or PDAs that support the Infrared Data Association (IrDA) standard. Company's estimated street price is $1100. 800/752-0900.

Merge Ahead Leader Technologies is shipping version 2.5 of its PowerMerge file-synchronization and -backup software. Version 2.5 is Power Mac native, incorporates scheduling features for automatic synchronization, and retails for $149. 714/757-1787.

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BY JIM HEID

Working Smart

PC Printers for the Mac

THE YEAR: 1984. THE COMPUTER: THE 128K Mac. The problem: Apple's dot matrix ImageWriter was the only Mac-compatible printer, and the lack of so-called letter-quality output—remember that?—was feared to be slowing the Mac's acceptance in the business world. (Never mind that no business software was available yet for the Mac.) The first solution: Mac Daisywheel Connection, which enabled the Mac to connect to daisy wheel printers—remember them?—designed for PCs.

Thus began a series of attempts to coerce the Mac into talking with printers that weren't designed for it. Even Microsoft got into the act in 1985 with a weird box called the MacEnhancer, which, among other things, gave Macs a PC parallel printer port. I once used one to print a book manuscript on an original HP LaserJet. It worked perfectly—if you didn't mind drunken character spacing.

Today's array of laser and ink-jet printers eliminates relying on PC printers for higher-quality output, but the need to connect to a PC printer often surfaces just the same—when you're traveling, at your PC-dominated office, after you price-shop for a new printer, or if you need to print reams of multipart forms on an impact printer.

Using a PC printer with a Mac would be a cinch if it weren't for two things: hardware and software. The vast majority of PC printers connect using a parallel port, while Mac printers almost always use a serial port—Macs don't have the kind of parallel port PC printers use.

Hurdle number two is trickier. The Mac's system software doesn't know how to talk to PC printers; that is, Macs don't include PC printer drivers, those Chooser icons that translate the Mac's native QuickDraw text and graphics instructions into the codes a specific printer requires.

Power to the Printer

Several PC printer packages have come and gone in recent years, but only GDT Softworks' PowerPrint has endured (version 2.5.2 $149; 604/291-9121, 800/663-6222; GDT offers PowerPrint upgrades to owners of its ex-competitors' products, Orange Micro's Grappler LX and Insight Development's MacPrint). PowerPrint includes printer drivers on disk and a serial-to-parallel cable with the necessary converter circuitry.

The PowerPrint drivers are straightforward and packed with many capabilities that even the printers' native PC drivers don't have. All drivers provide a fast, draft mode for text. The drivers for laser and ink-jet printers can reduce a page

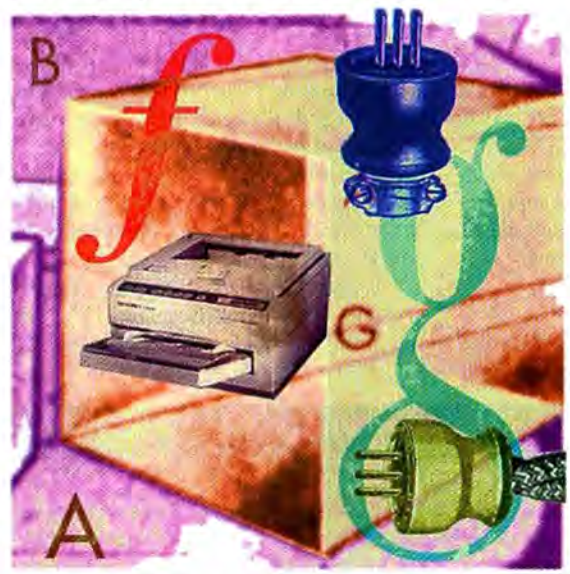

image without changing line breaks, just like a photocopier. (Using the reduction option in Apple's printer drivers reduces text size but changes line endings.)

The drivers also have great online help, page preview and background printing, and support for switching between multiple paper bins. You can even define custom paper sizes for offbeat stocks such as index cards.

The PowerPrint drivers generally support the highest resolution a printer provides—360 dpi for Canon ink-jet machines and up to 600 dpi for laser printers. If you're the owner of Epson America's 720-dpi Stylus Color printer, you're limited to a maximum of 360 dpi; at this writing, GDT has no plans to deliver a Stylus Color–specific driver. (A Mac driver for this printer is available from Epson; find it in the Epson forum on America Online.)

Twists and Turns

GDT boasts that PowerPrint can connect you to more than 1000 different PC printers. It can do this with only 18 different drivers because the vast majority of PC printers are compatible with at least one of the following industry-standard printing command sets: the Epson LX, FX, and ESC/P2; Hewlett-Packard's Printer Control Language (PCL); and Canon's BJC ink-jet series commands. If your printer understands one of these command sets (or one of several other less widely used sets), it will work with PowerPrint. Probably.

If you've spent time in the DOS/Windows world, you know that the phrase "it's compatible" really means "it's mostly compatible, we think." Many printers use modified command sets that can cause problems. On some 24-pin dot matrix printers, for instance, PowerPrint's Epson driver can use only 9 pins.

Sometimes the drivers are willing but the hardware is weak. You need a gender-changer adapter to connect PowerPrint's cable to an IBM 4079 ink-jet, for instance (the adapter is available from GDT or at Radio Shack). And for some printers you'll have to do some fine-tuning with those Tic Tac–size DIP switches.

PC laser printers introduce their own hurdles. To print a full page at 300 dpi,

continues

JENNIFER ISSEE

PowerPrint requires at least 1.5MB of memory, but many HP and compatible laser printers come with less, and PC owners are less likely than Mac owners to add lots of memory to their printers.

Sometimes the Mac causes headaches. For example, the system software that drives the modem ports on Power Macs and the Quadra 660AV and 840AV has problems with the PowerPrint cable. To connect the cable to the modem port, you need to install an extension called ASFU Fixer, which is included with PowerPrint and also available from GDT's forum on America Online (keyword: gdt). But with ASFU Fixer installed, Apple's GeoPort Telecom Adapter doesn't work, though the printer port works fine.

Other Driver Flavors

Of course, connecting PowerPrint's cable to the printer port means disabling AppleTalk and forgoing access to networked printers and file servers. If you can't bear the isolation, consider GDT's PowerPrint/LT 2.5 ($299 for a 25-user license), which adapts a PC printer's serial port to work with LocalTalk.

PowerPrint/LT not only lets you retain your connection to printers and file servers on a LocalTalk network, it also lets everyone on the network share your PC printer. (For Novell NetWare–based offices, GDT's PowerPrint/NW 2.5 [$499 for 50 users] combines PowerPrint drivers with access to NetWare print servers. And for QuickDraw GX users, PowerPrint/GX 1.0 [$199 per user], which I examined in prerelease version, supports GX's desktop printer icons and enhanced Print and Page Setup dialog boxes.)

What about PostScript?

PowerPrint is powerful, but there's one thing beyond its reach: PostScript. You'll get chunky-looking results if you try to print encapsulated PostScript (EPS) files through PowerPrint's QuickDraw-based drivers. Also, because font widths and printable areas can vary between printers, you wouldn't want to use PowerPrint to proof publications that you plan to print on a PostScript printer later.

The solution? T-Script 4.0.3 ($145; TeleTypesetting, 617/734-9700), a utility for printing PostScript documents on non-PostScript printers.

T-Script supports a healthy range of printers: several HP LaserJet, DeskJet, and PaintJet models; Canon's BJ-200 and BJC-800 series of ink-jets; Epson 9- and 24-pin dot matrix machines; and several Mac-oriented QuickDraw printers, including Apple StyleWriters, HP DeskWriters, the Apple Personal LaserWriter LS, and GCC's PLP series. For making the hardware connection, TeleTypesetting bundles the T-Link, a serial-to-parallel cable, with T-Script for $195; I used the cable that comes with PowerPrint. TeleTypesetting also sells a $195 NuBus card, called the T-Card, that adds a parallel port to your Mac—worth considering if your modem and printer ports are already occupied.

PC printer drivers have come a long way since 1984. Problems can still surface—the PowerPrint manual's 11-page troubleshooting and application-notes sections attest to that—but printing to a PC printer is a lot easier than it used to be. As proof, I leave you with the following quote from *Macworld*'s November 1984 review of another letter-quality driver package: ". . . to use LetterWare, you have to convert the text in your documents to 12-point Monaco before you can print. This process is annoying for long documents."

It makes me shudder just to think about it. ■

Next month: Film recorders and slide making

Contributing editor JIM HEID has been writing about the Mac since 1983. His *Macworld Complete Mac Handbook Plus Interactive CD*, third edition (IDG Books Worldwide, 1994), recently won the BMUG Choice award for best general Macintosh book.

IMPACT PRINTING

KEVIN CANDLAND

Apple's ImageWriter II is a sturdy little dot matrix printer, but it's no speed demon, and it isn't up to churning out thousands of multipart forms. Fujitsu makes a 24-pin boat anchor, called the DL6400 ($1595; 408/432-6333, 800/626-4686), that spits out 420 characters per second and prints up to 8 layers deep. With a Mac and PowerPrint, my first DL6400 document had that three-martini spacing, but things improved dramatically when I used Epson ESC/P2 emulation. I also got superb PostScript results using T-Script's 24-pin Epson driver. Print quality is excellent; even graphics don't look half bad.

The DL6400's wide carriage handles fanfold forms or cut sheets up to 15 inches wide, and an optional paper feeder adds another fanfold paper source.

Lasers and ink-jets may dominate the printer world these days, but ruggedness and the ability to print multipart forms guarantee dot matrix a place. In that unglamorous but important niche, the Fujitsu DL6400 is an excellent choice.

POWERPRINT POWER

Here are some tips that will help you to get the best results while using PowerPrint.

- Try various drivers if your printer supports more than one command set. Color printers are particularly affected by the driver used. (For all printers, I'd make the Epson LQ driver last choice.)
- Use the monospace Courier or Monaco fonts to avoid odd spacing for draft output. PowerPrint's draft mode uses a printer's default resident font, which is usually monospace.
- Use Adobe Photoshop or another program to convert EPS images to TIFF before printing. PowerPrint isn't a PostScript driver and produces better results with TIFF files, which don't require PostScript.
- Specify a lower resolution (from the Print dialog box's Resolution pop-up menu) for laser printers with less than 1.5MB of memory; PowerPrint can't print a full page at 300 dpi on low-memory lasers.
- Use unidirectional printing on dot matrix machines, so the print head prints only when traveling from left to right. It's slower than bidirectional printing, but it often gives better results.

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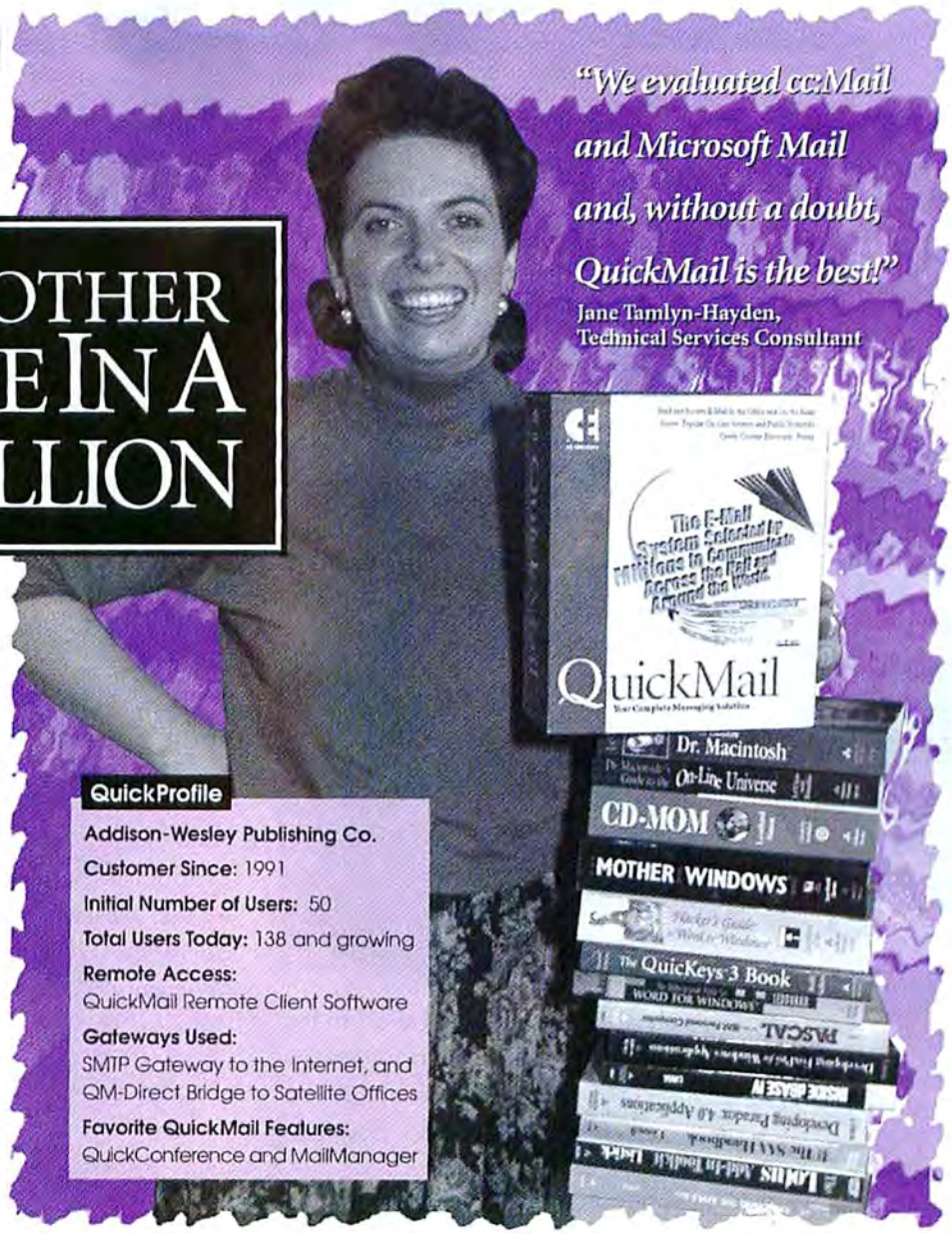

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Circle 170 on reader service card

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Circle 233 on reader service card

BY LON POOLE

Quick Tips

Tips, Tricks, and Shortcuts

IF YOU HAVE AN APPLE STYLEWRITER OR StyleWriter II printer and are as outraged as John Fuller of Granger, Indiana, at the cost of Intuit checks for Quicken, you can follow his lead and set up Quicken version 4 or 5 to use ordinary checks you get from your bank. Make the settings shown in "Setup for Ordinary Checks."

Virus

Q. Can my Mac get a virus from E-mail, newsgroups, and other text I get from the Internet or merely by connecting to these areas? Or do viruses only come from downloaded software? Will Disinfectant 3.5 protect me, or do I need software such as SAM 4.0? How often do I have to use the antivirus software?

Michael O'Neill
Apple Valley, Minnesota

A. Don't worry about getting viruses from text or pictures displayed live in a window (or sounds played) while connected to the Internet, commercial online services, electronic bulletin boards, or even local networks. The danger lies in files you download from online sources, receive as E-mail enclosures, copy from file servers over a local network, or get on disk. Only files that contain software can carry viruses, because a virus is a malignant bit of software grafted onto otherwise healthy software. The infected file could be an application, desk accessory, HyperCard stack, system extension, control panel, or other software. A virus can only reproduce itself on your computer when you use infected software—for example, when you run an infected program or start up after installing an infected extension or control panel.

Disinfectant is an excellent antivirus program that recognizes and neutralizes all currently known viruses except those that propagate only between HyperCard stacks. It's simple to use, unobtrusive, free, and widely available from online sources and user groups. On the Internet, the official anonymous FTP site is **ftp://ftp.acns.nwu.edu/pub/disinfectant/**.

SAM (Symantec Antivirus for Macintosh), Virex, other commercial antivirus software, and Chris Johnson's Gatekeeper shareware offer additional protection—and greater complexity. They recognize known viruses, including HyperCard viruses and viruses in compressed (but not encrypted or BINHEX-encoded) files, and they protect against unknown viruses by monitoring for suspicious activity such as attempts to add code to existing files. SAM and Virex also catch Trojan horses, which don't spread but contain malignant software disguised as benign software. These more powerful antivirus programs require some configuration, interrupt your work by scanning for viruses and suspicious activity, and sometimes ask you to make complicated decisions about detected suspicious activities.

For best protection you must religiously upgrade your antivirus software so it knows about the latest viruses. This is especially important with Disinfectant, which only spots known viruses.

IDE Replacement Drives

Q. I'd like to yank the 250MB hard drive from my 630 and replace it with a much larger drive. Does Apple have a list of IDE drives and types that it considers acceptable for a 630-series computer?

Fletcher Chambers
Minneapolis, Minnesota

A. Apple designed the 630 series and the PowerBook 150 to work with recently made IDE hard drives. Apple does not have a list of approved brands and models but does have some rather technical specifications. Fortunately, you don't need to understand what the specifications mean to find out whether products meet them. Just remember that all the assurances you get aren't worth as much as a money-back guarantee. If a drive doesn't work in your computer, you want to be able to return it without a lot of hassle.

The following requirements and recommendations apply to the Quadra 630, LC 630, Performa 630 series, and the PowerBook 150:

- The drive must support these commands: Identify Device, Read Buffer, and Write Buffer.
- The drive must be set for Master Mode only (DRV=0).

continues

DOUG ROSS

• Write Caching must be enabled so that the drive takes care of bad blocks as they crop up. The Mac doesn't manage bad blocks for the drive.

• The Read/Write Multiple command is optional; the Mac uses it to get better performance.

These Macs can work with IDE drives larger than 528MB, which use LBA mode for addressing blocks on the disk. They also work with smaller IDE drives that use the older CHS mode.

The following additional requirements and recommendations apply only to the PowerBook 150:

• The drive must not require a Set Features command after awakening from sleep mode.

• The drive must work at PIO timing mode 2 or higher.

• Recommended: start and stop cycles of 20,000 or better.

You shouldn't have to format the IDE drive because the manufacturer does that. The manufacturer probably won't set up the IDE drive for the Macintosh file system or install the necessary software to make it a start-up disk. If not, you will have to start up from an external hard drive, a floppy disk, or a CD-ROM. The operating system will tell you the new drive is not a Macintosh disk and offer to initialize it. After initialization, you can install System 7.5 to make the new IDE drive a start-up disk. You can't use disk utility software made for SCSI drives to reformat or partition an IDE drive. Check with the publishers of disk utility software to see if their products have been revised to work with IDE drives yet.

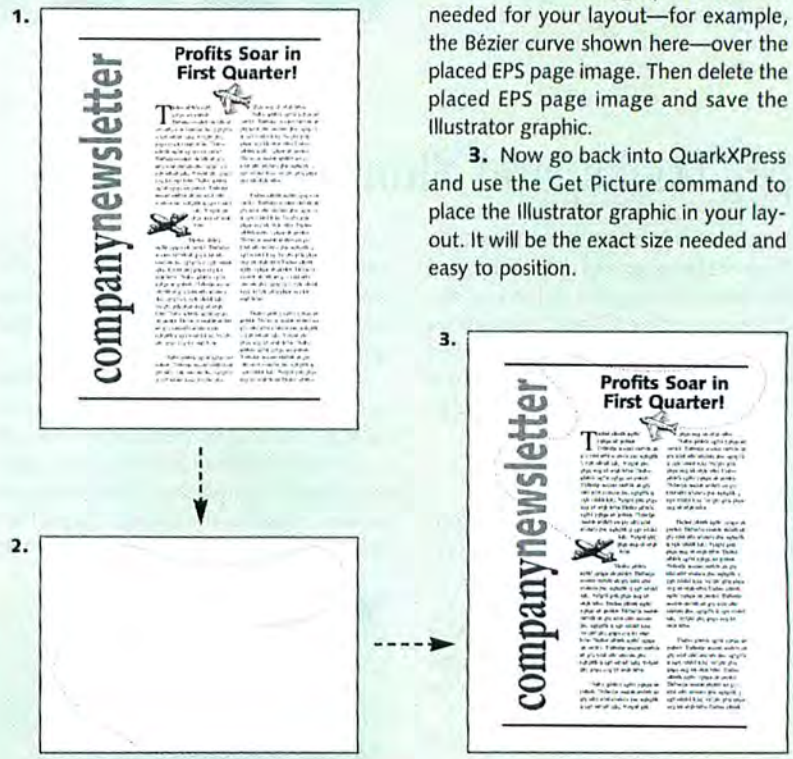
DRAWING TO FIT THE PAGE

Here's a technique from Jess Whited of Allentown, Pennsylvania, for drawing EPS graphics that need exact positioning within your page layout. The following instructions use Adobe Illustrator and QuarkXPress, but you can adapt them for equivalent applications:

1. In QuarkXPress, first lay out the page without EPS graphics—place text, clip art, and so forth—and save the page as an EPS file. Next open Illustrator and create a new document the same size as the saved EPS page. Use Illustrator's Place Art command to import the saved EPS page.

2. Draw the graphic element needed for your layout—for example, the Bézier curve shown here—over the placed EPS page image. Then delete the placed EPS page image and save the Illustrator graphic.

3. Now go back into QuarkXPress and use the Get Picture command to place the Illustrator graphic in your layout. It will be the exact size needed and easy to position.



A Multifloppy File

Q. I want to store my Retrospect catalog files on floppy disks, but some files are too big for one floppy. On a Windows computer the built-in File Manager takes care of this by breaking up a long file and prompting for additional floppies as needed. How can I do this on a Mac?

John Artero
Lanham, Maryland

A. StuffIt Deluxe and StuffIt Lite do exactly what you want. In addition, you can use StuffIt Deluxe or Lite to compress files before you segment them. If you do compress them, you have the option of making the segments self-joining so you won't need StuffIt or any other program to restore the original file. StuffIt Deluxe and Lite work with all sizes of removable media and can adjust automatically for disks that System 7 has formatted to less than rated capacity (due to bad blocks). You could also use Norton DiskDoubler Pro to split files, but it doesn't ask for floppies as needed. With DiskDoubler, you have to split a file into segments on a hard drive and then copy each segment to a floppy, ejecting each floppy yourself with the Finder.

You can also use the $15 shareware program File Transfer 1.3 to split a file directly to multiple floppies and recombine the pieces later. The program doesn't automatically eject floppies as needed; you have to use the Eject button in the program's save dialog box.

Curing a Skipping Mouse

TIP My mouse began to skip and track erratically even though the rollers inside were clean. The condition got worse as weeks went by. A close look at the mouse revealed that the slippery little pads on which it slides had worn down to the point where the mouse was nearly sliding on the hard plastic ball cover. As a result the ball was riding too high and occasionally failed to contact the rollers inside the case, making the cursor skip. My solution: replace the crescent-shaped pad on the ball cover with a new one cut from the lid of a take-out soup container—made of LDPE #4 plastic (low-density polyethylene, in case you're wondering)—nice slippery stuff. I peeled the old pad off the bottom of the mouse, stuck it to the lid, and used it as a template for cutting a new pad. Actually, the old pad stuck so nicely I left it stuck to the new one for some extra thickness. I glued the new pad to the mouse with a tiny dab of Shoe-Goo (that stuff you spread on tennis shoes to rebuild the tread). Presto, a smooth mouse again. Ahhhh.

David Peale
Chatham, New Jersey

Copying from Layer to Layer

TIP If you are familiar with Adobe Illustrator 5.0 or later you probably know that you can copy selected

continues

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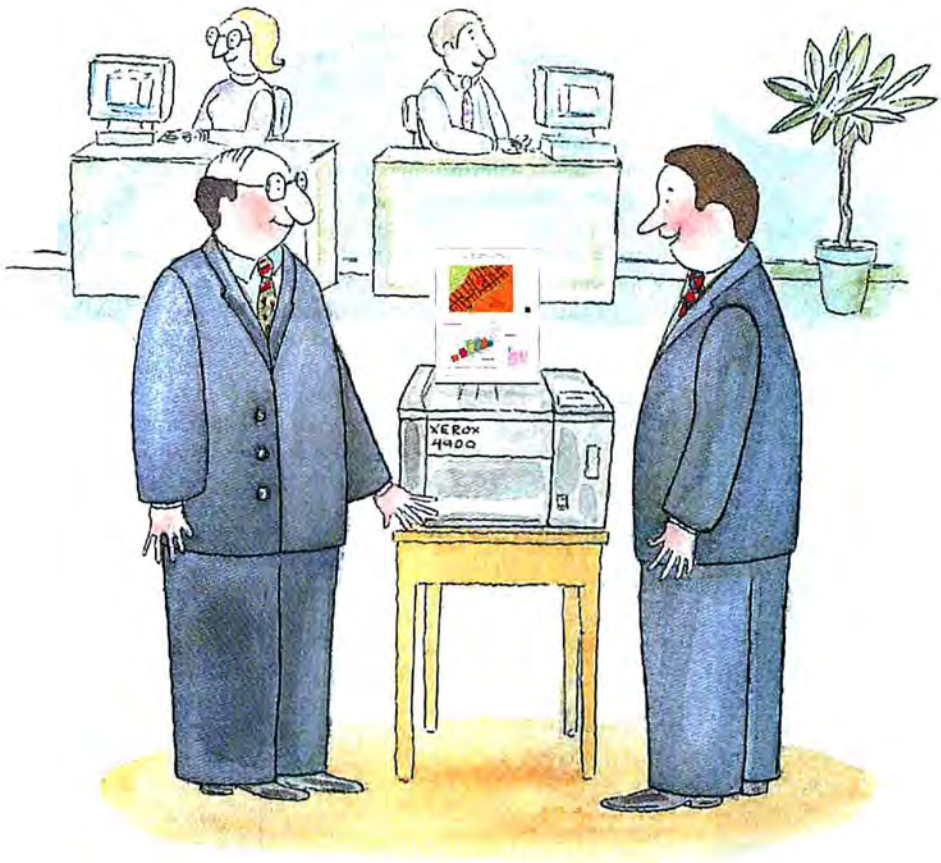

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objects by pressing the option key while dragging them. Additionally, you can move selected objects in one layer to another layer by dragging the small colored dot in the Layers palette, as described in the Illustrator manual. What the manual doesn't tell you is that you can combine these two techniques to copy selected objects from one layer to another in the Layers palette.

Both the layer that contains the selected objects and the layer to which you wish to copy them must be unlocked and visible. You select the objects to be copied, hold down the option key, and in the Layers palette drag the colored dot from the origin layer to the destination layer. As you drag, a red plus sign shows next to the pointing-hand cursor. When you release the mouse button, a copy of the selected objects appears in the same position as the original and in front of or behind other objects in the destination layer, according to the order of the two layers.

William Pitts
Jackson, Mississippi

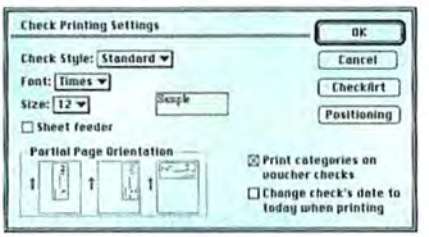
Start-up Booby Trap

TIP Don't hold down the power-on key on the keyboard for more than a second or two when starting up a 660AV, 840AV, or any Power Mac, or else you set the stage for an unexpected appearance of the mysterious programmer's window (a dialog box—containing only a greater-than symbol—that provides access to a limited set of program debugging tools known as the Mini Debugger). This baffling window appears sometime later, seemingly unbidden and definitely unwanted, when you press the ⌘ key. If the programmer's window appears on your screen, you can usually resume work without restarting by typing the letter G (short for Go) and pressing return. If you type anything else and press return, you may have to restart, losing all unsaved work.

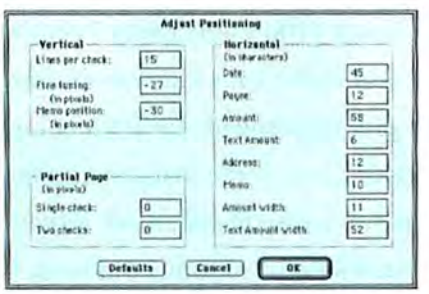
Joe Holmes
Kensington, California

Pressing control-⌘ instead of ⌘ causes a sudden restart, similar to switching the power off and on. However, I found that pressing any keys except ⌘, option, or control deactivated the booby trap on my Power Mac 6100 (which is fitted with a Sophisticated Circuits Power Key device to enable turning on the computer and peripherals from the keyboard as well as turning off the system with a regular Shut Down command). The culprit here is the CUDA chip, which controls the keyboard, mouse, and other ADB devices on 660AV, 840AV, and Power Macs. It stores the status of the power-on key, and locks that status in the "down" state if you hold down the power-on key too long at start-up. The condition can also occur after start-up if an application or control panel initiates a certain command (known as ADB REINIT) and if you then hold down the power-on key. I don't know which programs use that command, if any, but if you notice the programmer's window opening frequently when you press the ⌘ key in a particular program, you should check with the program's developer. The condition is less apparent on a 660AV or Power Mac 6100, because they aren't designed to be turned on from the keyboard.

You can make the programmer's window appear by holding down the ⌘ key and pressing the power-on key on the keyboard. You can restart by holding down control-⌘ and pressing the power-on key; you may have to wait a few seconds before you hear the start-up sound. Warning: Don't use this technique as a shortcut for the Restart command. Use it only in lieu of restarting with the power switch, for example, if your Mac crashes.—L.P. m



Setup for Ordinary Checks These settings let Intuit's Quicken print on ordinary bank checks with an Apple StyleWriter. Choose Check Printing (Settings menu) and in that dialog box click the Positioning button to bring up the second dialog box.



In the Adjust Positioning dialog box, you may have to change the settings for Payee, Memo, or Amount Width to fit your individual check style. You must make the changes separately for each account from which you wish to print on ordinary checks. When printing, be sure to select the Manual option so you can feed checks into the printer by hand.

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EDITED BY ELIZABETH DOUGHERTY

Networks

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PCI Networking Products Line Up

WHEN APPLE'S NEW POWER MAC line rolls out this summer, so will third-party Peripheral Component Interconnect (PCI) networking boards. The high speed of the PCI bus in the next Power Macs will let vendors bring to Mac desktops accelerated LAN and WAN technologies, including Fast Ethernet, Fiber-Distributed Data Interface (FDDI), and Asynchronous Transfer Mode (ATM).

