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happen revelations here in
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You begin

With a hunch.

You begin

At zero.

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   Are filled in for you.
   Automatically.

2. You enter numbers.
   You click AutoFilter
   And the data you want to see
   Rises to the top
   So you can focus on
   What you need to focus on.

3. You want to slice
   And dice your numbers.
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Software That We Use

What's inside Macworld's Macs—and why

As writers and editors, we at Macworld spend countless hours evaluating Macintosh hardware and software products with a single purpose in mind—to help readers make the best possible buying decisions. Even so, we’re constantly asked what software we use ourselves. So I finally decided to try to answer this question.

This turns out to be no trivial task. Macworld is not an especially large company, but its 100-plus employees operate in different departments such as editorial, design, circulation, ad sales, and production—each with a different set of requirements. Fortunately for me, our information-services department was just completing an audit of software and hardware and was able to provide me with recent profiles of every staffer’s hard disk and a tally of the most frequently used applications. Even a cursory look at this data showed me that Macworld’s staff uses far too many products to list or even categorize, so this month I focus on just a few of the major categories of applications that account for most of our day-to-day work. (I’ll talk about utilities, system enhancements, and the fun stuff in a future column.)

More than just what people use, I wanted to know how they feel about the software they use, so I formally polled the entire company. My query netted a boatload of comments. After poring over disk profiles and reading everyone’s comments, I was struck by the individuality of computer use. That means you should take the following comments with a large grain of salt. Though thought-provoking, these individual remarks are highly subjective and not intended as advice. They reflect the feelings of users at Macworld. Only our published reviews provide our thorough and systematic assessment of a program’s strengths and weaknesses.

War of the Words

The arrival of Microsoft Word 6 sparked a lot of commotion around here. Just as it dominates the marketplace, so Word is the dominant word processing program at Macworld. With software, our staff typically upgrades versions quickly to take advantage of the latest features and to avoid the confusion created by varied file formats. But early adopters of Word 6 warned their colleagues this was a product over the edge. After more people had a chance to try out the new version, the most common reaction was to stick with Word 5. Some people upgraded anyway to take advantage of Word 6’s advanced features: as one contributing editor put it, “I need character styles, revision tracking, annotation, and scripting, and I need them badly. This program has the features I’ve been clamoring for, for years!”

Word 5 holds out complaining bitterly when they received files in Word 6 format. Not only could they not read the files, but they “would not be upgrading anytime soon.” Even after the speed improvements in version 6.0.1, one editor wrote, “Out of principle and anger, I’m still not using Word 6. I love the auto-bullet and auto-numbering and auto-spelling-correction features in Word 6, but I’ll try to get these elsewhere rather than use this product.”

Quite a few users decided the time had come to investigate alternatives. Some settled on WordPerfect, Nisus, or WriteNow (causing those who had long ago abandoned Word in favor of these products to smile smugly). Others looked around but ended up back with Word 5.1. “After the hellacious experience with Word 6.0, I tried WordPerfect 3.1, but it’s not as well implemented as Word,” one editor said. She was particularly dissatisfied with WordPerfect’s styles.

Database Dilemmas

In the database-management arena, the main conflict we see is between Claris FileMaker’s ease of use and Microsoft FoxPro’s unique relational powers, which exact a toll of complexity. This comment, from a member of our editorial production department, is fairly typical: “FoxPro is our de facto corporate standard, but I use FileMaker when ever possible since I can hack it myself.” Over the years Macworld has used a number of relational database programs, but no one, not even our programmers, has ever really been satisfied with them. Some time ago we switched from 4D to FoxPro. Now nearly half the Macworld staff uses FoxPro, but no one says anything nice about it. Some were downright disdainful: “I use FoxPro only for our one relational database and it’s a dog: it crashes a lot, it has lots of glitches in display, and it is awkwardly designed for user interactions.”

Our shared FoxPro database inspired a long soliloquy from an administrative assistant: “I characterize my relationship with FoxPro as a dysfunctional one. While I need to access FoxPro for numerous tasks, I find myself yelling over a coworker’s cube partition for information rather than looking it up in the database. It demands that I quit other running operations to give it breathing room and yet it still insists on wigging out, giving me error messages and forcing me to quit and restart... On the other hand, it gives my system a sort of humanity and continues...”
gives me a scapegoat for my mistakes." An editor viewed his problems with Macworld’s FoxPro database less personally: "I need a relational database, and this is the one our programmer chose. Note that the end user and the programmer are not the same person, so when the database doesn’t work quite the way I want it to, changes take longer to implement."

He’s right to draw that distinction. Moreover, you can’t compare FoxPro and FileMaker directly, because only the former is relational. I think what our users respond to in FileMaker is that it embodies the Mac’s native virtues of approachability and elegance. It’s one of Macworld’s real workhorses, and most of the people who use it adore it. One advertising salesperson called it her “lifeline. We’ve really put this database to the test and we’re pretty darn happy with it, though I wish it could do goofy things like autodial and fax.” An editor commented, “With some of the whizzes we have at Macworld, we can get FileMaker to do almost everything a relational database can do.”

He looks forward to the release of a relational version of FileMaker—and he’s keeping his fingers crossed. Balancing usability and power is an especially daunting challenge for databases.

**Laying It All Out**

Like most businesses, Macworld relies on core productivity applications like word processors, database managers, and spreadsheets (we couldn’t live without Excel—end of story). But as a magazine publisher, we really take page-layout software through its paces. At one time we relied solely on Aldus PageMaker. Gradually we switched to QuarkXPress for some of the more design-intensive layouts, and now the magazine is designed entirely in QuarkXPress. Yet PageMaker still has its partisans, people who respect its elegant interface, ease of learning, and excellent customer support. We use it for some relatively simple jobs such as in-house communications and invitations, and some staff members choose it for personal projects.

Still, when it comes to our demanding design and prepress work, QuarkXPress has won more hearts at Macworld. One designer commented, “By comparison, to me PageMaker seems clunky, tedious, and illogical. Quark’s measurement palette tells you what’s what when you arrange a section. You can organize multiple columns of type quickly and easily, trusting the program to line everything up for you. With PageMaker you have to painstakingly direct each one to its position and then hope it doesn’t move when you’re not looking.” Another designer said QuarkXPress’s many commands and controls, such as type rotation and arbitrary line widths, eliminate the need for workaround.

**Finding That Sweet Spot**

This exercise really brings home how hard developers must work to figure out when users will willingly pay the price for additional features and when they won’t. As customers, this is not our problem; we have a right to demand products that meet our needs. And though to developers we users may seem a fickle bunch, we genuinely admire programs that make sensible design trade-offs.

Still, as customers we should be careful not to expect a program to do things its developers never intended. This is the standard to which Macworld holds its reviewers. It’s worth noting that most of the programs mentioned in this column received four stars in Macworld reviews. And that’s our official opinion.
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Circle 295 on reader service card
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Call 800-538-9696, ext. 830, and we'll send you a complete Apple Internet Server information kit. Or visit our WWW site at http://abs.apple.com.
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Sound Advice

ONE FACTOR THAT YOU DIDN'T mention in "Quad-Speed CD-ROM Drives" (June 1995) is audio compatibility. As an owner of both an AppleCD 150 and an APS T3501 (4X)—as well as being a shareware author of audio-CD software (Audio Strip GH)—I know that there are significant differences in audio control quality between these drives. Apple drives ship with the AppleCD Audio Player, an elaborate, attractive program that allows, among other things, saving track titles and programmatic playback. The APS drive comes with a much more limited player, it does not support a smooth fast-forward mode, its driver is not 100 percent compatible with the Apple player, and you cannot easily use it to import QuickTime sound files directly from an audio CD as you can with recent Apple drives.

I certainly don't want to pick on APS in this regard; I am uniformly satisfied with the T3501 as a CD-ROM reader and with APS as a company. I am just using it as an example of problems users might consider when choosing between an AppleCD 600 or AppleCD 300 and a third-party drive.

Glenn R. Howes
via the Internet

According to APS, choppy fast-forward operation results when the CD-ROM is not connected to a dedicated SCSI bus. Testing of three different drives—including the T3501—on a Power Macintosh 8100/100 all produced the same choppy results.

APS’s compatibility testing between the T3501 and Apple’s CD-ROM driver and player produced no incompatibilities. APS agrees that the APT Audio CD player, which ships with the T3501, has fewer features than the Apple software, but anyone with an APS T3501 can use Apple’s CD-ROM software and expect full compatibility.

APS invites readers with further compatibility questions to call APS Technologies at 816/483-6100.—Ed.

BAD NETIQUETTE

IN A RESPONSE TO A LETTER UNDER the heading “FTP, FPU Confusion,” in the June 1995 issue, you recommend logging on to an ITP server as anonymous, and you say that you don’t need a password. I find this a slightly irresponsible statement—it is considered a breach of netiquette if you do not use your E-mail address as the password when logging in anonymously. I’m aware that this convention is not enforced and often not followed, but it doesn’t help if the idea of it being OK to not give your address is spread by a popular magazine.

Thomas Reed
via the Internet

Still a Happy Mac

ADRIAN MELLO WAS A BIT PREMATURE in writing the obituary for the happy-Mac icon (State of the Mac, June 1995). The new Mac OS logo only comes on after the start-up sequence begins, in place of the “Welcome to Macintosh” message. The happy Mac appears where it always has—when the Mac recognizes a start-up disk. And until Apple rewrites the ROM, that’s where it’ll be.

Robert Vasquez
via America Online

Our Sacrilege Is Showing

IN DAVID POGUE’S JUNE 1995 DESKTOPCritic article, “Your Roots Are Showing,” he gave an incorrect name for the LDS Church, referring to it as the “Church of Latter-Day Saints.” The proper name is The Church of Jesus Christ of Latter-day Saints. While this is a minor issue or nonissue to some, I would think your otherwise excellent publication would be more careful than that. David also referred to this church as a “company” when he stated they asked that Personal Ancestral File not be included in the article.

Bob Walker
via the Internet

Macworld Myopia

MACWORLD! SURELY YOU ARE JOKING! Auditing the three pictures on page 91 (“Top Office Printers,” June 1995), I find that the middle picture is by far the most pleasant. Picking hardware based on these pictures alone, one would pick the product that produced the middle picture, but you chose the one on the left. Not trusting my own judgment, I asked my wife the same question. Answer: the middle picture.

Perhaps you mislabeled the pictures?

Charles Hussey
via the Internet

While the output sample that you like, from the Apple LaserWriter 16/6000 PS, is brighter, the sample from the Lexmark Optra LX shows finer details and smoother shapes, especially in the shadows.
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CORRECTIONS

- The system bus speed of the Power Macintosh 5200/75 LC was incorrectly listed in News (“The Sleekest Desktop Mac Yet,” June 1995). The 5200/75 LC’s system bus runs at 37.5MHz.
- The $39 price listed for Netscape Navigator doesn’t include a printed manual; the price with this manual is $59 (Reviews, May 1995).
- Personal Backup, which ships with Lomata’s Zip drives, is published by SunStar, not Highwire as reported (Reviews, July 1995).
- The correct phone number for Quark is 303/894-8888 (Graphics news, August 1995).
- To connect two notebook computers via modem, the correct communication string for (dial) is ATTD, not ADA (PowerBook Notes, August 1995).
- We mistakenly reported the latest Microsoft Office upgrade as 4.3.1; the current version is 4.2.1 (“Microsoft Fixes Up Office,” News, August 1995).
- The correct phone number for Gold Disk’s VideoDirector 1.5 is 408/982-0200 (Reviews, June 1995).

These differences are clearer in the original samples than they appear in the magazine. That said, both printers earned the Editors’ Choice designation, and there’s always room for individual preference.—Ed.

A Call to Clone Makers

WILL SOMEBODY PLEASE MAKE A Mac keyboard with a pointing stick similar to those common on MS-DOS laptops? Personally, I find this configuration (with a pencil-eraser-size joystick located between the G and H keys) ergonomically superior to even the PowerBook’s touch pad. This is a great example of an opportunity for clone makers to distinguish themselves by offering alternative solutions.

One final request: make an ADB desktop version, too, so we touch typists can enjoy the benefits at home or in the office, as well as on the road!!

