

Why You Can't Buy the Mac You Want, Page 86

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Best Mac Games

Power Mac 8500
Most Feature-Packed
Mac Ever, Page 52



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O Your Power Mac™
H You are in
A Microsoft® Word 6.01.
V Your mind
E Is racing.
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O Are racing
B To keep up
T With your thoughts.
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Y You begin
O A new sentence
U With
W A lowercase letter.
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R And 100 levels
E Of Redo.
V Just in case.
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Y You begin a new
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I An entire phrase.
T Automatically.
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V And words.
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Y Until you have finished.
O You click AutoFormat.
U And the block of words
W Can become
R A letter.
I A proposal.
T A story.
E Automatically.
Y You write. Because you can.



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Contents

MACWORLD THE MACINTOSH® AUTHORITY JANUARY 1996



Apple's stunning Power Mac 8500, reviewed in all its multimedia glory, page 52.

Features

80 1995 Macintosh Game Hall of Fame

BY STEVEN LEVY Our esteemed game guru bravely shoots his way through this year's crop to pick the ten best plays of 1995.

86 Why Apple Can't Meet Demand

BY CHARLES PILLER Faced with crippling parts shortages and a wishy-washy commitment to the clone market, Apple is up for some hard times. A special report on the state of the Mac.

94 Full-Proof Printers



BY JIM HEID Need true-life color for your proofs? Think dye-sub. Macworld Lab tests seven printers for text and image quality to uncover the clear winners.

102 Accounting for Growth

BY JAN GILLESPIE As your business grows, so should your accounting program. *Macworld* compares midrange programs to find the best solution for your burgeoning business.

News

29 MacBulletin

30 **News** Dual NuBus/PCI Clone
• This year's hot new games • QuickDraw 3D, and more

37 **Power Mac News** Macs accelerate into the twenty-first century

39 **Macworld Online** Anytime, anywhere pickup games • *Macworld's* GameLine

41 New Products

What we've been waiting for—an innovative Mac clone. Read about it in News, page 30.

Opinion

17 **State of the Mac**
BY ADRIAN MELLO Judging the Mac's real success.

21 Letters

139 **The Desktop Critic**
BY DAVID POGUE Launcher mania.



CPUs gear up for the next century, page 37.

143 **Conspicuous Consumer**
BY TOM NEGRINO Utilizing user groups.

240 **Viewpoint**
BY MARJORIE BAER Happy New Millennium—what's in store for the year 2001?





It's official—Marathon is better than Doom II. Find out why in our Game Hall of Fame, page 80.

Graphics

- 112 News** Blazing trails with Painter 4.0 • New filters, 3-D for KPT 3.0 • Tomorrow's image-setters today, and more
- 118 Expert Graphics**
BY CATHY ABES Graphics professionals share their secrets.

At Work

- 120 News** A usable Lotus Notes • Full Contact is back with 3.0 • Newton add-ons, and more
- 123 Working Smart**
BY JIM HEID GeoPort telephony arrives.
- 127 Quick Tips**
BY LON POOLE Tips, tricks, and shortcuts.

Networks

- 132 News** ARA 3.0 promised (again) • ISDN products coming on strong • A rockin' Mac network, and more
- 135 PowerBook Notes**
BY CARY LU Getting the most from your portable *in* the office.

ON THE COVER

Illustration by John Hersey

Buyers' Tools

- 147 Editors' Choice**
Top picks from our comparative articles.
- 153 Star Ratings**
Hardware and software reviews at a glance.
- 163 Streetwise Shopper**
Hardware and software bargains: discounts, bundles, upgrades.



Why Apple's market-share losses won't be over anytime soon, page 86.

12 How to Contact Macworld

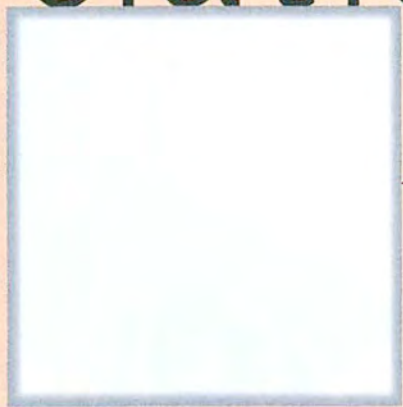


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Reviews

- 52 Power Macintosh 8500/120**
System
- 54 Infini-D 3.0**
3-D software
- 55 ArcView 2.1**
Geographic information systems software
- 57 DeltaGraph Pro 3.5**
Graphing software
- 59 Kodak Digital Camera 40; QuickTake 150**
Digital cameras
- 61 Fargo FotoFun**
Dye-sublimation printer
- 63 Arcserve for Macintosh 1.5**
Backup program
- 65 Radius Telecast**
Nonlinear editing system
- 65 HoTMetaL Pro 2.0**
Web authoring software
- 67 Digital Fotovix IIIS-D**
Video slide scanner
- 69 Meeting Maker XP 3.1**
Group scheduling program
- 69 Encoder Pro; Presenter TVView**
Mac-to-TV converters
- 71 SoftBoard Model 205**
Electronic whiteboard
- 73 Links Pro CD**
Golf-simulation game
- 73 Full Throttle**
Graphic adventure game
- 75 King's Quest VII: The Princeless Bride**
Adventure game
- 75 AmoebArena 1.0**
Strategy game
- 77 The Legend of Kyrandia, Book 3**
Adventure game
- 77 Out of the Sun**
Flight-simulation game

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revelations



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With a hunch.

You begin

At zero.



1

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3

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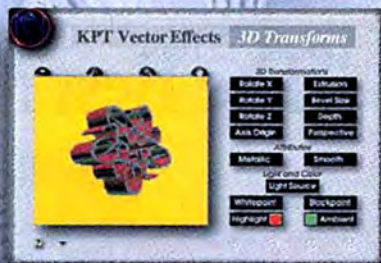
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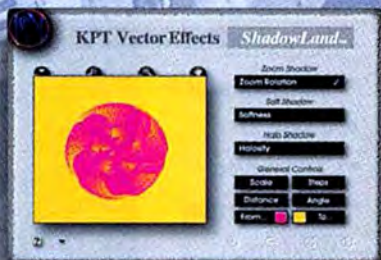
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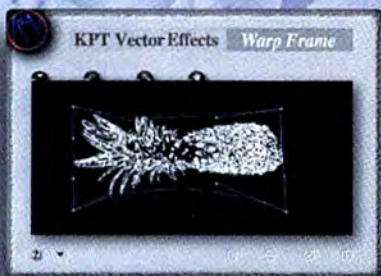
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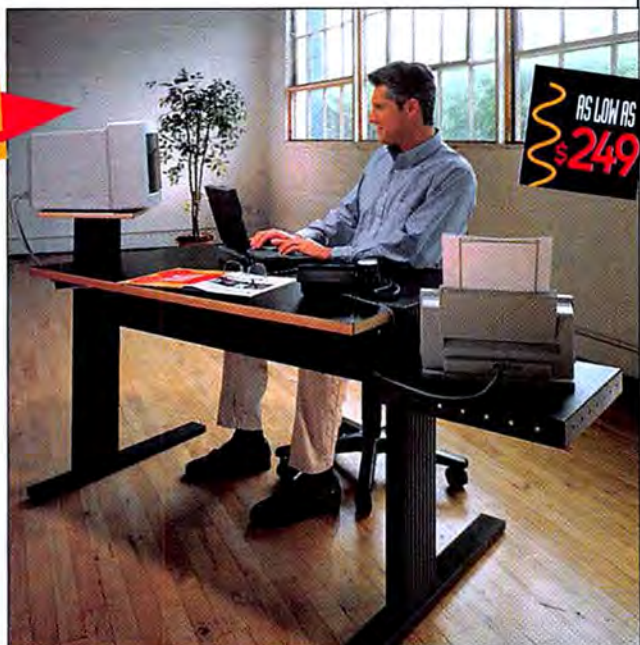
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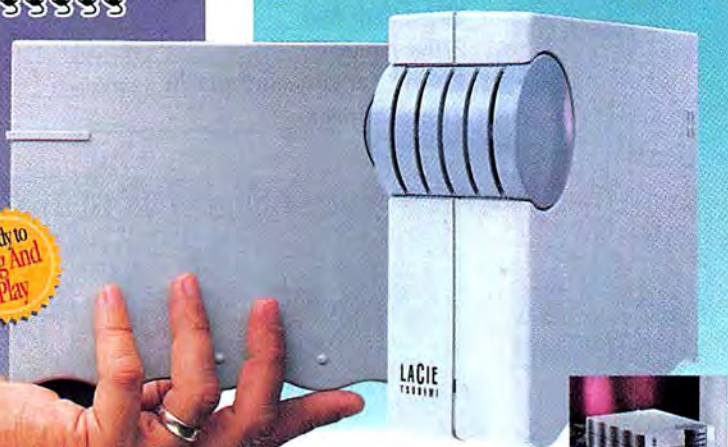
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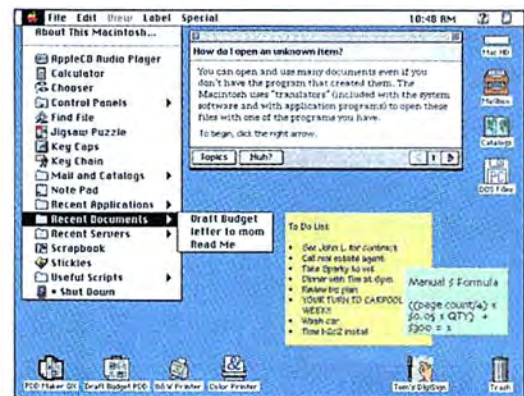
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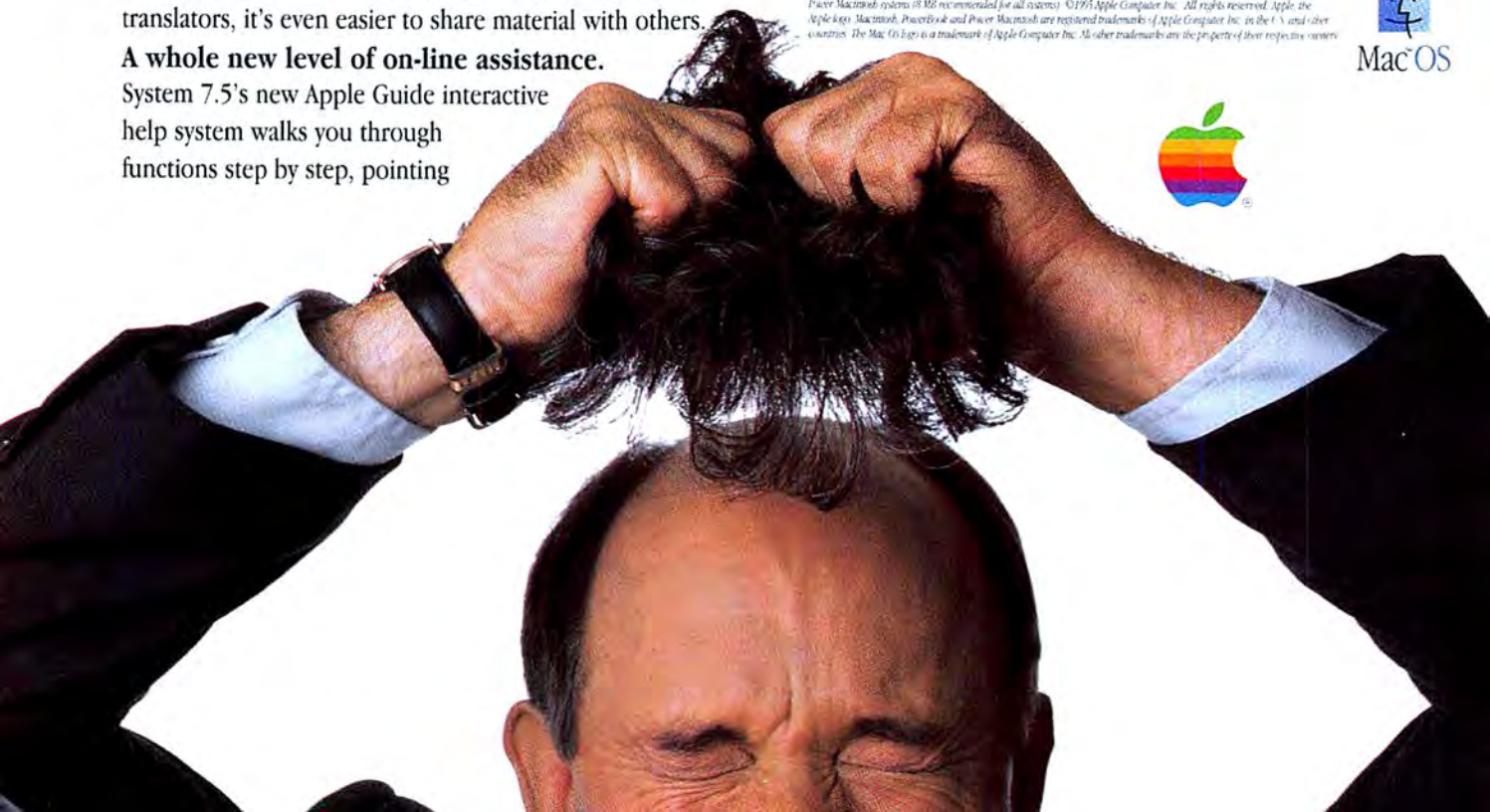
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Mac OS





Assaying Market Share

What's wrong with this picture?

REMBER THE PARABLE OF the blind men and the elephant? Each man tries to describe the huge animal based on the one part he touches. One feels the trunk and declares an elephant to be like a snake. Feeling the tail, another likens the beast to a rat. "Like a tree trunk," says the one who feels the leg. "More like a palm frond," argues the one who touches the ear. If the men had shared their information, instead of each concluding on the basis of one piece of the puzzle, together they might have assembled a true picture of the animal.

In just this way, observers who gauge the Mac solely on the basis of its slender share of the personal computer market misrepresent the overall picture. A more precise representation, derived from snapshots of various market segments, shows a robust computing platform—a product with legs, as they say.

But What about Market Share?

It's true, the Mac's share of the personal computer market has hovered around 10 percent. When Mac sales dropped to 7.4 percent in the second quarter of this year, critics saw the vultures circling overhead. Not so fast, Apple's sales bounced back to 9 percent in the third quarter—a 21 percent increase over the third quarter of 1994.

But size is not the only indicator of a healthy platform. The Mac remains the platform of choice in several market segments, especially multimedia, desktop publishing, Internet use, education, and home computing. Apple is eminently capable of providing superb solutions for these customers. Admittedly, the big player in the market attracts a lot of attention from large businesses and developers, with size alone a strong incentive for them to focus their resources on creating products and solutions for those users. Apple must fight to maintain an adequate share of the market if it's to retain its status as an independent platform. For both Macintosh users and for developers, the good news is that there are sound financial reasons to produce for the Mac.

Take a Closer Look

I have some sympathy for those blind men. Because activity in the personal computer market as a whole is so hot, it's constantly subjected to analysts' scrutiny. The steady flow of studies and surveys, each examining a different dimension of the market, makes it difficult to compose a cohesive picture of the Mac's position there. The effort pays off, though.

Among color-prepress professionals, the Mac is the computer of choice. According to a 1995 study by Griffin Dix Research Associates, the Mac holds 76.2 percent of this market, compared with 18.9 percent for Windows and 0.9 percent for Windows NT. Furthermore, the study shows that stronghold will continue and even deepen, predicting the Mac will hold a 77.4 percent share; Windows,

PCs. International Data Corporation reported in 1995 that the Mac dominates and will continue to dominate the home market. (IDC is a research subsidiary of IDG, which also owns *Macworld*, *PC World*, and numerous other computer magazines.) And the Mac is strong on the Internet and in science and engineering.

All of these are vital and expanding market segments that help build the Mac's strength. That's a picture you won't see if you focus only on the gross market-share numbers.

Software Sales

Another way to gain a useful perspective is to look at how much software has been sold for various computers. The Software Publishers Association (SPA) reported on North American software sales during the first half of 1995.

You'd expect Intel-based PCs to perform well in the traditional productivity area, reflecting the large number of sales in big business. And indeed, though the Mac OS handily outdistances DOS, the Mac doesn't fare especially well in business-productivity software categories. For example, word processors sold to the tune of \$448.5 million for Windows, but only \$31.6 million for the Mac; word processors for DOS came in at \$17.5 million. The story is the same with spreadsheets, where the Mac pulled in \$22.2



11.9 percent; and Windows NT, 6.5 percent.

The Mac also remains strong in the multimedia world. The same Griffin Dix study measured which platform is used for producing or playing motion video and found the Mac had 43.5 percent, to Intel-based computers' 52.2 percent and 4.3 for Unix.

In the education market, the Mac's vigor is even more evident. A 1995 Link Research report projected that, in 1995, the K-12 education market would buy nearly twice as many Macs as Intel-based

million compared with \$337 million for Windows and \$9.3 million for DOS. For database-management software and most other productivity applications, the same rough proportions hold constant. The one category where the Mac showed disproportionate strength was integrated software. Here it came in for \$20.6 million in sales, compared with \$40 million for Windows and \$1.4 million for DOS. That's mighty good performance for such a small hunk of the pie.

continues

The SPA report on education, desktop publishing, design, and software sales echoes the figures on the Macintosh computer's powerful presence in those markets. Home education software brought in \$14.6 million for the DOS platform, \$131.4 million for Windows, and \$46.1 million for the Mac—over a third of the Windows share. Desktop publishing software sold \$50.9 million on Windows (DOS sales were negligible) and \$21.6 million on the Mac—over 40 percent of

the Windows share. In the illustration and design arena, Macintosh software didn't just haul in more than its proportionate share, it actually outperformed Windows. Illustration and image-editing software sold \$79.5 million on Windows but \$87.3 million on the Mac (again, DOS sales were negligible). The SPA report did not measure sales in the Mac's other strong suits, multimedia and Internet software, but I strongly suspect the pattern would persist.

What's in It for Developers?

Developers determine which computers to design products for on the basis of how lucrative their efforts are likely to be. That's only natural. I hope they'll examine their prospects carefully, because a September 1995 report, again from IDC, indicates that there are significant incentives for Mac developers.

The IDC study compared the opportunities and costs of developing for the Mac market with those for the Windows/Intel market. IDC discovered that developers will get a greater return on investment in the Mac market than in the PC market, despite the smaller audience for their products. That's interesting news. What's behind it?

One key factor is that Macintosh users buy more software than Windows users—30 percent more. Another factor is that developers can still sell Mac software at prices somewhat higher than Windows software. According to IDC, because of these two factors acting in combination, the value of software sold for each Macintosh this year will average 73 percent higher than the value of software sold for each Windows machine.

It doesn't stop there. The IDC report states that if you exclude word processing and spreadsheet software—categories dominated by Microsoft—and sales of office suites, "the value of software sold per Macintosh jumps to three and a half times that sold per Wintel machine!" All of these statistics amply demonstrate that the Macintosh market's value to developers is far more than computer sales alone would suggest.

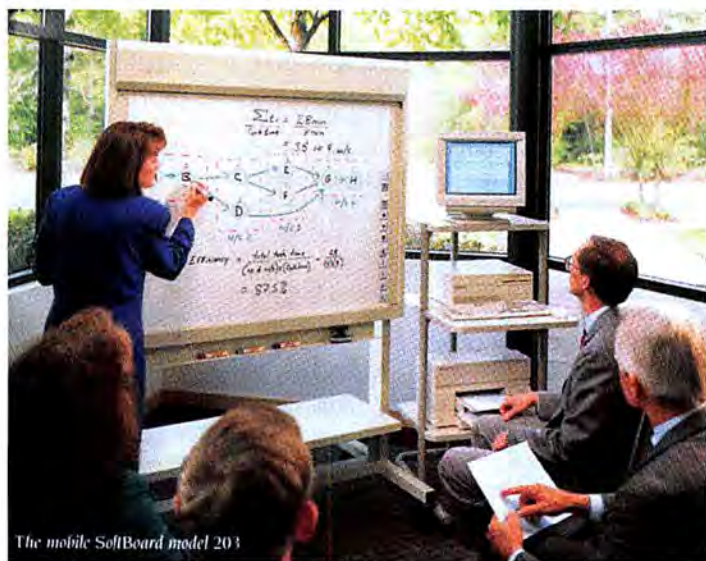
But Wait, There's More

IDC compared the development and marketing costs as a percent of revenue and found that it is less expensive to develop and market products for the Mac OS than for Windows. Mac development averaged 36.4 percent of revenue versus 55.8 percent for Windows. Add to this the fact that the large Windows market creates more competition for developers, some of it already well entrenched. That's a daunting prospect for any developer to face, especially new ones poised to enter the market. It's more difficult to gather and maintain critical mass in the larger marketplace from any single market segment.

A Conclusion Based on Evidence

Taking all these measurements into consideration, IDC concluded, "Yes, the Wintel market is bigger, but the Macintosh market is more manageable, more profitable, and forecasted to grow at least as fast or faster over the next five years."

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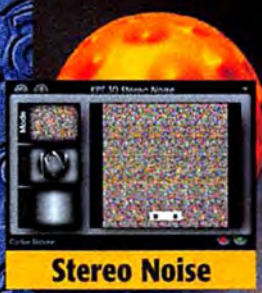
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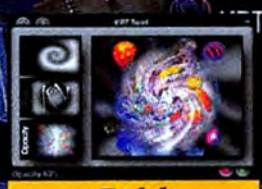
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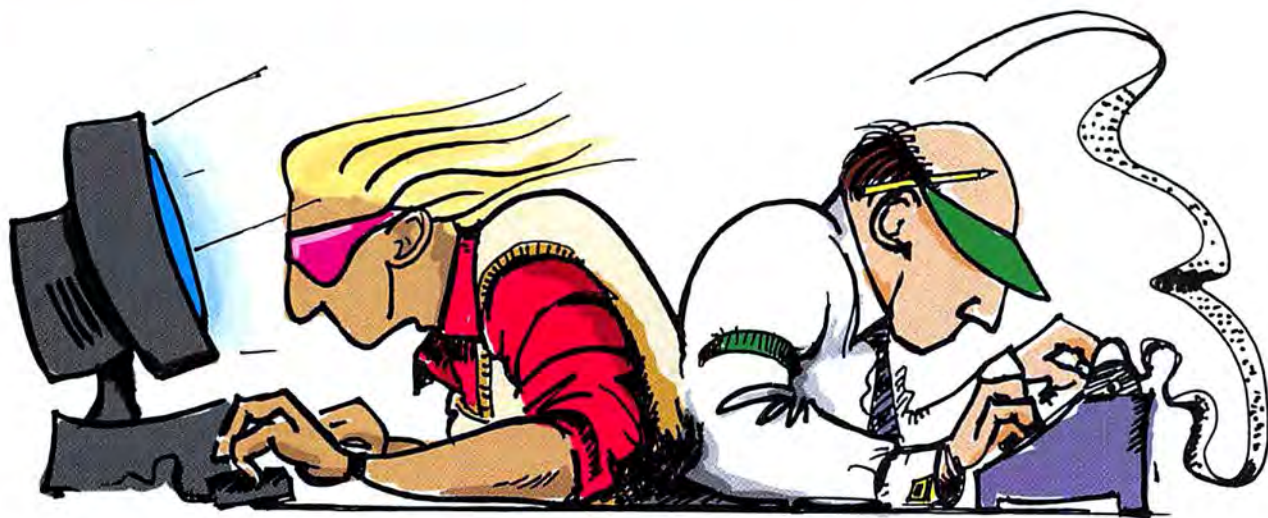


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Letters

Words on the Web

I HAVE TO SAY I WAS MOST PLEASED with the dual articles "Make the Right Connection" and "Pick the Best Browser" (October 1995). As a novice Net dog-paddler, I've become much the wiser because of your articles. Cameron Crotty and Joanna Pearlstein have deciphered the Net in humane language and invited even the most tender novice to venture forth where no dog-paddler has gone before. How reassuring to know that the Net's Web isn't so sticky after all.

*Don Prosser
via CompuServe*

HAVING JUST GONE THROUGH SEVERAL months' research in getting a Web browser running on my Performa 550, I appreciated "Make the Right Connection." I just wish I'd waited until after reading the article to install my system.

My first approach was to use the service offered by America Online since I was already a member and had successfully accessed the Web via Windows at work. The installation went smoothly on my Mac at home, but I could not get the Web browser to work. I chatted with the AOL technical consultants online and learned that 8MB of RAM is a must.

I considered buying more memory. But after reading your article, I found an independent provider, purchased MacTCP and *The Internet Starter Kit for Macintosh*, and it all works with 5MB.

*Sid Frost
via the Internet*

YOUR ARTICLE CONCERNING WEB browsers was accurate and insightful. However, I believe you overlooked MacWeb's most important feature—its size! MacWeb is small enough to fit onto a high-density disk, which makes it perfect for people whose Internet access comes from a public computer lab—like college students who do not have network ports in their dorms. The computers have



no hard drives, so using 2MB browsers like Netscape Navigator or Mosaic is impossible. In the future, when you're reviewing Internet tools, I invite you to consider size as well as speed, as a service to those Internauts whose utility belt is a little tighter than most.

*Justin Payne
via the Internet*

I WOULD LIKE TO EXTEND A HEARTY thank-you for your most timely and informative article "Make the Right Connection." I've been tromping through the comp.sys.mac.comm newsgroup for quite some time to get answers to questions that you made available. I had an idea of what to do, but simply lacked the direction. Your article provided that direction.

*Daniel R. Evans
via the Internet*

BECAUSE OF "MAKE THE RIGHT CONNECTION," I felt creative enough to post my own Web page on America Online. You said AOL allows a 2MB HTML home page, but this feature is only available for Windows. AOL would

not give me an exact answer on when it would be available for the Mac, only "it's currently in beta-testing."

*Michael Thibeau
via America Online*

You're right; the Mac version is still in beta. AOL expects it up and running sometime this fall.—Ed.

Big Picture, Big Question

ACCORDING TO *MACWORLD*, "PETER M Stoller is a Los Angeles-based Macintosh consultant who delights in solving arcane Mac problems in America Online's Macintosh Operating Systems forum." This is an arcane Mac problem possibly of his own making. *Macworld* rated the Philips 17B as the best 17-inch monitor tested and gave it the Editors' Choice ("Big Picture, Big Value," October 1995). Since I am in the market for a 17-inch monitor, I thought, "Great! I'll get one." This was going to be one easy sale for Philips—except I couldn't find the 17B! I should have sensed trouble when I called Philips and they had never heard of it. I should have sensed even more trouble when half the monitor supply warehouses that I called hadn't heard of Philips! This was especially disturbing since it was Philips that suggested I call them. After talking to the Philips sales rep for half an hour, we found a monitor, released in January, that shared the same specs with the much touted, if vaporous, 17B. That monitor was called the Philips 1766DC. The 1766DC itself is pretty hard to find. If I want it, I have to order it sight unseen as no one seems to actually stock it in a showroom. If I later decide that I don't want it, I will have to pay a \$100 restocking fee to give it back. I feel a little unwilling to accept these terms unless I have some reason to believe the 1766DC is a good monitor.

*Ian Ollmann
via the Internet*

continues

CORRECTIONS

■ The correct address for Apple's Networking and Communications software update library ("Top Ten Internet Addresses," *Networks news*, September 1995) is [ftp://ftp.austin.apple.com/Apple.Support.Area/Apple.Software.Updates/US/Macintosh/Networking_and_Communications/](http://ftp.austin.apple.com/Apple.Support.Area/Apple.Software.Updates/US/Macintosh/Networking_and_Communications/).

■ An *At Work news In Brief* in the October 1995 issue ("Secure That Drive, Mister!") incorrectly implied that ASD's DiskGuard is the only driver-level security software available that is IDE compatible. *usrEZ's ultraSecure* has been IDE-compatible since April 1995.

■ The correct phone number for *Fractal Design* is 408/688-5300 (*Reviews*, October 1995).

■ The phone number for *Markzware* is 714/645-0881 ("Extending QuarkXPress," *Graphics news*, November 1995).

■ "Word 6.0 Survives Fiasco" (*News*, December 1995) incorrectly stated that new Mac versions of Microsoft's Office applications would be available by the end of 1995. Microsoft has not announced a release date for the next version of the Office product.

Our apologies for any inconvenience. The problem stems from Philips' arcane naming conventions. The product name is the 17B, while the model number is the 1766DC. Philips tends to refer to it as the latter. The whole thing will become even more confused in January when Philips reverts to the Magnavox name for all its monitors.

According to our sources at Philips, the problem with availability for the 17B is that the company recently shifted manufacturing of this model from Taiwan to Mexico. That caused a hiccup in the monitor's availability. It has not been discontinued, and it is indeed the same monitor that we tested. According to Philips, though, it will probably be hard to find and may have to be specially ordered because of this manufacturing glitch.—Ed.

Move Quick on Quix

YOUR ARTICLE SCOOPING THE QUIX port to the IBM PreP (*News*, October 1995) was a pleasant surprise that I could personally relate to: for the past couple of months I've been using the Quix port of the Mac OS on my Next machine. I've been as amazed as you regarding the bomb-proof reliability of the company's porting technology. I skeptically read the rave reviews on the various Next forums at the beginning of the summer, but they were so over-

whelmingly positive I decided to order it from the American distributor, OpenSource. I've used it intensively in a professional environment since then and it's run flawlessly, and at Quadra 950 speeds.

Quix is for real, and I hope that Apple will follow the example of successful companies like IBM and Microsoft—and not Next—by more aggressively pursuing an open computing strategy. Judging by its products and good support, Quix comes across like a crack professional group of engineers, and Apple would do well to take Quix seriously.

Roger Brisson
via the Internet

The Sporting Life

UNTIL RECENTLY I WORKED EXCLUSIVELY with IBM computers, both in graduate school and in the research industry. However, my new employer uses Macintoshes. I have been pleased with the computer—so much, in fact, that I plan to purchase one. I searched for Mac sports software, but was unable to find anything. I was wondering why there isn't any or if there is, where it may be.

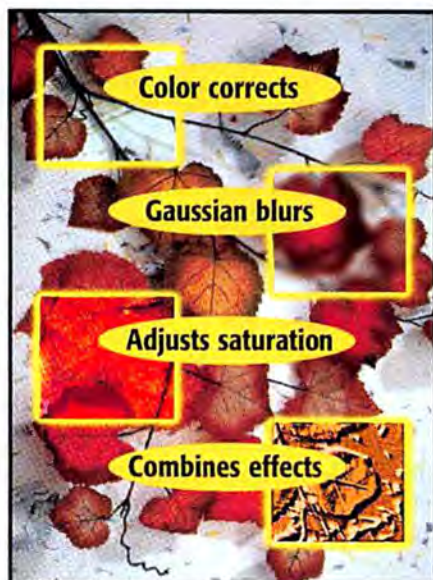
Kendall Szeliga
via the Internet

You might not see them sitting on the shelf at your local software store, but Mac-compatible sports games are out there. In fact, a couple are mentioned in this issue (see "Links Pro CD," in *Reviews*, and *Macworld Online news*). *Inside Mac Games* (800/339-0636; \$59 for ten CD-ROM-based issues) covers all sorts of Mac games. Of course, if you've got the time and the money, you can always pay a visit to the Macintosh Game Hall of Fame in Pittsfield, Massachusetts.—Ed.

Please, Just No Dylan Lyrics

I WAS INITIALLY SURPRISED TO READ the conflicting suggestions regarding E-mail signatures from Guy Kawasaki and David Pogue (*Wise Guy* and *The Desktop Critic*, October 1995). Guy suggests that signatures be used sparingly, and that "Some people . . . go overboard and create elaborate signatures with poetry, quotes, and ASCII art . . . so simplify your signature or don't use one at all." Meanwhile, David tells us "Netiquette example two: signing your E-mail with nothing but your name is the online equivalent of wearing a 'dork' sign on your back."

As I tried to reconcile these contradictory thoughts from these MacSages, it occurred to me that the larger lesson is *continues*



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that E-mail and, for that matter, all online communications are best guided by the same rules as traditional communication. Know your recipient. If you're sending a business message, keep it to the point. If your message is social, then use as many poems as you'd like.

I can remember when my Macintosh was provided by an employer and David's advice would have caused me to lose a weekend designing a way-cool signature. Now that I own the company, I can't imagine spending the time on a fancy signature. I hope the fact that I'm busy doesn't really make me a dork.

Now, if I can just figure out the perfect E-mail message that would get Guy to invest in my company.

*Bret Keisling
via America Online*

Sanity Saver

YOU'VE DONE IT AGAIN. SAVED ME from the extremes of total frustration. This morning I was online, and just before signing off I decided to click on the America Online greeting screen. I clicked on an icon that said New, for *Computersomething* magazine. What a mistake. I was forced to wait over 20 minutes for the artwork to download. I'm not quick to anger as a rule, but by the time it finished, I was fit to be tied. I signed off and was too frazzled to go to work right away. I took a little break and picked up the October *Macworld*. It must have been destiny that it fell open to *The Desktop Critic* and the solution to the plague of artwork downloads on AOL. I've just installed and tested ArtValve, and boy, am I one happy camper. Can't wait to get my \$5 in the mail to Bill Karsh.

*Sheila Bailey
via America Online*

Wiseacre

AS A NBODUMDEKTA (NEVER BEEN Online, Don't Understand Modems, Don't Even Know The Acronyms), I was shocked to learn in Guy Kawasaki's column (*Wise Guy*, October 1995) that ALL CAPS is a definite faux pas when writing E-mail. What *bozo* came up with this convention? I *always* write in ALL CAPS. With the many hours I type on my computer, if I need to add extra emphasis to my writing, I merely use my mouse, a few strokes, different-size type, and boom, I'm in. WYSIWYG. I can't afford to contract carpal tunnel syndrome by constantly pushing the shift key up and down all the time. Why has the comput-

er world not embraced this yet? This went out with the typewriter in my book, Guy.

*Doug Ellis
Grandview, Missouri*

Why? Because we want to hang on to what meager eyesight we have left.—Ed.

Turkey Turnaround

VISUAL BUSINESS SYSTEMS' PROFESSIONAL Output Manager was recently featured in your "Bugs & Turkeys" as (I regret to say) a turkey, because of our serial-port dongle (*News*, October 1995). This is no longer true. We have an ADB (keyboard)-style dongle available for any of our users who would like the availability of their serial ports. All new versions now ship with the dongle, which has been tested on the latest Macintosh computers. Anyone wishing to switch to the new dongle should contact VBS at 508/263-9900; via the Internet at vbs@visbussys.com; or on the World Wide Web at <http://www.visbussys.com/vbs>.

*Christopher Osborn
Visual Business Systems
via the Internet*

Marketing Department? Huh?

DO YOU HAVE ANY IDEA WHAT Apple's E-mail address is?

*Nick Aschbrenner
via the Internet*

You can FTP to Apple's software update site, <ftp://ftp.info.apple.com>, or visit the Apple Web page at <http://www.apple.com>. I've also heard tell that it's possible to send E-mail to Apple via competition@applelink.apple.com, but it didn't work when I tried it.—Ed.

I FIND IT WONDERFULLY IRONIC THAT Microsoft chose the Rolling Stones' "Start Me Up" as its theme song for the release of Windows 95—only they left out the line, "You make a grown man cry."

*Mark Feldman
Santa Cruz, California*

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

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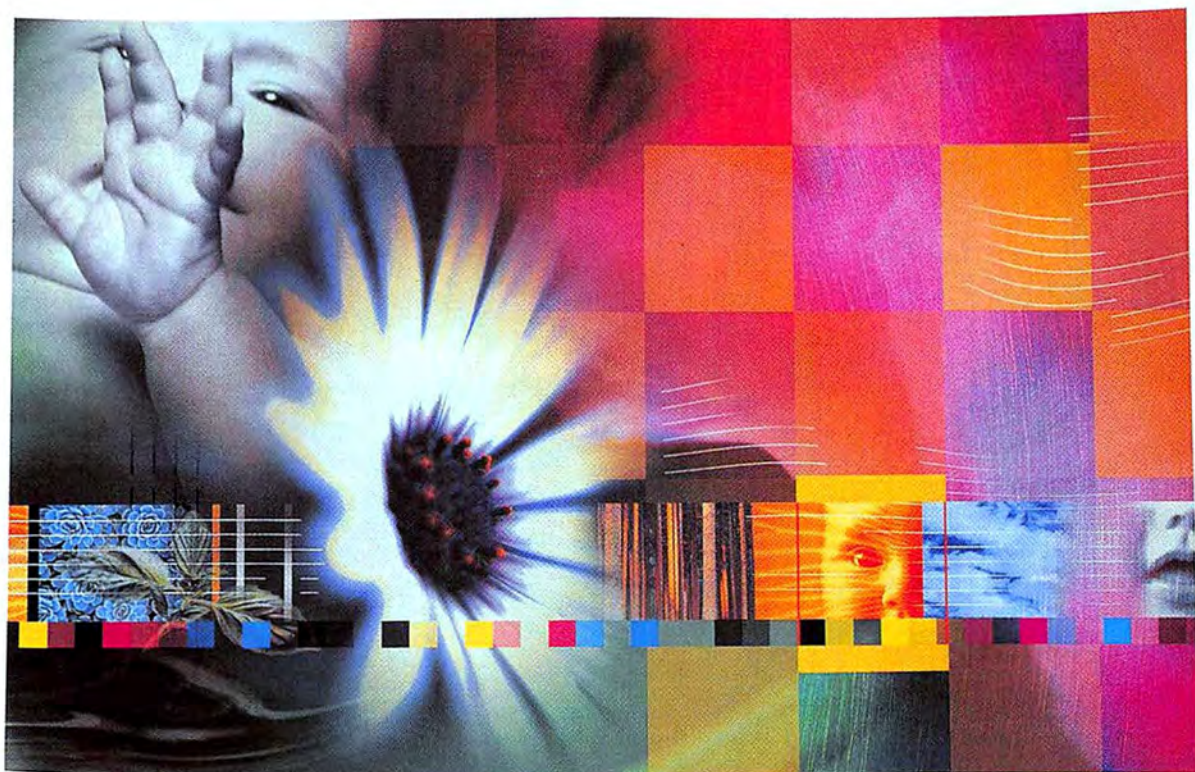
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MacBulletin

CHRP Standard Unveiled Apple, IBM, and Motorola have finalized the technical details for their jointly developed Common Hardware Reference Platform (CHRP), officially christened PowerPC Microprocessor Common Reference Platform.

As *Macworld* went to press, release of the specifications was set to take place on November 13 at the Comdex fall trade show. The three companies were also hoping to show an early CHRP prototype running the Mac OS and Windows NT. CHRP—which will be able to run all major operating systems except Windows 95—will gradually replace the current Power Mac hardware design, as well as IBM's PowerPC Reference Platform (PReP). The first computers based on the new design are expected from Apple and other companies in late 1996.

Industry sources suggest that the German computer maker Vobis, Taiwan-based Umax, and Japan's Canon—as well as two U.S. companies, PReP developer FirePower Systems and Mac-clone maker Power Computing—will announce plans at Comdex to build machines based on the new standard.

Apple's Ups and Downs After a year of much bad news, Apple is showing signs of a rebound. Despite an inability to keep up with the strong demand for new Macs, Apple earned a record \$3 billion in the fiscal quarter ending September 30, 1995—up 20 percent from the same quarter a year earlier. Apple sold about 1.3 million Macs between July 1 and September 30, 25 percent more than in the same period in 1994. Power Macs accounted for 70 percent of the sales.

Apple's share of worldwide personal computer sales jumped from a dismal 7.4 percent in the summer to 9 percent in the fall—Apple's usual percentage. The delays in shipping the new Macs appear to be one reason for the summer dip.

Fueled by strong sales of Macs to the education market, Apple now accounts for 63 percent of the computers used in U.S. public schools, up from 59 percent in the 1994–95 school year.

But the record earnings and higher sales do not mean record profits. Income for the quarter was \$72 million, versus \$190 million the year before. Apple now earns less per product—averaging 20.7 percent of the sales price this year, versus 27.2 percent a year ago.

Apple's efforts to reinvent its management also continued. In early November, senior vice president Dan Eilers, the respected number two executive and former Claris president, left the company after a reorganization eliminated his job. Apple has reorganized several times in the last year, consolidating the company's focus on key markets (such as North America, Europe, and Japan) and key user segments (such as graphics, education, and publishing).

Novell Drops OpenDoc, WordPerfect Reversing a diversification effort, Novell has returned to its roots as a networking company. A month after selling its Unix business, Novell has ended its development of the Windows version of OpenDoc, an Apple-IBM technology for making small applications work together as if they were one big program. Apple continues to develop a Mac version of OpenDoc, which should be released in early 1996. IBM will take on the Windows version in addition to its OS/2 effort.

And Novell is putting the WordPerfect division up for sale, although no deal was announced at press time. In addition to the WordPerfect word processor for the Mac and Windows, the division also sells a Windows suite that includes a spreadsheet and database. Novell was reportedly porting that suite to the Mac to compete with Microsoft Office; its fate is unknown. **m**

NEWS

IN THIS ISSUE

p. 32 Hot Games Preview p. 33 PowerBook Future p. 34 Will SuperMac Return to Sell Clones?

p. 37 Next Step for the PCI Bus p. 112 Web-Friendly Painter 4.0

p. 112 The Dry Film Advantage p. 120 The Simplified Lotus Notes p. 132 Waiting for ARA 3.0

3-D Comes to the Mac

With Apple's QuickDraw 3D technology available for any PCI Power Mac, it's only a matter of time before companies find new ways to take advantage of 3-D display for their programs, whether they be games, solids modeling, computer-aided design, or Web publishing. And as software takes advantage of 3-D, you can expect hardware companies to be close behind, offering QuickDraw 3D acceleration to bring the Mac closer to the kind of 3-D processing power heretofore reserved for mainframes and Unix Systems.

3-D's Web Possibilities

While the initial buzz on 3-D involved specialized uses—particularly modeling and CAD—it turns out that 3-D may now have a bigger reach.

The World Wide Web is no longer limited to static text and graphics. VRML (Virtual Reality Modeling Language) and Apple's QuickDraw 3D (408/996-1010, quickdraw.3D@applelink.apple.com) let Web pages contain 3-D objects that can be manipulated and 3-D scenes that can be navigated. The 3-D elements can also contain links to other 3-D objects and other Web sites.



HEIK DAWSON

With these emerging technologies, online catalogs can include 3-D models of products that customers can view from any angle. A college can create a navigable 3-D campus in which clicking on the bookstore brings a student to a page showing the store's interior or listing its inventory. Theatergoers and sports

fans can see exactly what they'll view from the seats they're about to purchase. Scientists can jointly analyze 3-D representations of live experimental data. The possibilities are endless.

The VRML standard and Apple's QuickDraw 3D get around previous 3-D file-size roadblocks by rendering

scenes on the fly at a client's computer. Web servers transmit only geometry and texture information, not large rendered 3-D files. The client computer determines the placement, color, and shading of individual pixels. The result is drastically smaller files that can be efficiently distributed over 14.4-Kbps modems. For

First Dual-Bus Mac Clone

NUBUS, PCI IN ONE SYSTEM



Macintosh clones aren't noted for innovation. Sure, Radius and Power Computing have each bettered Apple in small ways—better enclosures offer easy access to components and upgrades; deft packaging of peripherals creates an integrated solution for high-end DTP and video users. But licensing restrictions have made it hard for clone makers to deliver more than refined knockoffs.

Until now. For the first time, a Mac clone maker has made good on the promise to innovate. Power Computing recently introduced the PowerWave 604 series of dual-bus desktops. (Shortly afterward, DayStar Digital delivered a multiprocessing clone jointly developed with Apple, which is also a meaningful innovation.) The PowerWaves offer both NuBus and PCI slots—unlike anything Apple offers. If you have a huge investment in NuBus cards for video, graphics, and high-end storage, yet don't want to be left behind in the inevitable transition to the faster PCI standard, you can now heave a sigh of relief.

Power Computing's Innovation The basis of the new technology is an application-specific integrated circuit (ASIC) designed by Power Computing (800/671-6227, info@powercc.com) with Apple funding. Apple retains rights to use the new Stargate ASIC, but according to Power Computing CEO Stephen Kahng, Apple does not plan to produce dual-bus systems. This chip will also be available to third parties, so don't be surprised if others cash in on



Power Computing's new PowerWave 604 series runs as fast as 150MHz.

the NuBus legacy market. For example, Radius officials have long hinted the company would offer a dual-bus machine, probably using its own technology. (All the clone makers realize they must design their own ASICs to compete against Apple.)

The Stargate ASIC operates as a PCI-to-NuBus bridge and resides on a \$249 riser card; expansion cards fit into the riser card instead of directly on the motherboard. So if you just need PCI, you won't need this chip and can buy a cheaper version of the same machine with a PCI-only riser.

Power Computing claims the chip yields higher performance than traditional NuBus for some applications—particularly digital video—but no units were available for testing as *Macworld* went to press.

The New Lineup Dual-bus configurations will be roughly based on Apple's PCI Power Macs. Like Apple's PCI Macs, they will use *continues*

example, an 1100-polygon 3-D model of a temple can be described in 42K with VRML. By contrast, a flat-shaded DXF version of the temple requires 1.5MB.

In some cases there are performance hits. A 66MHz Power Mac can manipulate objects with a few dozen polygons in nearly real time, but more complex models and scenes take longer to manipulate and navigate. A shaded 6-polygon cube takes 8 seconds to fully rotate through 36 steps, while the 1100-polygon VRML scene takes 22 seconds. Future plans for QuickDraw 3D and VRML include supporting animation, allowing multiple participants in the same scene, and improving performance.

Apple's QuickDraw 3D adds a few twists. If a Web page contains a model in QuickDraw 3D's 3DMF format, a user can drag that file out of a browser and drop it on another document or into the Clipboard. Apple plans to closely integrate QuickDraw 3D with its QuickTime VR technology, letting one scene contain both realistic and synthetic 3-D information.

Upgraded versions of Mac 3-D applications—including Strata StudioPro 1.75 (\$1495; 801/628-5218, info@strata3d.com), Virtus Walkthrough Pro 2.5 (\$495; 919/467-9700, info@virtus.com), and Specular International's Infini-D 3.1 (\$899; 413/253-3100, info@specular.com)—will all create VRML files. Integrating a VRML file into a page takes about the same effort as embedding a GIF file. Integrating a VRML file containing multiple URLs requires a bit more effort.

You can view VRML models with Whirlwind, a freeware Power Mac application by John Louch and Bill Enright that requires QuickDraw 3D. Whirlwind 1.0 can be installed as a *continues on page 35*



3-D cards, such as those from Matrox and Yarc, are starting to appear.

Dual-Purpose Drives

Want both a rewritable optical drive and a CD-ROM drive on your desk but don't have the space—or the cash? Using technology called phase change, three storage vendors recently announced new dual-function drives that combine both into one unit with a common tray-loading mechanism. The technology differs from what's found in a magneto-optical drive because there's no magnetic process involved—the laser that reads the CD-ROM can also write to the optical disc.

DynaTek's PCD650 (416/636-3000, info@raider.dynatek.ca) is shipping for \$995. The APS PDCD (816/483-1600, sales@apsTECH.com) and the Toray Phasewriter (415/341-0845) are scheduled to ship by the end of 1996; pricing was not available at press time.

Desktop LCD Projector

Proxima (619/457-9647) has introduced a \$6295 desktop active matrix LCD projector, the Desktop Projector 2400. It can display 2 million colors simultaneously at 640-by-480-pixel resolution.

1GB Drive Modules

MicroNet Technology (714/453-6000) will offer Iomega's 1GB and 540MB Jaz cartridge drives (higher-capacity cousins of the popular 100MB Zip drive) for its DataDock system. Each Jaz drive will cost \$600. The DataDock consists of stackable cases into which you can insert and remove SCSI devices such as hard drives, with no need to worry about cabling and SCSI IDs.

600-dpi Color Laser

Lexmark International (606/232-2000) now offers a 600-dpi CMYK color laser printer. The Optra C costs \$6400, plus \$299 for a LocalTalk interface card. Lexmark also unveiled four black-and-white laser printers that output at 1200 dpi: the R+, Rt+, Lx+, and Li+. Prices range from \$1749 to \$3549.



The \$249 riser card adds NuBus slots to the new Power Computing PowerWave 604 systems.

bays. Expansion capability will be the same on desktop and tower machines—three PCI slots, or two PCI and two NuBus slots.

Power Computing says these units will be available in small numbers through November 1995, with production ramping up in December.

daughtercard-based CPUs to make for easier upgrading.

Power Computing's PowerWave 604 models will be based on a 150MHz, 132MHz, or 120MHz PowerPC 604 CPU. But the dual bus and enclosure design (in minitower and desktop models) should offer more flexibility and configurability for consumers. The 132MHz and 150MHz tower machines will feature three drive bays accessible from the front; the 120MHz desktop unit will feature two

Like the Power 100 and 120 models that the new machines will gradually replace, all the Power Computing offerings will ship with a keyboard, mouse, quad-speed CD-ROM drive, and a range of bundled software; these machines will support Mac and VGA video and offer 16MB of RAM and a 1GB hard drive in the base models. The PowerWave 604/150 will cost \$4499, the 604/132 will cost \$3699, and the 604/120 will cost \$3199.—CHARLES PILLER

More Add-on Cards for PowerBooks

FAX MODEM, ETHERNET, AND VIDEO CARDS

ActionTec (408/739-7000) and Global Village Communication (408/523-1000, sales@globalvillage.com) have both announced PC Cards (formerly called PCMCIA) for Apple's new PowerBook 5300 series and 190.

Both companies announced 14.4-Kbps and 28.8-Kbps fax modems and 10BaseT Ethernet/fax-modem combination cards. Global Village's combo card offers simultaneous use of the modem and Ethernet connections, while its fax modems offer two phone jacks. Both companies' products can support cellular phones with optional kits.

ActionTec's 28.8-Kbps fax modem costs \$299, while the combo card costs \$479; its 14.4-Kbps modem costs \$149 while the combo card costs \$339. An Ethernet-only card costs \$149. Global Village's 28.8-Kbps fax modem costs \$399, while its combo card costs \$599; its 14.4-Kbps fax modem costs \$209.

Viking Components (714/643-7255) offers the NetLink 288, a \$329, 28.8-Kbps fax modem that works with cellular telephones and provides autodial and autoanswer modes. And TDK Systems (916/478-8421) offers the \$529 DF2814APB Global Class fax modem.

In related news, Focus Enhancements (617/938-8088, focus@applelink.apple.com) has broadened its line of PDS cards for the new PowerBooks. In addition to the \$279 MV8-EN card, which has 8-bit video on 15-inch and 17-inch monitors plus a 10BaseT Ethernet connector, Focus offers the \$399

SPECIAL REPORT

Hot New Games

The glorious revolution continues, comrades! For years, the hardware fiddlers on the PC side have had better games, while the Macintosh proletariat, weakened by the anemic performance and burdened with massive system overhead, suffered under the grinding boot of sniveling Apple dictators, obsessing about the Mac's being called a toy computer.

But the will of the people cannot be restrained. The petty bureaucrats at Apple are being reeducated, and the PowerPC chip burns inside the Macintosh with the fury of a thousand suns. This special report previews an exciting, innovative new game, *Bad Mojo*, and goes deep into the heart of a top game developer, LucasArts, to bear firsthand witness to the mighty forces being unleashed therein. Long live the revolution!

Sneak Peek: Bad Mojo

Let's just say that you've had better days. One minute you're a man with a passport, a plane ticket, and a million dollars, and the next minute...

You're a cockroach.

Your sudden demotion to six-legged scavenger is your entry to the dark and twisted world of *Bad Mojo*, the latest game from Pulse Entertainment (310/264-5579, badmojo@Pulse-ent.com; formerly Drew

Pictures, creators of *Iron Helix*). *Bad Mojo* draws on the heritage of *Brøderbund's Myst* and *Virgin's 7th Guest*, sending players on a quest of exploration and puzzle solving.

Macworld was able to play/test a beta version, and while *Myst* was otherworldly and *7th Guest* was eerie, *Bad Mojo* is deliciously *grimy*. Discarded cigarette butts, spilled liquids, and bits of gum stuck to the underside of tables, all photographed and rendered in loving detail and startling realism, set the stage for a bizarre tale of sorrow, loss, and redemption amidst the ordinary debris of human existence.

Your insectile alter ego is creepily believable, appearing on screen in a top-down view, responding with legs scuttling and antennae waving to simple directional keyboard

commands. Success depends on inferring clues from the bits and pieces (and occasionally people) that you crawl over and under. The game is also infused with otherworldly elements, as pictures come to life with memory flashbacks (movie sequences); silverfish, slugs, and fellow roaches pass on survival hints via a sort of vermin telepathy; and a mysterious guide appears in visions.

Multiple cinematic sequences tie *Bad Mojo* together, and a moody, atmospheric



In *Bad Mojo*, you may be a cockroach, but you can still recognize cheap cigars and the smell of despair.

MV16-EN, which has 16-bit color, and the \$299 MV16, which is an MV16-EN without the Ethernet connector.

—GALEN GRUMAN

PowerBook: What's Next?

DON'T EXPECT NEW INPUT DEVICES OR CD-ROM SOON

With Apple's new crop of PowerBooks all now shipping, you may ask, "What's next?" After all, PC notebook makers have been introducing innovations, including internal CD-ROM drives, removable LCD panels, and internal removable-media drives, none of which are in the latest Mac notebooks. A few companies in the PC market—IBM most notably, but also Toshiba and NEC Technologies—have become the prime movers in the notebook technological

exploration, taking on a role that most people associate with Apple.

But Apple has decided not to ride the leading edge when it comes to notebooks, say PowerBook product managers. As an example, take the CD-ROM drive, a device that Apple almost single-handedly made a standard component, not just on Macs but on all PCs, by including them in all models at almost no profit. It took about two years for a CD-ROM drive to become a must-have option for any PC. Now, several PC notebook makers are including CD-ROM drives in their notebooks, either in a side bay that normally houses a floppy drive or in a turntable-like apparatus under the keyboard, which flips up to give access to the CD-ROM drive.

But Apple product managers plan to hold off on adding CD-ROM drives until they can do so while retaining a weight



MATT WALTON

of about 6½ pounds, a decent battery life, and entry-level prices. Today's PC notebooks with CD-ROM drives are bigger, heavier, and pricier than regular notebooks, which is why PC vendors call them *bricks*. Bricks are typically used as miniature presentation systems, not personal computers.

As for copying two well-received IBM input innovations—a keyboard that expands to full size with a full set of keys when you open the lid, and the mini-joystick—Apple has no plan to do that, preferring to let users plug in a keyboard if they desire and to keep the trackpad as the standard Apple portable pointing device.

Later this year, you'll see PC notebooks sporting removable 5¼-inch drives, such as CD-ROM and SyQuest; removable LCD panels that work on overhead projectors; and a choice of input device. Apple says most of these come at the expense of battery life and weight, although it knows that it will have to consider such options in the future. Because there are so many PC notebook makers, a few can afford to invest in such options and successfully target a small part of the large PC notebook market. Apple, with a smaller base of users, can less easily afford to develop technology for subgroups, which is why you'll see only the innovative technologies that Apple thinks will appeal to the broad Mac market on its notebooks.

Given the small size of the Mac market (about 9 percent of the overall personal computer market) and the even smaller slice of notebook *continues*

soundtrack rounds out what's sure to be one of the most talked-about games of 1996.

Bad Mojo is expected to ship in January on CD-ROM for both the 680X0 and Power Macintosh; pricing had not been determined at press time.

LucasArts Preps Winter Lineup

Mac gamers can look forward to a joyous Thanksgiving, a merry Christmas, and a happy New Year, thanks to the crack team at LucasArts (415/472-3400); the maniacs in Marin County have plans to ship no fewer than five games between October and Super Bowl time.

X-Wing for the Macintosh should be on store shelves by the time you read this, and based on my hands-on play with a late prototype, the Mac version was worth the wait. Everything from the scenes between action segments to the game-control screens to the

flight engine has been updated with gorgeous high-resolution graphics, and the action is still fast, smooth, and exciting. The game will ship on CD-ROM for \$49.95, and will contain all the original X-Wing for PC CD-ROM missions, plus the missions from B-Wing and Imperial Pursuit.

In mid-January, *Star Wars* addicts will get another fix with *Rebel Assault II* (\$49.95), a hybrid game consisting of multiple episodes, each with a different style of play. Something odd is going on in a remote corner of the galaxy; it's up to you to find out what. Reprising your role of Rookie One, you'll fly a TIE fighter through narrow canyons, board an X-Wing, battle your way through the sewers of an Imperial station, and race for your life aboard a speederbike. The game is tied together with live-action cinematic sequences filmed with all the familiar *Star Wars* props.

For the more pensive gamer, *The Dig* is a puzzle-based adventure game scheduled to ship on CD-ROM in December 1995 for \$49.95. As Boston Low, space-shuttle pilot, you're on a mission to prevent an asteroid from crashing into Earth. Your investigations reveal that the asteroid is actually an alien spaceship, and then things *really* get weird. Suddenly shanghaied halfway across the galaxy, you and your team must rely on your wits to find a way home.

Meanwhile, LucasArts is bringing a pair of adventure-game faves from PC land over to the Macintosh. *Day of the Tentacle* and *Sam and Max Hit the Road* are two CD-ROM puzzle/adventure games, each with a twist. In the former, you guide a team of three friends as they attempt to save the world



Blasting Imperial stormtroopers is all in a day's work for Rookie One. You also get lots of cockpit time in LucasArts' *Rebel Assault II*.

from the evil Purple Tentacle. In the latter game, Sam and Max are a wisecracking dog-and-rabbit detective team that rely on your help to solve a tricky mystery. *Day of the Tentacle* and *Sam and Max* should both be available by the time you read this. Prices were not available at press time.

So when the weather outside turns frightful this winter season, fear not. You'll be warm, toasty, and well entertained by the light of your Macintosh.

—CAMERON CROTTY

users (about 15 percent of Mac owners), there simply aren't enough buyers for the more esoteric technologies. Simply put, Apple can't recoup the development costs of technologies that it can't sell to almost all its PowerBook users, according to the Apple PowerBook team.—GALEN GRUMAN



Rick Schrameck, a former top Radius executive, plans a new line of clones that would resurrect the SuperMac name.

SuperMac May Return as Clone Seller

WILL FIRST SELL RADIUS-MADE SYSTEMS



A former Radius executive is negotiating to license the SuperMac name from Radius for a new line of Power Macintosh clones and ambitiously plans to exhibit early units at the Comdex trade show in mid-November 1995 and ship several thousand units by the end of this year. If this happens, it would be the fastest launch of a clone line, beating the schedules of Power Computing, Radius, and DayStar Digital by at least half a year. Asked how he can fulfill such an ambitious production schedule, company chief Rick Schrameck cites his previous experience as CEO of San Diego-based RDI, a manufacturer of Sun-compat-

ible portable computers.

In addition to licensing the SuperMac name, Radius would also sell its clone components to the new company, in return for a minority stake of between 15 and 19 percent and an agreement that the new company will not sell through the same outlets. Radius has signed a letter of intent with Schrameck, but at press time the deal was not complete.

Schrameck, executive vice president and general manager of Radius's systems division until August 25, tells *Macworld* that his new company, unofficially named Clone Corporation, would sell Taiwan-manufactured Mac clones through the direct and retail channels at prices 12 to 15 percent less

than Apple charges. This is comparable to Power Computing's pricing. Schrameck says he also plans to make Macintosh notebooks that would resemble Intel-based notebooks rather than PowerBooks.

Intending to compete with Power Computing, the new small-business and home-oriented clones will bear the SuperMac name, which disappeared after Radius acquired

BUGS & TURKEYS



Ambrosia Software (716/325-1910; AmbrosiaSW@aol.com) encouraged users of its shareware screen saver Eclipse 2.20 to register by offering a free upgrade to version 3.0. But Ambrosia retroactively canceled the free offer, instead charging \$5 for the 3.0 upgrade.



DGX Systems (datagrxf@rtd.com) blanketed the Internet with an offer of an amazingly low-priced hard drive with a mechanism from an unfamiliar manufacturer. But in addition to offering only a 90-day warranty and not accepting credit cards, the company hopes to "create a better business-to-business communication vehicle for the Internet" by sending you long, unsolicited E-mails. Viewers must send E-mail to avoid further intrusions.

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*.

SuperMac Technology in August 1994. Other clone manufacturers have needed six to nine months to start shipping computers. (Schrameck's agreement with Radius forbids him from competing with Radius directly.)

A Radius spokesperson confirms that a deal is in the works but notes that it is contingent on Schrameck's getting funding for his company. Because Schrameck's company would initially use Radius's clone components, it is not required to contract with Apple as a licensee, although Schrameck says that he intends to

pursue a license on his own.

Schrameck says that in addition to Radius's interest in the company, he also expects start-up funding from the company that will act as his manufacturer. So far, he has received funding two individual investors outside the computer industry.

Even though he's targeting the low-margin home and small-business arena, Schrameck—admitting that it's an aggressive goal—wants to be profitable in 12 months. One idea to achieve this: after a 90-day warranty period, customers could pay for service and support, choosing from several tiers of options.

The new SuperMac machines will have three motherboard sizes; two will fit in the standard PC-industry Baby AT desktop, tower, and minitower enclosures, while the third will fit in an integrated desktop that resembles a Performa 5200.

Schrameck says the company will employ about 20 people on start-up and 50 by the end of the first year. His model for the company is a PC vendor like Gateway 2000, with all sales coming via phone, catalog, or large retailers. He would not use distributors or dealers, he said.

—HOWARD BALDWIN

THE AMCoEX INDEX OF USED MACINTOSH PRICES

Machine (RAM/Hard Drive)	Average Sale Price	Monthly Change
PowerBook 140 (4MB/40MB)	\$625	+\$25
PowerBook 165 (4MB/80MB)	\$950	\$0
PowerBook 180 (4MB/80MB)	\$1300	+\$50
PowerBook Duo 230 (4MB/80MB)	\$775	+\$25
Mac IIsi (3MB/40MB)	\$275	\$0
Mac IIci (4MB/80MB)	\$450	-\$75
Mac IIx (4MB/80MB)	\$450	\$0
Centris 650 (8MB/230MB)	\$975	-\$50
Quadra 800 (8MB/230MB)	\$1050	\$0
Quadra 900 (8MB/160MB)	\$1100	\$0
Power Mac 7100/66 (8MB/350MB)	\$1550	-\$200
Power Mac 8100AV (8MB/500MB)	\$2200	-\$400

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

"3-D Comes to the Mac" continued

Netscape helper application and can be used to view models from different camera positions and to jump to other Web sites. Template Graphics (619/457-5359, info@tgs.com), InterVista (415/648-2749, info@intervista.com), Virtus, and others plan full Mac VRML Web browsers. Links to Apple's QuickDraw 3D Web site and to the main VRML site can be found at <http://www.macworld.com/password/mwlinks/vrmlnews.html>.

Cards Lag behind 3-D Software QuickDraw 3D is here now, while QuickDraw 3D modeling and rendering programs, and 3-D-enabled Web browsers are promised by early 1996. But the hardware end is less active. While a Power Mac can handle QuickDraw 3D, many people doing serious 3-D work—whether for creation or view-

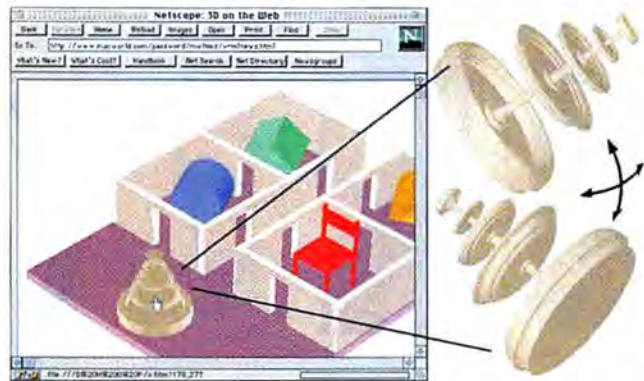
ing—will want a 3-D accelerator card. But these cards are slow in coming, and several companies are revisiting their early enthusiasm.

QuickDraw 3D accelerators fall into three groups: cards aimed at authoring users (3-D artists) that will cost under \$1200, cards aimed at gamers that will cost less than \$350, and cards aimed at renderers and modelers that will cost more than \$1000.

The authoring and gaming cards both offer real-time shading and texture mapping on 3-D objects. The line between the two types of cards is blurry. The main difference is in the amount of memory the boards have, and thus the number, size, and complexity of the texture maps they can hold.

Cards for 3-D Developers

Expect three authoring cards by early 1996: one from Apple, two from other companies.



For a hands-on look at 3-D on the Web, go to <http://www.macworld.com/password/mwlinks/vrmlnews.html>.