Next-generation networking technology operates at speeds of 25 megabits per second (Mbps) to 100 Mbps, which NuBus can't efficiently support. NuBus speeds top out at 40 megabytes per second (MBps), with average speeds ranging from 10 MBps to 16 MBps. PCI should perform at speeds of 20 MBps to 40 MBps under the existing Mac OS, according to Apple's *PCI Developer Notes*, with a theoretical limit of 132 MBps in PCI's first incarnation. (For more on PCI, see the feature "Why PCI" in this issue.)

Fast Ethernet (100BaseT and 100VG-AnyLAN), FDDI, and 155-Mbps ATM require 15 MBps of PCI bus bandwidth. According to Apple sources, PCI Macs running under System 7 will be able to sustain a 20-MBps bus-transfer rate, which accommodates LAN needs but leaves only a small margin for other peripherals. Apple's follow-on System, code-named Copland, supports preemptive task dispatching and direct memory access, making possible transfer rates of 40 MBps and beyond.

PCI is a more widely accepted standard than the largely Mac-only NuBus. Volume and competition should make PCI networking boards cheaper to build than NuBus boards, and PCI's performance opens up new product opportunities. For example, only one ATM board shipped for NuBus, which can't fully take advantage of ATM's speed, while several companies have announced ATM boards for PCI-bus Macs (see "ATM Arrives for NuBus," *Networks* news, February 1995, and "ATM LANs Will Run Lightning-Fast," *Networks* news, September 1994).

STUART BRADFORD

The first networking products to take advantage of PCI will be LAN and WAN adapters, all priced under $500: Apple Computer, Dayna Communications, Digital Equipment Corporation (DEC), Farallon Computing, and Asanté Technologies plan to ship 10/100BaseT Ethernet boards on PCI announcement day. Because 10/100BaseT boards automatically adapt to the prevailing LAN speed, users can deploy them on an existing 10BaseT LAN and then later transparently upgrade the LAN itself to 100BaseT.

Some low-end PCI Macs will not have built-in Ethernet, according to Apple; Dayna will offer a PCI 10BaseT board for those machines.

DEC also says it will have a Mac driver ready for its PCI FDDI adapters this summer.

PCI WAN interfaces are coming too. Apple, Fore Systems, Interphase, and others are working on 25- and 155-Mbps ATM cards, with price points near $1000. France-based 4-Sight International plans to ship a PCI ISDN adapter priced below $1000.

4-Sight, 515/221-3000; Apple Computer, 408/996-1010; Asanté, 408/435-8388; Dayna, 801/269-7200; DEC, 508/467-5111; Farallon, 415/325-6236; Fore Systems, 412/772-6600; Interphase, 214/919-9000.—MEL BECKMAN

New Remote-Access Choices

THE LATEST IN REMOTE ACCESS: new multiple-protocol remote-access servers have come to market; Tribe has introduced a low-cost PPP remote-access server; and finally, Apple Computer has reduced Apple Remote Access (ARA) server prices and revealed that the next revision of its ARA software, due by the end of the year, will be based on Open Transport and will support PPP.

Digital Equipment Corporation (DEC) is shipping the 8-port Digital NetRider 90 ($3400 list) and planning to ship in March its 32-port Digital NetRider 900 ($9345 list). Both multiprotocol remote-access servers handle more than one type of session at once—including AppleTalk as well as TCP/IP and IPX. The servers come with all necessary client software and Internet-browsing software.

Xylogics' Remote Annex line of dial-in/dial-out multiprotocol access servers have from 8 to 72 ports. The servers support TCP/IP, IPX, ARA, DEC LAT, and IBM TN3270–based applications. List prices range from $2695 to $10,000, depending on model and options.

Taking a different tack, Tribe Computer Works has introduced the TribeLink2 ($1295 list), a 2-port, PPP-only, dial-on-demand remote-access server due this spring. The TribeLink2 has 2 high-speed RS-232 ports that can accommodate modem, synchronous-switched, or leased-line operation (CSU/DSU), or an ISDN terminal adapter. Users can dial in using AppleTalk or TCP/IP over PPP, dial out, and have routed IP connection to the Internet. Upgrades will be available for IPX and AppleTalk support.

Apple dropped the price on its Remote Access MultiPort Server by 30 percent to $1259 (company's estimated price). The 4-port expansion kit now costs $1159 (company's estimated price).

Apple, 408/996-1010; DEC, 508/467-5111; Tribe, 510/814-3900; Xylogics, 617/272-8140.—NANCY E. DUNN

QuickMail's Enterprise Link

THE RECENTLY SHIPPED INTEROFFICE Message Exchange (IME), an enterprise system from CE Software, glues together a wide variety of normally incompatible E-mail systems, from Microsoft Mail to X.400 to Lotus cc:Mail to IBM OfficeVision/VM.

IME works through software access units installed on each E-mail platform's server. After installation, the system relays messages transparently, and automatically synchronizes user directories.

Boston Software Works developed InterOffice Message Exchange for PCs, workstations, minicomputers, and mainframes ($4500 to $24,000); CE Software added a $4500 access unit for its flagship Mac E-mail program, QuickMail. CE Software, 515/221-1801.—RAINES COHEN

Tape Backup Made Easy

AUTOMATED TAPE BACKUP, FOR years commonplace in mainframe computer operations, is now becoming popular on Mac and mixed-platform workgroup LANs. The backup systems combine tape drives with a robotic tape-loading magazine that rotates tapes as necessary, working with software that's designed to handle the unattended backup, such as Dantz Development's Retrospect Remote or Cheyenne's Arcserve.

Six companies have introduced systems compatible with the Mac. Most use 4mm digital audiotape (DAT) media in the current Digital Data Storage-2 (DDS-2) format or its lower-capacity precursor, DDS-1. Under DDS-2, a 120m tape can hold up to 8GB, depending on the compression ratio used.

Aiwa America and Core International jointly developed the largest-capacity system available for the Mac, the 17-cartridge Aiwa Autoloader, which comes in two forms: the single-drive AL-D210 ($6995 list) and the dual-drive AL-D220 ($8995 list). Both come with 16 data cartridges and 1 cleaning cartridge, for a total capacity of up to 128GB.

ROBERT PFRY

Aiwa America and Core International take the prize for largest-capacity Mac-compatible automated tape-backup device so far, the AL D210, which handles 16 data storage tapes totaling up to 128GB.

Advanced Digital Information Corporation (ADIC) makes the DAT Library 1200D, a DDS-2 system ($6995 list) that holds up to 12 DAT cartridges, for a capacity of up to 96GB. ADIC's DDS-1 model goes for $5995 list.

FWB's HammerDAT48G ($4099 list) supports DDS-1, DDS-2, and DDS-DC media, with a loader for 6 tape cartridges that have a total capacity of up to 48GB.

Exabyte's EXB-10h, unlike the other systems, uses 8mm tape. With a 10-cartridge loader, the $6000 (estimated street price) single-drive system's capacity goes up to 70GB.

MicroNet Technology is shipping a Mac-configured model of its 6-cartridge, DDS-2–format DAT Autoloader ($4495 list), bundled with Retrospect Remote.

TapeWorks can upgrade any DDS-1 or DDS-2 drive to a 6-tape autoloader for $1595. The company also sells a complete 6-tape DDS-2 system ($2995 list).

ADIC, 206/881-8004; Aiwa, 201/512-3600; Exabyte, 303/442-4333; FWB, 415/325-4392; MicroNet Technology, 714/453-6000; TapeWorks, 303/224-1700.—NANCY E. DUNN

IN BRIEF

■ **In Synch** To counteract clock drift between Mac nodes and the file server, Wholly Mac Software offers Time Align, which synchronizes a Mac to the file server's clock when the user logs on to an AppleShare or Novell NetWare file server. The utility, due to ship in March, comes in packs for 10 to 100 users, ranging from $90 to $299. 702/878-3316.

■ **More ISDN Support** Cisco Systems has enhanced ISDN support in two pieces of hardware that support AppleTalk, among many network protocols. The Cisco 2526 integrated hub/router ($3795 to $6095) now includes an ISDN Basic Rate Interface. The Cisco 7000 and 7010 core routers can now have one or two E1 Primary Rate Interfaces ($11,000 to $15,000). 408/526-4000.

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- ☐ 36. Does Not Apply

WHAT IS THE SIZE OF YOUR ORGANIZATION? (Check one)
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- ☐ 38. 50 - 99
- ☐ 39. 100 - 499
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- ☐ 41. 1000 & over
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- ☐ 43. Macintosh Plus/SE/SE30
- ☐ 44. Macintosh Classic Series/LC Series
- ☐ 45. Macintosh Powerbook Series/Duo Series
- ☐ 46. Macintosh II Series
- ☐ 47. Macintosh Performa Series
- ☐ 48. Macintosh Centris Series
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- ☐ 52. IBM PC or compatible
- ☐ 53. Other _____
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BY CARY LU

PowerBook Notes

The Changing Modem

SINCE I LAST WROTE ABOUT THEM IN May 1993, PowerBook modems have gotten much faster, and PowerBooks have been gravitating toward standard modems that work with many laptops.

28.8-Kbps Modems

The new international V.34 standard for modems runs at 28.8 kilobits per second (Kbps), a considerable improvement over the 14.4 Kbps of V.32bis (for more on this topic see "Blazing Modems," *Macworld*, May 1995). The older V.FC or V.Fast modems run an incompatible 28.8-Kbps protocol that will die out. For full speed, V.34 requires cleaner phone lines than the slower protocols. You may be able to achieve the full 28.8-Kbps speed only with local calls; interstate long distance may not work as well; in-state long-distance calls tend to be the poorest. The modem automatically reduces speed in steps until it makes a successful connection. If your 14.4-Kbps modem works at full speed, you can expect to get at least 21.6 Kbps with a V.34 modem. Global Village and Supra have V.34 internal modems for the 100-series PowerBooks, each selling for roughly $300.

PC Card Modems

For the Duos, no internal V.34 modem seems likely, so the only way to get to 28.8 Kbps is through an external modem. A Duo can use a PC Card (formerly called the PCMCIA card) modem through the Comms Modulette, a serial port–to–PC Card adapter from TeleAdapt (408/370-5105). No one seems likely to deliver a V.34 internal modem for the 500 series either, since a V.34 modem can be connected through the PC Card adapter. Many, though not all, PC Card modems are supported on the 500 series; check for compatibility and Macintosh software before you buy. And if you buy Apple's $219 PC Card adapter for a 500-series PowerBook, make sure you get version B (order number M2995LL/B; part number M2864 V1/B), which fixes a mechanical problem releasing thick PC Cards.

Future PowerBooks will have PC Card slots rather than internal modems. Although PC Card modems cost less, can be easily swapped between laptop computers, and make it easy to change modem standards, the PC Card shape has some drawbacks. The cards were originally designed only for solid-state memory,

which doesn't require external connectors; even a standard modular telephone plug won't fit in a PC Card.

However, there are ways to make a connector fit. Megahertz, Hayes, and Practical Peripherals use a clever little pop-out modular jack that accepts a standard telephone cord. These jacks do have some problems. They're fragile; although the companies will replace modems with broken jacks, you will be stuck until you get the replacement. Tripping over the cord can pull the computer off a table. And the jacks leave part of the modular plug's wires exposed. The 100-volt ring signal used in North America can produce quite a shock; the 250V ring signal found in some countries is even worse.

Other PC Card modems use a special cord that has a modular telephone plug at one end and a custom connector at the other. The modem connector won't break and will usually pull out if you trip over the cord. In the future, PC Card modem makers may standardize on a connector; for now each company has its own design. Because these are unusual cords, you should always carry a spare.

Connection Problems

When traveling, you will be tempted to connect your modem to any convenient telephone jack, but this doesn't always work. First of all, a modem needs an analog jack. The standard telephone cable connects to line 1 in the jack, using the inner pair of wires (red and green). In some cases, the modem needs line 2, which uses the outer pair of wires (yellow and black). Some analog PBX lines (the internal phone systems in offices and hotels) use the yellow and black wires for all calls. Radio Shack's $6.99 adapter (#279-402) lets you select the line 1 or line 2 pair. Lind Electronic Design sells Pilot Engineering's PocketNet 2000 kit with a 15-foot retractable phone cord and line adapter that not only lets you select line 1 or 2, but also maintains connections with a third pair of wires used by some business phone systems for message lights and other functions ($29.95; 612/828-6002, 800/682-4987).

A digital PBX can create bigger problems. Many use standard modular plugs for telephone connection. If you connect to these plugs, the PBX may damage your modem because the red and green wires in these systems carry power rather than an analog telephone signal. The modem damage is usually not repairable or covered by warranty (the PowerBook probably won't be damaged). Some digital PBX systems, particularly in hotels, have data ports built into the phones. You can connect to the data port safely, but not to the same telephone's wall jack.

Some recent modems (such as Global Village Mercury and newer models,

continues

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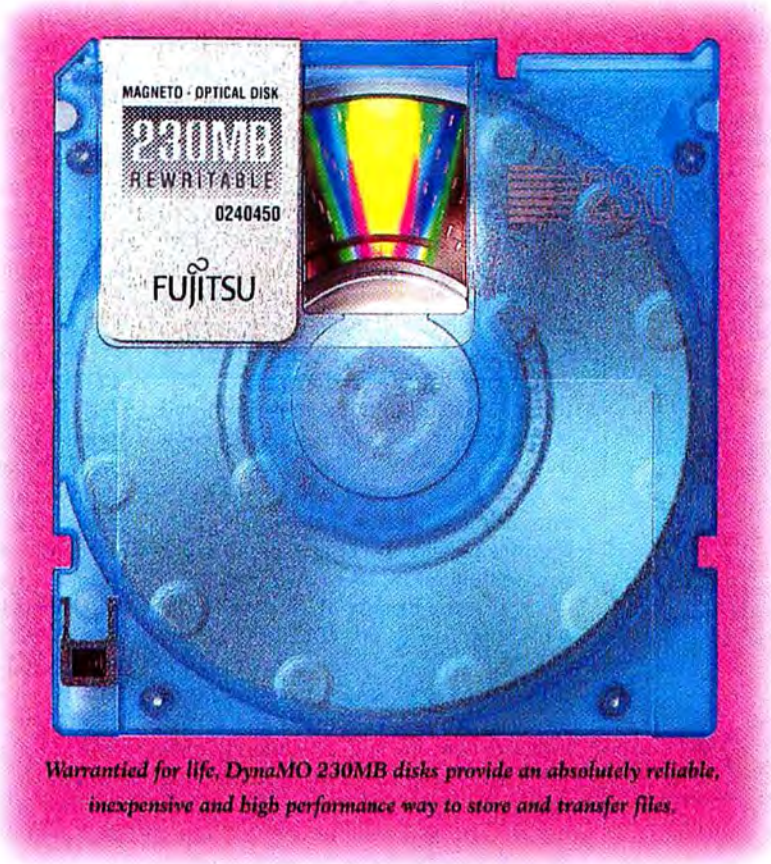

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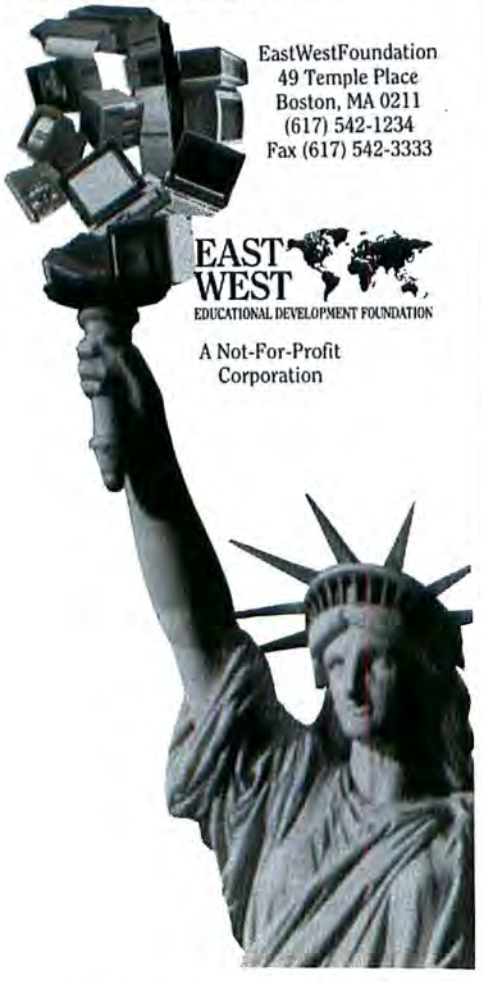

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and current Supra models) are protected from digital PBX damage. For other modems, how can you distinguish a digital-PBX threat?

- Look at the bottom of a telephone that's connected to the jack you want to use for a ringer-equivalence number such as REN:1.0B. Only analog phones have REN numbers. But not all analog phones have such numbers, and foreign phones certainly do not.
- Plug in IBM's Modem Saver ($29; part #73G5395; 800/388-7080 U.S. only), which detects digital lines by checking for higher than normal current. TeleAdapt also sells the Modem Saver. Two simpler line testers, a $14.95 TeleAdapt model and Radio Shack's #43-104 ($5.99) don't always detect a digital PBX.
- Plug in an ordinary telephone and listen for a dial tone. If you don't hear one, unplug the phone immediately. If you act quickly, the phone should survive for future tests (unfortunately, with a modem you can't react quickly). You can carry a small telephone in your travel kit.
- Ask about the telephone system. The people who use it may not know anything about it, but a modem user or the telephone-system manager should know if you can connect safely.
- Use the fax telephone line. The fax phone line is always analog, except for the rare Group IV fax machines, which work on digital ISDN phone lines.
- Use the Konexx Model 111 Handset Coupler ($159; 619/622-1400, 800/275-6354) or the Radish Inside Line ($119.95; 303/443-2237), to connect your modem to the telephone's handset jack rather than to the wall jack. The couplers work with nearly all digital PBX systems and won't be damaged by the rare exceptions. With some digital PBX systems, modem autodialing won't work through the coupler, although the telephone administrator may be able to reprogram the PBX to allow autodialing. Both couplers use AC adapters; the Iconexx can also use a 9V battery.
- Use a Konexx Model 204 Acoustic Coupler ($149), a microphone and speaker that straps around a telephone handset and also uses a 9V battery. Although it handles a wider range of phones than the electronic coupler, it takes some fiddling to set up. Users report that the coupler can reach 19.2 Kbps and sometimes faster speeds with V.34 modems. Speeds on older or low-quality phones may be limited to 2400 bps.

Two other common uses of modular telephone jacks are PhoneNet LocalTalk networks and SilverStreak Ethernet networks. Neither will damage modems plugged into their jacks.

Special Features

Although modems have become commodity items with little discernible difference in their hardware, some models do have distinct features.

- **Cellular Connection** A few modems have special features for connection via cellular phones; see *PowerBook Notes*, January 1995.
- **Caller ID** Some modems now come with caller-ID detection for phone lines that subscribe to the service. Supra, for example, offers this feature in all but its low-end modems, with software that looks up the number and displays the associated name in its own database (though it cannot look up data in external databases, such as FileMaker Pro).
- **Voice Processing** A few modems can digitize voice messages, turning your computer into an answering machine. No current PowerBook modem has these features, although future PC Card modems undoubtedly will.
- **TTY** One of the most frustrating problems with modems is their inability to connect to TTY equipment (also called TDD, telephone device for the deaf). The TTY protocol requires a change in the modem modulation; don't confuse it with the TTY terminal setting in many communications programs. All a modem needs for TTY connections is a little software in its ROM, but only a few desktop modems have it, and no portables do. Nexion's $389 NexCom 300ve is a 14.4-Kbps V.32bis modem with TTY features (801/466-1258; TTY line, 801/466-0453). Use any Mac communications program and initialize the modem with AT#AHH to connect in TTY mode. The modem's hold button lets you put an incoming TTY call on hold while you start your computer.

A simple way to resolve modem/TTY incompatibility would be for telephone companies to install modem pools that automatically translate between TTY and standard data protocols; unfortunately, so far none have.

A Little Traveling Software

When you travel, you have to reset the phone numbers your modem must dial to accommodate different area codes, access numbers, and local phone systems for every service that you call. MegaDial from Cypress Research ($79.95; 408/752-2700) stores all such travel information; you simply choose a different calling location and MegaDial changes the dialing process for every service. m

CARY LU is a *Macworld* contributing editor who covers mobile- and remote-computing issues in this monthly column.

BY DAVID POGUE

Your Roots Are Showing

The quest for genealogy—and software to store it in

YOU'D THINK I'D BE A WILD-eyed, gibbering genealogy junkie. I mean, my grandmother traced her lineage back to Governor Bradford of the Pilgrims. Her husband traced his back to eleventh-century Scotland—on index cards. My other grandfather, at 105, is a genealogical gold mine.

I can think of two reasons, actually, why ancestor hunting has never really made my adrenaline spurt. First, after having spent $3000 on a computer, I've developed a psychological abhorrence of *any* activity involving index cards.

Second, I've always been more interested in looks, lives, and personalities than in dull names and dates. Your garden-variety family-tree chart omits all the good stuff, like musical ability, sense of humor, and tendency to go bald.

Yet genealogy would seem a perfect use of a Mac. Think how great it would be to slap in scanned photos, type up anecdotes, or even—my personal fantasy—import QuickTime home movies. Seeing, hearing, *meeting* your relatives . . . now that's what I call genealogy.

In the following discussion, respect the importance of the GEDCOM (genealogical data communications) file format. If a genealogy program can import and export GEDCOM files, then it can swap all your painstaking record-keeping into any other genealogy software that supports GEDCOM. That's good, because family histories tend to outlive software, software companies, and computer brands.

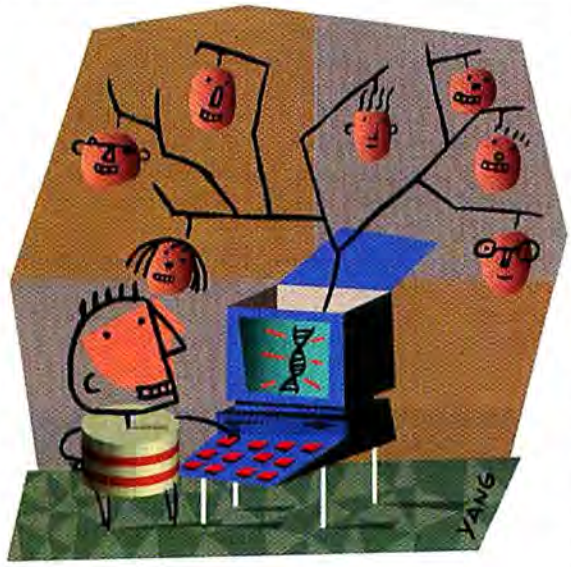
MacRoots II 1.6.5

MacRoots ($99; Itasca Softworks, 218/785-2745) is simplicity itself: at center screen are your name and vital stats. Above you are your parents. Below you and to the left is your spouse, if any. At the bottom of the screen are scrolling lists of your children and their spouses. (Exactly how often does a person need a scrolling list for spouses? Yikes.)

By clicking above or below your name, you can easily scuttle up and down your family trellis. Any name you click on jumps to center screen, and the appropriate family names spring into position.

MacRoots is wonderful, as far as it goes. It does the GEDCOM thing. It capitalizes names for you. Beside each name is a yellow page icon; click on it to open a window for notes.

MacRoots just doesn't go far enough. You can't resize windows. You can print out beautiful charts and lists, but you can't see them on screen. Each printout shows a maximum of ten generations (and the program itself maxes out at 10,000 people). Forget about special cases like multiple parents (as in adoptions), same-sex parents, and so on. And—bummer of bummers—you can't paste in pictures. (The next version, according to the programmer, will remove many of these limitations.)



Family Events 1.5

In most genealogy programs, you fill in a screenful of information about each person. (M)agreeable Software's Family Events, on the other hand, is shoe box–oriented: you fill in a screen for each research document or family event ($35; 612/559-1108). The program automatically constructs your family tree based on these scraps of information. Better still, it double-checks your math as you go. If a birth certificate says that your cousin Oswald was born in 1950, but you later indicate that he got married in 1965 at the age of 22, the program will gently point out that your documents conflict. It's up to you, the genealogist, to specify which source you prefer. (Also, it expresses some alarm if you indicate that a woman under 15, or over 50, gave birth.)

This inside-out design, according to the programmer, thrills some roots-hunters and confounds others. I found it pretty darned flexible; what's more, you don't have to work that way—you can also work person by person, as in the other programs. Really, I had only two complaints. First, Family Events is filled with dialog boxes—one apiece for birth, death, marriage, and so on—but, disconcertingly, there is no *main* screen, no home-base window. Second, Family Events offers only two chart types: a left-to-right pedigree diagram and a table of descendants. After spending months plugging stats into little blanks, it would be nice to have more flexibility in viewing the payoff. (At least the program is GEDCOM-savvy.)

Gene 4.0

The look of this prodigiously likable little shareware item should be the envy of designers of more expensive software ($10 requested, $13 by mail; Diana Eppstein, 714/854-6594). Its central interface element is a clean, simple, alphabetical list. One click takes you to that person's data screen. There you find not only the usual birth/death/parents info, but also a tidy list of all important life events for that person.

Even more exciting than Gene, though, is the tantalizing promise of Gene: The Next Generation—with those grayed-out, juicy, still-unimplemented menu commands like Add Picture and Export As EPS. When Gene does gain picture—and GEDCOM—features, it will be the most valuable $10 program in the family-foraging field.

continues

JAMES YANG

Family Heritage File 3.3

Do not adjust your set. You are entering a software zone where there are no Macintosh windows—only modal, all-white, Monaco-font screens with no close boxes, scroll bars, or even borders. Where ⌘-B means cancel . . . where there's no Open, Close, or Save command in the File menu . . . where the program is not a self-contained icon, but 32 tiny applications nestled into one folder, with names like Fgspri.bas and TMPWK.DAT ($149; StarCom Microsystems, 801/225-1480).

If Family Heritage File were a true Macintosh program, it might be tolerable. There's a name-checking feature to prevent typos in names. There's a ton of flexibility: you can input dates in 20 different formats (including phrases like "about 1905"), plus there are extensive options for Jewish and Mormon genealogical conventions. StarCom says a new version is in the works. Let's hope the newborn program doesn't get its looks from its parent.

Family Roots 3.7

Do not adjust your set yet. You are *still* in the zone of solid-white screens with no normal Macintosh windows. In this program, too, the File menu lacks Save, Open, and Close. Choose a command and the entire menu bar changes, placing you in a new "mode" until you discover the Return to Main Menu command in the File menu. Incredibly, this program won't even run if it isn't at the outermost level of your hard drive.

Except that it feels like someone's programming homework in BASIC, Family Roots is OK. It's got dozens of preference settings, from Use Maiden Name to Put Children in Order. You can view the charts on the screen or print them, although they're crude, made of dashes and slashes instead of solid lines. And Family Roots talks GEDCOM. Once again, we have a respectable genealogy program trapped inside a mess of an interface ($129; Quinsept, 617/641-2930).

Reunion 4.0

A real Macintosh genealogy program with GEDCOM input/output, resizable windows, and straightforward navigation—one that lets you attach photos. Is that really so much to ask?

Evidently the creators of Reunion don't think so ($149; Leister Productions, 717/697-1378). Reunion isn't just an outstanding genealogy program; it's an outstanding program, *period.* It handles every crazy kind of family: foster children, adopted twins, cousin-to-cousin marriages, you name it. You can enter dates in dozens of formats, including friendly forms like "2 years ago" or "25 years old." The program capitalizes for you and reduces your typing by keeping ready a list of names and places you've already entered.

The charts (up to 455 inches square) are amazing, colorful, drop-shadowed, beautifully laid-out affairs. Best of all, they're standard MacDraw-style graphics; you can drag limbs of your family tree all around, add captions, paste in (and resize) graphics, export to a draw program for further embellishment, and so on.

But to me, that's all hors d'oeuvres. Reunion also turns all your raw data into useful information. You can have the program show each person's relationship to you (for example, "first cousin"). It can display a list of birthdays, death days, or anniversaries. It'll even estimate life expectancies (but not, for some reason, marriage-length expectancies).

This program is somewhat slower than its interface-less rivals. It still doesn't do QuickTime movies (the next version will, says the company). And it won't let you record more than 20 offspring per couple. (That's a disappointment, says the company, primarily to dog breeders who use the program.) But no other program is as conducive to having fun figuring out where you've come from.

It's All Relatives Reunion's super-flexible charts are provided by its companion program, SuperChart. One command suffices to reorient the chart vertically or horizontally.

Alternate Roots

I also experimented with a few programs that are less full-featured. Heritage 2.0.5 (shareware) is a beautiful first half of a program—GEDCOM-friendly, lets you attach photos—but it offers no Quit command; you have to turn off the Mac to exit the program. Genealogy Pro, shareware, is exclusively for creating genealogical charts, not for storing family data. The world of HyperCard shareware offers a slew of family-tree trackers, too, such as Branches, Genealogy 2.1, and Family Tree. They're user friendly and cleverly designed, but they're simply not set up for serious genealogical work.

I also looked at Sesame 1.06 ($75; Commsoft, 707/838-4300), a unique spreadsheet program designed exclusively for family researchers. Unfortunately, it doesn't run in 32-bit mode (too bad for some Mac models), and it's slow.

Astute readers will also wonder about my omission of Personal Ancestral File, from the Church of Latter-Day Saints. In years gone by, it was supposedly the most-used Mac genealogy program on earth. Today, however, it's longer in the tooth than Dracula, and the company asked not to be included in this roundup, saying a new version is in the works.

The Upshot

Thousands of people, I realize, have been happily using some of the older, cruder programs for years. It's time to schlepp your data, via GEDCOM, into a modern, easy, ultraflexible program like Reunion. It's ideal for any kind of genealogy junkie—even (sigh) me. **m**

Contributing editor DAVID POGUE is apparently William Bradford's great-great (etc.) grandson. He's the author of *Mac FAQs [Frequently Asked Questions]* (IDG Books Worldwide, 1995).

SOURCES OF SOURCES

Software only helps you store and manage the ancestral data you dig up. *Finding* that data is up to you. Start with your local public library—then consider these likely sources.

Family History Centers These offices, maintained by the Church of Latter-Day Saints, are in most major cities. On microfilm and computer, they provide free access to millions of family records, Mormon and not. Check your phone book.

Online Services On America Online, use keyword genealogy; on CompuServe, it's go roots. Either way, you get messages, assistance, downloadable software, and GEDCOM files aplenty.

Magazines Try *Genealogical Computing* ($25 per year, 800/531-1790) or *Genealogy Helper* (801/752-6022).