Phil Natividad
via the Internet

Canadian Costs

I JUST THOUGHT I’D LET YOU KNOW that your $18 U.S. postage surcharge (or whatever it is) on Canadian subscriptions makes the cost (nearly $50 Canadian) prohibitive for those of us with limited budgets. Until you stop charging that ridiculous amount of money, I’ll be forced to buy only the odd issue or two. Don’t bother telling me it’s for S&H, because I subscribe to a couple of other U.S. magazines (larger than yours and shipped via first-class mail) that only charge around $6 for S&H to Canada.

Another thing I have been wondering is when you people are going to set up a Web page like MacUser’s and MacWeek’s, with some articles and the table of contents from the print edition of Macworld.

Mike Schwartz via the Internet

A Call for Programmers

A S A HIGH SCHOOL SOPHOMORE, I secured a bank loan and bought a Mac 128K for $3500 in 1984. Months later, in August of 1985, an accident left me completely paralyzed below my neck. I completed my rehabilitation, and my mother began researching available computer interfaces. She discovered a desk accessory called Screengetter that acts as a keyboard, allowing me to type via a hardware mechanism called Headmaster. The keys are arranged in two rows with most-used keys bunched toward the center. All the capabilities of a standard keyboard—the alphabet, digits, option, %, and shift equivalents—are there.

When System 7.0 and the 68040 processor arrived, I discovered that Screengetter was incompatible with both. But more than that, Personics had been bought out, and Screengetter was summarily discontinued. I looked into alternative keyboard software, but everything I found was awkward—obviously designed by someone who did not have to use it.

My inability to use the latest hardware and System is stifling, to say the least. I also stand to lose completely on such emerging technologies as Copland, OpenDoc, CHRP, and so on.

Eventually, I bought a Compaq. To
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my surprise, I found an incredible piece of software on my Windows desktop. WordWrite is completely configurable keyboard software—everything from keyboard shape to number of and arrangement of keys. I simply read the manual and re-created ScreenTypy on my PC. Unfortunately, WordWrite will never equal the Macintosh OS. Even though I can use the same keyboard layout on the two platforms, I am twice as productive on my Mac IIci as I am on my PC.

So what does this all mean? Bluntly, I ask for your help, not only for myself, but also for thousands of individuals trapped in the same predicament. I'm searching for a Mac programmer to create a piece of software similar to ScreenTypy for the newest Macs and Systems, with updates for Copland, Gershwin, and beyond. I would even settle for a System 7-compatible likeness of ScreenTypy. I'm prepared to compensate a programmer at the going rate, whatever it is.

One day, when my schooling is finished, I hope to develop keyboard software for the Mac myself, and have it bundled with Mac system software. But that's another story.

Shannon Hullen
via the Internet

Anyone interested in learning more about hardware and software solutions for disabled computer users can call the Alliance for Technology Access (800/455-7970). More resources are listed in “Real Problems, Real Solutions” (PC World, November 1994).—Ed.

Hot-Site Backup

JUST FINISHED READING “SUCCESSFUL Workgroup Backup” (May 1995). Thank you for a very informative examination of backup hardware, software, and procedures for preserving data integrity. Macworld always seems to present instructive articles decoding the arcane terminology that is pervasive in information technology vernacular. The only item I would add to your backup article is a discussion about off-site “hot sites” for restoring computer operations in the event of a catastrophic disaster. This site should be able to load backup media and restore users to normal working conditions. Such a plan is necessary in time-sensitive operations like customer service or order entry [not to mention publishing—Ed.]. There are third-party companies available that specialize in providing hot-site contingency hardware.

Thanks again for your fine article.

Dave Owen
via America Online

Too Many Tool Bars

JUST INSTALLED THE NEW VERSION of Microsoft Word. Just for the hell of it, I opened all the tool bars. Remember that Word 15 spoof you ran a while back (The Desktop Critic, February 1994) that was all tool bars with a postage-stamp-size work area? Word 6 just made it a reality.

Luckily, you can turn them off.

Keith Boglewicz
via America Online

Both the picture and the column are available for download in the “Mentioned in Macworld” software library on America Online.—Ed.

Flying-Toaster Alert

MIGHT BE THE ONLY COMPUTER GEEK religiously devoted to watching Beverly Hills 90210 (along with my girlfriend, who got me hooked), but here’s an interesting observation I made upon watching the latest episodes .... After Dark, the Microsoft Word of screen savers, seems to be the name of the local hangout for the kids of Beverly Hills. Plus, on the door of the club and all along the inside walls are the famous flying toasters. It appears Berkeley Systems is indeed ready for prime time.

Dave Salvador
via the Internet

Nice try, blaming your girlfriend. Macworld editors, fingers on the electronic pulse of America, noticed the flying toasters scattered around our second-favorite teens’ late-night hangout some time ago. We’ve also noticed that Melrose Place resident Billy insists on using a PowerBook as his desktop machine at the office, but we digress. Berkeley Systems spokesperson Monica Granados says the entire crew of 90210 are After Dark fans and originally approached Berkeley Systems for permission to use the famed winged toasters and screen-saver name. She says After Dark has also made appearances on The X-Files and Murphy Brown.

Hey! Captain Janeway and crew could run into aliens piloting flying toasters on the far side of the galaxy ...—Ed.

Letters should be sent to Letters, Macworld, 501 Second St., San Francisco, CA 94107; via fax, 415/442-0766; or electronically to CompServe (70370,702), MCI Mail (294-8078), America Online (Macworld), eWorld (Macworld), AppleLink (Macworld), or via the Internet (letters@macworld.com). Include return address and daytime phone number. Due to the high volume of mail received, we can’t respond personally to each letter. We reserve the right to edit all letters. All published letters become the property of Macworld.
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IBM Nixes Mac Clone  After lengthy deliberations, IBM has decided not to license today’s Macintosh hardware design and Operating System. Gary Griffiths, director of business development for IBM’s Power Personal Systems, told Macworld that the marketing and sales-channel efforts would be too great to justify building an IBM-branded Mac clone prior to the release of the Mac OS on the converged hardware reference platform (CHRP). Apple expects to ship CHRP-based Power Macs in late 1996 or early 1997. IBM recently indicated that it intends to offer the Mac OS as an option on CHRP-based machines.

Quark Delays Software Revisions  By the time you read this, Quark (303/894-8888) plans to have released a free maintenance upgrade (version 3.32) to QuarkXPress, available via online services. But Quark will deliver several new programs later than expected. QuarkXPosure, an image-manipulation and -editing program jointly developed with Japan’s JVC, is now expected to ship around January 1996, not August 1995. QuarkXPress 4.0 is likely to ship around February 1996, not this fall. And the multimedia-authoring adjunct to QuarkXPress, code-named Orion, is now expected to ship around March 1996, not September 1995. The delays are due to changes in the products’ features and interfaces, as well as the integration of PixelCraft’s ColorAccess color-separation software into QuarkXPosure. Quark would not confirm it, but it seems likely that ColorAccess will find its way into QuarkXPress 4.0, replacing the EfiColor software from Electronics for Imaging that is bundled with the current QuarkXPress version.

Also expected to ship around QuarkXPress 4.0’s release are upgraded versions of two other programs: Passport, a multilingual version of QuarkXPress aimed at European users, and Quark Publishing System, a QuarkXPress-based workflow-management system for publishers. Orion and XPosure will be Power Mac-only programs, while the others will be available for both 680X0 and Power Macs, as well as Windows.

More Mergers  Several companies have bought others, continuing a trend toward consolidation in the computer industry. Adobe Systems, which bought Aldus a year ago, has now purchased Frame Technology for $500 million. Frame’s key product is FrameMaker, a multiplatform publishing program for creating paper and online documentation.

Adaptec, the largest SCSI card maker in the PC market, has bought Trillium, maker of well-regarded (and widely bundled) Remus RAID software for Macs. Boca Research has purchased Hayes Microcomputer, the once-leading modem company that filed for bankruptcy last year. Boca will keep the Hayes product line as well as its Boca and Practical Peripherals lines.

After making an unwanted bid to buy Lotus Development, IBM reached an agreement with Lotus to acquire the software maker for $3.5 billion. Although Lotus makes several applications, like the spreadsheet 1-2-3 and the word processor WordPro (formerly named Ami Pro), IBM’s interest was in Lotus’s Notes system for exchanging mail, files, and electronic bulletin boards. Notes’ closest competitor is Novell’s GroupWise, which has a similar client and server makeup.

Delrina has agreed to be acquired by Symantec, the leading utilities company. Delrina dominates the Mac and Windows markets with its Fax Pro and WinFax fax software and with its FormFlow forms-design package. As Symantec has grown through several acquisitions over the last few years, it has cut back on developing new utilities and productivity software for the Mac.
While Internet browsers are becoming all the rage, they have the same limitations as most telecommunications technology: the content you browse—be it text files, page layouts, spreadsheets, presentations, or databases—is separate from the contents on your desktop. Apple plans to use its forthcoming OpenDoc technology to change that, letting you browse the World Wide Web, send E-mail, or transfer Internet files from within OpenDoc-aware documents and applications. A collection of OpenDoc parts (Apple's terminology for components) code-named CyberDog, lets users create documents that embed live links to almost any Internet resource. (For details on OpenDoc, see "OpenDoc and OLE 2.0," Macworld, November 1994.)

For example, say that you need to track the cost of producing a breakfast cereal based on the prices of wheat, tiny marshmallows, and cardboard boxes. Prices constantly change, and you want to keep your spreadsheet current with the least amount of effort. CyberDog will let you build a document with embedded Internet links that constantly fetch and display the most recent price information available from the Internet. Rather than making you hunt down the information yourself, CyberDog gets it automatically.

Although OpenDoc appears to hold enormous potential to change the everyday experience of computing, some early examples of OpenDoc components—such as a spelling checker that any application could use—didn’t really show anything revolutionary. Instead, they were small refinements to current approaches. But CyberDog really shows how OpenDoc can help transform the computing experience.

It aims to make using the Internet as easy as launching a Read Me file. And it aims to make including Internet-based information and links in an electronic document as easy as including clip art.

For example, while a teacher searches the Internet for information about hurricanes, CyberDog’s Log part could automatically track all Internet sites that the teacher accesses. Later, the teacher could sort log files chronologically, alphabetically, or by type of site.
The teacher could then create a ClarisWorks document about hurricanes that in addition to text contains the most recent satellite photo of the Caribbean from a constantly updated Web site, a link to a Usenet weather newsgroup, and links to appropriate FTP sites. The satellite picture would automatically update, and clicking on the links would let students connect with the correct Internet resource.

Building the Internet links would take only a few simple steps. For example, to build the link to the weather newsgroup, the teacher could create a button in the ClarisWorks document by dragging a button icon from an OpenDoc button tool onto the hurricane document. Then the teacher would drag the icon representing the URL (an address to a Web page) for that group from CyberDog's log onto the new button and label the button Weather Talk. The final document could then be distributed to and used by CyberDog-equipped computers that don't have the teacher's original log file. Students who click on that button would automatically be brought to the newsgroup without leaving ClarisWorks.

In business use, after a session of Net surfing you could drag log files of all relevant Internet resources into a CyberDog notebook file that would look much like the current Note Pad DA. A long URL such as http://www.unitedmedia.com/comics/dilbert could be given a shorter name such as Dilbert Site. Double-clicking on a notebook entry would bring you to that Internet location. The text–file–size notebooks could be given to other CyberDog users, freeing users from having to hunt down the sites you discovered.

Even more simply, log items could be dragged onto the desktop where they would appear as standard file icons. A busy executive, for example, could have an icon that connects to a Web page displaying the latest baseball box scores or stock prices.

Apple says CyberDog doesn't force new standards or protocols on the Internet. Instead, Apple wants to make existing standards easier to access. Therefore, Apple plans CyberDog parts to support the Web, FTP, WAIS, Gopher, and E-mail, along with viewers for data types such as GIF, JPEG, and sound files. Apple hopes other developers will build OpenDoc parts to support other capabilities or emerging technologies—such as MUDs (multiuser documents), Adobe Acrobat, or VRML (Virtual Reality Modeling Language)—that Apple's CyberDog collection won't provide support for.

But for CyberDog to become more than a clever alternative to existing Internet tools such as Mosaic and Sparkle, Apple needs third-party developers to integrate OpenDoc support into their current and future productivity applications. And the enthusiastic reception of CyberDog at Apple's recent developer conference may help shift some companies from merely announcing OpenDoc support to actually shipping OpenDoc software.