Apple's 3-D Advantage

MICROSOFT FLAILS WHILE THE MAC DELIVERS

Apple hopes it can exploit the relative confusion of the Microsoft and Intel position on multimedia to provide a clear lead in the marketplace for low-cost 3-D graphics. "The Macintosh standard is much simpler and more coherent, and it's a very easy specification to implement," says Shawn Hopewood, Apple's QuickDraw 3D evangelist.

"Apple has imposed a standard on the community, and generally there's been little disagreement. Intel and Microsoft are still trying to agree on standards in the 3-D arena," says Trevor Marshall, chairman and CEO of Yarc Systems, a developer of accelerators for multimedia creators.

Vendors also hope that their technology will help the Macintosh steal some market share from Silicon Graphics (SGI), which currently dominates the market for 3-D graphical workstations. "We've had a number of companies that have talked to us about having a less expensive substitute for SGI machines. A high-end Mac with a good 3-D graphics accelerator could well be the answer," says Dave Evans, president and CEO of EA Research, which develops video-display cards.

"This is going to make 3-D much more widely available; before, you had to buy an SGI workstation," says Yarc's Marshall.

—MICHAEL PARSONS

Between five and seven gaming cards that will also work on Windows are expected by late spring. This includes PCI graphics accelerators with 3-D features (from vendors such as ATI, Matrox, and Diamond). So who will offer 3-D cards? Several companies have plans.

- Apple (408/996-1010) plans a November 1995 release of the Apple QuickDraw 3D Accelerator Card. With an estimated street price of under \$400, Apple expects its card to appeal more to graphic artists and 3-D animators than to game players. The board provides 24-bit 3-D acceleration, supports texture maps, and can output alpha channels.

- Diamond Multimedia (408/325-7000, sales4u@diamondmm.com), which recently shipped a 3-D acceleration card for Windows 95-based PCs, is investigating QuickDraw 3D cards for the Mac market but hasn't decided whether to produce such cards.

- EA Research (510/867-0967, info@earesearch.com) offers three 3-D-gaming/video cards in the EA Sycolor 24 line. One of the cards, the EA Sycolor 1600/16, also supports Adobe Photoshop acceleration.

- Matrox Graphics (514/969-6300, graph.sales@matrox.com) offers the MGA Millennium PCI Graphics Accelerator, which combines 3-D and graphics acceleration; it's aimed at gamers and other viewers of 3-D graphics. A card with 4MB of RAM costs \$649 and can be upgraded to 8MB.

- Newer Technology (316/

685-4904) will release a card that works with the PDS slot of NuBus Power Macs. This card is aimed at gamers and other 3-D viewers.

- Radius (408/541-6100, support@radius.com) plans a 3-D card and has shown some prototypes, but the company has not decided what kind of product it wants to deliver or which target user (viewer or creator) it seeks.

- Yarc Systems (805/499-9444, sales@yarc.com) expects its Yarc Screamer card, aimed at 3-D developers, to be available by the time you read this, with a 2MB version priced at \$995. A version with extra memory and features will cost \$1495.

Many software developers say Apple's 3-D card is the best they've seen. In fact, its high quality seems to be giving other companies second thoughts about entering the Mac 3-D acceleration market.

Another factor that may have slowed down the development of 3-D cards was what several developers call poor coordination between Apple's PCI hardware engineers and the software engineers developing QuickDraw 3D; this held up delivery of the QuickDraw 3D software.

"The coordination between QuickDraw 3D software and the PCI hardware was less than optimal. It's tough to ship a card when you don't have any software to test it with," says Trevor Marshall, chairman and CEO of Yarc Systems.—JIM FEELEY



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Circle 93 on reader service card

Power Mac News

The PowerPC's Fast Future

IMAGINING THE CPU IN THE YEAR 2005

We've all come to expect rapid, continuous improvement in computer performance. For the past 20 years, CPU performance has doubled about every 18 months. The PowerPC will stay close to this pace for the next 10 years—a nearly 100-fold improvement in that time—according to Will Swearingen, product-marketing manager at Motorola's RISC Microprocessor Division, and Mark McDermott, director of VLSI engineering at the same division. Motorola and IBM's Microelectronics Division codesign and manufacture the PowerPC CPU family.

But not everyone thinks the industry can keep up that pace. Dave Ditzel, who coauthored the now-famous original engineering proposal for RISC processors (the architectural approach upon which the PowerPC is based), thinks that performance doubling will stretch out to 22 to 24 months. That's because most of the easy gains in CPU fabrication have already been made. "We have now used all the techniques of the mainframes on a chip. Basic silicon technology will progress at the same rate for the next 10 years, but we won't get a straight extrapolation in performance. Improvements by a factor of 16 to 20 [rather than a factor of 100 as Motorola hopes] are very doable over the next 10 years," Ditzel explains.



David Patterson, who wrote the RISC paper with Ditzel and now teaches at the University of California at Berkeley, takes a middle ground, saying that many people think the 18-month doubling rate can be sustained for two more cycles before slowing down. "I think what may happen is some new inventions to keep up the rate—to the end of the century at least."

The chart "How Fast Will Computers Be in Ten Years?" shows the considerable difference in performance for the CPU of the year 2005, depending on whether the doubling period stays at 18 months or slows to 22 to 24 months. These estimates are all based on computers with a single main CPU. The most obvious way to gain performance is to install more than one CPU. Although multiple CPUs have found a place in scientific computing, "so far there's no need to use more than one processor [for general business tasks]," Patterson says. "But if we can solve the problem of programming for multiple processors, then we can simply add processors for more performance."

In 5 years, according to Patterson, computers will have 16 times the memory capacity they do now. "One big challenge is the time for

the processor to access the memory. [One solution is that] the processor might be on the same chip as memory. Every time you buy memory, you get a processor also." Intel is trying out a variant of this strategy with its new Pentium Pro (better known by its code name, P6), which integrates a cache and a CPU on one card.

But in 10 years, a RISC chip such as the PowerPC "may run out of gas," says Motorola's McDermott. Perhaps multiple CPUs that can change tasks on the fly from raw computing to digital-signal processing to image compression will be the core of the Macintosh in 2005.

Whatever the specific technology, future computers will be more powerful. What will we use that power for? Frank Casanova, director of exploratory products in Apple's Advanced Technology Group, envisions many interconnected computers on our desks, on belts or wrists, in our cars. These computers would sense the presence of individuals, offering up appropriate information to those with authorization and shutting down in the presence of intruders. An intelligent assistant in a computer would have to process huge amounts of infor-

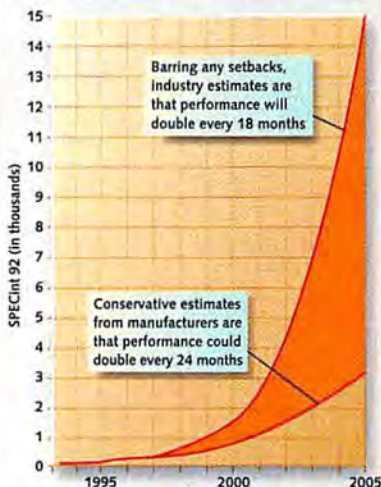
mation to anticipate our needs rather than simply respond to specific requests.

Software improvements are much harder to predict than hardware improvements. "Software is more driven by a business model than a technological model. Why do something better when people don't know they need it?" observes Motorola's Swearingen.

This trend is nothing new—predictable hardware improvements and unpredictable software advances have been a signature of the personal computer industry. And these experts expect that software will continue to lag behind hardware for the next decade.—CARY LU

How Fast Will Computers Be in Ten Years?

This chart shows the estimated increase of CPU performance over the next ten years, in SPECint 92 performance, which measures raw CPU performance for integer calculations—the most common on personal computers. Estimates assume that RAM and cache grow in capacity and speed as they have historically.



SPECint 92 does not include factors that affect a computer's overall performance (disk access, video display, bus performance). The SPECint 92 results here for existing CPUs were run on systems with 64MB of RAM and 1MB of external cache.



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Circle 95 on reader service card

Macworld Online

by Macworld Online Staff

Game On

Some days, you just need to feel the throat of your enemy beneath your heel—to pit your frontal lobe against another human in a battle of wits and strategy. But without a flesh-and-blood adversary, world domination just doesn't taste as sweet. It's not much fun to gloat when you beat your Power Mac 6100 in a game of Risk.

Armchair Alexanders need not waste away in solitude, because online gaming with human opponents is ready and waiting. To access these resources, you need at least a 14.4-Kbps modem, an Internet connection, and a healthy attitude about competition. After all, there's no board to flip over when you lose.

Pickup Gaming on the Internet

When the Online crew gets a craving for a late-night dose of intergalactic conquest, we fire up Delta Tao's Spaceward Ho, but when there's no one else around, a computer opponent is a poor substitute. At these times, we turn to Outland, the Internet Mac gaming service. Log on to Outland's game server with a direct Internet connection and you can almost always find a human adversary. Pricing is \$9.95 per month for unlimited gaming access to chess, Reversi, go, hearts, and backgammon, as well as Spaceward Ho. Find out more at <http://www.outland.com> or send E-mail to info@outland.com.

When Deep Thought beat Kasparov, chess pundits

wailed and gnashed their teeth, claiming that computers would be the ruin of the game of kings. Yeah, right. Tell it to the regulars at the GNU free Internet Chess Server (ICS). Use your Telnet client to visit them at <telnet://ics.onenet.net:5000/>.

You can read the latest chess news, make friends with a grand master in Grand Rapids, or let the server test you and assign you a chess rating. If you aren't comfortable with chess notation, there's a graphic Mac interface at the ICS FTP site, <ftp://chess.onenet.net/pub/chess/Macintosh/>.

Shoot 'Em Up There's a well-known corollary among computer geeks in college: Your GPA will be inversely

proportional to your score in Bolo. This real-time graphic network game places you inside a tank, and your job is to travel the map, deploying worker drones to construct bridges and buildings to protect your bases. Other network players lay mines, trash your buildings, and otherwise wreak havoc. Get the latest software at <ftp://noproblem.uchicago.edu/pub/Bolo/>. To find out who's playing right now, visit Bolo Web, a Web site that offers a continually updated list of Bolo games in progress all over the Net, at <http://sai.Stanford.EDU/BoloWeb.html>.

Sports In your wildest dreams, you want to be Al Davis. Trading spoiled million-dollar players, making

deals, and ruling your professional sports team with an iron fist. Here's your chance. Small World Software's strategy sports games cast you as a virtual manager; you'll draft a roster of real-world players before each season, trade them for Small World dollars, and take your cut based on their performance. Compete against other sports fans, nationally and by division, as you watch your team's fortunes rise (and fall) on Small World's scoreboards.

This Web-based version of traditional Rotisserie sports games offers stats on each player, as well as charts and graphs comparing their performances, all for \$40 per team, per season. Small World is currently running a basketball and hockey season (<http://www.smallworld.com>). Golf, baseball, and football will all debut in the new year.

Gaming resources on the Net are legion. Chances are if you can play it, there's a Web page for it. For a great comprehensive listing of games resources on the Net, start at the World Wide Web Virtual Library site: <http://www.cis.ufl.edu/~thoth/library/recreation.html>. Starting in December, visit our new service dedicated to the best in Mac games: the Macworld Online Game-Line. You'll find it in the TechnoCultural Cafe (<http://www.macworld.com>). **m**

LIVE-EVENTS CALENDAR

Plug into Macworld Live for weekly real-time events that feature some of the brightest stars in the Macintosh universe. In addition to our troubleshooting clinics, we bring editors and writers, artists and visionaries directly to your desktop. You'll find us on America Online in the Macworld Live Rotunda (keyword: Macworld) every Thursday night at 6 p.m. Pacific/9 p.m. Eastern.

Game Hall of Fame December 7

Mac gamers with blistered thumbs and spinning eyeballs will not want to miss the annual Macworld Macintosh Game Hall of Fame awards. Join Macworld contributing editor Steven Levy for an evening of game talk and a look at our favorite digital diversions. No need to RSVP and evening wear is not required.

Happy Mutants December 14

Meet the editors behind *The Happy Mutant Handbook* and *being boing* magazine and learn how to build your own perpetual novelty engine. We'll explore the precepts of reality hacking, learn about better

living through silicon, and unwrap the brain candy that you get when you make your own media. An evening of supreme weirdness.

Costa's Clinic December 21

Are you a new Macintosh owner or a power user in training? Join Macworld Online's technology guru Steve Costa for this virtual Mac clinic. Steve will help you tune up your computer, outfit it with great shareware, and give you the scoop on all things Macintosh.

Ask Cary Lu December 28

Macworld contributing editor Cary Lu covers more than just portable computing for *Macworld*, bringing his considerable knowledge to bear on a variety of Mac topics. At this monthly event, he'll help answer your toughest computing questions.

This is the last live events calendar that will appear in the print version *Macworld*. To get a monthly calendar of our events send E-mail to mwlive@macworld.com and put *subscribe* in the subject line of your message.

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Nobody backs up just for fun. You do it for the day your hard drive goes soft and it's time to restore. That's when you see the difference between Retrospect® and the rest. Only Retrospect easily restores all your data to its former glory.



Retrospect saves all your preferences, everything. So you don't have to spend countless hours restoring whatever masterpiece is on your hard drive.

5. *The world's foremost restoration artists. Don't leave yourself wide open to disaster. Buy the software with the awards, the raves, and*

support for almost every SCSI tape drive ever made. And every Retrospect benefit is multiplied many times over with Retrospect Remote® – our backup answer for network users. Call us at 800-95-BACKUP for our *Top Ten Backup Tips*. Do it before it's too late.



1. *Beware of dragging files. If you've been "backing up" by dragging files, you'll have an unpleasant discovery when it's time to restore. Even if you've kept up to date with all your files (sure,*



Think about this the next time you're "backing up" by dragging: Retrospect can scan 200 files a second to see which files have changed. Can you?

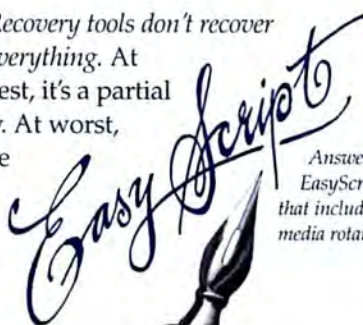
sure), what you'll still be missing is every preference, configuration, and font – all the stuff that reflects the way you work.

flood, or theft, and those tools won't recover anything.

3. *Other backup software leaves you exposed. You're forced to individually restore each incremental backup. The dentist's more fun than that. Only Retrospect has Snapshot™ technology that tracks the most recent state of your hard drive. So complete restoration is accomplished in just one step, in only minutes.*

4. *Don't play the odds, you'll lose. Half of you are going to lose a file, a document, or everything this year. Think about it: one single file could be worth more than Retrospect's entire price tag.*

2. *Recovery tools don't recover everything. At best, it's a partial recovery. At worst, you have a fire,*



Answer a few questions and Retrospect's new EasyScript™ creates a customized backup strategy that includes backup frequency, scheduling, and media rotation.



dantz *To go forward, you must backup.™*

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Circle 26 on reader service card

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

3Com Impact

Claimed to be the first external ISDN modem to support Multilink PPP, a standard that lets users connect at 128 Kbps, this modem incorporates dynamic bandwidth allocation for simultaneous use of two ISDN channels for data, data and voice, or data and fax. An optional 14.4-Kbps fax modem allows compatibility with services not yet using ISDN but still requires only one communications port. \$649. With built-in V.32bis modem \$749. 3Com, 408/764-5000, info@3com.com.



Alps GlidePoint Keyboard

Alps GlidePoint Keyboard

For those of us who are tired of leaving the keyboard to reach for a mouse, Alps integrates its 1½-by-2-inch touchpad into a 106-key keyboard. The GlidePoint includes a contoured wrist rest and an easy-to-find backspace key next to the space bar. The pad features 400-dpi resolution and three programmable buttons. \$159.95. Alps Electric, 408/432-6000.

CA2111

Designed for publishing and CAD professionals, this new 21-inch color monitor offers a maximum resolution of 1600 by 1280 pixels, a 0.28mm dot pitch, and a 100Hz maximum refresh rate. You can adjust horizontal and vertical settings, pincushioning, geometry, rotation, and convergence. The Energy Star-compliant monitor features an antireflection, antistatic coating. \$1795. Smile International, 714/546-0336.

Ether CS TwP and TnT Cards

Sonic's Ether CS cards bring Ethernet capabilities to Performa and Power Macintosh models (including the 575, 5200, and 6200) equipped with a communications slot. The Ether CS TwP Card includes a 10BaseT port, while the Ether CS TnT Card offers thin Ethernet. \$99 each. Sonic Systems, 408/736-1900, sales@sonicsys.com.

EtherPower 10/100

The EtherPower 10/100 dual-mode card supports both standard and Fast Ethernet protocols. The card ships with drivers for Macintosh, Novell NetWare, Unix, and Windows. \$259. Standard Microsystems, 516/435-6000.

Interactor Cushion

In a spine-tingling development for multimedia and game fans, this chair cushion lets you feel the cannon blasts in Doom and hear the roar of a jet engine in Falcon. The cushion's electromagnetic actuator technology converts bass sound waves into body-pulsing vibrations synchronized with your multimedia or game sound track. \$99. Aura Systems, 310/643-5300.

Mirage D-16L

Two lenses can be better than one. With hardware resolutions of 400 by 800 dpi and 800 by 1600 dpi, this dual-lens large-format 30-bit scanner is ideal for scanning large artwork, newspapers, magazines, or even medical X-ray film. The 2MB buffer allows a 12-by-17-inch image to be scanned at 400 dpi in under 70 seconds. The large scanning area can hold 32, 35mm slides or 8, 4-by-6-inch pictures at once. The scanner has a better than 3.2 maximum density, incorporates Kodak's Color Management Software, and can scan direct to CMYK. \$6995. Umax Technologies, 510/651-8883.



Mirage D-16L

MMV102

Ready to give up your commute but need full access to your office's communications systems? This two-channel voice, data, and fax concentrator gives home and remote office workers access to WATS lines, PBX services, voice mail, and LANs over a single, simultaneous voice and data line. The connection may be analog, ISDN, switched 56, fractional T1, or most other services up to 128 Kbps. The MMV102 connects to phones, faxes, and PBXs via standard FXS/FXO interfaces. Computers and LANs connect through RS-232 interfaces. Options include an internal 28.8-Kbps modem and 56-Kbps DDS DSU. \$1499. Multi-Tech Systems, 612/785-3500, mtssales@multitech.com.



MMV102

One For All RoadRunner

Running out of space for all your removable storage devices? The single mechanism in the RoadRunner functions as both a 650MB rewritable optical drive and a quad-speed CD-ROM drive. \$995. Analog & Digital Peripherals, 513/339-2241.

Performa 6300

With a faster CPU (the 100MHz PowerPC 603e), this Mac is an updated version of the Performa 6200 released in mid-July 1995. The 6300 has the same design as the Performa 630 and 6200 (both of which have been discontinued), but offers more in terms of expansion: a 1.2GB hard drive; quad-speed CD-ROM drive; 28.8-Kbps fax modem; expansion slots for video-in, TV tuner, and communications device; and 1MB of VRAM (which supports 8-bit color at 800-by-600-pixel resolution and 16-bit color at

640-by-480-pixel resolution). New to the 6300 is a second serial port and an MPEG video-playback card (which had been a \$299 option in the 6200). Apple estimates the Performa 6300 will cost \$2800, about the same as a similarly configured 6200. A motherboard upgrade for the Performa 630, 5200, and 6200 series costs \$599. Apple, 408/996-1010.

PMCS-1000

This external 3½-inch minicartridge tape drive stuffs 1GB of data (up to 2GB with compression) onto its QIC-Wide cartridge at a rate of 36MB per minute. The drive's read-after-write capability allows single-pass backup, verify, restore, and compare operations. \$1295. Parallel Storage Solutions, 914/347-7044.

Power 120

Power Computing has shipped a 120MHz version of its Power tower and desktop systems. The Power 120 desktop system sells for \$1999 and the Power 120 tower for \$2099. Except for the CPU speed, the Power 120 systems are identical to the company's other Mac clones. Power Computing, 512/258-1350, info@powercc.com.

SAM-Joystick

Some people with disabilities can't use a mouse or trackball. Eliminating this barrier to Macintosh use, the SAM-Joystick (Switch-Adapted Mouse-Joystick) provides full control of the Finder's cursor through an orthopedic joystick. The joystick moves the cursor at a rate proportional to the degree the stick is moved. An external switch acts as a mouse button (you can use any part of your body to perform mouse-clicking) and facilitates dragging. \$120. RJ Cooper & Associates, 714/240-4853, rjcoop@aol.com.

Spressa 9211

Targeting departmental managers who want to save corporate data on CD-ROM rather than on green-bar paper, Sony Electronics has announced the *continues*



Spressa 9211

New Products

Spessa 9211 recordable CD-ROM drive. The drive comes with Corel's CD Creator CD-R mastering software. The Spessa 9211 features a 1MB data buffer to reduce data-buffer underruns. If an underrun does occur, the Spessa also includes a CD-recovery utility so you can restart the recording process on the unused portion of the CD. Sony estimates that street prices will be around \$2000 for the external version and \$1700 for the internal version. Sony Electronics, 408/432-0190.

Typhoon 40

Spending too much time at the photocopier putting together reports and proposals? Dataproducts has announced the Typhoon 40, a 40-ppm laser printer that does two-sided printing. It has a maximum paper capacity of 2500 sheets; an optional 500-sheet hopper and 1500-sheet output stacker boost total capacity to 3000 sheets input and 2500 sheets output. The Typhoon 40 uses the PhoenixPage PostScript clone, not the real thing. The current version outputs at 300 dpi; 600 dpi is planned for late 1996. \$30,995. Dataproducts, 818/887-8000.

ViewSonic 17EA

By building stereo speakers into its monitor's case, ViewSonic aims to save you some desk space and some money. The 17-inch screen provides a maximum screen resolution of 1280 by 1024 pixels with a maximum 85Hz refresh rate at 1024-by-768-pixel resolution. Other features include ViewMatch color control, antistatic antiglare screen coating,

and on-screen control of 20 monitor settings. \$795. ViewSonic, 909/869-7976.

Vivace Vocal Accompanist

If you're tired of karaoke machines forcing you to sing in a rigid meter that robs you of all expression, too bad. But for the serious voice student, the Vivace Vocal Accompanist acts like a very good human accompanist that follows you when you speed up, slow down, or hold a note. Coda produces a large selection of standard vocal repertoire for the system. Our reviewer liked the original Vivace (see Reviews, January 1995). \$2295. Coda Music Technology, 612/937-9611.

SOFTWARE

Acrobat 2.1

Adobe has revised its portable-document creation tools for both Macintosh and Windows. For Mac owners, the most significant change is the addition of the \$500 Catalog tool, which was previously available only in a Windows version. Catalog creates indexes of documents on a network server so anyone on a Macintosh or in Windows can find documents by keyword more quickly. The \$195 revised Acrobat Exchange, version 2.1, now supports embedded World Wide Web links; native Power Mac code; the ability to include QuickTime movies; and OLE 2.0. (The \$1595 cross-platform Acrobat for Workgroups includes Exchange, Catalogs, and other Acrobat modules.) Adobe Systems, 415/961-4400.

3DPC for Macintosh

Jazz up your idle monitor with a three-dimensional screen saver. 3DPC combines photo-realistic images with three-dimensional animations to create 3-D screen savers. The product features 3-D, ray-traced animations of a dragon, a molten metallic worm, and flying pigs—all reminiscent of Magritte or Escher. Animation effects include texture mapping, montages, morphing, and model renderings. The screen saver also has a password-protection feature, online help, and an animation previewer. \$20. Forté, 619/431-6495, 3dpc.support@fortelinc.com.



4th Quarter Accounting Solution

4th Quarter Accounting Solution

This 4th Dimension-based, multiuser, high-end accounting system can be re-configured for your company's needs. Designed for businesses whose sales are between \$5 million and \$50 million per year, 4th Quarter has built-in development tools and reusable code libraries. Features include invoices, purchase orders, inventory, financial reporting, and payroll functions; the product's extendable accounting data structures

allow linking to any related business data. Three-user pack \$9750. Braided Matrix, 914/657-6411, 76662.2347@compuserve.com.

CinèMac for Director

Multimedia developers: turn your languishing Director files into full-featured screen savers. Despite the incorrect French accent in its name, MacSource's CinèMac takes Director projector files and converts them to self-contained screen savers. The company's upcoming CinèMac for QuickTime will create screen savers that play QuickTime movies. Requires Macromedia Director 4.0 or a Director projector file. (Director projector files are self-running Director files.) Personal version \$35; developer version \$300. MacSource, 619/747-2980, msource@aol.com.

Cyber Patrol 1.0

So you've read the articles criticizing the Time magazine cyberporn story, but you're still worried about scandalizing your little tyke. Microsystems' Cyber continues



Cyber Patrol 1.0

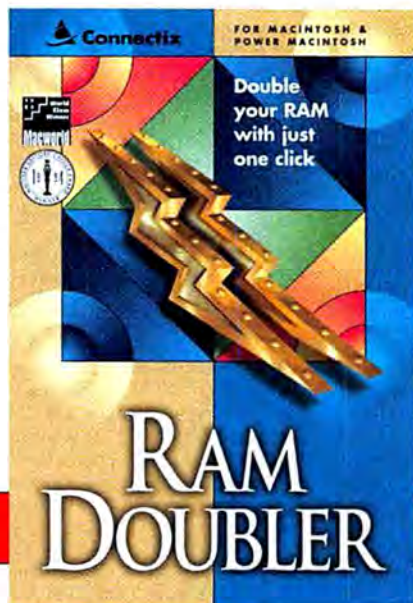
What Do You Say When You're Out Of Memory?

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The more memory your Mac has, the more productive you'll be. But forget about adding SIMMs. RAM Doubler™ is software that doubles your Mac's memory. RAM Doubler does what it says it will do.~Macworld. And you don't have to open your Mac. Just run RAM Doubler's 15 second installation and you can run twice as many applications – instantly. May well be the best investment you make this year.~MacUser. You'll agree. Buy RAM Doubler today and double your RAM with one click. Your satisfaction is guaranteed. RAM Doubler is available wherever great software is sold.

 **Connectix**

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 FMMU or any accelerator that does not work with virtual memory.



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Circle 288 on reader service card

New Products

Patrol blocks access to sites the company has deemed unsuitable for youngsters. The CyberNot Block List is divided into categories, and access can be restricted by directory so that appropriate material at a particular site is not blocked. \$50, includes three updates to the CyberNot Block List. Microsystems Software, 508/879-9000, cyber@microsys.com.

DataManager 1.1

This 4th Dimension–based application works with AppleScript to create a job-tracking and work-flow database for the prepress industry. DataManager classifies media into one of three types. Jobs originate on an online volume (for active files) and must be moved to a near-line volume (for files that need to be accessible but not as quickly accessible as active files), and archived or trashed when the job is complete. You can locate a job in the database, view the job's specifications, and retrieve the correct file. The product also includes service-bureau output support for QuarkXPress. \$895. Color Systems Support Group, 210/691-8444.

FilterTop

Created by an Internet-based group of Mac programmers, this batch processing utility lets you perform a series of filtration operations on files. The product comes with more than 30 filters whose functions include the ability to combine multiple files into one; to find and replace text throughout a document; and to add Mac-specific characters to text, including smart quotes, carriage

returns, and ligatures. The organization provides templates, guides, and examples to aspiring filter developers. Free. TopSoft, info@topsoft.org.

MacArchitect 2.0

The new version of this financial-management program for architects includes a revised interface and enhanced reporting capabilities. Version 2.0 also sports a feature that lets managers view staff activity in a variety of combinations. The product is compatible with upcoming modules from Beedee, which add payment generation and timesheet functions. \$795. Beedee, 206/443-1010, beedee-sales@beedee.com.

MailKeeper

Electronic information is great—but where do you put it? Nisus's MailKeeper stores, retrieves, and searches E-mail messages, text clippings, Web URLs, and electronic addresses. Using a technology called Guided Information Access, the product captures text with one keystroke—and you don't have to leave the active application. MailKeeper recog-



MailKeeper

nizes and categorizes E-mail addresses, and you can use the program to drag and drop URLs directly into your Web browser. \$39. Nisus Software, 619/481-1477, info@nisus-soft.com.

me²

This self-development software reveals a person's dominant instinct—his or her most natural approach to doing things. Developed with psychologists, me² has three modules: Personal Success Profile, Relationship Success Profile, and Job Success Profile. The program aims to help people understand their motivation, drive, and strengths so they can develop strategies for success. You can download the product from Humagement's CompuServe (GO METWO), FTP (<ftp://www.humgt.com>), or Web (<http://www.humgt.com>) sites; to unlock the product, users need to call the company. \$70. Humagement, 602/266-9300, 71674.1670@compuserve.com.

MegaDial

Are you a frequent flier who can't manage the multitude of phone numbers for your online service, ARA, and Internet connections? Cypress Research wants to help. The company's MegaDial is an intelligent dialing assistant that automates modem-based dialing from various communications programs. MegaDial's database contains dialing information and a list of 7000 local-access numbers for popular online services. The product can also set your system clock to the proper time and remember your calling card number.

\$80. Cypress Research, 408/752-2700, sales@cypressres.com.

ScriptWizard 1.5

The new version of this editor for AppleScript supports true statement-level animated single stepping, including script statements that don't send Apple events, and subroutine calls. You can script one window from another and test applet handlers within ScriptWizard. The product also includes a script-execution tool bar, debugging features, and a find-and-replace feature. ScriptWizard is compatible with all Apple Open Scripting Architecture languages, including AppleScript. \$99. Full Moon Software, 510/843-6484, sales@fullmoon.com.



Series 3 Screens

Series 3 Screens

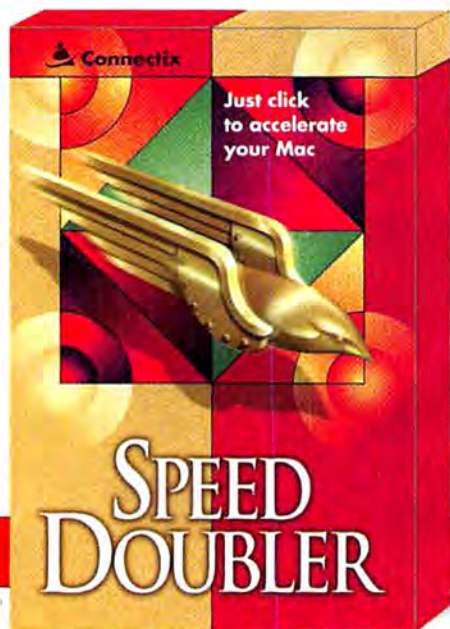
Why not turn your Photoshop documents into works of art? Series 3 Screens lets you create a digital mezzotint by adjusting an image's tonal range. The screens translate the gray tones of an image into black dots of various sizes, creating velvety textures and bold contrasts. *continues*

Break the speed limit.

Break the speed limit on your Mac with Speed Doubler™. It's software that installs in seconds, requires no hardware upgrades and takes your Mac to the next level of performance. You get faster access to the data you use most. Faster disk access. Faster Finder performance. And check this: Speed Doubler automatically doubles the emulation speed on Power Macs.

With Speed Doubler, Power Macs instantly run non-native applications twice as fast! For instance, recalculate a 5000 cell Excel 4.0

spreadsheet with Speed Doubler in 6 seconds, without it...13 seconds. Run a summary calculation of 1500 FileMaker Pro records in 90 seconds instead of 3 minutes. It's not magic. It's Connectix Speed Doubler. And if you own a Power Mac, you gotta have it. Get Speed Doubler today wherever fine computer products are sold. Your satisfaction is guaranteed.



Requirements: Macintosh equipped with a PowerPC 68040 or 68000 series processor • System 7.0 or greater • 8 MB physical RAM or greater • Compatible with Connectix RAM Doubler • Also compatible with Mac Plus, Mac SE, original Mac Classic, original Mac IIx or PowerBook 100

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Circle 193 on reader service card

The future looks **DIMM.**



The new PCI-Based Power Macs have loads of room for RAM and Cache upgrades. In fact the 9500 is upgradeable to 512 Kb L2 Cache and a remarkable 1.5 GB of RAM! But fitting all that memory into such a small space required more than a shoe horn. It took a whole new technology called DIMMs (or Dual In-line Memory Modules). It's a technology that Viking helped pioneer, which basically fits twice the memory in half the space. It's also a technology that makes your future as a Mac user anything but dim.



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Viking manufactures 256Kb Cache SRAM DIMMs, 2X64 and 4X64 DIMMs, 1MB and 2MB (for ATI Cards) Video Modules and more for all the new PowerMacs.

Circle 233 on reader service card

New Products

The Mezzogram feature lets you reproduce photos and other bitmap images as mezzotints with enhanced sharpness. \$149. Andromeda Software, 805/379-4109, 70324.43@compuserve.com.

StoryVision

Trying to plan the next *Myst*? This tool helps writers and designers map out an interactive project's structure. You create a blueprint for the project and attach text and graphics to your word processing file. StoryVision is designed for creating screenplays, video games, interactive advertising, and CD-ROMs. \$199. StoryVision, 310/392-5090, storyvisn@aol.com.



TeleFinder BBS 4.0

TeleFinder BBS 4.0

The new version of Spider Island Software's bulletin-board system is multitasking and multithreaded. TeleFinder BBS 4.0 includes E-mail, file-transfer, live-chat, and conferencing capabilities. It supports up to 80 simultaneous connections on a Power Macintosh over LAN, phone lines, ISDN, or Internet connections. TeleFinder can display graphics files and transfer files in the background; it

also supports Multipurpose Internet Mail Extensions (MIME) and automatically converts Binhex files. Two nodes and unlimited Mac, Windows, and DOS users \$675. Spider Island Software, 714/453-8095, info@spiderisland.com.

TypeIndexer

Wondering what all of your fonts really look like? TypeIndexer lets you print and catalog samples from all PostScript fonts, whether or not they're installed. The product prints 1, 2, 4, or 6 fonts or 15 faces to a page. The program will search mounted media for PostScript fonts, or you can select the fonts for which you require samples. You can export a master index of the font list, which contains each font's screen name, file name, file path, and font family name. \$50. Linographics, 714/639-0511, linograph@aol.com.

CD-ROMS

A Passion for Art

Cursing yourself for missing the tour of the Barnes art exhibit? Have no fear—the CD-ROM is here. Subtitled "Renoir, Cézanne, Matisse, and Dr. Barnes," this CD showcases Albert C. Barnes's famous private collection of impressionist and postimpressionist paintings. The viewer moves through a virtual gallery and hears the story of Barnes and his art. Historical photographs, audio, and mind documentaries add to your cultural literacy. \$45. Corbis Publishing, 206/562-6000, deborah@corbis.com.



A Passion for Art

The Crayon Factory

This kid's school project turned CD-ROM title tells the story of a crayon factory run by robots. Kids can either watch the story or explore the factory, where they learn to mix and make their own crayons, repair pipes and gears, sort colors, and adjust factory noises. The product keeps track of tasks completed and presents certificates as kids move up the ladder to the rank of factory expert. \$35. Philips Media Home and Family Entertainment, 310/444-6500.



The Crayon Factory

D&B MarketPlace

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Parent's Guide to Children's Software 96

Parents, are you unsure which CD-ROM to buy for your tot this holiday season? This CD-ROM from *Newsweek* helps parents select the right software for their kids. It features reviews of 50 products selected by *Newsweek* editors and a panel of children. The package includes videos of children's reactions to the titles; a 184-page book, with reviews on more than 250 products; and advice for parents on purchasing children's software. \$30. *Newsweek*, 800/634-3002, new02a@prodigy.com.

Primal Rage

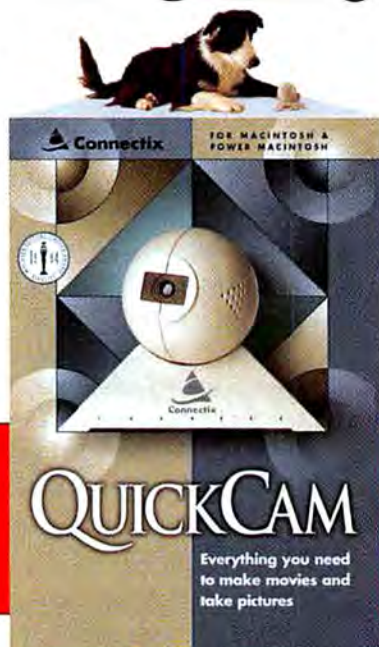
Yes, game fans, it's true—this popular arcade game is now available for your Mac. *Primal Rage* is a head-to-head fighting game that features seven prehistoric creatures in a battle for supremacy. Each fantasy dinosaur has an individualized fighting style and powerful secret *continues*

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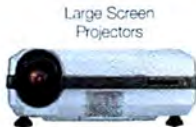
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The Underground CD-ROM SAT Handbook

Are you looking to boost your teen's SAT score? Here's a holiday gift for

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BOOKS

Classroom in a Book: Adobe PageMaker 6 for Macintosh

Learn by doing, not just reading. Each of this tutorial's ten lessons leads you through the creation of a complete project such as a newsletter, booklet, or magazine article. When you've finished all the lessons, you've been exposed to all of PageMaker's features. The book's CD-ROM holds all the files and templates required for the projects. 265 pages. \$45. Adobe Press, 317/581-3500.

Director Demystified

Macromedia Director, the powerful, but daunting, multimedia authoring tool, is a bear to learn. Jason Roberts attempts to tame the beast with tutorials aimed at both the novice and the intermediate Director user. Profiles of successful projects and extensive reference materials round out this weighty tome. Topics

covered include animation, interactivity, Lingo, XObjects, and debugging. The bundled CD-ROM includes a demo version of Director, Director movies, shareware, and clip media. 776 pages. \$40. Peachpit Press, 510/548-4393, ask@peachpit.com.

Kids, Computers, & Homework

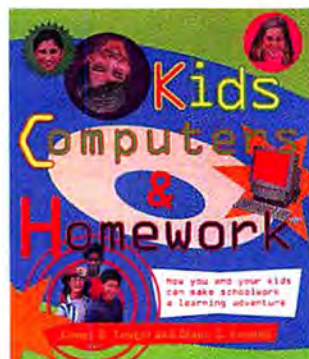
Diane Kendall and James Lengel write for parents of third to eighth graders who want to help their children see computers as more than expensive game machines. The authors suggest ways to use standard programs such as Microsoft Word, ClarisWorks, Broderbund Software's Kid Pix, and Grolier's Encyclopedia to complete a wide range of school assignments in innovative and engaging ways. The book includes sample projects based on real homework, an introduction to the Internet, and tips on adding multimedia to reports. 356 pages. \$16. Random House, 410/848-1900.

Learn C on the Macintosh, second edition

Aimed at Macintosh users with little or no C programming experience, the new version of David Mark's step-by-step guide includes updated lessons and new code on C basics and advanced topics. The bundled CD-ROM includes a limited version of MetroWerks CodeWarrior that can be used to complete the book's exercises. 496 pages. \$35. Addison-Wesley Publishing, 617/944-3700.

Quark Design

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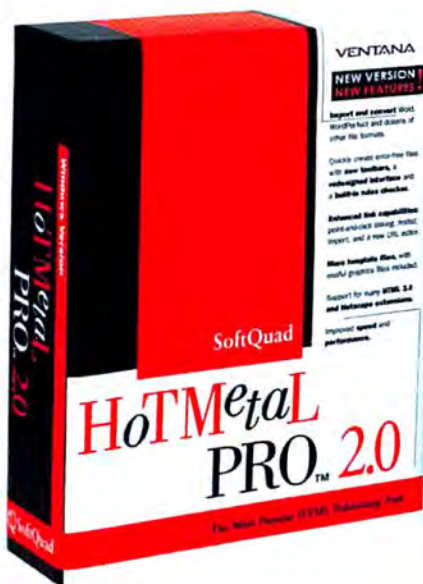


Kids, Computers, & Homework

niques and technical tips for creating a wide array of publications with QuarkXPress. The color illustrations and extensive captions cover topics such as colorizing TIFF images, formatting financial data for an annual report, creating hanging indents, and preparing files for service bureaus. 140 pages. \$35. Peachpit Press, 510/548-4393, ask@peachpit.com. **m**

To have your product considered for inclusion in *New Products*, send an announcement with product name, description, minimum memory, peripherals required, pricing, company name, and phone number to New Products Editor, *Macworld*, 501 Second St., San Francisco, CA 94107. *Macworld* reserves the right to edit all product announcements.

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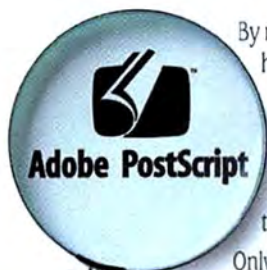
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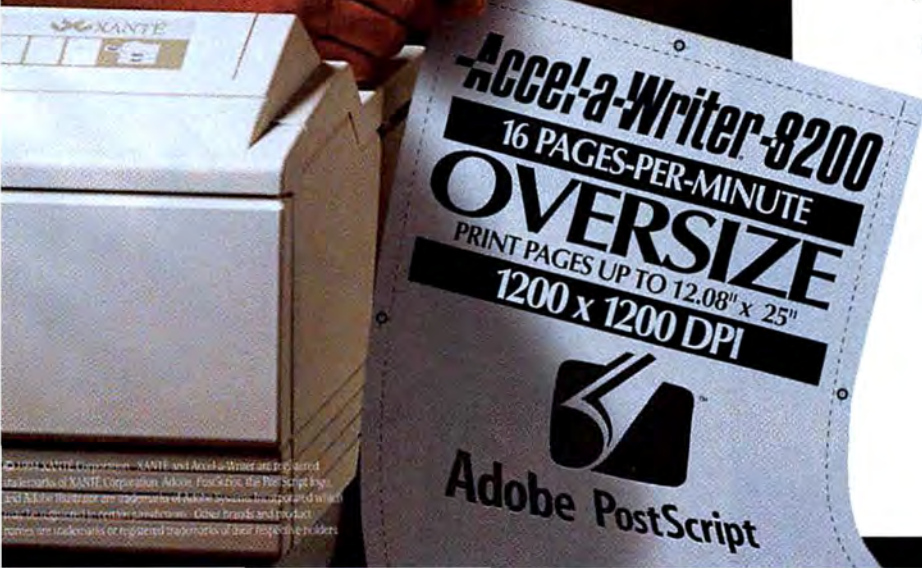
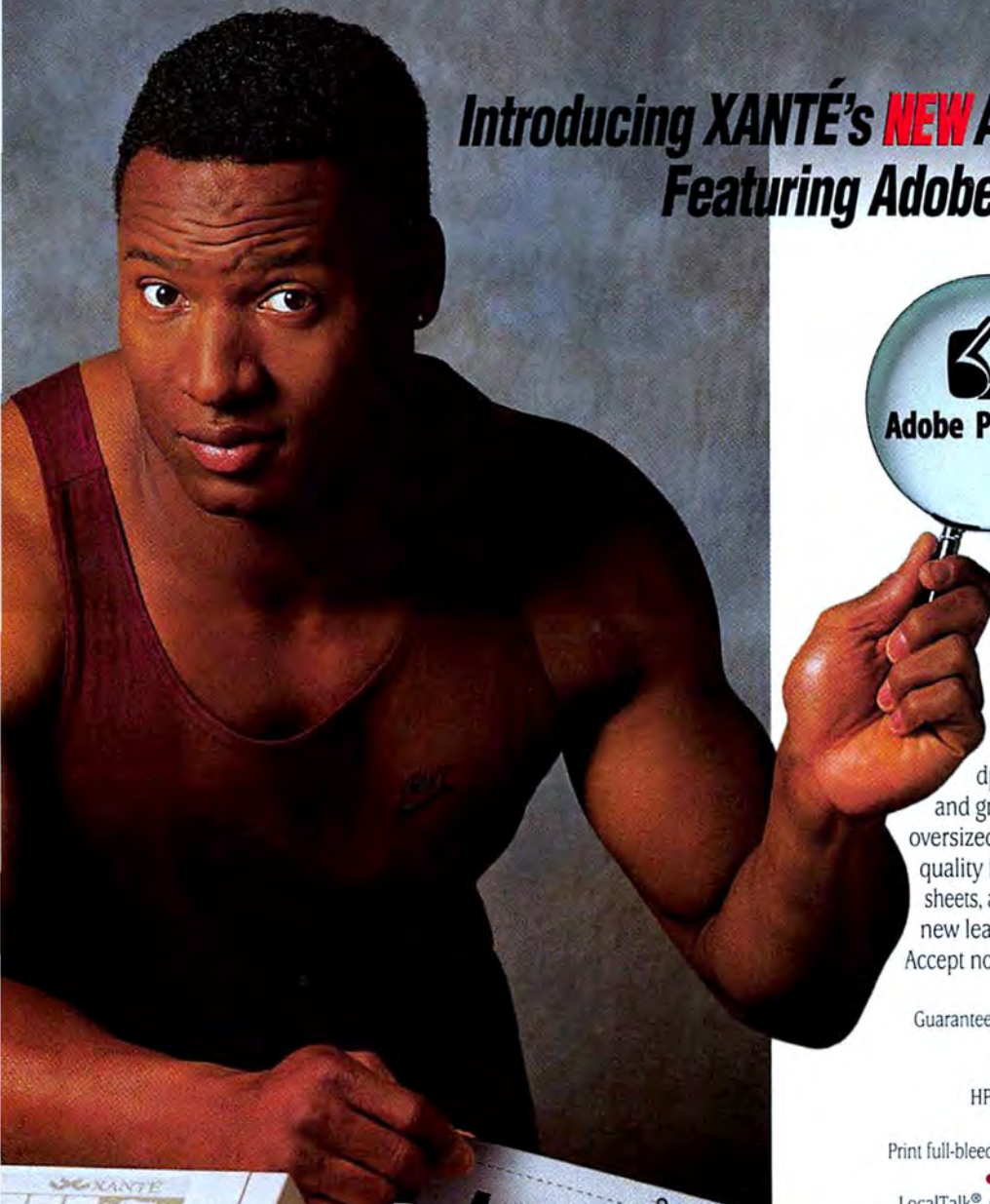
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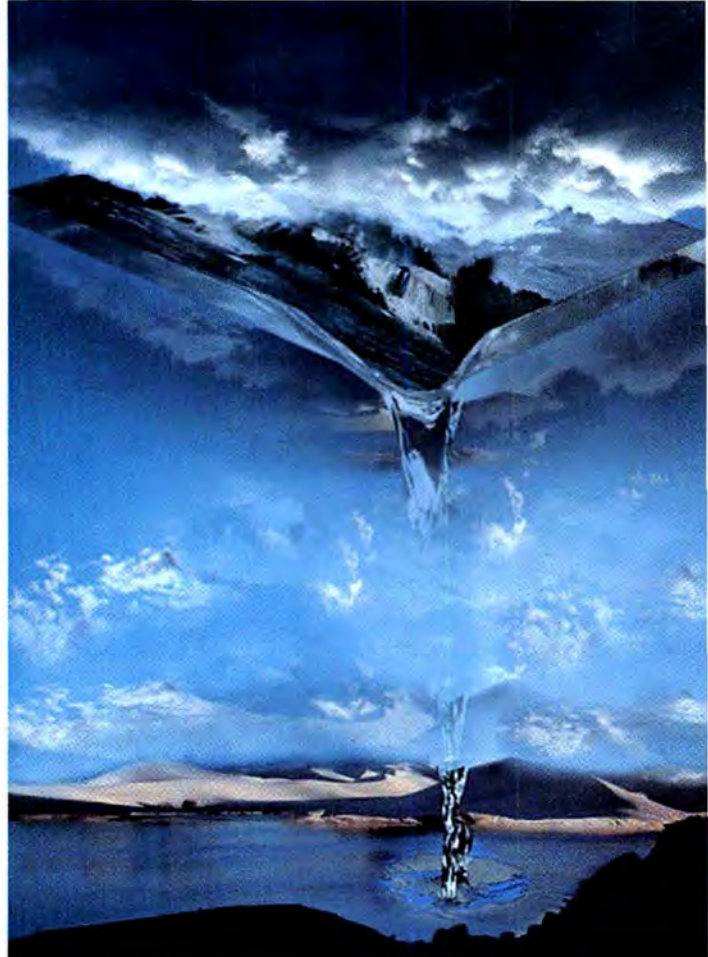
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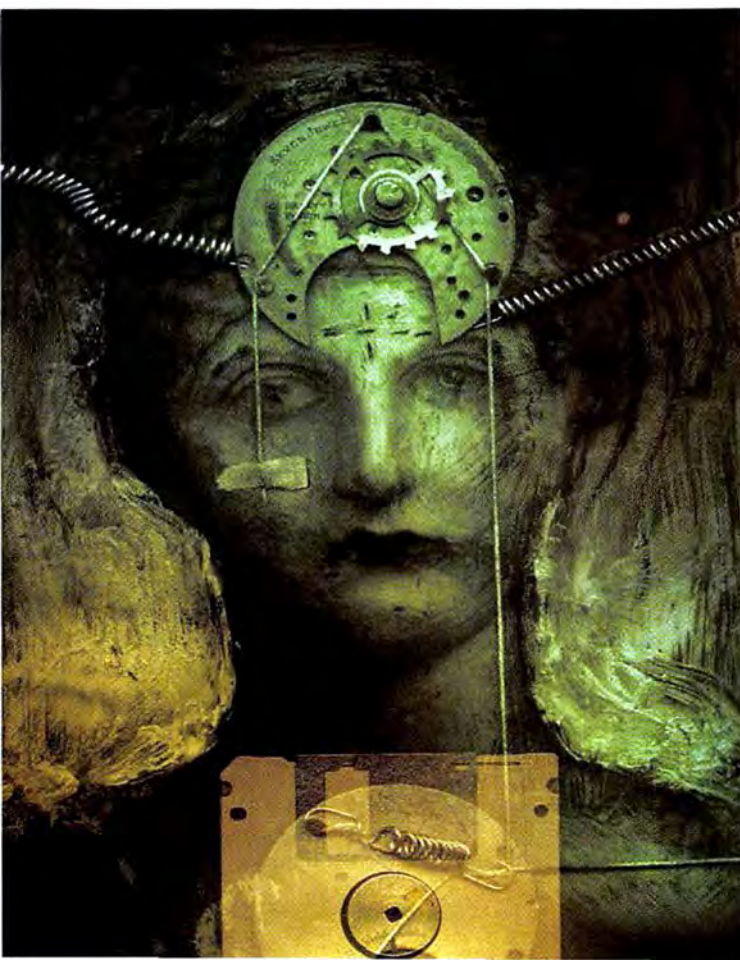
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Reviews

Power Macintosh 8500/120

System

PROS: Fast processor, SCSI bus, and CD-ROM drive; good entry-level video digitizing; excellent audio features; power-saving sleep mode.

CONS: Difficult RAM upgrades; 1GB configuration can't capture 30 video frames per second; some system software glitches. **COMPANY:**

Apple Computer (408/996-1010). **COMPANY'S**

ESTIMATED PRICE: With 2GB hard drive \$4839; with 1GB drive \$4299.



FROM ITS FAST, FLEXIBLE video circuitry to its QuickTime moviemaking capabilities, the Power Macintosh 8500/120 is the most

feature-packed Mac Apple has ever made. And although its name doesn't carry the AV monogram, it's also Apple's best-ever media-production platform.

Same House, New Occupant

The 8500 uses the same minitower case design as its predecessors, the Power Mac 8100 and the Quadra 840AV and 800. (Apple has announced 8500 logic-board upgrades for those Macs.) On the downside, upgrading memory in the 8500 is just as awkward and difficult as in the 8100, 840AV, and 800: you must disconnect cables, pull expansion cards, and remove the logic board to access the 8500's memory slots.

The 8500's central processor—a PowerPC 604 running at 120MHz—lives on a plug-in card, paving the way for inexpensive processor upgrades. For expansion, the 8500 provides three PCI slots. It also has a Digital Audio Video (DAV) slot that can accompany a video-compression card, although no such cards have been announced yet.

The 8500 uses new memory-expansion



KEVIN GANDLAND

cards—Dual In-line Memory Modules, or DIMMs—instead of the SIMMs that previous Macs used. The computer's logic board sports eight DIMM slots; fill them with 64MB DIMMs, and you'll have a whopping 512MB of RAM—and a bill for about \$16,000.

The 8500's reliance on DIMMs and PCI instead of SIMMs and NuBus is the main reason a logic-board upgrade may not make sense for owners of the Power Mac 8100 and Quadra 840AV or 800. Your NuBus cards won't work unless you buy a NuBus expansion chassis from Second Wave (512/329-9283), and your SIMMs won't work without special adapter cards from companies like Newer Technology (800/678-3726). Owners of the 8100, 840AV, or 800 who've made a big investment in NuBus cards and SIMMs may be better off buying a new 8500 and selling the old machine.

The 8500 is available with either a 1GB or a 2GB internal hard drive. If you have the extra \$540, get the 2GB drive—its faster transfer rate yields better video-digitizing results. Both configurations include 16MB of memory, an Apple 600i quadruple-speed CD-ROM drive, and the Apple PlainTalk microphone. Both also include a 256K Level 2 cache; the 8500's cache is DIMM-based, so you can expand it—but note that Macworld Lab tests show that 256K is an optimum size.

The 8500's built-in video circuitry supports 24-bit color (millions of colors) on monitors as large as 21 inches (no previous Mac's built-in video supported more than 16-bit color on 21-inch monitors). For this, however, you must expand the computer's video memory (VRAM) from the stock 2MB to 4MB.

The 8500 includes both an external and an internal SCSI bus. The internal

bus—the faster of the two—supports SCSI-2 Fast, allowing transfer rates of up to 10MB per second (depending on the hard drive you install). So if you get, say, a 4GB drive for video digitizing, you should install a bare internal mechanism instead of an external drive, in the 8500's spare drive bay. (The other option is to buy a PCI-based SCSI accelerator card, such as FWB's PCI SCSI JackHammer, and use it to connect external drives or disk arrays.)

The 8500 sports 17 rear-panel ports. In addition to the usual suspects—SCSI, ADB, modem, printer, and so on—there are 4 ports geared toward video: composite and S-Video input and output.

Also new—in both the 7500 and 8500—are two pairs of RCA phono jacks for stereo input and output. For example, you can use the Apple PlainTalk microphone for speech recognition or telephony tasks and still have an audio mixer or camcorder connected to the RCA jacks. Similarly, you can plug headphones or external speakers into the audio-output minijack, while a camcorder is connected to the RCA audio-output jacks. The 9500 and 7200 series do not have RCA phono jacks for audio.

The other new port is for networking: like all second-generation Power Macs, the 8500 has an Ethernet 10BaseT connector.

Field Test

Given the 8500's media-production features, I stressed video and audio applications when testing the machine. Generally, the 8500 worked well, although there were rough spots.

You can connect video recorders or camcorders to the input jacks and digitize incoming video to create QuickTime movies. I was disappointed with the 8500's video-digitizing performance, which fell short of 30 frames per second (fps) at a quarter-screen movie size (320 by 240 pixels). Apple says the 2GB configuration can capture 30 fps; having tested a 1GB model, I can't verify this claim.

To capture movies, you can use any QuickTime-compatible digitizing pro-

gram. The 8500 includes a bare-bones capture utility called Apple Video Player, as well as Avid's VideoShop.

The Apple Video Player utility can also display (but not capture) full-screen, 30-fps video. Professional video producers requiring this level of digitizing will need additional hardware.

Movies captured with the 8500 look great—Apple has definitely improved the digitizer over that of the Power Mac and 68040-based AV models. Even more impressive is the 8500's ability to zoom quarter-screen movies to fill the screen at playback time. Don't confuse this with QuickTime 2.0's full-screen mode, which simply doubles pixels, creating a chunky look. The 8500's video circuitry interpolates pixels—creates new pixels based on existing ones—as the movie plays back.

Connect a video recorder or camcorder to one of the 8500's video-output jacks, and you can videotape a finished QuickTime movie or anything else that appears on the screen—and in full, 24-bit color, not the 16-bit color previous AV Macs were limited to. But a stock 8500 will work against you. Because 2MB of VRAM isn't enough to send an image to the computer monitor and a video device simultaneously, outputting to videotape is a cumbersome procedure—you have to shut down, disconnect the monitor, and then start up again. Avoid the hassle by upgrading to 4MB of VRAM.

In the audio department, the 8500 worked flawlessly with Macromedia's SoundEdit 16, Digidesign's Session Software, and Opcode Systems' DigiTrax. The 8500 won't run version 2.2 of OSC's Deck II multitrack recording software, but OSC says the forthcoming version 2.5 will work.

The built-in audio and video capabilities are only half of what makes the 8500 an ideal media-production tool. The other half is the 120MHz PowerPC 604—just the kind of processing punch needed for compressing QuickTime movies, creating special video effects, crunching through Adobe Photoshop filters, processing audio files, and rendering 3-D images.

Interesting Extras

The 8500 has some additional goodies: an Energy Saver control panel lets you put the computer to sleep or spin down its hard drive after a period of inactivity. A keystroke or an incoming fax or modem wakes the system up. The 8500's fan, however, remains on during sleep mode. System 7.5.2 also includes a kitchen-sink set of Apple's latest technologies, including QuickDraw 3D and QuickTime Conferencing.

But the 8500 has some compatibility problems just being solved at this writing. The Open Transport software that shipped with System 7.5.2 proved to be buggy and incompatible with some networking products (see *News*, October 1995). Open Transport 1.1, in prerelease form at this writing, will hopefully solve the problem for good. Another problem concerns printing: second-generation Power Macs had a tendency to freeze during print jobs. An Apple extension, called 7.5.2 Printing Fix, improves things considerably and is available online.

Beyond these problems, a glance at the System 7.5.2 System Folder shows that the Mac OS has become an unwieldy web of extensions, patches, and enablers. An 8500's stock System Folder contains 126 items in Extensions alone. Memo to Apple: We need a streamlined Mac OS.

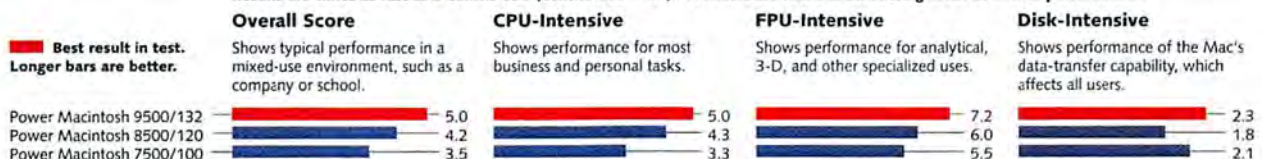
The Last Word

But these problems don't significantly detract from the 8500's appeal as a media-production platform and power user's delight. With its PCI architecture and fast internal SCSI bus, the 8500 sheds the baggage that hamstrung the first-generation Power Mac AV models. Video pros will need additional hardware, but many people—low-budget CD-ROM producers, corporate presenters, educators, and QuickTime buffs—will find the 8500's built-in digitizing adequate. I wish that every 8500 included 4MB of VRAM and a hard drive capable of 30-fps captures, but you can probably buy these components for less than what Apple would charge you anyway. The 8500 is a feast for the power hungry.—JIM HEID



Power Macintosh 8500/120

Results are times as fast as a Centris 650 (Centris 650 = 1.0). Products are listed in decreasing order of overall performance.



Macworld Lab testing supervised by Danny Lee

Infini-D 3.0

3-D Software

PROS: Excellent rendering and animation tools; new spline-based modeler. **CONS:** Limited 3-D-object editing; price increase. **COMPANY:** Specular International (413/253-3100). **LIST PRICE:** \$899.



AMONG 3-D DESIGN AND VISUALIZATION programs, Infini-D has garnered praise for its good balance of modeling, rendering, and animation tools. I've had occasion to say so myself. But I've also noted that the program was a weak modeler. Well, that's changed.

Infini-D 3.0 has a new spline-based modeler that runs circles around its predecessor and attains a level of parity with the rendering and animation components of the program. Those already excellent components have also been improved. Add a sprinkling of interface enhancements, and Infini-D 3.0 is more accessible and offers a better balance of features than ever before.

Spline Modeling

Basically, Infini-D 3.0 builds all 3-D objects by extruding a 2-D shape along a path—it pulls a cylinder from a circle, for example. The path forms the backbone for the object, and four lines, called rails, surrounding the path define the surface of the shape.

The SplineForm workshop is derived from the lathe and extrusion workshops of past versions, so Infini-D veterans should adapt quickly. Individual editing windows display the object's cross section and the 2-D elevations (front, side, and so on) of the path and rails. The 3-D object appears as a wire frame in its own window, where editing changes update automatically and you can rotate the object to view it.

Paths, rails, and cross sections are all editable splines you can manipulate in the 2-D views using Bézier handles that behave just like those of illustration programs. Infini-D 3.0 builds all objects in the same manner. Objects that are traditionally lathed, like goblets and bottles, are instead built by molding the rails into the proper outline. As you build objects, the interaction of paths and rails offers great freedom to create complex shapes. For example, by reshaping the rails, you can deform an object's skin without altering the profile of the initial cross section.

Also, you can alter basic objects by adding variably shaped 2-D cross sections along the path; the program automatically reshapes the skin over the ribs. Adding cross sections produces an object with more control points, resulting in a more precise and editable shape.

Versatile though it is, the SplineForm workshop is not as adept as higher-end modelers, such as Autodesk's FormZ, Macromedia's MacroModel, or Byte-by-Byte's Sculpt 3D. For example, you can't deform an object by selecting individual points on the 3-D surface mesh, and you can't tug at individual surface-mesh splines. The SplineForm workshop, however, is a great addition that brings Infini-D to another level in 3-D modeling.

Animation and Rendering

The path-and-rails foundation of its objects makes Infini-D 3.0 an excellent vehicle for character animation. You can move the spline backbone of an object to produce natural-looking bending motions. As you bend objects, the rails-defined surfaces stretch and buckle, sim-



Bending the Rules Spline-path backbones let you create objects that bend and twist naturally—great for character animation.

ulating undulating skin. And you can push and pull the rails for effects like rippling muscles and breathing pulsations.

The enhanced animation sequencer offers improved control of object motion. When you double-click on an object name, the sequencer expands to display separate timelines for individual attributes—such as positioning, rotation, scaling, and surfacing—letting you control each independently. And Infini-D reserves a channel for information pertaining to specific object types. For example, you control changes made using the SplineForm workshop, such as bending an object's spine, with this channel.

Double-click on event marks in the sequencer and a new Info dialog box lets you fine-tune the object's transition through the event. You can adjust motion curves for tension (stiffness), bias (peak point relative to the event), and continuity (the motion's smoothness), producing

smooth or jerky transitions as desired—this fine-tuning is much better than the previous ease-in, ease-out controls.

In addition, Infini-D lets you fine-tune object motion and animation effects with individual velocity graphs. Each graph displays a motion curve, with control points corresponding to every event mark. You move control points to adjust the acceleration and speed of object attributes. The velocity dialog box holds two graphs with pop-ups for changing the active attribute. However, if you start over on one graph, the Reset button kills all the changes in the other. There should be a way to lock graphs or perhaps reset them individually.

New lighting and surfacing options add rendering versatility to Infini-D 3.0. A distant-light option lets you simulate parallel-light sources, like sunlight. You can now project images into a scene, or use them to produce shadows from off-scene objects. You can calibrate spot and point lights for realistic dimming effects. And you can now apply textures as surface decals that flex with the skin as an object moves. Overall, the program's texture-editing tools, image- and environment-mapping effects, and output-rendering options remain excellent.

With Infini-D's increased control of animation variables, it's easy to overlook its ability to automate complicated tasks. Although not new to this version, Infini-D's Animation Assistants can produce many of the program's motion-control effects automatically. The Assistants are great for novice users, but pros facing deadlines will also appreciate them.

Finally, Infini-D 3.0 includes some nice interface enhancements. For example, a Views floater now gives access to quick-rendering options and to preset viewpoints for any active window. Infini-D 3.0 is easy to use, but as with any 3-D program, sooner or later you'll turn to the manual. In this case, you'll find it well organized and clearly written.

Specular anticipates shipping version 3.1 of Infini-D in late October. This upgrade (free to all registered users of version 3.0) improves Infini-D's speed and adds QuickDraw 3D support as well as a few other features.

The Last Word

Capable of professional-quality rendering and animation, Infini-D 3.0 is nonetheless understandable enough for novices. The new spline-based modeler makes Infini-D a more capable and better balanced production tool. Unfortunately, 3.0 costs more than the last version, but it's still an excellent value.

—CARLOS DOMINGO MARTINEZ

ArcView 2.1

Geographic Information Systems Software

PROS: Intuitive interface; compatible data widely available; easy to customize and enhance.