National Genealogical Society Ground zero for professional genealogists. 703/525-0050; $35 per year for membership and *NGS Newsletter.*

The National Archives and Records Administration Your tax dollars at work, there's an office in most large cities. Check the phone book.

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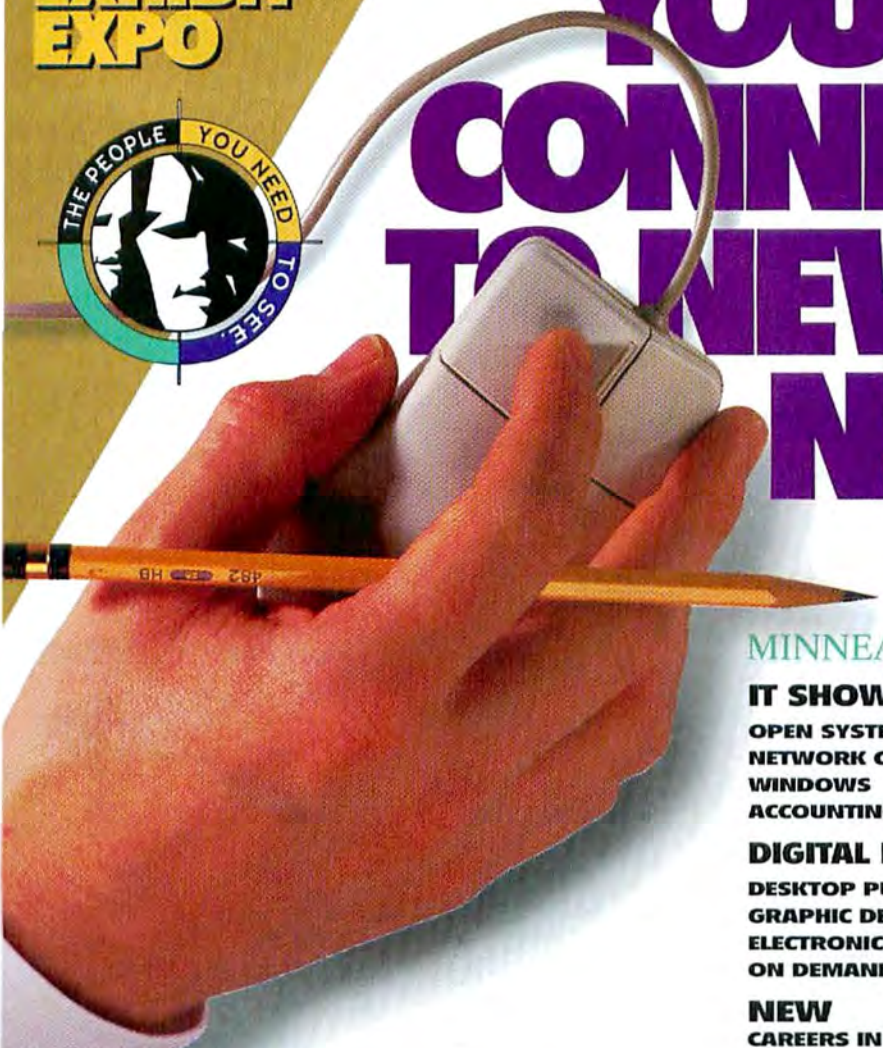

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SPECIAL KEYNOTE SPEAKER
Jim Buckley, President, Apple Computer

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- 48th Annual Information Systems Conference for the Association for Systems Management (ASM)
- 17th Annual Minnesota Joint Computer Conference (MJCC) with the Minnesota Software Association (MSA), Twin Cities ASM, Independent Computer Consultants Assoc. (ICCA), the Institute of Electrical & Electronic Engineers Computer Society (IEEE) and Assoc. of Computing Machinery (ACM)
- Minnesota Society of CPA Information Technology Conference

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BY DEBORAH BRANSCUM

Great Mac Tools

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THE COMPUTER INDUSTRY GENerates thousands of products, books, magazines, and related services each year. It's easy to feel overwhelmed by the constant onslaught of information. But it's not always easy to know which of these information sources is worth paying attention to. Read on for details on some newsletters, directories, databases, and more resources you may find useful.

• **Apple Product Facts** Price Books and Forms of Azusa, California, publishes this handy pocket guide to Apple products. The 112-page booklet lists technical specifications, features, and memory configurations for current Mac models. A revisions section shows when Apple products were introduced and discontinued. Apple display and printer specs are also included, along with a useful phone directory of Apple corporate, sales, education, and support lines. An annual subscription goes for $36.90; a single copy costs $9.50. You can call Price Books 818/334-0348 or 800/423-8961, or send E-mail to **pbfi@netcom.com**.

• **The PC Street Price Index** You too can locate rock-bottom computer prices. Merely turning the pages of this guide will reveal the lowest advertised prices nationwide for Macintoshes, Intel-based machines, laser printers, monitors, and software. There is a catch—you have to pony up $245 for an annual subscription. That may be money well spent if buying computers or staying abreast of street prices is an important part of your job. For a free sample issue or subscription info, call editor John A. Murphy in Gibbsboro, New Jersey, at 609/784-8866.

In Search of Software

• **Software Directory for Macintosh** If you need to locate a particular program or type of program, you might like this database, available from In4mation Software of San Clemente, California (714/366-1115). The publisher says its CD-ROM has detailed info on more than 8800 current Mac programs. Because copyright protection does not extend to directories, the company protects its assets by making it impossible to export or print records from its database. Users can cut and paste information as needed, though, and also rearrange, export, and print the vendor phone list if they choose.

The Software Directory for Macintosh is handy; I could easily search for vertical applications such as real estate programs and find all references to native Power Mac software, for example. The database lists any awards and reviews a product has received, which is a great idea. Unfortunately, the list treats various products differently—some records show a review date but no rating, others list the magazine but no date—so users may not be able to find a specific review. Overall, though, the Software Directory for Macintosh has a lot to offer. There are

competing directories out there—paper-based as well as electronic—so before you plunk down $99.95 to purchase this product, try out the demo version, an affordable $8.95 (California residents must add sales tax). The directory is updated twice a year; updates are $35.

• **The Macintosh Software Update Report** Launched last fall by Level 6 Computing, this newsletter-and-database combination keeps track of software upgrades. For $150, subscribers receive bimonthly mailings of a newsletter highlighting the newest software changes and a floppy containing two databases—one listing the most recent software upgrades and bug-fixes announced by various Mac developers, and the other listing 400-plus companies and how to contact them.

The quality of the information in the Update database is uneven; some upgrade entries are vague, some are undated. (For example, Microsoft was conspicuously absent from the premier Update database, although the company certainly produces patches aplenty.) Company president Kevin Garrett says that's because Level 6 depends on developers for its information. Still, you may find this service useful. For a sample issue, call Garrett at 818/888-0675. You can also access the service via the World Wide Web at **htpp://www.webcom.com/~level6/**. Nonsubscribers can browse the November issue only.

Industry Statistics

• **Computer Industry Almanac** This annual publication, compiled by Egil Juliussen and Karen Petska-Juliussen, includes company profiles, industry salaries, product awards, company rankings (including those from *Forbes* and *Fortune*), a calendar of conferences, a directory of associations and user groups, and industry forecasts and sales estimates. The almanac can be depressing reading (must we know that Charles Wang of Computer Associates made $3.7 million in 1993?), but generally the 1994–95 volume is chockfull of fascinating facts. The softcover version costs $50 and can be ordered at 702/831-2288 or 800/377-6810. It's also available online via eWorld (800/775-4556). A Mac CD-ROM is in the works.

Online Newspapers

I like to follow the technology coverage of both the *New York Times* and the *San Jose*

continues

JOHN RITTER

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Mercury News, a Pulitzer Prize–winning enterprise in the heart of Silicon Valley.

Both papers have forums on America Online, a fairly low-cost vehicle for tracking the papers if you already subscribe to AOL. The *Times* cannot match the *Mercury* in a head-to-head challenge online, because *Times* articles are available only for a short time. And not every article that appears in the *Times* appears in its AOL forum, @times. Still, it's quick and easy to get the national take on major technology stories of the day.

The *Merc*'s AOL forum, Mercury Center, is a much more full-service forum, allowing you to search old issues for relevant articles as well as browse the current issue. There's also access, for a fee, to a newspaper database of other dailies across the country and to a so-called NewsHound news-clipping service.

The Business section of Mercury Center has a Silicon Valley Companies department that includes company press releases and other interesting documents. In February, for example, it ran the text of Apple's letter to U.S. District Judge Stanley Sporkin regarding Microsoft and the proposed antitrust settlement. It even published Bill Gates's response to Michael Spindler. ("Dear Mike: I'm writing to make it clear how disappointed I am in the lack of candor and honesty Apple has shown in dealing with Microsoft during the last several months.")

The *Mercury* went online with AOL in May 1993; last January it launched a Web version of the paper at **http://www.sjmercury.com**. Both the *Mercury* and the *Times* are accessible on AOL via the Newsstand department. You can get an AOL starter kit by calling 800/827-6364.

• **TidBits** Last month David Pogue scooped me in singing the praises of TidBits, a terrific electronic newsletter that follows all things Macintosh. (See *The Desktop Critic*, May 1995, for a list of other interesting E-zines as well.) Indeed, editors Adam and Tonya Engst do a great job. Check out back issues on America Online (TidBits library in the Hardware forum), CompuServe (MACCLUB #8), or the Internet (**sumex-aim.stanford.edu** in the **/info-mac/digest/tb** directory).

Government Watchdog

We're a long way from full electronic access to the host of government documents now available in paper form. If you believe such access is vital, or simply want to keep current on related issues, drop Jim Warren a line at **jwarren@well.com**. Warren, a columnist for *MicroTimes*, *Government Technology*, and *Boardwatch*, maintains the GovAccess mailing list, an irregular but frequent missive on issues relating to computer use and government legislation. His calls to action—many federal in scope—are always important.

• **The RSI Network Electronic Newsletter** Caroline Rose and Craig O'Donnell target this newsletter to computer users worried about repetitive strain injuries. It's a forum for RSI sufferers to swap tips, publicize helpful doctors, and offer advice on dealing with difficult employers. To subscribe to this free, irregularly published newsletter, send an E-mail message to **majordomo@world.std.com**. No subject is needed; *simply type* **subscribe rsi** in the body of the message.

Macworld's Best

If you enjoy articles by *Macworld* writers, you'll probably enjoy their books as well. That's a handy thing to remember the next time you're at the bookstore facing 40 gazillion books on, say, the Internet. (Note: IDG Books Worldwide is a subsidiary of *Macworld*'s corporate parent.)

Recent computing books by our sterling columnists include *Macworld Complete Mac Handbook Plus Interactive CD*, third edition, by Jim Heid (IDG Books Worldwide, 1994); and *Macworld System 7.5 Bible*, third edition, by Lon Poole (IDG Books Worldwide, 1994). Cary Lu's latest, which he wrote with John Milligan, is *eWorld, The Official Guide for Macintosh Users* (Hayden, 1994). David Pogue's *Macworld Mac FAQs* (IDG Books Worldwide) will appear in May; Guy Kawasaki's *How to Drive Your Competition Crazy* (Hyperion) will be out in August.

Other *Macworld* contributing editors have penned more than a few tomes, including *The Macintosh Font Book*, second edition (Peachpit Press, 1991), by Erfert Fenton; *Insanely Great: The Life and Times of Macintosh, the Computer That Changed Everything*, by Steven Levy (Viking, 1994); *Photoshop 3 for Macs for Dummies* (IDG Books Worldwide, 1995), by Deke McClelland; *Real World Scanning and Halftones* (Peachpit Press, 1994), by Steve Roth and David Blatner; and *The Internet for Macs for Dummies* (IDG Books Worldwide, 1994), by Charles Seiter.

There are certainly other good writers and good books out there, but these folks are among the best in the business. Judge for yourself, and happy reading. **m**

You can write to contributing editor DEBORAH BRANSCUM, *Macworld*'s Conspicuous Consumer, at *Macworld*, 501 Second St., San Francisco, CA 94107, or via the Internet (**branscum@aol.com**).

Send nominees for sainthood to *Service Heroes, Macworld*, 501 Second St., San Francisco, CA 94107. Also, drop *Conspicuous Consumer* a line if a company is ignoring you.

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Editors' Choice

THE BEST PRODUCTS FEATURED IN MACWORLD

Edited by Elizabeth Maffly

Macworld Editors' Choice is a complete listing of the hardware and software products selected as the best of their type in *Macworld*'s comparative articles. A ❖ next to a product indicates that we chose more than one product in that category. A ◀ next to a product listing indicates that a native Power Mac version is available.

Hardware

MONITORS

SMALL COLOR MONITORS, Jan 94

14-inch display: ❖ Sony CPD 1430; Sony Corp. of America, 800/222-7669; $779.95.
❖ Nanao FlexScan F340i•W; Nanao USA, 800/800-5202; $799.
15-inch display: NEC MultiSync 4FGe; NEC Technologies, 708/860-9500; company's estimated price $755.

TWO-PAGE COLOR MONITORS, Nov 94

PressView 21 Display System; SuperMac Technology, 408/541-6100; $3999.

NETWORK HARDWARE

REMOTE-ACCESS SERVERS, Oct 94

Mixed networks: NetConnect Remote Access Server; Asanté Technologies, 408/435-8401; $3899 for eight ports.
AppleTalk networks: ARA Multiport Server; Apple Computer, 408/996-1010; four ports $1799, eight ports $3298.

PRESENTATION HARDWARE

PORTABLE PRESENTERS, Jan 95

Z115; nView, 804/873-1354; $5495.

PRINTERS

COLOR PRINTERS, Aug 94

Low-end ink-jet: DeskWriter 560C; Hewlett-Packard, 800/752-0900; $719.
Solid ink-jet: Phaser 300i; Tektronix, 503/682-7377; $9995.
Thermal-wax transfer and color laser: Phaser 220i; Tektronix, 503/682-7377; $5995.

DYE-SUBLIMATION PRINTERS, Jul 94

Prepress proofing—tabloid size/fastest: Phaser 480; Tektronix, 503/682-7377; $14,995.
Prepress proofing—tabloid size/most complete: Rainbow; 3M, 612/733-1110; company's estimated price $20,000.
Prepress proofing—letter size: ProofPositive Full Page; SuperMac Technology, 408/541-6100; $7999.
General publishing and business: Phaser IISDX; Tektronix, 503/682-7377; $9995.

PERSONAL PRINTERS, Sep 94

Ink-Jet: DeskWriter 520; Hewlett-Packard, 800/752-0900; $365.
Laser—$1000 to $1600: microLaser Pro 600; Texas Instruments, 214/995-6611; $1599.

WORKGROUP PRINTERS, Jun 95

Tabloid-size printers: LaserJet 4MV; Hewlett-Packard, 208/323-2551; $3549.
Legal-size printers: ❖ Optra Lx; Lexmark, 606/232-2000; $3298.
❖ LaserWriter 16/600 PS; Apple Computer, 408/996-1010; company's estimated price $2299.

SCANNERS/IMAGE CAPTURE

ELECTRONIC CAMERAS, Sep 94

Apple QuickTake 100; Apple Computer, 408/996-1010; $749. ◀

HIGH-BIT FLATBED COLOR SCANNERS, Mar 95

❖ Arcus II; Agfa, 508/658-5600; $3495.
❖ PowerLook; Umax, 510/651-8883; $3495.

LOW-COST COLOR SCANNERS, Nov 93

$1300 to $1600: ❖ La Cie Silverscanner II; La Cie, 503/520-9000; $1599.
❖ Hewlett-Packard ScanJet IIc; Hewlett-Packard, 800/752-0900; $1599.
Under $1300: Mirror 800 Plus Color Scanner; Mirror Technologies, 612/633-4550; $1299.

OCR, Nov 93

OmniPage Professional; Caere Corp., 408/395-7000; $995. ◀

SYSTEMS/STORAGE

1.3GB OPTICAL STORAGE, Dec 94

Best low-cost solution: 1.3Gig MO; Club Mac, 714/768-8130; $2099.
Best overall performance: Genesis 1300; Microtech, 203/468-6223; $2899.

QUAD-SPEED CD-ROM DRIVES, Jun 95

APS T3501; APS Technologies, 816/483-6100; $299.95.

HIGH-SPEED HARD DRIVES, Aug 93

2.7GB drives: ❖ Nova XL 2700; Microtech, 203/468-6223; $2999. ❖ Vista 3.5GB; Relax, 510/471-6112; $3499.
SCSI-2 adapter: QuickSCSI; PLI, 800/288-8754; $499.

PC COPROCESSING, Oct 94

OrangePC Model 210; Orange Micro, 714/779-2772; $1283.

RAID STORAGE SYSTEMS, Apr 95

RAID 3 or 5: MR/5 RAID; MegaDrive Systems, 310/247-0006; $18,840.
RAID 0: SledgeHammer 2000FMF; FWB, 415/474-8055; $2359.

SYSTEM UPGRADES, Feb 95

Upgrade for Macintosh Quadra 650, 800, or 950: Power Macintosh Upgrade Card; Apple Computer, 408/996-1010; $699.
Upgrade for other 680X0 Macs: Replace with Power Macintosh 6100/60 with CPU booster and cache card. Power Macintosh 6100/60; Apple Computer, 408/996-1010; $1819 (base system with 8MB of RAM). PowerClip (CPU booster); Newer Technology, 316/685-4904; $245. 256K cache card; various companies, roughly $200.

VIDEO/DISPLAY

24-BIT VIDEO CARDS, Apr 94

Inexpensive acceleration: PrecisionColorPro 24XP; Radius, 408/434-1010; $599.
Full-featured acceleration: Thunder II GX•1360; SuperMac Technology, 408/541-6100; $4499.

HIGH-END VIDEO EDITING, Jun 94

Presentation video: ❖ MoviePak2 Pro Suite; RasterOps, 801/785-5750; $4199. ❖ VideoVision Studio; Radius, 408/434-1010; $4499.
Corporate video (offline): Media Composer 400s; Avid Technology, 508/640-6789; $14,995.
Corporate video (online): VideoCube; ImMix, 916/272-9800; $40,500.

PHOTOSHOP ACCELERATORS, Apr 94

PhotoBooster; Radius, 408/434-1010; $999.

Software

ACCOUNTING/FINANCE

GROWING A SMALL BUSINESS, Nov 93

Small-business system: M.Y.O.B.; Best Ware, 201/

continues

MACWORLD Editors' Choice

586-2200; $199.
Home office/personal finance: MacMoney; Survivor Software, 310/410-9527; $119.95.

BUSINESS TOOLS

PORTABLE-DOCUMENT SOFTWARE, Apr 95
Document Distribution: Common Ground 1.1; No Hands Software, 415/802-5800; $189.95.

STATISTICS, Oct 93
Exploratory data analysis: DataDesk 4.1; Data Description, 607/257-1000; $595.
Comprehensive package: SYSTAT 5.2.1; SYSTAT, 708/864-5670; $895.

CD-ROM

TOP 10 CD-ROMS, Mar 94
Overall: Seven Days in August; Time Warner Interactive Group, 818/955-9999; $79.99.

COMMUNICATIONS/NETWORKS

COMMUNICATIONS SOFTWARE, Aug 94
Basic connectivity: ZTerm; David P. Alverson (no phone number available); $30.
Terminal emulation: Crosstalk for Macintosh; Digital Communications Associates, 404/442-4000; $195.
Internet exploration: VersaTerm; Synergy Software, 215/779-0522; $125.

DOS WINDOWS EMULATION, Oct 94
Timbuktu Pro 1.0.3 for Macintosh, Timbuktu 1.1 for Windows; Farallon Computing, 510/814-5000; $199 each.

NETWARE CONNECTIVITY, Sep 93
NetWare for Macintosh; Novell, 801/429-7000; $495 for 5-user license to $2295 for 200-user license.

PROTOCOL ANALYZERS, Jul 94
EtherPeek, AG Group, 510/937-7900; $795.

TERMINAL EMULATOR, Oct 93
VersaTerm; Synergy Software, 215/779-0522; $149.

GRAPHICS

3-D MODELING, Dec 94
Stand-alone modeler: formZ; autodessys, 614/488-9777; $1495.
Integrated-modeling package: Strata StudioPro; Strata, 801/628-5218; $1495.
Entry-level modeler: Infini-D; Specular International, 413/253-3100; $695.

CLIP ART'S GREATEST HITS, Jan 94
Overall collection: ❖ ClickArt Studio Series; T/Maker Company, 415/962-0195; $99.95 per volume.
❖ Electronic Clipper subscription service; Dynamic Graphics, 800/255-8800; $67.50 per month.
❖ Images with Impact series; 3G Graphics, 800/456-0234; $99.95 to $129.95 per volume. CD-ROM $499.
❖ Metro ImageBase Electronic Clip Art; Metro ImageBase, 800/525-1552; $74.95 per volume, CD-ROM $149.95.
❖ Typographers' Ornaments; Underground Grammarian, 609/589-6477; $25 per volume; ten TIFF albums $200; EPS volumes $50 each.

DRAW PROGRAMS (LOW-COST), Sep 93
Budget draw: Expert Draw; Expert Software, 305/567-9990; $49.95.
Budget draw/paint: UltraPaint; Deneba Software, 305/596-5644; $79.
Beginners' program: Aldus SuperPaint; Aldus Consumer Division, 619/558-6000; $149.95.
Overall: Canvas; Deneba Software, 305/596-5644; $399.

FONT BUYERS' GUIDE, Mar 94
Text-face collection: Type On Call CD-ROM; Adobe Systems, 415/961-4400; $99 (this price includes the ability to unlock two families from preselected packages); an additional $25 enables you to unlock individual faces, or $69 to $179 for unlocking families.
Display/decorative-face collection: Fontek; Letraset, 201/845-6100; $39.95 per face.
Bargain collection: Monotype ValuePack; Monotype, 312/855-1440; $89 for 57 fonts.

IMAGE DATABASES, Oct 93
❖ Aldus Fetch 1.0; Adobe Systems, 206/628-5739; $295.
❖ Multi-Ad Search 2.0; Multi-Ad Services, 309/692-1530; $249.

IMAGE EDITORS, Feb 95
Adobe Photoshop 3.0; Adobe Systems, 415/961-4400; $895.

INTEGRATED SOFTWARE

INTEGRATED SOFTWARE, Feb 94
ClarisWorks; Claris Corporation, 408/727-8227; $299.

ONLINE SERVICES

ONLINE SERVICES, Aug 94
E-mail: America Online; America Online, 703/893-6288; basic monthly fee $9.95.
Reference: CompuServe; CompuServe Information Service, 614/457-0802; basic monthly fee $8.95.

ORGANIZATION/PRODUCTIVITY

CALENDARS, Jul 93
Alarm system: ❖ First Things First; Visionary Software, 503/246-6200; $79.95. ❖ Smart Alarms Plus; JAM Software, 203/630-0055; $75.
All-around scheduler: Now Up-to-Date; Now Software, 503/274-2800; $99.
Meeting scheduler: Meeting Maker; On Technology, 617/374-1400; five-pack $495.

GRAPHING SOFTWARE, Aug 94
DeltaGraph Pro 3 3.0.4; DeltaPoint, 408/648-4000; $195.

SALES-AUTOMATION SOFTWARE, Oct 93
❖ Contact Ease; WestWare, 619/274-5053; one user $395, five users $1495.
❖ CBS; Colleague Business Software, 512/345-9964; $495.

TEXT-RETRIEVAL SOFTWARE, Dec 93
Small system: On Location; On Technology, 617/374-1400; $129.
Multiuser system: Personal Librarian; Personal Library Software, 301/990-1155; $995.

PRESENTATION TOOLS

PRESENTATION SOFTWARE, Jul 94
Persuasion 3.0; Adobe Systems, 206/622-5500; $495.

UTILITIES

BRAVE NEW DOCUMENTS, Jan 94
Application-independent document distribution: Common Ground; No Hands Software, 800/598-3821; $189.95.
Book-length documents: FrameReader; Frame Technology, 800/843-7263; $84.95.

PRINTING, Sep 93
PC-printer cable packages: PowerPrint; GDT Softworks, 604/291-9121; $149.

VIRUS KILLERS, Jul 94
Commercial software: Virex; Datawatch, 919/549-0711; $99.95.
Free software: Disinfectant; free from various online services.

VIRTUAL MEMORY SOFTWARE

VIRTUAL MEMORY, Jun 94
Virtual memory software: Virtual 3.0; Connectix Corp., 415/571-5100; $99.
Memory-boosting software: RAM Doubler 1.0.1; Connectix Corp., 415/571-5100; $99.

WORD PROCESSORS

HIGH-END WORD PROCESSOR (for fast 68040 Macs and Power Macs), Mar 95
Microsoft Word 6.0; Microsoft Corporation, 206/882-8080; $325.

LOW-COST WORD PROCESSOR, Mar 95
MacWrite Pro; Claris Corporation, 408/727-8227; $99.

Vendors: Please write to *Macworld Editors' Choice*, 501 Second St., San Francisco, CA 94107, or send a fax to 415/442-0766 to inform us of changes in your phone number or your product's list price.

Star Ratings

HARDWARE AND SOFTWARE REVIEWS AT A GLANCE

Edited by Wendy Sharp

Macworld Star Ratings lets you compare Macintosh products by providing summaries of *Macworld*'s authoritative product reviews from the past year. The number of stars indicates quality; our reviewers assign five stars to outstanding products and one star to poor ones. The ◐ symbol indicates that a product is available in a native Power Mac version.

If a product has been upgraded since our last review, the most recent version number supplied by the vendor appears in parentheses after the reviewed version number. To read a full review of any product in the listing, please consult the issue listed at the end of each synopsis.

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

Software

BUSINESS TOOLS

★★★ **AccuZip6 1.8.7, Software Publishers, 800/233-0555, $689.** Bulk-mail software has informative progress indicators, batch and individual processing, low rates, and flexible parsing during import, but the interface is incomprehensible. Sep 94

★★ **Adobe Acrobat 2.0, Adobe Systems, 415/961-4400, $195.** The font fidelity of this portable-document software is uneven, and the software demands too much in resources compared with other options. Mar 95

★★★ **Adobe Acrobat for Workgroups 2.0, Adobe Systems, 415/961-4400, $1595.** As a collaboration tool, this software is relatively inexpensive and offers well-done annotation tools. However, it's resource-intensive, and creating hypertext documents with it isn't easy. Mar 95

★★ **Bulk Mailer CASS 1.00d (1.3), Satori Software, 206/443-0765, $150.** Unattended operation is possible with this bulk-mail software, but batch processing is slow and the program has coding problems. Sep 94

★★★ **CA-Cricket Graph III 1.52 (1.53), Computer Associates International, 516/342-5224, $129.** Graphing software's features are just right for charts in the physical and social sciences, but lack pizzazz. The program is easy to learn and use, and includes math features for data transformations and curve fitting. Dec 94 ◐

★★★★ **ClarisImpact 1.0 (1.0 v3), Claris Corp., 408/727-8227, $399.** Business graphing, project management, object-oriented drawing, word processing, and presentation functions merge in this business graphics software. The outstanding integration offers versatility that dedicated programs are pressed to match. Jun 94 ◐

★★★★ **ClarisWorks 3.0, Claris Corp., 408/727-8227, $129.** Inexpensive, easy to use, and powerful integrated software is the best package available. It's far better in terms of features, speed, integration, and use of system resources than its competition. Feb 95 ◐

★★★★ **Crystal Ball 3.0 (3.0.1), Decisioneering, 303/449-5177, $295.** Compact business-simulation software is fast enough for complex projects and can pay for itself in disaster-avoidance in a variety of business tasks. Oct 94

★★★★ **Decision Analysis 2.5, TreeAge, 617/536-2128, $379.** Decision-assistance software handles complex business cases by constructing tree diagrams of probabilities and payoffs. It offers a type of modeling that is realistic and easy to modify. Nov 94 ◐

★★★ **Extend+BPR 3.0 (3.1), Imagine That, 408/365-0305, $990.** Business-modeling software includes superior templates for business-process reengineering, but some programming experience is helpful. Oct 94

★★★ **FastTrack Schedule 2.1 (3.0), AEC Software, 703/450-1980, $299.** Simple project-management software is ideal for managers who need to put together a schedule quickly and easily, but if you require more power to manage conflicts between multiple projects and resource allocation, you'll need a more comprehensive program. Sep 94 ◐

★★★★ **Helix Express 2.0.1 (3.0), Helix Technologies, 708/465-0242, $589.** Icon-based relational-database software's improved performance makes it a serious competitor for all-Mac networks. Especially notable is its much faster speed; multiuser operation is downright snappy. Jul 94 ◐

★★★ **InfoDepot 2.0 (2.3), Chena Software, 610/770-1210, $295.** All-in-one program for project planning includes tools for brainstorming and organizing ideas; scheduling project steps; and entering, calculating, and presenting data. It does a good job but has some flaws. Jan 95

★★★★ **MarcoPolo 3.0, Mainstay, 805/484-9400, $895.** Full-featured document-management system is significantly improved. The addition of OCR—both the handling of unrecognized words and the ability to batch-process TIFF files with OCR—make it very usable. Jan 95

★★★ **MicMac 2.0v1, Nirvana Research, 408/369-1200, $89.** The concept of Mac as dictation machine is undeniably attractive, and Nirvana Research has pulled it off well. It takes lots of hard drive space to save recordings, though. Nov 94

★★★★ **Microsoft Excel 5.0, Microsoft Corp., 206/882-8080, $339.** Although the feature set of this Power Mac spreadsheet is stunningly rich, the system requirements for a full install are jaw-dropping, including 27MB of hard drive space plus 24MB of RAM without virtual memory. Still, it is relentlessly complete. Jan 95 ◐

★★★ **Microsoft Works 4.0, Microsoft Corp., 206/882-8080, $99.95.** Although this isn't the best integrated package around, it's a sensible, low-cost choice. It offers a respectable word processor, database, spreadsheet, calendar, and address book, as well as a slide-show module, and drawing and communications tools. Jan 95 ◐

★★★★ **OmniPage Professional 5.0, Caere Corp., 408/395-7000, $695.** In a historic first for OCR, this Power Mac software has an accuracy of 100 percent on good text samples. It does still make occasional baffling minor errors on real-world documents. Nov 94 ◐

★★★★ **Pablo 2.0.1 (2.0.4), Andyne Computing, 613/548-4355, $695.** This effective end-user data-reporting tool puts a considerable workload on the corporate information department, but it sidesteps the hassles of SQL data access and produces great reports with minimal effort. Jul 94