By bringing new capabilities to Macintosh computing, rather than just enhancing existing capabilities, CyberDog shows the potential of OpenDoc to change the way users interact with and share data. CyberDog gives developers and users a compelling example of what OpenDoc can do. —IM FEELEY

**Radius Unveils New Clone**

**A MOVE TO THE MASS MARKET**

Radius engineers have been burning the midnight oil, and by the time you read this the company expects to be shipping its second Power Macintosh clone, dubbed the 81/110.

The 81/110 is a stripped-down version of Radius's System 100—which is to say it's nearly identical to Apple's Power Macintosh 8100/110. The 81/110 sports a 110MHz PowerPC 601 CPU, three NuBus slots, 16MB of RAM (72-pin SIMMs), a 2GB hard drive, built-in Ethernet via an AAUI port, and a quad-speed CD-ROM drive. The 81/110 will not come with a video card in the PDS slot, so resellers have the opportunity to customize the system, presumably with Radius components. Radius (408/541-6100) expects the 81/110 to carry a street price of around $5600. Company executives have also hinted that a version of the 81/110, using the Telecast professional video system might be in the works, but would not commit to a time frame.

Radius's executive suite has also been busy: in June, Radius announced an exclusive two-year agreement with distribution-channel juggernaut Ingram Micro. Ingram will distribute all of Radius's CPUs throughout North America. Also, Radius will pay IBM to manufacture motherboard and complete systems for Radius clones. This relationship in no way involves IBM's licensing the Mac OS for IBM-branded clones. —CAMERON CROTTY

### In Brief

**Help for Mobius Customers**

Sonnet Technology (714/261-2800) is supporting and selling an accelerator card from the defunct Mobius. Owners of the 40MHz Speedster 040 card can call Sonnet for technical support and software upgrades. Sonnet will sell Mobius's accelerator for the Mac II line for $399 and is shipping an improved version of the card with System 7.5 compatibility.

**Simultaneous Data, Voice Calls**

In an unusual display of cross-hardware connectivity, Apple joined IBM and AT&T at the recent PC Expo to demonstrate how Macs can link with tele­phone switches from AT&T and Siemens-Rolm, using the Versit standard. Developers incorporating the standard into their applications will be able to route data coming in through a telephone switch to users' computer screens simultaneously with the call. For instance, a caller's phone number can be identified through caller-ID technology, or when the caller punches an account number on the telephone keypad. That in turn triggers a database search of a customer account.

**Internet "Decency" Promoted**

A bill passed by the Senate in June would hold phone companies, commercial online services, the Internet, and bulletin board services liable for obscene or harassing content they transmit, including E-mail, binary files, and posted messages. At press time, the House of Representatives was considering a less severe bill. Meanwhile, Microsoft, Netscape Communications, and Progressive Networks have formed the Information Highway Parental Empowerment Group (IHPEG). The group aims to create indus­trywide standards to let parents prevent their children from accessing certain materials and to let content providers and rating services assess material's appropriateness.
News

More Power for Performas

APPLE ADDS TWO MODELS, BEES UP THREE

With the mid-July release of two new Performas, Apple has begun the serious transition of its home-oriented Performa line from 680X0 to PowerPC CPUs. The new all-in-one Performa 5200 and the flat, desktop Performa 6200 join the previously released Performa 6100 in the Power Mac home family.

The Performa 5200 is the same machine as the Power Mac 5200 LC, introduced for education buyers this spring (see “The Sleekest Desktop Mac Yet,” News, Macworld, June 1995), while the 6200 is the same product recently released in Europe under the same name (see “Apple Unveils Power Mac 6200 Series,” MacBulletin, July 1995).

The 5200 series uses a 75MHz PowerPC 603 CPU and has 8MB of RAM (expandable to 64MB). The 5200CD model with an 800MB hard drive costs $2000, while the 5215CD model with a 1GB drive costs $2300. It comes with a built-in monitor, mouse, and standard Apple keyboard.

The 6200 uses the same motherboard as the 5200 but comes in a more traditional desktop case, similar to that of a Performa 630. There are five models: the 6200CD has 8MB of RAM, a 1GB hard drive, and a 15-inch monitor; the 6216CD is a 6200CD without the monitor; the 6220CD is a 6200CD with 16MB of RAM and video-in jacks, but no monitor; and the 630CD is a 6220CD with an MPEG card and a 15-inch monitor.

All the new Performas include a quad-speed CD-ROM drive, a 14.4-Kbps internal fax modem, and Performa 630-style video-in and communication slots. Apple also has a new Performa 6100 variant with a larger hard drive.

Who Needs Visual Basic?

FINALY, MAC TOOLS TO LET ANYONE PROGRAM

When Windows users can’t find software that meets their specific business needs, they can turn to tools such as Microsoft’s Visual

Special Report

First Add-on Cards for the New PCI Macs

Macintosh professionals already have more PCI graphics and SCSI accelerators to choose from than they ever did NuBus accelerators, and in other product areas such as networking, digital video, and specialized cards, the number of PCI vendors equals the number working in NuBus. Thanks in large part to the influence of Windows developers in this market, PCI card prices are also lower than NuBus card prices in many cases.

Graphics

• ATI Technologies offers two graphics cards. The Xclaim GA 4MB supports 24-bit color at resolutions up to 1152 by 870 pixels and 16-bit color at 1600 by 1200 pixels. The company also sells the Xclaim GA 2MB, which supports 24-bit color at up to 832 by 624 pixels and 8-bit color at up to 1600 by 1200 pixels. A $249 memory module lets you expand the 2MB card to 4MB. The 4MB card costs $649, and the 2MB card is $449. 905/ 882-2600.

• Diamond Multimedia is selling the $569 Mac Multimedia Accelerator, which includes 4MB of VRAM and supports 24-bit color at resolutions up to 1152 by 870 pixels and 16-bit color at up to 1600 by 1200 pixels. The card also offers QuickTime and MPEG-1 software acceleration and scaling. An optional daughter card (price not determined at press time) provides hardware MPEG-1 decompression, dual video windows, and live video viewing from NTSC or PAL sources. 408/325-7000.

• EA Research plans two graphics cards (as yet unnamed), both of which aim to provide faster performance than the Power Mac 9500’s built-in video. One card released in June, offers 4MB of VRAM with a maximum 24-bit resolution of 1152 by 870 pixels at 75Hz, and a maximum 16-bit resolution of 1600 by 1200. The other card, available in September, will include 8MB of VRAM with a maximum 24-bit resolution of 1600 by 1200 pixels at 75Hz. An included daughter card will accelerate Photoshop, QuickDraw, and QuickDraw 3D routines. Both cards will offer energy-saving features and will include ColorSync 2.0. The 4MB card will cost $695; the price of the 8MB card has not been decided. 510/867-0697.

• Radius moves to PCI with three graphics cards. The ThunderColor 30 series cards with the included 4-DSP ColorEngine daughter card acce-
Basic and build their own applications. But Macintosh users don’t enjoy an equivalent broadly supported programming tool, and Microsoft doesn’t plan to port Visual Basic to the Mac.

To break into the corporate mainstream, Apple must ensure that businesses can find cross-platform custom-application-development tools that run on Macs and Windows computers. And those tools must exceed the standard set by Visual Basic—the program often used to give desktop machines access to a corporation’s crucial custom software.

That effort is finally starting to happen: as Visual Basic reaches the ripe old age of version 4.0, Apple, IBM, Novell, Oracle, PowerSoft, and others are developing new user-programming tools for the Macintosh that take aim right at Microsoft’s programming juggernaut.

Two of the upcoming Mac programs, Novell’s AppWare 2.0 and the Apple/IBM Denali project, step beyond the client-server mainstream of corporate development and let users build their own OpenDoc components, aiming to let businesses add custom functionality to any OpenDoc-aware application. The companies believe that taking advantage of OpenDoc will let businesses build better tools with less effort.

These programming tools aren’t as difficult to master as low-level languages like C and C++, but neither are they designed to create shrink-wrapped commercial software. Instead, you use them to build front ends to minicomputer databases (such as Oracle, Sybase, and Informix) and other custom business applications.

At least six new Macintosh business programming tools are planned:

- **Apple** (408/996-1010)

...and IBM plan to attack Microsoft head-on with an OpenDoc-development environment, code-named Denali, that will bring visual programming in BASIC to the Mac (as well as to OS/2, AIX, and Windows). Users will work with a scripting language similar to Visual Basic to build OpenDoc parts and integrate them into complete programs. The companies say their environment will run many Visual Basic applications (but initially not those with VBXs, a direct hook into Windows). Denali will support the Open Database Connectivity (ODBC) standard and eventually support Open Scripting Architecture. Apple says the product will be available by May 1996.

- **AppWare 2.0**, Novell’s cross-platform visual-development tool, lets users create applications and parts with canned software modules. Novell (801/429-7000) says that most Mac owners can master AppWare, which builds Network applications as well as stand-alone programs. Version 2.0 for the Macintosh is promised by the end of 1995, with the Windows version to follow in 1996. The price is not yet set.

- **Peregrine**, by Pictoric (902/475-4446), aims to let users create and compile client-server applications without writing code. Based on the

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**SCSI**

- **Adaptec** has shipped the AHA-2940W Wide SCSI accelerator. The card supports SCSI transfers up to 20 MBps and supports up to 15 SCSI-2 devices simultaneously in both asynchronous and synchronous modes. It costs $500, 408/945-8600.

- **Atto Technology** rolled out the ExpressPCI SC and ExpressPCI MC SCSI cards. The ExpressPCI SC has one SCSI Fast/Wide port, while the ExpressPCI MC has two SCSI ports. Together, the MC’s two ports support up to 15 SCSI devices. The ExpressPCI SC costs $395, and the ExpressPCI MC is $895, 716/691-1999.

- **Distributed Processing Technology (DPT)** introduced three SCSI cards and two RAID controllers. The SmartCache III SCSI cards—available with standard, Fast, or Fast/Wide support—offer optional support for up to 64MB of hardware cache with standard or Error Correction Code-protected SIMMs. An optional daughter card gives the boards hardware RAID front ends to minicomputer databases (such as Oracle, Sybase, and Infor...
visual Prograph CPX programming tool, Peregrine will be available by October in a $1495 single-user version and a $2495 multiuser version that includes links for Sybase and Oracle databases. Pictorius plans to add features such as a Power Mac–native compiler and links to other databases soon, with OpenDoc support coming in 1996.

- Oracle (415/506-7000) plans to bring its first low-end development and client-server tool to the Macintosh by October. The company says that Power Objects will be similar to Visual Basic but will make more use of object-oriented technology, provide superior database access, and build compiled applications. A stand-alone version of Power Objects will cost $399; a network version will cost $1999. Oracle also plans to bring its $3995 Developer/2000 enterprise development environment to the Macintosh by the end of the year. Developer/2000 will include OpenDoc features by early 1996, the company says.

- PowerSoft’s (508/287-1500) PowerBuilder 4.0, a popular client-server development tool for Windows users, continues its three-year-plus beta cycle on the Mac. The company says that, despite the long delay, it remains committed to bringing out the product. But PowerSoft won’t estimate when this might happen. PowerBuilder 4.0 for Windows costs $3295 in a single-user configuration.

- Other companies working on Macintosh development tools for corporate use include Andyne, Gupta, ParPlace Systems, and Uniface.

-Jim Feeley

**SPECIAL REPORT**

“First Add-on Cards for the PCI Macs” continued

modules allow the cards to support up to three Fast/Wide SCSI-2 or Fast channels, and thus multiple RAID systems. The SmartRAID PM3224 Fast card costs $1795; the SmartRAID PM3224W Wide card, $1995, 407/830-5522.

- FWB offers the $450 PCI SCSI JackHammer, a SCSI-2 Fast/Wide accelerator. The card is optimized for SCSI Manager 4.3 and is fully compatible with System 7.5. FWB includes the PCI SCSI JackHammer in its SledgeHammer VS for PCI and Sledge-Hammer FT for PCI RAID systems, 415/325-4392.

- MicroNet Technology has shipped the Raven Professional SCSI accelerator. One version has one SCSI channel and costs $595; the other version has two channels, supporting RAID 0 (no price was set), 714/453-6000.

- Western Digital has three SCSI accelerators that are compatible with SCSI-2 and SCSI-3 devices and offer direct memory access (DMA). The Fast WD7193 costs $249. The Wide WD7197 costs $299. The Wide WD7296 has five DMA channels, and costs $329, 714/932-5000.

Networking

- 4-Sight offers the $1995 SCII ISP card. Bundled with ISP Data Manager, it costs $2795, 515/221-3000.