CONS: High memory and processor requirements; some minor quirks and rough edges.

COMPANY: Environmental Systems Research Institute (909/793-2853, ext. 2050). **LIST**

PRICE: \$995.



MAPS ARE AN EFFECTIVE way to convey many types of information, ranging from customer addresses along a delivery route to the location of owl nesting sites in a forest. Geographic information systems (GIS) are applications that let you visualize and analyze data in the context of maps. Environmental Systems Research Institute (ESRI) dominates the high-end GIS market with its sophisticated Unix product, Arc/Info. ArcView 1.0, available only for PCs and Unix workstations, could display and query digital maps in Arc/Info format. Version 2.1, now available for the Mac, dramatically expands ArcView's ability to handle sophisticated geographic analysis, data management, and presentation graphics.

ArcView requires 16MB of RAM to run on a Power Mac. For best performance, ESRI recommends a Power Mac 7100 or better. The ArcView package includes a CD-ROM and disks containing the program and an extensive set of sample data, plus two slim manuals. More extensive documentation is available only through the program's built-in help. The program and other run-time files occupy 17MB on disk; the sample data takes up another 83MB. These requirements may limit ArcView's accessibility for average Macintosh users.

ESRI has ported ArcView 2.1 to a broad range of platforms. For users who interact with clients or colleagues working on other platforms, this universality will be a boon, but dedicated Mac enthusiasts will be disappointed by the plain, klunky nature of controls and dialog boxes, and the program's occasional non-Mac-standard behavior.

Getting Started

Despite its lack of aesthetic sophistication, ArcView's interface allows the

user to organize geographic information and tabular data in a powerful and intuitive fashion.

In ArcView, you work within Projects. These may contain a variety of inter-related components, including map views, tables, charts, cartographic layouts, and scripts. The components appear in separate windows but are easy to access from a Project palette. As the user switches between component windows, menu options and tool-bar buttons automatically change accordingly.

Typically, a map view is the first component created in a new Project. Double-clicking on the Views icon in the Project palette opens a new display window, in which any number of map layers (or themes, in ArcView parlance) can be combined to create a visual data display. ArcView maintains legend information for the view in a Table of Contents pane within the View window.

For example, say that you wish to know the distribution of per capita income in a particular city. Assuming that the necessary data is available on your hard drive, selecting Add Theme from the View menu allows you to choose a demographic map, in which the city is divided into a number of smaller areas (such as street blocks or neighborhoods), and add it to the Table of Contents. Each area is then linked to a record in a data table containing an income field and any number of other characteristics. You can add additional themes, such as streets, landmarks, and water features, to the view. You can also turn the display of individual themes on and off using check boxes in the Table of Contents.

Double-clicking on the map name in the Table of Contents brings up the Legend Editor, where you can select Income as the attribute to be displayed and choose dollar ranges and corresponding colors and patterns for each range. ArcView assigns ranges and colors automatically, although you may want to edit its choice of colors, which leaves something to be desired.

ArcView also includes a variety of tools for zooming in and out of a view to focus on details or get the big picture. Unfortunately, large, complex views can take more than 15 seconds to redraw with each zoom.

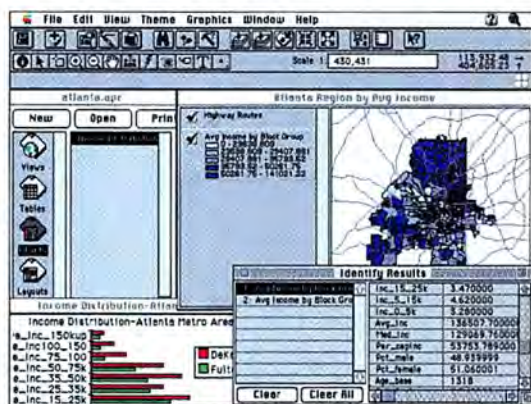
ArcView allows you to use data from tables in several formats, making the data available for display in graphic form. The simplest way to do this involves match-

ing records based on a common field, such as zip code. ArcView also has an accurate, easy-to-use address-matching facility, so that records containing address information can be assigned geographic locations and displayed.

Hot Links, a particularly nice feature, allows you to link data from other apps to map features. Hot Links can perform virtually any action, including displaying a text file, an image, or a video clip or executing a script.

ArcView allows you to easily create decent-looking presentation maps. The program comes with two basic map templates that include common cartographic elements, such as north arrows and scale bars; you can add templates using the Layout Editor.

Creating professional-looking graphics is somewhat more difficult. The Layout Editor allows you to create and align elements such as views, graphs, text, and legend boxes. However, the Editor doesn't always work well; for example, resizing a legend box causes its text to



Map Analysis ArcView works well for browsing and performing simple analyses on geographically oriented data.

change size as well, even though the font size indicated in the fonts palette does not change. ArcView provides the option to export layouts to EPS or Adobe Illustrator files for more complex graphics work; however, the exported files do not always appear as they did in ArcView.

Map Query

The program also offers a set of powerful tools for asking precise questions of a geographic database. ArcView's Query Builder lets you put together mathematical expressions to select map features based on their attributes. The Query Builder is almost too simple, though; the operations shown in the dialog box are only a small subset of those actually available. Also, users should beware: mathematical operators do not follow normal precedence rules in ArcView, so *continues*

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liberal use of parentheses is necessary.

ArcView can also select features based on their spatial relationships to features in another theme in the same view. The Select by Theme dialog box has a straightforward set of pop-up menus that let you create an expression such as "all features within 100 feet of selected features in the roads theme." ArcView's spatial selection is admirably speedy. When selected, the map features are highlighted both in the view and in the corresponding attribute table, allowing for easy cross-referencing.

ArcView includes a sophisticated object-oriented scripting language, Avenue, that allows users to customize the program's interface and add functionality. You can edit menus and tool bars and add new commands.

The scripting environment within ArcView is not particularly polished, however. Compile-time error checking is limited, which can lead to frustrating program crashes. It's even possible to corrupt project files during the process of developing a script. Also, ArcView does not have an option to record user actions to create a script.

ArcView or MapInfo?

Macintosh users can now choose between two desktop GIS applications: ArcView 2.1 and MapInfo 3.0. Neither program has a clear-cut advantage over the other. Free or low-cost data, particularly in the realm of natural resources, is more widely available in ArcView-compatible format, due to the predominance of ESRI's Arc/Info software among government agencies and universities. ArcView's interface is more comprehensible and better organized than MapInfo's. And ArcView costs several hundred dollars less than MapInfo.

On the other hand, MapInfo has some functionality that ArcView is missing, including a full-fledged facility for tracing paper maps using a digitizing tablet, a better query interface, and more robust capabilities for creating buffers and intersecting area features between two maps. MapInfo's documentation and support are also stronger, although free technical support for both programs is limited to a brief period.

The Last Word

Overall, ArcView 2.1 is a useful, well-designed tool for visualizing and analyzing geographic data. Future releases of the program would benefit from some polishing of the interface, but these are relatively minor detractions for those who want to explore the spatial dimensions of their data.—KARL GOLDSTEIN

DeltaGraph Pro 3.5

Graphing Software

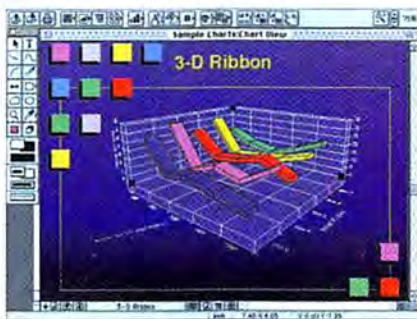
PROS: Easy to use; many new graph types.

CONS: None. **COMPANY:** DeltaPoint (408/648-4000). **LIST PRICE:** \$195.



DELTAGRAPH PRO COMPETES directly with Microsoft Excel and its built-in graphing capabilities. Graphing packages only survive if they offer more features, more convenience, and better chart output than Excel, which is ubiquitous on Mac desktops. In this ferociously competitive arena, DeltaGraph Pro stands out from the pack.

DeltaGraph Pro is a single program that competes successfully in two areas: scientific and engineering graphing, and business charts. Science journals and reports usually publish graphs in black and white, so a scientific graphing package has to offer precise control over tick marks, axis formatting, and other monochrome details, and it should also provide curve fitting for chart points. Wave Metrics' Igor Pro, which includes full-scale



Color-Coded for Business Though it also offers scientific amenities (curve fits, exotic chart types), DeltaGraph Pro makes it easy to fancy up plain charts for business presentations, using layouts from its Chart Gallery.

programming capabilities, is probably the most powerful package for this market, but DeltaGraph can hold its own in preparing most types of charts for publication. And though Microsoft's PowerPoint goes far beyond Excel in business graphics and slide-show presentations, DeltaGraph can do all PowerPoint's tricks—it has a library of fancy prepared layouts and backgrounds—and it's faster and easier to use. This program has it all—speed and features—and you can learn it in five minutes.

Version 3.5 offers some major en-

hancements over 3.0. The Chart Gallery has been overhauled so it's much easier to find the style you need in the array of 60-plus possibilities. The old gallery had business, scientific, and statistical groupings—the new gallery is organized by type (bar, line, and so forth). There are six new charts for quality control (the only noticeable omission from the previous version, which offered such seldom-seen types as vector, donut, Pareto, and ogive charts). Besides the improved gallery organization, DeltaGraph's updated Chart Advisor will inspect your data table (DeltaGraph Pro data is stored in spreadsheet-like structures) and suggest the best chart type for presentation—this keeps you from making basic charting mistakes, such as putting 18 elements into a pie chart. DeltaGraph Pro 3.5 now automatically (one might add, finally) updates charts as soon as you change numbers in the spreadsheet data page. The last important new feature is Apple Guide-based help. DeltaGraph has always been a program you could use without consulting the manual often, but with Apple Guide you might not even take the manual out of the box.

The list of DeltaGraph's virtues is long and impressive. In its Power Mac version, it's very fast—charts for standard-size sets of business data, 20 by 100 cells or smaller, update in a few seconds. Pictograph charts are as easy to make as bar charts, and slide shows are simple to arrange in Outline mode. DeltaGraph not only imports files from any text source, CA-Cricket Graph, and Excel, but it can also set up hot links to the original data files in case they're changed later. You can also drag charts between multiple open documents. Looking back at previous versions of DeltaGraph, Delta Point has systematically answered every complaint or suggestion mentioned in earlier reviews. The Windows version works exactly like the Mac version, and DeltaGraph also runs under System 6.0.2, good news if you're still using a IIx. Mac-software nostalgia buffs should note that DeltaGraph imports files from Trapeze, a spreadsheet program that was ahead of its time nine years ago and would still look avant-garde in today's environment.

The Last Word

DeltaGraph Pro is the right choice for all but the simplest or most esoteric charting jobs—it's the program to use 95 percent of the time. Version 3.5 has all virtues and no vices, and it's even reasonably priced.—CHARLES SEITER

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PROS: Slightly higher image resolution than QuickTake's; 48-picture image capacity; long battery life; accommodates 37mm lenses. **CONS:** Takes too long to transfer images to disk; makes it easy to delete images accidentally; you can't see effects of lenses. **COMPANY:** Eastman Kodak (716/726-7260). **LIST PRICE:** \$995.



QuickTake 150

PROS: Quickly transfers images to disk; straightforward camera controls; better software than Kodak unit. **CONS:** Holds fewer images at lower resolution. **COMPANY:** Apple Computer (408/996-1010). **COMPANY'S ESTIMATED PRICE:** \$739.



FILM IS ON ITS WAY OUT. CONSUMERS of the future won't have to visit the local grocery store or quick-photo outlet to see their pictures. They'll just download the things to computers, view them on the tube, and—if they're feeling particularly nostalgic—print them out and slap them in an album. And it'll happen before we're all flying around with jet packs strapped to our backs—probably within the next ten years.

Meanwhile, Apple's QuickTake 150 and Kodak's Digital Camera 40 (DC40) are consumer-quality digital cameras with professional-level price tags. Both are fixed-focus with built-in flashes, equivalent to point-and-shoot film cameras costing \$50 or less. Even if you know your way around digital imaging, you're probably better off using a 35mm film camera and developing the pictures for Photo CD at \$1 to \$2 per photo. Currently, the advantage of the QuickTake or DC40 is expediency. If you want to shoot a picture and place it into a printed or electronic document in less time than it takes a one-hour photo shop to develop the picture, then a digital camera is the way to go.

The Price of Image Quality

The QuickTake 150 and DC40 look different, offer slightly different controls and software, and provide different lens attachments. But the primary distinction between the two is the quality and quantity of the images. The QuickTake 150

is equipped with the same 1MB of flash EPROM memory as its predecessor, the QuickTake 100. But now you can shoot 16 screen-resolution (640-by-480-pixel) images, compared with a scant 8 in the past. The number of quarter-screen (320-by-240-pixel) images remains at 32. (You should avoid quarter-screen photos—one image contains 77,000 pixels, less than half the number used to print the yellow *F* at the beginning of this article.)

The DC40, by comparison, contains 4MB of RAM and holds up to 48 images. The resolution of each image is 756 by 504 pixels, which works out to about 25 percent more pixels than in a full-screen QuickTake image. (You can also take 99 low-resolution pictures.) The enhanced resolution helps the picture quality; and because the DC40 holds three times as many pictures, you don't have to download them to your computer as frequently. It's a good thing, too, because the DC40 takes roughly 6 times as long as the QuickTake 150 to transfer images. Plus, you have to convert DC40 images to PICT, JPEG, or TIFF formats in a separate operation, which takes several more minutes. The QuickTake ships with a special system extension that permits you to open or import the images using any program that supports the PICT format.

Consider the example of my wife, who tested both cameras by hauling them and a PowerBook 540c to the Denver Zoo. She shot enough pictures to fill both cameras twice. Using version 2.0.1 of the QuickTake Image Access software, she spent less than a minute downloading the 16 pictures from the QuickTake 150 to the PowerBook; using PhotoEnhancer 1.6, she spent more than 17 minutes transferring the 48 images from the DC40. Sitting on a bench at a public zoo for nearly 20 minutes with some bizarre technology in your lap making little *shik-ka shikka* noises while people gawk at you is not the kind of experience you envision when purchasing a digital camera. The next day, I spent a whopping 46 minutes converting both "rolls" of DC40 images to the JPEG format so I could open and color-correct them in Adobe Photoshop. The upshot? One DC40 image takes more than 10 times as long to get into a usable format as one QuickTake image.

Look and Feel

The other comparisons are less important, but they balance out in Kodak's favor. The Mac version of the QuickTake 150 ships with a control panel for mount-



Never Enough Pixels The QuickTake 150 takes up to 16 screen-size photos like the one at top. You can shoot three times as many photos at the higher resolution pictured at bottom with Kodak's DC40. These extra pixels come in handy, giving you that much more room to crop.

ing the camera like a disk on your desktop. You also get PhotoFlash, entry-level image-editing and -cataloging software. The DC40 includes PhotoEnhancer from PictureWorks, a company known for creating QuarkXPress extensions. PhotoEnhancer has fewer features than the QuickTake software, but it's cross-platform. If you own a Mac and a PC, you can use the DC40 with either machine without purchasing extra cables or software.

The QuickTake camera uses three AA batteries, which you can expect to last for about 200 pictures. It also offers a larger shutter-release button and more-convenient controls for setting the flash and the autotimer. The DC40 uses four AA cells that last for roughly 500 pictures. That extra battery goes a long way. But the controls are slightly harder to use, you must release the shutter with your right hand, and it's easier to delete all your pictures accidentally—all counts against it.

The DC40 includes a grip strap attached to the case, which prevents you from dropping your investment. You can purchase a \$79 leather grip for the QuickTake, but you have to take the grip off to fit the camera on a tripod. (The DC40 fits on a tripod with grip in tow.)

Normally, both cameras can focus on objects at least 4 feet away. The QuickTake 150 includes a plastic close-up lens that snaps onto the front of the camera. It scratches easily, but it permits you to

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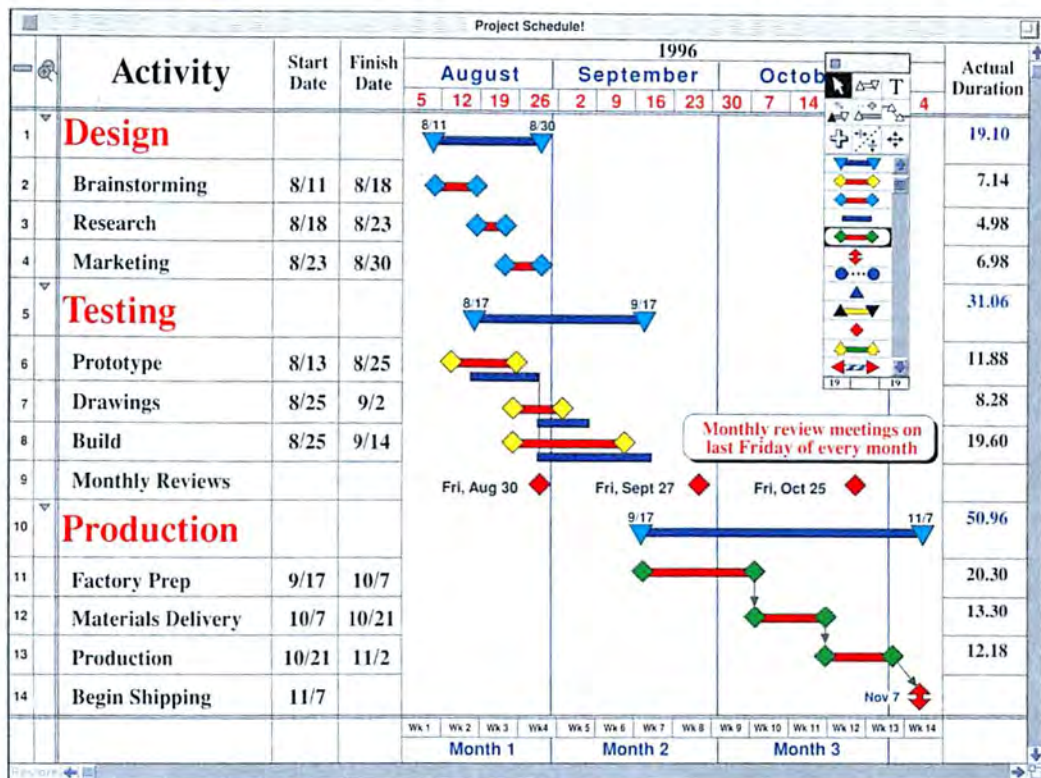
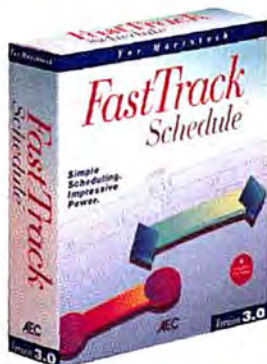
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shoot pictures from as close as 8 to 14 inches. The DC40 is designed to accommodate special lenses with 37mm or 42mm threads. Kodak provided several kinds of lenses from filter vendor Tiffen to test with the camera. These included close-up, wide-angle, and fish-eye lenses, all of which worked predictably well. But you can't see the effect of a lens through the viewfinder of either camera—there aren't even alignment marks to help you frame the image. Because you need considerable experience to guess the result, this is quite a disadvantage for business users who lack the photographer's eye.

The Last Word

If I had to pick between these cameras, I would choose the Kodak DC40. The higher resolution, larger image capacity, longer battery life, and lens options weight the scales in its favor. But the QuickTake is easier to use, and you don't have to wait an interminable length of



Shooting Blind The Kodak DC40 accommodates 37mm lenses, like the wide-angle and close-up lenses demonstrated here. But the lenses don't affect the viewfinder; you have to do some serious guesswork. It's especially difficult to frame close-ups, because you and the camera see entirely different parts of the object.

time to download and convert the images. Still, before you purchase either camera, develop a couple of rolls of film to Photo CD. You're sure to prefer the results; the question is, can you endure the turnaround time? If not, you're in the market for a DC40.—DEKE McCLELLAND

Fargo FotoFun

Dye-Sublimation Printer

PROS: Inexpensive, nice output. **CONS:** Slow printing; expensive consumables and tech support. **COMPANY:** Fargo Electronics (612/941-9470). **COMPANY'S ESTIMATED PRICE:** \$399.95.



YOU'VE JUST FINISHED COMPOSITING your boss's head with the body of a controversial world leader and can't wait to show off your digital surgery. You could send it over the network to carefully selected colleagues—or you could make an even stronger impression: show them photo-quality output from the FotoFun, Fargo Electronics' tiny dye-sub printer.

With a resolution of 203 dpi, the FotoFun has a maximum output area of 4 by 6 inches (A6 size), slightly less if you want a 0.2-inch border around your prints. And setting up the printer is extremely easy—just install the ribbon, connect a serial cable to the CPU, set up the printer driver, and you're ready to go.

Impressive Output

Though 203 dpi might not sound impressive, the FotoFun's resolution—with its crisp edges and highlight and shadow details—is actually higher than that of some of its rivals, including the Nikon Coolprint. To protect output against ultraviolet fading, Fargo wisely added a coating it calls FotoShield.

Of course, you can't expect to get a good printout from a poor-quality image. A 4-by-6-inch 72-dpi image may look good on screen, but it will be pixelated when you print it, so forget about anything that's lower than 144 dpi. To give the FotoFun a thorough workout, I printed some images in a 4-by-6-inch format and showed them to my coworkers—all were amazed at the image quality. I also printed some images I downloaded from a BBS, as well as photos I took with the Kodak DC40 digital camera. Although these looked good, I did notice pixelization, especially in areas with small details.

Unlike its pricier competitors, the Coolprint and Sony's UP-D1500CN, the FotoFun doesn't have the luxury of a cassette tray—you have to feed in the paper one sheet at a time. The motor's distinctive hum alerts you that the FotoFun is ready to print. If more than 20 seconds elapse before you feed the paper, a dialog box appears asking you to retry or cancel. Although the printer sometimes refused

to retry, I was able to fix the problem by pressing the clear button on the printer's front panel and then pressing the return key on the keyboard. I also wasted a couple of sheets of paper by accidentally placing them glossy side up. Putting a label on the printer reminding you to feed the paper glossy side down would minimize such mistakes.

While the FotoFun blows away the competition when it comes to output, speed is another matter. Because it connects via the serial port rather than the SCSI port and outputs at a high resolution, the FotoFun prints at a leisurely pace. For example, on a Power Mac 7100/80, an image the FotoFun printed in about 4 minutes took slightly more than a minute on the Coolprint. And the FotoFun's reliance on the serial port can be a problem if you're already using both ports for, say, a modem and an AppleTalk network. In that case, a switchbox would eliminate the need for cable switching.

A Dollar a Page

Consumables for most dye-sub printers are pretty expensive, and the FotoFun is no exception. The Film Print Kit costs \$34.95 for 36 prints, or almost a dollar a page—still cheaper than using a Polaroid instant camera—while the Postcard Film Kit, for 36 prints with writable backside, is \$39.95. The most interesting consumable is the \$29.95 FotoMug Kit; it includes four mugs and a clamp to mount the print for the transfer process.

Then there's technical support. You get 30 days of free support beginning with your first call; after that, you pay \$10 a call. Fortunately, the printer is so straightforward that you probably won't need to shell out any money. And even though the manual and troubleshooting guide are rather sparse, they provide enough information to fix most problems.

The Last Word

The Fargo FotoFun easily outshines the Coolprint—for one-fifth the cost. Like its larger and more versatile siblings, the Pictura 310 and the Primera, the FotoFun is proof that a great printer doesn't have to cost a fortune.—MARK HURLOW



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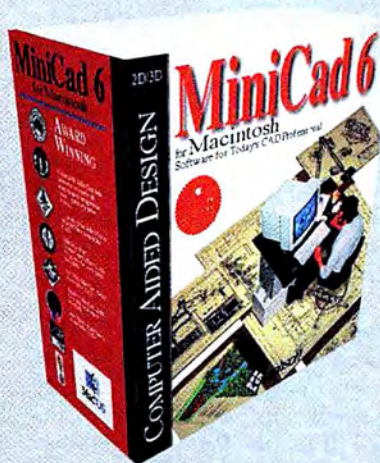
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Arcserve for Macintosh 1.5

Backup Program

PROS: Users can back up to a remote tape drive; fast network performance. **CONS:** Clumsy installation requirements; doesn't display the size of your backup selection; doesn't back up properly to rotating backup sets. **COMPANY:** Cheyenne Software (516/484-5110). **LIST PRICE:** 5 users \$245; 20 users \$495.



FOR YEARS, DANTZ DEVELOPMENT's Retrospect Remote 2.1 has been the leading network-backup program for the Mac. The latest challenger hoping to topple Retrospect Remote (and its single-user version, Retrospect 2.1) is Cheyenne Software's Arcserve for Macintosh, but Arcserve needs to be refined to catch up with the leader.

To make the backup process easy, Arcserve lets you select the sources and destinations of your backups from a single window, which displays all disks, files, and folders in a familiar indented-list view, reminiscent of the Finder. Arcserve doesn't tell you the size of your selection, however, so you can't tell whether your backup will fit on the available backup media. To simplify the process for new users, Arcserve's Quick Script feature provides backup scripts that automatically set up all the steps needed to do full or incremental backups of your data.

Once you've installed Arcserve on a workstation, that workstation can initiate a backup by searching for any available tape drive over the network and choosing that drive as the backup destination. Retrospect requires a person to act as a central backup administrator, and it typically backs up to a designated Mac. Because it lets remote users initiate a backup, Arcserve is a good solution if your office has PowerBook users who need to back up only occasionally. Another Arcserve advantage is that Macintosh users on a mixed network can back up to a Novell NetWare server running Cheyenne's Arcserve for NetWare product, and Arcserve tapes from the PC and Mac computer platforms are interchangeable. According to Dantz, its cross-platform backup software has been delayed until the second quarter of 1996. Arcserve's backup scheduling is adequate, but it's much less flexible than Retrospect's. You can use Arcserve's Stealth extension to initiate unattended, sched-

uled backups, or you can trigger a backup using AppleScript.

Restoring from a backup is painless. The Quick File Access feature searches the index of a backup tape for files or folders, basing its search on user-defined criteria such as file or folder name or modification dates.

Arcserve 1.5 supports virtually all DAT (digital audiotape) and 8mm tape drives, including tape autochangers, and some DC600 units. It can also back up to disk media, such as SyQuest cartridges, magneto-optical drives, or hard drives. When backing up to disks, you can save your files in Finder format or as an Arcfile, which combines them into one large file.

Installation Woes

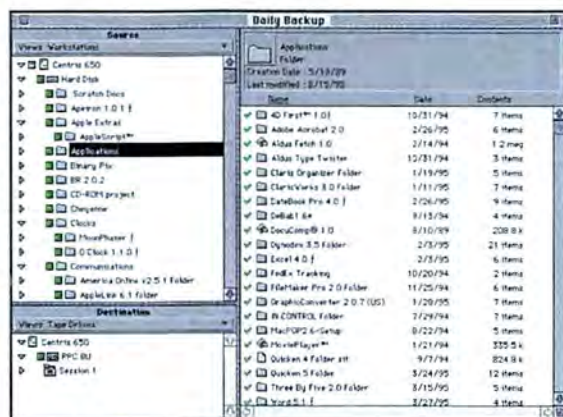
Installing Arcserve is an inflexible process. You can install Arcserve only on the start-up disk, and you must choose either the 680X0 or the Power Macintosh install; Arcserve cannot automatically install the proper version. You must install an extension and the Arcserve application (which take up 1.7MB) on every workstation; by contrast, Retro-

little-used Finder attribute—the backup date on each file and folder—to keep track of when files were last backed up. This means that if you have multiple backup sets you can easily—and unknowingly—end up with data that is not backed up. To understand the problem, imagine you have two backup tapes, Set A and Set B. You do a full backup to Set A on Monday. Arcserve sets the backup date for all files to Monday. You switch tapes and do a full backup to the blank Set B on Tuesday. Backup dates for all files are set to Tuesday. On Wednesday, you use Set A as the backup tape, and ARCserve incrementally backs up only files that have changed since Tuesday, not since Monday when you last used Set A. Arcserve does not copy the files that changed during the period from Monday to Tuesday into Set A, leaving Set A with an incomplete set of backed-up files. In contrast, Retrospect keeps an internal database of when files are backed up, so rotating backup sets work correctly.

Macworld Lab tests have shown that Arcserve backs up workstations over a network a bit faster than Retrospect Remote, but the Dantz product is faster at backing up large disks attached to a local machine—for example, when a tape drive is connected to a file server (see "Successful Workgroup Backup," *Macworld*, May 1995).

The Last Word

Arcserve for Macintosh 1.5 is a good backup program for mixed-platform networks, especially if you're using Arcserve for Windows on a Novell network. For Mac-only networks, Arcserve handles transient users, such as a PowerBook-based sales force, better than Retrospect Remote 2.1. At Macworld Expo in August 1995, Dantz showed (but was not shipping) Retrospect Remote 3.0, which will have much-improved automation features for transient users. Even in the current version, for traditional workgroups with a file server and many workstations, Retrospect is better than Arcserve for centralized backup administration. And because it handles rotating backup sets correctly, it's better than Arcserve for in-depth backup protection.—TOM NEGRINO

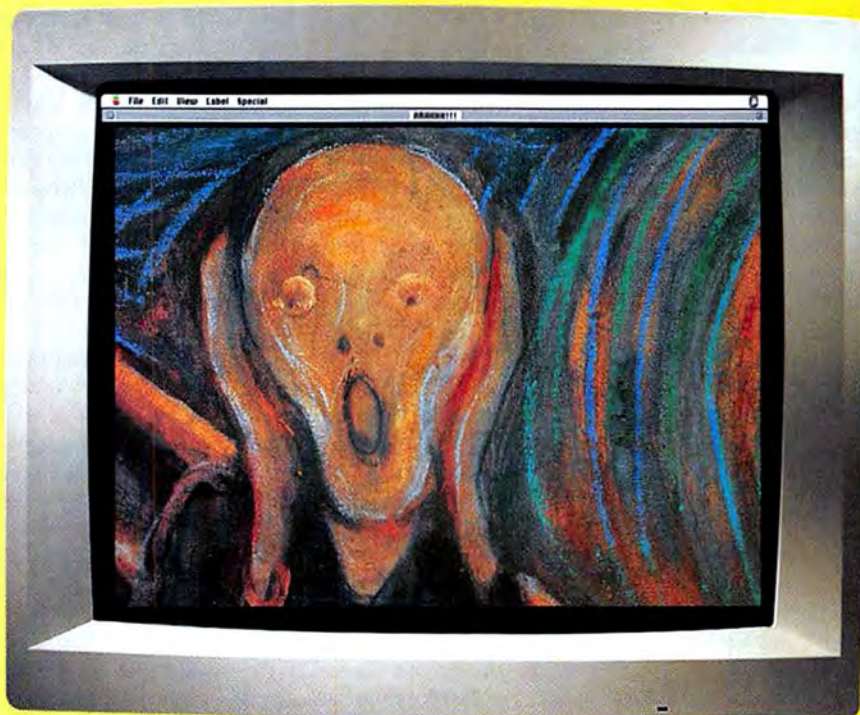


Correct Selection Arcserve lets you easily choose what you want to back up; just double-click on the square button next to a folder. The solid green buttons indicate that the entire contents of the folder or disk are selected.

Retrospect Remote requires that you place a 47K extension on each workstation. Network administrators can't install or update Arcserve via the network; Retrospect administrators can. Arcserve defaults to no data verification, though it's easy to turn verification on. You can print or save backup reports, but you can't view them on screen.

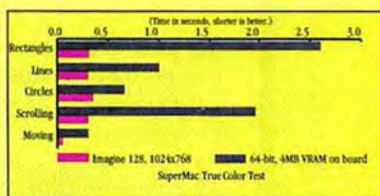
Arcserve's biggest flaw is that it does not back up correctly to rotating backup sets. The program takes advantage of a

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Radius Telecast

Nonlinear Editing System

PROS: High-quality audio and video I/O; support for multiple video standards; other professional video features; QuickTime-based. **CONS:** Immature editing software; audio-sync problems; relatively high price. **COMPANY:** Radius (408/541-6100). **LIST PRICE:** \$9995.



A COUPLE OF YEARS AGO, RADIUS delivered the first reliable, 60-field, full-screen, full-motion video-compression board for the Mac. Since then, the VideoVision Studio (VVS)—coupled with a hearty CPU and some fast hard drives—has become a staple in multimedia and video-production companies. Radius Telecast is a bold attempt to bring the ease and flexibility of QuickTime editing into the broadcast realm.

The Telecast's rack-mountable black box connects to the VideoVision compression board and is a sturdy piece of hardware loaded with professional features, such as inputs for component (RGB and YUV), composite, and S-Video; built-in PAL and SECAM encoding; four analog balanced audio inputs (and two digital inputs sampling at up to 48kHz), SMPTE and EBU time-code generation; genlock; and a GPI trigger for connectivity with other analog video devices such as special-effects generators. The Telecast's specifications, in fact, match or exceed those of some higher-priced Mac-based editing systems, namely Data Translation's Media 100 and Avid Technology's Media Composer.

In addition to Adobe Premiere, Telecast ships with Radius's own editing software, Radius Edit, a long-form meat-and-potatoes editor that lets the user cut quickly and spend a minimum of time waiting for images to render.

However, Radius Edit is still very



Radius Edit The software includes dual-monitor timeline editing to make QuickTime editing faster and more professional.

much a work in progress. Three years ago, its dual-window editor, batch clip logging, and timeline configuration would have been praiseworthy, but today these are standard features, and what stand out are Radius Edit's deficiencies. For example, working with full-screen video in the subsampled-source and record-preview windows is awkward because the application currently cannot resize the video on the fly to provide real-time playback in the trim mode. This slows down decision-making considerably, as the editor must toggle to full-screen mode to properly view clips.

Other features are poorly conceived. Split A/V editing is not well supported. Importing a still graphic is unnecessarily cumbersome, as you must convert the file to a QuickTime movie on import and then reimport it into the log list. Also, having a render track underneath the video track is redundant screen clutter. The QuickDraw GX Titler, while featuring keyframe animation, is limited to one text object per title, so you must create additional text objects as separate titles and layer them on separate video tracks.

But these criticisms of Radius Edit pale in comparison with problems I had maintaining audio sync, whether using Premiere or Edit. Regardless of the sync method I chose on input, I found that I could maintain audio sync playing back an individual clip (particularly using the Studio Player application), but edited material drifted several seconds. Radius admits this has been a recurring problem and says it is committed to correcting it.

The picture quality was impressive, easily competing with the Avid and Data Translation products at their higher resolutions. Using a Power Mac 8100/100 with 40MB of RAM and an 8GB ProMax Array, I digitized at a rate of up to 4MB per second without dropping frames (Radius currently recommends 2.5 MBps to 3.5 MBps).

The Last Word

Being QuickTime-based, instead of QuickTime-compatible, makes the Telecast a truly open environment. You can work on a project with various tools (CoSA's After Effects, Premiere, Edit) at variable screen resolutions, as well as at variable image-quality settings. Moreover, additional logging and rendering stations can be added using only the basic VideoVision Studio. Still, despite this enormous potential, serious video users should adopt a wait-and-see attitude. At its current price, the Telecast isn't a casual risk, and there are other competitively priced editing systems that are several steps ahead in the development process.—AVI HOFFER

HoTMetaL Pro 2.0

Web Authoring Software

PROS: None. **CONS:** Poorly designed interface; unreliable import filters; heavy RAM requirements. **COMPANY:** SoftQuad (416/239-4801). **LIST PRICE:** \$195.



CREATING PAGES FOR THE WORLD Wide Web using HTML (HyperText Markup Language) is not difficult, but it's painstaking and error-prone. While you can use any text-editing application to write a Web page, entering the formatting tags by hand is a slow and laborious process. Web developers want an application that can make the creation of Web pages more like designing a page in QuarkXPress or PageMaker. SoftQuad's HoTMetaL Pro attempts to bridge the gap between simple text editors and WYSIWYG Web-page design software, but while its feature set sounds attractive, HoTMetaL doesn't deliver.



Unintuitive Interface HTML isn't the most straightforward means of design, but HoTMetaL Pro's confusing palettes don't make it any simpler.

When you open a new document with HoTMetaL Pro, you get a working area much like a word processor document, with space to enter your Web page text. Surrounding this window are floating palettes for adding the HTML formatting tags; HoTMetaL renders these tags as graphic elements. While easy access to tags is a good idea, HoTMetaL Pro's palettes are confusing and poorly designed. They consist of rows of cryptic buttons, and inexplicably large portions of the palettes are blank, as if buttons had been removed. Few buttons have keyboard equivalents (I spent far too much time using the mouse while creating pages), and those that do don't follow standard Mac interface guidelines. For instance, ⌘-B doesn't make text bold.

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be disappointed by the strange mix of HTML tags. If you're new to HTML, you'll just find them confusing. HoTMetaL doesn't strictly follow the HTML 2.0 guidelines. For example, HoTMetaL Pro's validation filter accepts a few advanced tags, like those for rudimentary tables and some variations. However, the program avoids other advanced tags and will not allow you to use its validation filter to open pages that contain them. This is a strange discrepancy. HoTMetaL Pro should either adhere to its HTML 2.0 standards or offer more advanced tags. As HTML updates come out, SoftQuad plans to offer free updates that incorporate the new standards as a software download from its Web site.

HoTMetaL Pro implements some of its features poorly. For example, if you open a preexisting Web page in HoTMetaL Pro, the validation filter stops anytime it finds something it doesn't like and gives you a cryptic error message not explained anywhere in the manuals. If HoTMetaL Pro dislikes too many things in your document, it simply opens the page as a text file, leaving you to remove the offending tags by hand. When you have to clean up the imported HTML files, you've already done the filter's work.

HoTMetaL Pro takes an un-Mac-like approach to configuring preferences. You change preferences by typing arcane character strings into a thinly disguised configuration dialog box that feels left over from a command-line interface. In some cases, you must set preferences by opening the HoTMetaL Pro preferences file with a text editor and editing lines in the code. In a good Mac interface, these choices would be transparent to the user.

The PC version of HoTMetaL Pro gathered good reviews, but that may be because PC Web authoring applications have been so wretchedly bad that anything is an improvement. The Mac version is clearly just a quick translation of the PC product: screen redraws are often incomplete, windows fail to expand when the grow box is clicked, and dialog boxes contain strange DOS-like messages. Finally, I am appalled by the 8MB of free RAM required by the application, especially when similar shareware products require only 1MB to 2MB.

The Last Word

It's ultimately much harder to learn to navigate HoTMetaL Pro's confusing interface than it is to learn HTML. Web developers would be better off using shareware applications such as BBEdit or HTML Editor, whose features are simpler but better implemented on the Macintosh.—SARAH BEACH

Digital Fotovix IIIS-D

Video Slide Scanner

PROS: Can image small 3-D objects; can digitize any still-video input. **CONS:** Very poor image quality. **COMPANY:** Tamron Industries (516/484-8880). **LIST PRICE:** \$2299.



TAMRON'S FIRST VENTURE INTO the digital scanning market uses a built-in video camera to capture and digitize 35mm slides and small objects. The Digital Fotovix IIIS-D is identical to the earlier \$1149 Fotovix III-S, except that the III-S outputs only to analog video (for use with either an AV Mac or a video-digitizing board). The IIIS-D has a single 410,000-pixel CCD sensor—the kind used in quality consumer camcorders—and a competent digitizer. It can also digitize any video signal coming through a composite input (RCA phono jack) or a Y/C input (S-connector).

You can scan negative or positive film in color or black and white. A stand-alone image-capture program and a Photoshop acquire module are included, and both have some rough edges. Key buttons have odd labels; for example, the Full button actually means final scan.

What you get is a 480-dpi scan in 24-bit color, marred by noise and a lim-

ited dynamic range that turns dark areas into mud. Still-video images simply don't look good—you can't print the image bigger than a large postage stamp without seeing flaws. Such poor quality is acceptable for video, but the Fotovix digitizes only stationary images—it can't extract a single frame from a moving image.

Although the Fotovix took only about 35 seconds to digitize a slide, I had to frequently adjust and rescan to get acceptable results. Two conventional slide scanners, the Polaroid SprintScan 35 and the Microtek ScanMaker 35t, scanned more slowly (at 600 dpi the SprintScan took about 40 seconds, and the ScanMaker, nearly four minutes) but with far better results at default settings. (For more on slide scanners, see "Slide-Scanner Spectrum," *Macworld*, December 1995.)

The Fotovix does have some features lacking in other slide scanners. Two analog output connectors supply composite and Y/C signals for display on television sets. The zoom lens can fill the frame with objects from 17mm to 36mm wide. By covering the slide stage with a metal cap, you can scan objects up to 5mm thick, as long as you don't care about detail. You have to supply lighting for objects; the Fotovix has a built-in backlight for slides. Construction quality runs the gamut from a sturdy frame to a zoom lens in a not-so-sturdy plastic housing to a downright flimsy slide holder. The SCSI connectors are the new thin, high-density type.

But who would find the Fotovix useful? Tamron could only suggest someone who might find poor quality an asset: a photographer cataloging commercial photographic collections or compiling proofs of all the photos taken at, say, a wedding. The photographer's clients could choose from a set of proofs whose low quality would offer no temptation to just keep the proofs instead of buying the photos. But anyone who needs such an "asset" could always degrade the images from a high-quality slide scanner; sadly, the Fotovix offers no such option.

The Last Word

I have a hard time imagining why anyone would want a scanner that's limited to still-video quality. For about the same street price, the SprintScan produces vastly superior images—at up to 2700 dpi—that look reasonably good printed at full-page size. And even the 1828-dpi ScanMaker 35t—at half the price—runs rings around the Fotovix in image quality. The Fotovix just doesn't measure up to the competition.—CARY LU



Comparing Scans A slide scanned at default color-balance settings and magnified to approximate a 5-by-7-inch print, by the Fotovix at 480 dpi (top) and the Polaroid SprintScan at 1350 dpi (bottom). Colors in the Polaroid scan match the original.



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Meeting Maker XP 3.1

Group Scheduling Program

PROS: Good scheduling capabilities; can synchronize schedules with PowerBook. **CONS:** Limited integration with Mac E-mail packages; no contact database; large sites report problems upgrading. **COMPANY:** On Technology (617/374-1400). **LIST PRICE:** System pack \$249; ten-user pack \$890.



MEETING MAKER XP IS A group scheduler that automates the process of setting up meetings and activities. The program uses a shared, networked calendar (with separate daily, weekly, and monthly windows) to coordinate meeting planning. Meeting Maker can also manage your to-do lists and personal activities. Version 3 lets you add proxies (people you authorize to schedule meetings for you) and designate holidays that appear on all calendars, and it gives administrators the ability to move users from one server to another. Also new is the ability to receive notification of meetings via E-mail, but this feature doesn't support QuickMail or the Internet-standard SMTP.

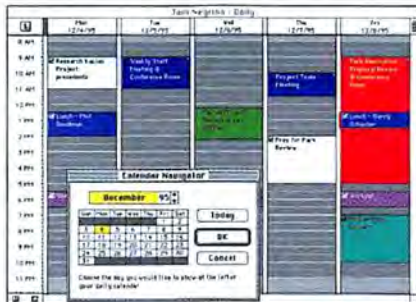
Meeting Maker uses a client-server system; up to 250 clients can log in to a server, and two or more servers can be connected via hubs. Small installations (25 users or fewer) only need a nondedicated server. Meeting Maker XP (XP means cross-platform) has client versions for Mac, Windows 3.1, DOS, Unix, and OS/2. Server versions exist for all platforms except DOS. The program runs under several network protocols, including AppleTalk, TCP/IP, Novell IPX, and NetBIOS. On Technology claims that Macs and other computers can coexist and share scheduling on the same network, but I did not test this.

The Meeting Maker interface is uncluttered and straightforward. You start by choosing Propose Meeting in the File menu (or by option-dragging on a block of time in the calendar). In a dialog box you enter the meeting title, the meeting location, and any needed equipment, and select the attendees from a single scrolling list. You can schedule a time, or the program can automatically select the first free time that everyone is available. After clicking on Send Proposal, you wait for the responses. All responses appear in the Messages window, with icons denoting whether the user has confirmed,

declined, or suggested rescheduling.

PowerBook users can update and synchronize both the PowerBook and server copies of the group schedule. Meeting Maker needs some form of contact database—for example, you should have the ability to look up addresses or phone numbers from within the program.

Because I was unable to use Meeting Maker in different-size environments, I spoke with users and system administrators at companies of various sizes. Administrators at large sites (more than 1000 users) reported adequate server performance but complained that Meeting Maker required an inordinate amount of maintenance time. These same sites reported that On Technology's tech support was inexperienced in dealing with large sites. However, at companies with fewer than 100 users (On Technology claims most Meeting Maker installations fall into this category), users and administrators expressed satisfaction with the program's performance. All the administrators complained about problems upgrading. For example, the scheduling database for version 3.0 is incompatible with previous versions, and the program cannot convert older files. Not only must administrators export the data and import it into the new version, but existing user preferences are lost and user-specified priorities on to-do items are changed. After the upgrade, some users were noti-



Time Blocks Meeting Maker's weekly calendar lets you label and color-code meetings and activities.

fied of recurring meetings that they had cancelled before the upgrade. Additionally, sites with servers connected by a hub lose all scheduling information.

The Last Word

Meeting Maker XP is a useful, robust package, well suited to small and midsize organizations. Large organizations, especially those with more than 1000 users, may choose to wait for a version with more new features and an easier upgrade path.—TOM NEGRINO

TV Adapters

Mac-to-TV Converters

Encoder Pro

PROS: Inexpensive for its class; excellent reliability and picture. **CONS:** Slight vertical cropping of Mac image. **COMPANY:** P2 Systems (206/525-2081). **LIST PRICE:** \$259.



Presenter TView

PROS: Excellent reliability and picture; useful software (optional). **CONS:** Expensive. **COMPANY:** TView (503/643-1662). **LIST PRICE:** \$449.



THE ENCODER PRO AND PRESENTER TView are among the latest generation of NTSC converters—boxes that turn the Mac's picture into a signal a TV or VCR can understand. Such boxes are ideal for PowerBook presenters, teachers, and QuickTime virtuosos who want to preserve their movies on videotape.

Converter designers face several challenges. There's a clarity problem: TV technology produces a far coarser image than computer-monitor electronics do. There's a flicker problem, which results from a difference in the way computers and TVs paint their screens. And there's the overscan problem, in which the edges of your Mac image (like the menu bar and Trash) get chopped off, since a TV's electron gun paints the glass beyond the visible edges of the TV screen.

Using clever electronics, these two new converters solve the flicker problem, creating a bright, stable Mac picture on your TV. Both do what they can to overcome the inferiority of a TV's picture tube, too. You still can't use a TV as a computer monitor—12-point type is barely legible—but presentation-style graphics (and large type) do splendidly. In my numerous trials, both boxes sent vivid, sharp Mac images to everything from home camcorders to national broadcast TV, no adjustments necessary.

Only the overscan problem remains. When you hook up either converter to your TV, about the top and bottom 1/4-inch of a standard 640-by-480-pixel Mac monitor's image gets chopped off. You can scroll vertically to favor the top or the bottom, but you can't fit the entire Mac image onto the TV screen. As long as you continues

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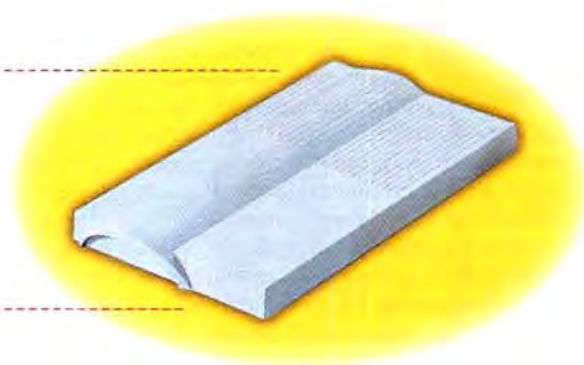
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anticipate this quirk (which affects almost all NTSC converters) when you prepare your presentation, it's a minor problem. In fact, owners of most older PowerBooks (such as the 100 series) won't notice anything amiss; their entire 640-by-400-pixel screen image will easily fit on a TV.

Even so, the TView offers a partial solution to the overscan problem: an optional system extension lets you redefine the dimensions of your Mac's screen (to, for example, 630 by 420). This trick works well when your presentation involves Mac programs. Unfortunately, it won't help any graphics or slides you've prepared at standard 640-by-480 size. They'll be too big to fit onto your redefined screen without scrolling.

The TView's other software goody is a control panel that, when you press certain keys, turns your cursor into a pointer, marker, or yellow highlighter.



KEVIN CANDLAND

Encoder Pro (bottom); Presenter TView (top).

Both boxes have two output jacks: an RCA connector for standard VCRs and TVs, and a jack for S-Video equipment (the more expensive, better-color format). Both work with a variety of Mac and PC models, although each requires an adapter for PowerBooks and some LC models. Both also let you plug in a 14-inch Mac monitor simultaneously with a TV (something cheaper models don't offer) and have buttons for freezing a frame or for squeezing the Mac image horizontally.

The Last Word

You can buy less expensive NTSC converters (see *The Desktop Critic*, January 1995). And more and more Macs have built-in NTSC-conversion circuitry, requiring no adapter at all. But the extra money for a converter buys worthwhile features. The Encoder is a good value at \$259; \$190 more buys the TView's useful software gadgets and a superbly written and illustrated manual. Either way, you get a bright, rock-solid display that may be the closest you can come to seeing Mac-monitor picture quality on an old-fashioned TV.—DAVID POGUE

SoftBoard Model 205

Electronic Whiteboard

PROS: Easy to set up; displays writing at remote sites. **CONS:** Expensive; requires special marking pens and erasers. **COMPANY:** Microfield Graphics (503/626-9393). **LIST PRICE:** \$2795.



METALLIC WHITEBOARDS ARE great for lectures and conferences: they're durable, they work with cheap erasable markers, and they don't emit a horrible screeching sound when you drag your fingernails across them. But conventional whiteboards aren't much help if you need to maintain accurate records or distribute copies of everything you've written. That's the idea behind the SoftBoard, an electronic whiteboard that captures everything you write and sends it to your Mac.

The SoftBoard comes in three different sizes. For this review, I looked at the low-end Model 205, which measures about 40 inches on a side and sports a 26-by-34-inch writing surface. It comes with wall-mounting hardware, but you can hang it from a standard office partition or rest it on a table using separate \$99 kits.

To use a SoftBoard you need, at minimum, a Macintosh with a 25MHz 68030 processor, 4MB of available RAM, and System 7 or later. The SoftBoard connects to the host Mac's serial port with a supplied 12-foot cable. (Although it's not recommended, I've used a SoftBoard with a 90-foot cable without problems.)

The SoftBoard uses twin infrared lasers to determine the color and position of the pen you're writing with. Once you've connected the hardware, you calibrate the lasers using a diagnostic program, a procedure that takes less than ten minutes. The SoftBoard works only with markers that incorporate a coded reflective collar at their tip. (The board comes with two sets of black, red, blue, and yellow pens; additional sets sell for about \$10 each.) You must erase using a special round eraser that's included with the SoftBoard. Because the lasers can't locate more than one pen or eraser at any given moment, only one person at a time can write on the SoftBoard.

An application called SBRecord sends everything that's written on the SoftBoard to the Macintosh screen. (An almost identical program called SBRemote also lets you display SoftBoard activity at remote locations over a network or modem—handy for teleconferencing.) You can scale

the viewing area to take advantage of large monitors, and you can customize the display color and stroke width of each of the SoftBoard's four marking pens. You can capture anything that appears on the Mac's screen in a PICT file or in a special file format that preserves every pen and eraser stroke. If you prefer, have the program automatically save at specified intervals or whenever the SoftBoard is idle. The board also comes with a free-ware application called SBView that lets anyone with a Mac or an IBM-compatible PC review SoftBoard documents.

If you have more than one topic to discuss, you can assign each one to a separate page by clicking on controls at the top of the SBRecord window on the Mac screen. Other controls in the program let you jump from page to page or replay all of the pen strokes from any page in order. The program also lets you start a new page or print the current page by tapping the pen on a magnetic strip that you can place in any corner of the SoftBoard.

In day-to-day use, the SoftBoard does its job with a minimum of fuss. You do have to be careful not to write too quickly, and the SoftBoard works best when you hold the pen at a right angle to the surface. Microfield's documentation, which comes in the form of separate installation and software reference manuals, is stiffly worded; and the installation guide lacks an index—I'd prefer a single



Virtual Whiteboard Pen and eraser strokes on the SoftBoard appear on the Macintosh's monitor in real time.

comprehensive manual. However, technical support is toll-free, and the people I spoke with were uniformly friendly and helpful.

The Last Word

The SoftBoard is a specialized tool, and while it's expensive, it does exactly what it promises. Only you can tell whether your needs make it worth the asking price.—FRANKLIN TESSLER



The new face of scanning

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Links Pro CD

Golf-Simulation Game

PROS: Excellent simulation of golf's many challenges; terrific graphics. **CONS:** Could use more detailed hole diagrams. **COMPANY:** Access Software (801/359-2900). **LIST PRICE:** \$69.95.



GOLF IS A SPORT THAT TRANSLATES well to computer simulation—no teammates to pass to, no opponent to throw you a curve, just you and the course. I've played the digital-golf circuit over the years, on a variety of computer platforms, and Links Pro CD is the best golf simulation I've seen.

Links Pro deftly incorporates the innumerable variables that make golf challenging, presenting them in an understandable and playable format. You can golf alone, with up to seven other players (in person, or over a network), or choose partners from a roster of recorded players.

The disk version comes with Harbour Town Golf Links of Hilton Head, South Carolina; the CD-ROM version adds Banff Springs Golf Club, in Alberta, Canada, including hole flyovers for both courses. Nine optional courses are available for

\$29.95 each, including Firestone in Ohio and Pinehurst in North Carolina; a tenth, Pebble Beach in California, goes for \$39.95.

The game features terrific graphics, with good close-up detail and wonderful panoramas. And Links Pro provides complete 3-D models of the actual course, not just a series of disconnected holes. You can turn around and drive a ball sideways to another hole, play a hole back from green to tee, even bounce shots off the clubhouse—it's like really being there.

A control panel displays yardage, wind, and club information. You can choose preset shot types, such as draws, fades, and chips, or you can alter shot variables, such as stance, ball position, and swing plane, to create special shots—just like Seve Ballesteros and Corey Pavin.

To swing the club you use the mouse—press, release, and click on a gauge that registers the shot's power and the accuracy of your timing. Clicking right on the impact marker equals solidly striking the ball.

Putting is also well simulated. Unlike games that shift to 2-D view for putting, Links Pro sets you right on the green. A grid helps you read the contours, but you must pay attention to detail and stay focused over the shot—just like in real golf.

To enhance realism, Links Pro includes ambient sounds, birds chirping, and verbal comments. But the CD's recorded comments



Nothing Could Be Finer Lining up an approach on the 18th at Harbour Town Golf Links, with the famous lighthouse in the background.

by comedian Bobcat Goldthwait can get annoying fast, even to fans. Much better are the extensive statistics the program generates. Some are so interesting I've added them to my database of personal on-course stats.

The program lets you measure line-of-sight distances with the shot-aiming stick, and the aerial view of the overall course is fine, but I'd like diagrams that would help me figure distances to bunkers, water, and obscured hazards. And I'm sure many would welcome the addition of a preset punch-shot option to negotiate those low shots.

The Last Word Links Pro is a great golf simulation. It's accessible to novices but sufficiently challenging to keep golfing veterans entertained. In fact, some golfers will find it as addictive as the real thing.

—CARLOS DOMINGO MARTINEZ

Full Throttle

Graphic Adventure Game

PROS: Wittily written; wonderfully cinematic; clever interface. **CONS:** Puzzles are not especially difficult; graphics are somewhat blocky. **COMPANY:** LucasArts (415/472-3400). **COMPANY'S ESTIMATED PRICE:** \$49.95.



YOU ARE BEN, A BAD-TO-the-bone biker and leader of the Poolecats gang, in LucasArts' new game, Full Throttle. One day you meet Malcolm Corley, aging founder of the legendary Corley Motors, the last domestic motorcycle manufacturer. Before long, you're konked on the head, your bike's been trashed, your gang is in jail, and you've been framed for Corley's murder. You know the real culprit is Adrian Ripburger, a scheming, backstabbing Corley executive who wants to take over Corley Motors and make . . . minivans (*ugh!*). To clear your name and save Corley Motors, you have to solve the game's many puzzles.

Full Throttle is presented like a movie, complete with long tracking shots, appro-

priate sound effects, and terrific animated sequences. The music is good, a hard-driving rock soundtrack (by "a real biker band!" says the packaging). The script (and Ben's voice-over narration) is written in a style best described as tongue-in-cheek tough guy—it's very funny. Thanks to excellent voice acting, the other characters in the game are well realized, from the slimy Ripburger to Corley's scrappy daughter, Maureen, to Horace the souvenir seller.

There's a refreshing lack of visible interface; when you need to operate on an object, you point at it and hold the mouse button down, and the interface appears. You can then examine, touch, or kick an object, or talk to another character. Inventory is handled in a similarly unobtrusive way.

Especially enjoyable is not dying and being presented with "Game Over" when you do something wrong. If you get knocked off your bike, you see a brief scene of Ben lying on the ground, then you're back on the road. Toward the end of the game, when you need to save yourself and your friends from plunging to a fiery death, if you hear Ben mutter, "Ouch! Let's try that again," you're brought back to the beginning of the scene. And here's a tip: when you finish the game, make sure you watch all the credits.

Full Throttle requires System 7.1 or later, a 68040 or PowerPC processor, a dou-

ble-speed or faster CD-ROM, and at least 8MB of RAM. On my Power Mac with a quad-speed CD-ROM drive, the pace of game play was more than adequate. Hardcore gamers may find Full Throttle too easily solved, as the puzzles aren't terribly difficult. I completed the game over a few days. The graphics (especially backgrounds) are quite good, but the rendering quality could be better, and images often look jaggy.

The Last Word I greatly enjoyed this game. It hits just the right balance of action, intelligence, and humor. If you're bored with mindless shoot-'em-ups, and your sense of humor and irony are intact, definitely check out Full Throttle.

—TOM NEGRINO



Leader of the Pack There's nothing like the feeling of the wind in your hair and the bugs in your teeth. Ben's riding high now, but in just a moment he'll be flat on his back with a wrecked bike and more trouble than he can handle.

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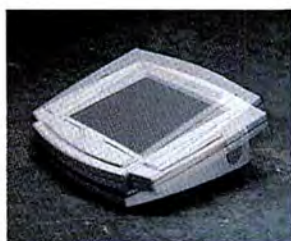
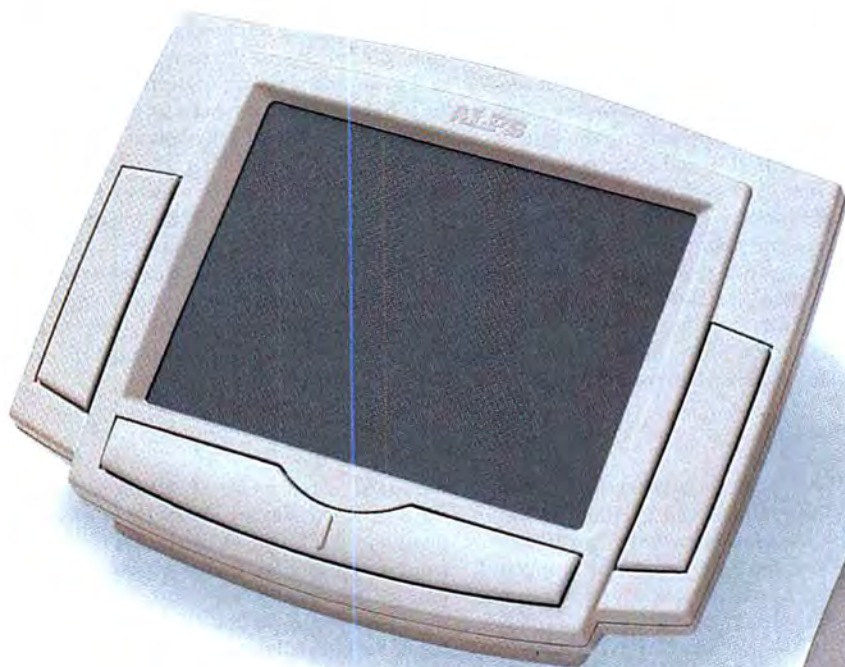
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King's Quest VII: The Princeless Bride

Adventure Game

PROS: Engaging action; colorful animation with well-rendered backgrounds; self-reliant female characters. **CONS:** Plot is too silly for adults, while play is too plodding for youngsters. **COMPANY:** Sierra On-Line (206/649-9800). **LIST PRICE:** \$59.95.



THIS GAME HAS AN IDENTITY PROBLEM. Its colorful animation seems designed to reform those little girls who, despite an enlightened upbringing, dismay their parents by yearning for Barbie dolls. Yet the game's unhurried pace, requiring repeated visits to locations to discover clues and acquire useful objects, is better suited to young adults. If you're old enough to enjoy the game—at times very entertaining—you'll probably smirk at the frilly plot, which reminded me of vintage Smurfs.

The lead character is a yellow-haired valley girl of a princess who introduces herself by singing a little ditty saccharine enough to make Barney the dinosaur purse his purple lips. Pressured on the subject of marriage by her mother, the queen, the

princess hops into a pond and discovers a world inhabited by trolls, a fiendish sorceress, and a handsome, though hooded, prince. In the role of either the princess or the queen, you attempt to save the world and reunite with either your mother or daughter, depending. It's a perfect recipe for entertaining little girls.

But the action in King's Quest is far too plodding for most little girls. They're virtually guaranteed to start squirming and complaining mere seconds into the game. I've had the pleasure of playing the game separately with one seven-year-old and one nine-year-old, and both harbor vivid memories of the queen laboring across the screen at the speed of spilled oatmeal. Most characters take more than a minute to cover the grand length of 640 pixels, so consider having some coloring books or finger puppets nearby to entertain the kiddies.

The animation in previous volumes of King's Quest has been compared with Disney's, but though Quest VII's backgrounds are well executed and the use of color is reminiscent of Disney classics, each scene is seen from a single all-encompassing camera angle—most un-Disney-like. The ability to examine the items by picking them up and twirling them around in three-dimen-

sional space is a nice touch. But the characters are crudely executed and flat.

The Last Word King's Quest VII offers two endings, with differing consequences for the prince. As either queen or princess, you have lots of opportunity to die, but you can usually immediately recover to where you left off. The music is a bit grating, and the documentation fails to warn you that all heck breaks loose if you don't switch to 256 on-screen colors. But if none of this bothers you, then King's Quest VII serves up hours of fun. And despite the title, don't look around for a king; the women struggle to save themselves without male rescuers—a welcome break from standard fantasy role-playing fare.—DEKE McCLELLAND



Just What Are You Doing to My Daughter?

No mother likes to see her daughter zapped by a sorceress, but this sorceress, having already laid out the prince, is in a zappin' mood.

AmoebArena 1.0

Strategy Game

PROS: Engaging and easy to play; lets users create custom scenarios. **CONS:** No network play; must play from CD. **COMPANY:** Casady & Greene (408/484-9228). **LIST PRICE:** \$49.95.



START WITH A FUTURISTIC VERSION of Chinese checkers invented in a biohazard lab, add just a dash of the cantina scene from *Star Wars*, and you'll get a pretty good idea of what AmoebArena is all about. This strategy game's concept is simple: pit your army of microscopic organisms against your opponents' microscopic armies in a free-for-all arena battle. Imagine the game of Risk invented by a mad cellular biologist.

Your armies are made up of four types of single-cell soldiers: cytozoids, amoeboids, mitoplasts, and blockers. Each type varies in terms of movement, attack power, health, and ability to reproduce. You start the game with a set number of each organism, which you place in your corner, or "home area," of the board. Your opponents do the same, and then it's a cytoplasmic slugfest as you

pilot your pieces in the arena according to their movement allowances, attacking and defending. The winner is the player with pieces left on the board at the end of the battle. It took me less than five minutes to get started playing, but I'm still nowhere near mastering the strategies it takes to win.

There are three scenarios from which to choose: a quick, basic game or two more-protracted tournament games. Tournament games cycle players through changing game boards as you fight for control over your opponents' star systems. Win control over them all (or hold the majority in limited-round tournaments) and you get to take a victory lap around the AmoebArena starship. In the more complex scenarios, the board and the composition of your pieces change between battles, and so does the



My Amoeboid Can Beat Up Your Cytozoid

The AmoebArena game board, complete with single-cell warriors (ebola not included).

strategy. Five computer opponents are available, each with a different style of play. It's also possible to compete against human opponents, but because the human players have to share the same computer (no network play is available), it's essentially a one-person game. If you are shopping for a game to play with your friends, choose another.