★★★ **Street Atlas USA 2.0, DeLorme Mapping, 207/865-1234, $79.** For the most part, this geographical information software delivers what it promises at a great price. Although inaccuracies in the data are troubling, DeLorme pledges to fix all reported errors in subsequent annual updates. Oct 94

★★★ **TeamFlow 3.1, CFM, 617/275-5258, $295.** Total Quality Management flowchart software is a valuable business tool. Its report printing and customizability are limited, however. Nov 94

★★★★ **TopDown 4.0 (4.1), Kaetron Software Corp., 713/298-1500, $345.** Flowcharting program's support for custom symbols and automatic drawing aids, along with its ability to let you easily create and navigate lower-level charts, make it a productive tool. Jul 94

★★★★ **ZipZapp 1.0 (2.0), True Basic, 603/298-8517, $34.** You can use this data-reference utility to find an area code, the correct spelling of a city's name, and more. The interface is intuitive, and the cost, low. Oct 94 ◐

★★★ **ZP4 12.1 (14.4), Semaphore Corp., 408/688-9200, $125.** Inexpensive bulk-mail software supports batch and individual processing, but the progress indicators are uninformative, and unattended operation requires extra work. Sep 94

COMMUNICATIONS/NETWORKS

★ **BLAST Professional, BLAST Inc., 919/542-3007, $139.** Our reviewer could not get this telecom software to work reliably and consistently during his tests, and found the minimalist and quirky interface frustrating. Jan 95

★★ **HoloGate 1.0, Information Access Technologies, 510/704-0160, $500.** Two unique features—UUCP and Usenet news distribution—are the primary reasons to consider this product. Otherwise, it comes up price-rich and feature-poor. Apr 95

★★ **The Internet Companion, The Voyager**

continues

Star Ratings

Company, 914/591-5500, $29.95. Well-written, HyperCard-based electronic book offers less information than others. Internet access is available through accompanying software, but it's a terminal-emulation screen. Dec 94

★★★★ **Internet Explorer Kit and Internet Starter Kit, Hayden Books, 317/581-3500, $29.95 each.** Well-written books and useful software combine to produce one of the best introductions to the Internet available for Mac users. Dec 94

★★★★ **Internet Membership Kit 1.0 (2.0), Ventana Media, 919/942-0220, $69.95.** If you need access to the Internet, this book and software combination is a good package. The best part about it is its included preconfigured software. Dec 94

★★★ **MicroPhone Pro 2.0 (2.1), Software Ventures Corp., 510/644-3232, $195.** The new feature set of this communications package includes multiple sessions, faxing, TCP/IP networking, and more, but it's a mixed bag. Not all the features are well integrated, although some are innovations for which users will be grateful. Oct 94

★★★★ **Netscape Navigator, Netscape Communications Corp., 415/528-2555, $39.** World Wide Web browser is well ahead of the competition in terms of features, stability, and ease of use. Although its E-mail features could use some improvement, it's the best way to surf the Net. May 95

★★★★ **NetWorks 3.0.4, Caravelle Networks Corp., 613/225-1172, $1395 to $2495.** For networks that sprawl across buildings or states, this network-monitoring utility is an indispensable tool. It continually polls devices, checking CPUs, routers, printers and hubs for signs of life. Apr 95

★ **PowerShare Collaboration Servers, Apple Computer, 408/996-1010, $999.** Before this collaboration software will be ready for prime time, Apple needs to overhaul the complex Admin application, add serious diagnostic aids, provide comprehensive documentation, and offer knowledgeable technical support at a price less than that of the program itself. Aug 94

★★★ **QuickMail 3.0, CE Software, 515/221-1801, $199 to $3799.** If you're shopping for a first-time E-mail application, this product is a good choice for ease of use and setup. The most promising new tool, rules-based messaging, lacks some important features. Jan 95

★★★ **RunShare, Run, Inc., 408/353-8423, $199 to $2499.** System extension endeavors to pump up file-transfer speeds across both local- and wide-area networks. It offers twofold to threefold throughput gains for fast Macs and large files but is less useful with small files or slow Macs. Feb 95

★★★ **Snap Mail 1.0.1, Casady & Greene, 408/484-9228, $200 to $1440.** Software will put you on the electronic-mail trail more easily and more cheaply than any competing product, if you can live with some minor (but surprising) shortcomings. Jun 94

★★ **SoftWindows 1.0, Insignia Solutions, 415/694-7600, $499.** You can run Windows software on a PowerMac with this emulation software, but although it's a viable solution, you pay the price in terms of performance, compatibility, and actual cost. Aug 94

★★ **TrafficWatch II 2.0 (2.1), Neon Software, 510/283-9771, $495.** The price of this AppleTalk traffic monitor is closer to that of full-blown network analyzers that do much more, albeit with greater complexity. Without printing, alarms, triggers, or true multiprotocol support, this product misses the mark. Jun 94

★★★★ **White Knight 12.0, The FreeSoft Company, 412/846-2700, $139.** While this telecom software can be bewildering, it works impressively well. If you're willing to read the manual from cover to cover, the program may become your favorite telecom tool. Nov 94

DESKTOP PUBLISHING

★★ **CheckPost 1.3, Working Software, 408/423-5696, $89.95.** Interface aside, this imagesetter-simulation software is generally disappointing. It can't automatically scale pages, it prints on a single sheet, and its error reporting is limited. Nov 94

★★★ **ClickBook 1.1 (1.2), BookMaker Corp., 415/354-8161, $69.95.** If you need to create inexpensive booklets quickly and without hassle, this print utility that helps you format documents in double-sided booklet form is an excellent tool. Nov 94

★★★ **Download Mechanic 1.0.2 (1.5), Acquired Knowledge, 619/587-4668, $249.** The strengths of this PostScript downloader lie in its tools for dealing with problem files, but when dealing with large files, it performs slowly and occasionally crashes. Feb 95

★★★★ **FontChameleon 1.0.1 (1.5), Ares Software Corp., 415/578-9090, $295.** Font utility introduces a new font-creation technology; it builds serif and sans serif fonts from a master outline file. It offers high-quality renditions of popular fonts, plus the ability to customize fonts. Sep 94

★★★ **FontMixer 1.0, Monotype Typography, 312/855-1440, $79.** Although a tad expensive for a one-trick pony, this font utility is a straightforward, relatively painless way to mix characters from different fonts to create composite fonts. Oct 94

★★★★ **Fontographer 4.0.4 (4.1), Macromedia, 415/252-2000, $495.** No other font editor does more or works better than this one. For the price of a few font families, it can give you a universe of unique faces. Oct 94

★★★★ **LaserCheck 1.0, Systems of Merritt, 334/660-1240, $199.** Imagesetter-simulation software can save you hundreds of dollars, and many hours, on image-setting jobs by letting you use a laser printer to proof your work. Nov 94

★★★★ **Let'er RIP 2.0 (2.0.1), Lupin Software, 916/756-7267, $239.** The flexibility, clean implementation, and attention to detail of this PostScript downloader make it a pleasure to use. Feb 95

★★★★ **PageTools 1.0, Extensis Corp., 503/274-2020, $129.** Collection of ten PageMaker Additions is packed with utility. Many users will find the PageAlign, PagePrinter, and PageRulers Additions alone worth the price, and the others frosting on the cake. Dec 94

★★★ **ReadySetGo 6.0.2, Manhattan Graphics Corp., 914/725-2048, $395.** There's no strong reason not to use this destop publishing software if its tools meet your needs, but there's no compelling reason to choose it, either. Its low price is nice, but not enough. Oct 94

EDUCATION/ENTERTAINMENT

★★★★ **3D Atlas 1.1, EA World, 415/571-7171, $79.95.** Well-designed atlas enriches map data with narration, photos, and QuickTime movies. May 95

★★★★★ **A.D.A.M. The Inside Story, A.D.A.M. Software, 404/980-0888, $79.95.** Multimedia anatomy CD-ROM teaches basic anatomy and physiology with a tantalizing mix of sound, graphics, and animation. If you are the least bit interested in learning more about how the human body works, buy this program. Mar 95

★★★ **Aquazone 1.0, Inago, 416/487-4005, $59.** The fish in this aquarium simulation are beautiful, but they're darned hard to keep alive. Only two varieties of fish are included. Jan 95

★★★ **Creative Writer 1.0, Microsoft Corp., 206/882-8080, $49.95.** Graphics/page-layout/word-processor hybrid offers some terrific type effects, zany sounds, and bright graphics. While it doesn't teach kids to be better writers, it does encourage them to develop ideas and provides a fun vehicle to express those ideas creatively. Sep 94

★★★★ **Crossword Wizard 1.0, Cogix Corp., 415/454-7217, $49.95.** If you're a crossword fan, this crossword-puzzle generator is a must. Although it's not perfect, the play mechanics are fantastic. Dec 94

★★★ **The Cruncher, Davidson & Associates, 310/793-0600, $59.95.** If you want to teach a child spreadsheet basics, this combination educational spreadsheet and business application will do the job. It's creative and easy to use, but slow. Aug 94

★★★★ **Crystal Crazy, Casady & Greene, 408/484-9228, $49.95.** Ultraglossy, superpolished version of the classic Crystal Quest is challenging and fun without being overly difficult. Each level retains some old elements, and adds some new ones to keep you on your toes. Jun 94

★★★ **CyberBoogie, Times Mirror Multimedia, 314/531-2503, $49.95.** The easy interface, bouncy songs, and cute graphics of this children's animation software make it a good choice for very young kids, but its relative lack of features restricts it to the same group. Apr 95

★★★ **Firefall Arcade 1.0 (1.0.2), Inline Software, 617/935-1515, $49.95.** If you loved the classic video game Centipede, or are just looking for a fun shoot-'em-up, this arcade-style game will satisfy. Jun 94

★★★★ **Grolier Multimedia Encyclopedia, Grolier Electronic Publishing, 203/797-3530, $395.** CD-ROM encyclopedia has excellent search capabilities, weighs much less than a shelf of books, and is lots of fun. Its timeliness and some hierarchical snafus were slight problems. Jul 94

★★★ **Kids World, Bit Jugglers, 415/968-3908, $30.** Although the painting tools could be more robust, this screen-saver-creation tool for kids is easy to use, cleverly designed, and can keep kids busy for hours. Mar 95

★★★★ **SimCity 2000, Maxis Software, 510/254-9700, $54.95.** In essence, your goal with this marvelous city-simulation software is to build a city and run it successfully. The game is fascinatingly complex, but it's simple to use, and the elaborate graphics are so lovely that it's even fun just to watch. Jun 94

★★★ **Small Blue Planet 2.0 (2.0.1), Now What? Software, 415/885-1689, $59.95.** The satellite photos of this atlas are truly dazzling, although the interface is less than world class. May 95

★★★★ **Spin Doctor (1.0), Callisto Corp., 508/655-0707, $59.95.** In the tradition of the best Macintosh games, this game tests your wits and reflexes alike. It's part strategy game, part kinetic sculpture. Jun 94

★★★★ **Storybook Weaver Deluxe 1.0, MECC, 612/569-1500, $69.95.** Hooray for applications that encourage kids to be creative! This one lets them combine pictures, sounds, and words to make their own storybooks. May 95

★★★★ **WarPlanes 1.0, Maris Software, 800/336-0185, $69.** Wonderful multimedia CD-ROM tours the post-WWII era in military aviation. As well as pictures and text, it includes rotatable models of aircraft, an extensive database, campaign maps, historical narration, live combat audio, and three flight simulators. Mar 95

★★★★ **Widget Workshop, Maxis Software, 510/254-9700, $44.95.** Fiendishly clever mad scientist's laboratory allows you to build Rube Goldberg–style widgets

out of metronomes, switches, light bulbs, and much more. It encourages imagination and exploration, plus kids think its cool. Apr 95

FINANCE/ACCOUNTING

★★ **Financial Competence 1.5, Competence Software, 603/435-5098, $99.** Business economics tutorial explains how financial statements are compiled and how they relate to each other. Jul 94

★★★ **MacMoney 4.01 (4.02), Survivor Software, 310/410-9527, $89.95.** Personal-finance software has new and improved features that will please longtime users, but it hasn't kept up with the leaders in the field and won't win many new converts. Jul 94

★★★ **Managing Your Money 6.0, MECA Software, 203/255-1441, $79.95.** Personal-finance program does a good if somewhat roundabout job of keeping track of your total financial picture. Although it isn't as easy to use as the competition, it excels in tax, investment, and financial planning. Jun 94

★★★★ **M.Y.O.B. 5.0, BestWare, 201/586-2200, $139; $239 w/payroll.** A well-designed interface makes double-entry accounting easy enough for anyone to do. And—for those small-business owners who are keeping an eye on the bottom line—the price is right. May 95

★★★★ **Quicken 5.0, Intuit, 415/322-0573, $49.95.** The addition of a calendar and new ease-of-use features keep this personal finance software comfortably ahead of the pack. This upgrade is an incremental, but still welcome, improvement over an already excellent product. Feb 95

★★★ **StreetSmart 1.0, Charles Schwab & Company, 800/334-4455, $59.** If Schwab is where you want your investments held, and if you want to have tighter control over your portfolio and save on brokerage fees, you should seriously consider this financial investment software. Feb 95

GRAPHICS

★★★★ **Adobe Dimensions 2.0, Adobe Systems, 415/961-4400, $199.** 3-D effects software has added color support, as well as drawing and text tools. Its ability to create resolution-independent 3-D images and map two-dimensional art earn Dimensions a place on a designer's hard drive. Apr 95

★★★★ **Adobe Illustrator 5.5, Adobe Systems, 415/961-4400, $595.** Despite slight speed disappointments, this draw program's upgrade is a bargain. It includes more than 200 tile patterns, 220 fonts, and the Acrobat Distiller and Exchange utilities. Sep 94

★★★★ **Adobe Photoshop 3.0, Adobe Systems, 415/961-4400, $895.** Image-editing program both broadens its capabilities and simplifies its work environment in this dynamic upgrade. While not perfect, the pros far outweigh the cons. Jan 95

★★ **Art Explorer 1.0, Aldus Consumer Division, 206/628-2749, $49.95.** While its cartoon style is refreshing and its features promising, this paint/draw program for kids 8 to 12 years old is still rough around the edges. Its biggest limitation is that it's unusably slow on 68030 Macs. Feb 95

★★★★ **Blueprint 5.0, Graphsoft, 410/290-5114, $295.** For plain old 2-D drafting, this CAD software has a rich, easy-to-use feature set and is admirably fast. The Power Mac version in particular is a first choice for large architectural or engineering diagrams. Jan 95

★★★ **ClarisDraw 1.0 (1.0v2), Claris Corp., 408/727-8227, $399.** For presentations without grand artistic pretensions, this draw program can be an effective tool. Considering the wobbliness of some of its features, however, $400 may be too much to pay. Jan 95

★★★ **Dabbler 1.0, Fractal Design Corp., 408/688-5300, $99.** Art-education and paint software provides an excellent paint set with an appealing if slightly quirky interface, at a great price. Nov 94

★★★★ **DeBabelizer Lite 1.0 (1.1), Equilibrium Technologies, 415/332-4343, $129.** Terrific graphics utility converts graphics files from one format to another. It offers a choice selection of capabilities at a nice, slim price. Aug 94

★★★★ **ElectricImage Animation System 2.0 (2.1), Electric Image, 818/577-1627, $7495.** Although the price may seem incredibly high, this software, with its extraordinary animation and image-rendering capabilities, is worth every penny for cinematic-production professionals. Dec 94

★★★ **Flying Colors, Davidson & Associates, 310/793-0600, $59.95.** While not the most dynamic kids' program, this paint/draw program provides easy-to-use tools and nicely drawn stamps for ages eight to adult. Feb 95

★★★★ **IntelliDraw 2.0 (2.0.1), Adobe Systems, 415/961-4400, $99.99.** Wonderful general-purpose graphics package works well, does a great job of automating drawing tasks, and is straightforward. Despite its breadth of features, it always feels approachable. Sep 94

★★★ **Koyn Fractal Studio 2.02 (2.1), Koyn Software, 314/878-9125, $119.95.** Software lets you generate beautiful fractals of your own design. It's a reasonable choice if you are interested in Sierpinski triangles or naturalistic forms, but it's not an all-fractals-for-all-people program. Aug 94

★★★★ **KPT Bryce 1.0 (1.1), HSC Software, 805/566-6200, $199.** For less than $200, you get a remarkable 3-D landscape-rendering program, a CD-ROM full of images, a slide-show utility, and even some screen-saver modules. Although the innovative, graphics-heavy interface can be confusing, this software is lots of fun. Dec 94

★★★ **Live Picture 1.5.5, HSC Software, 805/566-6200, $995.** At its core, this image editor is a promising program rather rudely assembled atop some marvelous technology. Though fast and blessed with all the benefits of a proxy-based system, its day-to-day functions leave plenty of room for improvement. Dec 94

★★★★ **LogoMotion 1.0 (1.5), Specular International, 413/253-3100, $149.** Easy-to-use 3-D package is eminently affordable. It's a terrific program, both for creating flying logos and as an entry-level 3-D package for nonprofessionals. Nov 94

★★★★ **MacDraft 4.0, Innovative Data Design, 510/680-6818, $449.** Report-links to Excel and a clean interface make this 2-D CAD software an excellent choice for use in mechanical engineering and construction. Plus, it's easy to learn. Mar 95

★★★★ **Macromedia FreeHand 5.0, Macromedia, 415/252-2000, $595.** The new version of this venerable program has not only kept pace with the competition but has also added unique features of its own. Although the interface is more cluttered than ever, the wealth of new capabilities make this the drawing program to buy. May 95

★★★★ **MetaFlo', The Valis Group, 415/435-5404, $595.** Graphics utility yields interesting visual effects with a minimum of fuss. It imparts elasticity to 2-D images, letting you push and pull collections of pixels while retaining the visual integrity of the image. Aug 94

★★★★ **MiniCad 5, Graphsoft, 410/290-5114, $795.** Excellent CAD software for the Power Mac offers major performance for its price. It's admirably easy to learn. Nov 94

★★★★★ **Painter 3, Fractal Design Corp., 408/688-8800, $499.** Image-creation program has achieved a rare state of perfection, balancing enhanced conventional controls with spectacular effects packaged inside a tidy interface. It offers a new level of usability and genuine practicality. Apr 95

★★★★ **PhotoEnhancer 1.0, PictureWorks, 510/855-2001, $129.** Nifty utility provides dozens of ways to improve the quality of QuickTake photos, from sharpening or softening focus to correcting over- or underexposed shots. Apr 95

★★★ **PhotoMatic 1.01 (2.0), DayStar Digital, 404/967-2077, $199.** AppleScript-based utility lets you automate tasks in Adobe Photoshop 2.5.1 or later. Although it's limited, it can relieve you of some mundane chores. Nov 94

★★★★ **Pixar Typestry 2.1, Pixar, 510/236-4000, $299.** With QuickDraw GX support, an approachable interface, a strong array of animation features, and outstanding image quality, this 3-D type-effects software is worth a try. It adds a new dimension to the way you look at type. Feb 95

★★★★ **PixelPaint Pro 3.01, Pixel Resources, 404/449-4947, $379.** Color paint program strikes a good balance between the artistic demands of painting and the technical precision of image processing. Mar 95

★★★ **Pointillist (2.0), Pictor GraFX, 310/865-0495, $79.95.** Stereogram software creates images that look, at first glance, like random dots, but as you focus beyond the page, a 3-D image emerges from the pattern and appears to hover inches in front of the background. It's gleefully wacky. Jul 94

★★★ **Ray Dream Designer 3.1.1, Ray Dream, 415/960-0768, $349.** 3-D graphics program provides competent (if sometimes awkward) modeling tools, offers excellent surface-texturing capabilities, and produces high-quality ray-traced renderings. Mar 95

★★★ **ScanPrepPro 1.2 (2.0), ImageXpress, 404/564-9924, $695.** Adobe Photoshop add-on automates the scanning and image-massaging process and produces good results, although the program is somewhat unstable. Nov 94

★★★★ **Scenery Animator 1.0.4 (1.1), Natural Graphics, 916/624-1436, $149.** Landscape rendering and animation software uses U.S. Geographical Survey data to create remarkably realistic 3-D representations of terrain. Its flaws are few, and our reviewer recommends it. Aug 94

★★★ **Specular Collage 2.0.1, Specular International, 413/253-3100, $399.** Practical image-compositing solution supplies a smooth interface and strong support for Adobe Photoshop 3.0. As long as you're willing to return to Photoshop to confirm your edits and make final changes, it's a serviceable tool. Feb 95

★★★ **Terrazzo 1.0, Xaos Tools, 415/487-7000, $199.** Turning a random group of pixels into a geometric pattern may not be everyone's consuming passion, but this plug-in graphic-effects module has definite appeal for a select niche of fabric, graphic, and video designers. Nov 94

★★★★ **TextureScape 1.5, Specular International, 413/253-3100, $195.** Algorithmic art program lets you manipulate and arrange PostScript shapes to create seamlessly repeating patterns. Like the best tools, it's simple enough to be fun and flexible enough to give you meaning-

continues

Star Ratings

ful control. Feb 95

★★★ **Typestry 2.0 (2.1), Pixar, 510/236-4000, $299.** An approachable interface, animation support, and outstanding Renderman rendering technology make this 3-D type-renderer a popular choice. This version improves on the original, but still lacks canned positioning effects. Jun 94

★★★★ **TypeTwister 1.0, Adobe Systems, 415/961-4400, $29.99.** Inexpensive, easy-to-use, and fun type styler lets you create wildly styled text effects, although it won't satisfy hard-core type manipulators. Jan 95

★★★ **Virtus WalkThrough Pro 2.0, Virtus Corp., 919/467-9700, $495.** Aside from occasional stumbles, this design tool is an exceptional program that lets you quickly and intuitively interact with your designs and gives clients the opportunity to visit and explore your creations before they are built. Apr 95

★★★ **Vistapro 3.0, Virtual Reality Laboratories, 805/545-8515, $149.95.** 3-D landscape rendering software uses digital versions of U. S. Geological Survey maps to create images and allows you to add external features such as buildings and rivers. Although it's a good program, it has some limitations. Feb 95

MATH/SCIENCE

★★★★ **Chamber Works 1.0.2 (1.1), OnScreen Science, 617/776-6416, $99.** Simulator for particle-physics events is the best introduction to particle physics yet produced, at a great price. Dec 94

★★★★ **JMP 3.0 (3.1), SAS Institute, 919/677-8000, $695.** This statistics software can be used for a wide range of biological, chemical, and physical-science investigations. New features include floating tool palettes, an annotation tool for data tables, and an experimental-design module. Sep 94

★★★ **Kekulé 1.1, PSI International, 410/821-5980, $495.** Science software reads scanned chemical-structure drawings and interprets them, giving both a diagram for checking interpretation accuracy and a formal string representation of the structure. Nov 94

★★★★ **LabView for Mac 3.0.1 (3.1), National Instruments, 512/338-9119, $1995.** For large-scale, demanding projects in data acquisition and analysis, this scientific software is an unchallenged standard. Jul 94

★★★ **Maple V 3.0, Waterloo Maple Software, 519/747-2373, $795.** If you prefer to do your own programming and function creation, you'll benefit from this symbolic mathematics software's efficient use of your Mac's resources. This version hits most of the points on your symbolic-math wish list. Oct 94

★★★★ **MATLAB 4.1 (4.2c), The Math Works, 508/653-1415, $1695.** Relatively expensive numerical math software has added nearly 100 new graphics commands, improved its treatment of sparse matrices, and added commands for sound processing. Its toolboxes make it a first choice for many applied-science specialties. Nov 94

★★★★ **MLab, Civilized Software, 301/652-4714, $1495.** Mathematical-modeling software lets you do fast computation on numerically complex real-world problems, using an ancient Mac II or higher. You must be willing to write short programs, but professional researchers will find it a rewarding choice. Apr 95

★★★★ **Resampling Stats 1.0, Resampling Stats, Inc., 703/522-2713, $225.** Innovative statistics software has proved itself to be a superior teaching tool in numerous classroom tests. If you have any interest in statistics, you should give this admirably straightforward approach careful consideration. Jun 94

★★★★ **SerePlot 2.12, Scientfic Visions, 301/593-0317, $135.** If you have piles of data and don't need animated, exploding bar-charts in 24-bit color, this scriptable plotting software should be part of your analysis tool kit. Jun 94

★★★★ **Spyglass Plot 1.0 (1.01), Spyglass, 217/355-6000, $295.** This scientific-charting software is the first choice for serious large-set plot crunching. Oct 94

★★★★ **Statistica/Mac 4.1, StatSoft, 918/583-4149, $695.** At present, this statistical software is the undisputed features-per-dollar champion in the Mac market. Mar 95

★★★★ **SuperScope II 1.25 (1.4), GW Instruments, 617/625-4096, $1490.** Despite a relatively small instrument library, this laboratory data-acquisition software effectively covers a wide range of needs, and learning to use it won't become your life's work. Oct 94

★★★★ **Survival Tools 1.0 (1.1), Abacus Concepts, 510/540-1949, $295.** The combination of survival analysis with the StatView template systems gives you a virtual actuary-in-a-box. It's a great set of tools, conveniently packaged. Feb 95

ORGANIZATION/PRODUCTIVITY

★★★ **ACT 2.0, Symantec Corp., 503/334-6054, $249.95.** Contact manager's file-level compatibility with DOS and Windows and its complete contact management make it worth considering if you can live with its weak scheduling functions. Mar 95

★★★★ **Arrange 2.0, Common Knowledge, 415/325-9900, $349.** If your needs fall beyond the usual calendar and address-book functions, this personal information manager is a strong contender. It now has more calendar functions and print options. Dec 94

★★★ **Claris Organizer 1.0 (1.0v2), Claris Corp., 408/727-8227, $99.** New personal information manager users, lured by the low price, good performance, and ease of use of this product, will find that it meets their needs. Most longtime PIM users won't be tempted to switch. Jan 95

★★ **ClienTrac 2.0, Whiskey Hill Software, 415/851-8702, $99.** It's easy to enter contact information, but this PIM is slim on speed, features, and flexibility. May 95

★★★★ **DateBook & TouchBase Pro Bundle 4.0, Adobe Systems, 415/961-4400, $89.99.** Personal information manager package is now easier to use and offers many new features. The excellent linking between contacts and calendar is the most significant feature. Sep 94

★★★ **DateView 1.0.1 (1.0.2), Prairie Group, 515/225-3720, $69.95.** If you're willing to sacrifice some features to get simplicity and speed, this calendar/to-do manager makes sense. It integrates with the contact manager, InTouch. Aug 94

★★★ **Day-to-Day Organizer 1.0, Portfolio Software, 802/434-6400, $149.95.** The address-book and outlining components of this organizer are great, but overall, it's a mixed bag. The calendar interface and the way it handles recurring events need to be improved. May 95

★★★ **Dynodex for Macintosh 3.5 (3.5.2), Portfolio Software, 802/434-6400, $69.95.** Although this program doesn't currently link to a calendar, it is an excellent contact manager. This upgrade has a few new features, improved performance, and an easier-to-use interface. Sep 94

★★★ **Expresso 1.0, Berkeley Systems, 510/540-5535, $69.99.** The just-the-basics approach of this calendar and address book might be just fine for people who don't need the feature set of other calendar programs and enjoy its graphics. Apr 95

★★★ **FastPace Instant Contact 1.0 (1.1), Attain Corp., 617/776-1110, $39.99.** Although this contact manager could use a few additional features—especially a menu-bar search function—it does a capable job, and it is intuitive and easy to use. Jan 95

★★★ **First Things First Proactive 1.1, Visionary Software, 503/246-6200, $149.** Capable scheduling program has some convenient features. It's worth a look if you don't have to share information with a contact manager. Nov 94

★★★★ **In Control 3.0.4 (3.0.7), Attain Corp., 617/776-1110, $85.** Excellent to-do-list manager and outliner, coupled with a good calendar is a strong choice if you live and die by to-do lists. Oct 94

★★★★ **Now Contact and Now Up-to-Date 3.0, Now Software, 503/274-2800, $99.** Taken together, this contact manager and calendar provide a set of solid, reliable tools for keeping your life in order. Users who need to share information over a network may find it close to ideal. Apr 95

★★ **Souvenir 2.2, ComposeTel, 415/327-0744, $49.** While this contact manager is fast and simple, it's hard to recommend it when you can buy integrated contact managers and schedulers for about the same price. Dec 94

★★★ **TimeSquare 1.0 (1.0.6), Team Building Technologies, 514/278-3010, $129.95.** Fast, flexible, network calendar program has lots of handy features, but it's missing a few as well, such as multiday events and label grouping. Aug 94

PRESENTATION TOOLS

★★★★ **Adobe Premiere 4.0 (4.0.1), Adobe Systems, 415/961-4400, $795.** Video-editing software for the Power Mac remains as solid and reliable as previous versions, and also advances far and above its competitors with new and improved professional-level features. With the right hardware, it can give desktop-video editors broadcast-quality products with a minimum of compromises. Dec 94

★★★ **Amazing Animation 1.0, Claris Corp., 408/727-8227, $49.** Cute pictures, funny sounds, and a kid-friendly interface come together in this package that lets children produce short animations or interactive presentations. The canned animations and scenes grow tiresome, however. Jan 95

★★ **Animation Master 2.0.5 (2.09), Hash Inc., 206/750-0042, $699.** Although this animation software packs extraordinary power at a reasonable price, it's difficult to learn and prone to instability. Oct 94

★★★ **Deck II 2.1, OSC, 415/252-0460, $399.** AV Macs turn into digital-audio workstations with this software that enables you to record, mix, modify, and play back CD-quality sound. It doesn't include equalization features. Jun 94

★★★ **Electronic Marker 1.0.2, Consumer Technology Northwest, 503/643-1662, $34.95.** This annotation tool can be a practical enhancement to live demonstrations and on-screen presentations, but it needs better controls for modifying and preserving markup layers. May 95

★★★★ **FlipBook 1.0, S. H. Pierce, 617/338-2222, $89.** Animation printing utility lets users make flipbooks (consisting of a series of printed images that through

continues

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MACWORLD

Star Ratings

the application of an extremely technical thumb-and-forefinger method, appear to move) out of QuickTime movies, PICS animations, and Scrapbook files. Jun 94