- Asante includes four LEDs on its $269 Asante-Fast 10/100 PCI Adapter, to aid in troubleshooting, 408/435-8388.

- Dayna Communications plans to release the Dayna-Port 10/100 Ethernet PCI card by September, for about $260. 801/269-7200.

- Efficient Networks will port its ENI-155p ATM adapter by the end of the year, 214/991-3884.

- Farallon’s Fast Ethernet TX-10/100 Fast Ethernet card uses a Comchip set to take advantage of ComChip’s Parallel Tasking technology. The company’s estimated price is $249, 510/814-5000.

- Interphase offers the 5515 PCI ATM adapter card for $650, 214/919-9000.

Digital Video

Companies that have announced plans to offer PCI-based video-editing hardware for PCI Power Macs include Avid (508/640-6789), Data Translations (508/460-1600), Intelligent Resources (708/670-9388), Interactive Images (719/598-3894), Radius (408/541-6100), and RasterOps Truevision (317/841-0332). CONTRARY TO Apple’s reports, Fast Electronics (415/802-0772) currently has no similar plans.

Other Needs

- National Instruments plans a summer release for four Macintosh PCI products for scientists and engineers: the PCI-GPIB instrument-control card, $495; the PCI-MIO-16XE-50 16-bit data-acquisition card, $1295; the PCI-1200 12-bit data-acquisition card, $795; and the low-cost PCI-DIO-96, $395, 512/794-0100.

- Second Wave’s Xpanse PN series lets NuBus cards work with a PCI Power Mac. The Xpanse PN200 supports two NuBus cards and costs $3995. The Xpanse PN400 holds four cards and costs $995. The Xpanse PN800 holds eight cards and costs $1895, 512/329-9283.—Jim Feeley

**BUGS & TURKEYS**

FreeHand 5.0, from Macromedia (214/680-2060), is painfully slow opening files on a server storing both 4.0 and 5.0 documents—taking up to several minutes to open a file. The current version, 5.0.1, does not address the problem; support technicians hope it will be addressed in a future release.

If you schedule an alarm in Claris Organizer (Claris, 408/987-7000), make sure your computer is left on. The program won’t display at start-up alarms that went off while the Mac was shut down. Users can only hope this feature is added in a future version.

The 6115CD CD-ROM drive from Apple (408/996-1010) can’t accommodate a keyboard in front of its pizza-box-size CPU—the CD tray doesn’t clear the top of the keyboard. If you’re not careful, the keyboard also pushes against the CD’s eject button while you type.

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.

**First Add-on Cards for the PCI Macs**

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The complete picture.
Tantalizing Potential of Four CPUs

APPLE, DAYSTAR SET NEW STANDARD FOR FAST MACS

The Macintosh is finally breaking into a key technology for those who need maximum speed: the use of two or more PowerPC processors in a single computer to accelerate compute-intensive tasks dramatically.

The recently announced collaboration of Apple and DayStar Digital will initially produce multiprocessor technology for DayStar Genesis MP publishing clones, but it should extend to other Mac system makers over time.

Ideally, two-processor systems run properly coded applications twice as fast as single-processor systems with the same CPU; three-processor systems, three times as fast; and so on. This symmetrical multiprocessing, in which system and application tasks are distributed across the available processors, was once the province of specialty workstation vendors. It’s now offered by mainstream vendors such as Compaq—though primarily to speed up transactions with massive databases on Windows NT- and OS/2-based servers.

PowerPC processors are also well suited to symmetrical multiprocessing. Unfortunately, the Mac OS won’t support symmetrical multiprocessing until sometime in 1997; two OS generations from now. The Mac OS allows only asymmetrical multiprocessing, in which operating-system tasks must always be performed on one processor, while other tasks can be allocated partly to this main processor and partly to extra processors.

DayStar and Apple have developed an Application Program Interface (API) that modifies application software to take advantage of multiprocessing technology. Recent Macworld Lab tests of a prototype DayStar system show how well multiprocessing can work, particularly on large files. In applying Photoshop filters to a 10MB image, the Genesis MP system operated twice as fast as an otherwise identical single-processor system; with a 20MB image, the Genesis MP raced ahead at 2.8 times as fast.

Early users of the Apple-DayStar API include Adobe (mainly for Photoshop), Elastic Reality (for morphing and related virtual reality applications), and Strata (for StudioPro, Strata’s 3-D design and animation program). DayStar expects to offer the Genesis MP system by late summer; the above software vendors should have multiprocessor-aware applications around the same time.

The forthcoming CodeWarrior 7 from Metrowerks (514/747-5999) includes a multiprocessing library that should open the door to faster database processing, and keep Mac performance on publishing applications as good as or better than anything possible on any other PC for the foreseeable future. —CHARLES SEITER

What Multiprocessing Can Deliver on the Mac

Tests on a prerelease version of the DayStar Genesis MP multiprocessor Mac show what multiprocessing technology can offer. In going from a single-CPU system to a four-CPU system, Macworld Lab found average speedup of 2.6 times, and a range of speedups from 1.6 to 3.5 times. In no operation did the four-CPU system perform twice as fast as the single-CPU system. There are two main reasons we don’t get four-times speedups: one is that a certain amount of overhead goes to coordinating CPUs; the other is that few operations can be divided into four equal parts that can be executed simultaneously. Shown here are several operations that demonstrate different speedup amounts.

<table>
<thead>
<tr>
<th>Mode Change</th>
<th>Unsharp Mask</th>
<th>Sharpen</th>
<th>Sharpen More</th>
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<td>One CPU</td>
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Macworld Lab conducted its tests on a DayStar Genesis MP (a PCI-based Power Mac) with 64MB of RAM, a 4GB internal drive, and a 17-inch monitor driven by a 24-bit mode by an ATI 32MB GA video card. We used a 10MB test image and an early prerelease version of Photoshop 3.0; modified for multiprocessor use. We allocated 50MB of RAM to Photoshop. We tested operations with one 100MHz PowerPC 601 CPU and with four. The shipping Genesis MP systems will use PowerPC 604 CPUs. —Macworld Lab testing supervised by Danny Lee

Power Watch

THE LATEST ON PRODUCTS FOR THE POWER MAC

A newly native MapInfo 3.0.4 is now shipping for $1295. Users can upgrade from any previous version for $299. (518/285-6000).

- Optronics (508/256-4511) is offering a native PostScript Level 2 interpreter for the Desktop 3000 and Desktop Express image-setters. Current users can upgrade to the new software RIP for $3500.

- PowerFPU 1.0, the $99 native version of SoftwareFPU from John Neil & Associates (415/905-3000), is now shipping. Upgrades cost $50 from SoftwareFPU.

- White Pine Software (603/886-9051) has released native versions of its terminal-emulation packages, Mac320, Mac340, Mac320 Lite, and Mac340. Users can upgrade from version 1.3 for $25 for Mac320 Lite, $45 for Mac320, and $75 for Mac340; regular pricing is $99, $179, and $349, respectively.

- Software Ventures (510/644-3232) has released MicroPhone Pro for Power Macintosh 2.1.1.

—SUZANNE COURTEAU
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by Macworld Online Staff

Macworld Web Launch


In the spirit of the magazine, Macworld Online is committed to quality and service for our readers. Besides offering electronic access to a full year's worth of Macworld editorial, we also provide a slew of exclusive articles and files aimed at the savvy Mac cybernaut. Knitting all this information together are linking, searching, and interactive technologies.

Links to the World

Besides giving you the ability to view graphics and multimedia over the Internet, the Web introduces the marvel of linking. Simply click on a highlighted word or phrase—say, "modem FAQ" (frequently asked questions file)—and you might find yourself reading a document that resides on a server in Sweden or Australia.

Macworld Online constantly culls from the Web universe, links we think will be valuable to our readers, including those links from software and hardware developers wishing to provide in-depth information and easier access to tech support.

Successful Searching

All the data in the world would be useless if you couldn't find anything, so we've spent many hours refining our search functions. On the Macworld Online Web server, if you type the name of a product or category—fax modems, for instance—in our search box, you jump to a page that lists Macworld's most recent comparative overview of fax modems, any single-product reviews in the past year, and links to fax-modem tips that appear in columns such as Quick Tips and PowerBook Notes, plus a selection of communications shareware utilities you can download from our software library. You'll also find a selection of online-only articles on the subject.

Two-Way Communication

Macworld receives fewer letters than you might suppose. Without day-to-day feedback from readers, magazine publishing can become an ivory-tower exercise, so on our commercial online-service forums and now on our Web server, Macworld is pleased to host message boards that encourage suggestions, critiques, and exchanges among readers.

Macworld Online's interactive content already includes animated informational graphics, audio files, and games. Watch for the regular upload of new multimedia files, as well as a series of contests, polls, and collaborative documents. Hook yourself up to the Web and check us out—we're looking forward to seeing you.

Best of the Web

The Postcard Store is a charming Web site. Pick an electronic card from the many delightful choices and E-mail it to a friend. http://postcards.www.media.mit.edu/Postcards

Internet Tools Summary provides a robust compendium of Web helper applications and online utilities. http://www.ri.edu/Linux/Guides/decenji/itsols/toc3.html

The Star Trek: Voyager site is well worth the visit, even if you aren't a dyed-in-the-wool Trekker. http://voyager.paramount.com/Voyagerintro.html

The Internet Movie Database is a remarkable collaborative document that invites your perusal and input. http://www.cm.cf.ac.uk/Movies/moviequery.html

San Francisco's Exploratorium, a hands-on science museum, demystifies technology: this Web site, dubbed ExploraNet, complements the museum's efforts well. http://www.exploratorium.edu

CyberWire Dispatches are Brock Meeks's insightful bulletins covering everything from online-related legislation to industry and technology updates. http://cyberwerks.com:70/1s/cyberwire/cwd

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HARDWARE

CD-R 1002
Smart and Friendly combines its double-speed recordable CD drive with Asstarte's Toast CD-ROM Pro 2.5 recording software, selling the whole package for just under $2000. Toast supports audio CDs and most CD-ROM formats. The CD-R 1002 costs $1999 with Toast and $2999 when Macromedia Director and a limited version of Authorware are added to the ensemble. Smart and Friendly, 818/994-8001; fax 818/988-6581.

Elite XL 408 and Elite XL 1208
High-resolution 11-by-17-inch laser printers no longer cost as much as a small car. GCC Technologies' Elite XL 408 outputs 600 by 600 dpi on letter-size paper and 400 by 400 dpi on tabloid or A3 sizes. It ships with 4MB of RAM and 35 fonts; adding a standard 2MB SIMM enables the 408 to print 600 by 600 dpi on tabloid and A3 sizes. The Elite XL 1208 offers true 1200-by-1200-dpi tabloid or A3 output. It comes with 35 resident fonts, a CD-ROM with 250 more fonts, and a SCSI port. The printer integrates GCC's AccuGray technology, which improves halftone output. Elite XL 408 $1999, Elite XL 1208 $3999. GCC Technologies, 617/275-5800, 800/422-7777; fax 617/275-1115.

Impression Maker
Leave a shining impression by adding metallic-foil type and logos to your presentations, reports, and certificates. This foil imprinter lets you personalize covers including one of General Binding's six foil colors. It comes with 14- to 30-point Times Roman and Arial type-impression wheels, with more type styles planned, and supports graphic logos up to 2 by 1½ inches. Impression Maker accepts materials up to 12½ inches long and ¾ inch thick. $440. General Binding, 708/272-3700, 800/723-4000; fax 708/272-7087.

Joule PC Reader/Writer
This paperback-size SCSI device lets desktop Macs read and write to PC Cards (formerly PCMCIA cards), giving desktop machines the same advantages as their PowerBook 520 laptop cousins that are equipped with PC Card adaptors. Using this device, the Mac views any PC Card 2.1-compatible hard drive, fax modem, networking interface, or solid-state storage device as a standard SCSI device. Joule PC Reader/Writer offers transfer rates of up to 4MB per second. Available as a Joule Base for $589, a Joule Portable for $549, or a Joule Module for $549. La Cie, 503/520-9000, 800/999-1488; fax 503/520-9100.

PanaMedia 15 and PanaMedia 17
PanaVision fits two forward-facing speakers and a microphone into its PanaMedia monitors while increasing the width of the cabinet by only 1½ inches. Both the 15-inch and 17-inch models offer maximum Mac resolutions of 1024 by 768 pixels, 0.27mm dot pitch, push-button controls, and an on-screen adjustment menu. PanaMedia 15 5999, PanaMedia 17 5999. Panasonic Communications & Systems, 201/348-7000, 800/742-8086; no fax.