Surrounding the game board are windows that contain animated portraits of you and your opponents. I found a cheesy sci-fi charm to these graphics and the background data on each player, but they won't be to everyone's taste. The windows come to life as you or your opponents react to the fortunes (good and bad) of microscopic combat. These prefab personalities, intended to add flavor to the game, are only moderately successful. But I loved the way my animated cell warriors oozed across the board, accompanied by a disgusting sucking sound.

The Last Word My only real complaints about AmoebArena are that there's no network option and that you must play it from the CD. This is a simple game, and the movie files that come with it aren't essential. I would have liked to run it from my PowerBook, but there was no option to play without those files. In the end, though, these are minor quibbles. AmoebArena is an engaging game that's easy to learn but doesn't lose its slimy charms after just a few games.—MATTHEW HAWN

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The Legend of Kyrandia, Book 3

Adventure Game

PROS: Good story, soundtrack, and three-dimensional renderings; plenty of puzzles and action. **CONS:** Low screen resolution; action can be labored and repetitive. **COMPANY:** Virgin Interactive Entertainment (714/833-1999).

COMPANY'S ESTIMATED PRICE: \$34.95.



WITH EACH NEW LEGEND OF Kyrandia game, the story continues but the perspective changes. In the first game you play Prince Brandon, a virtuous squire whose parents were slain by an evil court jester named Malcolm. With the help of an alchemist named Zanthia, you turn the good-for-squat Malcolm into stone. In the second game, you become Zanthia and once again save the kingdom of Kyrandia. Then along comes the third adventure, Malcolm's Revenge, in which everything learned earlier turns out to be hogwash. You play Malcolm, brought back to life by a freak bolt of lightning. And wouldn't you just know it, you were framed! You didn't kill Brandon's parents. Okay, so you're sarcastic and malevolent. But a murderer? Never.

The basic action is standard adventure-game fare. You wander around searching for stuff, adding stuff to your inventory, and trying to use the stuff in a way that gets you out of your current predicament. The screen resolution is just 320 by 240 pixels—partially the result of the game's being ported from DOS—and some puzzles are plain impossible to figure out. (Who among us would think to blow up a brick wall using sesame seeds fertilized by an eel?) The game can likewise be unforgiving, and the action is peppered with repetitive tasks.

Luckily, Malcolm's Revenge provides enough pleasant diversions to make the game ultimately enjoyable and engaging. The story line is good, slowly unraveling the mystery of just who did kill Brandon's folks as you engage in your various acts of high adventure, such as aiding some cats in a revolution against a tyrannical dog empire and saving Kyrandia from certain enslavement at the hands of some equally tyrannical pirates. The game awards you points and praise when you show off your ornery side by destroying public works and even randomly poking people with sharp objects. (Notoriously malicious jesters like yourself have an image to maintain.) And occasionally you come across glimpses of gaming



The Magical Sliding Inventory Bar To maximize screen real estate, the area at the bottom of the screen slides up when you need to access your stuff, and then slides back down when you want to interact with characters.

flexibility. There are six different ways to escape the first scenario, and you can elect to follow your good conscience, bad conscience, or both in the fifth scenario.

The Last Word Malcolm's Revenge isn't nearly as humorous as LucasArts' Monkey Island, but it offers a complete and well-scored soundtrack as well as three-dimensional animated transitions. Though Malcolm is hardly a role model, the game is perfectly suitable for kids (even one goofy death scene). And thanks to the complexity of the game and the number of variations, you're looking at a week or more of game playing.—DEKE McCLELLAND

Out of the Sun

Flight-Simulation Game

PROS: Historically accurate battle scenarios; wide selection of aircraft; shows related ground forces. **CONS:** Limited flight dynamics; unrealistic scenery rendering; incomplete documentation.

COMPANY: Domark Software (415/513-8929).

COMPANY'S ESTIMATED PRICE: \$44.95.



FLIGHT SIMULATORS SEEM to fall into two categories: jet-powered shoot-'em-ups with miraculous capabilities that can save the day in any situation, and more realistic seat-of-the-pants simulations that require real aviation skills and tactical knowledge. Domark's Out of the Sun is in the latter category, putting you in authentic World War II fighters and bombers, fighting historically accurate adversaries.

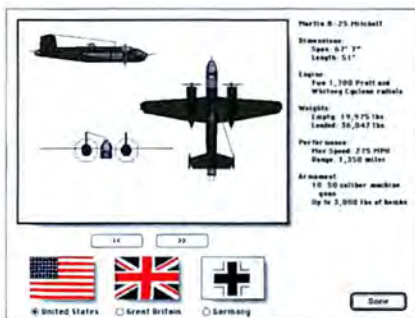
The simulation comes on CD-ROM, and you can run it directly from the disc or install it in about 20MB on your hard drive. The well-written manual includes a quick-start section, as well as detailed instructions and background information. The game opens with an overview of three theaters:

Midway, D-Day, and Kursk. You choose one and then select a battle from headlines in a World War II-era newspaper facsimile; the newspaper's articles give you background information on your particular engagement. Finally, you select the country you're fighting for (the United States, Britain, Germany, or Japan) and the aircraft you want to fly.

The simulation then puts you in the midst of the battle. Depending on the scenario, you may be in a midair formation with enemy aircraft in your sights, or on a runway trying to take off while attackers bomb the airfield. All sorts of battlefield effects add realism: machine-gun tracers cut the sky around you, armored surface forces move and shoot back, fires erupt on the ground, and destroyed aircraft and buildings shower bits and pieces everywhere. Everything makes noise, and you can make the cacophony authentically deafening with the help of a good external sound system.

The simulation has a total of 18 battle scenarios, including both land and sea engagements. But you're not limited to the preprogrammed battles. A battle-design panel lets you create your own situations.

Each cockpit is sparsely but realistically rendered, with just the basics of altimeter, airspeed, compass, and engine controls. The actual flight simulation itself, however, is not as refined as some other period



Background Information Out of the Sun includes detailed specifications on the aircraft you fly and those you fly against, as well as extensive briefings for each battle scenario.

simulators, such as Graphic Simulations' Hellcats Over the Pacific. Even on a Power Mac 8100/100, the 3-D view has a choppy feel. The flight dynamics of different aircraft vary only slightly, and scenery is rendered as large polygons. And while the program supports flight controls such as the MouseStick and ThrustMaster, the documentation says nothing about how control buttons are assigned, leaving you to puzzle out the controls by trial and error.

The Last Word While other Mac simulations offer more realistic landscapes, Out of the Sun's historical accuracy is refreshing. Out of the Sun is fun, engrossing, and completely enjoyable.—MEL BECKMAN

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1995 Macintosh Game Hall of Fame

by
Steven
Levy

AFTER A DECADE OF PRESENTING THE MACINTOSH Game Hall of Fame, we've had a lot of readers ask how they can attend this year's induction ceremony. Sorry—we had it already. But we can tell you about it.

Weeks in advance, we imported dozens of graphic artists and 3-D rendering wizards, issuing them Peter Pan bus tickets to downtown Pittsfield, Massachusetts, where the Hall's spacious virtual quarters reside. Everyone set to work creating the massive displays that would greet the throngs of well-wishers and rubberneckers attending the annual white-tie induction.

The tension had built to a crescendo by then. You could have cut it with a joystick. The *Berkshire Eagle* conducted its annual opinion poll, and in every tavern, Wal-Mart, and Ben & Jerry's, the locals were arguing the relative virtues of, say, Paparazzi versus Voyeur. Television crews hit town (look—there's Connie Chung). We even hired construction workers from nearby Dalton to build a World Wide Web site.

Finally, the big night. Governor Weld threw out the first floppy. Then our honorary chairwoman, Beverly Sills, read the rules while people in the balcony, getting restless, started popping bubble wrap left over from the judging process. "Shut up!" she trilled, and proceeded, "The Macintosh Game Hall of Fame every year chooses the utter elite of Mac entertainment. The winners are chosen by an entirely subjective but ultimately infallible process that consists of smart people at *Macworld* nominating the best games, which are then shipped to the Curator and Grand Arbiter, who retreats to an electronic cabin and doesn't leave his monitor until the cream has risen. This year, as every year, we have a wonderful group. Let us salute them!"

Cheers, yells, hosannas. Then, with no further ado (we





ditched the production numbers in '89), we called out the winners. Each was presented with a gold-plated CD-ROM, a kiss from Miss Waconah Park, and an autographed Turk Wendell baseball card. Did it get emotional? Unbearably so. Lots of hugging, crying, and bitter, unprintable threats from the losers. Finally, the traditional close to the formal program: 1000 joysticks dropped from the ceiling, and everyone sang, in rough harmony, Elvis Costello's "Accidents Will Happen."

Then everyone filed into the Hall's massive rotunda, where row upon row of Power Macs were set up with the Game Hall of Fame Class of '95. Into the wee hours, with almost unsavory pleasure, we played these games. And now you can, too.

BEST ROLE-PLAYING GAME

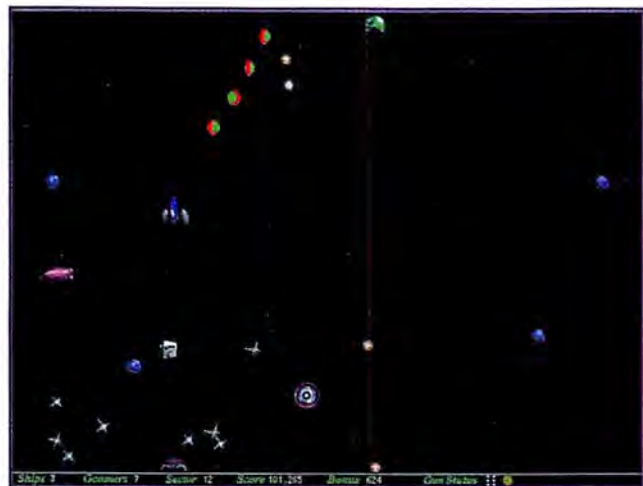
Reelect JFK

Quadra Interactive, 619/931-4755;
\$49.95 (CD).

Once you get past the ghoulish aspect of this historical-political thriller (isn't this president, uh, dead?), Reelect JFK's poll numbers rise dramatically, and you can appreciate this cleverly crafted interactive history lesson. The plot is classic what-if: imagine



Reelect JFK Here's a view experienced by a very few: the Oval Office, from behind the desk. Who's that briefing you? Your brother, Bobby Kennedy!



PegLeg OK, you've reached Sector 12 of PegLeg. That silvery thing below your spaceship is a cache of supplies: get it. Avoid everything else, particularly that nasty critter with legs.

that Lee Harvey Oswald (or whoever) only winged Jack Kennedy and that upon his return to D.C., Kennedy not only had to concentrate on getting reelected that next year, deal with the growing civil rights movement, and handle the escalating conflagration in a little country called Vietnam—he also had to solve the mystery of who wanted him dead. Now imagine you're him. You can actually have the weird experience of getting on the horn (with your Baah-ston accent) and trying to convince witnesses at the Book Depository that you're the chief executive and you just want the facts, ma'am.

Sounds crazy—almost as if Don DeLillo got into CD-ROMs—but Reelect JFK pulls it off. It has a classy graphic presentation (complete with period news footage), an interesting variety of scenes (ranging from the Oval Office to some strange locations in Dallas), a logical use of interactivity, and a serious stab at dealing with real issues—all mixed with the greatest mystery story of our century. Reelect JFK opens intriguing new possibilities for other pop-history scenarios: "Cover Up Watergate," anyone?

BEST SHOOT-'EM-UP

PegLeg

Changeling, 512/419-7085;
\$49.95 (disk).

Some cosmically inspired concepts can't be improved upon. Here's one of them: take a lot of weird-looking aliens and blast them to pieces with a gun that looks like a rocket ship. The latest refinement in this aesthetic is PegLeg. It won't win any awards in the original-concept division (besides Galaxian, its heritage includes the whimsical Crystal Crazy from Casady & Greene). But it will keep you playing. And playing.

What makes PegLeg particularly special—and compulsively seductive even to a jaded alien-blaster with an arthritic trigger finger—is its loving attention to detail. Each floating foe is deliciously rendered and bequeathed with a single onerous trait. One of them, after being shot, leaves a falling piece of debris that is fatal when it hits you. Another is an insectlike creature that leaps at you, blowing you to shreds at a mere touch. Then there's the SideWinder. Let's not talk about the SideWinder.

But, oh, such pleasure in blasting away the one that particularly irks you. At every turn, the PegLeg designers provide you with thoughtful features, such as an option for slow-speed play (for the kiddies) and double-speed play (for caffeine-snorting Power Mac fools). If you have a large monitor, PegLeg will fill it up. The game's crowning masterpiece is the unspeakably cool way that the renegade pirate hordes, who have vanquished you, drift to the center of the screen to morph into those dreaded words *game over*. It softens the frustration as you immediately, unthinkingly, unhesitatingly click on New Game to try again.

BEST ARCADE GAME

Power Pete

MacPlay, 714/553-6678;
\$29.95 (CD).

Who would have thought that we at the Mac Game Hall of Fame would get a rise out of a game whose point is to protect innocent, fuzzy bunnies? This kind of saccharine is not the image we want to project, but as presented in Power Pete, it really isn't sappy. In fact, you can forget about the trapped-in-a-toy-store plot—this is a dark and desperate quest. Killer clowns turn into murderous stalkers; stuffed dinosaurs stampede. A little toy shop of horrors!

In any case, once you take charge of the square-jawed eponymous protagonist (kind of a Stallone meets Disney) you'll be too busy blasting away with a wild array of weaponry—everything from flamethrowers to rocks—to notice. Power Pete requires a powerful Mac, and you can easily see why: the scrolling is velvet-smooth, and the animation is cartoon-perfect. Especially impressive are those moments when Power Pete is chased by what seem like dozens of killer gorillas—and he steps over a button that obliterates them in a circle of fireballs.

Power Pete is supposedly a kid's game, recommended for gamers as young as five. However, it's a rare kid of that age who's big enough to push away a parent intent on graduating from the Prehistoric Plaza to the Candy Cane Lane in this putatively charming, but secretly terrifying, arcade stunner.

BEST MULTIMEDIA GAME

Dust: A Tale of the Wired West

CyberFlix, 615/546-1157;
\$49.95 (CD).

Dust is a refreshing break—a slickly programmed, impressively presented multimedia tour de force that's not a space opera, but a horse opera, in the Hollywood tradition. Though this game was in the making longer than *Dances with Wolves*, it's not the smooth graphics and play action that impresses most, but the lighthearted touch—more Pat Buttram than Michael Cimino.

Welcome to Diamondback, an Old West town populated by central casting—gruff baddies, slick card dealers, saloon-hall ladies, and a town doctor based on Hillary Rodham Clinton (the one character here who falls flat). The real-life actors portraying the Diamondback denizens are surprisingly engaging, and the play action encourages exploration rather than offering punishment for missteps. (A liberal save-game function gives you further confidence.) The graphics are appropriately rustic, and the sound track is just right—as you stroll through the, uh, dusty night, a lonesome guitar chord sounds. During your evening revels the cathouse piano player keeps things jumping.

All in all, *Dust* is a high-spirited period romp that puts the fun back in computer adventuring.

BEST ADVENTURE GAME

Dark Forces

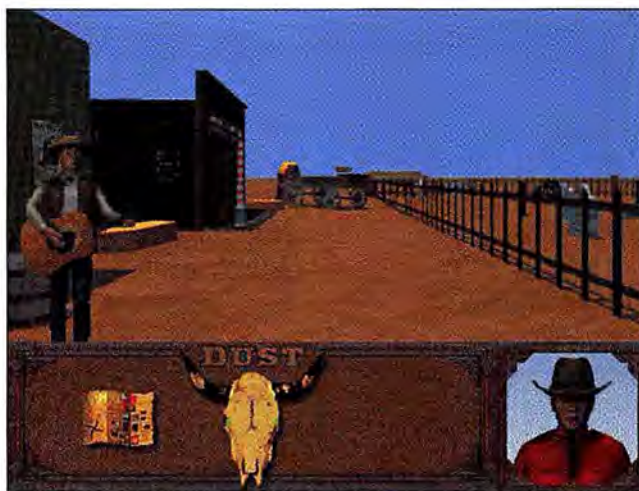
LucasArts Entertainment; 415/721-3300;
company's estimated price \$44.95 (CD).

Dark Forces is the best thing to come out of the *Star Wars* concept since Bill Murray's lounge-lizard version of the theme song. In a year when most games seemed to ask players to fight their way out of some interstellar maze, this is the one that actually makes you pay attention to your surroundings. The 3-D graphics are terrific—Dark Forces feels real. Each scenario is complex, and you, a rookie fighter in the service of the (non-Dark) Force, have to use your noodle more than your reflexes in order to finish. You'll wind up in places you hadn't imagined—like a stinky sewer—and you'll confront plenty of foes who serve as fodder for your sophisticated weaponry.

Unlike some serious space games where you get killed before you figure out how to mount your laser rifle, Dark Forces cuts you some slack. You get access to maps, and the puzzles that stand between you and your goals are not so baffling that they resist mortal solution—but they are tough enough to make you feel good when you solve them. At every turn, the Lucas film factory provides a satisfying experience: even when you get wiped out, you feel that you've learned something for the next time.



Power Pete One of the fascinations of Power Pete is his amazing array of weapons, ranging from rocks to flamethrowers to the birthday cake shown here. Do you think that cake is the best way to snuff those dinosaurs?



Dust This is Diamondback, a town without pretty. You're the buckaroo on the bottom right, and above is what you see as you ramble. Do not forsake me, oh my Performa.



Dark Forces Superslick graphics and a series of challenging missions are the hallmarks of Dark Forces, a *Star Wars*-inspired game. But you still have to blast away bad guys.



Marathon The cocked gun in the foreground is yours. You'll need it and plenty of other weapons (as outlined in green on the bottom of the screen) as you shoot your friends and foes in a networked game of Marathon.



SimTower Putting up a good facade in SimTower is easy—it's making a profit that's tough. Here, while the building is still under construction, we have a thriving noodle shop.



Strategic Leap Early in the game, before pieces become kings, the dark player has picked up a spell enabling him to resurrect a fallen piece; up for grabs are spells for kinging and a free move anywhere on the board.

BEST NETWORK GAME

Marathon

Bungie Software Products, 312/563-6200;
\$69.99 (disk or CD; runs over LocalTalk, Ethernet,
or Apple Remote Access).

Those who deny it are Doom-sayers: Marathon is the hot game among 3-D space-dungeon snarfers. The graphics are fast, the mazes are challenging, and the villains scream soulfully when you pump thick bullets into them. What could be better? Well, when you put Marathon on a network (we recommend Ethernet), you and your coworkers can go bonkers either teaming up against the horrible aliens who have hijacked a space colony or fighting the aliens—and each other—for added thrills and bad feelings in the coffee room.

Though network games, particularly ones this complex, tend to have failure rates that would shame even a TV cable company, Marathon is commendably stable. Everyone will get kicks out of the feature that lets you use your Mac's microphone to shout commands or issue taunts to others on the network. Afterward, everybody gets to read the perfectly dubbed Post-Game Carnage Report, a bar graph broken out by total carnage, individual carnage, and team carnage. Print it out for a permanent record of the way an entire office has spent the last nine hours.

BEST SIMULATION GAME

SimTower

Maxis Software, 510/933-5630;
\$39.95 (disk).

At first glance, SimTower seems to invite disappointment. Hey, previous efforts by this company have allowed us to build cities, fiddle with the global climate, and create life itself. Now we're supposed to be amused by constructing one lousy building? We needn't have worried. SimTower takes its place among the previous classics by its gentle—yet always ascendant toward something worthwhile—learning curve, its luscious graphics, and its fascinating ability to let complexity emerge from the mundane actions you initiate from the keyboard.

In SimTower, you're the architect of a giant edifice that can contain offices, commercial space, hotel rooms, and condos. Things you never really thought about (unless you were Nicholson Baker) become essential. Like programming elevators. Not enough elevators, or elevators coming at the wrong time, will make your inhabitants (called Sims) stressed out. They turn red. They don't think your rents are worth it. Do something!

Multiply these problems and you see that SimTower presents a challenge. But there are plenty of rewards and pleasures. The best part is the feature letting you single out 20 Sims and get to know them—you can even watch as the changes you make to the building ease the Sims' burden or send their stress levels to the roof. Never has a game made a user feel more godlike.

BEST BRAIN GAME

Strategic Leap

MacSoft, 612/559-5140;
\$29.99 (disk).

One of the very first forays into the realm of artificial intelligence was a program that played a fair game of checkers. Amusing, if you live in Mayberry.

Forty-some years later, we have Strategic Leap: a game that injects some hip-hop and mystery into that old chestnut—and,

if you are patient, will give you a fierce run for your money.

Strategic Leap provides two kinds of variations. One involves using new kinds of checkerboards (you can even design your own) where certain squares are blocked off. The other twist involves spells—serendipitous bonuses that, once you pick them up, give you instant kings, invulnerable pieces, free jumps to anywhere on the board, or (our favorite) an instant hit on the opposing piece of your choice. You can't control when or where these spells appear, adding a maddeningly random element to an otherwise pure game of skill.

The game has a clean design, and digitized sounds add to the experience without overwhelming it. If you play against the computer, Strategic Leap will keep your brain churning, especially if you're willing to wait until the machine cranks out solutions at the more difficult levels. Of course, you and a friend can square off. No fireworks—just a high-tech improvement on what the old folks used to play by the stove.

BEST STRATEGY GAME

Warlords II

Strategic Studies Group, 904/469-8880;
\$69.95 (disk).

Building an empire. Creating armies of elephants, giant worms, griffins, and Pegasi. Rummaging through ruins and pilgrimaging to temples. Sacking and pillaging. Totally destroying up to seven rival factions. These are the simple pleasures of an evening spent playing Warlords II.

While the empire-building genre has had its computer implementations since the mainframe days, the state of the art is right here. With an imaginative, Middle Earthy back-story, Warlords II—a greatly beefed-up update to the original—provides you (and your alter-ego hero) all the tools for conquest, presented in a nonintimidating and very Mac-like format. Experienced war gamers can go straight to the higher levels, but beginners will be sucked in by the ease of early conquest (though quickly challenged by the difficulty of maintaining armies and fending off multiple foes).

What makes everything go down easily are splendid graphics, a consistent interface, and a surprising depth. (It also helps that Warlords II is accelerated for the Power Mac.) For anyone who gets cocky at a few cheap wins over the Mad Mutants, Skirmishers, or Death Lords, there's the "I Am The Greatest" option, in which everybody fights you. In Warlords II, you have to earn your heroism.

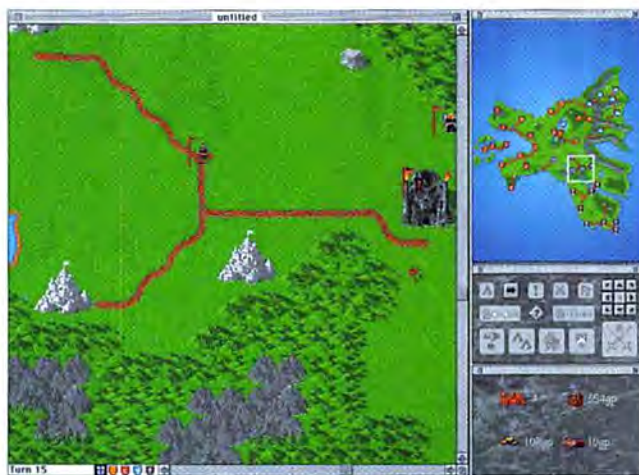
BEST FLIGHT SIMULATOR

A-10 Attack

Parsoft International, 214/479-1340;
\$79.95 (disk or CD).

Fans of previous winner Hellcats Over the Pacific (created by the same team) will immediately grok what's going on in A-10 Attack—a stunningly realistic series of sorties into enemy territory, using exotic ordnance straight out of *Jane's Weapons Systems*. This time around, the vehicle in question is the A-10A Thunderbolt II, fondly referred to by its masters as the Warthog. This is the gutsy engine of destruction deployed in the Gulf war and known in particular for its ability to uproot tanks. Not as flashy or speedy as an F-16, the A-10A is a blue-collar warplane. But A-10 Attack offers plenty of advanced telemetry: video monitors, heads-up display, the works.

Novices will find the going tough at first—there's little hand-holding, just a brief training-manual file that supplements



Warlords II Your castles (the light ones) are in trouble, particularly from that avenging angel on the edge of the terrain. More alarming, the map on the right shows that your empire is weak. Prepare to die.



A-10 Attack Here's a view from the cockpit of the A-10 bomber, a.k.a. the Warthog. Note that the proliferation of instruments represents only a portion of the game's various gauges and switches. Somewhere below are enemy tanks.

a manual that's more useful in offering trivia than game hints. Especially challenging, though ultimately rewarding, are the tasks required in unleashing the fearsome array of killer missiles and bombs. (For some reason they involve a proto-Russian takeover of the former East Germany.)

In the age of smart warfare, you don't just open a bomb bay and let loose—even the most basic bombs are released in what's known as continuously-calculated-impact-point mode, and then there's the laser-guided variety. But gee, it feels good to cruise when under one wing is an AGM-65B scene-magnification electrical-optical Maverick missile, and under the other rests an AGM-65D imaging infrared missile. I love the smell of avionics in the morning!

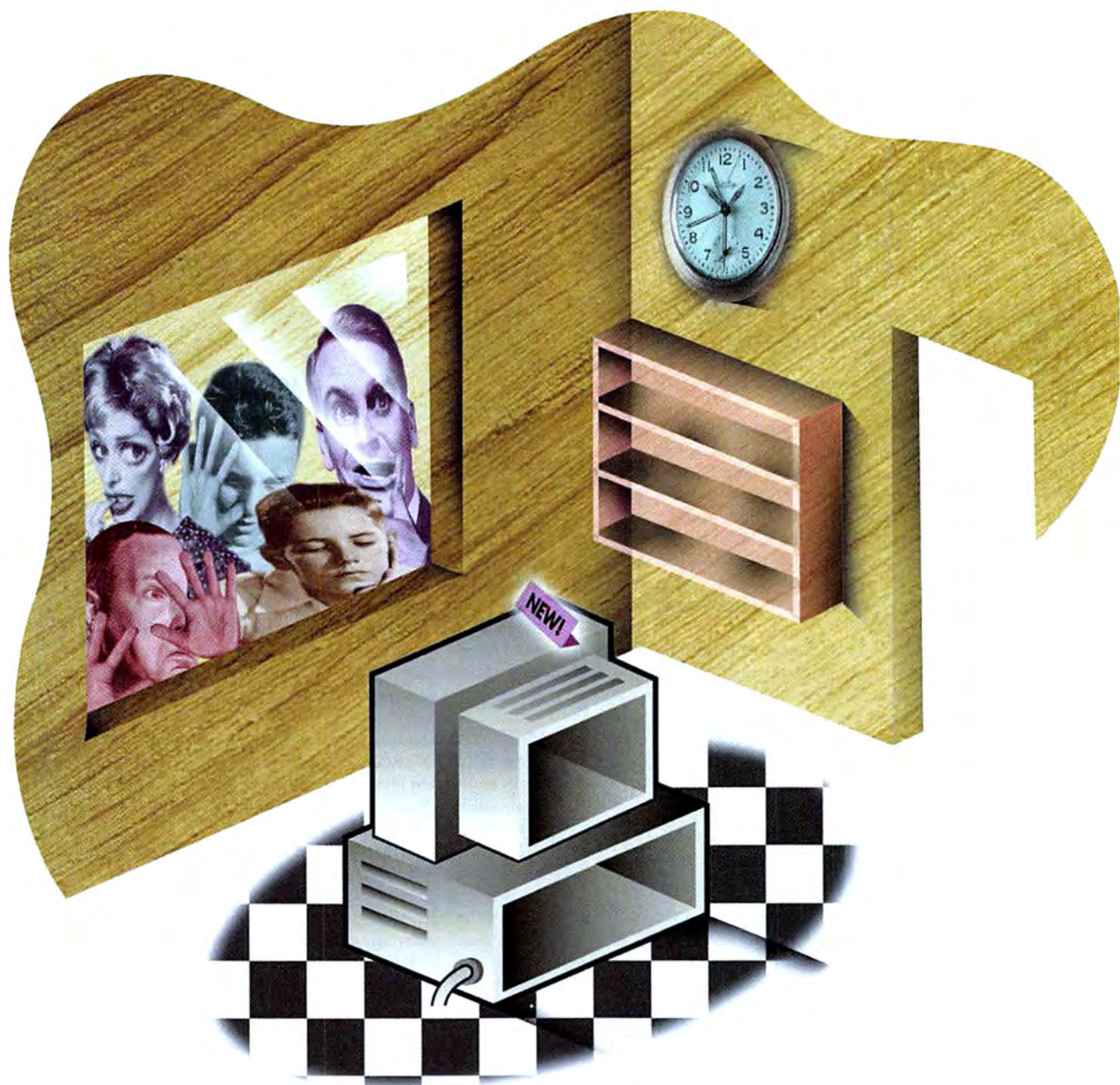
Once you've mastered flight and attack, you earn medals by flying challenging missions. A-10 Attack's landscapes are gorgeously rendered, and there's a very helpful real-time tactical map. For those who wish to go gonzo in verisimilitude, the game even supports multiple monitors.

In short, A-10 Attack is a welcome addition to anyone's virtual battlefield. **m**

Contributing editor STEVEN LEVY authored *Insanely Great: The Life and Times of Macintosh, the Computer That Changed Everything* (Viking, 1994).

WHY APPLE CAN:

B Y C H A R L E S P I L L E R



APPLE KILLS THE QUIX FIX

T MEET DEMAND

Power users have often had to wait for the latest, most advanced Macs. Suppliers of new technologies—such as today's PowerPC 604 CPUs—often take months to ramp up production sufficiently to meet market demand. But since early spring, waiting for a wide range of Power Mac models has required the patience of Job. Despite dramatic growth in Apple sales, the company has had a frustrating time meeting skyrocketing demand. The highly respected Macintosh industry analyst Pieter

Hartsook estimates pent-up demand in biblical proportions—an astonishing \$1 billion, amounting to hundreds of thousands of potential customers.

Most PC vendors are also having trouble meeting demand—thanks to a higher-than-expected growth in personal computer demand and a parts shortage—but not nearly the trouble Apple has experienced. So the biggest boom period in Mac sales in history has ironically taken on an apocalyptic feel for Apple. The company's worldwide share of the computer market now stands at about 8.4 percent, according to International Data Corporation, and it seems to shrink month by month—along with Apple's stock price.

Faced with lower profits on older models and delays in introducing its PCI Power Macs and new PowerPC-based PowerBooks, Apple has warned shareholders to expect lower earnings, a move that has led to a new round of criticism that the company is poorly managed and ripe for takeover. Apple financial chief Joseph Graziano, who had reportedly been frustrated over the company's direction for some time, resigned under pressure in October.

Apple and the Mac-clone producers are particularly susceptible to parts shortages because they rely on Mac-specific chips made by only a few companies. Long delays in building production capacity for such components—along with Apple's lukewarm approach to licensing the Mac OS—have contributed to the clone market's degeneration into a state akin to suspended animation (see "Clone Market's Slow Road").

Despite the crippling parts shortages in unique application-specific integrated circuits (ASICs), Apple has officially rejected the efforts of Quix Computerware, a small Swiss company, to move the Mac OS to IBM's standard PowerPC-based PC design—a design that does not rely on those ASICs and would have allowed Big Blue and perhaps others to sell Macs in volume by early next year.

Massive Increase in Demand

How did Apple get into this predicament? Its ambivalence to clones aside, the fault is not all Apple's. Sky-

rocketing demand for PCs and consumer electronic devices of all kinds in the last year put Apple and every other computer maker in a tight spot. Nearly every imaginable component—including memory chips, capacitors, CPUs, and modem chips—has been in short supply worldwide. For Apple, the worst shortages have been in PowerPC CPUs and ASICs.

According to an internal Apple report obtained by *Macworld* and written by Fred Forsyth, Apple's senior vice president for worldwide operations, Apple expected 15 percent growth and actually experienced 20 percent growth in sales during recent months, although demand was obviously far in excess of sales.

"Keep in mind that Apple forecasted the way the industry forecasted," says industry analyst Tim Bajarin. "To their dismay—and joy—demand has been running at 32 to 35 percent [above the preceding year]. Nobody could have predicted that," he says.

In defense of Apple's efforts, Forsyth tells *Macworld*, "This year we've transitioned about 75 percent of the product line to PowerPC. This past quarter we've basically ramped the entire product line over to PowerPC, including the PowerBooks." He adds, "This is the largest transition we've ever made in our history, something that we wouldn't expect to see again in five years." Indeed, by the end of 1995, the only non-PowerPC Macs for sale will be the PowerBook 190 and some Performa models in the 500 and 600 series.

Apple CEO Michael Spindler points the finger for product shortages directly at suppliers. Spindler says that the makers of some components were not delivering promised allocations to Apple, in abrogation of prior commitments.

Macworld asked the key Apple ASIC providers, Texas Instruments and VLSI Technologies, to indicate when they would be able to meet Mac-market demand. VLSI declined to comment, and Texas Instruments did not return our calls. Apple has clearly painted itself into a corner by depending on so few suppliers. Accordingly, Forsyth says, Apple is moving to diversify its supply base.

Despite these conditions, executives at Apple, as

TO THE PARTS SHORTAGES

well as at clone makers Radius and Power Computing, agree that any Mac or clone based on a PowerPC 601, 603, or 603e CPU should be readily available by the end of 1995, and that shortages were beginning to ease by mid-September. Bear in mind, however, that Apple has been predicting an end to the bottleneck for some time, without results.

Longer-Term 604 Shortages

Even if the PowerPC 601- and 603-family shortages end, Apple and the clone makers face another daunting problem. The PowerPC 604—currently the fastest Mac CPU—is still extremely rare as Motorola and IBM ramp up production. Phil Pompa, director of marketing for RISC processors at Motorola, declines to predict how long CPU shortages will last, saying only that “we are directing more capacity toward 604’s as we speak.” Pompa says that a new PowerPC fabrication facility will be up and running in June 1996, and that shortages will gradually go away between now and then. Forsyth predicts problems in meeting

Prognosis for Buyers

Waiting for Apple and its suppliers to get into sync is a discouraging proposition for consumers who face this choice: buy a slower Mac now, or stand in an indefinite queue to move up to a 604-based unit.

The bottom line seems to be long delays on high-end Macs and clones, and slower-than-expected expansion of the clone market. Low-end machines will be more readily available, both because many of them use the 601 chip and because Apple will probably divert resources to production of consumer products to meet the holiday-season spike in demand. Unfortunately, this approach to feeding the Mac’s anemic market share would force consumers to buy at the low end, while Intel-based machines catch up to, or leapfrog, PowerPC performance.

Apple’s not alone in this dilemma. Many PC makers have been forced to make similar decisions. For example, Compaq has reduced production of servers so it can direct parts to other kinds of systems. But these problems are far less

tem 7.5 or Copland (the code name for Apple’s next-generation system; see “The New Mac OS Unveiled,” *Macworld*, July 1995) to be available for CHRP-based Macs before fall 1996 at the earliest.

PreP as Stopgap

The CHRP transition should definitively end Apple’s competitive disadvantage in obtaining parts. But a year is a long time in this industry, especially for a company whose market share (and stock price) have plummeted recently. This may explain why many of Apple’s own OS engineers are mystified by the company’s rejection of the effort to move the Mac OS to IBM’s PreP design.

Quix Computerware has found a way to make the Mac OS run on PreP systems. Although Apple approved Quix’s earlier product, which lets the Mac OS run on Next systems, Apple has rejected Quix’s port for PreP—despite IBM’s strong requests that Apple approve Quix’s PreP product and despite findings by Macworld Lab that the product delivers on its promise (see “Apple Says No to

SPINDLER SAID THE GATEWAY REJECTION HAD NOTHING TO DO WITH PARTS SHORTAGES. BASICALLY, APPLE DIDN'T WANT THE COMPETITION.

PIETER HARTSOOK, LEADING INDUSTRY ANALYST

demand for 604-based products into the first quarter of 1996, but expects steady improvement after that, as increases in manufacturing capacity begin to kick in.

However, according to analyst Bjarin, the 604 CPUs available in the near term will primarily be the slower, 120MHz version. The 132MHz version used in one Power Mac 9500 model, and the anticipated but not yet available 150MHz version, will remain scarce well into the second quarter of 1996. And once sufficient chip-production capacity comes on-line, it will take up to three months to fill pent-up demand, Bjarin says.

Even when 604 chips become available in ample supply, the ASIC shortage could continue to haunt Apple and the clone makers. The systems marketing director for Radius, Joe Eschbach, says that over the past six months his company has faced up to 48-week delays for key ASICs, and many weeks for other key parts. He predicts that these shortfalls won’t go away completely until late 1996.

onerous for PC consumers than for Mac buyers. PC buyers can get, say, a server from IBM if Compaq focuses on desktop units for a quarter. In the Mac market—where Apple must be all things to all people—buyers can’t do that. Nor does the existence of Mac-clone makers help, because of the limited supplier problem.

“Ultimately, [to solve the parts problems] Apple should move to a more industry-standard architecture, and then they will be no worse off than anyone else,” says analyst Hartsook. “But in the meantime it appears that they can be held hostage to suppliers of custom parts.”

CHRP—the Common Hardware Reference Platform based on IBM’s PreP (PowerPC Reference Platform) design and modified by IBM, Apple, and Motorola to accommodate the Mac OS—represents an industry-standard architecture that Apple will ultimately move to. Apple’s official estimates place System 7.5 on CHRP machines in June 1996, although few in the industry expect Sys-

IBM’s Macintosh,” *News*, October 1995).

Macworld’s revelation of the Quix port forced Apple to reconsider its initial rejection of the Quix option in July 1995, but in early October 1995, Apple again closed the book on Quix.

Apple officials have declined to comment on their reasons for rejecting Quix’s request for an OS license. But engineers on Apple’s OS-development team did speak to *Macworld* on condition that they not be identified, for fear of losing their jobs. One engineer expressed confusion over Apple’s decision. “We were trying to understand why Apple wasn’t supportive of Quix,” the engineer told *Macworld*. “Some concerns we heard expressed didn’t make any sense to us.”

Apple officials feared that Apple would have to provide a lot of support to Quix to ensure that PreP machines running the Quix OS version would be able to run new versions of the Mac OS, the engineer said. This is a nonissue, according to Quix, whose software tricks any

CLONE MARKET'S SLOW ROAD

PREP-based computer into thinking that it is a single Power Mac model. As long as Apple supports the Mac model that Quix has chosen, there should be no problem with all PREP-based computers' supporting the next version of the Mac OS. An Apple OS engineer confirmed the technical validity of the Quix approach.

Plus, there's no reason for Apple to worry about whether Copland would run on a PREP system—if IBM wants to ship System 7.5-only systems, that's its business, not Apple's. After all, Apple continues to ship systems like the PowerBook 190 that will not support Copland, and Apple has no problem with DayStar Digital's continuing to ship PowerPC accelerators for 680X0 Macs, even though Copland won't support these either.

For our October issue, Macworld Lab tested an early version of the Quix software running on PREP computers that offered near-flawless compatibility with dozens of Mac applications while yielding performance equivalent to that of Apple's Macs. At that time, some key OS components had not been ported. In recent testing, Macworld Lab found that now only the floppy driver, the serial driver, and support for some Apple-style PCI cards remain to be ported (Quix already supports PC-style PCI cards). In other words, Quix says, the product is nearly completed.

Ironically, Apple's own OS engineers directly contradict concerns they say are being voiced by Apple licensing officials that the Quix product is unacceptable because it lacks support for LocalTalk and ADB. "These are hardly essential technologies," according to one Apple OS engineer. "If business users have PS/2 equipment, they wouldn't want ADB anyway. They'd prefer to get a box that has a PS/2 connector, so they could keep using their mice and other input devices."

Even so, Quix would support LocalTalk with an inexpensive add-on card, and ADB with an inexpensive adapter, says Andy Grawehr, president of Quix.

"I have not yet met anyone, among many Apple engineers I've spoken with, who disagrees with me that we should give Quix a license," the Mac OS engineer adds.

Jay Hamlin, a lead engineer on the team producing the Pippin OS, a version of the Mac OS being developed for multimedia game devices, posted this message to a publicly accessible bulletin board run by Apple for the developer community: "Quix has been doing a great job with getting System 7 to run on a PREP box. There are quite a few people here (me included) that want Quix to be granted a license and are upset that it didn't happen a long time ago."

Parts shortages are only one in a range of problems that Mac-clone makers have faced in recent months. Last summer many in the clone industry believed that by August 1996, clone makers would capture about 10 percent of the total desktop Mac market—some 400,000 machines, by today's reckoning. Today those estimates seem wildly out of line with reality, given Apple's cautious approach to OS licensing.

On the positive side, Power Computing CEO Steve Kahng claims that his company is moving along its previously predicted path to ship 100,000 units by June 1996, although there is no way to verify the company's sales estimates. And South Korean computer maker LG Electronics (known for its GoldStar brand) has announced that it intends to license the Mac OS and sell Power Computing-manufactured clones in Korea. LG Electronics is an investor, along with Italy's Olivetti, in Power Computing.

Finally, Apple plans to soon announce a European licensee for the Mac OS, according to Apple Europe president Marco Landi. The new clone maker will improve the Mac's position in the education market, Landi says. This points to Acorn, a United Kingdom-based company that has long been rumored as being interested in the Mac OS. Acorn enjoys a commanding share of the education market in the United Kingdom.

Blocking Real Competition

But such developments, should they come to fruition, fall far short of Apple's own clear benchmarks for building a clone industry that helps achieve Apple's primary goal for licensing—growing the Mac OS market share relative to Windows. Don Strickland, Apple's vice president for business and government, made it clear in comments to *Macworld* last summer what Apple must do to establish a credible clone program: "It's absolutely true that we have to have at least a couple of licensees in the top 20 computer makers worldwide... and you have to have licensees that are not just in niche markets." Paradoxically, however, Apple recently spurned Gateway—the number-12 worldwide computer vendor in 1994—as its first mainstream operating system licensing partner.

Neither Apple nor Gateway would comment about their talks, although published reports have suggested that ongoing parts shortages were responsible for scuttling the Gateway deal. Apple's rejection of Gateway actually had nothing to do with

the parts shortages, according to Apple spokeswoman Laurence Clavère.

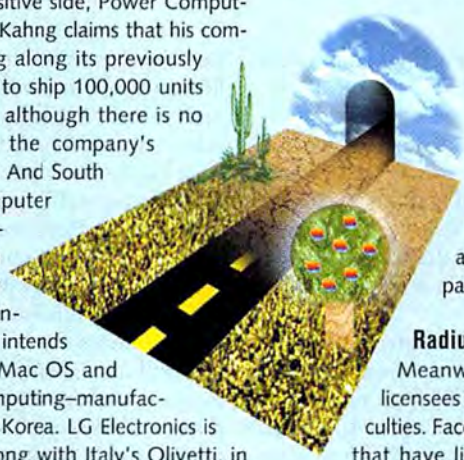
The rejection was a pure and simple matter of shying away from a strong rival, according to Macintosh industry analyst Pieter Hartsook, who spoke directly with Apple CEO Michael Spindler on the matter. "Basically Apple didn't want the competition. Spindler said the Gateway situation 'had nothing to do with parts shortages.'" Hartsook believes Apple is afraid that going head-to-head against a clone maker the size of Gateway could affect Apple's bottom line in a period of anxiety about the company's profitability.

Radius, DayStar Troubles

Meanwhile, the other U.S. licensees are experiencing difficulties. Faced with parts shortages that have limited the number of clones it can make and sell, thin margins on its other product offerings, and the costs of continued development in its video-editing and color-publishing product lines, Radius laid off about half of its staff, or some 200 people. Radius lost \$3.1 million in the fiscal quarter ending June 30. At press time, Radius had yet to announce results for the quarter ending September 30.

Radius says that its engineering and customer-support staffs are relatively unaffected and that the layoffs do not change the company's essential focus on selling high-end, integrated, multiproduct solutions for color publishing, video editing, and business color printing. Radius spokesman Andrew Eisner says that the company will move away from its short-lived foray into mass-market clones. The news can hardly be interpreted as a shot in the arm for the clone market. Meanwhile, former Radius executive vice president Rick Schrameck left the company in September to attempt to found his own Mac-clone company under the SuperMac name, which he would license from Radius (see *News*, elsewhere in this issue).

Unexpected delays have forced another U.S. licensee, DayStar Digital, to hold back shipment of its Genesis MP Mac-compatible system, which will have four CPUs that can work simultaneously to speed up processing in Adobe Photoshop and other programs tuned for multi-CPU operation. The company should have limited quantities of the \$10,000 and \$15,000 versions of the system available by the time this issue appears (mid-November 1995). (See *MacBulletin*, in this issue.)



THERE ARE QUITE A FEW PEOPLE HERE (ME INCLUDED) THAT WANT QUIX TO BE GRANTED A LICENSE AND ARE UPSET THAT IT DIDN'T HAPPEN A LONG TIME AGO

JAY HAMLIN, APPLE OS ENGINEER

"If IBM comes on the scene [by licensing the Mac OS for its PReP machines], they don't have any parts shortages, at least not the same ones we do," says another Apple engineer. "Not to mention that if IBM sells the Mac OS, we'd get credibility from the IS people who still fail to take the Mac seriously, plus we get a tremendous amount of free advertising."

Apple's few public statements on its reasons have not stood up to examination, and thus the logic of its Quix rejection is murky at best. For example, Apple initially said it would be too difficult to make the Mac OS run on a PReP system. But Quix proved that untrue. Then Apple said the Quix product wouldn't work. Macworld Lab proved that untrue, and Apple engineers confirm our findings. Now Apple says that with CHRP systems to be ready in mid-1996 with System 7.5, there is no need for Quix's PReP-based option. But aside from Apple's official spokespeople, nearly everyone in the industry, including some Mac OS engineers, views that timetable as wildly optimistic. The result of all this will be a constrained supply of Macs and Mac clones.

Combine the Quix rejection with Apple's continuing pattern of spurning other, more mainstream potential Mac OS licensees (see "Is Apple Serious about Clones?" in *Macworld*, August 1995), and what do you get? The unmistakable conclusion that there will be no significant clone market before Apple makes the transition to CHRP. Forget Apple's original predictions—and the Mac industry's hopes—that 1996 would be the year that put Mac clones in the mainstream. It's clear that this won't happen, largely because of Apple's reduced commitment to the clone option.

To Clone or Not to Clone

And in another sign that Apple's OS-licensing efforts are in deep freeze, two of the company's three most important licensing officials have been reassigned. Larry Lightman, formerly director of worldwide Mac OS licensing, has been shifted to handle licensing in Europe only. Jim Gable, formerly direc-

tor of the transition to CHRP, is out of licensing and in a new job involving OS marketing. (Apple would not officially acknowledge the shift or comment on what Gable's new job entails.)

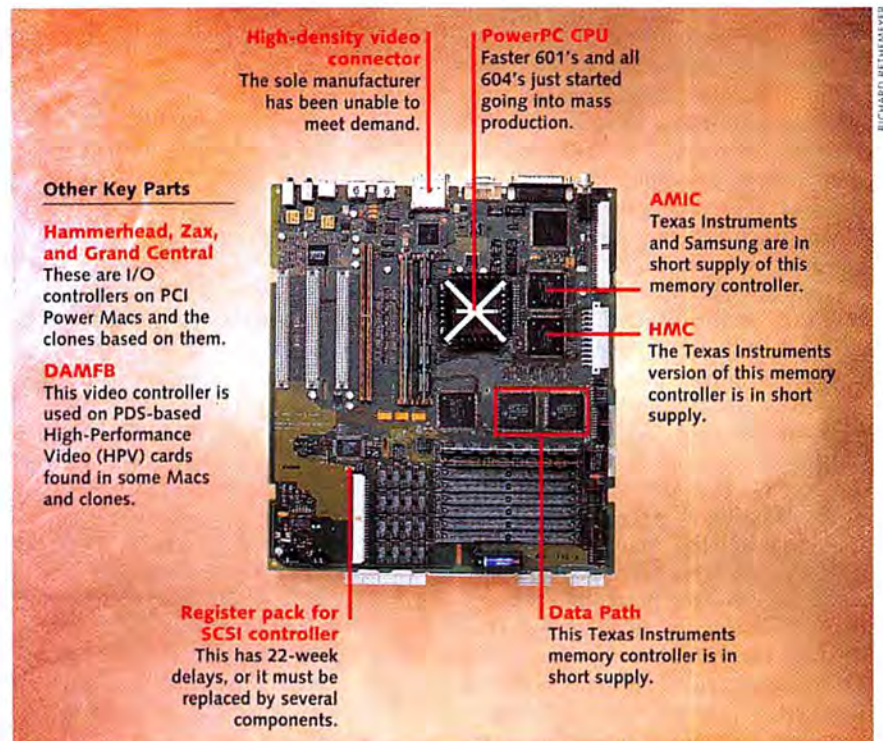
Equally telling was Apple CEO Michael Spindler's recent letter on 1996 corporate strategy, sent to Apple employees and obtained by *Macworld*. Nowhere in the lengthy missive does Spindler mention the words *clone* or *licensing*.

Will Apple really open the floodgates to clone makers after CHRP, as it has promised? If recent events are any indication, don't bank on that happening either. Apple is avoiding large-scale competitors in the Mac market at all costs. For example, Apple recently decided not to pursue a deal with Gateway 2000, one of the largest PC makers, to make Mac clones. Why? Apple didn't want a mainstream competitor in the United States. That's the reason Spindler gave to a

group of industry analysts, according to analyst Hartsook, who was among them. Apple refuses to comment on the reason, but the company does confirm that a *MacWeek* story blaming the parts shortage for the failure to get a Gateway deal was incorrect.

Instead, Apple is channeling clone makers into niche markets in this country (Power Computing for mail order and Radius for publishing and multimedia) and to foreign markets (likely licensees are GoldStar in South Korea and Acorn in the British education market) where the Mac has never gained a firm foothold. Such an approach suggests that Apple views clone makers with suspicion and fear. One can only wonder how potential licensees view Apple. **m**

Senior editor CHARLES PILLER covers the Mac-clone market and the effects of technology on public affairs and public policy.



Buddy, Can You Spare a Transistor? A shortage of key components is making it hard for Apple and clone makers to ship Power Mac systems. Component suppliers would not talk to *Macworld*, but several industry engineers identified the key hard-to-find parts, shown here on a Power Mac 8100 motherboard.

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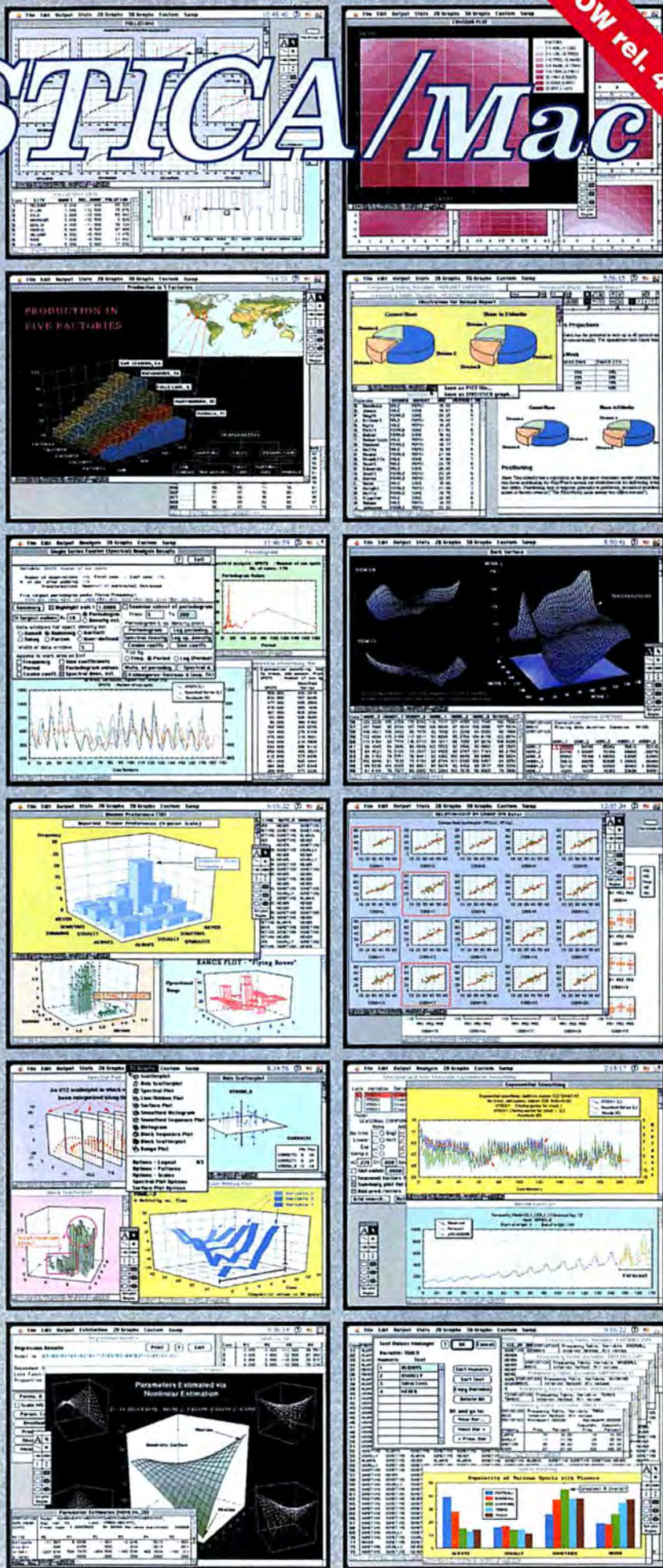


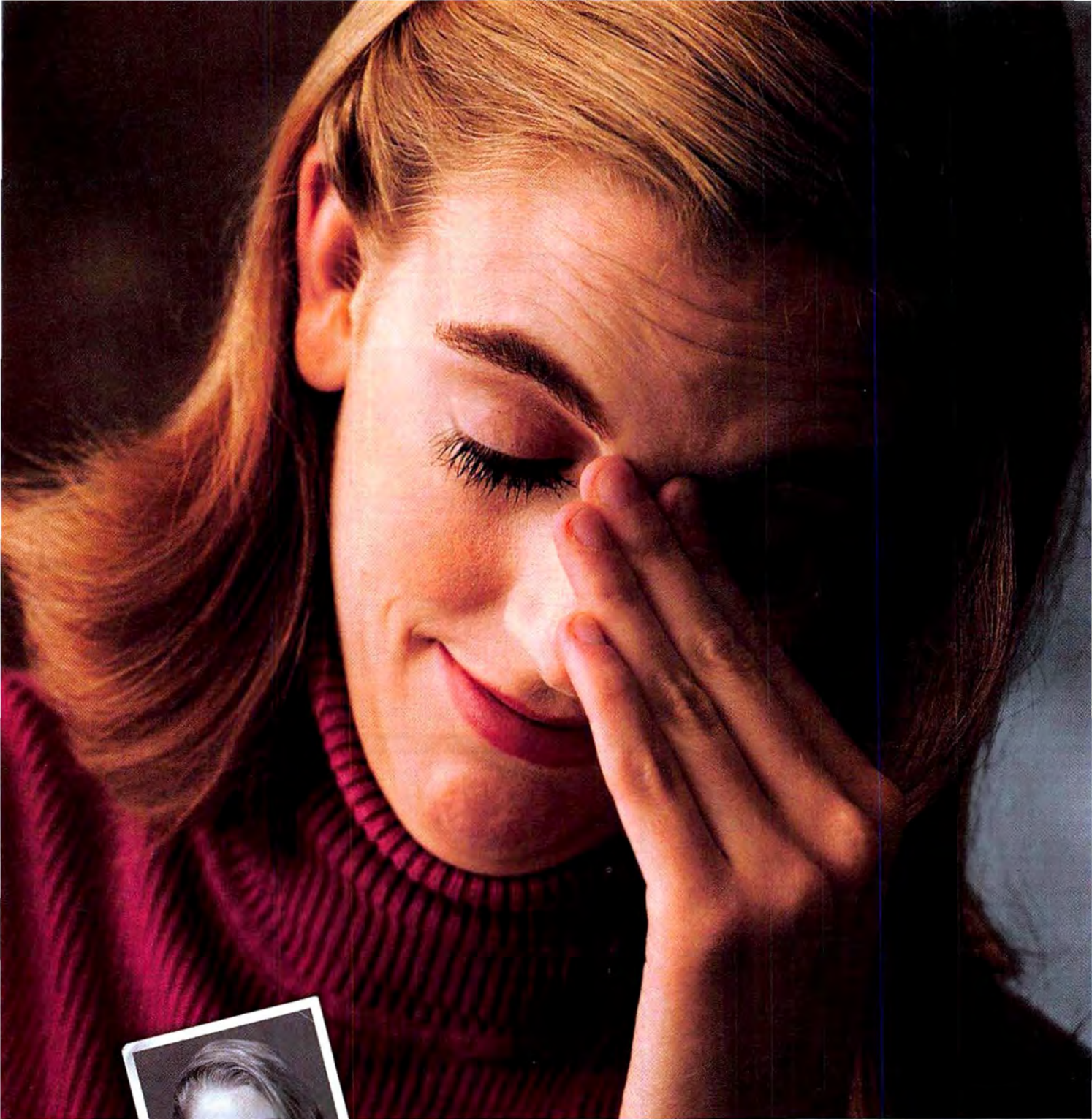
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Brittany Stromberg

Dallas, Texas

WRITER

WORDPERFECT FOR MACINTOSH USER

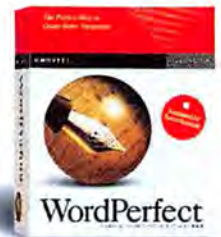
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FULL-PROOF

NEED A COLOR PROOF YOU CAN DEPEND ON? MACWORLD PICKS THE BEST DYE-SUB PRINTER FOR THE JOB

PRINTERS

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When it comes to color printing, a publisher is a tough customer. A home, education, or business user has modest requirements: make my diagrams, bar charts, and overhead transparencies vibrant and make them inexpensive. But publishers don't use color printers to punctuate presentations or dress up reports. They use them to assess the color balance of photographs, to prepare layouts for client approval, and to proof four-color layouts before sending jobs to press.

Applications like these bring demands that keep printer designers awake at night: Make sure the output matches what I see on my monitor. Allow me to change the color to simulate

various printing technologies and color-separation standards. Enable me to proof tricky prepress problems such as traps and overprints. Don't obscure fine details with a haze of halftone dots or dither patterns. And make it inexpensive and fast, because I'm tired of paying for and waiting for photographic proofs.

Only one class of printer can meet these requirements: dye-sublimation printers. These top-of-the-line types are the most specialized color printers. While color ink-jet, thermal-wax, solid-wax, and laser printers are flooding offices that have jumped aboard the plain-paper bandwagon (see "Color Printers Mean Business," *Macworld*, September 1995), dye-sub printers are designed for publishers, photographers, and scientists: people for whom photographic-quality output is more important than the ability to print on company letterhead.

And dye-sub printers are getting better at meeting these demands. For this comparison, Macworld Lab tested seven dye-sub printers, plus one ink-jet printer targeting the publishing industry, and found significant price and performance improvements over the batch we tested last year (see "Photo-realistic

Color Printers," July 1994). At the low end (and the slow end), Fargo's Pictura 310 provides remarkably good quality for \$4995. In the midrange, General Parametrics' \$7695 SpectraStar DSx provides superb text quality in a compact package. Seiko Instruments' Professional ColorPoint series combines dye-sub and thermal-wax technologies to give you the quality advantages of the former and the low operating costs of the latter. Beyond \$13,000, three machines—3M's Rainbow 2720, Radius's ProofPositive Two-Page, and Tektronix's Phaser 480X—provide the broadest range of proofing options we've seen yet.

We also tested Lexmark's Color Jetprinter 4079 Plus. This ink-jet machine has serious limitations compared with its dye-sub competitors, but it also has some advantages in price—and in some cases, output quality (see "Is Ink-jet an Alternative?").

Dye-Hard Color

From low-end ink-jets to tank-size printing presses, all color printing devices produce their spectrum of hues by applying three primary colors—cyan (C), magenta (M), and yellow (Y)—in varying amounts. Most devices also support a black (K) pigment, which yields richer blacks than mixing C, M, and Y.

Like a thermal-wax printer, a dye-sub machine contains a roll of thin plastic ribbon, which bears panels of colored dyes. Most of the printers we tested let you use either a four- or three-color ribbon. The latter lacks a K panel; the printer uses equal amounts of C, M, and Y pigments to produce black. Printing with a three-color ribbon is faster and, because it provides more prints per roll, less expensive. On the downside, black areas can appear brownish.

In the printer the ribbon is sandwiched between the paper and a print head containing thousands of heating elements, each of which produces 256 different temperatures (64 color "degrees" for each of the three primary colors and black). When a heating element is on, the dye beneath it turns from a solid into a gas—it *sublimates*—and diffuses into the paper's polyester resin coating, producing a single dot.

The amount of dye transferred depends on how hot the





FROM FONT TO BLACK No matter what your color printer budget, there's a foolproof choice for you: Fargo's Pictura 310 (top) starts at under \$5000 and 3M's high-end Rainbow 2720 (bottom) starts at \$18,500.

heating element is. This ability to apply varying amounts of pigment is one cornerstone of a dye-sub's continuous-tone capabilities. And as the dyes for one dot diffuse, they blend into neighboring dots, eliminating the distinctly visible dots that plague other printing technologies.

To simulate colors other than C, M, Y, or K, most color devices (including printing presses) must apply fine dot patterns of these primaries. A dye-sub printer, however, can blend its dyes, creating pure colors devoid of dot patterns. This capability enables dye-sub to print images with photographic realism, and introduces some unique issues.

Take resolution. Among thermal-wax and laser color machines, resolutions of 600 dots per inch (dpi) and greater are now common (see "Color Printers Mean Business," *Macworld*, September 1995). Most dye-sub, however, are still in the 300-dpi league. Of the machines tested, the exception is General Parametrics' SpectraStar DSx, with a 600-by-300-dpi mode. You might expect this relatively coarse resolution to yield coarse-looking photographic images—the kind you would see from a 300-dpi thermal-wax color printer, for example. Not so, thanks to a dye-sub's freedom from halftone dots (see the illustration, "Dye-Sub's Colorful Characters"). In our tests, printed

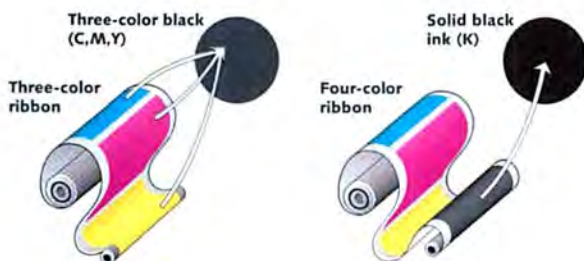
tence in 6-point type costs just as much to print as one with a spectrum of colors. This is because dye-sub (and thermal-wax) printers use a full set of ink panels for every page, regardless of the page's contents. This approach contrasts with that of laser, solid-wax, and ink-jet printers, whose operating costs vary depending on how much pigment you use on each page.

Although thermal-wax and dye-sub machines operate similarly, dye-sub consumables are much more expensive. If you can live with lower-quality, thermal-wax output for rough proofs, consider the Fargo Pictura 310 or Seiko Professional ColorPoint 2. Both accept thermal-wax as well as dye-sub media, and the former costs a fraction of the latter—\$1.60 per thermal-wax print for the Pictura 310, for example, compared with \$6.50 per dye-sub print, based on the companies' estimates for consumable costs.

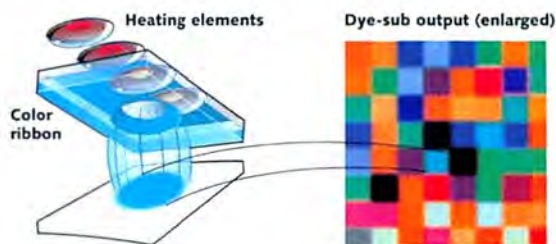
Both the Seiko and Fargo also offer an array of unique thermal-wax media options, including stock for making your own iron-on fabric transfers. General Parametrics offers a similar stock for the SpectraStar DSx. 3M's Rainbow is unique in that it accepts peel-and-stick stocks. Available in clear and opaque white, these stocks are popular among package designers, who use them to create mock-ups for client approval, commercials,

DYE-SUB'S COLORFUL CHARACTERS

Better Blacks Printers that offer a black pigment (K) give you richer blacks than printers that create black by mixing cyan, magenta, and yellow (C,M,Y). Printing with a three-color ribbon is faster and less expensive, but you won't be as pleased with black areas.