★★★ **HyperCard 2.2, Apple Computer, 408/996-1010, $249.** Authoring tool strikes a good balance between power and ease of use, and its price is reasonable. It may not satisfy all your wishes, but it should keep you happily building stacks. Sep 94

★★ **Living Album 2.5, QuickMedia Labs, 408/749-9200, $129.95.** A crowded interface detracts from the usefulness—and aesthetics—of this multimedia album. May 95

★★★★ **Macromedia Director 4.0 (4.04), Macromedia, 415/252-2000, $1195.** Although this multimedia program remains far from easy to use, this admirable upgrade increases the program's power and improves its interface. Multimedia professionals will continue to find it the best package available. Sep 94

★★★ **Microsoft PowerPoint 4.0, Microsoft Corp., 206/882-8080, $339.** If you're in the market for a presentation-graphics program, this is a good choice to use along with Word or Excel, as long as you don't mind the lack of animation functions. For general purposes, though, other alternatives have the edge. Feb 95

★★ **MovieWorks 2.0.2, Interactive Solutions, 415/377-0136, $295.** With diligence you can get decent results with this all-in-one QuickTime-based multimedia package. But other entry-level programs make leaping into multimedia easier and more rewarding. Sep 94

★★ **mPower 2.0, Multimedia Design Corp., 704/523-9493, $295.** Despite a handful of sophisticated multimedia features, this authoring tool is too limited to be compelling. While its push-button interface is easy to understand, it's far too cumbersome. Apr 95

★★★ **The Multimedia Workshop, Davidson & Associates, 310/793-0600, $79.95.** Children or adults can use this media-integration tool without big investments of either time or money. It's full of compromises, though, such as the inability to layer narration over music. Nov 94

★★★★ **Persuasion 3.0, Adobe Systems, 206/622-5500, $495.** Users have plenty of new features to cheer about, including improved tool palettes, extensive charting options, and hypertext functions with this presentation graphics program's upgrade. High memory and disk-space requirements are drawbacks. Sep 94

★★★★ **Presenter Professional 3.0, VIDI, 818/358-3936, $1995.** The improved interface, enhanced animation module, and reduced price of this 3-D modeling and animation package make it an excellent choice for multimedia producers. The new audio features are especially appealing. May 95

★★★ **SoundEdit 16, Macromedia, 415/252-2000, $379.** Digital audio software supports 16-bit sound and has enough goodies to earn it a place in a multimedia producer's toolbox. But its lack of record-level controls limits its usefulness as a professional audio tool. Dec 94

★★ **Special Delivery 2.0, Interactive Media Corp., 415/948-0745, $399.** Multimedia authoring tool can be confusing and isn't the best choice for complex projects. Still, it may save hours of training for users who merely need to create simple presentations. Apr 95

★★★★ **SuperCard 1.7.1 (2.0), Allegiant Technologies, 619/587-0500, $495.** Multimedia authoring system adds a few welcome enhancements, including QuickTime support, and squashes some old bugs. For current users, the upgrade is well worth the price; for others, it's an excellent alternative to more expensive authoring systems. Feb 95

PROGRAMMING

★★★★ **IDL 3.5 (3.6), Research Systems, 303/786-9900, $1500.** In this shockingly powerful, compact, graphics-oriented, interpreted language, a single command is worth a page of C-language code. If you're an image processing professional, you should consider adding IDL to your tool kit. Oct 94

★★ **ScriptWizard 1.0, Full Moon Software, 408/253-7199, $99.** Software attempts to make writing and debugging AppleScript scripts easier but doesn't offer enough improvement over Apple's Script Editor. Jan 95

★★★ **VIP BASIC 1.0.1 (1.0.3), Mainstay, 805/484-9400, $295.** Programming language lets programmers who know only BASIC get started producing real, if interpreted, Mac programs. It's a serious developer's tool, though it's not on the same footing as VIP-C. Jun 94

★★★★ **VIP-C 1.5 (1.5.1), Mainstay, 805/484-9400, $495.** For convenience in producing 680X0/Power Macintosh applications, this programming utility is a fine investment. Intermediate to advanced users will get the most benefit, but even beginners will find that it helps turn student projects into serious apps. Feb 95

UTILITIES

★★ **Apple Personal Diagnostics 1.0 (1.1), Apple Computer, 408/996-1010, $129.** In trying to make a hardware tool for the rest of us, Apple has come up short. This hardware-diagnostics utility has an uneven manual, some less than thorough tests, and a surprisingly unsatisfying interface. Nov 94

★★★★ **Automap Road Atlas for Macintosh 2.01 (2.04), Automap, 206/455-3552, $99.95.** Mapping software tells you how to get where you're going better than any other map or software our reviewer has seen. Although screen redraw is slow, it's worth it for the written directions and maps. Jul 94

★★★★ **Cal 1.0, Thought I Could, 212/673-9724, $79.95.** Well-chosen set of desktop necessities includes an excellent calculator, an associated-formula editor, a datebook, and a calendar. Due to its easy access and ample power, this software has become an everyday tool for our reviewer. Jan 95

★★★ **CanOpener 3.0, Abbott Systems, 914/747-4171, $125.** You can use this handy utility to open many types of files—which can be a lifesaver if you don't have the application a file was created in—but it falls a little short in the file-search department. May 95

★★★★★ **Conflict Catcher II 2.1.1, Casady & Greene, 408/484-9228, $79.95.** Customizable, fast, and safe extension-management utility goes well beyond the basics. For Power Macintosh users, it even tells which extensions aren't written in native code and are likely to slow down Power Macs. Oct 94

★★★★ **DiskGuard 1.0.1 and DiskGuard Remote, ASD Software, 909/624-2594, $129 to $799.** Rock-solid, flexible disk-protection tools are worth serious consideration if your Mac or Macs are accessible to other users. The remote version (which comes in five- and ten-user packs) adds network features, including clock synchronization. Mar 95

★★★★ **DiskTop 4.5 (4.5.2), Prairie Group, 515/225-3720, $69.95.** Organizing a crammed hard drive becomes a more manageable task with this simple but powerful file-management utility that enables you to copy, move, rename, delete, and find files—without using the Finder. Jul 94

★★★ **DragStrip 1.0, Natural Intelligence, 617/876-4876, $39.95.** Icon-based file and folder organizer brings a semblance of order to your cluttered desktop. But your troubles aren't over unless a future version lets you label folders. May 95

★★★★ **Drive7 3.0 (3.09), Casa Blanca Works, 415/461-2227, $89.95.** Highly recommended hard drive-formatting utility easily formats and partitions most drives and provides all the options you need. And within its limitations, its Mount Cache utility provides a real performance boost. Nov 94

★★★ **eDisk 2.0, Alysis Software Corp., 415/928-2895, $149.95.** Driver-level software compresses data read to your drive on the fly and automatically expands data read from your drive. It offers transparent compression. Dec 94

★★★★ **Graffiti 1.01, Palm Computing, 415/949-9560, $79.** If you can't seem to teach Newton your handwriting, you can teach yourself a new writing system that Newton can handle. Kind of makes you wonder who's running the show, but it works. May 95

★★★★ **Icon Mania 1.0 (1.02), Dubl-Click Software, 503/317-0355, $69.95.** Delightful icon-editing utility comes with terrific tools for building new icons, including an outstanding thumbnail feature that builds custom icons from graphics files. Aug 94

★★★★ **Kaboom 3.0, Nova Development Corp., 818/591-9600, $49.95.** Sound-effects utility with sound-editing application is a fun program for anyone who wants to play with sound. Feb 95

★★★★ **Launch Pad 1.0, Berkeley Systems, 510/540-5535, $49.99.** If you want to share your Mac with your kids, this desktop utility is a worthwhile investment. It can even speak menu items and file names out loud for kids too young to read. Jan 95

★★★ **MacTools Pro 4.0, Symantec Corp., 503/690-8090, $149.95.** This utility does a good job of diagnosing and fixing disk problems, but suffers from large RAM requirements and expensive technical support. May 95

★★★★ **Maxima 3.0, Connectix, 415/571-5100, $99.** If you have more than 8MB of RAM, you can use some of it as a RAM disk, speeding up disk-based operations, with this inexpensive utility. Nov 94

★★★★ **MultiClip Pro 3.1, Olduvai Corp., 305/670-1112, $59.** Easy-to-use utility is exactly what Apple's Clipboard and Scrapbook should have been; a convenient repository of data that moves between documents without fuss or muss. Apr 95

★★★★ **Norton DiskDoublerPro 1.1, Symantec Corp., 503/334-6054, $109.** Utility collection includes DiskDoubler, AutoDoubler, and CopyDoubler. Because of its ease of use, the product is a good choice for beginners. Feb 95

★★★ **Norton Utilities for Macintosh 3.1, Symantec Corp., 503/334-6054, $149.95.** Data-protection and -recovery utility collection is leaner, meaner, and faster than ever before, but it's also surprisingly uneven. While Disk Doctor leads the pack for disk-repair utilities, the back-up module is weak and the new UnErase module is missing some features. Feb 95

★★★★ **Now Utilities 5.0, Now Software, 503/274-2800, $89.** Three of the modules of this fine-tuned, interlocking utility set—Now FolderMenus, Now Menus, and Now SuperBoomerang—are almost indispensable, and while the other six may not be tops in their category, they're well worth considering. As a collection, this package remains the best in the business, and it's Power Mac native. Jan 95

★★★ **PaperPower 1.0, Piptel, 513/294-**

6656, $149. Graphics-tablet utility provides a useful tool for creating and using macros, but the overlays it creates can be tricky to use. Apr 95

★★★ **Peirce Print Tools 1.0, Peirce Software, 408/244-6554, $129.** Nine handy printing utilities work with QuickDraw GX. Most of the modules are useful, but not all are must-haves. Jan 95

★★★ **PopupFolder 1.0 (1.5.1), Inline Software, 617/935-1515, $59.95.** Finder utility is so handy and easy to use, you wonder why it isn't built into the Mac's system software. On the other hand, it's sluggish when readying pop-up menus for every folder. Aug 94

★★★★ **PowerAgent 1.1 (2.0), SouthBeach Software Corp., 305/942-0605, $159.** You can revolutionize your Macintosh work with this agent program that manages scripts. It provides excellent support for FileMaker Pro, but unfortunately in many other mainstream applications scripting is difficult to implement. Nov 94

★★★★ **PowerMerge 2.0, Leader Technologies, 714/757-1787, $129.** Powerful file-management tool helps you keep individual files, folders, or entire volumes organized and up-to-date. This version lets you compare and launch documents, rename files, trash superfluous files, and lots more. Aug 94

★★★ **ProFiles 1.0, Dayna Communications, 801/269-7200, $129.** Unusual new utility lets you group related files and folders for quick access and actions such as making aliases, copying, and more. Aug 94

★★★ **RescueTxt 1.0, Abbott Systems, 914/747-3116, $79.** If you want decent performance and the ability to locate text in even a deleted file, this text-retrieval utility is a good choice. It doesn't tell you what file the text comes from, however, so you cannot simply open the found file. Apr 95

★★ **SCSI Director Pro 3.0.6 (3.1.1), Transoft Corp., 805/565-5200, $99.** Utility provides simple, one-button hard disk formatting, but when it comes to doing some of the fancy tricks described on the program's box, the going gets rough and technical support costs $1.90 per minute. Sep 94

★★★★ **Square One 2.0 (2.0.1), Binary Software, 310/449-1481, $74.** The slick design, flexibility, and straightforward interface of this file-launching utility make it a pleasure to use. Dec 94

★★★ **Stop & Go 4.0, Engram International, 415/455-1100, $69.99.** File-protection/relaunch utility uses a portion of your hard disk to save a snapshot of the data in your Mac's RAM. It's fast, and it relaunches files, applications, and extensions in a single, unified process, but it's unduly complicated. Oct 94

★★★★ **TypeTamer 1.0.4, Impossible Software, 714/470-4800, $59.95.** Versatile font utility provides information on installed fonts and simplifies tasks such as typing special characters and reselecting fonts from the menu. May 95

★★★ **UnderWare 1.0.1, Bit Jugglers, 415/968-3908, $59.95.** Inspired, silly fun for your Mac's desktop comes from a control panel that adds three features: a screen saver, desktop patterns, and animations that run on your desktop while you work. The price for this whimsy is mostly in disk space. Jun 94

★★★★ **Virex 5.5.1, Datawatch Corp., 508/988-9700, $99.95.** Comprehensive, reliable, and speedy utility helps protect your files from those misguided lads who get their jollies by releasing viruses. To keep it current, updates are available on online services. May 95

★★★★ **VirtualDisk 1.1a (2.02), Continuum Software, 503/848-7112, $79.** Rapid disk cataloging; fast, efficient label-printing; and an excellent disk-copy utility make this software a wonderful value. Jul 94

VERTICAL MARKETS

★★★ **Autoscore 1.0, Wildcat Canyon Software, 510/527-5155, $150.** Converting the human voice into MIDI note information is a challenging task. If you have the right music software, the right mike, and the right voice, this music-recognition software can actually pull it off. Feb 95

★★★ **Bird Brain 2.01, Ideaform, 515/472-7256, $99.95.** Database lets bird watchers record every sighting of every bird they have ever seen to create electronic life lists. Although it can be slow, it includes species names and other information. Jan 95

★★★ **DigiTrax 1.1, Alaska Software, 408/738-3320, $349.** If you're an amateur musician or a multimedia producer with modest sound-recording needs and you have a Quadra AV, consider this audio-recording software. What it lacks in features, it makes up for in simplicity and a relatively low price tag. Mar 95

★★★ **ErgoKnowledge 1.0, Visionary Software, 503/246-6200, $395.** Despite a few shortcomings, this CD-ROM offers a good, basic review of office-computer ergonomics. Dec 94

★★★ **MayaCalc 2.3.1 (2.3.3), Ecological Linguistics, 202/546-5862, $120.** 4th Dimension database alleviates much of the pain involved in working with the complex, multilayered Maya calendar. Although the design could be improved, it's a highly useful tool for both serious and casual Maya enthusiasts. Feb 95

★★★★ **Maya Hieroglyphic Fonts Ecological Linguistics, 202/546-5862, $10 to $60 per set.** Although these fonts based on Mesoamerican hieroglyphic scripts are beautifully rendered, the character spacing is sometimes uneven. Feb 95

★★★★ **Mayo Clinic Family Health Book, IVI Publishing, 612/996-6000, $40.95.** Medical CD-ROM for home use deals with the full gamut of health-care topics, from AIDS to zygotes, although it doesn't include any reference to alternative therapies. Sep 94

★★★ **Mayo Clinic: The Total Heart 1.0, IVI Publishing, 612/686-0779, $21.75.** Cardiovascular health and related subjects are the topics of this medical CD-ROM for home use. Although it makes liberal use of drawings, photographs, and animations, video sequences would have been more effective. Sep 94

★★★ **Medical HouseCall 1.0, Applied Medical Informatics, 801/464-6200, $99.95.** This interactive medical guide is a painless way for people to learn about diseases, tests, and therapies. Although it is easy to use and interesting, some of the images were incorrectly labeled. Feb 95

★★★ **MusicTime 2.0 (2.0.1), Passport Designs, 415/726-0280, $149.** Music-notation program is geared for hobbyists and students. If your needs aren't complex, it may fit the bill, at a great price. Oct 94

★★★★ **Overture 1.02, Opcode Systems, 415/856-3333, $495.** Easy-to-learn, midrange notation software has a friendly interface and shows real polish. If you don't need all the features of a high-end product, it's a serious contender. Apr 95

★★★ **Performer 5.02, Mark of the Unicorn, 617/576-2760, $495.** A colorful, redesigned interface and an improved sheet-music view are just part of this MIDI recording program's worthwhile overhaul. If you like the sheet-music view, then this is the product you should buy. Mar 95

★★★★ **Practica Musica 3.0 (3.1), Ars Nova Software, 206/889-0927, $140.** Music-teaching program, with emphasis on sight-reading and ear-training techniques, shines as a smart, infinitely patient personal music coach in the classroom. Jan 95

★★★ **Route 66 1.5, Route 66 Geographic Information Systems B.V., 415/957-0666, $79.95.** Jack Kerouac could have saved a lot of time if he'd used this route planner (unless he was planning to drive to Alaska, which isn't included). It's fast, but omits some cities and can't handle more than three destinations at a time. May 95

★★★ **SAM-CD, Scientific American Medicine, 212/754-0550, $395.** Despite a few shortcomings, such as the poor interface for case simulations, this medical reference work—a popular series of publications covering topics in clinical medicine—should prove a worthwhile addition to any medical library. Sep 94

★★★ **Vision 2.08, Opcode Systems, 415/856-3333, $495.** MIDI program's list of exclusive, creativity-slanted features, such as endless count off, scrubbing (which lets you hear the music as you drag across it), and subsequences, give the program a usability edge. Mar 95

★★★★ **WillMaker 5.0, Nolo Press, 510/549-1976, $69.95.** Legal software quickly and easily automates the creation of wills, health-care directives and proxies, and final-arrangements documents. Jun 94

WRITING TOOLS

★★★★ **Bookends Pro 3.1, Westing Software, 415/435-9343, $129.** Comprehensive database program catalogs and stores all of your reference material—actual quotes as well as citations. It's a useful tool that researchers will appreciate. Mar 95

★★★★ **EndNote Plus 2.0, Niles & Associates, 510/649-8176, $299.** Despite its power, this indispensable bibliography and citation manager is surprisingly easy to learn and use. If you have to work with references, it's a good choice. Apr 95

★★★ **FullWrite 2.01, Akimbo Systems, 617/776-5500, $395.** As the leanest of all high-end word processors, this product requires only 2MB of RAM. Although its modular architecture is complex, it's worth considering if you don't need to share files with the Word/WordPerfect crew. Apr 95

★★★ **Grammatik 6 for Macintosh, Novell, 801/225-5000, $49.95.** The low price, pleasant interface, and improved accuracy of this grammar checker make it worthwhile for a large number of quality-driven writers. It still misses some errors. Feb 95

★★★ **Inspiration 4.1, Inspiration Software, 503/245-9011, $195.** Writing tool allows you to move between words and diagrams to show the relationships between ideas. This version adds improved keyboard controls, import and export capability, plus more. Apr 95

★★★ **Microsoft Word 6.0, Microsoft Corp., 206/882-8080, $339.** If you can put this word processor's new features—including cross-referencing, AutoText, automatic numbering, macros and more—to work and you have a Quadra 650 or faster Mac, take the plunge. If you have a slower 68040 Mac, think twice; and if you have a 68030 Mac, don't even think about it. Feb 95

★★★ **Nisus Writer 4.0, Nisus Software, 619/481-1477, $495.** In a few specialized areas—such as mixing English and non-Romance languages, this word processing program is unmatched. However, for some high-end uses, such as table creation, it's a poor choice. Mar 95

★★ **Read-It O.C.R. Pro 5.0, Olduvai Corp.,**

continues

Star Ratings

305/670-1112, $395. Although this OCR software has a nice collection of features, its recognition engine isn't up to par. It's not a first choice unless you simply need to process piles of very clear Courier text. Apr 95

★★★ **TextBridge 2.0, Xerox Imaging Systems, 508/977-2000, $99.** Optical character recognition software is impressive on good documents and can be trained and automated. You won't find that anywhere else at this price. Sep 94

★★★★ **WriteNow 4.0.1, WordStar International, 617/494-1200, $119.95.** Tidy word processor's conservative use of memory (the application fits into a dainty 600K partition) and graceful interface will continue to win it fans. This version adds elegant table capabilities and several PowerBook-friendly features. Jun 94

★★★ **Writing Coach 1.0, WritePlace Software, 503/484-6380, $89.** If you'd like help with your writing, this writing-skills tutorial could be a great investment. Skillfully worded worksheets assist with planning, organizing, and revising. Dec 94

Hardware

INPUT DEVICES

★★★★ **ArtPad, Wacom Technology, 206/750-8882, $199.** Measuring less than 7 by 7½ inches, this pressure-sensitive tablet is sheer convenience if you're looking for a device that you can hide away one moment and readily exhume the next. Apr 95

★★★ **DrawingSlate, CalComp Digitizer Division, 714/821-2000, $395.** Digitizing tablet is a good, compact, low-cost implementation of pressure sensitivity, although the battery-operated stylus is a bit heavy. Jun 94

★★★ **Ear Phone Streamline AV, Jabra Corp., 619/622-0764, $169.** As a hands-free telephony tool—and as a replacement for the Apple PlainTalk microphone—this telephone/speech-recognition earpiece is a winner. Its biggest draw is that you can't hear other Mac sounds, such as modem tones, when it's plugged in. Jul 94

★★★★ **FlightStick Pro for Macintosh, CH Products, 619/598-2518, $129.95.** The authentic look and feel of this joystick, along with well-conceived software, make it a nearly perfect desktop pilot's companion. Dec 94

★★★★ **Mac Keyboard Deluxe, MicroSpeed, 510/490-1403, $125.** If you're in the market for a new or replacement keyboard, this one, which is both smaller and lighter than Apple's Extended Keyboard, is worth considering. It has four ADB ports. Nov 94

★★★ **Mouse Deluxe Mac, MicroSpeed, 510/490-1403, $69.** The extra buttons of this mouse offer several features that Apple's mouse doesn't match, but its shape may not suit everyone's taste. Mar 95

★★★ **QuePoint, MicroQue, 801/263-1883, $149.** Tired of shoving a mouse around? Slide your finger across this tiny input device to manipulate the cursor with a minimum of movement. May 95

★★★ **Remote Point, InterLink Electronics, 805/484-1331, $199.** Although it may not be a first choice for desktop work, this infrared pointing device is an elegant workaround for users who don't want to (or can't) be tethered to their Macs. Apr 95

★★★★ **Thinking Mouse Macintosh ADB, Kensington Microware, 415/572-2700, $139.95.** A mouse is a mouse is a mouse. Not so. This one has four programmable buttons that you can use—with the accompanying software—to automate such tasks as selecting commands or typing text. May 95

MISCELLANEOUS HARDWARE

★★★★ **AirNote 1.0 (1.1), Notable Technologies, 510/208-4400, $299.** Remote-messaging service lets you originate alphanumeric paging messages from your own computer, eliminating both dictation charges and errors in translation. It's a very handy way to get into alphanumeric paging. Dec 94

★★★ **Apple PCMCIA Expansion Module, Apple Computer, 408/996-1010, $219.** Well-integrated, well-designed unit offers 500-series users an efficient and easy albeit expensive way to add features to their PowerBooks. If you can overlook the early-adopter prices (a big if), the PC Cards are great expansion options—lightweight, low-power, and high-performance. Mar 95

★ **EAB401P Speakers, Panasonic Communications & Systems, 800/742-8086, $99.** Small, inexpensive speakers provide less-than-state-of-the-art performance. The audio is thin and reedy. Apr 95

★★ **EAB701P Speakers, Panasonic Communications & Systems, 800/742-8086, $249.** The sound of these speakers is thin and slightly harsh, although they are attractive in a high-tech sort of way. Apr 95

★★★★ **IX-4015 Color Image Scanner, Canon Computer Systems, 714/438-3000, $1169.** The price of this color flatbed scanner is competitive, and its speed and excellent bundled software make it easy to use and a good choice for the small office. If you can get by without

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legal-size scans, it should serve you well. **Jul 94**

★★★★ **MMS557, Audio-Technica USA, 216/686-2600, $149.95.** Among a huge selection of similarly priced speaker systems, these stand out as a best buy. They look good, as well as sound good. **Apr 95**

★★★★ **MultiSpin 4Xe, NEC Technologies, 708/860-9500, $515.** With its competitive price, free tech support, and two-year warranty, this quad-speed CD-ROM player is ready to race. **Feb 95**

★★ **NEC AudioTower, NEC Technologies, 800/632-4636, $99.** Looks great; sounds mediocre. Although this speaker system provides a convenient jack for an external CD drive, the sound quality is nothing to shout about. **May 95**

★★★★★ **PaperPort, Visioneer, 415/812-6400, $399.** The paperless office is actually here. This clever combination of elegant hardware and intelligent software makes it easy to capture, organize, and retrieve documents. Once a page is scanned in, you can annotate it; run it through OCR software; or print, fax, or E-mail it. **May 95**

★★★★ **Photo Engine, Radius, 408/541-6100, $1099.** Photoshop acceleration hardware's suite of four 66MHz 32-bit DSP chips offers sufficient processing power to speed up 25 Photoshop functions on the most sophisticated systems, including Power Macs. **Feb 95**

★★★★ **SCSI Sentry, APS Technologies, 816/483-6100, $79.95.** Although the price of this terminator may seem steep, this device may well be the cure for SCSI woes. Our reviewer heartily recommends it. **Sep 94**

★★★★ **TurboDialer, Micromachines, 818/901-1700, $69.95.** Automatic telephone dialer is a well-executed product, except for occasional computer noise that seeps into phone conversations. **Jul 94**

★★★★ **Vivace, Coda Music Technology, 612/937-9611, $2295.** As an intelligent and endlessly patient accompanist, this music study system for wind instruments may be the best thing that's happened to learning wind literature since the metronome. **Jan 95**

MODEMS/NETWORK HARDWARE

★★ **Cooperative Adapter, Photonics Corp., 408/955-7930, $449.** The high cost of each unit, the limitations and restrictions inherent in diffuse infrared, and the extremely low cost of traditional LocalTalk adapters and cabling make this infrared network interface an expensive niche product. **Dec 94**

★★★ **DaynaPort Pocket SCSI/Link, Dayna Communications, 801/269-7200, $299 to $369.** Inexpensive, lightweight SCSI-to-Ethernet connector works with both desktop Macs and PowerBooks and can use the Mac's ADB port as a power source. **Nov 94**

★★★ **FastSwitch 10, Grand Junction Networks, 510/252-0726, $6250.** Switched Ethernet hub is a great solution for networks that handle large amounts of data traded peer-to-peer, but if your network consists of E-mail and a file server, you probably won't see much benefit in stepping up to switched Ethernet. **Dec 94**

★★★ **OneWorld Fax, Global Village Communication, 408/523-1000, $999.** Easy-to-use network fax product lets an office share fax-sending resources without dedicating a hard drive and CPU; however, it can't receive faxes and can't queue more than one fax document at a time from a single CPU. **Aug 94**

★★★ **Pocket EtherTalk Adapter, Xircom, 805/376-9300, $349 to 399.** All-in-one SCSI-to-Ethernet connector is lightweight and works with desktop Macs and PowerBooks. **Nov 94**

★★★★ **PowerPort Mercury/PB 500 Series, Global Village Communication, 408/523-1000, $399.** Top-notch fax modem is capable of exemplary fax and data communications performance. **Nov 94**

★★★ **Spectra-Com P192mx, Bay Connection, 408/270-8070, $169.** If you must have absolute portability and AC power isn't available, this pocket data/fax modem can do the job. It's not that much smaller than a regular desktop modem, however. **Oct 94**

★★★★ **SupraFaxModem 288, Supra Corp., 503/967-2410, $274.95.** This 28,800-bps fax modem is a very good performer, and the price of admission isn't steep. Combined with fast, stable fax software and a good terminal program, it's hard to beat. **Aug 94**

★★★ **Watermark Message Central 2.0.2 (3.0), High Tide Software, 510/704-9927, $499.** If you're willing to put in a lot of effort, you'll find this highly sophisticated voice-mail system supremely flexible. It includes a specially modified modem with voice chip, as well as fax software and telecommunications software. **Jul 94**

PRINTERS

★★★★ **Apple Color StyleWriter 2400, Apple Computer, 408/996-1010, $525.** Economical, QuickDraw-based color ink-jet printer offers gorgeous color output plus fast black-and-white printing. If you don't need DOS/Windows compatibility, it's a good buy. **Apr 95**

★★★★ **LaserWriter 16/600 PS, Apple Computer, 408/996-1010, $2399.** If speed is what

continues

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Star Ratings

you need, this fine printer provides it. The price is reasonable. Mar 95

★★ **Notebook Printer II, Citizen America, 310/453-0614, $399.** If weight and size are your biggest concerns in choosing a portable printer, this thermal-fusion printer may be a good choice. If speed is at all an issue, however, other options may be preferable. Jun 94

★★★ **Phaser 140, Tektronix, 503/627-7111, $1695.** If you're looking for a capable color printer for a small workgroup, this ink-jet is a great choice. It provides only 17 resident fonts, however. Apr 95

★★★★ **PowerPrint 2.5 (2.5.2), GDT Softworks, 604/291-9121, $149.** Ingenious hardware-software combo lets you print from your Mac to almost any PC printer. It supports over 1000 printers, ranging from aging dot matrix models to the newer color ink-jet and laser printers. Sep 94

★★★ **PrimeraPro, Fargo Electronics, 612/941-9470, $1895.** The photo-realistic output of this thermal-wax and dye-sublimation printer beats that of any other printer in the price range. But with expensive consumables and slow print time, it's best suited for routine thermal-wax use and occasional dye-sub work. Jan 95

★★★ **P-Touch PC, Brother International Corp., 908/356-8880, ext. 4307, $449.95.** Versatile label printer is easy to set up and use, and produces high-quality output. The cost per label is high, though, and the documentation is weak. Sep 94

★★ **QMS ColorScript Laser 1000, QMS, 205/633-4300, $6999.** Color laser printer succeeds in combining the versatility of monochrome laser printing with attention-getting color, but if you don't need to chase rainbows right away, you might wait and see if competition drives capabilities up. Jul 94

★★★ **Silentwriter 640, NEC Technologies, 508/264-8000, $825.** With 3MB of RAM, PostScript Level 2 support, and a 6-ppm engine, this printer is a capable performer. Jun 94

★★★★ **Stylus Color, Epson America, 310/782-0770, $699.** This color ink-jet printer is no speed demon at 720-dpi resolution, you need special paper for hi-res output, and it offers no color correction. But who cares? The print quality is superb and the price is reasonable. May 95

SYSTEMS/STORAGE

★★★★ **Alacrity PM 6100, K5 Labs, 614/374-5665, $165.** Installing a clock booster is the quickest, easiest, and cheapest way to extract more power from Apple's entry-level Power Mac. Oct 94

★★★★ **Brainstorm Accelerator for the Macintosh SE, Brainstorm Products, 415/988-2900, $199.** Your SE will never be a Power Mac or even a IIsi, but if your budget won't buy a new Mac, you can't do better than this accelerator, which pushes an SE's speed to close to a Classic II's in overall performance. Mar 95

★★★ **Conley SR2 RAID System, Conley Corp., 212/682-0162, $21,995.** While RAID technology is typically praised for its fault-tolerance rather than its speed, this high-performance storage system proves that you can have both. Sep 94