Scan-One Kit
The Scan-One Kit offers all the tools you'll need to integrate bar-code printing and reading into an existing database or accounting package. It includes Bar-One software for designing and printing labels, a Scan-One wand and software for reading bar codes, documentation, and an instructional video. The Scan-One Basic Kit costs $319. The Scan-One Professional Kit includes more-advanced software and sells for $429. Vertical Technologies, 801/576-9700, 800/477-5559; fax 801/576-5538.

StudioScan IIsi
Agfa's low-cost StudioScan IIsi color flatbed scanner runs up to five times as fast as Agfa's previous flatbed scanners yet offers better image quality and more bundled software. The StudioScan IIsi, aimed at small offices, design studios, and multimedia producers, has an optimal resolution of 400 by 800 dpi. It provides a 2.4-D dynamic range and generates a full-color preview in 17 seconds. The scanner bundles Agfa'S FotoLook 2.0 driver, FotoSnap automated scanning software, and FotoFlavor color-correction software, plus Adobe Photoshop LE and Corel OmniPage Direct OCR software. $995 company's estimated price. Agfa, 5086/745-5600, 800/424-8973; fax 508/696-6285.

VIP Scan
You know that pile of business cards you've been planning to type into a Mac contact manager as soon as you find a spare month? The speedy, pocket dictionary-size VIP Scan is an answer for reading business-card layouts. This SCSI scanner is built around an OCR engine that intelligently places contact information in the appropriate database fields, and is bundled with Now Contact. $199. La Cie, 503/520-9000, 800/999-1488; fax 503/520-9100.

SOFTWARE

Astound 2.0 for the Macintosh
Amaze your audience with the miracle of multimedia. Version 2.0 of this presentation software provides authoring capabilities, additional special effects, built-in animation capabilities, and support for both video and sound. Features include a slide sorter, outline view, speaker's notes, drawing tools, and a collection of templates. The package comes with a CD-ROM containing a variety of clip media, and you can also import your own PICT, GIF, TIFF, EPS, PCX, and Photo CD files. $249.95. Gold Disk, 408/982-0200, 800/982-9888; fax 408/982-0298, catherine@golddisk.com.

[CMYK] Squared
ElSoftware's solution to the color-management problem relies on creating color swatches for your output device. [CMYK] Squared generates CMYK process-f tint charts in increments ranging from 1 to 100 percent. You define the CMYK percentages and swatch size, and the application creates a chart collection based on those specifications. Requires 4MB of RAM, System 7, 16- or 24-bit color monitor recommended. $119. El Software, 216/241-1140, fax 216/736-8888; devil@implicot.com.

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NEW PRODUCTS

File Genie Pro
This utility for removable media maintains a catalog of every optical disk, SyQuest cartridge, CD-ROM, or floppy disk you insert in your Mac. In a matter of seconds, File Genie Pro can find any file on a disk by searching hard disks, network servers, and catalogs. Then it can either display the file's contents or open the creating application. If the file resides on an unmounted disk, File Genie Pro tells you which disk to mount. Requires System 7. Single user $59, five-user pack $349; ten-user pack $599. Duet Development, 408/559-3838, 800/383-8546, fax 408/559-7117; duetline@aol.com.

FreeMail Parent, FreeMail Call Home, and FreeMail Extended Family
An e-mail package that requires no computer network? FreeMail says it can be done. Relying on the imaxis's optical character recognition software. Then they can search full text, perform catalog searches, and place bookmarks on frequently accessed pages. A key feature of version 2.01 is improved document-retrieval performance. $3995 (includes scanning software, OCR software, server software, and four packages of the client software); Imaxis Start Up Pack $995 (contains scanning software, server software, and one client). Systems Engineering Solutions Inc., 703/573-4366, 800/622-9470; fax 703/207-9146; imaxis@sesi.com.

Internet Valet
Here's yet another product that promises easy Internet access. Internet Valet includes a copy of MacTCP and a free 14-day account with an Internet service provider. The product also comes with several Internet clients, including Eudora, a popular E-mail client; Fetch for retrieving files from FTP sites; NewsWatcher for reading Usenet newsgroups; TurboGopher for accessing Gopher sites; MicroPhone Telnet for remote log-on; and Enhanced Mosaic for browsing the World Wide Web. Requires 2MB of RAM, System 7; 14.4-kbps modem or TCP/IP network connection recommended. $49.95. Software Ventures, 510/644-3232, fax 510/848-0885; valet-info@svcdudes.com; http://www.svcdudes.com.

Connectix
Connectix announced Connectix Power D-1, a 1MB RAM Doubler. Connectix Power D-1 provides a simple, one-click interface to double your RAM. The software allows users to boot with additional memory instantly. Connectix Power D-1 also doubles your Mac's performance by increasing the RAM memory. By using Connectix Power D-1, users can run applications faster, reducing the time spent waiting for applications to load. The software is easy to use and is available for both Macintosh and Windows operating systems.

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VP and General Manager, Macromedia

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- **New Architron**
  
  BAGH's new version of this CAD product provides design and drafting tools for architects and designers. New Architron is based on an extended-precision floating-point data structure that supports complex surfaces. Users can move between 2-D and 3-D, maintain design intentions as objects are moved, and automatically create certain forms. New Architron's open Application Programming Interface permits the creation of custom applications. Requires Power Macintosh, 16MB of RAM, System 7; color monitor recommended. $499. BAGH Technologies, 514/273-0522, 800/561-0522; fax 514/273-3059.

- **Newt Tools**
  
  No, this isn't a set of tools to help Newt Gingrich enforce the Contract with America. It's a set of six integrated utilities for managing your Newton MessagePad. The Newt Tools main menu is the core application for the integrated tools. The ButtonBar launches applications; the Memory Tool performs diagnostics to alert you to potential data problems. With the Package Tool, you can move, delete, hide, and archive applications. The Soup Tool and Soup Editor help you manage your files. Requires Newton MessagePad, Newton Operating System 1.3, PC Card (formerly PCMCIA card) for storage recommended; software installation requires Mac SE/30, 4MB of RAM, System 7, and a high-density floppy drive. $44.95 company's estimated price. Ascribe Software, 415/331-0717, 800/732-8608; fax 415/331-0711; ascribe@ewworld.com.

- **PixelPutty Solo 1.5**
  
  This inexpensive modeling and character-animation software was designed by a professional animator so he could achieve the organic-looking 3-D models with naturalistic movement his work demands. PixelPutty Solo supports Renderman operations; nine types of spline curves, including Nurbs; and the ability to define the relationship between vertices on a mesh, for realistic sculpting and stretching effects, for example. Advanced animation features in the new version include inverse kinematics, vertex level alignment, and path animation with velocity controls. A MacRenderMan-compatible application, PixelPutty Solo supports RIB, DXF, and 3DGf file formats. $399. The Valis Group, 415/435-5404, 800/825-4704; fax 415/435-9862; valisgroup@aol.com.

- **ScreamSavers**
  
  Your coworkers will be too scared to snoop through your files when your computer is displaying Binary Software's ghastly ScreamSavers. This screen saver has 15 animated modules of wart-covered, disembodied heads that terrorize your desktop and scream through space. The included After Dark control panel provides password protection, and its Ecologic Power Manager will shut down an Energy Star-compliant monitor after a user-defined period of time. $44.95. Binary Software, 310/449-1481, 800/824-6279; fax 310/449-1473; binarysw@aol.com.

- **Session 2.0**
  
  This multitrack audio-editing system supports 2 channels of recording, 12 tracks of simultaneous playback, and digital parametric EQ. Session synchronizes to QuickTime video, and imports and exports mono and 16-bit stereo sound in .WAV, .AIF, .SDlI, QuickTime audio, and System 7 sound formats. Users can edit audio during playback. Requires Mac IITi, 8MB of RAM, 13-inch color monitor, System 7.1, QuickTime 2.0. AudioMedia Inc Sound Tools II for Mac IITi or Quadra-series machines. $395. Digidesign, 415/688-0500, 800/333-2137; fax 415/327-0777.

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Visual Arranger
If Schubert had used this product (or lived longer), perhaps he would have finished his Eighth Symphony. Visual Arranger lets both novice and experienced musicians create, compose, and arrange music. The software offers an icon-based layout for recording and arranging chord progressions, phrases, and melodies. Users choose from eight accompaniment groups: ballad, dance, jazz, Latin, pop, R&B, rock, and world music. Completed songs can be played on any MIDI device. Requires 68020-based Macintosh, 8MB of RAM, MIDI interface or MIDI-compatible sound card, MIDI tone generator or external keyboard, speakers. System 7.1. $59.95. Yamaha, 714/522-9937, 800/301-7076; fax 714/228-3913.

CD-ROMs

Baseball's Greatest Hits
Tired of all the noise about labor disputes and the late season? Let Baseball's Greatest Hits take you back to the heady days of yore. This CD has commentary from Mel Allen, audio clips, photographs, and rediscovered video clips such as Babe Ruth's legendary call of his own shot in 1932. It includes player stats and bios, team histories, and a trivia game. $49.95. The Voyager Company, 212/431-5199, 800/446-2001; fax 212/631-5799; http://www.voyagerco.com.

Science Navigator

Space Quest 6: The Spinal Frontier
Gamers rejoice: version 6 of this popular spoof on space adventures is here. In this game, space jockey Roger Wilco travels through the bloodstream of his cohort, corps member Stellar Santiago, passing through her vital organs on the way to her brain, where the evil Sarpeo awaits. The new version has more sounds, new code, and some of science-fiction spoofs. For all ages. $55. Sierra On-Line, 206/649-9800, 800/757-7707; fax 206/641-7671.

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Sci pays (dynamic, internally scrollable tables; all numbers can be instantly converted into a variety of on-screen customizable, presentation-quality graphs) • All content of Scir pays can be saved as data and used for output or be exported. Flexible facilities to perform analyses on specific subsets of data. Extremely large analysis designs. Unlimited size of files. Extended data storage. Unmatched speed (e.g., on a Mac IIx, arbitrary rotation of a 3D surface). Windows versions also available (can exchange data with Macintosh versions): STATISTICA/Win® $995, Quick STATISTICA/Win® $495.

Domestic add $10 per product, please specify type of computer with order. 1-800-day money-back guarantee.
Here’s what’s going on in our head. Pencil sketch is scanned into Adobe Illustrator. Rainbow color effect is created with Linear Gradient. Scanned eye is colorized in Photoshop to simulate a sunglass effect. Grid of green & black in the other lens is altered with Twirl filter. Circles are added to the bottom of the letter “A”. Pathfinder filter unites them. Letter is imported into Adobe Dimensions which adds perspective. Brush stroke is created with the Calligraphy tool and then painted with multi-color Gradient. The spreadsheet chart is converted into an Acrobat PDF file and imported. Light bulb glow is achieved with Shape Blending tool. Punk filter creates spikes on globe. Entire ad was created and spell checked using Adobe Illustrator 5.5.

Adobe Illustrator 5.5

Your mind is loaded with visions and ideas. What you need are the best tools to show them to the world. With Adobe Illustrator 5.5, the leading illustration and page design program, you’ve got an all encompassing creative resource for Macintosh that also runs native on the Power Macintosh. It’s loaded with features that add power and automate tasks once difficult or impossible in other drawing programs. These include trapping and text handling tools like tabs, smart punctuation and a spell checker. And you can import, export and edit any document from any application using the Acrobat Portable Document Format (PDF). You also get a free CD-ROM with 220 Adobe Type 1 fonts, tips and techniques, clip art and more. Turn your thoughts into reality. With Adobe Illustrator 5.5, what the mind wants, the mind gets. Call 1-800-521-1976, Extension J1201 for information or to purchase our exciting Adobe Graphic Sampler CD with tryout versions, interactive tips, and more. Or visit our web site at http://www.adobe.com/.

If you can dream it, you can do it.”
Despite all the fanfare surrounding recent movies, creating cinematic special effects remains painstaking and time-consuming. For instance, to eliminate the telephone lines and jet exhaust hovering in the background of a Western set in the 1870s, an artist must go through the scene frame by frame and paint over the wires and jet trails—a technique called rotoscoping.

Sure, computerization helps, but even with digitized images you often must transfer the affected frames to an image-editing program and edit them one frame at a time. That's why artists look bleary-eyed when they go up to get their Oscars.