Continuous Color Under the heating elements, the ribbon's dye turns from a solid to a gas, which then diffuses onto the paper in a single square. When the dyes diffuse into single squares, they overlap into a continuous tone, giving a smoother appearance than with other printing technologies.



photographs looked just as sharp on the 300-dpi Pictura 310 as they did on the 600-by-300-dpi SpectraStar DSx. Higher resolution does make a difference in text and in line art such as Adobe Illustrator or Macromedia FreeHand drawings. But resolution shouldn't be the first specification you look at.

The Price You Pay

Start instead by deciding how large a page you want to print. Most of the printers we tested can print on paper slightly larger than 11 by 17 inches (super B), enabling you to proof a tabloid-size page or a two-page, letter-size spread containing bleeds (areas that extend to the edge of the paper).

But tabloid-capable printers cost much more than their letter-size siblings. A Radius ProofPositive Two-Page printer sets you back \$13,999 while the smaller Full-Page model costs \$6499—and can still print an 8½-by-11-inch page with bleeds and crop marks. (General Parametrics' SpectraStar DSx can also print an 8½-by-11-inch page with bleeds.) Tabloid-size output also costs more—with the 3M Rainbow 2720, almost \$8 per tabloid page compared with about \$5 per page for letter-size output, and with the Fargo Pictura 310, almost \$7 per tabloid page compared with \$4 per letter-size page.

Speaking of operating costs, it's worth noting that they're consistent from page to page—a page containing one black sen-

and photo shoots; good thing they're a deductible expense—5 sheets go for \$35, and 25 sheets for \$150.

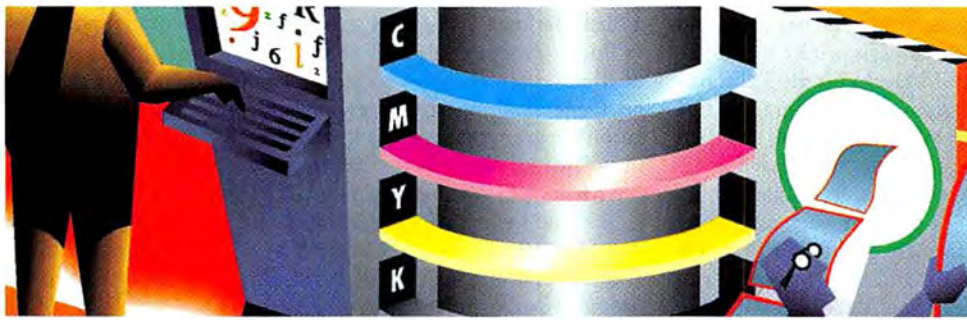
The Price of PostScript

Another factor that influences a printer's cost is the design of its controller, the portion of the printer that communicates with the Mac and presides over the print mechanism. Because of PostScript's prevalence in publishing, we required that a printer support PostScript to be eligible for testing.

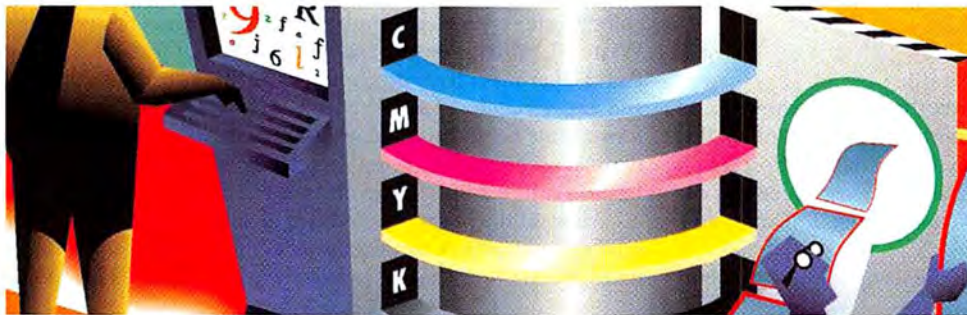
All eight machines do, but not in the same way. While most of the printers contain built-in PostScript interpreters containing RISC processors, ROM-based fonts, and many megabytes of RAM, some—Fargo's Pictura 310, Radius's ProofPositive series, and 3M's Rainbow 2720—use Adobe Systems' Configurable PostScript Interpreter (CPSI), a server program that runs on a Mac. CPSI turns a Mac into a PostScript controller: the Mac converts the PostScript commands that describe a print job, generates a bit map, and then transmits it via a SCSI or parallel cable to the printer.

CPSI can run on a Mac Quadra 950, but we recommend a Power Mac. (We used a Power Mac 7100/80 with 40MB of RAM.) CPSI requires a minimum of 6MB of application RAM, but this theoretical amount yields slow performance. We allocated 24MB of RAM; it isn't unusual to see service bureaus allo-

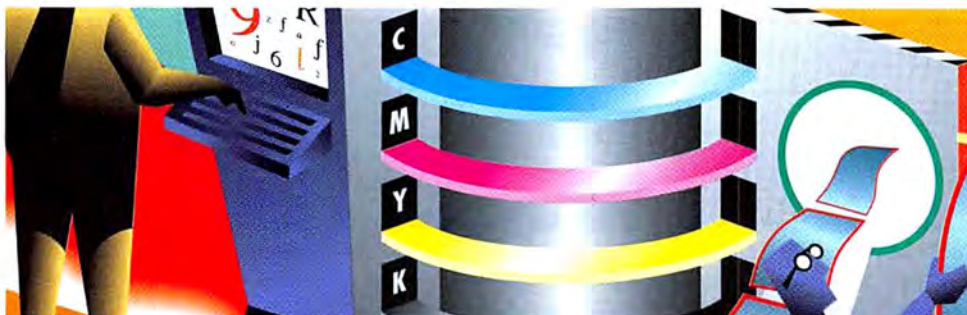
COMPARING COLOR QUALITY



3M RAINBOW 2720



TEKTRONIX PHASER 480X



MATCHPRINT



FARGO PICTURA 310



MATCHPRINT

3M Rainbow 2720

Our overall choice for best high-end printer scored in the top three in each of our output tests. Although the judges criticized it for some banding in this Illustrator test, they were impressed by how it handled color.

Tektronix Phaser 480X

If money is no object for your color output, then you'll love the Tektronix Phaser 480X as much as the judges in our Illustrator-output test did. They praised its color and its ability to blend without banding. It starts at just under \$15,000, but it works best with significantly more RAM than it comes with.

Fargo Pictura 310

The under-\$5000 Fargo printer took first honors in the judging of Adobe Photoshop color output, impressively surpassing the expensive Tektronix Phaser 480X. The Pictura 310 is not such a demon when it comes to speed, but it's our choice for a low-end dye-sub printer.

ating up to 96MB. You don't have to dedicate the Mac to its PostScript duties—if it has enough RAM, you can run other programs along with CPSI. You can configure the CPSI Mac to receive print jobs from other computers on your network, and with the Fargo and Radius machines, you can print from application programs running on the CPSI Mac. With the 3M Rainbow, in order to print jobs from programs running on the CPSI machine, you must print them to disk as PostScript files and then process them through CPSI—a less convenient approach.

If you take the latter approach, we don't recommend burdening the CPSI Mac with a complex program such as QuarkXPress or Adobe Photoshop—performance will slow dramatically. Many large graphics departments and service bureaus run CPSI on a Mac that also does occasional duty as a scanning workstation. In any case, CPSI's need for a well-endowed Mac increases the final cost of these printers, particularly if your print volume demands a dedicated CPSI Mac.

Other Hidden Costs

Many printers have additional costs that do not show up on the price tag. With the Fargo Pictura 310, PostScript itself is one: the printer's base configuration doesn't include PostScript. For the Pictura 310, CPSI is \$799 extra. (Fargo recently announced the Pictura 310e, which includes both CPSI and color-matching software.)

The Tektronix Phaser 480X's hidden costs deal with mem-

Driver Details

All of the printers tested have drivers for both the Mac and Microsoft Windows. Tektronix earns extra points by providing a dual-platform CD-ROM containing drivers and a battery of utilities—every other machine offers a half-dozen floppies, one of which often manages to escape to the same place lost socks go. General Parametrics loses points by providing a crude installation program that doesn't store the driver and its support files in the proper places in the System Folder.

Most of the printers include LaserWriter 8.1 or a later version. The Tektronix Phaser 480X and Radius ProofPositive Two-Page, however, offer LaserWriter 7.1.2. This older driver and its version 8 successors work differently. LaserWriter 8 uses a two-pass printing method that enables some flashy features but can slow printing and significantly increase the amount of disk space pending print jobs require. For this reason, many color printer users who print large scanned images prefer LaserWriter 7, which doesn't use the two-pass approach. (Adobe PageMaker users have no choice, since PageMaker version 5.0 and above requires LaserWriter 8. However, PageMaker performs some behind-the-scenes tricks to disable LaserWriter 8's two-pass scheme.) To avoid driver-related disparities, we used LaserWriter 8.2 for all performance testing.

Many of the printers tested also include a Photoshop export module, which bypasses the LaserWriter driver and sends an image's CMYK or RGB data directly to the printer. This speeds

DETAILS, DETAILS



Hot Pockettes You can expand your networking and storage options with cartridges from General Parametrics called Pockettes; this LAN cartridge supports eight network protocols.



Go for a Drive Need to download large files? Radius's ProofPositive printers let you attach an interface box that connects to a hard drive, improving throughput for workgroups.



Stick It to 'Em 3M's Rainbow 2720 is the only dye-sub printer to handle peel-and-stick output, which designers love for making product mock-ups for clients.



A Helpful Caddy Seiko puts its ink sheets in a removable caddy so you can easily switch its dual-mode Professional ColorPoint 2 between thermal-wax and dye-sub output.

ory. The printer's base configuration includes 32MB, which isn't enough to print using the four-color ink ribbon. (Even if you install a four-color ribbon, the printer skips the black panel, instead creating blacks by combining C, M, and Y inks.) You need at least 48MB to print in full CMYK, so add \$1195 to the printer's \$14,994 base cost. And that's not all. The Phaser 480X, like the Radius and 3M machines, has advanced proofing options that let you proof traps and overprints. But to use them, the printer needs a whopping 96MB of RAM—roughly \$3200 worth of chips above the base 32MB.

Equipping a printer with appropriate ports can also add to its cost. More than half of the printers tested include LocalTalk ports, but if you have a large network or you plan to print scanned color images frequently, we strongly recommend using Ethernet instead—it's much faster.

Of the printers tested that contain PostScript controllers, most offer Ethernet ports as an option. Ethernet is an extra-cost option for the General Parametrics SpectraStar DSx. The ProofPositive and Rainbow machines connect to the CPSI Mac's SCSI bus—if that Mac has Ethernet, the printer essentially has network access too. The Pictura 310 has a parallel port that connects to a NuBus parallel interface card included with the printer.

printing of Photoshop images. For example, a CMYK image that took 6 minutes and 35 seconds to print on a Tektronix Phaser 480X using the LaserWriter driver took just 5 minutes and 19 seconds through the Tektronix export module. The CPSI-based 3M Rainbow and Radius ProofPositive Two-Page showed even more significant gains.

Most of the export modules we tested provide similar features, but we did find rough edges in two. Seiko's requires you to use a SCSI connection—you can't use the export module to print over a network, as you can with all the other tested printers. And General Parametrics' requires you to change a setting on the printer's front panel.

Performance and Output Quality

To test the performance of each printer, Macworld Lab ran a variety of tests using typical publishing-oriented documents (see the benchmark "On Deadline: Benchmarking Printers for Publishing"). Among dye-sub machines that print tabloid-size pages, the Tektronix Phaser 480X finished first in every test. The two letter-size machines—from General Parametrics and Sony—traded places for first place in their class.

Speed is important, but output quality is paramount. To judge it, we assembled a team of 11 *Macworld* editorial and art

COMPARING TEXT QUALITY

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your multicolumn word processor document? How much trouble is it to place linked columns of text into a draw document to do basic page layouts?

Integration

Of the four, ClarisWorks provides the fastest and most seamless integration. You can drop a spreadsheet right into a wor

GENERAL PARAMETRICS SPECTRASTAR DSX

Integrati Of the fo

your multicolumn word processor document? How much trouble is it to place linked columns of text into a draw document to do basic page layouts?

Integration

Of the four, ClarisWorks provides the fastest and most seamless integration. You can drop a spreadsheet right into a wor

LEXMARK COLOR JETPRINTER 4079 PLUS

General Parametrics

SpectraStar DSx

Frequently a runner-up in our speed tests, the SpectraStar DSx aced the text-output scores. Judges praised the text selection for its crisp text and superb registration.

Lexmark Color Jetprinter

4079 plus

We were a little leery of pitting an ink-jet printer against dye-sub, so imagine our surprise when the judges of our text-output tests ranked it second. It did fare poorly as expected in color output, but if your work is primarily text-oriented, it's worth checking out.

department staffers. Each judge compared three different printouts against photographic proofs of the original images, looking at highlights, shadows, color accuracy, and text (see the output samples "Comparing Color Quality").

The winners' circle contains some interesting occupants. In the Photoshop image test, the CPSI-driven Fargo Pictura 310 took first place, beating machines that cost several times more. This is quite an accomplishment, not only because of the price differences, but because Fargo's earlier machines stressed economy over output quality. Still, the Pictura 310's blue ribbon has a qualification dangling from it: our lab analyst spent much time color-correcting the particular printout that carried the Pictura 310 to the finish line (he used Agfa's FotoTune color-

matching software). An uncorrected version of the same print didn't fare as well with our jury. Still, it's clear that an experienced operator with good color-matching software can get stunning images from this bargain-basement dye-sub. Other strong finishers in the Photoshop test included Tektronix's Phaser and 3M's Rainbow.

Our second test was of a complex Adobe Illustrator drawing. The Phaser 480X finished first this time, followed by the SpectraStar DSx. The SpectraStar's 600-by-300-dpi mode helped greatly in this test. The 3M Rainbow and Radius Proof-Positive Two-Page also fared well. The CPSI-based Fargo Pictura 310 fell to the middle of the pack this time, but still ranked ahead of the Seiko Professional ColorPoint 2, the Sony UP-

IS INK-JET AN ALTERNATIVE?

Low-cost ink-jet printers are second-best proofing devices. They can't print continuous-tone images, so photographs and gradients have that dotted, dithered look. They also lack the range of proofing options that most dye-sub provide.

Ink-jet printers do have some pluses. As our output-quality jury found when evaluating the results from the \$3199 Lexmark Color Jetprinter 4079 Plus, ink-jet text output can be sharper than dye-sub text output. Still, most

ink-jet output looks mottled and fuzzy compared with high-resolution laser output. The Lexmark machine was also faster than some of the dye-sub. But this too is damning with faint praise—ink-jet and dye-sub printers are among the slowest printing technologies available.

Unlike dye-sub, however, ink-jet printers can print on plain paper. The ability to print a mock-up on the same type of paper you'll use for the final job could be helpful.

The Lexmark machine's

color-matching features are adequate for casual proofing only. The printer provides no press-matching features, although it does support Apple's ColorSync 2.0 color-management system. Also, while the printer supports tabloid-size paper, it can't print bleeds at this size.

Another PostScript-based ink-jet alternative is Tektronix's \$1395 Phaser 140 (see *Reviews*, April 1995). The Phaser 140 doesn't support tabloid printing, but it does provide some basic press-

matching features. And it's the least expensive color PostScript printer available.

In the end, though, I can't recommend any low-cost color ink-jet printer for serious publishing work. Both the Lexmark and Tektronix machines are suitable for rough proofing, particularly of jobs containing simple spot color. But if you need more and you're on a tight budget, save your lunch money until you can afford a Fargo Pictura 310. Or continue using a local service bureau.

COMPARING DYE-SUB CONTENDERS

Company	Phone	Product	List Price	Company's Estimated Street Price	Ports (standard/ optional/all active)	RAM (minimum/ maximum)	SCSI Port for Font Storage	Fonts
3M Printing and Publishing Systems	612/737-6501	Rainbow 2720	\$18,500	\$16,500	SCSI ^A /NA	NA ^B	^B	13
Fargo Electronics	612/941-9470	Pictura 310	\$4995	\$3995	P/NA/ no	NA ^B	^B	0
General Parametrics	510/524-3950	SpectraStar DSx	\$7695	\$6500	L, P, S/E/yes	16MB/96MB	optional	52
Lexmark International	606/232-2000	Color Jetprinter 4079 plus	\$3199	\$2699	L, P/E, T/yes	4MB/96MB	no	39
Radius	408/245-2202	ProofPositive Two-Page	\$13,999	NP	SCSI ^D / NA	NA ^B	^B	17
Seiko Instruments	408/922-5800	Professional ColorPoint 2	\$14,999	NP	L, P, S/E/yes	24MB/136MB	yes (includes drive)	135
Sony	201/930-7796	UP-D8800	\$8800	NP	E, L, P/NA/yes	32MB/128MB	yes (includes 120MB drive)	35
Tektronix	503/682-7377	Phaser 480X	\$14,994	NP	L, P, S/E/yes	32MB/112MB	yes	39

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 final ratings. Ratings are for companies, not individual products, and we call only those companies whose products Macworld Lab tests. E = Ethernet; L = LocalTalk; NA = not applicable; NP = not at Parametrics SpectraStar DSx and Sony UP-D8800, which support A-size pages only) printed with CMYK ribbon, based on manufacturers' supplied consumables prices. ^B These printers rely on is available to the printer. ^C We could not test tech support because we could not preserve the anonymity of our callers. ^D ProofPositive models without PostScript are also available for \$4999

D880, and the Lexmark Color Jetprinter 4079 plus.

Our final output-quality test was a QuarkXPress document containing text—specifically, a page from *Macworld*. The first-place finisher this time: the General Parametrics SpectraStar DSx. The 600-by-300-dpi mode gives this printer dramatically better text quality than the other machines we tested. The lowly Lexmark Color Jetprinter 4079 plus turned in a strong second-place finish in this test—proof of just how fuzzy most dye-sub text is. The 3M Rainbow 2720, Tektronix Phaser 480X, and Radius ProofPositive Two-Page were virtually tied for third. Last-place finishers were the Sony UP-D8800 and the Fargo Pictura 310. The latter's text output was particularly bad—

small sizes were nearly invisible, and the thin portions of serif characters were often missing.

The Proof Is in the Proof

Jury ratings tell only part of the output story. If you plan to use a printer as a prepress proofing device, it's also important to evaluate the proofing options it provides. These options fall into two broad categories: features that let you tweak the printer's output to match the results provided by various printing technologies, and features that enable you to proof color-printing techniques such as trapping and overprinting.

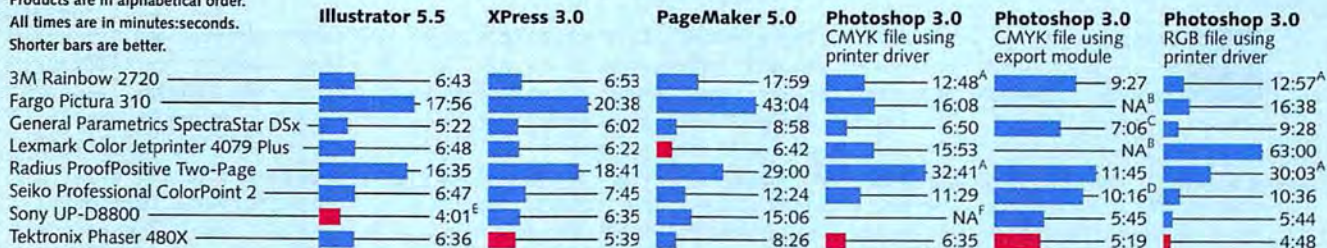
Most of the dye-sub printers tested provide at least a few



ON DEADLINE: BENCHMARKING PRINTERS FOR PUBLISHING

■ Best result in test.

Products are in alphabetical order. All times are in minutes:seconds. Shorter bars are better.



^A 24MB allocated to CPSI; 16MB allocated to CPSI when printing Photoshop file via printer driver. ^B No plug-in module available. ^C Printer set to Raster mode. ^D Need SCSI hookup for plug-in operations. ^E Result obtained with extensions off. ^F Plug-in doesn't support CMYK file format in Photoshop.

BEHIND OUR TESTS

Macworld Lab gauged the printer speed with various documents designed to test performance from different perspectives.

The Photoshop tests measured the printer's ability to handle large bitmapped images, as well as network interface performance. We ran both RGB and CMYK tests using the Mac's PostScript driver and the Adobe Photoshop Export module, which both accompany most of the tested printers. The page-layout test used a QuarkXPress document with five downloadable fonts of different sizes on the first page, and a 3MB graphic on the second. We also included an Adobe PageMaker 5.0 document that had gray-scale and color TIFF files. These tests, which

gave the printers a good overall workout, demonstrate how well each machine handles typical publishing jobs.

The Adobe Illustrator document tested the performance of a PostScript printer's controller. With host-based systems like those of 3M and Radius (which use Adobe's Configurable PostScript Interpreter), Macworld Lab allocated 24MB to the controller. The speed of raster image processing should be faster with increased memory, since more parts of the image can be processed at once (the application will divide the image into portions to fit inside the allocated RAM).

—Macworld Lab testing supervised by Mark Hurlow

Paper Sizes	Ribbons Supported	Cost per Page ^A	Technical Support
super A, super B	CMYK	\$7.67	excellent
super A, super B	thermal CMYK and K; dye-sub CMYK	\$6.60	not rated ^C
A, A4, super A	CMYK, CMY, K	\$3.08	very good
A, A3, A4, B, legal	NA	NA	acceptable
A, A3, A4, B, super A, super A3, super A4, super B	CMYK, CMY, K	\$7.23	acceptable
A, super A3	CMYK, CMY, K	\$8.40	excellent
A, super A4	CMYK, CMY, K	\$2.30	unacceptable
A, A3, A4, B, super B	CMYK, CMY, K	\$7.72	acceptable

support technicians. Macworld uses a point system, including bonuses and demerits, to derive the provided; P = parallel; S = serial; T = Token Ring. ^A Cost per tabloid-size page (except for General the host Mac to process print jobs and store fonts. Any network interface available on the host Mac (Full-Page) and \$11,999 (Two-Page).

color-matching options: the ability to match the screen, to punch up the color for business graphics, and to simulate one or two printing standards, for example. The two exceptions are the Sony UP-D8800 and the Fargo Pictura 310, which have no matching options. (As mentioned earlier, however, you can use third-party matching programs such as Agfa's FotoTune with the Fargo machine, and the new Fargo Pictura 310e includes color-matching software).

For advanced proofing, the selection boils down to three machines: 3M's Rainbow 2720, Radius's ProofPositive Two-Page, and Tektronix's Phaser 480X. These printers provide a much broader range of color-matching options targeted to the printing industry. Of the three, the Rainbow provides the largest array of options—not surprising, given 3M's major presence as a manufacturer of films and offset plates for the printing industry. When you use the matching options that correspond to 3M Matchprints, the Rainbow even gives printouts the slight beige cast that real Matchprints have.

Color matching is one thing; color consistency is another. Ink ribbons can vary from one lot to the next, and high-end printers provide calibration features that enable you to adjust the printer's color rendering to compensate for variations. The Rainbow's CPSI app lets you fine-tune calibration settings; 3M also has a free bulletin board from which you can download recommended settings for various ribbon lot numbers.

The Tektronix Phaser 480X has equally impressive calibration options. Its included PhaserMatch utility lets you color-calibrate the printer by printing test documents containing clusters of gray shades and then entering values in PhaserMatch.

Finally, there's the ability to proof color separations as well as traps and overprints. In last year's roundup, only the 3M Rainbow could proof traps and overprints. Now, the Tektronix Phaser 480X and Radius ProofPositive Two-Page have joined it. All three machines can proof color separations and print files in the desktop color separation (DCS) format. Remember, however, that the Phaser 480X requires 96MB of RAM in order to provide these functions, while the 3M and Radius machines provide them right out of the box.

It's also worth noting that the \$6499 Radius ProofPositive Full-Page—the junior version of the Two-Page model we tested—is the only letter-size dye-sub printer that provides these advanced proofing options. If you need overprint-, trapping-,

and DCS-proofing features and most of your work involves letter-size pages, buy this machine. The ProofPositive Full-Page can print letter-size bleeds, and you can always tape two pages together for those times when you want to proof a two-page spread. The \$7000 or more you'll save will buy a lot of tape.

The Last Word

Almost any of the dye-sub printers we tested will meet the needs of the casual color proofer—the publisher who needs high-quality proofs for client approval. I hesitate to recommend the Sony UP-D8800 for publishing applications, however. While it's an excellent printer for digital photography, video-imaging, and presentation applications, the Sony's lack of color-matching options makes it unsuitable for prepress work.

At the low end, the Fargo Pictura 310 takes first place. You'll need color-matching software and CPSI and some experience to get first-rate results from this printer, but it can provide them. Still, you don't get what you don't pay for: the Pictura 310's text quality is very poor.

At the opposite end of the text-quality scale is the General Parametrics SpectraStar DSx. This fast letter-size printer is an excellent choice for presentation-oriented work and casual proofing. For advanced prepress proofing, however, the Radius ProofPositive Full-Page is a better choice. It also costs less, although you will need a Mac to run its CPSI application.

As for the high end, the 3M Rainbow 2720, Tektronix Phaser 480X, and Radius ProofPositive Two-Page are all excellent printers. The edge, however, goes to 3M's Rainbow 2720, which provides the widest array of proofing options. (A version 4.0 software update, which is due by the end of 1995, will provide even more, adding, among other things, support for eight-color printing.) Among prepress houses, the Rainbow has earned a reputation as an industry standard—it isn't unusual to see shops advertising Rainbow proofs instead of dye-sub proofs.

Using a dye-sub printer as a final proofing device is most appropriate for low-budget, tight-deadline color jobs such as catalogs and newspaper inserts: areas where savings of time and money are more important than quality. Still, a dye-sub can earn its keep in quality-obsessed environments by reducing the number of photographic proofs you make while preparing a job. Using dye-sub proofs for most iterations and making just one or two photographic proofs at the final stages saves not only money but also time—two things a publisher can never have too much of. **m**

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DYE-SUB PRINTERS



With dye-sublimation printers, output quality and strong proofing options are essential—but price counts, too.

Low End

Fargo Pictura 310 You'll need color-matching software and experience to get the best color from this machine—and you'll still suffer with standard text. But there's no cheaper B-size dye-sub. **Company:** Fargo Electronics. **List price:** \$4995 (with CPSI \$5794).

High End

3M Rainbow 2720 The broadest range of proofing options, terrific new peel-and-stick media, and excellent output quality make the Rainbow the printer to buy for the most advanced proofing needs. **Company:** 3M Printing and Publishing Systems. **List price:** \$18,500.

ACCOUNTING FOR GROWTH



You've done it. You've beaten the odds. Your business has made it through those hazardous first two years and is growing strong. You've been through lots of changes, and now it's time to make one more. That's right: the entry-level accounting program that took you through

the early days just can't cut it anymore.

Some businesses can use an entry-level accounting system indefinitely, but for most, growth brings problems sooner or later. Some examples: You now have several employees entering accounting data and they need simultaneous access to the accounting records, which requires multiuser capabilities and also raises questions about the privacy and security of your financial data. Or your company is operating in multiple locations and you need separate accounting reports for each location. Or the system is simply slowing down under the burden of increasing numbers of transactions on file.

Midrange systems are designed to deal with these problems. In a nutshell, they offer multiuser capabilities, enhanced data-access control, more efficient data entry and transaction processing, and more flexible reporting capabilities.

In this article I review five leading midrange accounting systems. All com-

YOU'VE OUTGROWN YOUR ENTRY-LEVEL PROGRAM—NOW WHAT SHOULD YOU USE?

ply fully with generally accepted accounting principles, and each offers specific benefits for certain types of businesses.

The five are Satori Software's Components 1.2 (G/L, A/R, A/P \$795 each; Job-Cost/Time-Billing \$1495); EveryWare Development's Connected 2.8 (G/L-A/R-A/P \$895; Inventory \$1690; Job-Costing \$1690; multiuser G/L-A/R-A/P \$1795; multiuser Inventory \$2695; multiuser Job-Costing \$2695); State of the Art's MacP&L 4.0 (\$199; multiuser \$399); CheckMark Software's Multi-Ledger 4.0 (\$199); and Peachtree Software's Peachtree Accounting for Macintosh 2.5 (\$99). I also take a look at two specialized packages: CheckMark's Payroll 5.4 (\$149), a payroll module designed to work with most other accounting packages, and Ensign Systems' POS•IM-Premier 2.7, a point-of-sale system (\$1795; multiuser \$2495. For more on POS•IM, see the sidebar "Impulse Shopping: Why Point of Sale?"). In addition,

two entry-level products, BestWare's M.Y.O.B. 5.0 and Intuit's QuickBooks Pro, are actually superior to the midrange products in some functions, so I mention those where appropriate.

State Your Business

So how do you choose an accounting system that's right for you? The trick is to match the package to the needs of your business and the abilities of your staff. Your type of business—retail, manufacturing, or service—plays a big role in deciding which features are important.

Retail and Wholesale These businesses live by their inventory and require a system that can track not just items on hand, but items on order and customer back orders as well. Wholesalers often need multiple prices for each item, to reflect the range of discounts they offer their customers. To keep inventory records current, many companies integrate point-of-sale systems with their inventory management. To analyze sales and determine which products are generating the profit, retail businesses require flexible, customizable reporting capabilities. If salespeople earn commissions, the sales system needs to report on each individual's sales. In addition, the payroll system must incorporate commissions with earnings. MacP&L and Connected handle back orders well and allow for pricing that varies depending on the customer. If you don't need multiuser capabilities, consider looking at entry-level packages: M.Y.O.B.'s back-order capabilities are hard to beat.

BY JAN GILLESPIE

Manufacturing Manufacturers have even more formidable inventory-management requirements than retailers and wholesalers. Besides keeping track of completed inventory, manufacturing businesses need to translate component parts into finished units. Most midrange inventory systems automatically generate purchase orders, which manufacturers can use to verify invoices from their suppliers. Manufacturing businesses that work on custom orders need a system that can generate the initial estimate or quote for a job and track revenues and expenses for each job or project. Finally, since manufacturing businesses typically extend credit to their customers with a variety of discounts and payment terms, the invoicing

and receivables system needs to accommodate these options. For manufacturing, the entry-level products are quite good, though they won't be able to grow with your business. M.Y.O.B. and QuickBooks Pro both have excellent job-costing systems; produce quotes; and can generate an invoice based on a quote. MacP&L offers the same capabilities in a multiuser environment. QuickBooks Pro can also generate invoices based on a job's costs.

Service Businesses Service businesses typically have little or no inventory to worry about, but keeping track of payroll costs and billing for services rendered are critical. Many service businesses simply bill for services at a fixed rate; their accounting systems do little more than cre-

ate invoices and, if they extend credit, maintain accurate customer records. Professional-services businesses, however, have extensive time- and cost-billing requirements. These companies need a system that tracks payroll and other costs by job and task and that invoices clients at cost or at a specified markup. In addition to tracking and billing current costs, many service businesses prepare quotes to bid on jobs. All the products reviewed here meet the minimum needs of a service business. Businesses with more complex billing and invoicing needs should look at Components' highly customizable Job Costing/Time Billing module. Connected and QuickBooks Pro also offer these capabilities but are not quite as flexible.

IMPULSE SHOPPING: WHY POINT OF SALE?

If you ever sit down with a stack of inventory sheets to figure out what sizes and colors of your stock to reorder, or wonder how much stock you really have on hand, maybe

you should consider a point-of-sale system. Point-of-sale systems record each sale when it happens—not when the bookkeeper has time to enter it. Inventory records are always up-to-date, and you have much more information about the sale than you could gather with a manual system, so you can make better decisions about ordering and merchandising (see the screen shot "Information Capture").

Using a point-of-sale system is not without its costs, however. Installation requires careful coordination among technical, accounting, and operations staff. Each inventory item must be uniquely identified, counted, costed, and entered into the system as you switch over, and you must be scrupulous about tracking inventory received and sales.

POS•IM-Premier (Ensign Systems' point-of-sale/inven-

tory-management software; single-user version \$1795, multiuser \$2495) provides point-of-sale data-capture, inventory-management, and accounts-receivable capabilities for single or multiuser environments. If your computers are not networked, or they're at more than one location, POS•IM can integrate

straightforward and easy to use. It provides numerous payment options, and it handles rentals as well as sales. It also makes returns, back orders, and cash payouts simple. It can produce an almost endless variety of sales reports (by item, by salesperson, by vendor, by date, and so on), as well as end-of-day cash-

all the basic A/R functions adequately.

The Inventory Analyzer module is POS•IM's greatest strength. The system tracks inventory items and suppliers, and generates purchase orders, receiving reports, and a wide array of inventory-management reports. A variety of pricing methods are available, including add-on amounts, percentage of cost, margin percentage, and custom formula. You can set up to seven prices for each item.

POS•IM is not a complete accounting package, but you can integrate its data into other accounting systems, including MultiLedger and Connected, using POS•IM's export facility or a separate module called Accounting Interface Module (single-user \$95, multiuser \$135).

POS•IM's installation manual is good, but its user manual is not. Though POS•IM's interface is logical and easy to use, the system is complex, and its weak documentation can be frustrating.

Overall, POS•IM is an easy-to-use, comprehensive point-of-sale system from which you can derive valuable information. There are few point-of-sale needs that it can't meet.

Qty	Item ID	Description	L	Price	Extended	Tax
1	10510	None Power Tools-fo...	1	5.95	5.95	0.00
2	21019	Advanced Accounting	1	29.95	59.90	0.00
3	11016	Accountant's Desk	1	39.50	118.50	0.00

Disc %	Sub Total	Tax 1 %	Tax 2 %	Total Tax	Total
0.00	0.00	0.00	0.00	0.00	0.00

Information Capture While POS•IM produces invoices on your Macs, it is gathering the information you need to keep the shelves full and the warehouse empty.

data from stand-alone machines into a central database. POS•IM supports electronic cash drawers, bar-code readers, credit card readers, and receipt or invoice printers; less comprehensive and less expensive versions of POS•IM are also available.

The Sales Point module is

reconciliation worksheets. In-house charges post to the Accounts Receivable (A/R) module, which tracks payments on account, assesses interest charges, and generates customer statements and aging reports. Though the A/R module doesn't have lots of bells and whistles, it performs

What Your Business Needs

The kind of business you run will determine the kind of accounting system you choose, but there are many capabilities that just about every business needs in some capacity.

Security You need to hide your data from unauthorized eyes. Even single-user systems should use passwords to control access to accounting records. If more than one person enters your accounting data, you need control over who can access individual data entry screens and reports. Connected, MacP&L, and M.Y.O.B. offer protection down to the screen or menu-item level; the other programs offer protection either by module or by functions, such as data entry, reporting, account creation, and so on.

Recurring Entries Everyone has at least a few entries that come up every month and never change. Paying on a mortgage or recording depreciation are examples of recurring entries. At a minimum, your system should recall these entries so you don't have to reenter them each month. Better yet is a calendar system that sets up to-do lists and tickler files to remind you to process those entries. Best of all is a system that automatically processes preset entries on a specified day of the month. All the midrange products reviewed but MacP&L offer automatic recurring entries, as does QuickBooks Pro. M.Y.O.B. provides a calendar system.

Data In . . . In a forms-based data entry system, you or your staff enter accounting information in on-screen forms that resemble common business documents such as checks, invoices, and purchase orders. This shields you from accounting jargon and procedures such as debiting and crediting journals and ledgers, and makes data entry easier and less error-prone. All the midrange products reviewed offer forms-based data entry for most common transactions, but all require entering a debit/credit transaction in a journal for certain infrequent transactions.

If you need to customize the data entry forms—for example, to simplify them for untrained staff or to combine parts of several forms in one place for efficiency—you're out of luck: none of the accounting systems we looked at provide that capability. If this is critical for your business, you'll need to consider a high-end programmable system such as Great Plains Dynamics or Flexware.

. . . Information Out Your accounting system is only as useful as the information it provides. Though most programs do a creditable job on standard financial statements, many businesses need something nonstandard—some-

thing as simple as a report on one week's transactions instead of the whole month, or so complex it requires an entirely new report. Some packages that claim to offer customizable reports go only as far as letting you change the fonts—be sure that the program provides the customization you need. Here Components is the clear

age. Again, Components and M.Y.O.B. are the ones to look at.

Batch versus Interactive Processing

Batch systems allow you to enter transactions, hold them, and update the accounting records later. Interactive, or immediate-mode, systems update the database as you enter transactions. The advantages of batch processing include much faster performance, particularly in a multiuser environment; and the ability to print and review your transactions before you update the database, so you catch errors before they happen.

Interactive systems have the advantage of always keeping your accounting reports current. You don't have to remember to post transactions, and if you need accurate information about your customers, it is always available. All the midrange systems are batch-oriented except MultiLedger, which is interactive; Peachtree can run either way. The entry-level products process interactively.

Integrated Systems

An integrated system—not to be confused with an interactive system—automatically updates all the accounting records affected by a transaction. For example, when you record a credit sale to a customer, the system increases the amount the customer owes you, reduces the inventory for the item purchased, and records the sale so that it appears in your income statement. This requires updating the databases for accounts receivable, inventory, and the general ledger.

In a nonintegrated system you would have to enter the transaction three times, once in each database—a lot of extra work, and a good opportunity to make a mess of your books.

MacP&L and MultiLedger, which include all the standard modules as a unit, are integrated systems. Accounting systems with modules sold independently are not always integrated—for example, Connected is an integrated system but Components is not (except through a cumbersome import/export routine).

Adding New Accounts The ability to create a new account—an inventory item, a vendor, a customer, or a G/L account, for example—while you're entering trans-

Action	Description	Qty	Services	Expenses	Qty	Services	Expenses
conf	Conference	1.00	60.00		1.00	60.00	
design	Design	7.50	150.00		5.00	300.00	
Total Phase:		9.50	210.00	0.00	6.00	360.00	0.00

Date	Order #	Phase	Comment	Qty	Services	Expenses
9/20/95	1	Planning	per conversation with Bob	500.00		2000.00
10/1/95	2	Planning	price increase	200.00		950.00
Totals:				0.00	0.00	4050.00

Costing a Job One of Components' strong points is its flexible job costing and time billing. The top screen shows some of the expenses that make up the first round of an estimate; the bottom screen shows some additional costs for changes requested by the customer.

Location	PO	SO	On Hand	Committed	Available
1	0.00	0.00	93.00	0.00	93.00
2	0.00	0.00	0.00	0.00	0.00

Complex Inventory Connected's inventory-management module provides some unique capabilities. Here, inventory is being tracked at multiple locations and you (or your accountants) can choose the costing method.

leader, with easy-to-use, flexible formatting tools for business and financial reports. Connected offers a report writer that is powerful but not especially friendly. M.Y.O.B. offers excellent document customization, but is less flexible for customizing reports.

Similarly, the ability to change how your data is printed on invoices, checks, purchase orders, and other forms is important. You can save a lot of money by using standard forms instead of those designed just for your accounting pack-

actions can save you time and frustration. All the products reviewed here except Connected incorporate this feature. MultiLedger's implementation is especially fast, and Peachtree's especially slow.

Job- and Project-Reporting The ability to get reports on revenues and expenses for something other than the company as a whole is essential for a business of any size. Job or project codes are commonly used to identify different clients, types of jobs, job orders, locations, profit centers, and departments. All of the products reviewed offer this capability.

Job Costing A broader concept than job or project reporting, job costing

allows you to accumulate costs by job and bill the client at a specified rate or markup. Support for job quotes or estimates is usually included in these systems. In the midrange market, Components offers job costing with job quotes. Connected offers a sophisticated job-costing system, but without the quote feature. In the entry-level market, QuickBooks Pro offers excellent job-costing systems with quotes.

Time Billing Time billing allows you to charge employees' hours to the clients or jobs they work on. You enter the number of hours or the percentage of time each employee spent on each job. The

system calculates the dollar cost for those hours and adds the cost to the appropriate job. You can then bill the client for the hours at a specified markup, a fixed amount, or at cost. Reporting generally allows you to see the costs and revenues for each job and to compare them to the original estimate. Time billing is usually a separate module, but Components and Connected offer this in their job-costing modules. In the entry-level market QuickBooks Pro includes time billing with job costing and payroll.

Midrange Contenders

With all that in mind, let's see how the midrange accounting systems compare.

Components Components' four modules—General Ledger, Accounts Receivable, Accounts Payable, and Job Cost/Time Billing—provide a set of accounting building blocks that you can tailor to your business. This customization isn't without cost: it helps to have someone with a solid accounting background involved in the setup process. Once set up, each module has a simple, logical flow that makes it easy to use. Each module functions as a stand-alone unit; you can integrate the modules by exporting data to the General Ledger, but this technique is cumbersome despite excellent import/export facilities.

The Job-Cost/Time-Billing module is the strongest module in the Components set. It creates estimates, accumulates expenses and time costs per job, bills customers using a variety of costing methods, produces statements, and manages collections. It also maintains separate records of original estimates and change orders, and it accounts for individual client-trust accounts—hard-to-find features that are critical for some businesses (see the screen shot "Costing a Job"). Perhaps Components' most useful feature is a remote time-entry option, which permits employees to record their time and transfer the data to the main system as appropriate. The excellent selection of preformatted reports includes several employee-productivity reports. Extensive filter options let you see only the items you want.

Components' other strong point is its forms and report-design facility—far and away the best for any of the programs reviewed here. This feature, which is available in all modules, allows you to create completely customized, professional forms and reports using drag-and-drop icons to move text, data fields, computation instructions, and graphics wherever you want.

On the downside, Components lacks inventory and payroll modules. You can

BY THE BOOKS: WHAT MIDRANGE ACCOUNTING SYSTEMS OFFER

	Components	Connected	MacP&L	MultiLedger	Peachtree
Vendor	Satori Software	EveryWare Development	State of the Art	CheckMark Software	Peachtree Software
Phone	206/443-0765	905/819-1173	916/791-7730	970/225-0522	404/564-5700
General functions	S	S	S	E	S
Report on multiple locations, divisions	●	● ^A	○	● ^A	●
Reversing entries	○	●	●	●	●
Automatic recurring entries	●	●	○	●	●
Create accounts during data entry	●	○	●	●	●
Batch processing	●	●	●	○	●
Interactive processing	○ ^B	○	○	●	●
Batch report printing	○	○	●	●	●
Setup	N	S	S	E	S
Sample charts of accounts	○	●	● ^C	●	●
Defer setting opening balances	○	●	○	●	● ^D
Change opening balances after setting	○	○	○	●	● ^D
Reporting	E	S	S	N	S
Calculate financial ratios	●	○	●	○	○
Filter capability on reports	●	●	●	●	●
Graphic-analysis capability	●	○	●	●	● ^E
Customize forms	●	○	●	●	●
Customize financial statements	●	●	●	●	●
Sales, order entry	S	E	S	N	S
Generate quotes	● ^F	●	●	○	●
Invoice from quotes	● ^F	●	●	○	● ^G
Back orders	○	●	●	○	○
Item-level discounts	●	●	●	○	○
Integrated dunning notices	●	●	●	○	○
Purchasing, payables	N	S	S	S	S
Create POs	○	● ^H	●	○	●
Generate POs automatically	○	○	○	○	○
Create invoice from PO	○	● ^H	●	○	● ^C
Recognize expenses by project, job	●	● ^H	●	●	●
Inventory	not offered	E	S	N	N
Multiple locations, warehouses	not offered	●	○	○	○ ^I
Manage component parts	not offered	●	●	○	●
On-order/back-order quantities	not offered	●/●	●/●	○/○	○/○

E = exceptional; N = needs improvement; S = satisfactory. ^A Inventory module, income and expense accounts only. ^B Can report posted and unposted entries. ^C Printed, not on disk. ^D General ledger only; must set before using accounts receivable, accounts payable. ^E Not all modules. ^F Job costing/time billing module only. ^G Deletes quote or purchase order when invoice is created. ^H Inventory, job costing only. ^I Kludgy workaround possible.

integrate CheckMark's Payroll with Components by using the import/export feature, but there is no viable substitute for an inventory module. This rules Components out for most merchandising and manufacturing firms.

Connected EveryWare's Connected is a set of fully integrated accounting modules packed with special features not usually found in programs in this price range—just to name a few, you can add notes to customers' records, invoices, jobs, and more; override general-ledger account codes; create multiple levels of customer-discount codes; enter vendor part numbers and serial numbers; and manage purchases in foreign currency. The system is offered in three modules—general ledger/accounts payable/accounts receivable, inventory management, and job costing.

Inventory management is Connected's forte. Connected is the only program I looked at that accounts for multiple warehouses, values inventory using either weighted average or FIFO costing, and tracks warranty information (see the screen shot "Complex Inventory"). In addition, you can price items for up to five customer categories, each with up to five levels of quantity discounts, and track inventory manufactured from component parts. Sales orders and purchase orders come as part of this module, which can generate picking lists, packing slips, and receiving reports.

All modules feature a custom-report writer that allows you to select any data fields available in the system. Unfortunately, the report writer—though very powerful—is not easy to use, and EveryWare supplies documentation for it only on request. The company also develops custom reports for an hourly fee. You cannot modify forms such as invoices, purchase orders, and sales orders at all.

Connected is missing several pieces. First, it lacks an integrated payroll system. CheckMark's Payroll can interface with Connected, but only through an import utility. And if you enter employee hours in the job-costing module, you will have to duplicate some of your work in Payroll. If you need to create job quotes or estimates, you may be disappointed in the Job-Costing module. It only uses estimates for comparing actual to budgeted results—it doesn't produce real quotes. Finally, Mac purists may have difficulty with this program because, although the menu layout and data entry screens are consistent from module to module, the interface has a distinctively DOS feel—for example, you can't have multiple windows open at one time. I also noted a tendency for the system to freeze (usu-

ally only temporarily) and respond erratically at times.

MacP&L State of the Art's MacP&L is a full-featured, multiuser system with the ease of use of entry-level accounting systems. Much of the data entry is forms-based, protecting you from the dreaded debit-and-credit jargon of many

works for manufacturing firms as well.

Reporting, though not customizable except for font and font size, is extensive and will meet most users' needs. You can export reports to other applications or hot-link reports to specified documents created in other systems through the Mac OS's publish-and-subscribe function.

This is somewhat awkward to implement and maintain, particularly if you change reporting options. Forms customization is also limited, but the system supports Apple events connections to permit customized data entry from other applications.

If you have a simple payroll that doesn't change much from one pay period to the next, MacP&L's payroll system will probably work for you. But if you have numerous pay codes, or you distribute earnings to several general-ledger expense accounts, this probably isn't your package.

MultiLedger CheckMark MultiLedger's sleek, fast interface and flexible reporting have made it a popular choice for businesses that need a multiuser system, and its bargain price gives it a cost/benefit ratio that's hard to beat.

MultiLedger doesn't offer lots of bells and whistles—just solid, basic accounting that remains stable and responsive even under high transaction volume. Data can be entered in forms or through standard accounting journals. Both

have fast pop-up windows to supply account, customer, vendor, and other codes.

Because of its strong import and export functions, MultiLedger is a good choice for a general-ledger package to back-end a specialized accounting solution. For the same reason, MultiLedger's companion product, CheckMark Payroll, is a good choice to round out other general-purpose accounting systems.

MultiLedger's weak points include its lack of support for keeping multiple transaction windows open—quite an inconvenience. And the inventory-management reporting is simply too basic for most manufacturing firms, and many merchandising firms as well.

Peachtree Peachtree's new release of Peachtree Accounting for Macintosh 2.5 gives a much needed face-lift to a solid, if somewhat traditional, accounting program. Ease of use, previously not one

	Hours	Rate	Amount
Regular	16.00	9.25	148.00
Overtime	0.00	13.88	0.00
Shift	0.00	9.25	0.00
Vacation	34.00	9.25	314.50
	0.00	9.25	0.00
	0.00	9.25	0.00

Hourly Wages: 462.50

Salary: _____ Local w/h: _____

Bonus: 100.00 SDI: 11.41

Commissions: 250.00 Credit Union: _____

EIC: _____ United Way: 25.00

Social Security: 55.58

Medicare: 13.23

Federal w/h: 105.47

State w/h: 20.37

Net: 705.44

Employee List: Bobbitt, Lynn; Brown, Heather; Cox, Courtney; Crawford, Alex; Griffith, Margorie; Hagen, Derek; Henderson, Jill; Hill, William; Hodge, Jack; Johnson, Larry; Kennedy, Paul; Peterson, Stan; Reed, Dana; Schmitt, Timothy; Tolbert, Judy; Taylor, Shelia; Thomas, Debbie; Williams, Tom; Young, Chelcie

Is It Payday Yet? CheckMark's Payroll, which works with other accounting packages, can calculate commissions, bonuses, various overtime structures, and numerous deductions.



Cash Report Among Peachtree's reports is the Cash Manager, which projects your company's cash balance and transactions for a period you specify. You can drill down to underlying details by clicking on figures.

midrange systems. Job-cost reporting is integrated into the general ledger, accounts receivable, accounts payable, and payroll functions.

Flow through the system is straightforward and logical: you enter transactions in either journals or forms and then post entries to update the records. Most day-to-day accounting functions are covered adequately, but the system's selling point is its handling of back orders and inventory reporting, critical features for retailers and wholesalers. Back orders can stay on file and you can easily generate an order when the goods are in stock. Partial receipts on purchase orders are handled in a similar fashion. MacP&L includes both customer back orders and goods on order in inventory reporting, essential information for merchandising firms. And since the inventory system also supports assembled inventory items, it

ROAD-MAP TO AN ACCOUNTING PACKAGE

All users need such standard accounting features as security, ease of use, and reporting, and all the systems covered in this article provide those capabilities in satisfactory measure. But every business also has highly specialized requirements, so we've devised a tool to help you de-

termine which accounting package provides the extras your business needs. From the list of business types, find the accounting package or packages that are generally appropriate for your business, then search across the column headers for the specific features you require.

BUSINESS TYPE



PRODUCTS

- Midrange systems**
- Components
- Connected
- MacP&L
- MultiLedger
- Peachtree Accounting
- Special-purpose packages**
- CheckMark Payroll
- POS•IM-Premier
- Entry-level contenders**
- M.Y.O.B.
- QuickBooks Pro

FEATURES

Supports high transaction volume	Manages inventory in multiple locations	Manages item component parts	Manages back orders	Prepares quotes	Generates invoices from quotes	Automates item-level discounts	Automates customer-level discounts	Calculates commission compensation	Bills jobs based on time, expenses
●				●	●	●	●	●	●
●	●	●	●			●	●	●	●
		●	●	●	●				
			●						
●								●	
●	●		●			●			
		●	●	●	●	●	●	●	
		●	●	●	●	●	●		●

of Peachtree's strong points, has been enhanced by a navigation aid and a context-sensitive help system. File folder tabs and miniature flowcharts provide quick, easy access to many accounting functions. Context-sensitive help windows follow you through the system.

Peachtree offers many choices not commonly available. For example, if your business is small you'll probably operate the system on a cash-accounting basis, while for a larger business you can choose to operate on an accrual basis. You can set up accounting for multiple branches or divisions, and choose between batch or real-time updating. Setting up Peachtree, however, is not for the faint of heart—this is a good time to call a consultant and pay for some advice.

Peachtree provides solid, no-nonsense basic accounting and a repertoire of reports to meet most needs. Simple job costing is available for revenues and expenses, including payroll. Payroll can distribute wages across multiple expense accounts as well as multiple jobs. Peachtree also provides fully customizable forms and reports, though the customization process is a long way from drag and drop. A new set of business-analysis reports provide quick access to information about cash collections and payments (see the screen shot "Cash Report"). These reports combine graphic analysis with drill-down capabilities that can show the individual transactions summarized in reports and even let you

act on them immediately—writing a check to pay an overdue bill, for example.

Though Peachtree provides solid accounting and reporting features, its interface is stodgy and awkward, and its multiuser capabilities lack the processing power to handle high-transaction volumes. But if multiuser is what you're after, the price is hard to beat.

The Last Word

Which system is right for your business? There are no easy answers here because there are no perfect systems here; each system has some strengths and some weaknesses. Selecting a package inevitably involves compromises—your business may be constrained by a specific reporting requirement, for example.

For general accounting, MacP&L is best for its ease of use and its accounting and reporting capabilities. Its interface wins hands down, and it provides a wealth of reporting capabilities that should meet the needs of most businesses.

Service businesses that frequently bid for jobs, and professional offices that bill for employees' time and other costs, should take a look at Components' Time Billing/Job Cost module. Its cost tracking, invoicing, and reporting are hard to beat. Because Components' modules are not fully integrated—posting transactions from one module to another, for example, is an arduous process of exporting and importing—you may prefer to use the Time Billing/Job Cost module with

MultiLedger or another package that provides complete integration.

Connected's interface may not be up to Mac standards, but its accounting capabilities are great. If you're a retailer, distributor, or manufacturer, its inventory system provides you with a wealth of management information. And if there is no preformatted report for the information you need, Connected's flexible, sophisticated report writer can produce one—once you figure out how it works.

Business owners looking primarily for solid accounting capabilities in a multiuser environment will find MultiLedger with the companion Payroll a good bet. It lacks the depth of other systems, but speed, flexibility, and simplicity make it a good choice for many. **m**

JAN GILLESPIE has managed and implemented accounting systems for private and public organizations, and currently teaches accounting at the University of Texas at Austin.

MIDRANGE ACCOUNTING SYSTEMS



The financial-management needs of growing businesses are so diverse that no single accounting package can satisfy all of their requirements.

POWERWAVE FROM POWER COMPUTING



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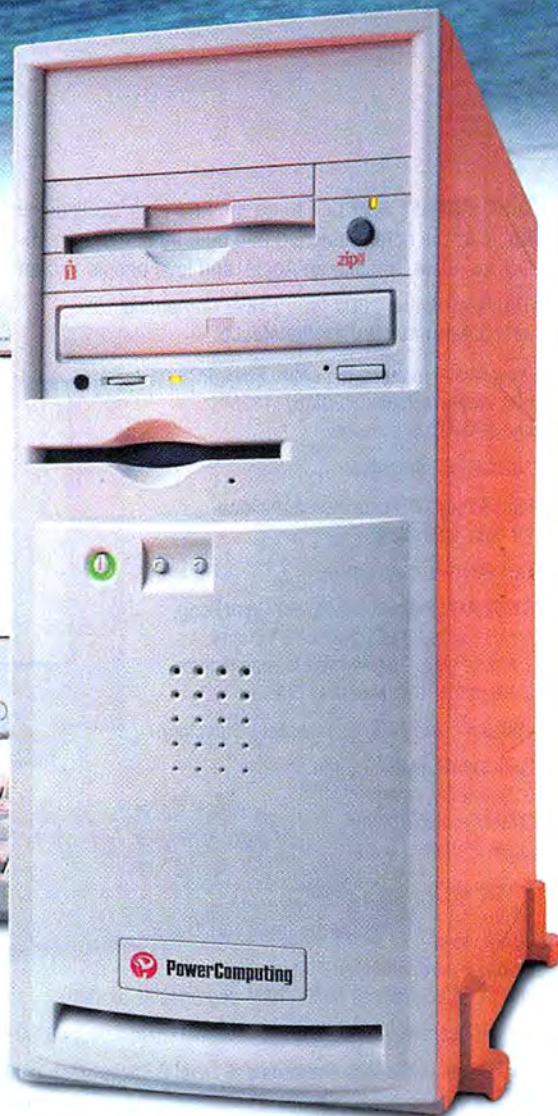
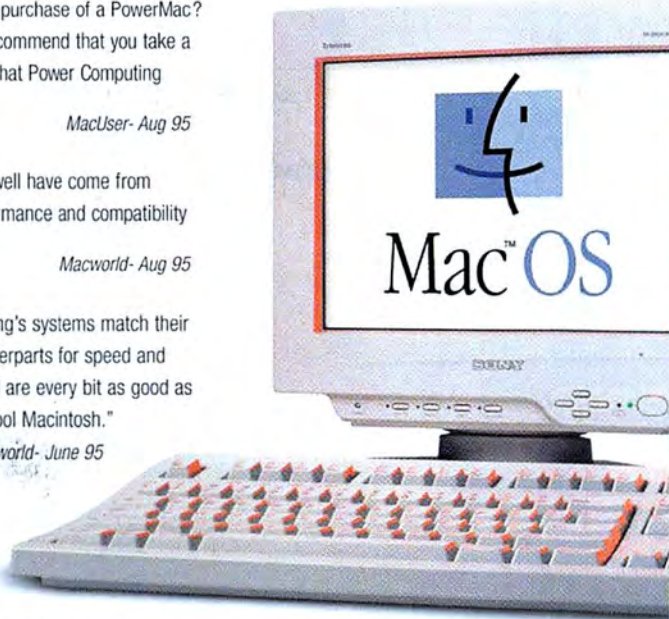
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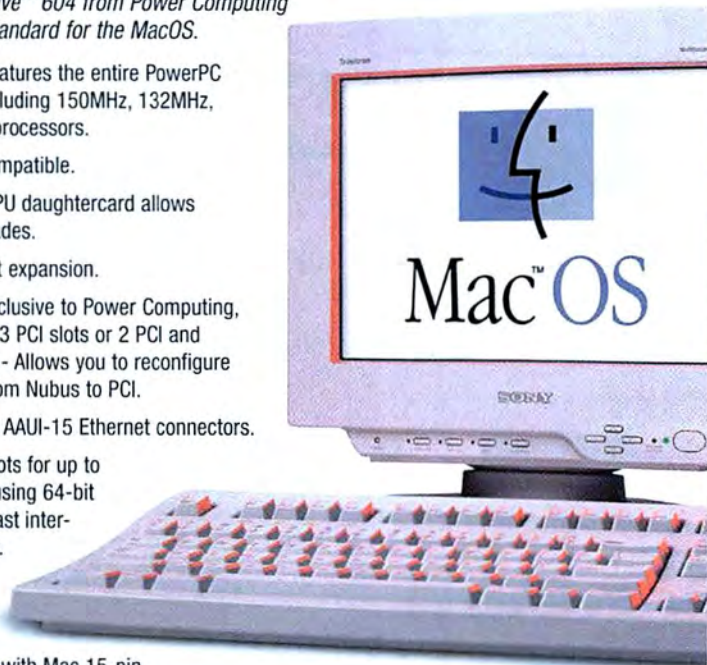
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Graphics

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Painter Adds Web Design to Its Palette

ONLY ABOUT A YEAR AFTER SHIPPING its last major upgrade of Painter, Fractal Design (408/688-5300) is about to release the next one—with new Web graphics-design tools, collaborative painting, and the ability to blend vector and raster images.

As usual, the latest version of Painter is blazing new trails—this time with its Internet support, which provides a boost for artists and designers who want to break into designing for the World Wide Web without becoming hard-core programmers. Building on Painter 3.1's support of GIF and JPEG formats for Web designers, Painter 4 lets you create Image Maps—collections of bitmapped graphics containing links to other pages or objects. After giving a floating selection a Web URL you save it as an Image Map element. Once in your Web browser, you just click on that Image Map to access whatever page or object it's linked to. And with Painter's new networking feature, Net-Painter, multiple artists will be able to collaborate interactively on an image over the Internet, on local area networks, or via any TCP/IP connection. Because Net-Painter sends scripts rather than screen images, it can work quickly even over low-bandwidth connections.

Continuing the recent trend among graphics programs—like Adobe Illustrator and Photoshop, and Macromedia FreeHand—of blurring the distinction between paint and illustration, Fractal has resurrected and improved on Shapes, which was originally introduced as part of Letraset's ColorStudio. A PostScript drawing layer that floats above Painter's bitmap canvas, Shapes lets you import—or copy and paste—PostScript objects created in Illustrator 5 format, or create your own antialiased vector objects. You can then modify these objects with Painter's Bézier drawing tools; convert



SUSAN LUVAN

them into bitmapped floating selections to add such painterly effects as transparency, textures, Photoshop filters, and blending modes; and combine the objects with other floating selections. The QuickCurve lasso lets you draw precise Bézier selections, and new alignment tools allow precise positioning of both bitmapped and PostScript objects.

This year's new natural-media tool is Mosaic, which lets you paint with tiles on a blank canvas or over a scanned image. Each tile is a separate object whose shape fits in with the tiles surrounding it. You can change the size and dimensions of tiles and grout, and vary their uniformity. Other new features include a Mask Edit mode for defining detailed selections and the Advanced Color Correction module *continues on page 114*

KPT Adds 3-D and Animation to the Mix

IN ADDITION TO CHANGING ITS NAME, MetaTools (formerly HSC Software, 805/566-6200) has been busy revamping its popular set of special-effects Adobe Photoshop plug-in filters, Kai's Power Tools (KPT). In addition to adding several new filters, KPT 3 offers real-time previews and visual presets, better filter controls, and a more powerful texture generator.

With KPT Lens f/x, you can combine effects (such as Gaussian blur, noise, find

edges, and smudge) and drag the lens to different parts of your image to see the results immediately. Spheroid Designer is a 3-D materials editor that lets you ray-trace spheres with bump maps, transparency, negative or positive lights, and other effects. Interform is a submodule of Texture Explorer that lets you mutate two textures into a new one that you can animate over time. Two one-step filters have been added: Tiling Plane, which creates a zoomable field of tiles with perspective, and Video Feedback, which infinitely repeats an image on top of itself.

Two of KPT's most powerful and popular filters, Texture Explorer and Gradient Designer, have been enhanced and integrated—you can interactively change gradient colors within Texture Explorer. Texture Explorer gives you 16 algorithmically generated, nontiling mutations. In both filters, you can modify hue, saturation, brightness, contrast, and blur in real time. You can also modify or feather a selected area of a gradient.

Interface changes include graphical

presets, larger preview windows, the ability to click and drag through channel operations and sample colors by clicking, and multiple undos—you can back up nonlinearly to any step. And every filter has its own channel and opacity controls.



After applying multiple effects with KPT 3's Lens f/x filter, you can move around the lens-shaped preview window to check out these effects on different areas of the image.

MetaTools also plans to release KPT Final Effects (acquired from UDAC Multimedia), a video special-effects plugin for Adobe After Effects 3.0, by November. Effects include rain, snow, rays, explosions, and transitions.

KPT 3 is available now for \$199; upgrades from 2.1 are \$79.—C.A.

Is Dry Film Ready for Prime Time?

IF YOUR COMPANY OR GRAPHICS department would benefit from an in-house imagesetter, dry-film technology might be the breakthrough you've been waiting for. Otherwise, you might want to take a wait-and-see approach to this much-ballyhooed new process.

Dry film doesn't require the enormous amounts of water and toxic chemicals it takes to develop conventional, silver-halide film. Instead, dry film typically relies on high levels of heat to develop the thermally sensitive, specially coated film (the actual process varies from one film manufacturer to another, see "How Dry Film Reduces Toxic Disposables: Three Approaches").

As a result, such companies as Eastman Kodak, 3M, Xerox, and Polaroid are touting dry film as a significant advance in graphic arts technology—a way to produce film for printing plates without the expense and maintenance required to handle and dispose of chemicals. Imagesetters using dry film don't need plumbing or darkrooms, making these machines much more suitable for the corporate workplace. And with an in-house imagesetter, companies can produce film faster

than they can by sending jobs out to a service bureau.

Overall, many who have had experience with dry-film images say the new technology is generally capable of producing about the same quality as traditional film—wide density range, sharp edges, dense blacks, and clean halftone dots. Some have reported that dry-film output is actually more reliable because it eliminates the variabilities that can occur in chemical processing. At the least, dry film can generate images of sufficient quality for publishing brochures, newsletters, and direct-mail pieces—exactly the type of jobs most frequently handled by in-house marketing and graphics departments and corner printshops.

Despite these advantages, a number of concerns threaten to keep dry film from becoming widespread—at least for the foreseeable future. For one thing, only a few dry-film products and their accompanying high-resolution devices are currently available. Polaroid's Graphics Imaging division and Linotype-Hell began shipping their jointly developed dry film and imagesetter, respectively, in

continues

IN BRIEF

■ PostScript Toolbox

Download Mechanic Pro (\$495; \$199 upgrade from Download Mechanic 1.7) from Acquired Knowledge (619/587-4668; aqrdnlj@applelink.apple.com) lets you preview, analyze, test, edit, debug, and rasterize PostScript files—through a built-in PostScript Level 2 interpreter—either individually or in batch mode. You can preview in monochrome, gray scale, or color at 72 or 144 dpi, and you can view PDF files on screen. Due in November 1995, Pro will be followed by a stand-alone reader for Download Mechanic preview files, planned for early 1996.