★★★ **Joule System, La Cie, 503/520-9000, Price varies by component.** Plug-and-play tower lets you stack drives—including hard drives, removable media, and other modules—atop a base unit, making it easy to buy extra storage or swap modules with other Joule towers. Joule drive prices are generally slightly higher than for comparable drives, however. Feb 95

★★★★ **LC 575, Apple Computer, 408/996-1010, $1699.** For students and small-business professionals who want high power and the convenience of having everything integrated into one case, this 33MHz 68040 system is an ideal choice. Jun 94

★★★ **Newton MessagePad 110, Apple Computer, 408/996-1010, $599.** This is the personal digital assistant that Apple should have shipped in August 1993, with improved handwriting recognition, including deferred and letter-by-letter recognition. It also has more memory, longer battery life, and a more efficient design. Aug 94

★★★★ **OrangePC Model 200 Series, Orange Micro, 714/779-2772, $1139 to $3237.** If your goal is to get a Mac that runs Windows as fast as a PC, you can't get there from here. If your goal is to get business-level performance for day-in, day-out use, these PC coprocessor cards are probably your best choice. Aug 94

★★★★ **PLI Infinity 270 Turbo, PLI, 510/657-2211, $599.** This 270MB SyQuest drive is fast, reliable, and a very good product. The cost of the medium is competitive with that of optical drives. Sep 94

★★ **PowerBook 150, Apple Computer, 408/996-1010, $1449.** Fast, lightweight portable is minimalist in the extreme, with no video-out, ADB, Ethernet, or microphone. Unfortunately, the price is less minimalist, and most budget-conscious shoppers would be better off buying a used or discontinued model. Dec 94

★★★ **PowerBook 540c, Apple Computer, 408/996-1010, $4839.** The prestige PowerBook du jour, this sleek, curvy and futuristic-looking notebook makes a good computer for both on-the-road and in-the-office use. Its nonstandard battery, memory, and Ethernet ports are not ideal features, however. Oct 94

★★★★ **PowerBook Duo 280c, Apple Computer, 408/996-1010, $3759.** If you travel a lot, this notebook computer is hands down the best Mac to get. It offers close to the power of a Quadra 650 in a subnotebook. Oct 94

★★ **PowerBook Duo Dock II, Apple Computer, 408/996-1010, $969.** Apple has added Ethernet to this full-featured docking station, but installing NuBus cards is still absurdly difficult. Oct 94

★★★★ **Power Macintosh 6100/60, Apple Computer, 408/996-1010, base model $1819.** Given its price and performance, this Power Macintosh is hard to resist. This should be a system that will give you power to spare. Jun 94

★★★★★ **Power Macintosh 7100/66, Apple Computer, 408/996-1010, $2899.** Midrange Power Mac makes an outstanding workstation whose power should last for several years. The price is nothing to take lightly, but this system delivers every dollar's worth. Aug 94

★★★★ **Power Macintosh 8100/80, Apple Computer, 408/996-1010, $4249.** While this system doesn't quite offer the excellent price/performance ratio of the other available Power Macs, you should consider it if you're a high-end user moving your work over to RISC-based computing. Aug 94

★★★ **Power Macintosh 8100/110, Apple Computer, 408/996-1010, $6379.** High-end users who have invested heavily in NuBus cards can protect their investment with this top-of-the-line Power Mac. Mar 95

★★★ **Power Macintosh Upgrade Card, Apple Computer, 408/996-1010, $699.** Current 33MHz 040 machines will get the best bang for the buck with this card, which is a less expensive upgrade path than a standard motherboard replacement. However, other Macs won't realize as much of a performance gain. Oct 94

★★★★ **Quadra 630, Apple Computer, 408/996-1010, $1279.** Fast, inexpensive, expandable 33MHZ 68040 machine may be the last 680X0-based desktop Macintosh, but it's one of the best entry-level Macs ever. Nov 94

VIDEO/DISPLAY

★★★ **Apple Macintosh Display Card 24AC, Apple Computer, 408/996-1010, $1579.** 24-bit accelerated graphics card offers a satisfactory price/performance ratio, although it can't switch resolutions from the keyboard. Oct 94

★★★★ **Apple Multiple Scan 15 Display, Apple Computer, 408/996-1010, $509.** The tridot tube of this 15-inch monitor provides a sharp and accurate image, but reflects some glare. The built-in stereo speakers reproduce sound nicely. Feb 95

★★★ **Apple QuickTake 100 for Macintosh, Apple Computer, 408/996-1010, $749.** If you're in the market for a medium-quality, digital color camera that costs less than $1000, this is the best deal around. But if you're not in a hurry you may want to wait until some of the camera's more obvious problems, such as its fixed-focus lens and lack of a zoom option, are ironed out. Jul 94

★★★★ **FlexCam, VideoLabs, 612/988-0055, $595.** Small, unobtrusive desktop video camera has a flexible gooseneck for positioning. Dec 94

★★★ **L-TV Portable, Focus Enhancements, 617/938-8088, $229.99.** Sturdy, inexpensive, external TV-converter plugs into your Mac and converts video output to NTSC. Aug 94

★★★ **L-TV Pro NuBus, Focus Enhancements, 617/938-8088, $299.99.** NuBus card converts your Mac's RGB video signal to NTSC so you can use your Mac with a TV or VCR. It supports a wide range of Macs, but the image has some flicker and distortion. Aug 94

★★★★ **Multiscan 15sf, Sony Computer Peripheral Products, 408/432-0190, $499.95.** Trinitron monitor has a flat screen that displays sharp, bright, and accurate images. With good antiglare coating and adjustable image tilt, it's worth looking at. Feb 95

★★★★ **MultiSync 3V Monitor, NEC Technologies, 708/860-9500, $495.** With a bright display and great image quality, this monitor delivers a fine picture at a moderate price. Feb 95

★★★★ **Panelight ZX, Panelight Display Systems, 415/772-5800, $3995 to $4695.** LCD panel offers vivid images at a comparatively low price. It's a great choice for presenters. Mar 95

★★★ **The Presenter Plus Mac/PC, Consumer Technology Northwest, 503/643-1662, $429.** Small, external TV-converter supports output to television from most Macs with built-in video. Aug 94

★★★ **QA-350 LCD, Sharp Electronics Corp., 800/237-4277, $1995.** At less than half the cost of a typical active matrix LCD panel, this passive matrix projection panel offers an economical alternative for presenters who don't need multimedia capability. Jul 94

★★★ **QA-1500, Sharp Electronics Corp., 201/529-8731, $5795.** While this LCD panel's display is crisp and flicker-free, placing a presentation on its PC Card is cumbersome. Less expensive products are available. May 95

★★★★ **QuickCam, Connectix Corp., 415/571-5100, $149.95.** For as little as $99 (street price), this tiny, fun, easy-to-use, digital video camera lets users experiment with video input for making QuickTime movies or capturing still images. Mar 95

★★ **Tornado Graphics Card, Mirror Technologies, 612/832-5622, $699.** Inexpensive 24-bit accelerated graphics card has zoom and pan options but is relatively slow. Oct 94 m

Streetwise Shopper

SPECIAL HARDWARE AND SOFTWARE BUYING OPPORTUNITIES

Selected and edited by Charles Barrett

The following listings include both time-sensitive promotions and open-ended offers being sponsored by Macintosh vendors and their resellers. Each listing indicates which products have been awarded a star rating in *Macworld's Reviews* (products rated ★★ or lower are not eligible for inclusion), have been selected as an **Editors' Choice**, or have won a **World-Class** award. In some cases, the editorial evaluation quoted is for an earlier product version. The ◆ symbol indicates that the product is Power Mac related. Except where otherwise indicated, prices given are suggested retail prices.

When placing an order, please mention that you saw the offer in *Macworld*. Should any problems arise, contact the *Streetwise Shopper* editor by fax (415/442-0766), phone (415/978-3241), or mail (*Macworld*, 501 Second St., San Francisco, CA 94107).

Vendors and resellers desiring to have products and services included in this section are encouraged to contact the *Streetwise Shopper* editor with particulars.

BUNDLES

◆ Avid VideoShop 3.0 + ◆ LogoMotion 1.5 Avid Technology now includes a free copy of Specular International's $149 LogoMotion 3-D title and animation tool (Nov 94 ★★★★ for 680X0 version 1.0) with its $395 QuickTime video-editing program (Feb 94 ★★★ for 680X0 version 2.0). Call 800/949-2843 (option 5) for more information.

CV Link CVA 1000 + Digital Chisel 1.2 Display Tech Multimedia now includes Pierian Spring Software's $199.95 entry-level multimedia tool (Jun 95 ★★★) with its $599 CV Link CVA 1000 for connecting any Macintosh computer supporting RGB and VGA 640-by-480 output to a TV, VCR, or video projector. Available for $429. Call 510/676-9362 for more information.

◆ Macromedia FreeHand 5.0 + ◆ MacroModel + ◆ Fontographer 4.1 + ◆ Painter 3 + RenderMan Macromedia is offering a $995 Graphic Design Studio bundle that consists of its $595 FreeHand draw program (May 95 ★★★★), $895 MacroModel 3-D modeler (May 94 ★★★★), and $495 Fontographer font editor (Oct 94 ★★★★ for version 4.0.4), plus Fractal Design's $499 Painter image-creation program (Apr 95 ★★★★★) and an OEM version of Pixar's RenderMan. Call 800/288-4797 for more information.

Media 100 Suite Deal and Whole Deal Bundles Data Translation is offering two bundles that complement its $18,990 Media 100 2.0 digital video-editing system (that is, two NuBus boards, breakout I/O box, software). The $3995 Suite Deal consists of a $1495 CG character generator, $995 edit-decision list, $995 FX Option for digital video effects (includes Adobe Premiere 4.0 plug-in architecture), and a $1495 Platinum technical-support option. The $9995 Whole Deal includes the Suite Deal plus a $3995 Power Option, which provides batch digitizing and supports draft-mode video compression, and a $3995 HDR Option, for highest-resolution video. Call 508/460-1600 for more information.

Newton Enhancement Pack StarCore, the Newton software arm of Apple Computer, is offering a $149 trio of applications for extending the functionality of PDAs, including the company's MessagePad, Motorola's Marco, and Sharp's ExpertPad. The suite includes Palm Computing's $79 Graffiti 1.01 text-entry software (May 95 ★★★★); StarCore's Newton Utilities, a $49.99 collection of four customizable applications; and iambic's $49.95 Action Names for seamlessly integrating calendar and to-do functions with the names file. Call 800/708-7827 for more information.

◆ Prism GT + ◆ Painter 3 DTP Direct is offering Fractal Design's $499 Painter image-creation program (Apr 95 ★★★★★) free of charge to customers who purchase RasterOps' $1199 Prism GT 24-bit accelerated graphics-display card. Available for $999 (#5100175-111) by calling 800/890-9371. *Offer good through at least 5/15/95.*

ScanMaker III + ◆ Adobe Photoshop 3.0 + Transparency Adapter The Mac Zone is offering Microtek Lab's $699 Transparency Adapter for $148.98 to customers who purchase Microtek's $3499 ScanMaker III color flatbed scanner (see Mar 95 "Scanning beyond 24 Bits" feature), which includes an $895-value full version of the Adobe Photoshop image-editing program (Jan 95 ★★★★; 1994 World-Class), for $2598. Call 800/248-0800 to order (#01122 for ScanMaker II; #01123 for Transparency Adapter). *Transparency Adapter offer good while supplies last.*

◆ StuffIt Deluxe 3.5 + Open Sesame 1.1 + Square One 2.0 + CDU 1.0.4 + Kaboom 3.0 The Mac Zone is offering a bundle consisting of Aladdin Systems' $129.95 StuffIt Deluxe compression utility (Mar 95 ★★★★; 1994 World-Class), Charles River Analytics' $99 Finder-automation utility (May 94 ★★★ for Open Sesame 1.02), Binary Software's $74 Square One file-launching utility (Dec 94 ★★★★), the $99 CDU collection of 16 utilities (Nov 93 ★★★ for Connectix Desktop Utilities 1.0), and Nova Development's $49.95 Kaboom sound-effects utility (Feb 95 ★★★★). Available for $78.98 (#92897) by calling 800/248-0800. *Offer good while supplies last.*

COMPETITIVE UPGRADES

◆ DOS Mounter 5.0 Software Architects offers this $89 cross-platform file-transfer utility package to users of competing products, such as Apple's PC Exchange and Insignia Solutions' AccessPC utilities, for $29.95. In addition to formatting floppies, version 5.0 formats and creates both Mac and DOS partitions on higher-capacity removable media. Call 206/487-0122 for more information.

◆ Microsoft PowerPoint 4.0 MacWarehouse offers this $399 presentation-graphics program (Feb 95 ★★★; 1994 World-Class) for $129 to registered Macintosh users of Persuasion, More, Cricket Presents, CricketGraph, and DeltaGraph. Call 800/255-6227 to order (#SID 0091) and for proof-of-ownership requirements.

MultiClip Pro 3.1 Olduvai is offering this $59 clipboard utility (Apr 95 ★★★★) to registered users of any scrapbook or clipboard product (including Now Scrapbook and shareware) for $29. Call 800/548-5151 (fax 305/670-1992) to order. *Offer expires 8/30/95.*

Nisus Writer 4.0 Nisus Software is offering this $495 word processor (Mar 95 ★★★), which supports languages written with the Latin alphabet and Japanese (additional languages require $100 hardware key), for $129 to registered users of any other word processor. Call 800/890-3030 for more information. *Offer good through at least 6/15/95.*

SPECIAL DISCOUNTS/REBATES/OFFERS

Aladdin Desktop Tools 1.0 Aladdin Systems is offering this $89.95 set of seven System 7 utilities, which accelerates and streamlines basic file management and Finder activities, at an introductory price of $49.95 ($39.88 to registered owners of any Aladdin commercial or shareware product, or Victor Tan's SpeedyFinder7 shareware utility). Call 800/732-8881 for more information. *Offer expires 5/31/95.*

Business User's Guide to the Internet Global Village Communication is offering a free guide that shows how to benefit from Internet resources such as World Wide Web home pages, which offer information maintained by institutions worldwide, government archives of national and international market information, and a variety of news sources providing timely industry updates. Call 800/736-4821 for a free copy. *Offer expires 5/15/95.*

CD-ROM Online Software retailer NSI Multimedia is delivering this biweekly magazine, free of charge, by Internet E-mail. CD-ROM Online reviews popular software and provides a list of the top-ten best-selling software titles. Also features product recommendations. E-mail your name and E-mail address to **CDRmag@NSImultimedia.com** to subscribe.

◆ Poser Fractal Design is offering this $199 application for modeling human forms for an introductory price of $99. Poser models are exportable in several different formats for use with paint, illustration, and rendering applications. Call 800/297-2665 for more information. *Offer expires 8/31/95.*

Sharp JX-7000PS DTP Direct has a large inventory of these $7997 dye-sublimation thermal-transfer printers (see May 93 "Dye-Sublimation" feature) available for $2999 each. They were acquired through special arrangement with Sharp Electronics, which no longer markets them under its own name. A copy of Electronics for Imaging's $199 EFIColor Works (May 95 "The Color You Expect" feature), which is required to run the EFIColor Profile color-management software that comes with the printer, is available for $99. Call DTP Direct at 800/890-9371 for more information and to order (#6100195-111 for printer; #3300362-111 for EFIColor Works). *Offer good while supplies last.* m

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Page No.	Advertiser	Reader Srvc. No.	Phone
198	Advanced Business Center	225	800/723-8262
66	AEC Software	203	800/450-1982
40	Agfa	43	800/685-4271
62	Agfa	158	800/685-4271
124	Agfa	—	800/227-2780
8	Agio	—	800/688-2446
182-183	Alliance Peripheral Systems	62	800/874-1428
153-154	America OnLine	—	800/827-6364
120-121	American Power Conversion	72	800/788-2208
14	Anthro	—	800/325-3841
30-31	Apple Computer	—	—
42	Apple Computer	—	—
49	Apple Computer	—	—
82	Apple Computer	—	—
133	Apple Computer	—	—
184-185	BottomLine Distribution	63	800/990-5795
11	Caere Corp.	69	800/535-SCAN
22-23	Canon Inc.	109	800/962-2708
161	CD ROM Expo	—	—
127	CE Software, Inc.	170	800/523-7638
180-181	ClubMac	96	800/CLUB MAC
200-201	Computer Discount Warehouse	2	800/861-4CDW
48	Connectix	192	800/950-5880
50	Connectix	191	800/950-5880
44	Corel Corporation	78	800/836-3729
203-205	CRA Systems Inc.	20	800/375-9000
70	DataViz	79	800/780-1466
46	DayStar Digital	7	800/532-7853
24	Delphi	173	800/695-4005
21	Deneba Software	57	800/733-6322
184-185	DGR Technologies	63	800/990-5795
202	DigiCore	269	800/858-4622
198	Digital Axis	83	800/747-7555
199	Direct Connections	121	800/572-4305
190	Direct Tech	298	800/279-5520
235	Educorp	157	800/843-9497
8	Engineered Software	12	910/299-4843
188-189	Express Direct	81	800/765-0020
144-145	Fujitsu	202	800/831-4094
72	Graphsoft	46	410/290-5114
39	Hewlett Packard	11	—
80	Hewlett Packard	—	—
74	Hitachi NSA	74	800/441-4832
47	HSC Software	5	805/566-6200
12	Image Club	50	800/387-9193
109	Insignia Solutions	68	800/848-7677
28	Inspiration Software	—	800/877-4292
84-85	Iomega	76	—
BC	Kensington Microware, Ltd.	—	800/535-4242
15-18	LaCie	52	800/999-1422
194-195	Mac Bargains	70	800/619-9091
78	MacAcademy	106	800/527-1914
94-95	MacConnection	—	800/800-3333
173-178	MacMall	131	800/222-2808
196	MacProducts	65	800/347-8756
186	MacWarehouse	150	800/255-6227
168	Macworld Active Buyer Days	—	—
142	Macworld Expo	—	—
136-141	Macworld Expo—Boston	—	—
206	MegaHaus	245	800/786-1184
IFC-1	Microsoft	—	800/709-3787
150	Minolta Corporation	101	800/553-3779
52	Multimedia Design Corporation	91	800/921-9493
2-3	NEC Technologies	15	800/NEC-INFO
IBC	NEC Technologies	16	800/NEC-INFO
20	Orange Micro	33	714/779-2772
13	Peachtree Software	205	800/573-3750
76	Performance Systems International	95	800/8PSI82
27	Pinnacle Micro	115	800/553-7070
32	Polaroid	295	800/816-2611
68	Pro CD	217	800/992-3766
197	ProDirect	135	800/524-9952
29	QMS	—	800/392-7559
26	Reply Corporation	—	800/801-6898
115	Seiko Instruments	93	800/888-0817
191-193	Spin Peripherals	248	800/215-9200
51	Statsoft	99	918/583-4149
53	Strata	114	800/Strata3d
149	Strictly Business Expo	—	—
207	SuperMicro	126	800/352-3415
103	Tektronix	143	800/835-6100
6-7	Texas Instruments	266	800/527-3500
279	The Mac Zone	71	800/436-0606
10	UsrEz Software	36	800/482-4MAC
128	Viking Components	233	800/338-2361
9	Visioneer	18	800/787-7007
54-55	WordPerfect Corporation	—	800/526-7820
64	Xante Corporation	112	800/926-8839
131	Xerox Corporation	100	800/ASK-XEROX

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Page No.	Advertiser	Reader Srvc. No.
SOFTWARE		
BUSINESS		
66	AEC Software	203
28	Inspiration Software	—
IFC-1	Microsoft	—
13	Peachtree Software	205
51	Statsoft	99
54-55	WordPerfect Corporation	—
CAD/CAM		
8	Engineered Software	12
72	Graphsoft	46
CD ROM		
44	Corel Corporation	78
235	Educorp	157
68	Pro CD	217
COMMUNICATION		
70	DataViz	79
ENTERTAINMENT		
44	Corel Corporation	78
FINANCIAL		
13	Peachtree Software	205
GRAPHICS/DTP		
21	Deneba Software	57
47	HSC Software	5
12	Image Club	50
53	Strata	114
MISCELLANEOUS		
28	Inspiration Software	—
NETWORKING		
127	CE Software, Inc.	170
OCR		
11	Caere Corp.	69
ONLINE		
76	Performance Systems International	95
SECURITY		
10	UsrEz Software	36
STATISTICAL		
51	Statsoft	99
UTILITIES		
48	Connectix	192
109	Insignia Solutions	68
HARDWARE		
BOARDS		
20	Orange Micro	33
26	Reply Corporation	—
CD ROM		
235	Educorp	157
2-3	NEC Technologies	15
COMPUTER SYSTEMS		
203-205	CRA Systems Inc.	20
188-189	Express Direct	81
207	SuperMicro	126
DIGITIZERS/SCANNERS		
40	Agfa	43
62	Agfa	158
198	Digital Axis	83
32	Polaroid	295
DISPLAY		
203-205	CRA Systems Inc.	20
198	Digital Axis	83
74	Hitachi NSA	74
IBC	NEC Technologies	16
EXPANSIONS/UPGRADES		
46	DayStar Digital	7
128	Viking Components	233
FURNITURE		
8	Agio	—
HARD DISKS/STORAGE		
182-183	Alliance Peripheral Systems	62
184-185	BottomLine Distribution	63
180-181	ClubMac	96
184-185	DGR Technologies	63
199	Direct Connections	121
190	Direct Tech	298
144-145	Fujitsu	202
15-18	LaCie	52
196	MacProducts	65
206	MegaHaus	245
27	Pinnacle Micro	115
197	ProDirect	135
207	SuperMicro	126
128	Viking Components	233
INPUT DEVICES		
BC	Kensington Microware, Ltd.	—
9	Visioneer	18
MISCELLANEOUS		
120-121	American Power Conversion	72
150	Minolta Corporation	101
MULTIMEDIA		
52	Multimedia Design Corporation	91
PRINTERS		
124	Agfa	—
39	Hewlett Packard	11
80	Hewlett Packard	—
29	QMS	—
115	Seiko Instruments	93
103	Tektronix	143
6-7	Texas Instruments	266
64	Xante Corporation	112
131	Xerox Corporation	100
SECURITY		
120-121	American Power Conversion	72
VIDEO		
50	Connectix	191
SERVICES		
ON LINE		
153-154	America OnLine	—
49	Apple Computer	—
24	Delphi	173
TRADESHOWS/CONFERENCES		
161	CD ROM Expo	—
142	Macworld Expo	—
136-141	Macworld Expo—Boston	—
149	Strictly Business Expo	—
TRAINING		
78	MacAcademy	106
ACCESSORIES		
FURNITURE		
14	Anthro	—
MISCELLANEOUS		
22-23	Canon Inc.	109
MAIL ORDER		
198	Advanced Business Center	225
182-183	Alliance Peripheral Systems	62
184-185	BottomLine Distribution	63
180-181	ClubMac	96
200-201	Computer Discount Warehouse	2
184-185	DGR Technologies	63
202	DigiCore	269
199	Direct Connections	121
190	Direct Tech	298
188-189	Express Direct	81
194-195	Mac Bargains	70
94-95	MacConnection	—
173-178	MacMall	131
196	MacProducts	65
186	MacWarehouse	150
206	MegaHaus	245
197	ProDirect	135
191-193	Spin Peripherals	248
279	The Mac Zone	71

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Please answer these questions so that we may better serve you.

A. Including yourself, approximately how many people are employed at your entire work-site (i.e., employees in your office, building, or cluster of buildings)? (Check one.)
- 01 ❑ 1000+
- 02 ❑ 999 - 100
- 03 ❑ 99 - 25
- 04 ❑ Under 25

B. Which of the following computers are installed at this entire work-site? (Check all that apply.)
- 05 ❑ Apple Workgroup Servers/ Mac Quadra-series
- 06 ❑ Mac Centris-series/II-series/LC III/ Performa 600/450/SE 30
- 07 ❑ Mac LC/LC II/Performa 430/405/ 400/200/Classic-series/SE/Plus/ 512K/128K/Portable
- 08 ❑ Mac PowerBook-series/Duo-series

C. What is the total number of Macs installed at this entire work-site? (Check one.)

D. For how many Macintosh computers within this entire work-site do you have purchase involvement for products and/ or services? (Check one.)

	C	D
500+	❑ 09	❑ 15
499 - 100	❑ 10	❑ 16
99 - 50	❑ 11	❑ 17
49 - 10	❑ 12	❑ 18
9 - 1	❑ 13	❑ 19
None	❑ 14	❑ 20

E. In which ways are you ever involved in purchase decisions for Macintosh products at this entire work-site? (Check all that apply.)
- 21 ❑ Initiate/Determine need for product/capabilities/features
- 22 ❑ Evaluate, recommend, or approve brands/models
- 23 ❑ Evaluate, recommend, or approve purchase source
- 24 ❑ Authorize purchases

F. Over the next 12 months, how much will this entire work-site spend on Macintosh products and/or services? (Check one.)
- 25 ❑ $1 million or more
- 26 ❑ $999,999 – $500,000
- 27 ❑ $499,999 – $100,000
- 28 ❑ $99,999 – $50,000
- 29 ❑ $49,999 – $10,000
- 30 ❑ Under $10,000

G. Considering the entire work-site, which of the following Macintosh hardware and software products are currently installed? (Check all that apply.)
- 31 ❑ Business software (Word processing, spreadsheet, database, etc.)
- 32 ❑ Graphics/publishing software
- 33 ❑ Monitors/displays
- 34 ❑ Printers/scanners
- 35 ❑ Networking/communications hardware and/or software
- 36 ❑ Multimedia/AV hardware and/or software
- 37 ❑ Mobile computing products (PowerBooks, peripherals, software, etc.)

H. What is your primary job function? (Check one.)
- 38 ❑ Computer Reseller/VAR/VAD
- 39 ❑ MIS/DP/IS/Network Management
- 40 ❑ Engineering
- 41 ❑ R&D/Scientific
- 42 ❑ Corporate/General Management
- 43 ❑ Accounting/Finance
- 44 ❑ Marketing/Sales/PR/ Communications
- 45 ❑ Art/Design/Creative Services

Thank You!

Please print or type all information.

Title_____

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Free Product Information

1	2	3	4	5	151	152	153	154	155
6	7	8	9	10	156	157	158	159	160
11	12	13	14	15	161	162	163	164	165
16	17	18	19	20	166	167	168	169	170
21	22	23	24	25	171	172	173	174	175
26	27	28	29	30	176	177	178	179	180
31	32	33	34	35	181	182	183	184	185
36	37	38	39	40	186	187	188	189	190
41	42	43	44	45	191	192	193	194	195
46	47	48	49	50	196	197	198	199	200
51	52	53	54	55	201	202	203	204	205
56	57	58	59	60	206	207	208	209	210
61	62	63	64	65	211	212	213	214	215
66	67	68	69	70	216	217	218	219	220
71	72	73	74	75	221	222	223	224	225
76	77	78	79	80	226	227	228	229	230
81	82	83	84	85	231	232	233	234	235
86	87	88	89	90	236	237	238	239	240
91	92	93	94	95	241	242	243	244	245
96	97	98	99	100	246	247	248	249	250
101	102	103	104	105	251	252	253	254	255
106	107	108	109	110	256	257	258	259	260
111	112	113	114	115	261	262	263	264	265
116	117	118	119	120	266	267	268	269	270
121	122	123	124	125	271	272	273	274	275
126	127	128	129	130	276	277	278	279	280
131	132	133	134	135	281	282	283	284	285
136	137	138	139	140	286	287	288	289	290
141	142	143	144	145	291	292	293	294	295
146	147	148	149	150	296	297	298	299	300

Free Macworld Shopper Information

401	402	403	404	405	501	502	503	504	505
406	407	408	409	410	506	507	508	509	510
411	412	413	414	415	511	512	513	514	515
416	417	418	419	420	516	517	518	519	520
421	422	423	424	425	521	522	523	524	525
426	427	428	429	430	526	527	528	529	530
431	432	433	434	435	531	532	533	534	535
436	437	438	439	440	536	537	538	539	540
441	442	443	444	445	541	542	543	544	545
446	447	448	449	450	546	547	548	549	550
451	452	453	454	455	551	552	553	554	555
456	457	458	459	460	556	557	558	559	560
461	462	463	464	465	561	562	563	564	565
466	467	468	469	470	566	567	568	569	570
471	472	473	474	475	571	572	573	574	575
476	477	478	479	480	576	577	578	579	580
481	482	483	484	485	581	582	583	584	585
486	487	488	489	490	586	587	588	589	590
491	492	493	494	495	591	592	593	594	595
496	497	498	499	500	596	597	598	599	600

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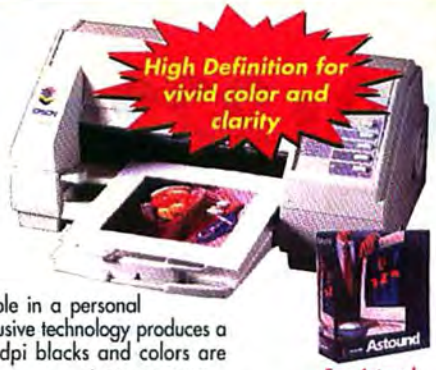

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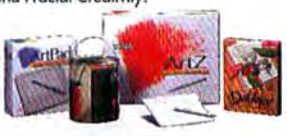

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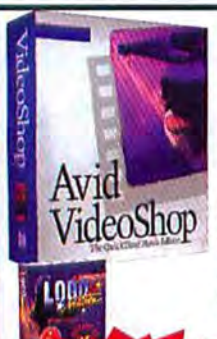

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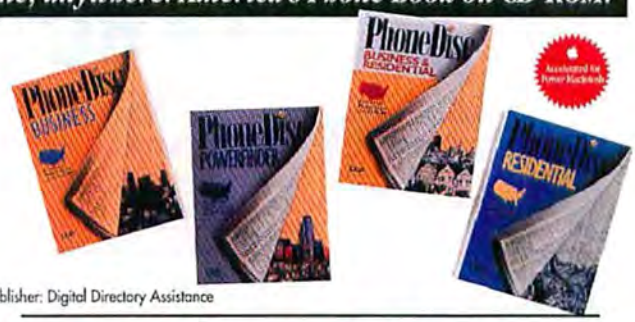

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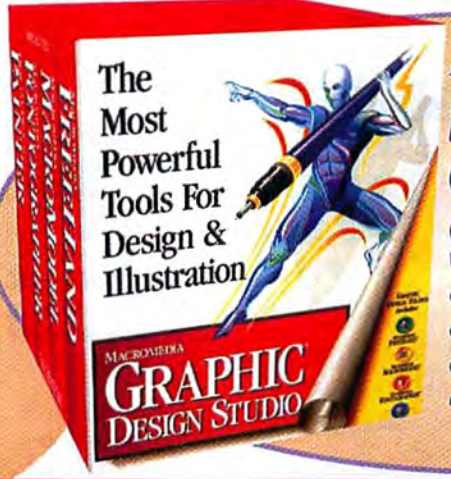

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MacUser February 1995

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MacWORLD February 1995

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- Includes CD Caddy
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- ONE Year Warranty

4X C109 9502 $299

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Seagate 5 YEAR Warranty

Unformatted Capacity	Model	Description	Part No.	Internal	Part No.	External
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2.4GB	32430N	Hawk 2 LP	C109 2211	$959	C109 2112	$1019
4.3GB	15230N	Hawk 4	C109 2212	$1339	C109 2113	$1399
2.5GB	32550N	Barracuda 2 LP	C109 2203	$1089	C109 2109	$1149
4.3GB	15150N	Barracuda 4	C109 2207	$1559	C109 2106	$1619
5.25" Full Height						
9.1GB	410800N	Elite-9			C109 2110	$3399

$1619 Barracuda 4 Ext.