Anyone who produces special effects for QuickTime movies should examine MediaPaint, a program that removes some of the tedium of special-effects work by allowing you to edit ranges of frames. MediaPaint breaks down a movie into its individual frames and lets you copy paint strokes and pixel manipulations from frame to frame, automating rotoscoping tasks. You can even paint on a QuickTime movie as it plays.

You may remember MediaPaint as Video Graffiti. Acquired (from Neil Media) and renamed by Strata, it is now a much improved program that includes alpha-channel capabilities for compositing (superimposing) images, an onionskin tracing feature, and support for pressure-sensitive tablets.

**MediaPaint 1.0**

**QuickTime Paint Tool**

**PROS:** Paints on QuickTime movies; automates rotoscoping tasks. **CONS:** Demands extensive hardware resources; only one level of Undo. **COMPANY:** Strata (801/628-5218).

**LIST PRICE:** $695.

MediaPaint is a RAM hog; the program relies on many memory buffers to offer the features it does, so you'll need to populate your SIMM slots. Though RAM requirements vary depending on the frame size of your movie, working with 640-by-480-pixel images requires a minimum of 33MB of RAM—that's free RAM available to the program, not the total RAM in the Mac. MediaPaint runs on 680X0 Macs, but plan on using a Power Mac (it's Power Mac native), since programs like this must perform some intensive rendering.

**Windows and Layers**

When you first open a QuickTime movie in MediaPaint, it appears as a collection of individual frames in the scrollable Filmstrip window, where MediaPaint stamps each frame with a time code. Though you can't paint on frames in the Filmstrip window, you can specify In and Out points for applying special effects across a range of frames.

You paint and edit frames in the Document window, where you work in the invisible Paint layer that MediaPaint places over any QuickTime movie you open. MediaPaint preserves the original movie in an inviolable Movie layer to protect it. As you edit frames in the Document window, MediaPaint uses a memory buffer to immediately update those frames in the Filmstrip window. Unfortunately, MediaPaint offers only one level of Undo—unlike the multiple Undo levels in Adobe's After Effects—which can force you to revert to the last saved version of your movie to eliminate unwanted effects. When you save, MediaPaint creates a new QuickTime file containing your edited movie, separate from the original QuickTime movie file.
Media Painting
If you use Adobe Premiere for Quick-Time editing, you have to export your movie as a filmstrip file so you can paint on the movie using Adobe Photoshop, and Photoshop lets you paint only one frame at a time. MediaPaint's principal strength is the Autocopy mode, which speeds up rotoscoping by transferring paint from frame to frame over the sequence of frames you define. When you select Autocopy New, the program transfers the just-applied paint to subsequent frames. Select Autocopy All, and Media-Paint applies all of your edits in the selected frame to the next frame. Rotoscoping in MediaPaint is fast and easy because you step through the movie frame by frame and tweak the copied effects rather than reapplying your effects for each frame.

Autocopy is a memory buffer, so it always applies the paint from the first selected frame to the second, even if you move backward through the filmstrip. This enhances the versatility of autocopying, since you can create special effects in reverse chronology or skip frames when applying paint to produce special effects with a staccato delivery.

MediaPaint also provides a Stencil layer (actually a memory buffer) that holds PICT images and QuickTime movies. Stencil items appear in a window similar to the Filmstrip window and can be applied to the Paint layer using any of the program's brushes or filters (see “Stencil Images”). For example, you could select a PICT file in the Stencil layer and apply it as a translucent image to an entire frame in the Document window, producing the effect of looking through a reflection-filled window pane.

When the Stencil layer holds a QuickTime movie, the frames in the stencil strip are synchronized (by time codes) with the frames of the movie displayed in the Filmstrip window. As you move back and forth over the length of a movie in the Filmstrip window, the stencil strip tags along, letting you always see the current state of both movies. And since the two movies are always in sync, when you paint the sequence of stencil images over the frames of your target movie, the stencil movie plays inside the frames of your finished edited movie. For example, you could position a QuickTime movie in the Stencil layer to play on a blank TV screen within your target movie, or you could blend a movie containing an animated character with your target movie.

Ghosting and Compositing
MediaPaint's Lightbox feature acts like digital onionskin paper; you see ghosted images (from frames both before and after the currently selected frame) in the background of the frame being edited in the Document window. You can trace over the ghosted images or use them for reference as you paint, helping you to create smooth progressions in your painted effects over multiple frames.

MediaPaint lets you set alpha-channel values for anything in the Paint layer, so you can seamlessly blend whatever you create with the background movie. Though compositing works well, you can work on only one layer at a time; you have to fuse each layer with the movie before moving to your next layer. Adobe's After Effects provides more powerful compositing features, especially since you can work with several separate layers simultaneously, but it also carries a $1995 price tag.

MediaPaint also allows you to composite images using the chroma-key technique, similar to the blue-screen superimposition method used in television and film. When you're working with images in the Stencil layer, MediaPaint's chroma-key feature lets you adjust the transparency of selected (keyed) colors. When you apply the image to the Paint layer, the keyed colors drop out, allowing both previously applied paint and the underlying movie to show through.

Media Tools
Floating palettes hold tools, brushes, colors, patterns, movie controls, and strokes—predefined tool movements that can be used with any brush. An Info palette provides data on cursor location, distance traveled, and angle of movement, for precise positioning of paint elements. If the screen gets too cluttered, you can use the Samples palette, which displays the currently selected items from other palettes.

MediaPaint's strokes are terrific for automating repetitive effects. You define strokes by painting in the active window while the program records the stroke path. Later, you can use the same path with any tool, in any currently selected color or pattern. And MediaPaint lets you apply strokes over a sequence of frames.

MediaPaint expands its assortment of built-in tools and brushes via plug-ins. You access plug-in tools—including an airbrush, a fine-line brush, a pixel-sharpening tool, and a shape painter that lays down random splatters—from scrollable icons on the tool palette. MediaPaint's tools are well suited to the demands of producing and editing special effects.

MediaPaint also includes a selection of plug-in process filters that produce global transformations, such as blurring, diffusing, and fade-in/fade-out effects. Many of the program's process filters are tweakable, meaning their effects can be applied across a sequence of frames. You set filter values for the beginning and ending frames and MediaPaint calculates the values for the intervening frames. For example, MediaPaint's Fade Out filter allows you to fade a movie gradually over several frames simply by selecting values for a beginning and an ending frame. MediaPaint also accommodates most of your favorite Photoshop filters.

Similarly, MediaPaint offers four particle tools that create animated effects by painting automatically over a sequence of frames. The PixieDust tool produces particles that fly according to user-defined gravity and friction settings (see “Media Particle Tools”). The SpinOut tool generates spinning particles that leave trails. The Squiggle tool builds wriggling, wormlike lines. And the BabyBoom tool creates particles that self-propagate at user-regulated rates. All four tools generate particles randomly, so their effects differ each time, even with identical settings.

The Last Word
Despite its hefty RAM requirement, MediaPaint is an excellent, well-conceived program suitable for multimedia developers or video editors. Though MediaPaint may not return the glamour to filmmaking, it helps reduce the tedium of special-effects work.

—CARLOS DOMINGO MARTINEZ
SmartSketch 1.0

**Drawing Software**

**PROS:** Innovative; intelligent graphic objects; easy-to-use drawing tools; great price.

**CONS:** Lacks high-end illustration tools.

**COMPANY:** FutureWave Software (619/637-6190). **LIST PRICE:** $69.95.

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**SmartSketch** is a new species of graphics program that unites the free-form creativity of a paint program with the structure and precision of object-oriented drawing. SmartSketch's intelligent routines perform pattern recognition, reduce the steps involved in building objects, and simplify on-screen geometry. And the program introduces graphic objects that you can apply with brushes, delete by erasing, and manipulate simply by dragging on them.

Aimed at, and priced for, novice computer users, SmartSketch won't replace high-end paint or illustration programs, but it may be an appealing tool for professional artists and illustrators, who can use it with other programs—importing and exporting EPS, DXF, object PICT, and bitmapmed PICT files.

**Pretty Smart**

SmartSketch blurs the distinction between paint and draw programs by integrating painting with object graphics. SmartSketch lets you draw an object with a brush, but you can't edit the strokes as individual pixels. You're actually drawing a free-form, color-filled object.

These brushed-on objects don't behave like filled objects in traditional draw programs, however. When you apply another brushstroke, SmartSketch adds the new stroke to the object, rather than building a separate object atop the first stroke. The program can do this because it knows the boundaries of the first brushstroke object. When it recognizes a second stroke with the same fill characteristics, SmartSketch assumes you're adding it to the first, whether you apply it immediately or hours later. If you alter the fill color or pattern, the program builds a second brushed-on object over the first.

SmartSketch's understanding of objects gives it some intuitive masking capabilities. A pop-up tool palette lets you choose whether applied brushstrokes cover an object or mask it. For example, you can define brushstrokes that affect only fills, leaving lines intact. When you select Paint Inside, SmartSketch applies the brushstroke only within the confines of the object where the stroke begins.

Since SmartSketch brushstrokes are objects, you can drag them freely about the document. Better yet, when you want to reshape objects, SmartSketch doesn't restrict you to specific object handles or control points. You simply click and drag anywhere along the object's edge, and the fill expands and contracts as necessary.

If you want to cut the object in half or delete part of it, SmartSketch lets you just erase it. If you use SmartSketch's outline mode, you can see that when the eraser cuts the object in half, or takes a gouge out of it, the object heals itself along the line of the eraser stroke; the resulting objects remain fully editable. Like the brush, the eraser can be set to discriminate between lines and fills and to mask objects. A Faucet option lets you erase whole fills or contiguous lines with one click. Pretty smart, eh?

**Smart Tools**

Even with all its built-in intelligence, SmartSketch remains a very simple program. The aforementioned brush and a pencil that builds lines and geometric shapes are the only drawing implements on the modestly sized, context-sensitive tool palette. SmartSketch's pencil behaves much like traditional pencils, but offers some enhancements of its own.

Smooth and Straighten options help the pencil produce sharp lines and flowing Bézier-like curves, although without the control points and anchor points common to digital Béziers and splines. Instead, you simply drag anywhere along the lines to reshape them.

When you use the pencil to overlap lines (or a brush to overlap brushstrokes), SmartSketch joins both lines and segments them. For example, you can build shapes that become joined and can be filled with the paintbucket, but all the segments remain independently editable.

With SmartSketch's pattern-recognition feature turned on, you don't have to draw shapes perfectly. The program evaluates the lines and builds the shape automatically—provided the shape is simple. To draw a pentagon, and depending on your sketch, the program could build a rectangle or a circle.

The paintbucket also recognizes shapes and executes fills even when the shapes are not completely closed. However, the program could use an explanation dialog box noting that a fill wasn't completed because the gaps were too large to bridge. With SmartSketch's ink-bottle tool, you can alter line weights and apply patterns to any line, including the normally invisible (zero-thickness) bounding lines of brushstrokes.

And there's more. You can ungroup and edit text elements as you would any other SmartSketch object. The program includes a drag-and-drop library and over 500 clip-art images. The Smooth display command lets you preview high-resolution printed output. And a multipage document feature (used for the on-screen tutorials) lets you create anything from flipbooks to presentations.

The manual is concise and helpful (though page numbers in the index are wrong), but SmartSketch's unique ways with graphic objects may be confusing at first. For example, when you click on objects sequentially with the arrow, SmartSketch adds them to a selection. Shift-clicking to make multiple selections works only with the lasso tool. And if you put one object over another, the program (like a paint program) can replace the object below. It doesn't take long to adjust to such differences and it's a small price to pay for so much innovation.

If anything, SmartSketch leaves you greedy for more. Users who rely on the functionality of high-end illustration packages may find the lack of bells and whistles constraining. And the melding of paint and draw concepts is so good, I confess to hungering for more tools—airbrushes, gradient fills, and so on.

**The Last Word**

SmartSketch is a terrific graphics program for beginning computer users or novice artists. It won't cause pros to forgo paint and illustration packages, but many will find SmartSketch interesting to explore and may adopt it anyway. SmartSketch is more than smart, it's positively brilliant—Carlos Domingo Martin EZ
SledgeHammer8000FT

Fault-Tolerant Drive Array

PROS: Preconfigured to operate at RAID Level 5; simple software makes it easy to change error notification and configuration. CONS: No remote-analysis software provided for remote troubleshooting; currently must use QuickMail services for remote paging; no support for RAID 3; minor problems with messaging and notification.