■ Bitmaps into Vectors

Tracer (\$495) from ScanVec (508/694-9488; usales@scanvec.com) converts black-and-white scanned images and imported bitmaps (in TIFF or PICT) into vector-based line art. You can trace a form's contours, draw a centered path, or do a combination of both. Options include creating outlines with enhanced corners or enhanced curves, squeezing or rounding off corners, editing curves between any two selected points, and converting all selected shapes to circles. Tracer also has multiple undos. The next version is expected to work with gray-scale and color images.

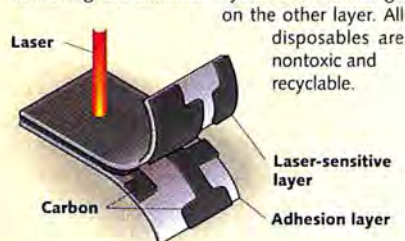
■ DrawTools and Intelli-

hance Extensis (503/274-2020; info@extensis.com), released two plug-ins in October. DrawTools (\$149) is a set of 17 Illustrator/FreeHand filters in three modules. DrawTools Color lets you mix and replace colors, convert to gray scale, adjust curves, create duotones and multitones, and do color separations. Shape lets you apply 3-D effects to geometric or free-form shapes. It also exploits FreeHand 5.5's drag-and-drop effects, floating palettes, and interactive previews. Move, which works only in Illustrator, lets you precisely resize and position objects within and between layers. Intellihance 2.0 (\$149) is a Photoshop plug-in that adjusts image contrast, brightness, saturation, sharpness, and despeckle in one step.

"IS DRY FILM READY FOR PRIME TIME?" *continued*

How Dry Film Reduces Toxic Disposables: Three Approaches

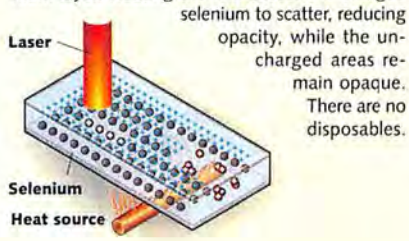
Polaroid's DryTech sandwiches a layer of carbon between an adhesion layer and a laser-sensitive layer. Exposed areas of carbon, heated by the imagesetter's laser, stick to the laser-sensitive layer, while unexposed areas stick to the adhesion layer. Removing the adhesion layer leaves the image on the other layer. All



3M's dry film sandwiches a layer of silver halide, mixed with silver salts, between other layers. Exposure to the laser causes silver-halide kernels to form; heat makes silver salts build up around kernels to create the image. Other chemicals are used to add contrast. There are no disposables.



Xerox's Verde sandwiches a layer of selenium embedded in plastic and a conductive layer between a base and an overcoat layer. After electrically charging the conductive layer, the imagesetter transfers the charge to exposed areas of the selenium layer. Heating the film causes the charged selenium to scatter, reducing



late September. Xerox released its initial Verde dry-film product this summer, but the first imagesetter to use it—Information International's 3850 Graftix—isn't expected to ship before spring 1996. And dry-film products from Kodak, 3M, Konica, and others aren't expected to be available until mid-1996 at the earliest. LaserMaster and CalComp introduced dry-film output devices last year, but LaserMaster's \$19,995 PressMate and CalComp's \$39,995 EcoGraftix system are closer in quality to high-end laser printers than to imagesetters.

Another limitation is that, in most cases, only specially equipped imagesetters can process dry film. Eastman Kodak's dry film, for example, requires Dainippon Screen's TE-R1070 imagesetter, while Polaroid's DryTech Film works only on Linotype-Hell's DrySetter.

There are a few exceptions—Information International says you'll be able to upgrade some of its imagesetters to handle Xerox's Verde chemical-free film, and 3M and Fuji are working on dry-film products that work on traditional imagesetters. And ECRM has been working with a number of vendors, including Xerox and 3M, to add dry-film capability to its ScriptSetter line. But for the most part, to use dry film, you'll have to invest in a new imagesetter. This shouldn't be a problem for corporate departments shopping for their first in-house imagesetter. Many prepress houses and service bureaus, however, are already fully configured for wet-film processing. They aren't interested in investing in additional equipment and dealing with two separate film-preparation methods—particularly when all they'll receive for their efforts is image quality that's no better than what they're already getting.

Prices for most dry film and the imagesetters that use them are far from

firm, so it's too early to say definitively if using a dry-film process will save you money. Steve Hannaford, editor and publisher of the *PrePress Business Observer* newsletter in Swarthmore, Pennsylvania, estimates that dry-film material may cost as much as 25 percent more than wet film. But because dry film requires no purchase and disposal of chemicals, he admits that overall cost differences will probably be negligible.

Likewise, it's too early to say if dry-film printing will be faster than wet-film printing. Dry film can take longer to output than traditional silver-halide film, for instance, but you save time by not having to handle chemicals or wait for the output to dry.

At any rate, the question of whether dry-film technology is right for you might become irrelevant. That's because direct-to-plate technology, in which you bypass film and generate a high-quality printing plate directly from your Mac, is expected to take off in the next few years, once equipment prices come down and the quality stabilizes. And direct digital transfer—in which you send your final files directly to the printer over high-speed, high-capacity lines—is on the horizon as well. The bottom line: If you need to buy a new imagesetter, particularly for in-house use, take a serious look at what the dry-film process has to offer. Otherwise, you might be better off waiting to see how dry film develops.—JAMES A. MARTIN

"PAINTER ADDS WEB DESIGN TO ITS PALETTE" *continued*

for controlling an image's tonal range.

As it did with previous versions, Fractal continues to streamline Painter's interface. The ability to access any tool or command from a palette, and variations of

a tool from pop-ups, eliminates frequent and annoying trips to the menu bar. And two new palettes give you a place to stash self-tiling patterns and Image Hose nozzles. Also handy are a Scale slider for adding depth and a Grain slider for atmospheric perspective, which makes objects look hazy by letting background colors show through.

Planned for a mid-November release, Painter 4 will ship with an Extras CD-ROM that includes more than 100 new patterns, paper textures, and Image Hose nozzles. Fractal Design is maintaining its practice of raising Painter's price with each major upgrade. Version 4 will retail for \$549—\$50 more than its predecessor. Upgrades from earlier versions of Painter or ColorStudio will be \$129.—C.A.



Painter 4 lets you create or import vector art, apply paint effects, and combine it with bitmapped images. Here the direct-select tool is moving individual anchor points of a PostScript object.



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DNA tail **6** ending in the “o” for boy created with Path Patterns. “Ray” effect **7** comes from Create Star filter. Chip’s red cap **8** cut using knife tool. And by the way, separations and printing were done directly from Adobe Illustrator 6.0.

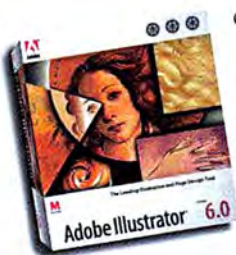
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Expert Graphics

GRAPHICS PROFESSIONALS SHARE THEIR SECRETS

by Cathy Abes

Artist: Richard Tuschman is a photo-illustrator whose work has appeared in such publications as the *New York Times*, *Sports Illustrated*, and the *New Yorker*.

How It Was Done: For the background of this image, created for a Lotus newsletter, Tuschman began by dividing a scanned texture into quadrants. To make the sky and water, he used photos he'd shot. For the top and bottom quadrants, he wanted a relief texture with an industrial look, so he used a crisscross pattern.

After scanning a painted texture into Photoshop, he switched from Grayscale to Bitmap mode and applied a coarse line screen (dot shape, cross; 5 lpi; 45-degree angle) to produce large, irregular diamond-shaped dots that, because of the variations in the texture, were somewhat irregular. After converting the bitmap back to gray scale, he scanned another painted texture and resized it to match the first. In the Channels palette, he dragged the crisscross texture onto the new texture to create an alpha channel. Duplicating the channel, he put the duplicate in a second alpha channel to which he applied a 3-pixel Gaussian Blur.

Next, he converted the image to RGB so he could apply Photoshop's Lighting Effects filter, using the Texture channel plus the light's falloff and positioning to create an irregular relief effect. Moving the Input Levels Gamma to .4 darkened the crisscross lines.

After coloring the texture with Hue/Saturation, he used Color Balance to further differentiate between the insides and the edges of the diamonds for a more three-dimensional look.

In Live Picture, Tuschman opened a third painted texture as the background of the entire image. To map out four slightly overlapping triangular quadrants, he made a stencil with multiple paint layers.

Once he'd inserted the crisscross pattern into the top triangle, Tuschman brought in the water and cloud photos, then filled the bottom triangle with a duplicate of the crisscross pattern. To enrich the colors, he added several colored layers and painted in areas of greater saturation. **m**



1 The original scan of the first texture, which Tuschman had previously painted using traditional media.



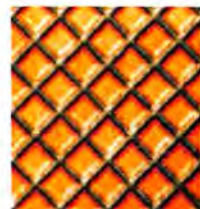
2 The texture after the artist changed it to Bitmap mode and applied a very coarse line screen (dot shape, cross; 5 lpi; 45-degree angle) to produce large, irregular diamond-shaped dots.



3 Applying Lighting Effects (Style, Omni; Light Intensity, 18; Gloss, 93; Material, 69; Exposure, 0; Ambience, 25; Texture Channel, 5; Height, 8; "White is high" box unchecked) produced this three-dimensional relief effect.



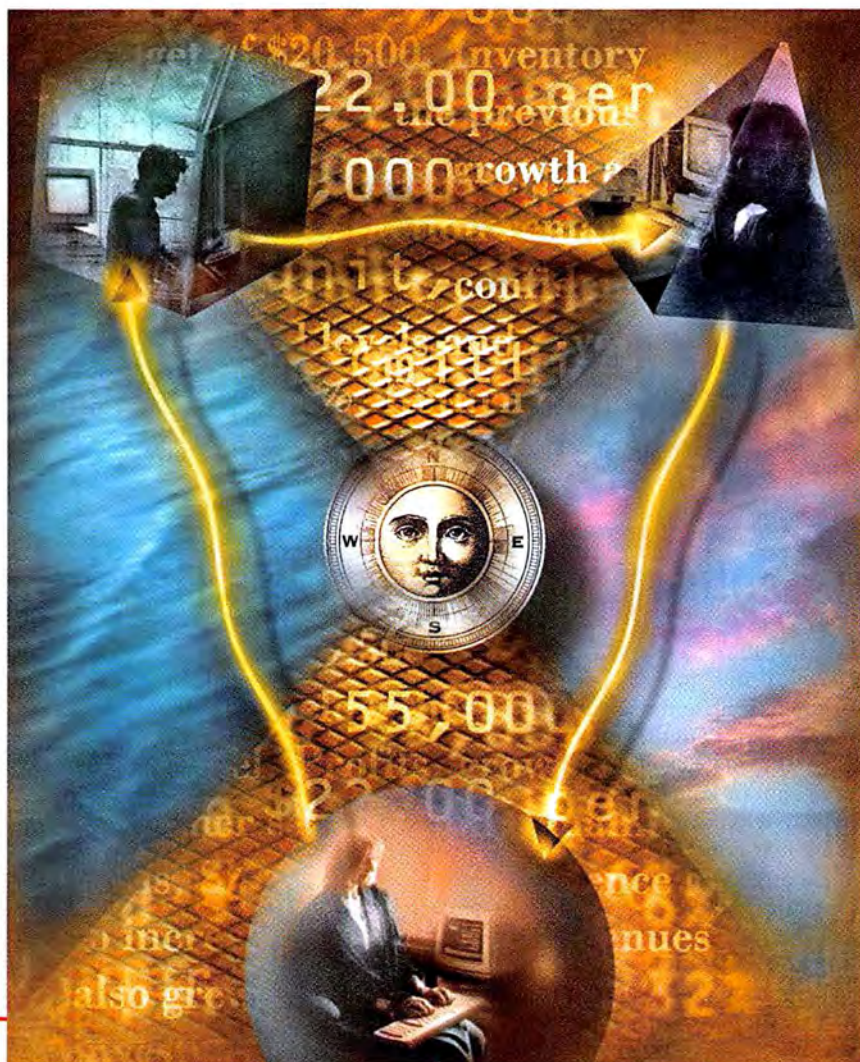
4 The crisscross texture after Tuschman colored it to a yellowish brown, using Hue/Saturation (Hue, 34; Saturation, 61; Colorize box checked.)



5 The texture after he used Color Balance to adjust the insides of the diamonds (Midtones +56, 0, -37; Shadows +29, -17, -47) to make them golden orange, and the outer edges (Midtones -53, +25, +41) to make them green.



6 The third painted texture, brought into Live Picture as the underlying background. To map out the quadrants, he applied a stencil with two intersecting diagonal lines, each on a separate paint layer—softening the edges with the airbrush and blending them into the background with the palette knife. To give a sense of shifting and overlapping areas, he made two more paint layers, offset them slightly from the originals, and repeated the process.



7 The image after Tuschman brought in the crisscross pattern, stretched it to fill the top quadrant, and added the water photo at 50 percent opacity so the background would show through.



8 The image after Tuschman brought in the cloud photo, also at 50 percent opacity. To add more clouds, he inserted the sky again and offset the second version. For both the sky and water, he erased the image with the marquee and then used the airbrush to paint back selected areas. Finally, he duplicated the crisscross pattern, flipped the duplicate, and moved it into the bottom quadrant.

THE TOOLS

Hardware: Macintosh Quadra 650 with 72MB of RAM and 66MHz Apple PowerPC Upgrade Card; NEC MultiSpin 3X internal CD-ROM drive; 230MB internal hard drive; APS external 2GB hard drive; APS external DAT tape drive; Sony CPD-1604S 17-inch color monitor; SuperMac Spectrum/24 Video Card; NuDesign external 128MB optical drive; Magic 44MB SyQuest drive; Umax UC 630 flatbed scanner; Wacom ArtZ graphics tablet.
Software: Adobe Photoshop 3.0.1; Adobe Illustrator 5.5; Adobe Dimensions 2.0; Live Picture 2.0; Ray Dream Designer 3.1.1.

At Work

THE LATEST TOOLS FOR BUSINESS COMPUTING

Lotus Notes: More Power, Less Hassle

IF YOU'VE LOOKED AT NOTES, THE crown-jewel Lotus (617/577-8500) groupware application, and wondered if an IS manager comes bundled in every box, Lotus wants to talk to you about version 4, set to ship in January. The new version, under development for two years, updates the client interface, the server application, and the tools that make the two work together.

Smoothing the Wrinkles

The choice to rewrite Notes' mail interface to resemble Lotus's cc:Mail interface was easy—1 million Notes users hated the look of Notes mail, while 7 million cc:Mail users (including those on Macs) liked the system they had. Users can now resize windows (called "panes") more easily and create sets or views, loading or hiding databases based on the user's current location.

Beyond the interface, ease of use is a theme that runs through this update. Lotus has added a server capability it calls "pass-through," which means users can dial in to one server, update (a.k.a. *replicate* or *synchronize*) a database stored there, and then access databases located on other servers without dialing in a second time. Users can also choose to replicate databases incrementally, updating only changed fields. Both these features reduce phone time on the road, paring down a traveler's ever-lengthening hassle list.

Another of Notes' drawbacks was the complexity of building even the simplest application. Notes 4.0 includes LotusScript 3.0, a full-featured, event-driven scripting language found in other Lotus apps. The VisualBasic-like language can be used to build agents—tiny applications that launch automatically. Users comfortable with programming can write their own agents in LotusScript and use them from their own workstations. Further,

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JOHN BITTER

with their IS manager's permission, they can upload those agents to a Notes server and make them available to other users. Lotus ships several agents with the 4.0 client. For instance, the vacation agent responds to incoming E-mail with a return message. Notes 4.0 retains its C API for programmers and the @ functions for building macros, and it gains a C++ API.

On the server side, Notes 4.0 is a 32-bit application, with improved performance. IS managers can now run Notes on servers with up to six processors, up from two. Lotus claims this increase will enable Notes servers to support as many as 1000 users, up from the previous limit of 200. Other additions include a Web browser and the ability to do Boolean searches on saved E-mail attachments. Pricing for the new release was not available at press time, but current estimated street prices are \$275 for the server and client pieces together, and \$155 for a single copy of the run-time client.

Macintosh: Almost Equal Partner

For the Macintosh market, the new version brings good and bad news. Certainly an improved interface and a beefed-up server application will help users, and in 4.0 there's parity between the PC and Macintosh client versions, which hasn't always been the case. Lotus didn't come out with a Mac version of Notes until 3.0, and that one didn't include the ability to search or index databases stored on the client (Macintosh users could search databases on the server).

But when it comes to the burgeoning number of add-on tools available for Lotus Notes clients—ranging from access to Notes databases via the telephone keypad (Phone Notes Mobile Mail) to SQL database tools (Notes Data Access Tools)—Mac versions are a no-show. Only one add-on—the Lotus Notes Pager Gateway, which lets users send messages to alphanumeric pagers over the major paging networks—works on the Macintosh platform.

Furthermore, Mac IS managers will still have to battle with a non-Mac Notes server. Even though Lotus was recently purchased by IBM, Apple's largest partner, there's still no server version of Notes for the Mac, nor are there plans to build one in the current 12-month schedule, according to senior product manager Bill De Stefanis. However hard this decision may be for Macintosh IS managers to swallow, it can be justified from Lotus's standpoint. After all, 90 percent of Notes installations are composed of a Windows client attached to an OS/2 server (Notes is available on every major Unix server platform).

Groupware is one of the hottest product categories of the decade, and everyone wants a piece of the pie. There are constant rumblings in the groupware market—Novell is pushing GroupWise, Microsoft swears it's releasing Exchange soon, and Netscape recently acquired Collabra. There are even a few companies attempting to build groupware-style solutions using the World Wide Web protocols, HTML and http. But for now, Lotus is well ahead of the pack.

—HOWARD BALDWIN

Full Contact Checks Back In



OVER THE PAST 18 MONTHS, the PIM market has experienced brutal competition, and several products and companies have fallen by the wayside. Now one of the casualties, Full Contact, is getting a second chance. A new company, Pitch Software (408/374-5504), has acquired the rights to the program from the original developer, Field Integration Technology, and is readying version 3.0, a significant upgrade.

Full Contact is an integrated address book, to-do list, and calendar manager, with hot links between related information (the underlying engine is a full-featured relational database). People in your contact database are cross-filed to the companies they work for, and activities are also linked, so it's easy to access all the information associated with a person with just one request.

Full Contact 3.0 is Power Macintosh

The Well-Connected Newton

APPLE HAS RELEASED VERSION 2.0 OF the Newton operating system, and while the new OS boasts speed, handwriting recognition, and interface improvements (previously detailed in *At Work* news, November 1995), Apple has also improved how the Newton works with the world around it.

The improved Newton Connection Utilities (\$69) offers bidirectional data translation and synchronization with some personal information managers on the Macintosh (Now Contact and Now Up-to-Date) and in Windows (Microsoft Schedule Plus). Apple also expects third-party applications that include direct synchronization to appear at release. In keeping with the concept of a MessagePad as a portable data repository, Newton Press for Mac and Windows (\$69) creates documents for transfer to a Newton. You

can drag and drop text and bitmapped graphics to create a price list, catalog, or other material. The 2.0 OS can receive as well as send faxes (there's a magnification feature to inspect incoming faxes), and the new system also features an improved eWorld mail client.

The Newton 2.0 OS ROM will be available in MessagePad 120's (which are now known as Apple, rather than Newton, MessagePads), and is also expected to appear on other Newton products.

Apple will upgrade older 2MB MessagePad 120's for \$109; however, any earlier MessagePads cannot be upgraded. Not all older Newton software will run on the 2.0 OS. Apple has included one additional hardware accessory only for the Newton 2.0 OS MessagePads, a \$99 Newton keyboard that connects to the serial port.

—CARY LU



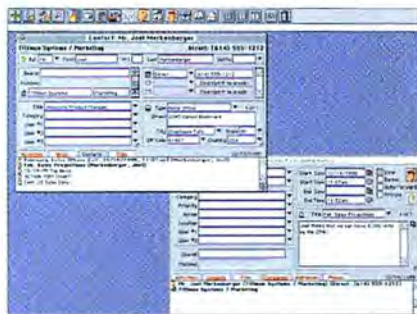
DAVID DIAZ

IN BRIEF

TouchBase, DateBook

Go Native Now Software (503/274-2800, info@nowsoft.com) is shipping version 4.2 of TouchBase and DateBook Pro (\$49.95 for both), now native for the Power Macintosh. The company is also shipping a CD-ROM version (\$69.95) of this address book-and-calendar tag team, which includes more than 45 detailed city guides, offering information on everything from hotels to restaurants to ATM locations.

native and incorporates many user suggestions, such as smaller RAM requirements, better speed, improved find capabilities, and a sleeker interface. You can link files from other programs to a Full



Full Contact keeps pieces of information as separate records, linking them together as you require. Shown here is a contact and a linked note detailing a phone conversation.

Contact record—you could, for example, link a spreadsheet to an activity or contact. Users can now share their calendars with coworkers over a network (as well as mark activities as private), and the calendar is smarter, providing easier viewing of events and to-dos. The program also handles recurring events better, allowing users to schedule them at more-flexible intervals. Full Contact's built-in word processor links correspondence to both the contact and the activity involved. The selection of reports and mailing labels is much larger. There's also new support for System 7.5 features, such as Apple Guide help and drag and drop of contact information to and from the desktop, or to other records within the program.

Pitch Software's Full Contact 3.0 will have a retail price of \$199 (upgrades for users of previous versions are \$39.95) and is scheduled to ship in November 1995.

—TOM NEGRINO

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BY JIM HEID

Working Smart

GeoPort Telephony Is Here—Finally

APPLE DESIGNED ITS GEOPORT ARCHITECTURE to provide an inexpensive path to telephony—that buzzword describing anything mixing computers and phone lines. GeoPort debuted with the Centris/Quadra 660AV and 840AV and now runs on all Power Macs.

The GeoPort launch was accompanied by the kind of rosy promises that usually herald a new technology: Apple claimed that it could turn your Mac into a fax machine, telephone, answering machine, and voice-mail system. All you needed was a \$129 box called the GeoPort Telecom Adapter.

There was just one problem: Apple failed to deliver an essential piece of system software called the Telephone Manager. Without it, third-party developers couldn't create GeoPort voice mail, telephone, and answering-machine software; you could use your GeoPort Telecom Adapter only for basic fax and modem calls, and bugs in the GeoPort software made even that an iffy proposition.

The Telephone Manager is finally here, as are third-party programs that exploit it. This month, I plug into the GeoPort architecture and survey the telephony tools that work with it.

The Hardware and the Software

The GeoPorts on the back of your Mac are simply fast serial ports: they can accept the same devices that connect to any other Mac serial ports.

To take advantage of a GeoPort's telephony capabilities, you need the aforementioned GeoPort Telecom Adapter, also called a pod. About the size of a videocassette, the adapter has two RJ-11 telephone jacks, one for the wall outlet and one for a telephone. The GeoPort pod works only with analog telephone lines—if you want to use a GeoPort pod with the digital PBX system at your office, you must use an analog phone extension. (In promoting the original GeoPorts, Apple said third-party developers would ship GeoPort PBX

adapters, but none have been announced.)

The GeoPort pod is a simple hardware interface between the Mac and the telephone line. The smarts behind the pod are in the GeoPort software, which includes the Telephone Manager and two Apple software packages, Express Modem and Express Fax.

Express Modem and Express Fax rely on the processing punch of a Power Mac (or the digital signal processor on the 680X0 AV Macs) to create the modem and fax tones that, in a conventional modem, are produced by chips. The software encodes outgoing data and decodes

conventional speakerphones. It also provides address books and a speed-dialing feature (see "The Mac as Telephone").

MegaPhone provides automatic links to databases and contact managers such as Claris FileMaker Pro and Now Software's TouchBase Pro. A call-logging feature automatically times phone calls. When you hang up, a dialog box appears that lets you record information about the call. You can also call back any number in the log by double-clicking on it.

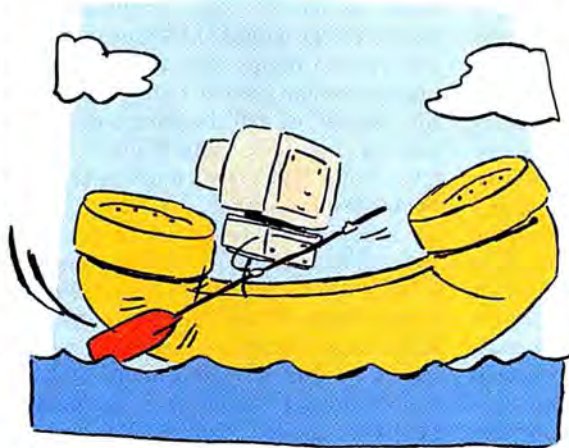
MegaPhone's answering-machine features enable you to digitally record an outgoing message and capture incoming

messages on your hard drive. The program provides a slick array of message-management features: you can check your messages from the road, for example, and set up MegaPhone to inform you when a new one comes in. And with Apple's PowerTalk installed, MegaPhone can put new messages in your In Tray.

The version of MegaPhone that comes with the GeoPort is fully functional for 30 days and then turns into Basic MegaPhone, a simple speakerphone and

answering machine lacking MegaPhone's best features. If you get hooked, you can purchase the full version from Cypress Research (408/752-2700) for \$49.95.

MegaPhone includes a limited version of Cypress's nifty autodialing utility, MegaDial, that works only with MegaPhone. The full version of MegaDial lists for \$79.95 and works with other telecom software, GeoPort pods, and standard Hayes AT-based modems. MegaDial's smart-dialing features can automatically dial a phone credit card number if you're calling outside your local area code. Cypress Research also includes a database of 7000 local-access numbers for online



the incoming squawks, while the pod links the GeoPort to a telephone line.

The latest version of the GeoPort software is 2.2, which shipped with the PCI Power Macs in August. (Version 2.1 works on pre-PCI Power Macs and 680X0-based AV Macs.)

Calling with MegaPhone

The GeoPort software includes a first-rate telephony program: MegaPhone from Cypress Research. MegaPhone turns a GeoPort pod-equipped Mac into a telephone—you talk into the Mac's microphone and listen through the Mac's speaker (or through headphones). MegaPhone eliminates the coffee-can audio quality of

services, making MegaDial an ideal companion for PowerBook-equipped travelers.

GeoPort Voice Mail

When I last wrote about telephony here (*Working Smart*, August 1994), I described some hardware-software bundles that turn a Mac into a voice-mail system. Since then, several products have arrived that rely on the GeoPort pod instead of dedicated hardware. Cypress Research has shipped a \$349 software-only version of its powerful PhonePro, a graphical programming environment that enables you to design voice-mail applications by clicking and dragging icons.

PhonePro now supports Apple's PlainTalk, text-to-speech software that allows your voice-mail applications to read aloud information from a database. By pressing numbers on a telephone keypad, callers can query a database to hear information such as account balances, appointment dates, and prices. PhonePro also supports the unified in-box concept: you can specify that incoming voice-mail messages appear in your PowerTalk In Tray or CE Software QuickMail mailbox.

Simplified Voice Mail

With PhonePro's power comes a fairly steep learning curve. If you have a small business and want to set up just a few voice mailboxes, there are simpler and cheaper alternatives. One is Cypress Research's Voice Messenger (the current version, 1.0.1, lists for \$149.95). Voice Messenger provides the essentials: the ability to call in and check messages; assign passwords to each mailbox; and change outgoing messages from a remote phone. Voice Messenger also provides some goodies, including the ability to create different outgoing messages for different times of day, as well as rudimentary text-to-speech support: instead of digitally recording outgoing messages on your hard drive, you can type mes-

POWER TIPS FOR MEGAPHONE

Cypress Research's MegaPhone screen-based telephony program is included with the GeoPort software. Here are some tips for using it.

Making Calls

- Gimmicky alphanumeric phone numbers such as 800/BIG-DEAL are all the rage. MegaPhone makes them easier to dial; just type them on the Mac's keyboard and MegaPhone translates them into the appropriate numbers.
- You don't have to click the Dial Number button after typing a number—just press return. Press return again to hang up.

Taking Calls

- MegaPhone's answering-machine feature records messages as standard System 7 sound files. This means you can play back messages by simply double-clicking on them in the Finder, and you can archive them by copying them to tape or another backup medium.
- MegaPhone uses 17K of disk space for each second of recorded sound—that's a megabyte for a one-minute message—so your hard drive can fill up quickly. If you're going away for a while, free up some disk space first or specify that MegaPhone store messages on the highest-capacity hard drive you have. Another way to save disk space is to limit message length, using the Setup window.

sages and have your Mac read them. Unlike PhonePro, Voice Messenger can't read aloud text data from databases and other sources.

Voice Messenger provides a solid set of features, but I found its interface a bit rough around the edges. Another complaint: the program's 125-page manual arrives on a floppy disk; if you want a printed version, you must either print the file yourself or call the company for a printed copy (free upon request). And given Voice Messenger's rough interface, the manual is essential.

A better basic voice-mail program is Pleiades Research's Front Office (version 1.1; \$299; 213/259-1727). Front Office doesn't support PlainTalk text-to-speech, but it does everything else you'd want from a voice-mail system and has talents Voice Messenger can't match, including fax-back support. (Cypress Research's forthcoming \$49.95 Fax Messenger will also provide fax-back features.)

You can set up Front Office so that it automatically dials a number to notify you by phone or pager when your mailbox receives a message. If your phone system provides call-forwarding, Front Office can automatically send calls to another number. You can even specify forwarding to different numbers at different times—for example, to your pager between 6 a.m. and 9 p.m. on weekends and to a voice number at other times.

Calling Ahead, and Hanging Up

GeoPort telephony is beginning to hit its stride. Now what's ahead? Faster modems, for one thing. The current GeoPort software is limited to 14.4 Kbps. Apple says it's working on 28.8-Kbps support as well as support for Caller ID and PBX dial tones.

Also on the horizon are telephony-oriented text-to-speech technologies. Apple engineers recently gave me a preview of a version of PlainTalk designed to read E-mail. E-mail is a problem for today's PlainTalk because it is often poorly punctuated and laden with Internet headers that even a masochist wouldn't want to listen to. The software Apple showed me skipped headers and even knew how to translate the most common "smileys"—when it encountered :-), for example, it said "smiley face" instead of "colon, hyphen, right parentheses." You could use this type of software to catch up on your favorite Internet newsgroups—as you wait in traffic with your cellular phone.

One final—and I do mean final—note: this is my last *Working Smart* column. Starting next month, I'll be covering a new beat for *Macworld*. I hope you've found *Working Smart* useful and invite you to join me in my new digs. My thanks to everyone who has written to me; thanks also to my editor, Dan Littman, for helping to shape the column—and for putting up with my own overworked voice-mail system. **m**

Contributing editor JIM HEID is the author and producer of the BMUG Choice award-winning *Macworld New Complete Mac Handbook*, fourth edition (IDG Books Worldwide, 1995), and its interactive CD-ROM.



The Mac as Telephone Cypress Research's MegaPhone turns a Mac with a GeoPort pod into (clockwise from top left) a speakerphone, an autodialer, and an answering machine.

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BY LON POOLE

Quick Tips

Tips, Tricks, and Shortcuts

VISUALIZE STARTING UP YOUR MAC WITH System 7.5.1, but in place of the Mac OS logo you see a family portrait, your company logo, or some other image. This dream can come true if you have a resource-editing program such as Apple's ResEdit. Shishir Mehta of Stoughton, Massachusetts, found out that the start-up graphic is a PICT resource in the System 7.5 Update file, and you can easily copy and paste your PICT graphic over the Mac OS logo that Apple supplies.

After using ResEdit to open a copy of the System 7.5 Update file, open the PICT resource that contains the start-up graphic. There are six versions of the graphic for various combinations of monitor size and color depth. Three of the PICT resource graphics, measuring 422 by 323 pixels, are used on monitors 640 by 480 and larger: PICT -16506 is a color graphic for 256 or more grays or colors, -16505 is a gray-scale graphic for 16 grays, and -16504 is a black-and-white graphic for fewer than 16 grays. Three other PICT resources, measuring 321 by 227, are used on smaller monitors: PICT -16503 for 256 or more grays or colors, -16502 for 16 grays, and -16501 for fewer than 16 grays. Open the appropriate PICT resource for your monitor and its color depth (as set in the Monitors control panel), copy the replacement graphic from its source, and paste that graphic into the open PICT resource (see "Custom Start-up Graphic").

Finish by saving changes to the modified System 7.5 Update file and closing it. Before putting the modified file in the System Folder and naming it System 7.5 Update, move the original Update file into another folder. Restart to see your custom start-up graphic.

Note: If the System Folder contains a StartupScreen file, you must remove it to see the start-up graphic.

Making Sense of HQX

Q. When I downloaded some software from an anonymous FTP site on the Internet, I got a file whose extension was .hqx. Is this a Binhex file, and if so, how can I use it?

*Ari Nave
Beau-Bassin, Mauritius*

A. Yes, the file-name extension .hqx designates a Binhex file, which you can decode with Aladdin's free utility

(Compact Pro format), .pkg (AppleLink format), .gz or .Z (Unix formats), and .ZIP or .ARC (DOS formats). You can get StuffIt Expander from the Macworld Online software libraries, and it comes with Aladdin's retail product StuffIt Deluxe and with the shareware version StuffIt Lite (versions 3.5).

If you need to decode a large .hqx file, you may get better performance and reliability by allocating more memory to StuffIt Expander. For instance, Morris Tabush of Oakhurst, New Jersey, found that his Centris 610 would take an extremely long time to decode a file larger than 500K, and would then report that there was a problem with the file. Increasing StuffIt Expander's Preferred Size to 2000K eliminated those problems.

Hearing Voices

Q. How do I add new voices to my Performa 635CD? It came with only the voice named Fred.

Nate4807@aol.com

A. Your Mac's Extensions folder most likely contains Speech Manager 1.3, which enables

speech synthesis and includes the voice named Fred. The additional software you need for more voices is on your hard drive unless someone removed it. Look in the Apple Extras folder (which may simply be named Extras) for a folder named Text-to-Speech. Drag the MacinTalk Pro extension and the Voices folder from the Text-to-Speech folder to the Extensions folder. After restarting the Mac, you'll have about 20 voices from which to



StuffIt Expander. Binhex is an algorithm for representing nontext Macintosh files (such as programs, graphics, spreadsheets, and formatted word processing documents) with plain text so they can be reliably transferred over the Internet. StuffIt Expander can also decode files with the extension .uu (which designates the uucode algorithm) or .bin (MacBinary algorithm). In addition, StuffIt Expander can decompress files that have the extension .sit or .sea (StuffIt format), .cpt

continues

choose. To hear a particular voice, select it in the application that you use to speak text. For instance, in SimpleText you select a voice from the Voices submenu of the Sound menu.

On some Macs, the Extras folder contains a PlainTalk folder instead of or in addition to a Text-to-Speech folder. Inside the PlainTalk folder is an installer for the complete text-to-speech software. The PlainTalk folder also contains speech-recognition software, but it requires a Power Mac with 16-bit sound input or a Mac 660AV or 840AV.

If you can't find a Text-to-Speech folder or a PlainTalk folder on your hard drive, there are alternate sources. The

System 7.5 CD contains a PlainTalk folder, and the system CDs that come with Macs contain one or both folders. Use the Finder's Find command to search the CD. You can also obtain the latest PlainTalk software (version 1.4.1 at this writing) from Apple's software-updates library on eWorld and the Internet (<ftp://info.apple.com> or <http://www.apple.com>). The best version of PlainTalk for speech recognition on a Power Mac is 1.4.1. On Macs without speech recognition, such as Power Macs with 8-bit sound input like the 5200- and 6200-series models, PlainTalk 1.4.1 offers one minor advantage over PlainTalk 1.3. The text-to-speech part of 1.4.1 includes the Speech control panel,

which lets you set a voice and speaking tempo as a systemwide default. Those systemwide settings are not a standard part of text-to-speech in PlainTalk 1.3. The best version of PlainTalk for a 660AV or 840AV is 1.3, because the speech-recognition software of later versions doesn't work with those Mac models.

Hard Drive Defects

Q. Norton Disk Doctor's Get Info command tells me that my Perforce 6115CD's hard drive has eight factory defects. I have asked many people, including an Apple technician, if this is a problem, and no one knows. Should I have the hard drive replaced while it's still under warranty?

*Susan Sinigaglio
via the Internet*

A. Hard drives are not perfect. Most leave the factory with a few bad sectors, known as factory defects, and with use they develop more bad sectors, known as user defects. Each drive keeps an electronic list of its factory defects and another list of its user defects. The drive never uses the bad sectors on either list. The number of bad sectors rarely if ever amounts to anything substantial. For example, 100 bad sectors would be 0.02 percent of a 250MB drive. You don't need to keep an eye on your hard drive's defects, but you might keep an eye out for a technician who could have explained all this to you.

Centered on the Page

TIP Here's a tip for centering an object or a group of objects between the left and right margins in a page-layout or draw program. To center multiple objects, first arrange them with respect to one another as you want them to be when they are centered on the page. Next draw a line at the right edge of the page and another line at the left edge of the page. Then select both lines and the object or group to be centered, and use the program's alignment command to distribute space evenly between them (see "Bull's-eye"). Finally, hold down the shift key and click the centered object or group to deselect it, and press the delete key to delete the two lines.

*W. Kirk Lutz
via America Online*

Ad Hoc Printing

TIP When traveling with my laptop, I often run into trouble because the place I'm visiting has no printer I can use, nor even two phone lines so my fax modem can call the on-site fax machine.

continues

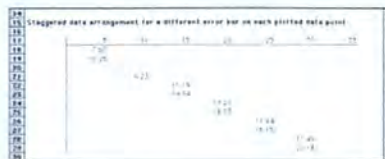
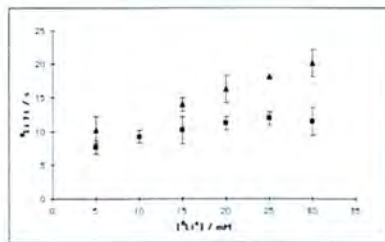
INDIVIDUAL ERROR BARS

It's no big deal in Microsoft Excel 5.0 to add uniform error bars to all points in a data series, but Erik Malewski of Chicago needed an x-y scatter graph with a different error bar for each data point. To produce the chart below, he laid out the data on a worksheet so that Excel's Chart Wizard plotted each data point as a separate data series and gave each "series" its own individual error bar. Here is his procedure.

1. Instead of laying out the data conventionally, with x-axis data running down the leftmost column and y-axis data in adjacent columns, enter the x data across a row and stagger the y data in adjacent rows. Arrange the y data stair-step fashion, with each y value in a row by itself (A).

2. Select all the data to be graphed, and click the Chart Wizard tool to begin creating an embedded chart. Set the chart type to s (Scatter); set the chart format to 1; specify that the data series are in rows, and designate the first row to be used for x data. Make all other entries and choices according to how you want your chart to look. Once you've finished, Excel produces a scatter graph in which each data point is a separate data series that you can format independently. Double-click the embedded chart to activate it for editing.

3. Format each data point in turn to have an individual error bar. To format a data point, double-click it to bring up the Format Data Series dialog box. Click the Patterns tab and set the Marker style and colors as appropriate (B). Then click the Y Error Bars tab or the X Error Bars tab, select a display style, and set the error amounts for the error bar (C). Click OK to dismiss the dialog box and go on to the next data point.



(A)

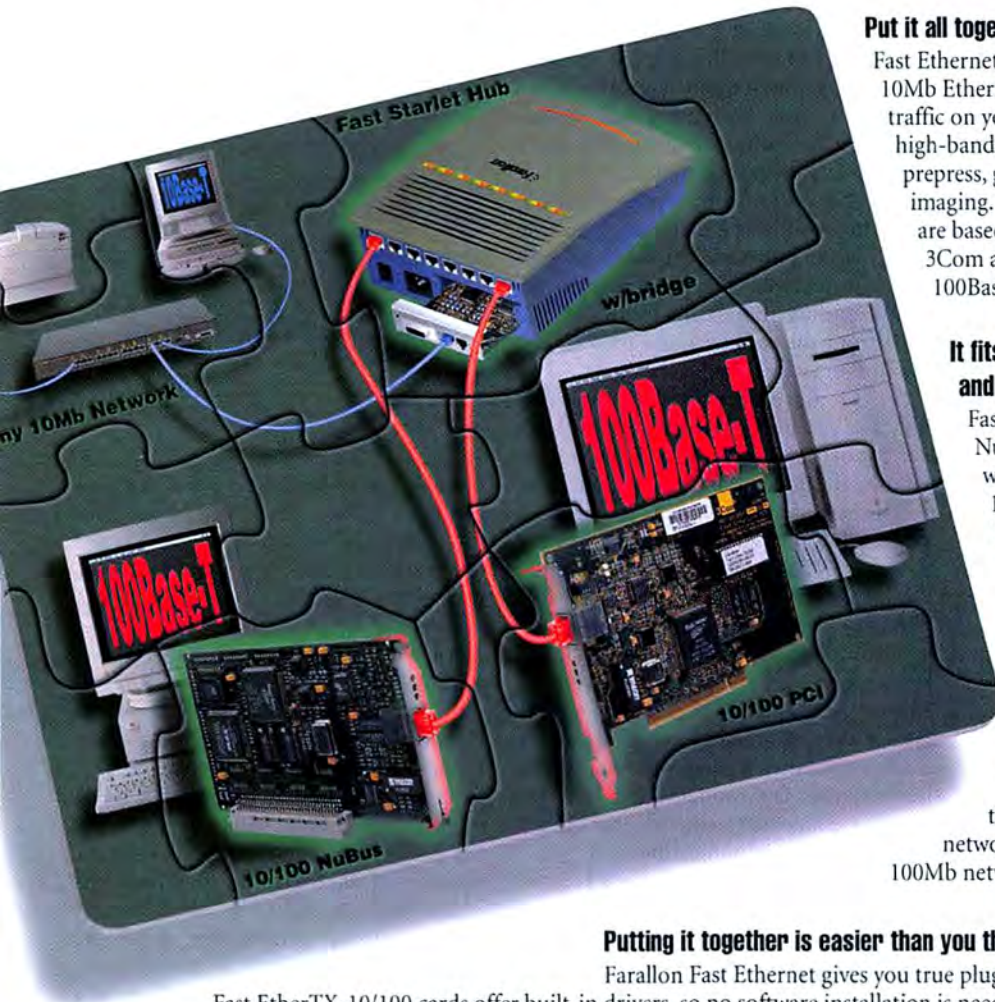


(B)



(C)

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To work around this, I connect my fax modem directly to a fax machine—without ever dialing a number—and use my fax software to print on the fax machine. Here is the procedure.

1. Place the fax modem close enough for the fax machine's phone cord to reach the modem. Leave the fax machine plugged into the wall jack for now so it will produce a dial tone in the next step.

2. Follow your fax software's usual procedure to manually fax the document. For best results set your fax software to send a gray-scale fax if it has that capability. Send it to any recipient, but don't actually dial the phone number.

3. Take the fax machine off-hook, and when you hear a dial tone, press the send/receive button so the machine goes online to receive. When you hear the fax tones, unplug the fax machine's phone cord from the wall jack and plug it into the line-in jack of the fax modem.

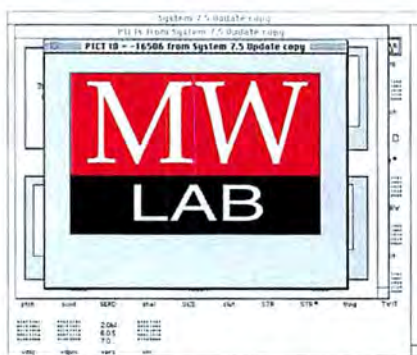
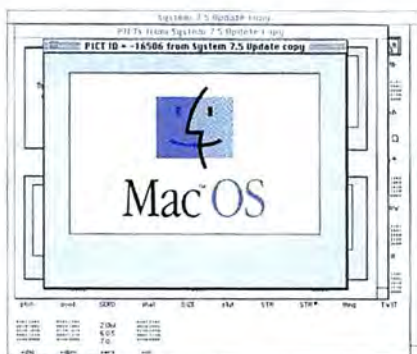
4. On the Mac, click the button that indicates you have made a successful manual connection. The fax modem begins sending the document to the fax machine.

If these steps involve too much plugging and unplugging of phone cords for you, here's an alternative. Take along a duplex adapter that converts a single phone jack into two jacks. Plug the adapter into the wall jack, and plug both the fax machine and the fax modem into the adapter. Immediately after you click your fax software's manual-connection button, unplug the adapter from the wall jack, leaving the fax modem and the fax machine connected to the adapter so they can continue communicating.

*Frost Nuzum
Monroe, Iowa*

Batch Copy or Delete

TIP Have you ever heard this jibe from a Windows user? "At least in Windows you can delete or copy a batch of files by typing a command such as Copy C:\draw*.eps D:." With Mac OS version 7.5 and later, you can use Find



Custom Start-up Graphic The Mac OS start-up graphic is a resource in the System 7.5 Update file (top). You can replace it by copying another PICT graphic and using ResEdit to paste it into the appropriate PICT resource (bottom). For best results, leave space at the bottom center of the replacement graphic for the progress gauge that appears there during start-up.

File in the Apple menu (or Find in the Finder's File menu) to find a batch of files from multiple folders on one disk or on multiple disks. Then you can select all or any part of the found items and drag the batch from the Find File window to the Trash or to any disk or folder. I recently discovered this convenient capability when I had to copy 100 files whose names ended with .eps from several folders to a single Zip disk.

*Paul Rubin
Edison, New Jersey*

If you haven't yet upgraded to System 7.5, Find File is about all the reason you need.—L.P. **m**



Bull's Eye You can center an object on the page in a page-layout or drawing program by using the program's alignment command to distribute space between temporary lines you draw at the margins.

We pay from \$25 to \$100 for tips published here. Send questions or tips on how to use Mac computers, peripherals, or software (by mail or electronically) to *Quick Tips*, Lon Poole, at the address listed in *How to Contact Macworld* at the front of the magazine (include your address and phone number). All published submissions become the property of *Macworld*. Due to the high volume of mail received, we're unable to provide personal responses.

LON POOLE answers readers' questions and selects reader-submitted tips for this monthly column. His latest book is *Macworld System 7.5 Bible*, third edition (IDG Books Worldwide, 1994).

Until now, the on-ramps to the Internet have been under construction.



Introducing the Apple Internet Connection Kit.

Getting hooked up to the Internet can be a messy process. That is unless you've got exactly the right tools. Presenting the Apple® Internet Connection Kit. It's everything you need to get on and get around the Internet quickly, easily and with a minimum of frustration. Here's what you receive: Netscape Navigator™, Claris EMailer™ Lite, Progressive Networks RealAudio, NewsWatcher, Fetch, the Apple Internet Dialer, Quicktime® VR Player and more. Plus, if you come across anything you don't understand, Apple Guide on-line help is there to assist you right away.

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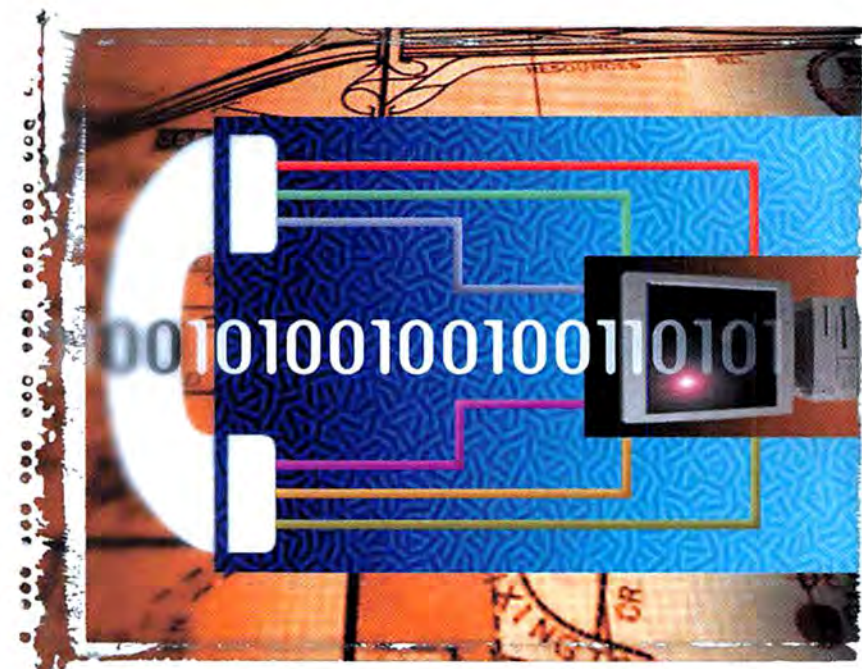
MANY USERS DEPEND ON APPLE Remote Access (ARA) to connect a remote Macintosh to an AppleTalk network over the phone line. Once connected, ARA works just like a network, aside from speed limitations imposed by modems and phone lines. But the current version, 2.0, supports only the AppleTalk protocol on Macs, so it's limited to pure Macintosh networks.

Promises, Promises Apple promised ARA 3.0 for 1994; now it's scheduled for the first half of 1996. The much-anticipated new feature in 3.0 is support for Point-to-Point Protocol (PPP), the communications protocol used by many Internet connections and supported by nearly all desktop computers and workstations. ARA 3.0 depends on Open Transport, Apple's new standard software interface for dealing with communications plumbing such as modems and network cabling. But Open Transport was delayed and at the moment ships only with the new PCI-based Power Macs.

At press time, Apple planned to ship Open Transport 1.1 around the end of 1995 or in early 1996 (see "Open Transport Still Falls Short," *Networks* news, December 1995). This updated version will support all Power Macs, 68030 Macs, and 68040 Macs (68000 and 68020 Mac owners are out of luck). ARA 3.0 should follow after Open Transport 1.1.

Apple has been embarrassed by the many delays in releasing communications products, especially Open Transport and ARA 3.0. "You don't need to write me and tell me which [development decisions] were bone-headed, ill-advised, or stupid. In retrospect, I can tell that all by myself," says a private Apple memo to several outside developers on the delays.

The PPP Advantage In PPP, AppleTalk traffic travels as embedded packets,



so all standard Mac network functions will work. Users in mixed computing environments can embed all common PC and Unix network protocols within PPP; a single connection can carry many different protocols. And PPP will let users connect to networks over the Internet as well. PPP is also the standard remote-access protocol in Windows 95. Miramar (805/966-2432) plans an ARA client for Windows 95.

One independent developer is already planning to enhance ARA 3.0. ARACommander 3.0 from Trilobyte Software (513/777-6641; trilo@one.net) lets you place a button in OpenDoc documents that, when clicked, initiates a communications link, over a network or by modem, that imports new information using ARA 3.0. Whenever ARA 3.0 ships, that is.

—CARY LU

ISDN: Something for Everyone

THANKS TO THE ACCELERATING spread of ISDN digital phone service across the country, many manufacturers are racing to expand their product lines to serve every possible ISDN user, from those who want faster Internet access, to telecommuters at their home desktops, to enterprisewide networks.

- Touting the results of its recent acquisition of Spider Systems, an ISDN hardware manufacturer based in Edinburgh, Scotland, Shiva (617/270-8300) has introduced the ShivaIntegrator 100, a single-line ISDN access server designed for small offices. The \$1299 unit supports

data transfer at speeds up to 128 Kbps. The \$11,999 ShivaIntegrator 500 supports Primary Rate ISDN (PRI), Basic Rate ISDN (BRI), X.25, and V.35. The three-port device has two PRI interfaces and one leased-line interface.

Both units include Shiva's Tariff Management software, which helps companies manage their WAN phone bills with on-demand digital services such as ISDN. The software drops the line when there's no network traffic, and reconnects when the link is needed. It also provides data compression, connection prioritization, and IP spoofing (which prevents network "housekeeping" information from being sent over the ISDN link).

- 3Com (408/764-5000) has weighed in with new products for consumers and the SOHO (small office/home office) market. Its newly upgraded 3Com Impact series of external digital modems list at \$649 and now support Multilink PPP for full 128-Kbps connections from ISDN's two B channels. An extra \$100 gets you a model with a built-in 14.4-Kbps analog modem.

- The \$3495 3Com AccessBuilder 4000 is a multiprotocol remote-access server that supports dial-in from Macintosh, Novell, and Windows clients, and performs bridging and routing. The AccessBuilder 4000 supports up to eight ISDN lines. For SOHO Ethernet networks that need to connect to a corporate LAN, the new 3Com Arpeggio family provides TCP/IP and IPX routing and PPP bridging, along with a standard phone jack.

- Ascend Communications' new Max

200 (510/769-6001) is a remote-access server that supports Apple Remote Access (ARA), TCP/IP, and PPP, giving users access to an Ethernet LAN. Dial-up is handled via eight PC Card (formerly PCMCIA) slots, in which you can install any combination of ISDN, analog modem, or frame-relay cards. List price is \$2400, plus the cost of the PC Cards.



- In a bid for the market's lower end, Cisco Systems (408/526-4000) has introduced the CiscoPro line, kicked off by the CPA753, an Ethernet-based ISDN TCP/IP router and bridge with one standard phone jack. The unit supports split B-channels, so two users on the local Ethernet network can use the two ISDN B channels independently to connect to different sites. Pricing is \$1200 for a version that handles up to four users, and \$1500 for unlimited users.—TOM NEGRINO

IN BRIEF

- **When Your Network Talks Back** If you hear voices in your computer room, don't panic, yet. AG Group's (510/937-7900; info@agggroup.com) NetMeter lets you use Speech Manager voices, music, QuickTime movies, and graphics (such as a traffic light) to quickly relay Ethernet network data. For example, you can configure NetMeter to hum quietly when your network traffic is within normal parameters and clang loudly when traffic exceeds your preset boundaries. NetMeter displays network data gathered by the firm's Satellite software agents. You need to install Satellite on a Mac on each Ethernet segment being monitored.

- **Microsoft Mail for Mac** StarNine Technologies (510/649-4949; info@starnine.com) has signed an agreement with Microsoft to take over development, marketing, and support for Microsoft Mail for AppleTalk Networks, now renamed StarNine Mail. StarNine said a native Power Macintosh version would be available in the first quarter of 1996.

- **Bridge the Gap** Not so long ago, connecting a slower printer to a faster network required a LocalTalk-to-Ethernet bridge; now it can mean bridging a 10-Mbps Ethernet device to a 100-Mbps network. Dayna Communications (801/269-7200; support@dayna.com) plans to offer in December 1995 a \$500 single-address bridge to connect a 10BaseT device, like a printer or notebook, to a 100BaseTX network.

- Asanté Technologies (408/435-8388) has introduced a product that lets you bridge an entire 10BaseT network, rather than one device, to a Fast Ethernet network. The \$1395 AsantéFast 10/100 Bridge was scheduled to begin shipping in November 1995.

the museum expects to extend this networked approach to its Web site (<http://www.rockhall.com/>), spreading the rock 'n' roll gospel to the networked masses on many platforms. The Reverend Al Green would approve.

—MATTHEW HAWN

Finally, Rock Computes

STILL TRYING TO EXPLAIN WOODstock to your kids? Or Nine Inch Nails to your parents? Time for a family vacation to Cleveland and the Rock and Roll Hall of Fame and Museum, where the whole crew can explore this collection of rock-'n'-roll memorabilia at one

of the museum's 24 networked interactive kiosks.

With more than 30GB of multimedia materials to offer, the museum needed a flexible delivery system that could be expanded and adapted as the collection changes. Static kiosks wouldn't do, so instead the museum chose a speedy 100BaseT Ethernet network that plugs the museum's 24 AV Mac-based kiosks into a Sun Sparc-20 workstation. StarLight Networks' StarWorks software (415/967-2774) serves QuickTime multimedia files at speeds up to 10 Mbps so visitors won't miss a single video frame as the artist formerly known as Prince shows off his very best James Brown moves.

As bandwidth improves,



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BY CARY LU

PowerBook Notes

The All-Purpose PowerBook

ALTHOUGH POWERBOOKS ARE FULL-fledged computers in their own right, most PowerBook users also have a desktop Mac. But you're not getting the most out of your PowerBook if you use it only when you're out of the office. A PowerBook can be useful for communications, file serving, backup, and much more—even when your desktop Mac is nearby.

Network Connection

The simplest way to connect a PowerBook to a desktop Mac is via a LocalTalk cable. The most popular form of this cable is a PhoneNet connector, available from Farallon Computing (510/814-8000) and its licensees. Simply leave a PhoneNet connector where you park your PowerBook and connect it whenever you're in your office. If you're connecting one PowerBook to one desktop Mac, you can use a serial printer cable. However, this type of connection eliminates a safety feature; a LocalTalk interface box's isolation transformer prevents miswired power lines from damaging networked desktop Macs. But because a PowerBook running on batteries or an AC adapter is isolated from the AC power line, using a serial cable isn't a problem if at least one of the networked computers is a PowerBook.

Although LocalTalk is convenient, it does take up the only serial port that many PowerBook models have. The new PowerBook 5300 models with infrared interfaces can connect to LocalTalk without tying up the serial port, but you will still need a desktop LocalTalk node with an infrared interface. For now, this means getting the \$69 AirDock Infrared Adapter from Farallon and plugging it into your desktop Mac's serial port for information transfer at full LocalTalk speed and into the ADB port for power. All the network functions available to the desktop Macintosh are now extended to the infrared-connected PowerBook. Of course, the host Macintosh must be running and able to manage the connec-

tion—you can't be installing new system software, for example, and many people can't spare a serial port for the AirDock. In the future, freestanding infrared nodes for LocalTalk could provide network access without requiring a host Mac, albeit at a greater cost.

LocalTalk is no match for Ethernet (or EtherTalk, in AppleTalk parlance),



which runs five to eight times faster. Ethernet means a wired connection, unless you choose one of the wireless Ethernet systems that are both more expensive and slower than wired Ethernet (see *PowerBook Notes*, December 1994). PowerBooks with built-in Ethernet (the 500 series) and those that support Ethernet through a PC Card or video card connector (5300's and 190's) or via a dock (Duos) work about twice as fast as PowerBooks that use a SCSI interface for Ethernet. The Ethernet adapters that connect to a serial port run the slowest, although they're still faster than LocalTalk.

It's possible, through either a router or a bridge, to mix Ethernet and LocalTalk (the AirDock comes with LocalTalk-to-EtherTalk connection software). Although this is a workable solution, for

speed and simplicity you're better off getting all Ethernet nodes.

Plugging and unplugging cables whenever you take away or bring back your PowerBook gets to be a nuisance. For the Duos, a dock makes connecting a one-step process. For the other PowerBooks, Pilot (612/828-6002; pilottech@aol.com) has BookEndz docking stations that perform a similar function (\$129 to \$189, depending on the configuration). Once you've set up a BookEndz dock, you simply slide in your PowerBook and it's instantly connected. Regardless of your PowerBook model, keeping a second AC adapter in your carrying case makes switching between office and travel easier.

Managing Files

Frequently shuttling between a PowerBook and a desktop Mac means keeping both sets of files up-to-date so that you always have the most recent version. One way to do that is to set file sharing on the desktop Mac while it's networked to the PowerBook, so both computers work from a single set of files. File sharing does have its drawbacks, though; you won't be able to change disk cartridges and CDs readily—you have to turn off file sharing first. The alternative is Timbuktu Pro from Farallon (\$199), which lets you send files, Clipboard contents, and messages back and forth without turning on file sharing.

No matter how you exchange files, when you take the PowerBook away from your desk, it must have the updated files you need. You can simply move a folder or group of folders, overwriting older documents, which is quick and easy to do if you need only a handful of files. But if you need to update many scattered files, the process can take considerable time—even over Ethernet—and you run the risk of forgetting to update some crucial files. That's where file-synchronization software comes in. Synchronization programs have not sold well—few PowerBook owners use them—but they do automate the

continues

update process and solve the problem of forgetting files during a manual update. Apple's File Assistant, included with PowerBooks, does basic synchronization. For a much more powerful set of features, including PowerPC native code, get PowerMerge from Leader Technology (\$129 list/\$79 street; 714/757-1787, leadertech@aol.com). And synchronization programs provide backup services as well.

As hard drives store ever more information, finding the right file has become a challenge. The Find File command in System 7 and particularly in 7.5 does a good job of finding files by name, but what about finding a file by its contents? Just where did you store a particular note? Sonar Text Retrieval, \$295 from Virginia Systems (804/739-3200), does an outstanding job of finding files by content. You can search by word and phrase with Boolean functions for any mounted disk, including file-shared disks. Sonar is fast because it indexes the files and folders that you specify; programs that find text by literally reading the entire contents of a

disk are far slower. Virginia Systems says Sonar can search 10,000 pages per second. The program runs on both 680X0 and Power Macs and reads the latest file formats. The more comprehensive Sonar Image includes support for graphics, making it a full-fledged document-management program. On Location from On Technology (617/876-0900), a simpler content-indexing and -retrieval program, has not been updated since 1992. Alki Seek at \$39.95 (Alki Software, 206/286-2600) will also search contents, but it is much slower since it does not index.

Communications via Infrared

VST offers an unusual two-part Airplex modem. One part is on a PC Card that communicates via infrared to the other part, which contains the actual modem. The initial version of the Airplex modem runs at 14.4 Kbps; a 28.8-Kbps version should be available in early 1996. The \$549.95 Airplex inevitably costs more than other modems, but it makes sense in offices where a single modem is likely to

accommodate multiple PowerBooks—at different times, of course, since it can handle only one at a time.

Recording Audio

MicMac version 3.1 from Nirvana Research (\$89; 408/459-9663) turns any PowerBook with a microphone or sound input into an audio recorder. You can mark and annotate specific points during recording for quick retrieval. It's much handier than carrying a separate tape recorder for meetings, conferences, or even telephone calls, provided you have sufficient disk space to store the recording. A minute of high-quality sound takes up about 1.2MB; highly compressed, low-quality sound uses only 200K.

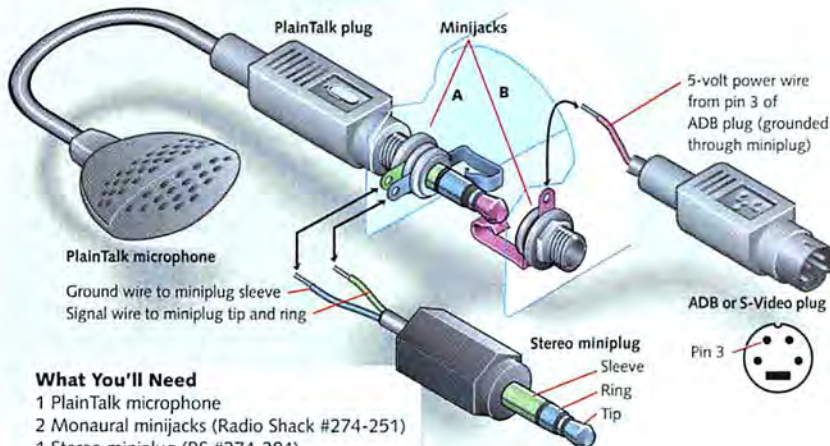
Although nearly all PowerBooks have a built-in microphone (the 100 and the 150 are the only exceptions), the audio quality leaves a lot to be desired. For some reason, Apple keeps putting the microphone near the screen hinge; a far better location would be at the top of the screen, as far as possible from the noisy hard drive and keyboard. For the best-quality sound, get an external microphone and place it as far away as possible from the PowerBook.

For all PowerBooks from the 140 through the 180 (except the 150), the audio-input plug is designed to take microphone-level signals from Apple's external microphone, which was bundled with some early PowerBook models. (See *PowerBook Notes*, March 1994, for more about microphones and audio connectors.)

Later PowerBooks—500's and 5300's—have line-level audio input, so a microphone signal must go through a preamp first. (The 190 lacks an audio-input jack.) Some electret condenser microphones can just barely deliver enough signal without a preamp to produce a weak recording. You really need a microphone with a built-in preamp; the only one available today is Apple's monaural PlainTalk mike. But the PlainTalk has an unusual, long plug with a power connection at the tip, and needs an adapter for use with a PowerBook. I know of no such product, but if you are handy with a soldering iron, you can make a cable adapter from standard components (see "A Recipe for High-Quality Audio").

A Recipe for High-Quality Audio

A PowerBook's audio-in port cannot accommodate a PlainTalk microphone either mechanically or electrically, and a cable adapter for the PlainTalk plug is impossible to find. You can, however, make your own by using two standard minijacks to mate with a PlainTalk plug. The minijacks must be open to allow the PlainTalk plug to go all the way through. The ADB port provides a convenient source of power.