Best storage solution for applications requiring high performance at an economical price

- 8.5ms average seek time
- 1024 multisegmented cache
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C109 4750 $1499

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APS ST 1.0[5] Seagate ST 31230N Hawk	1010MB	549.95	649.95
APS Q 1.0[5] Quantum Atlas XP31070 mechanism	1025MB	699.95	799.95
APS Q 2.0[5] Quantum Atlas XP32150 mechanism	2050MB	999.95	1099.95
APS MS 2.0[5] Micropolis 4221 mechanism	1955MB	999.95	1099.95
APS MS 2.0AV[5] Micropolis 4221AV mechanism	1955MB	1099.95	1199.95
APS ST 2.0[5] Seagate ST 32550N Barracuda	2040MB	1099.95	1199.95

Model	Capacity	Internal	SR2000
4095-9090MB			
APS MS 4.0[5] Micropolis 3243 mechanism	4095MB	$1499.95	$1599.95
APS MS 4.0AV[5] Micropolis 3243AV mechanism	4064MB	1599.95	1699.95
APS ST 4.0[5] Seagate ST 15150N mechanism	4294MB	1899.95	1999.95
APS MS 9.0[5] Micropolis 1991 mechanism	8669MB	2999.95*	3199.95
APS MS 9.0AV[5] Micropolis 1991AV mechanism	8669MB	3099.95*	3299.95
APS ST 9.0[5] Seagate ST410800N mechanism	9090MB	3299.95*	3499.95

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Model	Capacity	RAID Stripe	Price
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ARRAID S4/7200[5]	4GB	Striped	2499.95
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APS HyperDAT[1]	8GB	949.95	999.95
APS DLT20[2]	20GB†	—	3999.95

*Actual data compression and tape capacity vary greatly depending on the type of data recorded, other system parameters and environment. [1] 2:1 Software data compression. † 2:1 Hardware data compression.

All APS DAT, DLT & HyperTape drives include Retrospect by Dantz

Tape Media	1-4	5-19	20+ (BEST VALUE)
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SQ-800 (88MB) cartridge	54.95	53.95	51.95
SQ-2000 (200MB) cartridge	84.95	83.95	81.95
SQ-310 (105MB) cartridge	59.95	58.95	56.95
SQ-327 (270MB) cartridge	64.95	63.95	61.95

Prices listed are for unformatted media

APS MO DRIVES

Model	Internal	SR 2000
APS 230MB MO[1]	—	$599.95
APS 1.3GB MO[1]	$1899.95	1999.95

MO Media	1-4	5-9	10+ (BEST VALUE)
128MB cartridge	$27.95	$26.95	$22.95
230MB cartridge	39.95	38.95	34.95
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1-5 Denotes length of manufacturer's warranty

POWERBOOK DRIVES

Model	Capacity	Internal	Companion II
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APS Q 341[1]	326MB	299.95	—
APS Q 514[1]	491MB	399.95	—
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5. Nomai 88MB Cartridge.....$38.50
5. Apple MultiScan 17" Display.....$929
6. CDR-650 74 min. Recordable CD...$11
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9. Magic 10baseT Transceiver.....$39
10. Magic 230MB Optical.....$599

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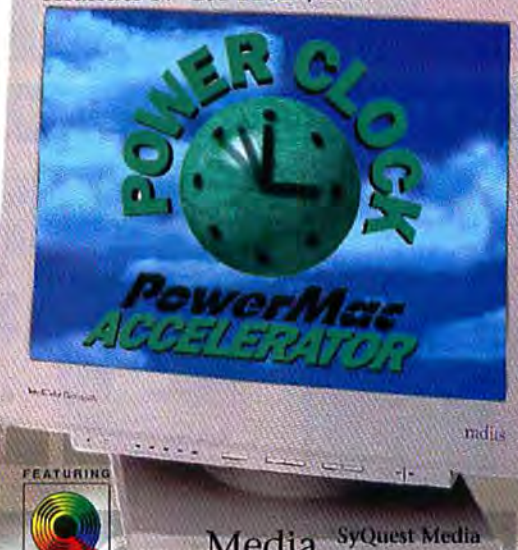

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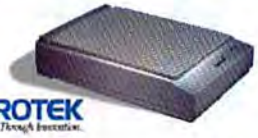

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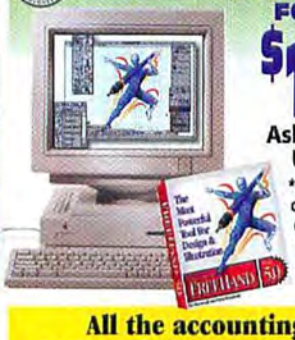

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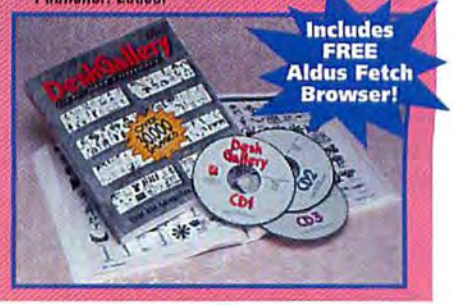

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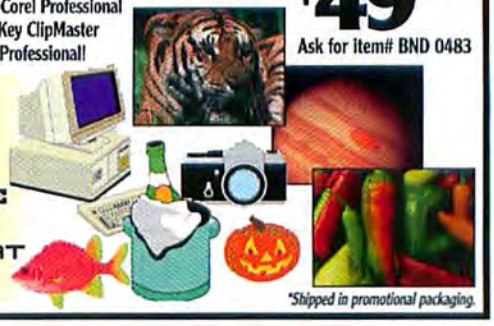

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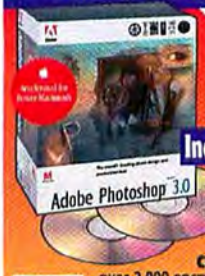

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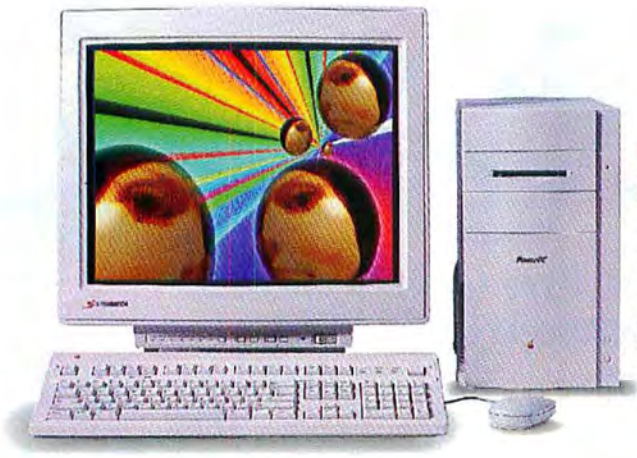

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2-5GB	EXABYTE 8205	8MM	$1499
5-10GB	EXABYTE 8505	8MM	$2275

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Capacity	Model #	Seek	External
230MB	FUJITSU 230OP	28MS	$825
1.3GB	HP C1716	23MS	$2299
1.3GB	MAXOPTIX TAHITI III	18MS	$2399

MEDIA

1 GB	$100	128 MB	$30
1.3 GB	$89	230 MB	$39

DISK ARRAYS

Capacity	Model #	Seek Time	Trans. Rate	Price
2.0GB	DT-3120DAR	5MS	7MB per sec	$CALL
4.0GB	DT-3256DAR	4.5MS	8MB per sec	$CALL

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> - MacUser July, 1994

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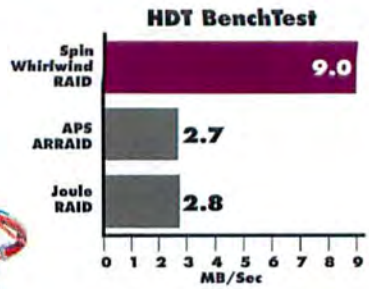

Internal RAID

Our internal kit offers all of the advantages of RAID and can be conveniently mounted in the extra drive bay of your 300, 840AV, PowerMac 8100, or Workgroup Servers 80 and 8150. Dual fans keep the drives and your Mac cool. Internal arrays can be expanded with Whirlwind Fast & Wide drives through the Silicon Express IV external port.

CAPACITY	RAID 0,1	RAID 0,1,4,5
2GB	$2999	$3199
4GB	$3999	$4199

SyQuest Drives

Spin SyQuest™ 3.5" and 5.25" removable drives accommodate your expanding storage needs without slowing you down. The new 200MB and 270MB continue the SyQuest reputation for convenience and reliability at higher speed and capacity. Small, lightweight cartridges are easy to transport and store.

SyQuest 44MB		Cartridge $43
SyQuest 44/88MB	$299	Cartridge $48
SyQuest 200MB	$409	Cartridge $75
SyQuest 105MB	$199	Cartridge $56
SyQuest 270MB	$429	Cartridge $65

MacUser FEBRUARY 1996 — 4½ mice rating for our SyQuest 200 and 270!

DAT Drives

Before disaster strikes, secure your valuable data with a Spin DAT drive. The low cost 3100 stores 2GB while the 3400 packs up to 8GB for remote backups and large audio, video and graphics files. All DAT drives include one tape cartridge and Retrospect™ for easy, complete backups.

Spin 3100 (DDS)	$799
Spin 3200 (DDS-DC)	$979
Spin 3400 (DDS-2)	$999

ATTO Board

Video, prepress and other storage intensive applications benefit substantially from this SCSI-2 BusMaster accelerator that parallel processes with the Mac's CPU. The Silicon Express IV uses RISC technology and is recommended for use with Spin's new line of Whirlwind Fast & Wide drives.

SE IV with Drive Purchase	$895

QuickTape

Our new tape drive is the affordable backup storage solution. Easy to use and highly reliable, the Spin QuickTape will secure your valuable data faster than a 2GB DAT drive. Based on the new Tandberg mechanism, the drive can use 1GB QIC-Wide cartridges. Delivered with Cheyenne five-user backup software package and one cartridge.

QuickTape	$499	Cartridge $19

Optical Drives

Spin's 3.5" Olympus 230MB is the affordable solution to securing your data while the 5.25" Maxoptix 1.3GB optical drives set the standard for speed and capacity. Great for backups, archiving, and as a secondary drive. One cartridge included.

Olympus 230MB	$659	Cartridge $39
Maxoptix T4 1.3GB	$1999	Cartridge $85

$399!
Including Cartridge!

Bernoulli Drives

Continuing the Bernoulli tradition of rugged dependability, the Spin 230MB cartridge drive provides unlimited capacity with additional cartridges. Featuring DCR Active Termination and a full five year warranty, the 230MB drive is backwards compatible with older cartridges. One cartridge included.

Bernoulli 230MB	$399	Cartridge $89
		3-Pack $199

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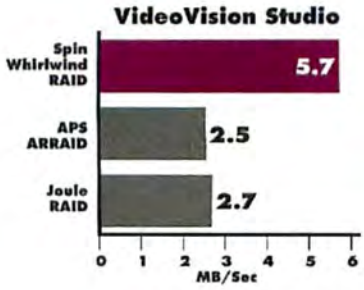

Whirlwind RAID

Whirlwind RAID is fast enough to handle all types of applications, even high-quality 30 fps video. In benchmark tests, our Fast & Wide arrays approach transfer rates of 9 megabytes per second, and will deliver better than 5.5 MB/sec performance when used with Radius VideoVision Studio™. Package includes ATTO SE IV, Remus software RAID controller, active terminator.

CAPACITY	RAID 0,1	RAID 0,1,4,5
2GB	$2999	$3199
4GB	$3999	$4199
8GB	$5499	$5699

Whirlwind Blows The Competition Away!

Whirlwind

These Fast & Wide drives are great for all those applications that require high speed storage but not an array. When used with an ATTO Silicon Express IV board these drives can double your SCSI throughput, making your office more productive. The Whirlwind drives can be added to our Fast & Wide arrays.

CAPACITY	INTERNAL	TORNADO
1GB	$899	$999
2GB	$1299	$1399
4GB	$2099	$2199

PowerBook Drives

Spin 2.5" drives are fast, easy to install, and offer the capacity you need when you are on the road.

Quantum 170MB	$279
Quantum 256MB	$299
Quantum 341MB	$349
Quantum 514MB	$449

Hard Drives

Our exclusive Tornado drives feature DCR Active Termination and a front mounted power switch, while our new Mini ZFP is compact enough to fit anywhere. All Internal drives install in minutes.

CAPACITY	INTERNAL	TORNADO	MINI
Q170MB	$139	$239	$209
Q365MB	$199	$299	$269
Q540MB	$249	$349	$319
Q730MB	$279	$379	$349
Q1.0GB	$599	$699	$669
Q2.1GB	$949	$1049	
S2.1GB	$1099	$1199	
Spin 1.0GB	$479	$579	
Spin 2.1GB	$1099	$1199	
M2.1GB AV	$1099	$1199	
M4.3GB AV		$1699	

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Spin's 2x and 4x Multisession CD-ROM drives deliver the excitement of multimedia to your desktop. Enhance either drive with Spin's CD-ROM bundle, including speakers, headphones, CD-ROM titles and more!

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97892	PrecisionColor Pro 24XK	$797.98
33683	Video Vision Studio 2.0	$3,598.00
33833	Video Vision Studio 2.0 Pro Pak w/RAID HD	$8,998.00
97879	Spectrum Power 1152	$686.98
93684	Spigot Power AV	$799.98
05913	Thunder 24 V2.0	$979.98
92542	Thunder IV GT	$1,379.98
92536	Thunder IV GX 1600	$2,398.98
92534	Thunder IV GX 1360	$2,349.98
92537	Thunder IV GX 1600	$1,974.98
97857	Video Spigot II Tape	$699.98

Raster Ops

92533	MoviePak Presenter w/Avid VideoShop	$1,499.00
92532	MoviePak Pro Suite NTSC w/Premiere	$3,298.00

ACCELERATORS

DAYSTAR

95397	33MHz Univ Turbo 040 128K Cache	$649.98
97262	33MHz Value 040 FPU 128K Cache	$825.98
97260	33MHz Value 040i 128K Cache	$647.98
95399	40MHz Univ Turbo 040 128K Cache	$789.98
97263	40MHz Value 040 FPU 128K Cache	$949.98
95350	PowerPro 601 66MHz Xel	$1,349.98
93313	PowerPro 601 80MHz Xel w/1MB Cache	$1,999.98
92169	Turbo 601/66mhz	$1,191.54
92168	PowerCard 66mhz	$855.98

NETWORKING

ASANTÉ

06501	10T FriendlyNet Adapter	$52.98
00348	10T HUB/12 w 10T/TK/TN Ports	$454.98
00404	10T HUB/8 w/ 10T/TN Ports	$223.98
36104	Asante Print (10T/TK)	$327.98
35842	Asante Print 8 (AUI/10T)	$347.98
34145	MacCon-I LC 10T	$99.98
34147	MacCon-I LC 10T/TN	$165.98
38802	MacCon-I LC TN	$109.98
34143	MacCon-I NuBus 10T/TK	$109.00
34144	MacCon-I NuBus TN/TK	$117.98
33546	MC+30IET64 IISI & SE/30 (TK/10T)	$145.98
33541	MC+IIE64 Mac II & Performa 600 (TK/TN)	$153.98
34933	MC3IISI IISI & SE/30 (TK/TN/10T)	$194.98
30511	MC3NB Mac II & Performa 600 (TN/TK/10T)	$198.98
99952	MCLC10TIII LC, LCIII, LCIII (10T)	$129.98
99951	MCLCTNIII LC, LCIII, LCIII (TN)	$155.98
34118	Micro EN/SC for PowerBooks 10T	$218.98
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36817	Mini EN/SC for PowerBooks (10T)	$235.98
36818	Mini EN/SC for PowerBooks (10T/TN)	$228.98
36840	NetExender Hub (AUI/10T)	$119.98
36841	NetExender Hub FN (AAUI/10T)	$129.98
35500	Thick FriendlyNet Media Adapter	$65.98
35499	Thin FriendlyNet Media Adapter	$54.98

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36825	Dayna Pocket SCSI Link M (10T/TN)	$287.98
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34114	DaynaLINK Mobile Access Server EtherTalk	$1,998.98
34718	DaynaPORT E/II (TN/TK) DP0200	$114.98
35728	DaynaPORT E/II-3 (10T/TK/TN) DP0202	$159.98
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36404	DaynaPORT E/LC-M (10T/TN) DP0403	$157.98
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30488	DaynaPORT SCSI Link-3 DP0802	$278.98
36405	DaynaPORT SI/30-3 (10T/TK/TN) DP0513	$159.98
36401	DaynaPORT SI/30T (10T/TK) DP0511	$145.98
99962	DaynaSTAR Hub-24	$868.98
34115	DaynaSTAR MiniHub-5	$147.98
34116	DaynaSTAR Stack 12	$699.98
34117	DaynaSTAR Stack 24	$1,199.00
35279	EasyNet Transceiver 10T/AAUI	$55.98
35280	EasyNet Transceiver TN/AAUI	$55.98
35595	EtherPrint 3 (10T/TK/TN)	$353.98
99622	EtherPrint 3 Plus (10T/TK/TN)	$469.98
35562	Mini EtherPrint Plus 10T/TN	$429.98
35559	Mini EtherPrint-T 10T	$349.98
35560	Mini EtherPrint-T 10T/TN	$359.98
93561	Mini EtherPrint-T Plus 10T	$419.98

Farallon

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93587	Ether 10T Starlet/4	$168.98
05693	Ether 10T Starlet/8	$238.98
03333	Ether10-T StarController	$1,049.00
04307	Ether10-T Transceiver (AAUI/10T)	$51.98
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98843	EtherThin Transceiver (AAUI/TN)	$61.98
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93409	EtherWave AAUI Transceiver	$95.98
98408	EtherWave AUI Transceiver	$92.69
98412	EtherWave LC Card	$167.98
98411	EtherWave NuBus Card	$169.98
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04160	PhoneNET Connector 50pk PN350	$798.98
03355	PhoneNET DB-9 PN309	$34.98
03328	PhoneNET DIN-8 10pk PN310	$184.98
03332	PhoneNET DIN-8 PN308	$26.98
02779	PhoneNET Star Connector PN301	$14.98

COMMUNICATIONS/MODEMS

Global Village

95206	One World Fax 1 Line, LocalTalk	$839.98
95207	One World Fax 2 Line, Ethernet	$1,259.00
95209	One World Remote Acc 2 Line, Ethernet	$1,598.00
05685	PowerPort Bronze	$89.98
05684	PowerPort Gold	$232.98
98182	PowerPort/Mercury for PowerBook 1XX	$309.98
98183	PowerPort/Mercury for PowerBook Duo	$309.98
94368	PowerPort/Mercury for PowerBook 5XX	$339.98
93748	TelePort Gold II	$124.98
98181	TelePort/Mercury for Desktop Macs	$270.98
01155	Teleport Platinum for Desktop Macs	$289.98

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93736	Supra Express 144 Plus	$95.98
99308	Supra FaxModem 144LC Ext - Mac	$127.98
05855	Supra FaxModem 144PB Int - PowerBook	$189.98
98582	Supra FaxModem 288 Ext - Mac	$208.98
98583	Supra FaxModem 288 Int - Mac PB	$284.98
00413	Supra FaxModem V32BIS (MC) w/SirCable	$173.98

USRobotics

93701	Mac & Fax Sportster 14.4	$112.98
92953	Mac & Fax Sportster 28.8 V34	$246.98

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93593	270MB Ext HD	$339.98
95348	340MB Ext HD	$379.98
95338	540MB Ext HD	$445.98
93568	1080MB Ext HD	$849.98

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05476	Hard Disk Toolkit - Personal Ed	$46.98
00655	Hard Disk Toolkit	$122.98
94121	SCSI JackHammer	$597.98

iOMEGA

93320	Iomega MacTransportable 230	$452.98
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LaCie

93569	Q Drive External 170MB	$244.98
03695	Q Drive External 270MB	$315.98
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93554	PocketDrive 85MB	$212.98
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93566	PocketDrive 256MB	$424.98

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93301	Tahoe 230MB Optical	$879.98

PLI

94112	Infinity 230MB Optical 3.5	$999.98
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06941	Quantum 340MB	$249.98
92056	Quantum Lightning 730MB	$349.98
99929	Quantum 1GB	$749.98
97991	Seagate 2.1GB Barracuda	$1,298.98

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94074	256MB 2.5 Drive	$305.98
99176	340MB 2.5 Drive	$439.98

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97961	Quantum 270MB	$259.98
06542	Quantum 340MB	$305.98
01108	Quantum 540MB	$398.98
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05538	SyQuest 44/88MB w/o cartridge	$312.98
01142	SyQuest 200MB w/o cartridge	$471.98
97989	SyQuest 270MB w/o cartridge	$459.98

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Agfa

02135	Arcus II	$2,729.98
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02103	StudioScan II	$865.00

Epson

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02133	ES-1200C	$949.98
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92601	ScanJet IICX	$936.98

MICROTEK

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06251	ScanMaker II	$499.98
06945	ScanMaker IISP	$748.00
06252	ScanMaker IIXE	$874.98
01120	ScanMaker IIHR	$1,036.00
06903	35T Slide Scanner	$934.98
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01174	ScanTouch Flatbed	$1,149.00
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97971	Avec 2400LE	$468.98
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01189	Powerlook	$2,999.98

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92698	Alps Glidepoint for Mac	$70.98

Calcomp

95241	Drawing Slate 12x12 Cordless 4B Cursor	$224.98
95242	Drawing Slate 12x12 Cordless 6B Cursor	$229.98
98251	Drawing Slate 12x12 w/ Pressure Pen	$224.98
95243	Drawing Slate 12x18 Cordless 4B Cursor	$369.98
93496	Drawing Slate 6x9 w/ Fractal Painter 3.0	$469.98

Kurta

92683	XGT 6x8 Graphics Tablet	$274.98

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93628	Thinking Mouse	$89.98
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92692	UD1212R w/Fractal Painter 3.0	$789.98
06593	ArtZ 6x8 Graphics Tablet	$299.98
92686	ArtZ ADB w/ Fractal Painter 3.0	$614.98
92687	ArtPad 4x5 ADB Graphics Tablet	$145.98

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19726	NEC 2V CD-ROM	$223.98
19724	NEC 4Xe CD Rom Drive	$479.98
19728	Plextor 4Plex CD-ROM	$512.98
94099	Performantz Mini 2X CD-ROM	$175.98
01124	Performantz 4x Quad CD-ROM	$340.00
13166	Sony SRS-D2K Speakers w/ Subwoofer	$134.98
02168	Yamaha M10 Shielded Speakers	$84.98

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95506	LabelWriter XL Plus	$234.98

Epson

19270	Stylus Color Ink Jet Printer	$509.00

Fargo

92705	PrimeraPro	$1,379.98

Hewlett-Packard

92619	HP DeskWriter 320	$308.00
92617	HP DeskWriter 540	$299.98
95527	HP ColorKit for 540/320 Printers	$35.98
95522	HP DeskWriter 560C	$480.00
21151	HP LaserJet 4ML	$999.00
21155	HP LaserJet 4M Plus	$1,958.00
21157	HP LaserJet 4Si MX	$4,198.00
21159	HP LaserJet 4MV	$2,824.00

Nikon

02136	CoolPrint	$1,539.98

Texas Instruments

06859	MicroWriter PS23	$599.98
14319	MicroLaser Pro 600 PS23	$1,194.98
14320	MicroLaser Pro 600 PS65	$1,521.00
19899	MicroLaser Power Pro	$1,627.00
93992	MicroLaser Pro E	$1,369.00

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94396	APS Personal Surge Arrest	$18.98
94395	APS Personal Surge Arrest w/Phone	$29.98
07150	BackUps 280	$115.98
99364	BackUps 400	$179.98
11651	BackUps 600	$288.98

Tripp Lite

99790	Tripp Lite BC 250 UPS	$98.98
05661	Tripp Lite BC 400 UPS	$154.98
04744	Tripp Lite BC 500 UPS	$188.98

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19929	Bernoulli 230MB Cart	$99.98

SyQuest Cartridges

02183	SyQuest 44MB Cart Unfo	$42.98
00183	SyQuest 88MB Cart Unfo	$48.98
99922	SyQuest 105MB Cart Unfo	$52.98
00278	SyQuest 200MB Cart Unfo	$76.98
97992	SyQuest 270MB Cart Unfo	$61.98

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Targus

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Top quality, high speed modem. Conforms to V.34/V.FC standards. Includes SitComm, Delrina FaxPro and cable. 14.4 fax capability.

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Hard Drives

Quantum Quantum Quantum

Lightning & LPS (2 Year Warranty)

Capacity	Seek	RPM	Cache	Int.	Ext.
365 MB	11 ms	4500	128K	185	245
535 MB	9.5 ms	5400	512K	230	290
730 MB	11 ms	4500	128K	265	325

Quantum hard drives are based on customer focused innovation, making Quantum a leading manufacturer of 2.5 inch and 3.5 inch high quality high performance hard disk drives.

Trailblazer Series (3 Year Warranty) NEW

420 MB	11 ms	4500	128K	Call	Call
850 MB	11 ms	4500	128K	Call	Call

Fireball Series (3 Year Warranty) NEW

540 MB	10 ms	5400	128K	Call	Call
1080 MB	10 ms	5400	128K	Call	Call

Empire & Grand Prix (5 Year Warranty)

2100 MB	9.5 ms	5400	512K	970	1030
4200 MB	8.6 ms	7200	512K	1450	1510

Daytona Powerbook Drives

Capacity	Access	Warranty	Int.	Ext.
256 MB	17ms	1 Year	250	350
341 MB	17ms	1 Year	315	415
514 MB	14ms	1 Year	430	530

MICROPOLIS MICROPOLIS (5 Year Warranty)

Capacity	Size	Model	Access	RPM	Cache	Int.	Ext.
2.1 GB	3.5"	M4221 Low Profile	8.5 ms	7200	512K	890	950
2.1 GB	3.5"	M4221AV	8.5 ms	7200	512K	990	1050
3.6 GB	5.25"	M1936	11 ms	5400	256K	1220	1320
4.3 GB	3.5"	M3243	8.5 ms	7200	512K	1475	1535
4.3 GB	3.5"	M3243AV	8.5 ms	7200	512K	1575	1635
9.0 GB	5.25"	M1991	11 ms	5400	512K	2695	2795

Seagate Seagate Seagate Seagate (5 Year Warranty)

Capacity	Size	Model	Access	RPM	Cache	Int	Ext
1.2 GB	3.5"	Hawk 2LP	9.5ms	5400	512K	$535	$595
4.2 GB	3.5"	Hawk 4	9ms	5400	512K	1445	1505
1.0 GB	3.5"	Barracuda 2LP	8ms	7200	1024K	735	795
2.4 GB	3.5"	Barracuda 2LP	8ms	7200	1024K	1075	1135
4.2 GB	3.5"	Barracuda 4	8ms	7200	1024K	1695	1755
9 GB	5.25"	ST 410800N	11ms	5400	512K	3085	3185

IBM Drives utilize IBM's advanced Magneto-Resistive (MR) disk technology technology which increases the amount of data stored per disk surface and reduces the number of heads making the IBM series more slim-lined and reliable.

IBM IBM IBM IBM IBM

Capacity	Seek	RPM	Warranty	Int.	Ext
540 MB	12 ms	4500	2 Year	240	300
720 MB	12 ms	4500	2 Year	280	340
1.0 GB	11 ms	5400	5 Year	590	650
2.0 GB	9 ms	5400	5 Year	1060	1120

Genuine Products by

SyQuest

Capacity	Seek	RPM	Int.	Ex
88 MB SQ5110C	20ms	3200	300	36
200 MB SQ5200	18 ms	3200	420	48
270 MB SQ3270	13.5ms	3200	420	48

2 Year Warranty on all SyQuest Drives
SyQuest drives come complete with a cartridge (Formatted or Unformatted) and the latest SCSI 4.3 compatible software.

SyQuest Media

Capacity	Model	Warranty	Price
44 MB	SQ400	5 year	$41
88 MB	SQ800	5 year	47
105 MB	SQ310	5 year	53
200 MB	SQ2000	5 year	75
270 MB	SQ327	5 year	63

One FREE Cartridge Included with all SyQuest Drives!

HEWLETT PACKARD HEWLETT PACKARD (5 Year Warranty)

Capacity	Access	RPM	Int.	Ext.
1.2 GB C3323	9.5 ms	5400	$599	$65
2.4 GB C2490	8.5 ms	6400	1150	121

Direct to Disk Recording Audio/Visual Hard Drives

MICROPOLIS MICROPOLIS

Active Termination

Capacity	Size	Model	Access	RPM	Cache	Int.	Ext.
2.1 GB	3.5"	M4221AV	8.5 ms	7200	512K	990	1050
3.6 GB	5.25"	M1936AV	11 ms	5400	512K	1265	1365
4.3 GB	3.5"	M3243AV	8.5 ms	7200	512K	1575	1635
9.0 GB	5.25"	M1991AV	11 ms	5400	512K	2795	2895

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Call to determine what AV drive will meet your specific needs.