We live in an age of telecommuting, round-the-clock businesses, Internet Web servers, and increasing digital dependency. The SledgeHammer8000FT from FWB—an 8GB, Level 5 RAID system—provides constant access to your stored information.

The $23,599 SledgeHammer8000FT is an enclosure and array controller with redundant power supplies and fans, a SCSI-1 Fast/Wide interface, and seven drive slots, into which you can plug drives even while the array is powered on. It includes six 2GB Seagate Barracuda drives, an FWB JackHammer SCSI-2 Fast/Wide NuBus board, a DAT drive, Retrospect backup software from Dantz, and the SledgeHammer8000FT ToolKit software needed to configure the array. FWB also includes its Hard Disk ToolKit software so that you can partition the array.

If 8GB is not enough storage, there’s a 16GB SledgeHammer16000FT for $28,599. Arrays are available in desktop, tower, or 19-inch rack-mountable enclosures. Versions that use PCI instead of NuBus JackHammer boards cost $200 less.

Ensuring that your data is always available and reliable demands some extra consideration. FWB provides spare drives at reasonable costs: $2259 for a 2GB drive and $3099 for a 4GB. Extra power supplies are $549. The enclosure carries a three-year warranty and the drives have a five-year warranty. Although returning faulty drives is easy enough and FWB’s technical support is very good, on-site service is not available directly from the company.

Safety in Numbers

The SledgeHammer8000FT arrives preconfigured as a RAID Level 5 array. RAID 5 writes data in chunks over five of the drives in the system, using some of the space for parity data—data the array can use to rebuild a drive that breaks. (For more about how RAID works, see the sidebar “RAID by the Numbers” in “The RAID Option,” Macworld, April 1995.) The sixth drive is an autoswap drive. Autoswapping rebuilds the failed mechanism’s information on an extra drive. This is also called hot-sparing because a spare drive is plugged in, powered on, and ready to go when one of the array’s drives fails.

Although its performance as a Level 5 array is respectable, the SledgeHammer8000FT runs faster as a Level 0 array. However, I do not recommend it over FWB’s other Level 0 arrays. For example, opening a 40MB Photoshop file with the array set as the scratch disk took 145 seconds on RAID 5 and 118 seconds on RAID 0, but in our April RAID tests, FWB’s SledgeHammer4100FMS-W at Level 0 took only 93 seconds. You can improve these times by enabling special features of the JackHammer board. However, doing so increases the possibility of losing data and makes these features undesirable for RAID 5.

Unfortunately, the current version of the array does not support the fastest RAID option, Level 3. FWB includes RAID Level 1—drive mirroring—but because mirroring wastes space, is slow, and provides only moderate protection against lost data, even FWB agrees that Level 1 is a poor way to use the array.

Crying Wolf

If and when a drive fails, you want to know about it. The SledgeHammer8000FT ToolKit software provides several ways for you to get error messages, including Apple’s Notification Manager (the same mechanism that programs like PrintMonitor use to get attention when things go wrong), AppleShare messages, QuickMail, or in a log file.

Of these methods, QuickMail is the most effective. You can send messages through a QuickMail Name Server to any user. Error messages marked “urgent” arrive moments after a failure. This method has two minor problems: the message appears to have arrived from another user rather than from the array (unless you create a user named Array on QuickMail), and the message’s title contains a fixed text statement instead of a description of the problem.

You cannot yet send messages directly from a SledgeHammer8000FT array to a paging system such as Ex Machina’s Notify, but you can use QuickMail’s paging services to achieve the same end. FWB is adding direct paging in the next version of the array.

While testing QuickMail messaging, I found one problem with the array controller. Although no data was damaged when I removed a drive during a file duplication in the Finder, I received about 100 error messages, over 90 percent of which were nonsensical. With an engineer’s help I determined that some controller registers had become corrupted. I corrected the problem by simply reconfiguring and reinitializing the array.

Although FWB knows the risks of RAID 5 and recommends frequent back-ups to the built-in DAT drive, true fault-tolerance requires several things that the SledgeHammer8000FT does not provide: redundant array controllers, host adapters, cables, and servers, as well as uninterrupted power. There’s also no way to get technical information about stripe sizes or how individual drives are configured. You can run tests on the power supply and fans to ensure they are in good working order, and you can run integrity checks on your data, but you can’t schedule tests to occur automatically.

The Last Word

In price, speed, and configurability the SledgeHammer8000FT is a notch below MegaDrive’s MR/5, featured in “The RAID Option.” The advantages the SledgeHammer array has over the MR5 are ease of configuration—you must configure the MR5’s complex options through a terminal emulator—and integration with common Macintosh services such as AppleShare and QuickMail. The SledgeHammer8000FT’s simple strengths will keep your data safe, sound, and online.—TIM WARNER

MACWORLD September 1995 59
Speech-Recognition Software

PROS: Lets you dictate at up to 50 words per minute with impressive accuracy; works with QuickKeys and AppleScript for software control; straightforward, logical design.

CONS: Very expensive; requires at least 12MB of free memory; requires extensive training; some bugs.


Power Secretary Power Edition 2.0

For millions of computer fans, the ultimate fantasy isn't more RAM, a 36-inch screen, or a sextuple-speed CD-ROM; it's voice recognition. Not just the flaky PlainTalk voice-command feature of the Power Mac and AV series ("computer, print"), but bona fide dictation software. With Power Secretary 2.0, the day has finally arrived.

You wear a lightweight headset that positions a microphone a half inch from your mouth. Wherever you can type—in your word processor or E-mail program, in a dialog box—you can dictate. You must separate each word by a tiny pause; otherwise you speak normally. To witness an experienced Power Secretary user at work is to believe the future is upon us: the words fly magically onto the screen, amazingly fast, without a single spelling mistake. (I've put a QuickTime movie of Power Secretary at work in the Macworld areas of America Online and eWorld.)

The trick, of course, is becoming an experienced Power Secretary user. First, there's the cost: $2495, possibly more than you paid for your Mac to begin with. Second, there's the equipment. Power Secretary requires 12MB of free RAM, or 19MB for fastest operation. Furthermore, it requires 16-bit sound—a standard feature of Power Macs and the AV series, but an add-on, in the form of a NuBus speech-recognized sound card, from Tiger Software.

Above all, though, Power Secretary requires patience. Unlike PlainTalk, Power Secretary responds only to your voice. When you first get the software, you read 45 minutes' worth of prepared sentences to it, so that the program can get the basic hang of your voice patterns.

Department of Corrections

After that initial training, you're ready to work. And, at first, it is work: Power Secretary gets about every third word wrong. At each error, you say "correct word"; the program responds by displaying a small, neat, numbered list of its next closest guesses. If the word you intended is there, just say "choose three" (or whatever its number is), and the program quickly replaces the incorrect word.

Sometimes the word you want doesn't appear in the list—for example, if it's an unusual name. In that case, you spell it, using the pilot's alphabet ("Mike, alpha, Charlie, . . ."), until Power Secretary displays the correct word in its list of guesses. Believe me: after a couple days, you'll know that pilot alphabet cold.

Performing this correction routine, however, doesn't just fix the erroneous word in your document. More important, it teaches Power Secretary that word. Over time, your cumulative corrections improve the program's accuracy dramatically. In fact, after several weeks of daily use, Power Secretary will begin to seem like a science-fiction technology.

Power Secretary's dictation skills are greatly enhanced by its "text macros" feature, which lets you define terms of your own. For example, you can create a text macro that types Arnold Schwarzenegger, superstar extraordinaire when you say merely, "Sign this."

Furthermore, you can teach the program to trigger QuickKeys macros or AppleScript scripts, if you know how to use those programs. That is, in addition to simply typing, Power Secretary can also control your Mac—launch programs, choose menus, change monitor settings, and so on—at your vocal command. If this feature sounds like Apple's PlainTalk technology, forget it; Power Secretary's voice control, especially in conjunction with QuicKeys, is far more flexible and far-reaching.

Life without a Keyboard

Unfortunately, controlling your Mac by voice isn't quite as easy as conversing with the onboard computer on the Star Trek ships. Although the program's accuracy becomes impressive over time, its poor distinction among homonyms (there versus their, for example) never improves.

Environmental sounds are another problem. The program succeeds in screening out steady background noise. Sudden sounds, on the other hand, make bogus words appear in your document. Predictable sounds, such as the telephone, are easy to deal with—you record them as text macros that type out nothing. But unrepeatable sounds (sirens, bursts of laughter, and the like) are still an occasional problem. The "scratch that" command, which deletes the last word you typed, is your only recourse.

Finally, Power Secretary is not without a few bugs and incompatibilities. I had trouble getting it to make corrections in QuickMail and QuickDex. It doesn't work at all in Microsoft Word 5, Works, or with the new 9500 machines. The company says it can't re-create the occasional mad-delete-key syndrome I endured (you say "delete key," and the program backspaces furiously over your last several sentences instead of just the last letter). Despite all this, on a Power Mac I achieved speeds of 75 words per minute without stopping, or about 50 wpm with corrections.

The Last Word

Power Secretary has the potential to help doctors, lawyers, and others who must frequently type up standard documents with a lot of big words; people who can't, and aren't supposed to, use the keyboard; or hunt-and-peck typists who hate hunting and pecking. The technology seems magical, but only after many weeks of your time; the price is too high, but not as high as the cost of hiring a typist. (Speaking of money, $995 will buy you a version that works only in WordPerfect and doesn't have the hooks to QuicKeys and AppleScript; $3000 buys you an edition with 60,000 additional medical terms in its vocabulary.) If you have the cash, the RAM, the patience, and a quiet room, Power Secretary can be a powerful, efficient replacement for your keyboard.

—David Pogue
How Do You Tell If It's A "Trinitron"?
Live Picture 2.0

**Image Editor**

**PROS:** Reasonable price and RAM requirements; incredibly fast: previews when opening compositions and importing images; batch processing; user control over clipping paths and CMYK separations. **CONS:** Automatic views don’t keep up with transformations; inadequate filtering options; no Copy or Paste command; just one level of Undo. **COMPANY:** HSC Software (800/566-6200). **LIST PRICE:** $995.

Live Picture is an image-compositing application that treats scanned images, brushstrokes, and text as independent objects, subject to mathematical transformations and color corrections. The objects remain editable long after you create them, much as in draw programs. And you can manipulate enormous images—50MB and up—without the performance penalty associated with pixel-based editors (most notably Adobe Photoshop). Just as important, you can render the compositions at any resolution.

This is impressive technology, but the initial release of Live Picture was roughly executed, and the $3995 entry price was pure conceit. The newest Live Picture, version 2.0, still falls short of perfection—it’s only slightly more powerful and more usable than its predecessor—but the cost has plunged so dramatically, I wouldn’t have been surprised to see the product burst into flames on reentering Earth’s atmosphere. Last year, you could expect to pay $3995 retail; now, the typical street price is under $700. This may not please so-called early adopters, but it’s great news for those prudent souls who waited. Happily, Live Picture is now worth what it costs.

Other than this most laudable price reduction (which was introduced a few months before version 2.0), the new Live Picture boasts lower RAM requirements, down to 24MB minimum and 48MB recommended. Version 2.0 is also faster at importing images, zooming and scrolling, and rendering compositions. (Edits continue to occur virtually instantly on a Power Mac.) And there is no longer hardware copy protection.

**Previews, Processing, and Getting Around**

Feature-wise, Live Picture 2.0 is a modest update that is documented in a slim, 50-page addendum. Even so, many of the incremental changes are quite helpful. When you import an image or open a composition, for example, a preview appears in the open dialog box. The preview shows performance slightly, but you can see what a file looks like before opening it. You can also replace one image in a composition with another lifted from disk; this technique permits you to apply identical transformations to more than one image and import new corrected scans in place of old ones.

If you find yourself juggling multiple compositions daily, a new batch-processing function lets you render the compositions unattended. You can even render images in the background, but you’ll probably want to let the computer work uninterrupted.

Live Picture 2.0 sports improved views, useful for quickly zooming from one portion of the composition to another. You can speedily and effortlessly render a 72-ppi proof of any view. You can also instruct the program to create a view automatically for every imported image and painting or effects layer you add to the composition. This is an essential feature—particularly since Live Picture doesn’t give you any zoom-ratio feedback to show you how image pixels compare with screen pixels—but it could be better implemented. If you move, transform, or delete a layer, the view doesn’t automatically keep up. You have to adjust or delete the view manually after you finish changing the layer.