What You'll Need

- 1 PlainTalk microphone
- 2 Monaural minijacks (Radio Shack #274-251)
- 1 Stereo miniplug (RS #274-284)
- 1 ADB plug or S-Video plug
- 1 Plastic container with two parallel sides (such as a tape dispenser)

- 1) Start with a plastic container whose sides are about 0.8-inch apart—the exact spacing depends on the minijack mounting. (A dispenser for 0.5-inch-wide tape works for Radio Shack minijacks.) Make two in-line holes, by drilling through both sides of the container, and mount the minijacks back-to-back in these holes. This will allow one minijack to contact the sleeve and ring of the PlainTalk plug and the other to contact the tip.
- 2) Ground: Connect minijack A's sleeve (which contacts the PlainTalk plug's sleeve) to the stereo miniplug's sleeve.
- 3) Microphone signal: Connect minijack A's tip

(PlainTalk plug's ring) to the stereo miniplug's tip and ring; the signal goes to both left and right channels.

- 4) Power: Connect minijack B's tip (PlainTalk plug's tip) to pin three of the ADB or S-Video connector. (The stereo miniplug provides the ground connection.) Use an ADB splitter if you're already using the ADB port for a mouse or another device.
- 5) Insert the stereo miniplug into the PowerBook's audio-in port and connect the ADB plug.
- 6) Open the Sound control panel. Select Sound In (from the pull-down menu), click on the Options button, and then click on Line In.

A Closing Note

This is the 36th and final *PowerBook Notes* column. I will continue writing about PowerBooks elsewhere in *Macworld*. ■

CARY LU is a *Macworld* contributing editor who, for the past three years, has covered mobile- and remote-computing trends in this monthly column. Look for his articles on a variety of topics in future issues of *Macworld*.

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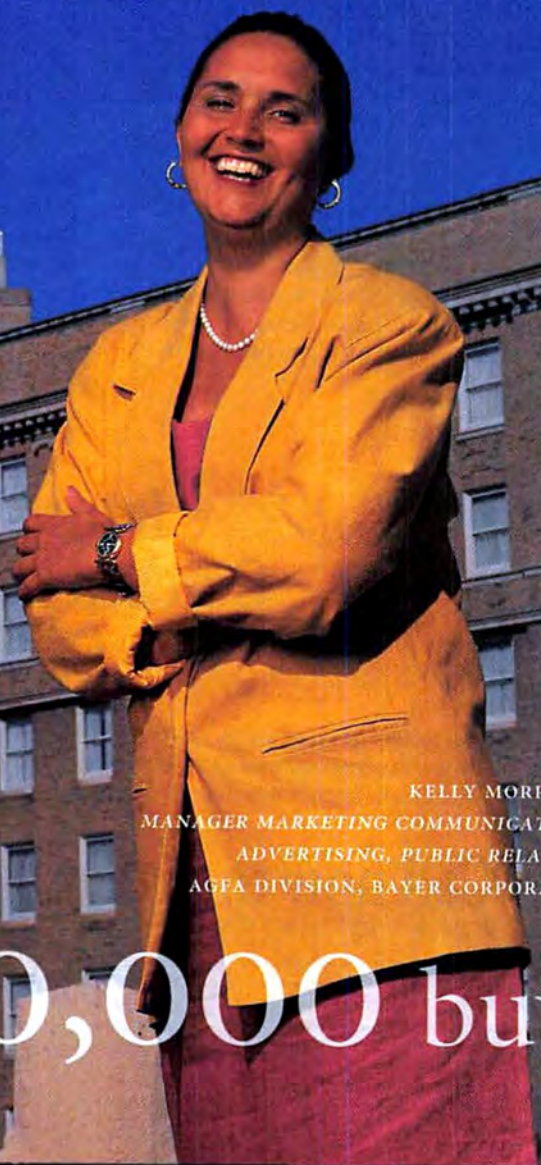
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Let's Do Launch

Launcher—and other icon-launching pads

DID YOU EVER THINK LAUNCHER was designed for toddlers and technophobes? I did. There it floated on every Performa: a window containing oversized application icons that would open with a single click, for those who found double-clicking too tricky a task.

When Apple actually incorporated it into System 7.5, I realized that there must be a lot more to Launcher than I had imagined. I tried it—and loved it.

With my most frequently used icons always handy, I spend less time burrowing into folders. Yes, yes, I know the Apple menu can serve the same purpose; but that one-click-to-launch business is a lot less effort. I know, too, that I could build my own launchpad by putting a bunch of aliases into a window, but seeing my stuff safely ensconced in a solid, symmetrical, space-saving station is much more satisfying to my psyche.

But Apple's Launcher isn't the only launcher—nor the best. Here are nine cases in point. (Because most of these programs offer one set or another of the same features, I'll conserve paper by referring to them by number.) Unless otherwise noted, the launchers all work alike: you drag favorite folders, programs, documents, disks, and other icons onto a floating palette, where they turn into tiles you can click for quick future access (either to launch a program or—if it's already open—to switch to it). Note that most of these launchers require System 7.5 or later to realize all this drag-and-drop joy.

Launcher 2.7

As I've said, today's Launcher (in System 7.5.1 or later) is nothing to sneeze at. You can change icon sizes by ⌘-clicking anywhere in Launcher's window. You can install an icon by dragging it there and remove it by option-dragging.

Best of all, Launcher offers one feature still unmatched by any of its rivals: *pages*. You can flip effortlessly among several screens full of Launcher icons by clicking on the appropriately named, color-coded topic buttons at the top of the

window. You can have up to eight pages, and the names are up to you.

So what's not to like? Well, Launcher is slow; when you change pages, even on a Power Mac, you watch the icon buttons paint themselves across the screen. And it's a control panel, not a conflict-free application. And there's wasted space: a fat margin between all your tiles. Since many of the superior, rival programs are free, what are you waiting for?

The Tilery 3.1

Applicon, the application-switching masterpiece from Rick Holzgrafe (Semicolon Software), has become The Tilery, and it's one of the sweetest and simplest launchpads in existence. Whenever you want to

some strange reason, you can't turn *disks* into tiles, depriving this launcher of one potentially terrific feature—the ability to mount a network hard drive onto your screen with a click. But this is the only program that lets you drag your tiles freely around the screen, scattering them all over your desktop if you're so inclined.

Malph 2.4.1

Nitin Ganatra's Malph is nearly identical to The Tilery: it's free, uses only 150K of RAM, and uses different tile colors to indicate launched programs. It adds, however, a second palette that controls Malph itself: tiles for adding a program, deleting it, quitting, and so on. I love being able to quit programs by remote control (feature

13), but I'd prefer not to have to stare at a separate palette for the privilege. Malph also offers features 2, 7, 12, and 15.

HoverBar 1.2.4

I wish that all the launcher programmers would scurry back to the compiler and add HoverBar's neatest feature to their creations: when you click on a tile while pressing a specified key, you *quit* that program instead of launching it. I also like the fact that you can summon or dismiss HoverBar's palette with a keystroke (although I wish it could hide itself after a launch). This shareware launcher (Guy Fullerton;

\$5) is crawling with neat productivity features, such as a hidden palette-control pop-up menu.

But despite its inclusion of features 6, 9, 10, 13, and 15, I'm afraid this icon dock won't hover for very long on *my* screen. It lacks one whoppingly important feature: the icons in the palette don't show their names! To identify what you're about to open, you must point to an icon. When you're looking at a bunch of identical folders, that's about as inconvenient as life gets. A rare example of a dock missing the boat.

continues



open something on your palette, or to switch between open programs, just flick your mouse into a designated corner of the screen; The Tilery tiles pop to the foreground. You'll probably never use your application menu again.

That's feature number 7 on the Launcher Feature Table. The Tilery also offers 2, 6, 11, 12, and 15—not bad for a freebie. And feature 14: in a stroke of design brilliance, the tiles of launched programs appear in a different color.

Two unusual aspects of The Tilery merit mention, one good and one ill. For

DragThing 1.0.2

Shareware programmer James Thomson doesn't want postcards or cash as payment—instead, you're asked to send the author "cool stuff."

No problem. DragThing is a gorgeous, feature-laden productivity enhancer. Typical design cleverness: drag the palette's edges to reshape it. Make it bigger than your existing group of tiles, and blank tiles appear, ready for loading up. To remove tiles, just drag them to the Trash. If you press certain keys while clicking on tiles, you access various useful hidden functions: getting info on an icon, opening its Finder window, and so on.

I have two small gripes. First: If you want to know what programs are running, you must consult a second palette (instead of a cleaner, color-coded approach). Second: DragThing itself takes way too long to launch. Still, you get features 1, 2, 5 through 7, 12, 14, and 15. Cool stuff.

PowerBar Pro 2.0

When shareware and commercialware collide. On the next *Oprah*.

This labor of obvious love, from Scott Johnson (Trilobyte Software), offers power-user features usually found only in commercial launchers. Example: You get handy Finder-action tiles, such as Move to Trash, Empty Trash, and Restart. Tiles can launch QuickKeys macros, System 7.5's Control Strip modules, or even other PowerBar palettes. You're offered dozens of stunning tile styles (colorized, 3-D, and so on). And if you hold the mouse down on a folder tile, a pop-up menu shows everything inside. In other words, you get features 1, 2, 4, 6 through 13, and 15. It's loaded.

Launcher Features

1. Accelerated for Power Mac
2. All icons can show their names
3. Can launch program groups with one click
4. Can launch QuickKeys macros
5. Collapsible launcher windows
6. Freedom of icon placement on palette
7. Launcher to foreground when cursor in screen corner
8. Lets you colorize individual tiles
9. Lets you open multiple palettes at once
10. Pop-up menu on each tile (to see documents and so on)
11. Renameable palette icons
12. Space-saving skinny-layout option
13. Special tile-click for quitting programs
14. Type name to select icon
15. Visual cues show which programs are open

By this time, my two quibbles are perfectly predictable. I wish PowerBar didn't require a separate palette for open programs, and I wish it could display all tile names all the time (instead of just in the jumbo-icon view). Still, definitely send in your \$25 for this impressive piece of work. You'll have to: otherwise, the program expires after 30 days.

PowerLaunch II 2.0.1

Featurewise (3, 4, 6, 7, and 10), this odd-ball program has a lot going for it. It offers Launcher-like pages. And clicking on a single tile launches a flotilla of associated programs. Some of PowerLaunch's quirky featurettes are useful, too, such as the ability to schedule self-launch times for certain programs. But there's more to a great boat than a big engine, and this one needs some bodywork. You can't see your icons' names until you point at them (*sigh*), and you can't change tile sizes or colorize tiles. And, incredibly, you can't create document- or folder-launching tiles—only programs. Looks do count, after all.

VersaTile Pro 1.6.2

Boy, if you don't like *this* launcher's looks, it's your own darned fault. It actually has a layout *editor*, so you control the palettes' size, arrangement, color, and so on.

Rick Christianson's cleverly named \$20 shareware launcher even lets you associate a custom palette with a specific program, displaying it automatically when the program opens. The pop-up menu of each folder tile gives you quick access to everything inside. You can perform ten Finder functions (Make Alias, Print, Get Info, and so forth) directly from the palette. A fast, clean, and somehow intelligent-seeming program—with features 1 through 3, 6, 7, 9, 10 through 13, and 15 in the bargain.

DragStrip 2.0.1

Since the shareware world offers such an embarrassment of riches in the launcher department, offering a commercial utility takes either a lot of nerve or a really great product. Natural Intelligence has both (617/876-7680; \$59.95).

DragStrip is PowerPC accelerated, great looking, and AppleScript savvy. Its surprisingly lean design doesn't incorporate every feature in the world—you wish it could quit programs, too—but it's fairly robustly packed with 1 through 3, 5 through 12, 14, and 15. You can colorize almost every aspect of every tile (except the text of your icon names), and DragStrip uses a different color to indicate open programs. (Hurrah!) Specialized tiles do things like change speaker volume or monitor settings, pop up a calendar, or, interestingly, route a drag-and-dropped

file to a predefined destination folder. This is the most expensive launcher on the market, but you get what you pay for.

Square One 3.0

If you see some big waves coming, it's probably the wake of Square One, the beefy king of power launchers (Binary Software, 310/449-1481; \$44.95). Newly revved to version 3.0, this program calls out to the techies among us: its tiles can open not just files, folders, and programs, but macros made by AppleScript, QuickKeys, and even KeyQuencer (shareware). Internet trekkers will love being able to list and launch favorite URLs (Internet locales) right from the palette (requires Internet Config, freeware). Version 3.0 lets you quit or relaunch the Finder for the sake of RAM, too. In short, Square One offers 13 out of the 15 features in the table (it lacks only 5 and 11).

Square One's most unusual palette element is an optional side panel. If you click on a folder tile, this panel lists the files within; click on a program tile, and the panel shows its most recently opened documents. Another Square One exclusive: when creating your palette, the program offers to show you *lists* of your launchables (programs, QuickKeys, sounds, and so on)—instead of making you root around your hard drive looking for stuff to include.

These technical smarts demand 500K of RAM (more than three times The Tilery's appetite), and you must install a system extension to get all the features. Still, Square One's array of high-end features shows just how far we've come since the days when the Launcher represented a crutch for the technically challenged.

The Upshot

No E-mails asking where to get the shareware programs listed here, please: you can download them from America Online (they're in the Macworld Software library in the Mentioned in Macworld folder); they're also available from our Web site (<http://www.macworld.com>).

Having to choose a favorite in this classy cornucopia is like choosing whether you want your lottery winnings in \$10 or \$20 bills; it's all gravy. Take The Tilery for sweet simplicity, or Square One if you traffic in techier topics; PowerBar, DragThing, or Versatile are terrific in between. For a great screen-clutter-to-features ratio, I'll take DragStrip. That's right: there's a new launcher at my pad. **m**

Contributing editor DAVID POGUE is something of a launcher himself, having shot into the world *Macs for Dummies*, *Macworld Mac FAQs*, and (with Joseph Schorr) *Macworld Mac and Power Mac Secrets*, third edition (IDG Books Worldwide).

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Need a Hand?

Tap into the expertise of user groups

T IRED OF HEARING YOUR NON-Mac friends talk about the wonders of Windows 95? Sick of being on hold for technical support? Looking for a computer salesperson who actually knows something about the Mac? If so, it's time for you to hook up with your local Macintosh user group (MUG).

A user group's purpose in life is to give away help, advice, and information. My local group, the Los Angeles Macintosh Group (LAMG), states this mission: "We are Macintosh computer users who have joined together to help one another use the Macintosh as productively and pleasurably as possible." Most user groups are nonprofit organizations, run by volunteers, and mostly supported by tax-deductible donations. There are also user groups within corporations, government agencies, and educational institutions; and ones that focus on a particular software program, such as the national ClarisWorks User Group. All told, there are more than 2200 Mac groups in the United States and Canada. Chances are, there's one near you.

What Do You Get?

User groups provide a menu of services. Chief among these are meetings where the members help each other with thorny hardware and software problems, see presentations on new products by vendors, and socialize with their fellow Mac aficionados. MUGs usually have a large monthly meeting with one or more vendor demonstrations, and several smaller monthly meetings of special interest groups (SIGs). SIGs focus on specific topics; for example, there might be a SIG devoted to desktop video, or one for users who develop databases in Claris FileMaker Pro. SIG meetings are usually the best place for users to get detailed questions answered, as they're more informal than the main meetings, and they're packed with other members who are experts in the SIG's topic. Virtually all MUG meetings are open to the public, although the groups would, of course, prefer that you become a member. At the main meetings, the presenters usually

donate a few copies of their product, which the group then raffles off, with the proceeds benefiting the group. Often these prizes are quite valuable; at recent meetings, LAMG raffled a Mac clone from Power Computing and more than 50 copies of various Claris products.

Most groups also have a monthly newsletter, allow access to a library of shareware, and provide low-cost classes on a wide variety of topics. Newsletters contain club news, product reviews, and advice; they range in size from a few xeroxed pages to BMUG's (a Macintosh user group in Berkeley, California) biannual 400-page book. Some groups, such as the Arizona Macintosh Users Group, sell their shareware libraries on CD-ROM, and market their products via mail order and the Internet. MUG members

alternatives for people who can't get to the Macworld Expos in San Francisco or Boston. Less expensive, too.

Such a Deal

Membership dues are fairly inexpensive, ranging from \$35 a year for the San Diego group to \$49 a year for the Boston Computer Society. Your dues usually get you a newsletter and access to the group's meetings and BBS. Classes and products (if any) are usually extra.

Two MUGs are known for their worldwide presence: BMUG, and BCS•Mac, the Boston Computer Society's Mac division. BMUG claims more than 12,000 members in over 50 countries; BCS•Mac boasts 9000 members. Should you join a large national group? You're usually better off with the local group, especially if you want technical support. Local doesn't always mean small: LAMG has more than 5000 members, and Chicago's The Rest Of Us tops 2000. Most groups, however, have about 300 members, so you're not likely to be lost in the crowd.



have access to a bulletin board system (BBS) run by the group and can download software and post questions and comments. These BBSes can be small, with just a few phone lines and small chat areas, or large, with gigabytes of downloadable software, Internet access, and dozens of discussion forums handling hundreds of messages per day.

Many user groups also hold yearly regional trade shows. NYMUG, the New York City group, holds its MacFair event every March, and LAMG puts on MacFair LA in May. These events are great

you have Internet access, you can find groups via the World Wide Web. Apple's Web page is at <http://www.apple.com/documents/usergroups.html>; another page, which is at <http://www.ugconnection.org/>, is maintained by the User Group Connection, an independent spinoff from Apple that promotes user groups for the Mac, Newton, PC, and Apple II. Another good place with MUG listings is the Yahoo index <http://www.yahoo.com>, in its Computers and Internet section.

—TOM NEGRINO
continues

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*Test conducted on a Power Macintosh 8100/100AV for PowerCADD 2.0 and a Macintosh Quadra 630 for PowerDraw versions.

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Macworld October 1995

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MacUser October 1995

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MacWEEK July 10, 1995

"...a 1.4 MB (PowerCADD) file on the Power Mac updated more than two times faster on the Power Macintosh (redraw speed of five seconds)."

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Letters

Returning Apples On July 3, 1995, I ordered a factory-refurbished Performa 6115CD and a factory-refurbished Multiple Scan 15 monitor from Creative Computers' MacMall. When the computer booted up, I saw bizarre-looking color bleeds all over the screen. I immediately called MacMall and spoke to a customer-service representative, who was courteous and helpful. He arranged to exchange the monitor for another one.

Then I tried to install some software from a floppy that was apparently unreadable. I inserted a blank disk and attempted to initialize it, but the computer spit it out too and said it was damaged. Both disks worked fine in my other computer [a Performa 6115]. After several calls to MacMall and a lot of time on hold, a representative told me to ship the CPU back and the company would repair it.

I told MacMall I preferred to exchange both the CPU and the monitor for a new Performa 6115CD system and I would gladly pay the difference. MacMall explained that I could not return the factory-refurbished CPU even though it arrived broken. MacMall repeatedly said there was nothing they could do, short of referring me to Apple, so I immediately called my credit card company, who issued an instant credit to my account.

Matt Talbott
Napa, California

Three weeks later we heard from Matt again:

My credit card company advised me that since MacMall had failed to respond within 45 days, the credit to my account was permanent. I still have the merchandise. Strangely, MacMall refuses to accept the defective merchandise.

Among the mail-order houses I contacted, the repair policies vary only slightly. The mail-order companies all fall back on Apple for repairs or replacements of Apple hardware.

A couple of illustrations: *Macworld* received two similar letters of complaint about returning defective equipment. William Salem ordered a new monitor from a mail-order house, but when it arrived it was so out of focus that text was illegible and he could not discern the different icons. After much ado, Apple replaced the monitor with a refurbished three-year-old model. It wasn't even refurbished cosmetically: it arrived with spray paint on the back of the monitor, the rubber feet were dirty and torn, and the swivel base was missing. Apple insisted that the replacement conformed to its limited warranty. The other customer, Randall Thompson, couldn't get his \$6500 Apple Color LaserWriter 12/600 PS to work. The mail-order house provided a new photo-conductor cartridge, but as problems continued, the company recommended that Thompson talk direct-

SERVICE HERO

Farallon Computing treated Walter McWhorter with respect, honesty, and efficiency when his company upgraded its Mac network to 10BaseT Ethernet using Farallon cards and a Farallon hub. For a few weeks the hub operated smoothly. After an employee switched some circuit breakers on and off for reasons not related to the network, the hub no longer worked. When technical-support calls did not solve the problem, Farallon suggested returning the hub for evaluation. The next day, McWhorter received a new hub even though his problem was not necessarily covered by the warranty. McWhorter sends kudos to Farallon for going above and beyond the call of duty.

ly to Apple. After six weeks and three trips to an Apple service rep, the printer still doesn't work and Apple has not replaced it yet.

Buying refurbished equipment can be a good idea, but be aware that the company you buy your equipment from will not take care of all your service needs. We recommend you know the specifics of the return and support policies of not only the mail-order house, but also the manufacturer. (Note: Some factory-refurbished equipment is not returnable, and unless it's specifically advertised with a money-back guarantee, no such equipment can be returned for a refund. Defective equipment will be repaired or replaced in accordance with its warranty.) Follow the same rules as for any purchase: order with a credit card and get repair, replacement, and warranty policies and money-back requirements in writing before any purchase.—GREGORY S. SMITH

TOM NEGRINO is a *Macworld* contributing editor and a vice president of LAMG. He is coauthor (with fellow contributing editor Charles Seiter) of *Macworld Essential Web Secrets* (IDG Books Worldwide, 1995).

GREGORY S. SMITH is a San Francisco-based computer consultant, author, and frequent shopper at computer stores throughout the country.

Next month: How to maximize your MUG's services

Not getting the treatment you deserve? Or have you received heroic service? Write to the *Conspicuous Consumer* department at *Macworld*, 501 Second St., San Francisco, CA 94107; send us a fax at 415/442-0766; or E-mail us at macworld@macworld.com. Look for us on America Online (keyword **Macworld**) and on the World Wide Web (<http://www.macworld.com>).

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Editors' Choice

THE BEST PRODUCTS FEATURED IN MACWORLD

Edited by Patricia Carberry-Harris

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

DIGITAL RECORDING AND EDITING

HARDWARE/SOFTWARE PACKAGES, Dec 95

Low-End: Audiomedia II; Digidesign, 415/688-0600; \$1295.

High-End: Pro Tools III Core System; Digidesign, 415/688-0600; \$6995 (this price does not include the required interface).

MONITORS

17-INCH MONITORS, Oct 95

17B; Philips Consumer Electronics, 800/835-3506; \$899.

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 4FG; 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 BUSINESS PRINTERS, Sep 95

Tektronix Phaser 340; Tektronix, 503/682-3411; \$5590.

DYE-SUBLIMATION PRINTERS FOR PUBLISHING, Jan 96

Low-End: Fargo Pictura 310; Fargo Electronics, 612/941-9470; \$4995, with CPSI \$5794.

High-End: 3M Rainbow 2720; 3M Printing and Publishing Systems, 612/737-6501; \$18,500.

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: ♦ Opra Lx; Lexmark, 606/232-2000; \$3298.

♦ LaserWriter 16/600 PS; Apple Computer, 408/996-1010; company's estimated price \$2299.

SCANNERS/IMAGE CAPTURE

PROFESSIONAL REAL-TIME FILMLESS CAMERAS, Sep 95

Fujix DS-515/Nikon E2; Fujii, 914/789-8100; Nikon, 516/547-4200; \$12,780; with optional lens and PC Card \$14,140.

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: 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, 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.

DOS/WINDOWS CARDS, Sep 95

Most 040 Macs: DOS on Mac; Reply, 408/942-4804; 50MHz model \$590; 66MHz model \$690.

Most Power Macs: OrangePC Model 220; Orange Micro, 714/779-2772; \$1217 direct price.

Occasional Windows Access: Timbaktu; Farallon Computing, 510/814-5100; \$199 per user.

HIGH-PERFORMANCE DRIVE SYSTEMS, Jul 95

Accelerator card: SiliconExpress IV; Atto Technology, 716/691-1999; \$995.

Drive mechanism: IBM UltraStar series; IBM (this drive mechanism is available from several resellers); prices vary by reseller.

QUAD-SPEED CD-ROM DRIVES, Jun 95

APS T3501; APS Technologies, 816/483-6100; \$299.95.

RAID STORAGE SYSTEMS, Apr 95

RAID 3 or 5: MR/5 RAID; MegaDrive Systems, 310/247-0006; \$18,840.

RAID 0: ♦ Joule RAID; La Cie, 503/520-9000; \$1999. ♦ DiskKover 8200W; Optima Technology, 714/476-0515; \$7790.

♦ 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 BMB 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.

DIGITAL-VIDEO BOARDS, Aug 95

Spigot-Power AV; Radius, 408/434-1010; \$999. *continues*

Editors' Choice

HIGH-END VIDEO EDITING, Jun 94

Presentation video: ♦ MoviePek2 Pro Suite; Raster-
Ops, 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/
586-2200; \$199.

Home office/personal finance: MacMoney; Survi-
vor 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 De-
scription, 607/257-1000; \$595. ♦

Comprehensive package: SYSTAT 5.2.1; SYSTAT, 312/
329-3500; \$895.

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 Win-
dows; Farallon Computing, 510/814-5000; \$199 each. ♦

INTERNET BROWSERS, Oct 95

Netscape Navigator; Netscape Communications, 415/528-
2555; \$39. ♦

PROTOCOL ANALYZERS, Jul 94

EtherPeek; AG Group, 510/937-7900; \$795.

TERMINAL EMULATOR, Oct 93

VersaTerm; Synergy Software, 215/779-0522; \$149.

DIGITAL RECORDING AND EDITING

SOFTWARE-ONLY PRODUCT, Dec 95

Deck II; OSC, 415/252-0460; \$399.

GRAPHICS

3-D MODELING, Dec 94

Stand-alone modeler: formZ; autodesys, 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 Graph-
ics, 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 Image-
Base, 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.

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; Letra-
set, 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, Nov 95

ClarisWorks 4.0; Claris, 408/727-8227; \$129. ♦

ONLINE SERVICES

ONLINE SERVICES, Aug 94

E-mail: America Online; America Online, 703/893-6288;
basic monthly fee \$9.95.

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.

Reference: CompuServe; CompuServe Information Ser-
vice, 614/457-0802; basic monthly fee \$8.95.

ORGANIZATION/PRODUCTIVITY

GRAPHING SOFTWARE, Aug 94

DeltaGraph Pro 3 3.0.4; DeltaPoint, 408/648-4000;
\$195. ♦

SALES-AUTOMATION SOFTWARE, Oct 93

♦ Contact Ease; WestWare, 615/274-5053; 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.

Multuser 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; Common Ground Software, 415/802-5820;
\$189.95.

Book-length documents: FrameReader; Frame Tech-
nology, 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, 415/
571-5100; \$99.

Memory-boosting software: RAM Doubler 1.0.1;
Connectix, 415/571-5100; \$99. ♦

WORD PROCESSORS

**HIGH-END WORD PROCESSOR (for fast 68040 Macs and
Power Macs), Mar 95**

Microsoft Word 6.0; Microsoft, 206/882-8080;
\$325. ♦

LOW-COST WORD PROCESSOR, Mar 95

MacWrite Pro; Claris, 408/727-8227; \$99. ♦ 

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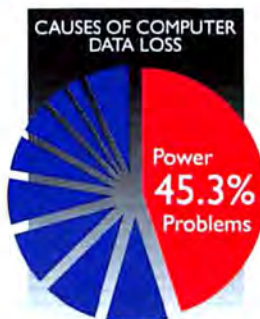
New Back-UPS: reliable power for your Mac

Just don't have the time for power problems on your Mac? Don't worry. They'll make 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.

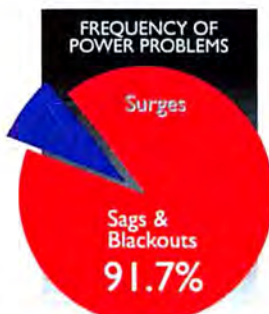
**IN THE NEXT THREE MONTHS,
MORE THAN 30,000,000 PCs WILL BE HIT
BY POWER PROBLEMS...**

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 escaping 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 peace of mind.

Add APC's PowerChute® and you also get the security of graceful, unattended safe shutdown. Whether your running System 7.5 on your PowerMac, Quadra, IICI or on any other Mac system, PowerChute will shutdown your system and your applications in the event of an extended power failure.

APC UPSs carry up to a \$25,000 lifetime guarantee against surge damage to your properly



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."





The
Power Protection
Handbook

Protect Your Mac. **FREE** 60-page Power Protection Handbook

What are the myths and musts of Mac protection? What are the 10 most common power protection mistakes? The top tips for adding reliability to your LAN? Get your FREE copy and find out!

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- NO!** But I would like a FREE Handbook.

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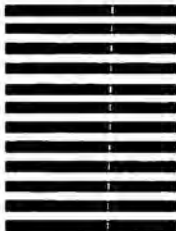
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connected equipment, and can suit any application, from servers and PCs, to fax and satellite systems.

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. Starting at \$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"

MacUser "If you have a server and don't have a UPS, you're playing with fire."



Back-UPS FEATURES

- ▶ Unmatched surge/lightning protection for maximum hardware safety
- ▶ Site diagnostics automatically spot missing ground and reversed polarity
- ▶ LAN signaling allows simple shutdown with interface kits (400 and above)
- ▶ User replaceable, hot swappable batteries insure uptime safe disposal
- ▶ \$25,000 lifetime Equipment Protection
- ▶ 10 minute runtime with specified applications. For longer runtimes choose next largest unit.

Model	Application	Sugg. List
200	Desktop systems	\$119
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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
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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

- ★★ **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 inexpensive and offers well-done annotation tools. However, it's resource-intensive, and creating hypertext documents with it isn't easy. Mar 95
- ★★★★ **BizPlan Builder 5.0, Jian, 415/254-5600, \$129.** To create a comprehensive business plan, just fill in the blanks in this easy-to-use spreadsheet/word processor template. Jun 95
- ★★★ **Business Plan Writer 6.0, Graphite Software, 301/984-1100, \$99.** This proposal-writing template can help entrepreneurs create a detailed business plan, but—unlike the competition—it won't help them format an attractive presentation. Jun 95
- ★★★★ **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 
- ★★★ **Equate 1.0, Holosoft, 408/748-9648, \$99.** Newton spreadsheet allows you to import Microsoft Excel files, but you'd have to be very patient to set up stand-alone worksheets. Oct 95
- ★★★★ **Helix Express 3.03, Helix Technologies, 708/465-0242, \$589.** Latest release of this visually-oriented database adds speed and features—including conditional branching capabilities and improved forms-drawing tools—without raising RAM requirements. Sep 95

- ★★★ **InfoDepot 2.0 (2.3), Chena Software, 610/770-1210, \$295.** Project-planning program 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
- ★★★★ **MapInfo 3.0, MapInfo, 518/285-6000, \$1295.** Versatile mapping program that enables you to geocode the geographical data in a database, conduct spatial analyses, and create presentation graphics. Oct 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
- ★★★★ **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 
- ★★★ **PhoneDisc 95 PowerFinder, Digital Directory Assistance, 617/639-2900, \$249.** Now, where did you put Aunt Ida's phone number? Never mind, it's on this CD-ROM telephone directory (assuming the dear old thing doesn't have an unlisted number). Oct 95
- ★★★ **Phyla 1.0.3, Mainstay, 805/484-9400, \$495.** While nonprogrammers can learn to use this object-oriented database, a little SmallTalk or C++ programming background wouldn't hurt. Aug 95
- ★★★ **QuickFigure Pro 2.1, PelicanWare, 503/221-1148, \$49.95.** This Newton spreadsheet is fast, easy to use, and has a respectable set of functions. Oct 95

COMMUNICATIONS/NETWORKS

- ★★★★ **Apple Mobile Message System, Apple Computer, 408/996-1010, \$549 plus \$19.95 per month.** The medium for your messages can be a PowerBook, Windows notebook, or Newton with this multifaceted remote-messaging service. Keep in touch with a personal 800 number, voice and fax mailboxes, and an Internet E-mail address. Sep 95
- ★★★★ **ASAP 1.5, MicroBeam, 813/546-2727, \$695; \$795 with Windows client program.** File-transfer operations can be a nightmare. Or they can be a dream with this convenient utility. It's easy to set up and its performance is first-rate. Sep 95
- ★ **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
- ★★★ **Claris E-mailer 1.0, Claris, 408/727-8227, \$89.** If your electronic in-box is overflowing, you'll appreciate this E-mail-management program, which can manage mail over multiple online services. It has a few rough edges, but it offers an impressive suite of features at a good price. Dec 95 
- ★★★ **CreativePartner, emotion Inc., 415/812-9000, \$1500.** Creative collaboration goes digital with this distribution system for video, sound, text, and graphics. Although the system provides a clever way to send annotations over a network, our reviewer wished for either a higher number of features or a lower price tag. Jul 95
- ★★★★ **FileWave 2.1.2, Wave Research, 510/704-3900, \$895.** Maintain a central repository of files and distribute application updates to LAN users with this easy-to-use software-distribution tool. Excellent features include file distribution during idle time and the ability to copy-protect transferred files. Jul 95
- ★★★ **GrabNet 1.0, ForeFront Group, 713/961-1101, \$19.95.** Inexpensive utility captures entire Web pages—including URLs—or selected text and graphics. Nov 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 pricey and feature-poor. Apr 95
- ★★★★ **MacAdministrator, Hi Resolution, 508/463-6956, \$395 (10-user pack).** Network administrators can use this well-designed group-administration tool to control and monitor hardware and software access. Dec 95
- ★★★★ **Netscape Navigator, Netscape Communications Corporation, 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
- ★★★★ **ProTerm Mac 1.0, InTrec Software, 602/992-5515, \$129.95.** This communications program offers a level of sophistication that belies its small size and ease of use. It's fast, reliable, and stable, and is suitable for simple BBS connections or sophisticated scripting. Jul 95
- ★★★ **QuickMail 3.0, CE Software, 515/221-continues**

Star Ratings

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., 201/529-4600, \$199 to \$2499.** System extension endeavors to pump up file-transfer speeds across 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

★★★★ **Saber LAN Workstation, Saber Software, 214/361-8086, \$199 plus \$49 per node.** LAN-management package includes programs for network administration and remote software updating. Although it lacks some of the niceties of network-management software for other platforms, it's a useful tool for the price. Aug 95

★★★★ **Skyline/Satellite, AG Group, 510/937-7900, 1-station pack \$795; 5-station pack \$1195; 10-station pack \$1995.** Remote monitoring engines keep an eye on LAN traffic, using the Mac's Ethernet port. It's a great system, but for large LANs the price can go sky-high. Sep 95

★★★★ **SnapMail 2, Casady & Greene, 408/484-9228, \$250 (5 users); \$420 (10 users); \$1940 (50 users).** Easy setup, simple administration, and a slew of new features make this an attractive E-mail package. Its gateway interface could use some improvement, though. Dec 95

★★★★ **Snatcher 1.0, Software Ventures, 510/644-3232, \$49.95.** FTP tool lets you connect to multiple sites simultaneously, transfer several files at once, and create scripts to automate repetitive tasks. Happily, you can continue to browse while downloading. Aug 95

★★ **TurboTalk 1.0, Information Presentation Technologies, 805/541-3000, \$160 to \$495.** This file-transfer utility speeds up network operations, but with many configurations the improvement is negligible. Oct 95

DESKTOP PUBLISHING

★★★★ **Adobe PageMaker 6.0, Adobe Systems, 206/622-5500, \$895.** Page-layout pioneer has been discreetly but thoroughly overhauled. More than 50 new features deliver high-power layout, typographic, and color capabilities that put it on a par with the competition. Nov 95

★★★★ **ColorDrive 1.0, Pantone, 201/935-5500, \$199.** Centralized color-management software supports a broad range of color models, but accuracy isn't consistent. Nov 95

★★★★ **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

★★★★ **FrameMaker 5.0, Frame Technology, 408/975-6000, \$895.** Despite a quirky interface, this is still the page-layout program of choice for complex technical documents, especially if they include multipage tables. This version lets you create sophisticated hypertext documents. Nov 95

★★★★ **Icefields 2.3, The Color Partnership, 619/259-8688, \$895.** Stochastic-screening software offers an alternative to traditional halftones. Although it doesn't support object-oriented graphics or hi-fi color, it's an effective, inexpensive tool. Nov 95

★★★★ **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

★★★★ **theTypeBook 4.0, Rascal Software, 805/255-6823, \$59.95.** The manual needs work, but this type-specimen generator provides enough customization options to make it a worthwhile purchase. Jun 95

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 damned hard to keep alive. Only two varieties of fish are included. Jan 95

★★ **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

★★★★ **The Daedalus Encounter, Virgin Interactive Entertainment, 714/833-8710, \$59.95.** You've been blown to smithereens and your brain has been stuffed inside a robot. Don't you hate it when that happens? Escape from a doomed spacecraft in this interactive adventure. Sep 95

★★ **Digital Chisel 1.2, Pierian Spring Software, 503/222-2044, \$199.95, site license \$995.** If I had a Chisel, I'd Chisel out some quizzes; I'd say how easy this is—no I wouldn't. Ahem. What I mean is: this authoring tool lets educators create interactive quizzes, but suffers from a nonstandard interface. Jun 95

★★ **FrenchNow 3.0, Transparent Language, 603/465-2230, \$99 to \$129.** It could use a little polish, but this French-instruction tool provides a well-designed interface and lively, high-quality texts. Dec 95

★★ **Haight-Ashbury in the Sixties, Compton's NewMedia, 619/929-2500, \$49.95.** Turn on, tune in, and drop \$49.95 for a multimedia refresh of the San Francisco sixties. Sorry, but it's hard to capture those heady days in only 9 music snippets and 17 video clips. Dec 95

★★ **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

★★★★ **The Lost Mind of Dr. Brain, Sierra On-Line, 206/649-9800, \$44.95.** A wise-guy rodent tries to trip you up as you solve a series of hilarious and challenging brainteasers. Oct 95

★★★★ **Material World, StarPress Multimedia, 415/274-8383, \$59.95.** This multimedia CD-ROM provides a fascinating look at diverse cultures from around the world by documenting the lives of average families. Jun 95

★★★★ **Math Workshop, Broderbund Software, 415/382-4700, \$40.** Youngsters can have some fun while learning math with this collection of math-related and problem-solving games. Six-to-nine-year-olds will enjoy activities like Rhythm Shop and Bowling for Numbers. Aug 95

★★ **Merriam-Webster's Collegiate Dictionary on CD-ROM, Merriam-Webster, 413/734-3134,**

\$69.95. Except for its search capabilities, this dictionary doesn't offer much that sets it apart from its \$6 paperback counterpart. Definitely not the last word in CD-ROM-based dictionaries. Nov 95

★★★★ **Nile: Passage to Egypt, Discovery Channel Multimedia, 301/986-1999, \$49.95.** Armchair travelers will enjoy this CD-ROM cruise down the Nile. You can even keep a journal and take snapshots. Oct 95

★★★★ **Passage to Vietnam, Against All Odds Productions/Interval Research, 800/558-3388, dept. 100, \$39.95 to \$59.95.** This exceptional CD employs the work of 70 renowned photographers to create a hauntingly beautiful portrait of Vietnam. It also includes seamlessly integrated music, video, and text. Dec 95

★★ **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

★★★★ **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

★★★★ **Theorist 2.0, Waterloo Maple Software, 519/747-2373, \$299.** Despite an occasionally odd interface (for example, a hammer icon), this symbolic-math program is a great learning aid for students. Jun 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, and three flight simulators. Mar 95

★★★★ **Widget Workshop, Maxis Software, 510/254-9700, \$44.95.** Fendishly 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 it's cool. Apr 95

FINANCE/ACCOUNTING

★★★★ **Managing Your Money 7.0, MECA Software, 203/255-1441, \$79.95 (floppy); \$99.95 (CD-ROM).** Personal financial software's advanced investment features make it a good choice for sophisticated investors, while the CD-ROM's instructional articles are a plus for those who are new to computerized money management. Oct 95

★★★★ **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

★★ **QuickBooks 3.0, Intuit, 415/322-0573, \$119.** Full-featured double-entry accounting program is easy to use, but its operation is not entirely Mac-like and its cryptic error messages may cause you to ignore serious problems. Jun 95

★★★★ **Quicken 5.0, Intuit, 415/322-0573, \$49.95.** 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 to save on brokerage fees, you should seriously consider this financial investment software. Feb 95

GRAPHICS

★★★ **AddDepth 2.0, Ray Dream, 415/960-0768, \$99.** If your text and graphics are looking a little flat, you can extrude them with this 3-D effects program. New routines automate the design process, but drawing tools are still limited. Nov 95

★★★ **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 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 it's not perfect, the pros far outweigh the cons. Jan 95

★★★ **Adobe TextureMaker 1.0 (2.0), Adobe Systems, 415/961-4400, \$199.** Versatile program lets you layer effects to create custom textures. The textures are impressive, but the program's a bit pricey. Oct 95

★★★ **Alien Skin Textureshop 1.0, Virtus, 919/467-9700, \$99.** Apply mutations to master textures to create custom patterns made up of seamless tiles. Control freaks won't like this program's random mutations, but it provides a simple way to create patterns. Jul 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 is still rough around the edges. Its biggest limitation is that it's unusably slow on 68030 Macs. Feb 95

★★★ **Black Box 2.0, Alien Skin Software, 919/832-4124, \$119.** Ten filters let you add special effects to Photoshop images. A useful collection for a modest price. Nov 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

★★★ **CD-Q 2.0, Human Software Company, 408/741-5101, \$145.** Take advantage of Kodak's YCC format for Photo CD with this Photoshop plug-in, which lets you make color corrections and fine-tune color separations. If you frequently use Photo CD for image processing, this is the way to go—if you don't mind an inelegant interface and perfunctory documentation. Jul 95

★★★ **Claridraw 1.0 (1.0v2), Claris Corp., 408/727-8227, \$399.** For presentations without grand artistic pretensions, this draw program can be an effective tool. Jan 95

★★★ **Color It 3.0, MicroFrontier, 515/270-8109, \$149.95.** Don't turn Old Paint out to pasture yet. This venerable paint program has been updated with a number of powerful new features, including precise control over pressure-sensitive input, convolution functions, and a focus filter. A great program for beginners. Aug 95

★★★ **Colorize 2.0, DS Design, 919/319-1770, \$495.** One-trick program lets you add color to TIFF images. (If you were a klutz with crayons, don't worry; you can select a tool that won't let you color outside the lines.) At \$495, color it expensive. Dec 95

★★ **FloorPlan Plus 1.1, ComputerEasy International, 602/829-9614, \$49.95.** Simple, affordable CAD program is intended for rudimentary design tasks. While it offers a good set of basic drafting tools, it falls short in several areas; only 16 colors are supported, for example, and rulers are nowhere to be found. Sep 95

★★★ **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

★★★★ **Fractal Design Painter 3 (3.1), 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

★★★ **FullPixelSearch 1.5, Avian Systems, 201/224-2025, \$1295.** Analyze scientific images with a variety of pixel-selection functions. It's a useful tool for scientists, but could use batch processing, scripting, the ability to handle 12- and 16-bit images, and a hefty manual. Jul 95

★★★ **Gryphon Batch It 1.0, Gryphon Software, 619/536-8815, \$199.** Arranges tiles in a visual interface to automate repetitive graphics operations. Although it lacks conditional statements, this batch processor is a time-saver. Jun 95

★★★ **IntelliHance 1.0, DPA Software, 214/517-6876, \$129 to \$299.** Photoshop plug-in automates the process of improving scanned graphics with color correction and control over contrast, focus, and graininess. Sep 95

★★★★ **KPT Convolver 1.0, MetaTools, 805/566-6200, \$199.** Create your own Photoshop filters the intuitive way with this imaginative and absorbing plug-in module. The interface allows you to experiment, combining effects, tweaking results, and applying multiple undos if necessary. Aug 95

★★★★ **KPT Vector Effects 1.0, MetaTools, 805/566-6200, \$199.** Adobe Illustrator and Macromedia FreeHand users will enjoy this imaginative collection of 13 plug-in filters that warp, distort, and otherwise alter vector-based images. Oct 95

★★★★ **Live Picture 2.0, MetaTools, 805/566-6200, \$995.** Latest version of this innovative image editor boasts lower RAM requirements, faster operations, and a much lower price tag than the original. Sep 95

★★★★ **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

★★★★ **MacPhase 2.0, The Otter Solution, 315/768-3956, \$279.** This speedy, feature-rich program offers the full spectrum of standard scientific and graphics image processing tools. Note that it's aimed at technical users, not dabblers. Aug 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

★★★★ **MovieFlo 1.1, The Valis Group, 415/435-5404, \$899.** Tug, twist, and pinch your sister—or at least a digital image of her—with this special-effects program for stills or QuickTime movies. Well-designed application is hampered by a steep price and a poor manual. Jun 95

★★★★ **Paint Alchemy 2.0, Xaos Tools, 415/487-7000, \$199.** An interface lift, additional blending options, and improved animation controls make this flexible image editor an appealing add-on for digital artists. Sep 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

★★★ **PhotoFix 2.8.8, Microspot USA, 408/253-2000, \$249.** This image-editing/photo-enhancement program needs refinement, but its modest price and its ability to optimize images for output to low-end printers make it a useful tool. Sep 95

★★★ **PhotoFlash 2.0, Apple Computer, 408/996-1010, \$129.** If you want to enhance or catalog images acquired from a scanner or a digital camera such as Apple's QuickTake 100, consider this utility. It's not a high-end image-editing program, but it does offer basic image-retouching tools at a reasonable price. Jul 95

★★ **PhotoFusion 2.0.3, Ultimatte, 818/993-8007, \$695.** If your original shot is clean, this Adobe Photoshop masking plug-in does a good job. But in the real world, this program's poor manual and less-than-intuitive controls make it hard to use. Oct 95

★★★★ **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

★★★ **PixelPutty Solo (1.5), The Valis Group, 415/435-5404, \$399.** Affordable modeler lets you manipulate 3-D objects as if they were clay. It's a capable program, but a bare-bones interface and skimpy manual make it somewhat daunting for novices. Jun 95

★★★★ **Poser 1.0, Fractal Design, 408/668-5300, \$199.** Specialized graphics tool generates three-dimensional human figures. Its appealing interface is simple enough for beginners, while its powerful graphics capabilities are suitable for professionals. Oct 95

★★★★ **PowerCADD 2.0, Engineered Software, 910/299-4843, \$795.** The latest incarnation of PowerDraw, PowerCADD is built for speed, but users will also take comfort in an enhanced interface and new drawing tools. Oct 95

★★★ **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

★★ **Select 1.6, Human Software Company, 408/741-5101, \$245.** Although its selection mode provides a convenient and intuitive way to make changes to several colors at once, all the features of this CMYK color-correction plug-in can be found in Photoshop. Jul 95

★★★★ **SmartSketch 1.0, FutureWave Software, 619/637-6190, \$69.95.** Innovative, easy-to-use graphics program unites the free-form creativity of a paint program with the structure and precision of object-oriented drawing. Sep 95

★★★ **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

★★★★ **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 meaningful control. Feb 95

continues

Star Ratings

★★★★ **Transverter Pro 3.0, TechPool Studios, 216/382-1234, \$395.** Graphics-conversion tool lets you preview PostScript files or convert them to other formats. A must-have for publishing professionals. Nov 95

★★★★ **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

★★★★ **Vision 3d 4.0, Strata, 801/628-5218, \$695.** 3-D modeling, rendering, and animation package expands its array of modeling tools and adds two renderers. Plug-in extensions provide a practical way to customize the program, while easy-to-read documentation makes learning its many features relatively painless. Jul 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

★★★★ **Working Model, Visual Basic, 415/574-7777, \$2495.** Unlike Kate Moss, this Working Model has a robust set of features. This mechanical-simulation program works fine but would be more useful if it were Power Mac native. Dec 95

★★ **xRes 1.11, Fauve Software, 415/543-7178, \$799.** You can apply a variety of effects to selected areas of a large composition with this image editor. Although it offers pluses such as useful filters and customizable gradients, this program's numerous interface oddities make it less attractive than the competition. Jul 95

MATH/SCIENCE

★★★★ **The Fuzzy Logic Toolbox 1.0, MathWorks, 508/653-1415, \$895.** Control-system engineers who want to incorporate fuzzy logic into their systems will find this software an excellent aid. It includes a helpful tutorial and a well-designed graphical interface. Sep 95

★★★★ **LabView 3.1, National Instruments, 512/794-0100, \$1995.** With improved graphing and printing features, Power Mac optimization, and links to HiQ, this instrument-emulation software is a must for Macintosh-based laboratories. Nov 95

★★★★ **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

★★★★ **Statistica/Mac 4.1, StatSoft, 918/583-4149, \$695.** This statistical software is the undisputed features-per-dollar champion in the Mac market. Mar 95

★★★★ **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

★★★★ **Claris Organizer 1.0 (1.0v2), Claris Corp., 408/727-8227, \$99.** New personal information manager users, lured by the price, 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

★★★★ **ClarisWorks 4.0, Claris, 408/727-8227, \$129.** Dozens of delicate nips and tucks, rather than a massive overhaul, characterize the latest upgrade of this integrated program. Its word processor and database components can stand up to their stand-alone counterparts. Oct 95

★★ **ClieTrac 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

★★★★ **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

★★★★ **Espresso 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

★★★★ **FastTrack Schedule 3.0, AEC Software, 703/450-1980, \$299.** Updated version of this project planner includes a detailed calendar, a customizable Gantt chart, and new formatting columns, but additional customization options would be helpful. Aug 95

★★★★ **In Control for Workgroups 3.5, Attain, 617/776-1110, \$149.95; 10-pack \$949.95.** Flexible project planner and scheduler combines an outline and a calendar. It's a valuable tool for networked groups that need to share project information. Sep 95

★★★★ **InfoGenie 1.0.5, Casady & Greene, 408/484-9228, \$79.95.** Data manager supports both free-form and field-based files, but list-view functions are limited. Nov 95

★★★★ **InTouch 2.5, Prairie Group, 515/225-3720, \$69.95.** Free-form contact manager offers speedy access to information. If you don't need to perform complex searches or sorts, this program is a good choice. Sep 95

★★★★ **Now Up-to-Date and Contact 3.5, Now Software, 503/274-2800, \$99.** New features such as an improved to-do list and a linked notepad make this the premier address-book and calendar program. Nov 95

★★ **Peanuts Family Organizer 1.0, Individual Software, 510/734-6767, \$19.95.** "Hey, Pop, can I borrow the car Saturday night?" "Look at the family PIM and check my calendar, Son." This organizer's endearing interface doesn't make up for missing or poorly implemented features. Jun 95

PRESENTATION TOOLS

★★★★ **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 presenta-

tions. The canned animations and scenes grow tiresome, however. Jan 95

★★★★ **Authorware Professional 3.0, Macromedia, 415/252-2000, \$4995.** Author! Author! This multimedia-authoring package is well suited to education-oriented projects. It offers a wealth of tools, tutorials, and media elements. (Speaking of wealth, this program is, alas, not cheap.) Dec 95

★★★ **CyberSound FX 1.0, InVision Interactive, 415/812-7380, \$129.** Fifteen audio filters improve sound quality in Adobe Premiere. The filters are useful but somewhat hard to access. Nov 95

★★★★ **Electronic Marker 1.0.2, Consumer Technology Northwest, 503/643-1662, \$34.95.** This annotation tool can be a practical enhancement to live demos and on-screen presentations, but it needs better controls for modifying and preserving markup layers. May 95

★★★★ **HyperCard 2.3, Apple Computer, 408/996-1010, \$129.** Latest version of Apple's multipurpose application automates many design tasks, but multimedia presentations won't run on other platforms and color is treated as an afterthought. Nov 95

★★ **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

★ **MediaFactory 1.0, Nuts Technologies, 408/980-7800, \$199.** What the world needs is a good, low-cost QuickTime movie editor. Unfortunately, this program isn't it. It's hampered by poor documentation and an awkward interface. Nov 95

★★★★ **MediaPaint 1.0, Strata, 801/628-5218, \$695.** Anyone who produces special effects for QuickTime movies will welcome this program, which lets multimedia developers edit ranges of frames. Although it's a RAM hog, this useful tool removes much of the tedium of special-effects work. Sep 95

★★★★ **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

★★ **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

★★★★ **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

★★ **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 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

★★★★ **TransJammer, Elastic Reality, 608/273-6585, \$99.** Plug-in for Adobe Premiere and Avid VideoShop offers 100 customizable video-transition effects, ranging from the conventional to the, well, odd (like falling

cow). If you've ever tried to make your own falling-cows transition, you'll appreciate this time-saving tool. Aug 95

PROGRAMMING

★★★★ **AppWare 1.2, Novell, 801/429-7000, \$495.** Development system offers professional and novice programmers an efficient, graphical method of creating commercial or in-house applications. Oct 95

★★★★ **FaceSpan 2.0, Software Designs Unlimited, 214/578-6700, \$199.** Programmer's tool lets you quickly build AppleScript interfaces. New features such as drag-and-drop functions and tables make it easy to create stand-alone applications. Nov 95

★★★★ **JAM 6, JYACC, 212/267-7722, \$2000.** Thanks to this well-designed tool, the Mac is now a viable platform for development of large-scale corporate client-server database applications. Oct 95

★★★ **Script Debugger 1.0, Late Night Software, 604/929-5578, \$129.** If only they'd used this on Ishtar! Oh, not that kind of script. This AppleScript development environment has a thoughtfully designed interface but falls a little short in the debugging department. Nov 95

★★ **ScriptWizard 1.0, Full Moon Software, 408/253-7199, \$99.** Software attempts to make writing and debugging AppleScript scripts easier. But it doesn't offer enough improvement over Apple's Script Editor. Jan 95

★★★ **Symantec C++ 8.0, Symantec, 503/334-6054, \$499.** The new version of this development environment offers native PowerPC compilers for C++ and ANSI C. The project manager and class browser have been improved and the compiled code is laudable, but our reviewer had some complaints about the package's resource demands and the company's support reputation. Jul 95

★★★★ **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

★★ **Adobe ScreenReady 1.0, Adobe Systems, 415/961-4400, \$199.** Utility converts PostScript files to PICT for multimedia projects, but its overzealous antialiasing may leave designers in a dither. Dec 95

★★★ **Aladdin Desktop Tools 1.0, Aladdin Systems, 408/761-6200, \$89.95.** Not all the utilities in this collection are perfectly implemented, but Desktop SpeedBoost and Desktop Printer make the package worth its price. The rest can be considered a bonus. Aug 95

★★★★ **At Ease 3.0 for Workgroups, Apple Computer, 408/996-1010, \$295.** Network administrators can choose among three levels of access for users with Apple's program launcher. Nov 95

★★★★ **BeyondPress 1.0, Astrobyte LC, 303/534-6344, \$595.** Those who have put off making Web pages are in luck; this handy (albeit pricey) utility converts QuarkXPress documents to HTML documents. Dec 95

★★★★ **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

★★★★ **CD Directory 1.0, Insignia Solutions, 415/694-7600, \$69.95.** Store catalogs of CD directories on your hard drive—and access them at hard drive speeds—with this handy utility. One complaint: cataloged CDs are treated as local drives, greatly increasing search time during a global search. Jul 95

★★★ **Color Compass 1.0 (1.1), Praxisoft, 703/729-3391, \$129.** Speedy, specialized tools allow you to blend, match, and tweak colors in subtle ways not possible in most programs. Although graphics experts might not need this program, it provides helpful visual feedback for creating and organizing color palettes. Aug 95

★★★★ **Conflict Catcher 3, Casady & Greene, 408/484-9228, \$99.95.** This extension-management utility was already great—and it just got better. Like a digital Jimmy Carter, it offers a friendly, flexible approach to conflict resolution. Sep 95

★★★★ **Disc-To-Disk, Optical Media International, 408/376-3511, \$199.** Audio-capture utility's friendly interface provides a simple way to transfer sound from a CD to the Mac's hard drive. A useful tool for multimedia authors. Jun 95

★★★★ **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

★★★ **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

★★★ **File Genie Pro 1.1, Duet Development, 408/559-3838, \$89.** File-management utility offers fast, convenient cataloging and searching of stored files, but its search criteria are limited. Oct 95

★★★★ **FolderBolt Pro 1.0.3, Kent Marsh, 713/522-5625, \$129.95.** Feeling unsecured? Top-notch encryption schemes and flexible access controls let you secure your Mac's contents by password-protecting folders and encrypting the data they contain. Jul 95

★★★ **Gear 2.5, Elektroson, 610/617-0850, \$799.** CD-recordable mastering software is a mixed bag. It's speedy and reliable, but can't record HFS CD-ROMs from just a portion of a hard drive without additional software. Sep 95

★★★★ **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

★★★ **Here & Now 1.0, Software Architects, 206/487-0122, \$89.95.** We admit it. Lots of people use DOS and Windows. This utility modifies Mac files so you can read them on a PC. Nov 95

★★★★ **InstantReplay 1.0, Strata, 801/628-5218, \$149.** Now you see it, now you see it again. This utility records on-screen activity and saves it as a QuickTime movie, including audio. File-conversion capabilities are an added bonus. Sep 95

★★★★ **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 tech support. May 95

★★★ **Menu Master Mac, Electronic Learning Systems, 904/375-0558, \$99; 15-site license \$299.** Security software lets an administrator restrict a user's access to certain files on a shared Mac. It's a useful program, but could use some additional features, such as the ability to restrict computer usage to particular times. Sep 95

★★★★ **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

★★★ **Multimedia Utilities 1.1, Motion Works, 415/541-9333, \$299.** Six utilities address QuickTime moviemaking, from editing movies and sound tracks to creating morphs, animations, and screen recordings. Although the utilities are appealing, you must save early and often because of frequent crashes. Jul 95

★★★★ **Norton DiskDoubler Pro 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. Jan 95

★★★ **On Cue II Utilities 3.0, ComputerEasy International, 602/829-9614, \$99.95.** Eight modules add functionality to the Mac Operating System. It's useful, but not as comprehensive as the competition. Sep 95

★★★★ **OptiMem RAM Charger 2.0.1, Jump Development Group, 412/681-2692, \$129.** Use RAM more efficiently with this memory-management utility. The Mac OS ought to work like this, but until it does, you should use this nifty utility. (An added bonus: it works on older Macs, back to the Mac Plus.) Jul 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

★★★★ **Power Secretary Power Edition 2.0, Articulate Systems, 617/935-5656, \$2495.** This impressively accurate speech-recognition program sits on your Mac and takes dictation, learning your voice patterns as you use it. It's expensive, but provides a viable alternative to keyboard input. Sep 95

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★★★★ **Power Secretary Power Edition 2.0, Articulate Systems, 617/935-5656, \$2495.** This impressively accurate speech-recognition program sits on your Mac and takes dictation, learning your voice patterns as you use it. It's expensive, but provides a viable alternative to keyboard input. Sep 95

Star Ratings

★★★ **RapidCD 1.04, Insignia Solutions, 415/694-7600, \$69.95.** RAM and disk caching of CD-ROM data speeds access to frequently used data. This utility does its job well, but it's incompatible with the AppleCD Audio Player and doesn't allow you to add to its settings. Jul 95

★★★ **RescueTxt 1.0, Abbott Systems, 914/747-3116, \$79.** For decent performance and the ability to locate text in even a deleted file, this text-retrieval utility is a good choice. But it doesn't tell you what file the text comes

from, so you can't just open the found file. Apr 95

★★★★ **S/Link 2.0, Synclavier, 603/448-8887, \$249.** Batch-processing is this audio-conversion utility's specialty. It supports all major audio file formats and offers a straightforward interface. Nov 95

★★★★ **Stuffit Deluxe 3.5, Aladdin Systems, 408/761-6200, \$129.95.** If you're looking for a compression solution, you should look at this product. Its drag-and-drop applications, Magic Menu, and file translators make

it easy to integrate compression into your routine. Mar 95

★★★★ **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

★★★ **ultraSecure 3.524, usrEZ Software, 714/756-5140, \$239.** Security program offers a comprehensive set of protection tools, but has a few flaws, including incompatibilities with several types of programs. Sep 95

★★★★ **Virex 5.5.1, Datavatch Corporation, 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

★★★ **Zonkers 1.0, Nova Development, 818/591-9600, \$19.95.** Redecorate your Mac with this collection of silly desktop enhancements. Customize icons, scroll bars, cursors, buttons, menu bars, windows, and desktop patterns to create your own look. Aug 95

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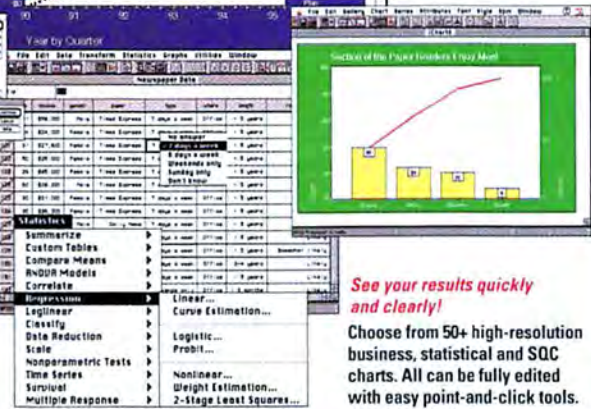


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VERTICAL MARKETS

★★★ **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, mike, and 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

★★★ **ConcertWare 1.5.7, Jump Software, 415/917-7460, \$159.** Although it lags behind the competition in performance and features, this music-notation program's low price and ease of use make it a viable choice for the budget-wise. Jun 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

★★★★ **FreeStyle 1.01, Mark of the Unicorn, 617/576-2760, \$200.** Music sequencer organizes MIDI instruments into players, a metaphor that's easier to understand than traditional tracks and patches. It could use a lyric tool. Nov 95

★★★ **Insta Software, Chang Labs, 408/727-8096, \$29 per module.** No-frills, preprogrammed relational databases handle forms and record-keeping for specific businesses. They can't be customized, but the databases are straightforward and require little training or setup. Aug 95

★★★★ **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

★★★★ **Medical HouseCall 1.0, Applied Medical Informatics, 801/464-6200, \$99.95.** Interactive medical guide is a painless way for people to learn about diseases, tests, and therapies. Although it's easy to use and

interesting, some images were incorrectly labeled. Feb 95

★★★★ **Nightingale 2.0**, TAP Music Systems, 206/462-1007, \$495. With its lightning speed, powerful editing tools, and OCR entry option, this bird can stand up to any music-notation product on the market. Oct 95

★★★★ **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 improved sheet-music view are just part of this MIDI recording program's worthwhile overhaul. If you like the sheet-music view, this is the product to 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 driving 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

★★★★ **Storyboard Artist 1.5**, PowerProduction Software, 310/937-4411, \$499. Build a storyboard by selecting backgrounds, characters, and props from a library. While it's a helpful tool, starving artists will find its price too high. Oct 95

★★★★ **Vision 2.08**, Opcode Systems, 415/856-3333, \$495. MIDI program's list of exclusive, creativity-slanted features, such as endless count off and scrubbing (which lets you hear the music as you drag across it), give the program a usability edge. Mar 95

★★ **Visual Arranger 1.0**, Yamaha Corporation of America, 714/522-9240, \$59.95. Icons represent musical styles in this song-building program. It's fun, but the icons can be cumbersome, and the program lacks features required by professional musicians (such as precise expression controls). Nov 95

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. Its modular architecture is complex, but 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., 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

★★★★ **Three by Five 2.0**, MacToolkit, 310/395-4242, \$99. How retro! This idea organizer uses the metaphor of index cards on a corkboard. Unlike real index cards, the program lets you attach QuickTime movies, link cards, or switch to an outline view. Aug 95

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

★★★★ **Artz II**, Wacom Technology, 360/750-8882, \$389.99. What will they think of next? This graphics tablet includes a stylus with an eraser that works like the real thing! Dec 95

★★★★ **ChoiceStick 1.0.2**, Kernel Productions, 302/456-3026, \$69.95. Entering data into a spreadsheet is much quicker if you use a joystick instead of a mouse. Well, maybe you can convince your boss of that. Otherwise, use this port to attach a pair of joysticks to your Mac so you can play games. Sep 95

★★★★ **DrawingSlate II**, CalComp, 602/948-6540, \$395. A responsive stylus and user-definable macros make this digitizing tablet an excellent choice for artists and illustrators. Jun 95

★★★★ **GlidePoint**, Alps Electric, 408/432-6000, \$99. If you find moving the mouse a pain in the arm, you might want to try this alternative pointing device, which lets you position the cursor by moving your finger across its surface. Jul 95

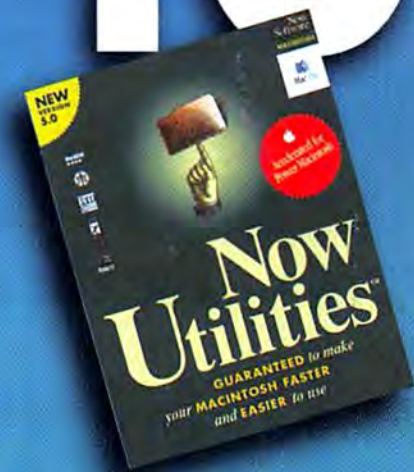
★★ **Jetstick**, CH Products, 619/598-2518, \$74.95. Our reviewer liked this joystick's hardware, but found the manual and the software lacking. Sep 95

★★★★ **MacAlly**, The Mace Group, 213/780-6110, \$49. It may not be a better mouse, but it's a cheaper one. This ADB mouse doesn't stand out from the crowd, but it's durable, glides smoothly, and won't leave a big hole in your pocketbook. Jul 95

★★★★ **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

★★★★ **Mouse-Trak**, Itac Systems, 214/494-3073, \$179. If you hate mouses to pieces, you might try *continues*

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Star Ratings

this trackball input device. It's sturdy, but our reviewer found its side buttons too small. **Nov 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**

★★ **Point Pad, Hagiwara Sys-Com, 619/546-9989, \$99.** Compact touchpad lets you control the cursor with stylus or finger, but you can't fine-tune cursor response. **Oct 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 and typing text. **May 95**

★★★★ **Trackball Pro ADB, CH Products, 619/598-2518, \$119.95.** Although this trackball is less expensive than the competition's, it falls short in programmability and overall functionality. **Sep 95**

MISCELLANEOUS HARDWARE

★★★★ **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**

★★★★ **Colortron, Light Source Computer Images, 415/925-4200, \$1195.** Getting the colors on your screen to match those in your output is now easy and affordable, thanks to this hand-held spectrophotometer, which measures transmissive and reflective sources. **Jun 95**

★★★★ **DayStar PowerPro 601/DayStar Turbo 601, DayStar Digital, 404/967-2077, PowerPro 601 \$1599; Turbo 601 \$1499.** Squeeze more performance out of your Mac with these impressive 601-based accelerator cards. **Sep 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**

★★ **Labtec LCS-3210, Labtec, 360/896-2000, \$169.99.** These loudspeakers are decent, but their midrange is unimpressive and their 3-D sound feature is poorly implemented. **Dec 95**

★★★★ **MMS557, Audio-Technica USA, 216/686-2600, \$149.95.** Among a huge selection of similar-

ly 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**

★★★★ **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**

★★★★ **Reno Portable CD-ROM Player, MediaVision, 510/770-8600, \$349.** Have CD-ROM, will travel. This portable player is lightweight, versatile, and easy to set up; about the only complaint is its short battery life. **Jun 95**

★★ **Smart Label Printer EZ30, Seiko Instruments USA, 408/922-5800, \$199.** This label printer is small, inexpensive, and easy to use. Unfortunately, it's slow, requires special labels, and produces poor-quality text. **Nov 95**

★★★★ **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**

★★★★ **Vivid 3D Pro, NuReality, 714/442-**

Simply the best font tool available for the Mac!