Seagate Seagate Seagate Seagate

Active Termination

Capacity	Size	Model	Access	RPM	Cache	Int	Ext
1.0 GB	3.5"	Hawk 2LP	9.5ms	5400	512K	535	595
2.4 GB	3.5"	Barracuda 2LP	8ms	7200	1024K	1075	1135
4.2 GB	3.5"	Barracuda 4	8ms	7200	1024K	1695	1755
2.4 GB	3.5"	Barracuda 2W	8ms	7200	1024K	1345	1445
4.2 GB	3.5"	Barracuda 4W	8ms	7200	1024K	2485	2615

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NEW

Quantum Quantum Quantum Quantum Quantum Quantum

The Atlas Series (5 Year Warranty)

The new A/V drives by Quantum are specially tuned to maximize your performance by ProDirect!

Capacity	Size	Model	Access	RPM	Cache	Int.	Ext.
1.0 GB	3.5"	XP3107	9 ms	7200	1024K	680	740
2.1 GB	3.5"	XP32150	9 ms	7200	1024K	950	1010
4.3 GB	3.5"	XP34300	12 ms	7200	512K	1595	1655

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CD Rom Drives

NEC

	Access	Transfer	Price
MultiSpin 2V	320ms	300Kb/sec	$245
MultiSpin 3Xp	240ms	500Kb/sec	$395
MultiSpin 4Xe	220ms	600Kb/sec	$495

Plextor

4Plex QuadSpeed	235ms	600Kb/sec	$499

CHINON

CDX535 Dual Speed	280ms	300Kb/sec	$229

Scanners

Nikon	Scantouch	$1199
	Transparency Adapter	$499
	Coolscan 35mm film scanner	$1399
UMAX	UC630/1260	675/1240
	Vista-S6	760
	Powerlook	3250

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Zero Footprint	$75
MicroCab	$89
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Multi Bay Cabinets	$CALL

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Tape Backup Drives

DLT Series

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Model	Capacity	Trans.Rate	Media	Price(Ext)
DLT2000	20GB	2.5MB/sec	DLT20	2995.00
DLT4000	40GB	3MB/sec	DLT40	Call!

by Quantum

HEWLETT PACKARD HEWLETT PACKARD HEWLETT PACKARD HEWLETT PACKARD

Capacity	Model	Transfer Rate	Media	Int.	Ext.
2.0 GB	35470	15 MB/min..	4mm	$835	$885
3-5 GB	35480	45 MB/min.	4mm	995	1055
4-10 GB	1533A	60 MB/min.	4mm	1225	1285
20-50 GB	1553A	60 MB/min. Auto Tape Loader	4mm	3195	3295

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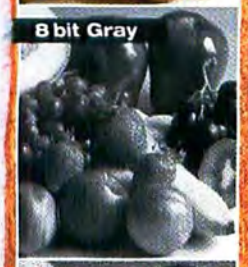

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105MB	14.5ms	105MB	SQ3105S	64K	$249	$309
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270MB	13.5ms	105, 270MB	SQ3270S	128K	$409	$469

FUJITSU

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FUJITSU OFFERS THE BEST VALUE ON THE MARKET!
- Low price guarantee on all Fujitsu drives!
- THESE PRICES ARE NOT MISPRINTS!

Capacity	Speed	RPM	Buffer	Wty	Model	Internal	External
530MB	13.8ms	4500	256K	2yr	M2684S	$209	$269
1080MB	9.5ms	5400	256K	5yr	M1606S	$490	$550

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Micropolis is THE high performance drive for your Mac!
- Low price guarantee on all Micropolis drives!
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Capacity	Speed	RPM	Buffer	Wty	Model	Internal	External
2050MB	8.5ms	7200	512K	5yr	MC4221	$899	$999 SALE!
4294MB	8ms	7200	512K	5yr	MC3243	$1479	$1579
9100MB	12ms	5400	512K	5yr	MC1991	$2549	$2649

Seagate

Seagate offers incredible performance and durability.
- Low price guarantee on all Seagate drives!

Capacity	Speed	RPM	Buffer	Wty	Model	Internal	External
1050MB	9ms	5411	512K	5yr	ST31230N	$549	$609
2147MB	9ms	5411	512K	5yr	ST32430N	$899	$959
2147MB	8ms	7200	512K	5yr	ST32550N	$969	$1069
4290MB	9ms	5400	512K	5yr	ST15230N	$1349	$1409
4290MB	8ms	7200	1024K	5yr	ST15150N	$1549	$1649
9090MB	11ms	5400	1024K	5yr	ST410800N	$3049	$3149

CD ROM DRIVES

Brand	Model	Speed	Transfer	Buffer	Internal	External
Toshiba	XM3501	155ms	600KB/sec	256K	$309	$379
Plextor	6Plex	145ms	900KB/sec	256K	$599	$659

TAPE DRIVES

Complete external DAT drive includes Retrospect 2.1, 1 tape, terminator, and cable.

2-4Gig	QIC3080	Conner	$599*	4-8Gig	DC-DAT	Conner	$949	4-10 Gig	DDS2-DAT	Conner	$1029
2Gig	DAT	HP	$879	4-8 Gig	DC-DAT	HP	$999	4-10 Gig	DDS2-DAT	HP	$1169
2 Gig	DAT	Conner	$929	4-10 Gig	DDS2-DAT	Sony	$989	(* includes NovaMac backup software			

OPTIMA DeskTape Software mounts DAT tape drive on your desktop to use as a standard drive! $275

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- Radius 17" Trinitron monitor
- SuperMac Thunder 24 video card
- Internal SyQuest 200 w/ 2 carts
- Microtek ScanMaker III
- Xante 8200 w20MB RAM, 600 dpi, 11"x17" printer, 2 AppleTalk connectors
- Wacom 12x12 Graphics Tablet
- SuperMicro Extended Services

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8100/100 /24/2.1GB/CD	Sony 20" /Thunder 24	$8417	$189	
8100/110 /40/2.1GB/CD	Sony 20" /Thunder 24	$11,235	$253	
7100/66 /24/1.0GB	Sony 17" /Thunder 24	$4899	$110	
7100/80 /40/700/CD	Sony 20" /Thunder 24	$7495	$169	
6100/66 /24/540	14" hi-res color monitor	$2199	$49	
Q800 /32/1.0GB/CD	Sony 20" Dos Card	$7799	$175	SALE
Q840AV /40/1.0GB/CD	Sony 17" /Thunder 24	$6699	$152	

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6100/60 starting at $999!

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- External SyQuest 88c w/ 1 cart
- Sony 17SF Trinitron monitor
- Radius 24xk video card
- Tamarack 6000c scanner w/ PS LE
- TI Pro 600, 600 dpi, 8 ppm printer w/ 2 AppleTalk connectors
- Wacom 6x8 Artz Graphics Tablet
- SuperMicro Extended Services

Zero Down! $199 per month

$6 a day!!

Printers

Xante 8200 w/40MB $6385!

The Xante Accel-A-Writer 8200 is the professional choice for ultra-high resolution, camera ready output. If you regularly use a service bureau, this printer will save you money!

Model	Resolution	Print Area	Price	Lease	
TI Pro 600 PS23	600	8.5"x14"	$1299	$29	
GCC Elite XL 608	600	11"x17"	$2589	$58	
GCC Elite XL 808	800	11"x17"	$3459	$78	
Xante 8200 w/20MB	600	11"x17"	$4999	$113	
Xante 8200 w/40MB	**1200**	**11"x17"**	**$6385**	**$144**	SALE
Xante 8200 w/64MB	1200	11.8"x17.5"	$8495	$191	

Scanners

Microtek ScanMaker IIHR $1029!

The ScanMaker IIHR from Microtek offers sharp, 24-bit color scans at 600 x 1200 dpi. It comes with a professional quality color calibration system for images with vivid, accurate colors.

Scanner	Description	Price	
Tamarack 6000c	600 dpi flatbed w/PS LE	$449	
Tamarack 8000c	800 dpi flatbed w/PS LE	$549	
Tamarack 12000C w/trans	**1200 dpi flatbed w/PS LE**	**$949**	SALE
Agfa StudioScan II	400 dpi flatbed	$829	
Agfa Arcus II w/trans	1200 dpi flatbed	$2709	
ScanMaker III	1200 dpi flatbed	$2479	
ScanMaker IIHR	**600 dpi flatbed**	**$1029**	SALE
Umax PowerLook	**1200 dpi flatbed**	**$2479**	SALE
Nikon CoolScan	2700 dpi slide	$1449	
Polaroid SprintScan	2700 dpi slide	$1859	
StudioScan II adapter	transparency upgrade	$379	
Microtek adapter	transparency upgrade	$519	

Monitors

Sony 17SF/ SuperMac T24 $1479!

Save $200 on a Sony 17SF monitor and Thunder 24 Series IV video card. Get accurate, lifelike colors at resolutions up to 1024 x 768.

Monitor	Resolution	Price	
Sony 1425	14in, .25mm, 1024x768	$321	
Sony 15SF	15in, .25mm, 1024x768	$439	
Sony 17SF	**17in, 25mm, 1024x768**	**$879**	SALE
Sony 20SF	20in, .25mm, 1280x1024	$1889	
NEC 17XE	17in, .25mm, 1280x1024	$979	
Apple 15	15in, .25mm, 1024x768	$499	
Apple 17	17in, 1024x768, .26mm	$899	

Video Cards

Video Cards	Resolution	Price	
SuperMac Thunder 24 Series IV	**1024x768**	**$799**	SALE
SuperMac Thunder II Series IV GX 1360	1360x1024	$2389	
SuperMac Spectrum Power, 1152	1152x870	$1138	
SuperMac Thunder II Series IV GX 1152	1152x870	$1939	
SuperMac Thunder II Series IV GX 1600	1600x1200	$2869	
SuperMac Spectrum 24 Series V	1024x768	$650	

Multifunctional Drives

A multifunctional drive combines hard drive, optical drive, CD-ROM, tape and Syquest drive all together in the same enclosure! They cost less and eliminate compatibility problems.

Multifunctional	Price	
Sony SDT 5000 /2.0GB Quantum	$2069	
Sony 650MB Optical /SyQuest 200	$1399	
Sony 3.5" optical /Nikon Coolscan	$2399	
SyQuest 200 /540MB hard drive	**$669**	SALE
SyQuest 88c /650MB optical drive	**$1299**	SALE
SyQuest 88c /NEC 3X CD ROM /540MB HD	$979	
128MB optical drive /540MB hard	$1039	
NEC 3X CD-ROM /1.3GB optical drive	$2399	
2.1GB Quantum HD /8.0GB Sony DAT drive	$1839	
4.0GB Seagate HD /Nikon CoolScan	$3539	

Includes drive, 25/50 SCSI cable, terminator and Mac software.

Tape Drives

Sony SDT-5000 $1019!

Sony DAT drives provide low cost data backup. With built-in data compression, the Sony SDT-5000 holds up to 16GB on a 120 meter cartridge!

FREE! 72 hour Replacement Guarantee with any tape drive purchase!

Model	Capacity	Size	MacKit	dsc Turbo	
Sony SDT-2000	2GB	3.5"HH	$725	$775	
Sony SDT-4000	8GB	3.5"HH	$935	$985	
Sony SDT-5000	**5-16GB**	**3.5"HH**	**$969**	**$1019**	SALE
Exabyte 8200	2GB	5.25"FH	$1275	$1350	
Exabyte 8500	5GB	5.25"FH	$2175	$2250	
Exabyte 8205	**2-5GB**	**5.25"HH**	**$1479**	**$1529**	SALE
Exabyte 8505	5-10GB	5.25"HH	$2189	$2239	

Includes external drive, 25/50 SCSI Cable, MAC SW II and terminator. Turbo version includes Retrospect.

SyQuest Drives

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Now even faster! Turbo models have guaranteed 72-hour replacement *plus* FWB Toolkit—*FREE!*

Model	Internal	External	dsc Turbo	
SyQuest 270	**$370**	**$410**	**$435**	SALE
SyQuest 200	**$355**	**$395**	**$420**	SALE
SyQuest 105	$190	$230	$255	
SyQuest 88C	$260	$300	$325	
SyQuest 44	$130	$160	$185	

Includes external drive, 25/50 SCSI cable, Mac SW, terminator.

Cartridges	44MB cartridges only $34		
270MB Cartridges *(20 + or with drive purchase)*		$56	
200MB Cartridges *(20 + or with drive purchase)*		$70	
105MB Cartridges *(20 + or with drive purchase)*		$50	
88MB Cartridges *(20 + or with drive purchase)*		**$39/45**	SALE
44MB Cartridges *(20 + or with drive purchase)*		**$34/40**	SALE

Hard Drives

dsc 2.0GB only $799

Capacity	Speed	Internal	External	dsc Turbo	
2.0GB	**9ms**	**$799**	**$899**	**$924**	SALE

Quantum 4.2GB only $1619

Capacity	Speed	Internal	External	dsc Turbo	
GO256MB	NB 17ms	$209	$329	$354	
G0514MB	**NB 17ms**	**$379**	**$499**	**$524**	SALE
42MB	17ms	$79	$139	$164	
85MB	17ms	$110	$170	$195	
270MB	10ms	$150	$210	$235	
365MB	10ms	$179	$239	$264	
540MB	10ms	$215	$275	$300	
730MB	10ms	$260	$320	$345	
1.0GB	10ms	$509	$569	$594	
1.4GB	9.5ms	$690	$750	$775	
2.1GB	9.5ms	$899	$959	$984	
4.2GB	**8ms**	**$1619**	**$1679**	**$1704**	SALE

Seagate Barracuda 4 only $1669

Capacity	Speed	Internal	External	dsc Turbo	
2.5GB	B'cuda 2, 8ms	$1079	$1139	$1189	
4.3GB	**B'cuda 4, 8ms**	**$1669**	**$1729**	**$1779**	SALE
1.0GB	Hawk 1, 9ms	$519	$579	$629	
2.4GB	Hawk 2, 9ms	$959	$1009	$1069	
4.3GB	Hawk 4, 9ms	$1449	$1509	$1559	
3.4GB	**Elite 3, 11ms**	**$1935**	**$1995**	**$2045**	SALE
9.1GB	Elite 9, 11ms	$3039	$3139	$3189	

Includes external drive, 25/50 SCSI cable, Mac SW & terminator.

Optical Drives

5.25" Optical Drives	Sony 650 $999				
Model	Capacity	Seek	MacKit	dsc Turbo	
Sony 650	**650MB**	**19ms**	**$999**	**$1049**	SALE
Sony 1.3GB	1.3GB	25ms	$1989	$2039	
MaxOptix-Tahiti II	1.0GB	25ms	$1299	$1349	
MaxOptix-Tahiti III	1.3GB	25ms	$1989	$2039	
PMO-1.3GB	1.3GB	19ms	$2379	$2429	

3.5" Optical Drives	Sony 128 $599			
Model	Capacity	Seek	MacKit	dsc Turbo
Fujitsu-230	230MB	30ms	$639	$689
Sony P-301	**128MB**	**35ms**	**$599**	**$649** SALE
Most-256	256mb	37ms	$895	$945

Includes external drive, 25/50 SCSI cable, Mac SW & terminator.

5.25" Cartridges		Price	
dsc / 3M 650MB		$64 /75	
Sony 650 /1.2 /1.3GB		**$75 /95 /95**	SALE
Komag 650 /1.0 /1.3GB		$69 /81 /83	
3.5" Cartridges		**Price**	
dsc 128MB /Sony 128MB		**$22 /29**	SALE
Komag 128MB /230MB		$24 /34	

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PRODUCT INDEX
BUSINESS TOOLS

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PRODUCT INDEX

Category	Page No.
BUSINESS TOOLS	**208-211**
Bar Code	
LCD Panels	
Manufacturing	
Medical	
Point of Sale	
Presentation	
Productivity	
Projection Panels	
Real Estate	
EDUCATIONAL & RECREATIONAL	**228-230**
Astrology	
Discount Software	
Genealogy	
Grading	
Music	
Religion	
GRAPHICS	**232-233**
CD ROM Photos	
Clip Art	
Graphics Translators	
MULTIMEDIA & CD-ROM	**230-232**
CD ROM	
MOBILE COMPUTING & PDA'S	**228**
Security System	
NETWORKING & COMMUNICATIONS	**228**
BBS	
PROGRAMMING & UTILITIES	**233**
Data Compression	
Languages	
SERVICES & SUPPLIES	**233-234**
Computer Insurance	
Computer Repair	
Data Recovery	
Slides	
Specialized Market Services	
SYSTEMS & PERIPHERALS	**211-222**
Switch Box	
UPGRADES & MEMORY	**222-227**
Memory Upgrades	

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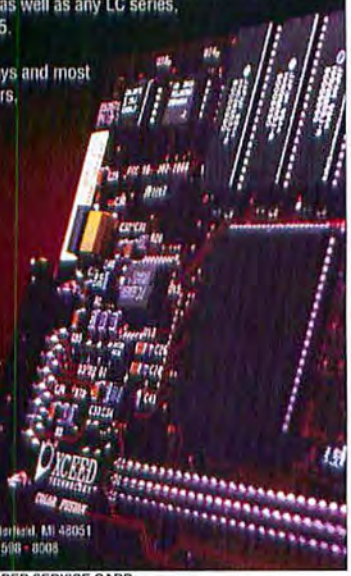

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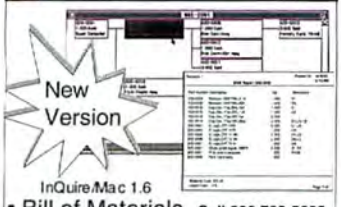

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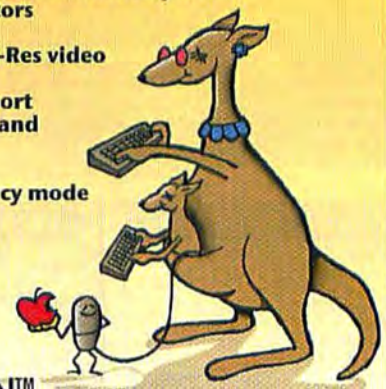

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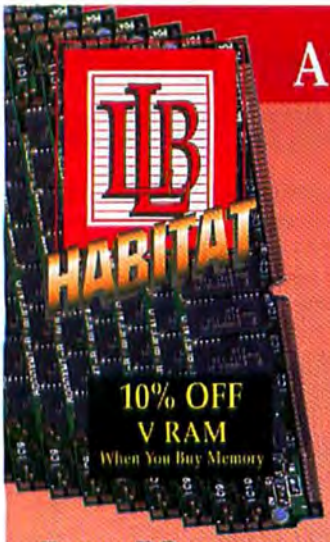

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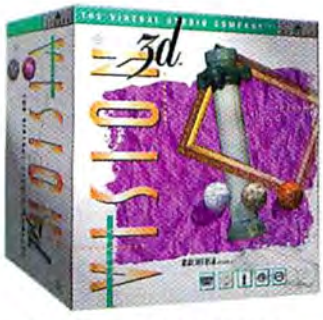

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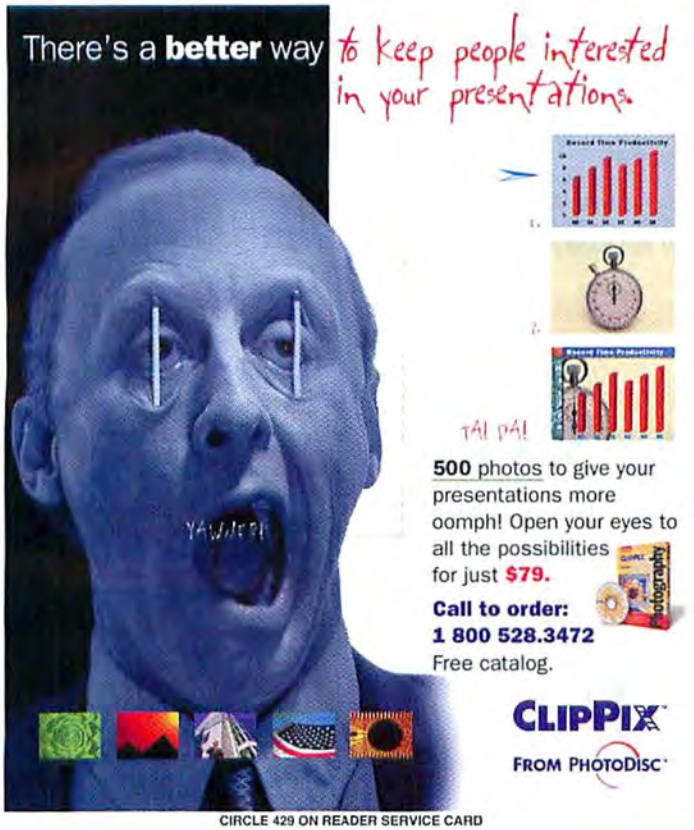

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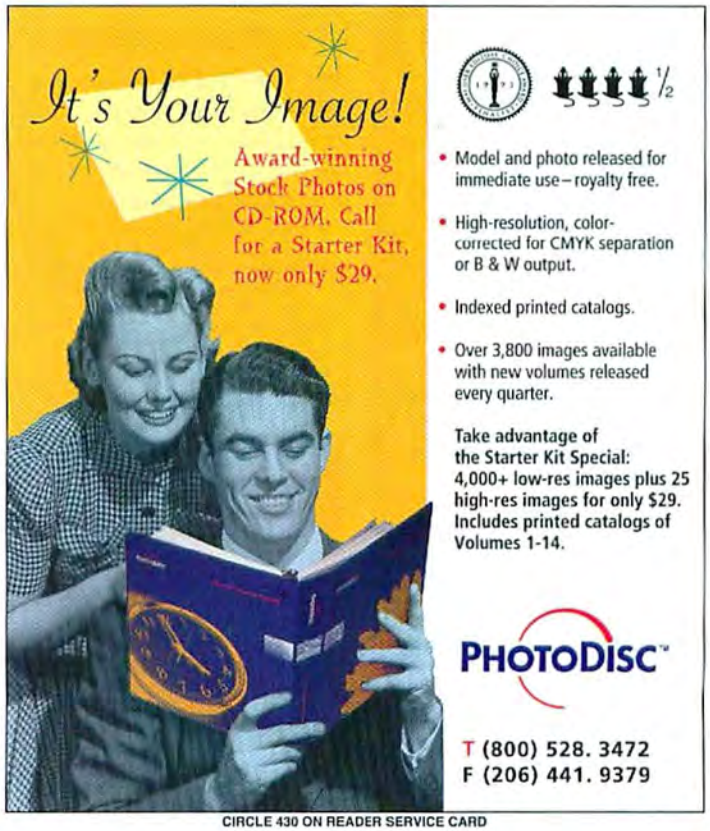

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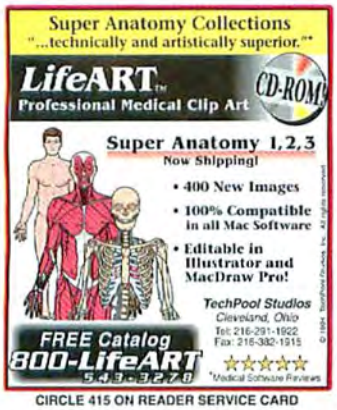

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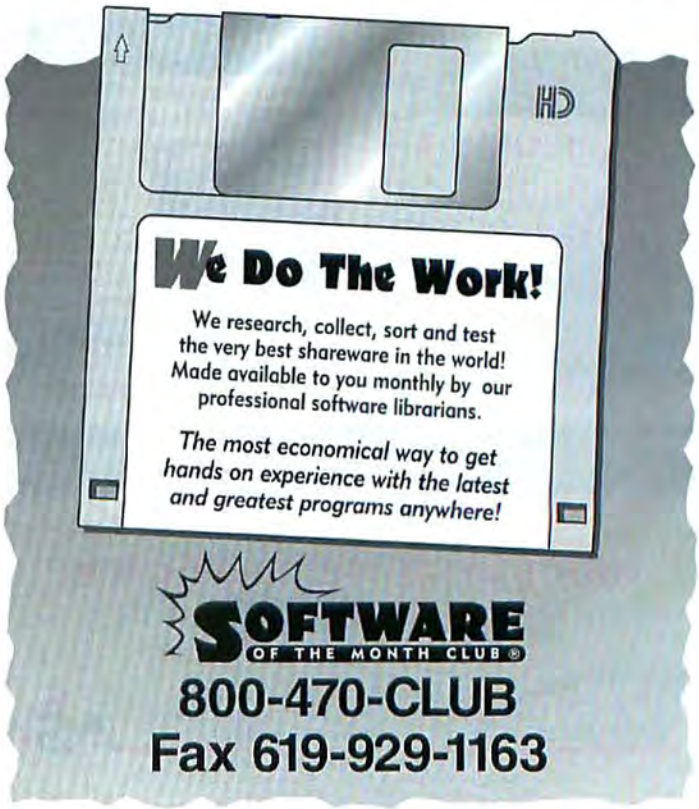

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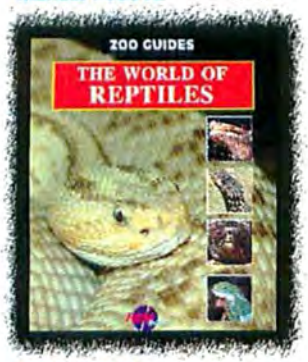

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WISE GUY

BY GUY KAWASAKI

Nerd Bonding

How to impress Macintosh programmers

PROGRAMMERS, IN THE PECKing order of the Macintosh universe, are pretty close to the top of the pyramid. They are the artists who create what we mere mortals use (and endorse) to increase our creativity, productivity, and amusement. Therefore, one of the most important skills a Macintosh owner can acquire is the ability to impress Macintosh programmers. This column will help you achieve this worthy and valuable goal. Once you acquire this skill, you'll find that people will respect you more, you'll get lots of free software, and you might get to invest in companies with higher payoffs than the 4 percent your money-market fund is paying. So read on.

Technique 1 Worship Macsbug. On a simplistic, practical level, Macsbug has two functions: it helps programmers figure out why software crashed by creating a report of the crash, and it enables users to quit a program that's crashed without rebooting—sometimes, anyway.

Many people know about these two functions of Macsbug. If you want to impress Macintosh programmers, you've got to go deeper. I suggest mentioning that you use Macsbug as a calculator. For example, when you type **2*2** and press the return key, Macsbug gives you the answer of 4. Take my word for it, this is cool to a Macintosh programmer.

Technique 2 Slam MPW. MPW stands for Macintosh Programmer's Workshop. It is a collection of compilers, linkers, debuggers, and tools held together by a programming editor. Unfortunately, MPW seems to have fallen behind the times: it's not exactly a speed demon, and its interface is the Unix command-line of decades past.

There is a way, however, to admit to using MPW and look cool: "I've gone back to the MPW editor as my word processor because I couldn't stand Word 6." A decent Macintosh programmer will give you a high five for this statement because in one sentence you've shown that you know what MPW is, and you've dissed Microsoft.

Technique 3 Fawn over CodeWarrior. CodeWarrior is the hip way to write Macintosh software. It's a great product from Metrowerks that compiles about ten times as fast as MPW, has a sexy interface, and enables Macintosh programmers to create Windows software on a Macintosh. (While producing a Windows version is not important to a true Macintosh programmer, it is good for shutting up management and getting venture-capital funding.)

Technique 4 Express joy at the architecture of Power Macs. Besides raising gross margins and sticking it to Intel, Power Macs have made the lives of Macintosh programmers much easier. You don't need to know how. All you need to do is utter sentiments along these lines: "I used to hate writing software for the 680X0 machines because after the OS was done, I only had ten or so registers I could use."

Technique 5 Express frustration at tracking down unsolvable crashes. Nothing frustrates Macintosh programmers more than the crash that defies logic and repeatability. (Such crashes filter their way down to end users and result in tech-support people blowing smoke at you: "We've never heard of this. It must be an INIT conflict. Restart your machine while holding down the shift key, and call me in the morning.")

When the conversation inevitably turns to tracking down unrepeatable bugs, here are four appropriate buzz-sentences: "Perhaps you de-referenced 0." "Maybe your ZCB went free." "It sounds to me like you tried to execute an odd address." "Maybe you unloaded a segment that was executing."

Technique 6 Enter the great Jolt-versus–Mountain Dew debate. This topic accounts for more online traffic and programmer downtime than the release of a new *RoboCop* movie. Here's the ice-breaker: "Jolt is for Windows programmers. It's typical IBM PC: it goes in brown and comes out yellow. Mountain Dew is for Macintosh programmers: it goes in yellow and comes out yellow. It's WYSIWYP."

Technique 7 Empathize with programmers who are forced to comment their code. Commenting code is the process of explaining how software works, so that if a programmer gets hit by a truck, someone else can take over the project. In other words, comments are fables written by pathological liars for ignoramuses. Frankly, I've never heard of commented code resurrecting a bozo product.

There you have it: seven ways to impress Macintosh programmers. If these techniques don't do it, maybe you should use a Pentium-based machine. Then you just have to worry about math, not impressing programmers. ■

GUY KAWASAKI's views are his own and only sporadically represent those of *Macworld*. He is president of Fog City Software and has investments in Bit Jugglers, Global Village Communication, Bookmaker Corporation, and others. He can be reached at **kawasaki@radiomail.net.**

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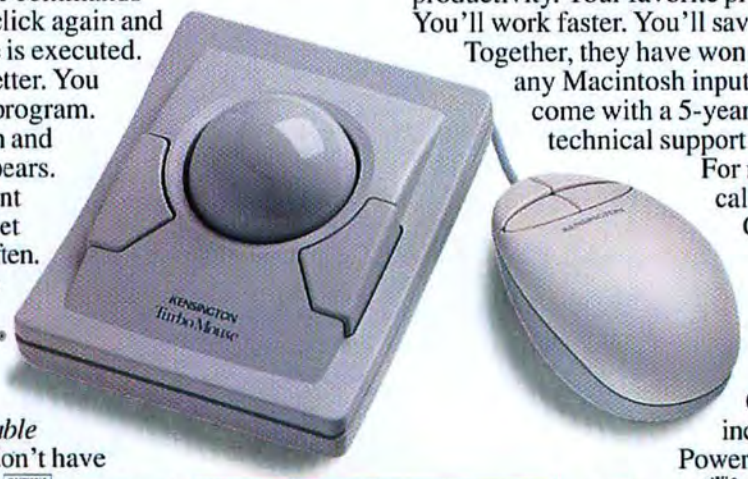

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