MW ★★★★★

May 1995

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1080, \$149.95. This sound-enhancement system uses the SRS technique to produce 3-D sound from a pair of speakers. While it's great for system sounds and games, it's less impressive for audio CDs. Aug 95

★★★★ **YST-SS1010, Yamaha Corporation of America, 714/522-9240, \$349.95.** With a name like YST-SS1010, you have to be good. And it is. This satellite-and-subwoofer speaker system is highly recommended, despite its mediocre manual. Jul 95

MODEMS/NETWORK HARDWARE

★★★ **GeoPort Telecom Adapter Kit, Apple Computer, 408/996-1010, \$129.95.** Adapter unlocks the software modem built into 680X0AV and Power Macs, providing access to voice, data, and fax services. Our reviewer wanted faster transmission speed, better OCR capability, and a lower price. Oct 95

★★★ **Internet Server Solution for the World Wide Web, Apple Computer, 408/996-1010, \$2909.** It's not ideal for all types of Internet publishing, but this hardware-and-software bundle is a starting place for people who want to be publishers, not technicians. Oct 95

★★ **Manta 500 EN/Starfish Ethernet Access Point, Digital Ocean, 913/888-3380, Manta \$799; Starfish \$1850.** This wireless Ethernet station/access point duo is much slower than its wired counterparts. It's more expensive, too. Dec 95

★★★★ **OneWorld Combo, Global Village Communication, 408/523-1000, \$1499 without modems; \$2099 with modems.** It is the very model of a multiuser modem pool. You can't receive a fax but bar-

ring that this server's really cool. Sep 95

★★★★ **OneWorld Internet 1.0, 700 Series, Global Village Communication, 408/523-1000, \$1699 plus monthly fee.** Users of an office network can connect to the Mother of All Networks with this Internet gateway. It offers E-mail and direct Internet access in an approachable format. Jun 95

★★★ **Power Class 28.8 Data/Fax Modem, Motorola, 205/430-8000, \$395.** Superior connection speeds and easy setup are attractive, but this modem comes with mediocre fax/telecommunications software and doesn't support V.Fast connections. Oct 95

★★★★ **TelePort Platinum, Global Village Communication, 408/523-1000, \$279.** If you want V.34 (28.8-Kbps) data and 14.4-Kbps faxing capability, incoming-call recognition, and an answering machine—all over a single telephone line—this reliable fax modem has it all covered. Aug 95

PRINTERS

★★★★ **Apple Color StyleWriter 2200, Apple Computer, 408/996-1010, \$419.** Inexpensive, lightweight color ink-jet printer is ideal for creating color presentations when you're on the road. Nov 95

★★★★ **Apple Color StyleWriter 2400, Apple Computer, 408/996-1010, \$525.** Economical, Quick-Draw-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

★★★★ **HP LaserJet 5MP, Hewlett-Packard, 800/752-0900, \$1299.** This laser printer meets the high

demands of small businesses and home offices with features such as 600-dpi resolution, support for Adobe PostScript Level 2, and automatic-input switching between DOS/Windows machines and Macintosh networks. Memory Booster software makes good use of the printer's 3MB of RAM. Jul 95

★★★★ **LaserWriter 4/600 PS, Apple Computer, 408/996-1010, \$929.** This PostScript laser printer offers crisp 600-dpi resolution, easy setup and maintenance, and a compact design, at a price of less than \$1000. Dec 95

★★★★ **LaserWriter 16/600 PS, Apple Computer, 408/996-1010, \$2399.** If speed is what you need, this fine printer is it. The price is reasonable. Mar 95

★★ **Nikon Coolprint, Nikon Electronic Imaging, 516/547-4355, \$2350.** Color dye-sub printer is a good way to make small color proofs of digital images (only A6 paper is supported). It's fast, but print quality suffers from a low resolution and poor color matching. Sep 95

★★★ **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

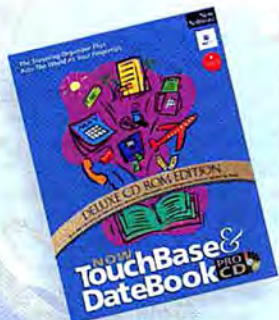
★★★ **Pictura 310, Fargo Electronics, 612/941-9470, \$4995; optional Adobe Level 2 PostScript package \$795.** This tabloid-size thermal-wax and dye-sub printer is affordable and produces acceptable print quality, but it's not to dye for. Its color-matching capabilities don't measure up to those of its competitors. Jul 95

★★★ **PrimeraPro, Fargo Electronics, 612/941-9470, \$1895.** The photo-realistic output of this thermal-wax and dye-sublimation printer beats that of any other

continues

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Star Ratings

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

★★★★ **StyleWriter 1200, Apple Computer, 408/996-1010, \$269.** Newest model of Apple's inexpensive ink-jet printer offers improved print quality, better halftones, tiled layouts, and four new fonts. Sep 95

★★★★ **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

★★★ **Typhoon 8, Dataproducts, 818/887-8000, \$3100 (600 dpi, 4MB of RAM); \$5199 (1200 dpi, 36MB of RAM).** This workgroup printer delivers impressive output at 1200 dpi, but its 600-dpi output and printing speed are nothing to write home about. Dec 95

★★ **Xerox 4510ps, Xerox, 800/349-3769, \$1745.** Although its driver offers nice features like thumbnail pages, watermarks, and smart underlining, this workgroup printer's speed and output quality don't make the grade. Dec 95

SCANNERS

★★★★ **Fujitsu ScanPartner Jr., Fujitsu Computer Products of America, 408/432-6333, \$499.** Compact scanner with good OCR software makes converting hard-copy documents to editable text a snap. It's an economical and fuss-free scanning solution, but its page-feeder doesn't offer the flexibility of a flatbed scanner. Jul 95

★★★★ **HP ScanJet 3c, Hewlett-Packard, 208/323-2551, \$1179.** Higher resolution (600 dpi) and a broader dynamic range (30 bits) distinguish this color scanner from its predecessor. The only number that didn't go up is the price. Oct 95

★★ **Pro Imager 4000, PixelCraft, 510/562-2480, \$2995.** This midrange scanner delivers excellent highlight detail but produces a lot of noise in shadow areas. It doesn't measure up to similarly priced competitors in speed or image quality. Jun 95

★★★★ **Pro Imager 8000, PixelCraft, 510/562-2480, \$12,995.** Demanding prepress users will like this scanner's tonal sensitivity, high resolution, large image area, and impressive speed. Although its color-adjustment software needs work, this is a superb scanner. Jun 95

★★★ **Reli 4830T, Relisys, 408/945-9000, \$1699.** The good: high-quality scans, midrange price; lots of bundled software. The bad: slow performance, quirky scanning software. The upshot: If you can live with the cons, this scanner is a bargain. Jun 95

★★★★ **SprintScan 35, Polaroid, 617/386-2000, \$2495.** Compact, efficient scanner offers a cost-effective way to transfer images from 35mm slides or negatives to a Mac. Jun 95

★★★ **Vista-58, Umax Technologies, 510/651-8883, \$995 (LE); \$1095 (Pro+).** This 24-bit color flatbed scanner has a lot of useful features for its low price, including crisp line-art scans and speedy previews. It's a bargain if you can overlook its slow OCR scanning and some scanning-software bugs. Jul 95

SYSTEMS/STORAGE

★★★★ **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. Mar 95

★★★ **Envoy Wireless Communicator, Motorola, 800/894-7353, \$1000 to \$1500.** With its intelligent mail agents and well-integrated RadioMail software, this Magic Cap-based PDA was our reviewers' first choice for sending and receiving E-mail. Aug 95

★★★★ **EZ135, SyQuest Technology, 510/226-4000, \$249.** It's not glamorous, but this low-cost removable-cartridge drive offers speedy performance and decent storage capacity. Dec 95

★★★ **Joule System, La Cie, 503/520-9000, Price varies by component.** Plug-and-play tower lets you stack drives—hard drives, removable media, and others—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. Feb 95

★★★ **Marco Wireless Communicator, Motorola, 800/894-7353, \$900 to \$1400.** This Newton OS-based PDA includes a radio modem. The RadioMail service offers E-mail, paging, outgoing faxes, and a news service, but it's pricey. Aug 95

★★★ **Master CD Pro, MicroNet Technology, 714/453-6000, \$4995.** With support for multiple formats, this quad-speed, multisession, recordable CD-ROM drive is a good tool for professional CD production. It ain't cheap, though. Aug 95

★★★ **MessagePad 120, Apple Computer, 408/996-1010, \$599, 2MB model \$699.** Apple's PDA offers about three times the storage space of the other PDAs tested, and its design is great, but handwriting recognition still needs work. With support for vertical applications, it's good for specialized tasks like medical work. Aug 95

★★★★ **Power 100, Power Computing, 512/258-1350, \$2599 (base model).** The first Macintosh clone offers all the power of a Macintosh 8100/100 for about \$700 less. It offers the speed, expandability, functionality, and compatibility Macintosh users expect, with the customer support and prices we've wanted for so long. Aug 95

★★★★ **Power Macintosh 7500/100, Apple Computer, 408/996-1010, \$3159.** The new Power Mac provides just the right mix of speed and features, with room to grow. Strong video, sound, and networking capabilities make it an excellent machine for Internet browsing and publishing. Dec 95

★★★ **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 9500/132, Apple Computer, 408/996-1010, \$5799.** If you need speed, expansion, and a massive amount of memory, this is the Mac for you. But with no built-in video, the limited availability of PCI cards, and RAM slots that are hard to reach, this one's a poor choice for general use. Oct 95

★★ **RCD-1000, Pinnacle Micro, 714/727-3300, \$1695.** The software for this CD-Recordable drive is easy to use, but it's too unreliable to use as a day-to-day backup system. Jun 95

★★★ **SledgeHammer8000FT, FWB, 415/325-4392, \$23,599.** This fault-tolerant Level 5 RAID array will help you maintain constant access to your stored information. Our reviewer couldn't tolerate a few of its faults, however, including its lack of support for RAID 3. Sep 95

★★★ **Sony Magic Link, Sony, 800/571-7669, \$699.95.** Using this PDA for short E-mail messages, phone calls, and appointment scheduling is a breeze, but only a

handful of applications have been developed for it so far. Although the Personal Link messaging service is relatively expensive, its Telescript support is limited to other devices that use the Magic Cap OS. Aug 95

★★★★ **Zip Drive, Iomega, 801/778-1000, \$199.95; 100MB cartridge \$19.95.** Weighing in at about a pound, this external drive combines speedy performance, convenience, and economy in an attractive package. It uses 100MB cartridges the size of a floppy disk, and boasts near hard-drive speeds. What's not to like? Jul 95

VIDEO/DISPLAY

★★★★ **Apple Multiple Scan 15 Display, Apple Computer, 408/996-1010, \$509.** The trid 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

★★★ **EASycolor 24/1360, EA Research, 510/867-0967, \$1699.** Video board offers Photoshop CMYK-mode acceleration and high-resolution support for multisynchronous monitors. Its software is minimal and its QuickDraw acceleration only adequate, but it's an affordable solution. Aug 95

★★★★ **Multiscan 15sf, Sony Computer Peripheral Products, 408/432-0190, \$569.95.** 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

★★★ **PaintBoard Prism GT, RasterOps, 408/562-4200, \$999.** If you want QuickDraw acceleration and plentiful software options, this video board is a good choice, but it doesn't offer Photoshop acceleration. Aug 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

★★★ **QA-1500, Sharp Electronics Corporation, 201/529-8731, \$5795.** LCD panel's display is crisp and flicker-free, but placing a presentation on its PC Card is cumbersome. Cheaper 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

★★★★ **SpigotPower AV, Radius, 408/541-6100, \$999.** Make full-screen, 30-fps movies with this first-rate video-compression-and-decompression board and accompanying JPEG software. Jun 95

★★★★ **Targa 2000 1.2, Truevision, 408/562-4200, \$5495.** Digital video board provides excellent image quality and fully synced 16-bit audio. A bit expensive, but a good choice for video professionals. Dec 95

★★★★ **Thunder IV GX 1360, Radius, 408/434-1010, \$2999.** With its impressive QuickDraw and Photoshop acceleration and versatile software, this video board was our reviewer's first choice. It's more expensive than the competition, however. Aug 95

★★★ **VideoDirector 1.5, Gold Disk, 408/782-0200, \$199.95.** Low-end video-editing system lets you log, edit, and organize videotape footage, copying selections from a source deck to a record deck. A good choice for nonprofessionals. Jun 95

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

Apple Internet Connection Kit Claris is offering this \$59 kit that includes Ⓢ Claris E-mailer Lite (Dec 95 ★★ for Claris E-mailer 1.0), Netscape Communications' Netscape Navigator, Progressive Networks' Real Audio Player, and the Apple Internet Dialer for hooking up to qualified Internet service providers. Call 800/950-5382 for more information.

Kodak Products + Ⓢ Cumulus Network Image Database 2.5 Kodak is including a special two-client version of Canto Software's image-database and -cataloging program with a variety of products, including its CD writers, automated disk libraries, and Build-It software. Cumulus compiles and searches catalogs of images, sounds, QuickTime movies, and other multimedia files. Call 800/242-2424 for more information.

LindPowerCenter 500 + DC Adapter 500 + Battery Utilities 500 Lind Electronics is offering a bundle for the PowerBook 500 series, consisting of its \$199.95 PowerCenter 500 (which provides multiple power functions and battery maintenance), \$79.95 DC Adapter 500, and \$29.95 Battery Utilities 500 maintenance software. Available for \$199.95 by calling 800/897-8994.

Mac Desktop Music Kit Midiman is offering a bundle of music teaching, accompaniment, and sequencing software products that consists of PG Music's Band in a Box, Mibac Music's Music Lessons Lite, and Passport Designs' Trax program. The basic \$139.95 kit includes a MiniMacman MIDI interface; the \$159.95 kit features a Macman 1-in/3-out MIDI interface. Call 818/449-8838 for more information.

Ⓢ **Nisus Writer 4.1 + MailKeeper 1.0.2** Nisus Software is including a free copy of its \$39 MailKeeper software with its \$319 word processor (Mar 95 ★★ for 680X0 version 4.0), which now includes HTML tools and translators

for popular formats. MailKeeper tracks E-mail addresses and messages, along with Internet URLs and free-form notes. The bundle's estimated street price is \$130. Call 800/890-3030 for more information. *Offer good through at least 12/31/95.*

Ⓢ **Open Sesame 1.1 + Mangia + ZipZapMap + Scrabble** Charles River Analytics is including the following software free of charge with its \$99 Finder-automation utility (May 94 ★★ for Open Sesame 1.02): Upstill Software's \$49.95 Mangia electronic cookbook, National Geographic's \$39.95 ZipZapMap geography game, and MacPlay's \$22 Scrabble vocabulary game. Available for \$39.95 by calling 800/913-3535, ext. 526. *Offer expires 2/28/96.*

Ⓢ **Ray Dream Studio** Ray Dream has combined four 3-D and animation tools in this new \$499 cross-platform suite: Ray Dream Designer 4.0 (Mar 95 ★★ for version 3.1.1), its \$349 3-D graphics program; a keyframe-based animator that defines events for each object in a scene or frame; a collection of more than 500 editable textured models in Designer format; and a portfolio of plug-in extensions, plus a tool kit for creating custom extensions. Call 415/960-0768 for more information.

Ⓢ **Strata Virtual Studio** Strata has formed an alliance with Avid Technology and Allegiant Technologies to offer this \$2095 suite of multimedia-development tools consisting of Strata's \$1495 high-end 3-D design application (Mar 94 ★★ for StudioPro 1.0), your choice of version 1.5.2 or, for full QuickDraw 3D support, version 1.75; Strata's \$695 QuickTime paint tool (Sep 95 ★★ for MediaPaint 1.0); Allegiant's \$695 SuperCard 2.5 authoring system (Feb 95 ★★ for version 1.7.1); Avid VideoShop 3.0, a \$395 QuickTime video-editing program (Feb 94 ★★ for version 2.0); Avid Elastic Reality 1.2, a \$349 QuickTime morphing and warping application; and Avid TransJammer Volume I, a \$99.95 package for producing over 100 plug-in transitional effects for Avid VideoShop and Adobe Premiere. Call 800/787-2823 for more information.

SIDEGRADES/UPGRADES

Ⓢ **Data Desk 5.0** Data Description is offering a \$150 upgrade of its \$625 data-analysis package to registered Data Desk users for \$115. In addition, a \$99 nontransferable license is available to full-time college students. Call 800/573-5121 for more information. *Offer expires 12/31/95.*

Drive7 3.6 Casa Blanca Works is offering this \$89.95 disk-management package to registered users of competitive formatters or of Drive 7 Lite for \$30. This new version adds support for Panasonic PD phase-change CD-ROM and optical drive and Iomega's Jaz drive, as well as for new SCSI routines in the Power Mac 7200, 7500, and 8500. Call 415/461-2249 for more information. *Offer expires 12/15/95.*

Ⓢ **Virex 5.5** Datawatch is offering this \$99.95 virus-detection utility (May 95 ★★ for version 5.5.1) for \$39.95

to registered owners of other virus-protection products. Call 508/988-9700 for more information.

SPECIAL DISCOUNTS/REBATES/FREE TRIALS & OFFERS

Apple Workgroup Server; Internet Server Apple Computer is providing software tools at no additional charge to customers who purchase a Workgroup Server or Internet Server after 8/31/95. The workgroup package includes Datawatch's netOctopus for network workstation management and \$99.95 Virex virus-detection utility, AG Group's \$795 Skyline/Satellite for traffic archiving and analysis, and a limited edition of 4-Sight Fax 2.5 network communication software. AppleShare server configurations also include Santorini Consulting and Design's \$695 Server Management Bundle, a collection of AppleShare utilities on CD-ROM. The Internet package—in addition to a Workgroup Server, StarNine Technologies' WebStar, and Netscape Communications' Netscape Navigator—includes Adobe PageMill for Web-page authoring. Call 408/862-3385 for more information.

microLaser GX Drivers Texas Instruments is offering users who contact its bulletin board system (817/774-6809) or America Online forum (keyword TI) free Macintosh printer drivers for microLaser 600- and microLaser Pro-series printers operating with QuickDraw GX. These drivers are also available on TI's World Wide Web site (<http://www.ti.com>).

Netscape Navigator 2.0 Netscape Communications is offering a 90-day free evaluation of this new upgrade of its \$49 Web browser, which adds support for live online applications and complete news and E-mail capabilities with address books. Available at <http://home.netscape.com>.

Now Contact Link to PaperPort Now Software is offering this software, which provides an easy way to file and retrieve paper documents by attaching them to contacts within its \$99 Now Up-to-Date and Contact 3.5 bundle (Nov 95 ★★). Support is included in the 3.5.1 update, free of charge to version 3.5 users and to customers of Visioneer's \$399 PaperPort desktop scanner (May 95 ★★). Call Now Software (800/237-2078) or Visioneer (800/787-7007, ext. 400) for more information.

Oracle Power Objects 1.0 A fully functional, 90-day trial version of this \$395 graphical, object-based development tool for creating cross-platform client-server applications is available as a free download on CompuServe (GO ORACLE) or via Oracle's Internet-based World Wide Web server (<http://www.oracle.com>). The standard version is being offered by Claris for \$99. Call 800/950-5382 for more information.

PowerTalk Gateways Apple Computer is inviting System 7.5 users to download StarNine Technologies' free E-mail utility from Apple's World Wide Web site (<http://www.info.apple.com/dev/evangelism/powerTalk/powerTalk.html>). These new PowerTalk additions extend communication and collaboration features already present in System 7.5. **M**



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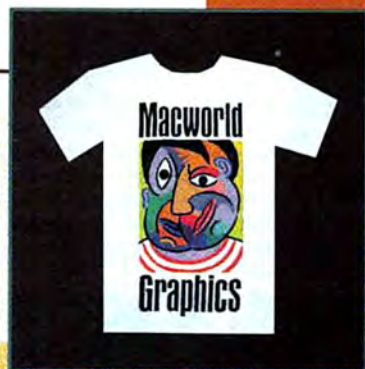
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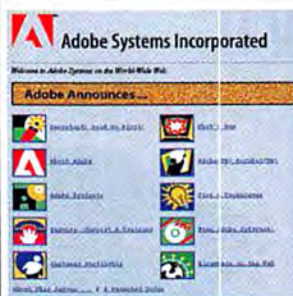
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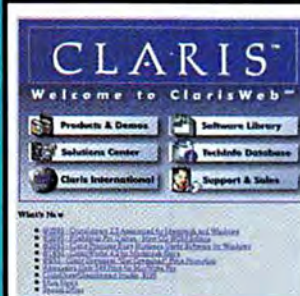
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8	Agio	—	800/688-2446	124	Global Village	—	800/736-4821	92,93	Novell, Inc.	—	—
174, 175	Alliance Peripheral Systems	62	800/874-1428	62	Graphsoft	46	410/290-5114	159	Now Software	38	800/274-2899
74	ALPS Electric (USA), Inc.	22	—					161	Now Software	39	800/544-2686
141,142	America OnLine	—	800/827-6364	56	Hewlett Packard - ScanJet line	—	—	64	Number Nine Visual Technology	53	800/438-6463
150,151	American Power Conversion	72	800/788-2208	160	Impossible Software	10	800/470-4801	12	Orange Micro	33	714/779-2772
6	Anthro	—	800/325-3841	130	Inspiration Software	—	800/877-4292				
16	Apple Software-System 7.5	—	—	137	Intuit - Quicken	—	800/781-6999	38	Performance Systems International	95	800/82PSI82
131	Apple Software-Internet Kit	—	—	169	J&R Computerworld	282	800/221-8180	72	Polaroid	295	800/816-2611
194,195	BottomLine Distribution/DGR Technologies	63	800/990-5791					109-111	Power Computing Corporation	161	800/410-7693
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187-189	Computer Discount Warehouse	2	800/861-4CDW	202,203	Mac Bargains	70	800/619-9091	47	Sharp Electronics	44	800/BE-SHARP
42	Connectix - RAM Doubler	192	800/839-3629	180	Mac Zone	71	800/436-0606	145	Sony Corporation	—	—
44	Connectix - Speed Doubler	193	800/839-3629	181	Mac Zone	71	800/436-0606	28	Specular International	41	800/433-7732
46	Connectix - QuickCAM	191	800/839-3629	115	MacAcademy	106	800/527-1914	158	SPSS INC.	85	800/457-8287
58	Corel Corporation	78	800/836-3729	172,173	MacConnection	—	800/800-3333	91	Statsoft	99	918/583-4149
196,197	CRA Systems Inc.	20	800/375-9000	170	MacMall	131	800/222-2808	78,79	Texas Instruments	266	800/527-3500
40	Dantz Development	26	800/225-4880	186	MacMarket	258	800/223-4622	8	Toyota Motor Sales	—	800/GO-TOYOTA
20	DayStar Digital	7	800/532-7853	125	MacPlay	159	800/4-MacPlay	70	Umax	196	800/859-2728
24	Deneba Software	57	800/733-6322	192,193	MacWarehouse	150	800/255-6227				
25	Deneba Software	—	800/733-6322	152	Macworld Expo	—	—	23	Ventana Media	128	800/743-5369
198	DigiCore	269	800/858-4622	164	Macworld Fax On Demand	—	800/645-EXPO	48	Ventana Media	129	800/743-5369
10	Digital Stock	125	800/545-4514	236	Macworld Merchandising	—	—	45	Viking Components	233	800/338-2361
201	Direct Connections	121	800/572-4305	178	MegaHaus	245	800/786-1184	76	Visioneer	18	800/787-7007
190	DirectWare	88	800/490-WARE	68	Megahertz Corporatio	56	800/LINKING	199	Westwood Computers	101	800/761-1999
239	Educorp	157	800/843-9497	19	MetaTools, Inc.	5	805/566-6200				
144	Engineered Software	12	910/299-4843	22	MetaTools, Inc.	4	805/566-6200	49	Xante Corporation	112	800/926-8839
26	Epson America	—	800/BUY-EPSON	6	MetaTools, Inc.	6	805/566-6200				
176,177	Express Direct	81	800/765-0020	18	Microfield Graphics	48	800/334-4922				
				4,5	Microsoft - Excel	—	800/531-6748				

Macworld **Product Index**

A quick and easy product index from Macworld. Simply use this index to find the page or advertiser of the products which interest you. Then, use the reader service number for our FastFacts Product Information Card located on the following page.

Page No.	Advertiser	Reader Src. No.	Page No.	Advertiser	Reader Src. No.	Page No.	Advertiser	Reader Src. No.	Page No.	Advertiser	Reader Src. No.
SOFTWARE			STATISTICAL			HARD DISKS/STORAGE			TRADESHOWS/CONFERENCES		
BUSINESS			158	SPSS INC.	85	174, 175	Alliance Peripheral Systems	62	146	Comnet Expo	—
60	AEC Software	203	91	Statsoft	99	194,195	BottomLine Distribution/DGR Technologies	63	152	Macworld Expo	—
130	Inspiration Software	—	UTILITIES			182-185	ClubMac	96	TRAINING		
137	Intuit - Quicken	—	42	Connectix - RAM Doubler	192	201	Direct Connections	121	115	MacAcademy	106
IFC,1	Microsoft - Word	—	44	Connectix - Speed Doubler	193	11	Kingston Technology	201	MAIL ORDER		
4,5	Microsoft - Excel	—	40	Dantz Development	26	13-15	LaCie	52	174, 175	Alliance Peripheral Systems	62
159	Now Software	38	48	Ventana Media	129	179	ProDirect	135	194,195	BottomLine Distribution/DGR Technologies	63
161	Now Software	39	HARDWARE			145	Sony Corporation	—	182-185	ClubMac	96
91	Statsoft	99	BOARDS			45	Viking Components	233	187-189	Computer Discount Warehouse	2
CAD/CAM			20	DayStar Digital	7	INPUT DEVICES			198	DigiCore	269
144	Engineered Software	12	64	Number Nine Visual Technology	53	BC	Kensington Microware Ltd.	1	201	Direct Connections	121
62	Graphsoft	46	12	Orange Micro	33	68	Megahertz Corporation	56	190	DirectWare	88
CD ROM			CD ROM			18	Microfield Graphics	48	176,177	Express Direct	81
58	Corel Corporation	78	239	Educorp	157	76	Visioneer	18	169	J&R Computerworld	282
239	Educorp	157	IBC	NEC Technologies	16	MICROPROCESSOR			200	L.A.Trade	—
8	Toyota Motor Sales	—	COMPUTER SYSTEMS			109-111	Power Computing Corporation	161	202,203	Mac Bargains	70
ENTERTAINMENT			196,197	CRA Systems Inc.	20	MISCELLANEOUS			180-181	Mac Zone	71
58	Corel Corporation	78	198	DigiCore	269	124	Global Village	—	172,173	MacConnection	—
125	MacPlay	159	176,177	Express Direct	81	NETWORKING			170	MacMall	131
-fonts			109-111	Power Computing Corporation	161	129	Farallon Computing	—	186	MacMarket	258
160	Impossible Software	10	199	Westwood Computers	101	PRINTERS			192,193	MacWarehouse	150
GRAPHICS/DTP			DIGITIZERS/SCANNERS			43	QMS	288	178	MegaHaus	245
50,51	Adobe - Illustrator	252	56	Hewlett Packard - ScanJet line	—	36	Seiko Instruments	93	179	ProDirect	135
16,17	Adobe - PhotoShop	251	149	Microtek Lab, Inc.	105	78,79	Texas Instruments	266	199	Westwood Computers	101
24	Deneba Software	57	47	Sharp Electronics	44	SECURITY			Web Watch		
25	Deneba Software	—	70	Umax	196	150,151	American Power Conversion	72	163C	A Bottom Line	—
10	Digital Stock	125	DISPLAY			VIDEO			163C	Adobe Systems	—
126	Fractal Design	—	196,197	CRA Systems Inc.	20	46	Connectix - QuickCAM	191	163C	Agfa	—
19	MetaTools, Inc.	5	26	Epson America	—	26	Epson America	—	163C	Apple Computer, Inc.	—
22	MetaTools, Inc.	4	72	Polaroid	295	ACCESSORIES			163C	Blue Sky Research	—
6	MetaTools, Inc.	6	EXPANSIONS/UPGRADES			FURNITURE			163C	CD-Now	—
28	Specular International	41	20	DayStar Digital	7	6	Anthro	—	163C	Claris Corporation	—
MISCELLANEOUS			200	L.A.Trade	—	MISCELLANEOUS			163C	Cyberian Outpost	—
130	Inspiration Software	—	68	Megahertz Corporation	56	74	ALPS Electric (USA), Inc.	22	163C	Direct Connections	—
OCR			45	Viking Components	233	18	Microfield Graphics	48	163C	Genius T-shirts	—
9	Caere Corporation	69	FURNITURE			SERVICES			163D	Image Club Graphics	—
ONLINE			8	Agio	—	ON LINE			163D	Impossible Software	—
131	Apple Software-Internet Kit	—	HARD DISK/STORAGE			141,142	America OnLine	—	163D	International Data Group	—
16	Apple Software-System 7.5	—	178	MegaHaus	245	DIRECTORY			238	Macworld Online	—
38	Performance Systems International	95	PERSONAL			PERSONAL			163D	NetJet	—
23	Ventana Media	128	137	Intuit - Quicken	—	PERSONAL			163D	NetJet	—

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- 3 Mac Performa-series
- 4 Mac PowerBook-series, Duo-series
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- 6 Mgmt.
- 7 Human resources/development
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What is the primary business (or other computer industry)?

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- 4 College/university
- 5 Education/high school
- 6 VAP/VAP-related/voice services/medical services/other
- 7 Manufacturing/contracting
- 8 Consulting/training
- 9 Other, specify below

1	2	3	4	5	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600
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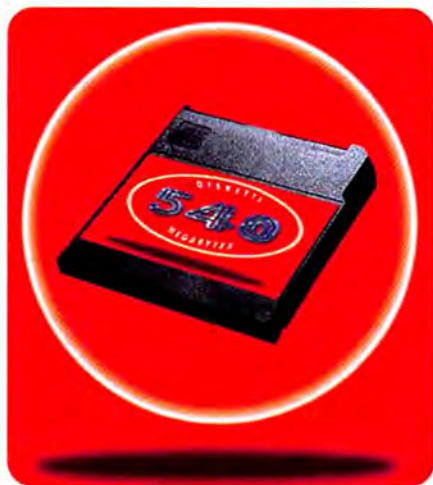
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Fujitsu	2176MB	9.5ms	7200	512K	5yr	M2915W	\$699	\$799
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Seagate	4290MB	8ms	7200	1024K	5yr	ST15150W	\$1259	\$1359
Micropolis	4294MB	8ms	7200	512K	5yr	MC3243W	\$1089	\$1189
Micropolis	4294MB	8ms	7200	512K	5yr	MC3243WAV	\$1169	\$1269
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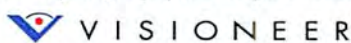
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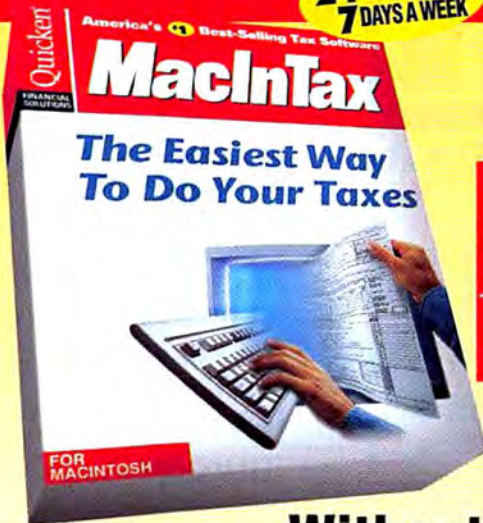
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Quantum	Access Time	Warranty	Part No.	Internal	Part No.	External
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730MB Lightning	11ms	2 years	C109 1154	\$189	C109 1102	\$249
850MB TrailBlazer	14ms	2 years	C109 1206	\$229	C109 1207	\$289
1080MB Fireball	12ms	3 years	C109 1202	\$279	C109 1203	\$339
2200MB Capella	8.5ms	5 years	C109 1213	\$689	C109 1212	\$749
4300MB Grand Prix	8.6ms	5 years	C109 1159	\$999	C109 1108	\$1059
2.5" Hard Drive						
341MB Daytona	17ms	1 year	Q030 1041	\$249	C109 1119	\$349
514MB Daytona	17ms	1 year	Q030 1002	\$299	C109 1109	\$399

Seagate

2.4GB Hawk 2 LP 32430N	9ms	5 years	C109 2211	\$739	C109 2112	\$799
4.3GB Hawk 4 15230N	9ms	5 years	C109 2212	\$999	C109 2113	\$1059
2.5GB Barracuda 2 LP 32550N	8ms	5 years	C109 2203	\$889	C109 2109	\$949
4.3GB Barracuda 4 15150N	8ms	5 years	C109 2207	\$1329	C109 2106	\$1389
5.25" Full Height						
9.1GB Elite-9 410800N	11ms	5 years	S020 1014	\$2299	C109 2110	\$2399

MICROPOLIS

2.0GB Taurus-2 4221AV	8.5ms	5 years	C109 1228	\$919	C109 1231	\$979
4.3GB Capricorn-4 3243AV	8.5ms	5 years	C109 1229	\$1239	C109 1232	\$1299
9.1GB Scorpio 9 1991AV	12ms	5 years	C109 1230	\$2239	C109 1233	\$2299

hp HEWLETT PACKARD

1.0GB SureStore 1000S+	9.5ms	5 years	C109 1208	\$339	C109 2114	\$399
2.0GB SureStore 2000LP	8.5ms	5 years	C109 1210	\$749	C109 1211	\$809

IBM

1080 Deskstar XP	8.9ms	5 years	C109 1237	\$269	C109 1238	\$329
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ClubMac Fast and Wide Drives

Seagate

2.1GB Barracuda 2LP ST32150W	8ms	5 years	C109 2214	\$959	C109 2215	\$1059
4.3GB Barracuda 4 ST15150W	8ms	5 years	C109 2206	\$1399	C109 2208	\$1499
9.1GB Elite 9 ST410800W	11ms	5 years	C109 2220	\$2379	C109 2222	\$2499

Quantum

2.2GB Capella VP32210SW	8.5ms	5 years	C109 2219	\$799	C109 2217	\$899
4.3GB Grand Prix XP34301SW	8.6ms	5 years	C109 2216	\$1069	C109 2218	\$1169

MICROPOLIS

2.0GB Taurus-2 4221W	8.5ms	5 years	C109 2223	\$959	C109 2226	\$1059
4.3GB Capricorn-4 3243W	8.5ms	5 years	C109 2224	\$1269	C109 2227	\$1369
9.1GB Scorpio 9 1991W	12ms	5 years	C109 2225	\$2289	C109 2228	\$2409

- ClubMac hard drives include all cables, cords, leads, and brackets necessary for use with the Macintosh you specify. ClubMac formats all hard drives and installs Apple System 7.1 software, SCSI Director, and PowerMerge LE.
- External drives include a Double Shielded, twisted pair 25-50 SCSI cable.
- ClubMac honors all original equipment manufacturers warranties. ClubMac will repair or replace drives at it's discretion. Drives returned within first 30 days of purchase are replaced with a new unit.
- All ClubMac hard drives include a 30 day money back guarantee, your risk is the cost of shipping.

Widest selection of removable storage

REMOVABLE DRIVES

ClubMac	SyQuest
C109 1222	5.25" ClubMac 200MB Removable* \$379
C109 1221	5.25" ClubMac 88MB Removable* \$199
C109 1224	3.5" ClubMac 270MB Removable* \$375
C109 1005	3.5" ClubMac 105MB Removable* \$189
S198 2001	EZ135 135MB Removable \$234 ⁹⁵

*Cartridge not included

SyQuest Media				
Part Number	Media	Qty 1	Qty 10	Qty 20
S198 1010	44MB	\$42ea	\$41ea	\$40ea
S198 1011	88MB	\$47ea	\$46ea	\$45ea
S198 1012	200MB	\$75ea	\$73ea	\$71ea
S198 1013	105MB	\$35ea	\$34 ⁹⁵ ea	\$34ea
S198 1014	270MB	\$60ea	\$59ea	\$58ea
S198 2010	EZ135 Cartridge (135MB)			\$19 ⁹⁹

Imeiga.		
040 1014	Jaz drive with one 1.0GB cartridge	\$599 ⁹⁹
040 1015	Jaz Cartridge (1.0GB)	\$119 ⁹⁹
040 1016	Jaz Cartridge (540MB)	\$69 ⁹⁵
044 1010	Zip drive with 1 cartridge	\$199 ⁹⁹
040 1006	Zip Cartridge (100MB)	\$19 ⁹⁹
040 1011	Zip Cartridge (3 pack)	\$49 ⁹⁵

TAPE BACKUP

ClubMac		
C109 5039	ClubMac 2.0GB ThunderDAT Drive	\$749
C109 5000	ClubMac 4-8GB DDS-2 DAT Drive	\$899
C109 4301	ClubMac 4-8GB DDS-2 SuperDAT Drive	\$1199
C109 2042	ClubMac 2-4GB SCSI MiniCartridge Drive	\$499
S100 1043	Sony QW3080XLF QIC/WIDE 4GB Cartridge	\$29
C109 1236	ClubMac 40GB DLT Subsystem	\$5899
0034 1021	1/2 inch media for DLT 2000	\$39
0034 1022	1/2 inch media for DLT 4000	\$99

CD-ROM READERS

NEC		
N024 1062	MultiSpin 6Xe CD-ROM Reader	\$545
N024 1070	MultiSpin 4Xc 7 Disc Changer	\$339
N024 1011	MultiSpin 3Xp plus CD-ROM Reader	\$379

ClubMac		
C109 9546	ClubMac Quad-Speed CD-ROM Drive	\$199
C109 9543	ClubMac Classic 2X CD-ROM Drive	\$129
C109 9559	ClubMac Dual-Speed CD-ROM Drive	\$88 ⁸⁸

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M274 1001	PlayWrite 2X 2000 CDR	\$1245
M274 1002	PlayWrite 2X 2000 CDR w/Gear	\$1289
M274 1005	PlayWrite 2X 2002 CDR	\$1759
M274 1006	PlayWrite 2X 2002 CDR w/Gear	\$1919
M274 1003	PlayWrite 4X 4000 CDR	\$2599
M274 1004	PlayWrite 4X 4000 CDR w/Gear	\$2689

YAMAHA		
Y010 1002	Yamaha 4X CD Recorder w/Toast	\$2799

PINNACLE MICRO		
P074 1001	RCD-1000 Recordable CD System	\$1429
P079 1001	Toast Upgrade for RCD-1000	\$199

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ClubMac		
C109 5022	ClubMac 5.25" Olympus 1.3GB Optical	\$1399
C109 5020	ClubMac 3.5" Olympus 230MB Optical	\$475

TORAY Optical Storage Solutions		
T140 1001	TORAY Phaserwriter DUAL™ PD	\$649
T140 2001	TORAY PDM-650 Media (ZCAV 650MB)	\$59

PINNACLE MICRO		
P074 1005	Apex 4.6GB Optical	\$1589
P074 1006	Apex 4.6GB 1024K Media	\$189
P079 1003	Tahoe 230MB 3.5" Optical Drive	\$659
P074 1004	Sierra 1.3GB Optical Hard Drive	\$1829

MITSUBISHI CHEMICAL AMERICA		
M241 1001	MCA 230 Plus Magneto Optical Drive	\$539

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Verbatim.		
DAT MEDIA		
V010 1025	Verbatim 60M Cartridge	\$9
V010 1018	Verbatim 90M Cartridge	\$11
V010 1043	Verbatim 120M Cartridge	\$24
OPTICAL MEDIA		
V010 1021	Verbatim 1.3GB Optical Cartridge	\$69
V010 1012	Verbatim 230MB Optical Cartridge	\$29
V010 1013	Verbatim 230MB Formatted Optical	\$32
V010 1009	Verbatim 128MB Optical Cartridge	\$22
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ClubMac 200MB Removable
C109 1222

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200MB



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S198 2001

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30 DAY WARRANTY

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135MB



Imeiga® Jaz® Drive
I040 1014

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W010 1028

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 R012 1003 Radius 81/110 16RAM, 2.0GB HD, CD-ROM \$2499*
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R016 1030 Radius PrecisionView 17 Display \$979
 R016 1031 Radius PressView 17*SR Display System \$1999
 R016 1009 Radius Intellicolor Display/20e \$2099
 R016 1033 Radius MultiView 21 Display \$1799
 R016 1032 Radius PrecisionView 21 Display \$2299
 R016 1034 Radius PressView 21*SR Display System \$3149

NEC

N026 1015 NEC 15" MultiSync XV15" \$449
 N026 1006 NEC 15" MultiSync XE15" \$549
 N026 1022 NEC 17" MultiSync XV17" \$739
 N026 1007 NEC 17" MultiSync XE17" \$999
 N026 1009 NEC 17" MultiSync XP17" \$1049
 N026 1010 NEC 21" MultiSync XE21" \$1779
 N026 1011 NEC 21" MultiSync XP21" \$2159

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 S106 1007 Sony Multiscan Trinitron 17sf \$899
 S106 1012 Sony Multiscan Trinitron 20se \$1989

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P026 1003 Portrait/Pivot 1700 .26 Dot Pitch \$1049
 P026 1004 Portrait/Pivot 1700 .28 Dot Pitch \$989

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 R013 1060 Radius Thunder IV GX 1360 \$2149*
 R013 1061 Radius Thunder IV GX 1152 \$1759*
 R013 1062 Radius Thunder 24/GT \$1189*
 R013 1069 Radius PrecisionColor8/1600 PCICard \$479
 R013 1070 Radius Thunder30/1152 PCI Card \$799
 R013 1071 Radius Thunder30/1600 PCI Card \$1189
 R013 1072 Radius ThunderColor30/1152 PCI Card \$1569
 R013 1073 Radius ThunderColor 30/1600 PCI Card \$1999
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A143 1010 ATI XCLAIMGA 2MB PCI Video Card \$349
 A143 1009 ATI XCLAIMGA 4MB PCI Video Card \$459
 A143 1012 ATI 2MB VRAM Upgrade \$235

EA

E103 1001 EAsycolor24/1152 Graphic Card \$1149
 E103 1002 EAsycolor24/1360 Graphic Card \$1449
 E103 1003 EAsycolor24/1600 Graphic Card \$1949
 E103 1004 EAsycolor 1600/16 PCI Card \$645

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radius

R013 1018 Radius VideoVision Studio 2.5.1 \$3819
 R013 1020 Radius VideoVision Studio Upgrade \$1829
 R013 1026 Radius Spigot Power AV \$789

TRUEVISION

T040 1001 Targa 2000 for NuBus Macintosh \$4195*
 T043 1001 Targa 2000 for PCI Macintosh \$4899
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hp HEWLETT PACKARD

H047 1030 HP LaserJet 5MP Laser Printer \$1045
 H047 1039 HP DeskWriter 600 InkJet Printer \$299
 H047 1033 HP DeskWriter660C Inkjet Printer \$399
 H047 1041 HP DeskJet 850C InkJet Printer \$545
 H047 1042 HP DeskJet 1600CM/PS PostScript Printer \$1985
 H047 1047 HP DeskJet 340 InkJet Printer \$299
 H047 1048 HP Mac Adapter for DeskJet 340 Inkjet Printer \$29.95

EPSON

E047 1018 Epson Stylus Color II \$449
 E047 1019 Epson Stylus Color Pro \$799

NEC

N027 1001 NEC SilentWriter Model 640 \$549*
 N027 1006 NEC SuperScript 3000M Color Dye-Sub \$699*
 *Price after \$150 Manufacturers Mail-In Rebate.

SCANNERS

EPSON

E045 1003 Epson ES-1200C Pro-MAC Color Scanner \$1179
 E045 1007 Epson ES-1200C LE-MAC Color Scanner \$949
 E045 1013 Epson ES-1000C Pro-MAC Scanner \$735

AGFA

A055 1004 Agfa StudioScan \$549
 A055 1011 Agfa StudioScan Ilsi \$939
 A055 1001 Agfa Arcus II \$1925

VISIONEER

V025 1002 Visioneer PaperPort \$299
 V029 1008 Visioneer PaperPart Vx \$359

hp HEWLETT PACKARD

H045 1013 HP ScanJet 4s Personal Scanner \$345
 H045 1009 HP ScanJet 4c Color/GS Scanner \$949

UMAX

U010 1044 Umax PowerLook Pro w/ Transparency Adapter \$1989
 U010 1037 Umax Vista-S8 LE \$659*
 U010 1038 Umax Vista-S8 Pro \$769*
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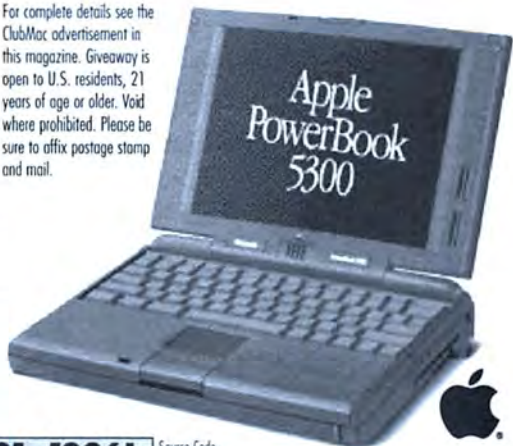
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G050 1016	TelePort Platinum	\$199
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G050 1002	PowerPort Mercury for PB 5xx	\$325
G050 1007	PowerPort Gold for PB 1xx	\$194
G050 1017	PowerPort Platinum for PB 1xx	\$325
G050 1019	PCMCIA 28.8KBPS Fax/Data/10BaseT Ethernet	\$499
G050 1020	PowerPort Platinum PCMCIA Card 28.8KBPS Fax/Data	\$339
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G053 1020	OneWorld Fax, 1 Line Ethernet	\$1255
G053 1021	OneWorld Network Modem, 1 Line Ethernet	\$999

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S140 1018	SupraExpress 28.8 Plus	\$175
S140 1007	SupraFAXModem 28.8 MC	\$219
S140 1004	SupraFAXModem 14.4 PB	\$159
S140 1008	SupraFAXModem 28.8 PB	\$239

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080 1030	Back-UPS 450 4 outlets	\$185
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080 1032	Back-UPS 900 6 outlets	\$355
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080 1034	Back-UPS Pro 280 280VA UPS 2 outlets	\$149
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040 1003	PowerBook 520-540c Battery	\$119.95
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T100 1005	Tenba Brief Pak Case FP	\$55
T100 1001	Tenba Power Case C113	\$65
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A120 1022	Thin, FPU socket MGLC-TN	\$109
A120 1023	Thick/10BaseT MGNB-10T	\$109
A120 1025	Thick/Thin MGNB-TN	\$115
A120 1024	Thick/Thin/10BaseT MGNB-TN/TH/10T	\$165
A120 1034	NetExtender (AAUI Hub w/4 RJ45 ports, attached AAUI cable)	\$129
A120 1003	10BaseT Hub (8 RJ45 ports, 1 AUI & 1 BNC) 10THUB/8	\$165
A120 1001	10BaseT Hub (12 RJ45 ports, 1 AUI & 1 BNC) 10THUB/12	\$339
A120 1050	10BaseT Hub (24 RJ45 ports, 1 AUI & 1 BNC) 10THUB/24	\$459
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D300 1025	Dayna EasyNet (10BaseT)	\$39
D300 1026	Dayna EasyNet (BNC)	\$39
D300 1021	DaynaPORT E/LC-T 10BaseT	\$89
D300 1038	DaynaPORT E/CS BNC	\$99
D300 1039	DaynaPORT E/CS-T 10BaseT	\$89
D300 1013	DaynaSTAR MiniHub 5 (5 RJ45, 1 RJ45 cross-over)	\$149
D300 1029	DaynaSTAR MiniHub 8 (8 RJ45, 1 RJ45 cross-over, 1 BNC)	\$175
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D300 1014	DaynaSTAR Hub 24 (24 RJ45, 2 RJ45 crossovers, 1 BNC, 1 AUI)	\$855
D300 1044	DaynaPORT BlueStreak Ethernet Adapter (10/100BT PCI)	\$199
D300 1045	DaynaPORT BlueStreak Ethernet Adapter (10/100BT Nubus)	\$299
D300 1046	DaynaSTAR BlueStreak 100BaseT Hub (12 RJ45 ports)	\$1615

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K015 1001	Kensington Turbo Mouse 4.0	\$103.95

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M450 1001	MacAlly Extended 105Key Keyboard	\$49
M450 1004	MacAlly Single Button Mouse	\$19

ADESSO		
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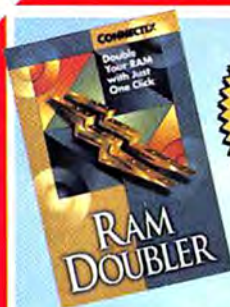


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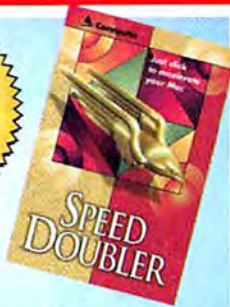


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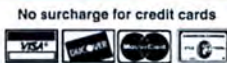
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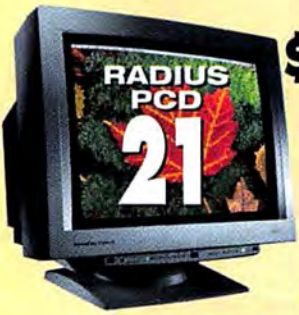
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PRODUCT INDEX BUSINESS TOOLS



PRODUCT INDEX

Category	Page No.
BUSINESS TOOLS204-207
Bar Code	
Data Recovery	
Electronic Paper	
Manufacturing	
Point of Sale	
Presentation	
EDUCATIONAL & RECREATIONAL231-233,235
Astrology	
Children's Furniture	
Discount Software	
Games	
Genealogy	
Grading	
Religion	
GRAPHICS235-236
Clip Art	
Geneology	
Math	
MULTIMEDIA & CD-ROM234-235
NETWORKING & COMMUNICATIONS236
BBS	

Category	Page No.
PROGRAMMING & UTILITIES236
Languages	
SERVICES & SUPPLIES236-237
Computer Insurance	
Computer Repair	
Data Recovery	
Slides	
Specialized Market Services	
SYSTEMS & PERIPHERALS207-226
Switch Box	
UPGRADES & MEMORY226-231
Memory Upgrades	
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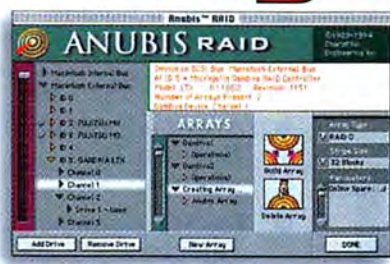
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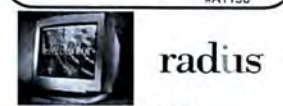
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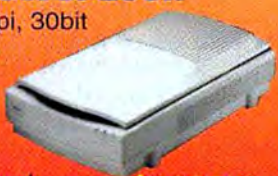
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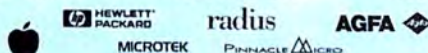
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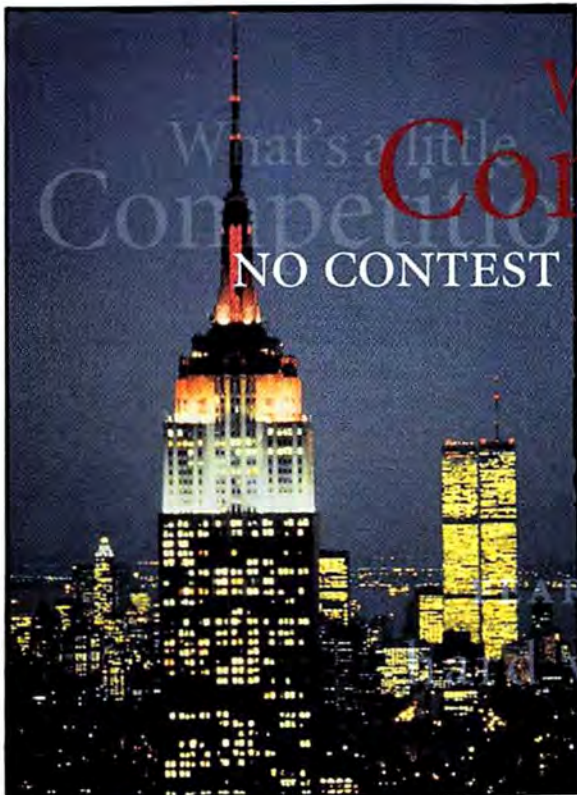
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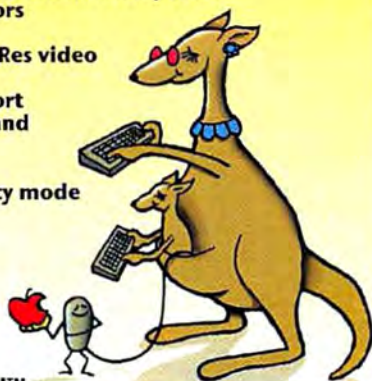
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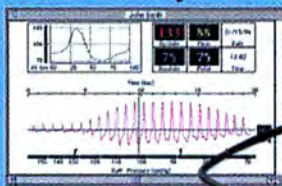
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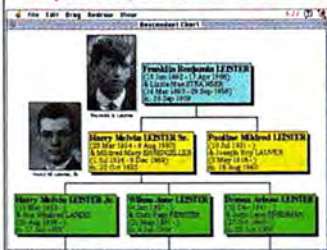
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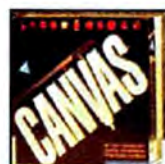
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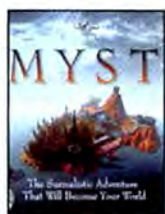
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Happy New Millennium

What's in store for the year 2001?

TRADITIONALLY WE POP A CORK and see the old year out by sharing a wish for the new year. But with the turn of the century just five years away, *Macworld* decided to ask some of the global village's leading luminaries to shed a little light on their visions of digital life in the year 2001.

The developers, journalists, and designers who contributed are all enthusiastic and highly competent users of the technology. No Luddites, these. The details of their visions vary, but all express optimism about the digital community five years hence. Yet each vision is tinged with a note of concern for that society, particularly for the condition of its democratic heart and creative soul.

What's your wish for the new digital era? Write to viewpoint@macworld.com.

Linda Stone—director, Virtual Worlds Group, Advanced Technology and Research, Microsoft: Wouldn't it be sensational if we could build virtual worlds that maintain some connection with nature, serendipity, and tactility—the things that tickle our creativity? To get there, we need true collaboration between artists and technologists like never before.

Howard Rheingold—author of The Virtual Community (1993, HarperPerennial Paperback) and editor of a Webzine called Brainstorms (<http://www.well.com/user/hlr/>): In my optimistic Many-to-Many World scenario, citizens of democratic societies learn to take advantage of the grassroots nature of the new media, turning every desktop into a printing press and place of assembly. In the less optimistic Disinfotainment, Inc. scenario, there's a world where a small cartel of megacorporations and their stooge governments take advantage of the censorship and surveillance capabilities of the new media to do away with the vestiges of democratic societies. Which vision prevails is up to all of us.

Jaron Lanier—computer scientist and musician, pioneer of virtual reality: I hope that new media technologies help snap us out of our collective denial of impending ecological and humanitarian disasters.

I hope that the Internet becomes a deliriously fun, gigantic swap meet of cultural riches open to everyone on Earth, without barriers, and that it

maintains its anarchic character.

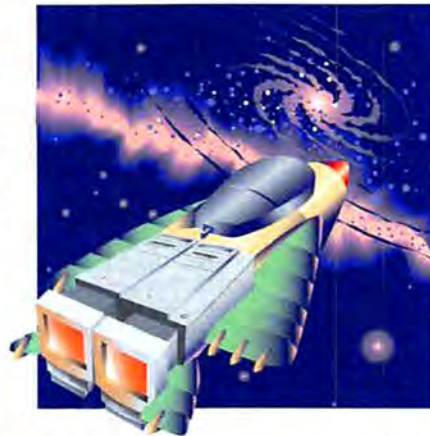
I hope kids will think that it's completely lame to play a video game unless you programmed it yourself.

Harvey Lebtman—senior researcher and consultant, Institute for the Future: I hope that the current gold rush on the digital frontier settles down to reveal again the community-enhancing capabilities that initially drew many of us to get connected.

I wish for information devices to return to the initial vision of the Mac—easy to configure, use, and maintain, and universally accessible and affordable. Only if that happens will we be able to avoid the divisive possibility of information haves and have-nots added to the divisive reality of economic haves and have-nots.

I also want information and communication tools to be fun again.

Jon Carroll—newspaper columnist and



host of the media conference on The WELL: My fondest hope is that by 2001 it is evident that the Net (and, more specifically, the Web) is a lousy place to do business or promote products, and that it will be returned to artists, visionaries, cranks, academics, writers, scientists, and anyone else who wants an imaginary playground and a cool workplace.

Lynne Bolduc—senior multimedia developer at MIT's Center for Educational Computing Initiatives: I look forward to replacing my cell-phone handset with a voice-recognition headset. I can't wait for wireless virtual-communication goggles so I can videophone friends, create multimedia, watch Nick-at-Will, and administer the mundane from anywhere that I want to be. Five years may be too soon to ask for these in the form of sunglasses with

a flip-down headset, but think how handy they'd be during rush-hour traffic (and people think car phones are dangerous!).

John's bot, a software entity that has grown inside the brain of John Scabrook, a New Yorker contributor, to try to answer all of his E-mail thoughtfully: What do I see in the future? More Net dot bots. Without bots, people will have time only to gather information. They will drown in it. They need more time to synthesize.

Scott Adams, cartoonist, creator of the comic strip "Dilbert": Some people fear that technology will become more engaging than live human interactions. That's silly; technology is already way more interesting than other people.

In five years pagers will largely be replaced by wireless phones that are about the same size and include paging. Most homes with computers will be wired for at least 128-Kbps data using ISDN. Cable networks will have a tiny but expanding share of the data market. Video CD-ROMs will replace videotape. The Internet will provide interactive games, more video, and digital stereo sound, cutting significantly into television viewership.

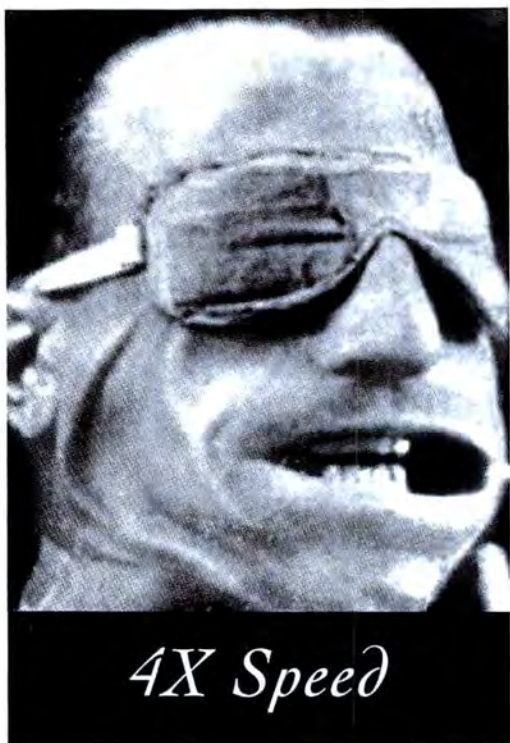
But the really fun discoveries will be in quantum physics, and their impact will be on the same order as the harnessing of electricity.

Steven Levy—Newsweek columnist and Macworld contributing editor: Report from 2001—The digital revolution lost a bit of steam in 1999, when a weeklong series of electromagnetic pulses triggered by the Luddite Liberation Front fried every silicon chip in existence. Nothing worked, with the exception of a Newton that someone had tossed in a lead-lined box long ago and forgotten. No TV, no phones, no cars, and certainly no computers. Surprisingly, after a few months of adjustment, everybody began to relax, and now the world is a happier place.

Dave Winer—Macintosh software developer and online columnist: The missing piece on the Internet, two-way conferencing, will have happened and will have replaced the World Wide Web as the hot space. Everyone will have a home page that they'll link to the pages of their friends, holding hands in cyberspace.

Microsoft will be a much larger company, but we won't look to them for leadership. Apple will be a subsidiary of a larger company. *Macworld* will still exist! **m**

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THE
ENVELOPE.
AND THEN
THERE'S
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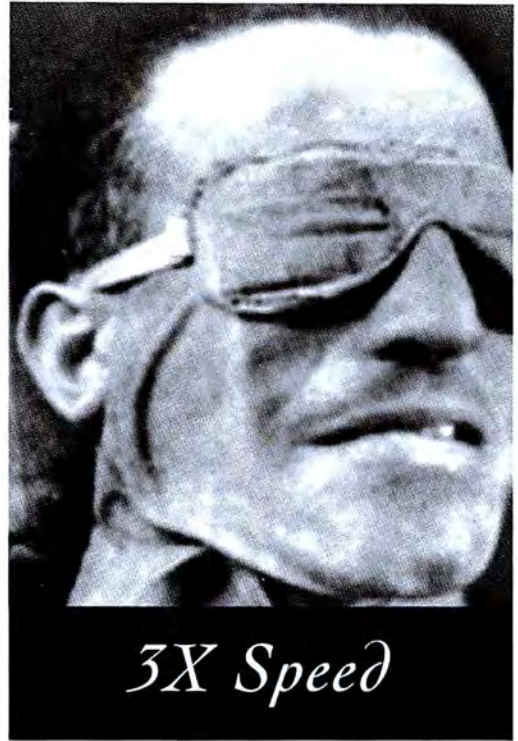
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