**Real-World Modifications**

Live Picture 2.0 offers better support for working with other applications. The product ships with a Photoshop plug-in module that permits Photoshop to open Live Picture’s proprietary-format IVUE files. You can also convert masks to paths and export a rendered composition complete with clipping paths in either the Desktop Color Separation or Photoshop format. Perhaps most important, you can now fine-tune the separation table that Live Picture uses to render RGB images out to a CMYK composition. Granted, Live Picture’s support for the CMYK color space is still pretty rudimentary—you can’t import CMYK images directly, nor edit individual CMYK color channels—but you are no longer at the mercy of Live Picture’s predefined one-size-fits-all color-conversion tables.

These enhancements are much appreciated, but Live Picture still requires some fairly significant modifications. Its inability to open multiple compositions and lack of support for Clipboard operations (both of which would allow you to transfer edited images between compositions), the absence of blend modes for overlying images, its imprecise sharpening functions, its refusal to let you modify the contents of any but the top-most visible layer, and its continued reliance on a single-level Undo command (when its underlying technology would clearly support more levels) all qualify as inexplicable omissions.

**The Last Word**

HSC is fond of reminding potential users that Live Picture is not a Photoshop killer, and version 2.0 shows no sign of proving the company wrong. That’s too bad, because with some extra effort Live Picture could render Photoshop obsolete. The application’s speed is utterly fantastic, its core technology is generous and flexible, the price and memory requirements are more realistic than they were, and the software is increasingly stable. But HSC needs to address the mundane but very real needs that its users are bringing to the table, by filling in the feature gaps and tightening the interface. After all, if Photoshop isn’t going to come through in the speed and resolution-independence departments, then what most high-end users are going to want—and what HSC and others should concentrate on delivering—is a fully equipped and fully mature, no-holds-barred Photoshop killer. —DEKE MCCLELLAND
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For the highest quality, look for the Trinitron Inspiring Vision Logo. Then you’ll know it’s truly a Trinitron monitor.
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Circle 74 on reader service card
StyleWriter 1200

Ink-Jet Printer

**PROS:** Inexpensive; software supports watermarks and tiled layouts; automatically powers up for print jobs.  **CONS:** Slow when used in Best mode.  **COMPANY:** Apple Computer (408/996-1010).  **COMPANY'S ESTIMATED PRICE:** $269.

The StyleWriter 1200 is Apple's first new black-and-white ink-jet printer in more than two years. At first glance, this member of the StyleWriter series appears no different from its immediate predecessor; it has virtually the same sleek, smart design as the StyleWriter II, as well as the same 100-sheet (or 15-envelope) feeder. It uses the same ink-jet cartridges as previous models and renders gray-scale images at the same 360 dpi.

The new model, however, offers improved print quality, a better variety of output options, and four additional fonts. It can also handle a few sophisticated printing tasks, such as creating custom watermarks—at a price below that of the StyleWriter II.

Like the StyleWriter II, the 1200 is networkable and supports gray-scale printing. It operates in three different quality modes: Draft, Normal, and Best. At the highest setting, the printer renders gray-scale pages at 360 by 360 dpi and black-and-white pages at 720 by 360. Frankly, I found it hard to see the difference between the two resolutions. Even so, the StyleWriter 1200's output is outstanding in Best mode, with crisp black text, smooth gradients, and unstrakeded gray—provided you use a smooth-finish paper. (The StyleWriter's liquid ink produces slightly ragged edges on textured or overly absorbent paper.) On gray-scale images, you can choose between two different halftoning methods—Pattern or Scatter. With the Pattern option, the 1200 creates grays through a fixed pattern of dots. The Scatter method uses randomly placed dots and produces smoother, more realistic-looking grays. But images rendered with the Scatter method take slightly longer to print than those rendered using the Pattern method.

The 1200's new printer driver adds other convenient new functions. For example, the Layout pop-up menu in the Page Setup dialog box now lets you tile two or four document pages onto a single sheet of paper, creating booklet-size documents. Switching to the 2-Up or 4-Up layout setting not only consumes less ink and paper, it's a quick way to turn out mini-flyers or booklets without reformatting your full-page documents.

The Page Setup dialog box also allows you to superimpose a watermark on your pages as they are printed. The software comes with eight watermark designs, such as Confidential and Draft. You can position them at the center of a page, in an upper corner, or spread across an entire page. A slider bar lets you control the density (darkness) of the watermark image. You can also create custom watermarks (such as a company logo) using your own PICT graphics.

Also new is a Paper Type pop-up menu in the Print dialog box, which lets you tell the printer what type of paper you're using—glossy or flat stock, for example. The StyleWriter adjusts its ink flow based on the paper.

The 1200's energy-saving features are also convenient. If the printer remains idle for more than five minutes, it simply turns itself off. When you send a new print job to the idle printer, it powers up and starts printing.

Apple claims the 1200 can print three pages per minute in Normal mode. That's accurate if you're printing text-only documents; graphics, of course, take considerably longer. Printing text documents in Best mode takes about three times as long—roughly one minute per page.

The Last Word

You can't argue with the value of a StyleWriter. At $269, the 1200 offers high-quality output, even when you're dealing with graphics. Granted, it doesn't crank out pages very quickly or offer PostScript capabilities, but its price-to-performance ratio makes it a perfect low-cost printer for typical home and small-office use.—JOSEPH SCHORR

Helix Express 3.03

Relational Database

**PROS:** Excellent client-server design, easy-to-learn, graphical approach to building databases; improved performance.  **CONS:** Documentation insufficient; lacks index.  **COMPANY:** Helix Technologies (708/465-0242).  **LIST PRICE:** $589.

With Helix Express 3.03, Helix Technologies bucks the trend set by the biggest software developers: the latest version adds important features and speed (some functions are two to three times as fast as in the previous release) without raising the program's RAM requirements or price. Helix now features compiled forms for improved speed, a better client-server interface, and conditional branching; and it imports and processes complex data more quickly.

The basic Helix package ($589) is a single-station client-server installation for 680XO Macs (Helix says a Power Mac version should be ready this winter), with additional client installations ranging from $199 each (for packages of up to 3 clients) to $135 each (for packages of 12 or more). A single Mac can run both the client and server software, so a small network (3 to 8 Macs) usually doesn't need a dedicated server—just make the fastest Mac in the office the server as well as a client. Helix is shockingly compact too; the server and client components require less than 1MB of RAM each.

Helix uses a uniquely visual, drag-and-click method for building databases. You drag icons that represent database elements into a work space, then double-click on the icons to access dialog boxes where you define the characteristics of each database element. For instance, to create a database field, you drag the Field icon (from the icon well, on the left) into the work space, enter a name for the field, then double-click on the icon to access a dialog box where you define the type of data (text, numbers, pictures, documents) that the field will contain. You design database forms (for data entry and reporting) using a similar icon-based method, and the forms-drawing tools of version 3.03 are significantly more precise and flexible than those in the previous release. As before, Helix includes a set of sample databases covering an array of business applications.

Helix provides an easy-to-use, graphical method for relationally linking your continues...
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data tables as well; you simply draw a link between file images on screen (see “A Big Plus”). Helix also facilitates searching for specific records in your data tables—you compose a query in the Quick Query dialog box simply by responding to prompts. (Version 3.03 also offers a Power Query feature for conducting more-complex searches that you can even time for later execution.)

The real power of Helix, however, lies in the Sequence, a sort of assemble-it-with-icons macro that allows you to select and arrange Helix commands for automating and customizing your database functions. For example, you can make a Sequence that adds a menu-bar command to your database to streamline such common tasks as printing (the Sequence will open a table or report, print it, and then close the file). You can develop custom menus using the Sequence feature, allowing you to tailor your database interface for your users. Version 3.03 also supports Sequences that accept conditional branching in addition to the usual straight playback of commands.

While Helix compiles forms for better speed, Sequences always have their works exposed in a graphical programming style for easy tinkering. Developers can often address client requests for changes in Helix applications over the phone, walking the client through changing a Sequence. Every aspect of a Helix application (forms, reports, Sequences, data itself) can be separately password-protected to prevent this easy modifiability from getting out of hand.

The Last Word
Though the process is markedly different, building a flat file in Helix is as simple as constructing a flat file using Claris’s FileMaker Pro or ACIS 4D, and Helix lets nonprogrammers develop relational databases without extensive training. Helix Express 3.03 is fast, and it’s especially appropriate for small-office networks.—CHARLES SEITER

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Two Accelerators

**601-Based Hardware Accelerators**

**DayStar PowerPro 601, DayStar Turbo 601**


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**Faster Than Your Basic System: Accelerator Board Speedups**

<table>
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<th>Acceleration Type</th>
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*Mac IIx used a Radius PrecisionColor24 video card.

The Mac IIx and the Quadra 650 both used 10MB of RAM and used System 7.5.1. Note that the Quadra 650 is faster than the IIx.
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Conflict Catcher 3

Extension-Management Utility

PROS: Superb conflict-testing features; customizable list views of start-up files; displays names of start-up files, in addition to their icons, on desktop during start-up sequence. CONS: None.
COMPANY: Casady & Greene (408/484-9228).
LIST PRICE: $99.95.

WHAT CAN YOU SAY ABOUT A PROGRAM THAT GAINED A FIVE-STAR RATING FROM Macworld less than a year ago—and just got dramatically better? Conflict Catcher II has proven itself to be a flawless tool for managing extensions and control panels. Conflict Catcher 3 is the same—but with this substantial update, the program does its job with greater efficiency and has an even more flexible, friendly interface.

Conflict Catcher's systematic approach to isolating extension conflicts has gotten more intelligent, speeding up conflict resolution. For example, the program now records the date on which each start-up file is installed on your Mac. When you use Conflict Catcher to track down a conflict, the program starts by turning off the most recently installed control panels and extensions—the most likely suspects when a new conflict arises. It can also scan for damaged start-up files immediately, in case a damaged resource is responsible. And if you have a hunch about which file might be causing the problem, you can even point Conflict Catcher in the right direction using the new Intuition dialog box. With this feature, you identify the suspect files. Conflict Catcher first tests your hunches, then moves on to other suspects if the problem isn't solved.

Even when you're not tracking down a conflict, the program gives you a better handle on the mysterious extension and control-panel files that lurk within your System Folder. You can, for example, have Conflict Catcher display the names of start-up files as well as their icons during your Mac's start-up sequence—a great way to figure out the identity of a file you can't recognize by its icon alone.

As in previous versions, Conflict Catcher 3 allows you to group extensions and control panels into sets in order to create customized start-up configurations. You can also assign each configuration its own keyboard shortcut and start-up sound, making it easy to select the configuration you want. During a work session, you can choose from your saved sets using the new Conflict Catcher menu (which appears in your Mac's menu bar at all times), then restart your machine. You can also launch Conflict Catcher from the menu bar at any time. All of this makes managing your start-up files disarmingly simple.

Conflict Catcher's main window now lets you display and sort start-up files in seven different list views instead of four. You can sort files by loading order, name, kind, folder, date installed, or amount of memory used, or by whether they're enabled. In addition, the resizable main window now includes a second column that can display each item's kind, folder, date installed, or memory use. Clicking on any listed file displays even more detailed information about it, such as its icon, version number, type/creator code, and a description of its function.

The program lets you color-code start-up files in list views—you can have all extensions appear in blue, for example—and the colors are fully customizable. Do you really need to be able to display your list of control panels and extensions in 16 million colors? Probably not—but it certainly doesn't hurt to have such conveniences either.

The Last Word

Even with all these interface enhancements, the price is still right. Conflict Catcher offers unparalleled control over the ever-growing number of components that make up your system software. When conflicts arise, Conflict Catcher helps you home in on the problem with the elegance and efficiency that characterize the very best Mac programs.—JOSEPH SCHORR

InTouch 2.5

Contact Management

PROS: Free-form data entry. CONS: No typing shortcuts.

FOR PEOPLE WHO NEED SPEEDY ACCESS TO NAMES, ADDRESSES, AND PHONE NUMBERS, but don't want to bother with field-oriented programs like Now Contact, InTouch offers a free-form approach to storing personal information. Instead of a separate field for every item, InTouch has only two fields—one for name and address and another for phone numbers and notes. InTouch doesn't include any of the data entry shortcuts (auto-completion, word capitalization, phone number formatting) that most field-based contact managers do, and searching and sorting options are fewer.

Since my last review of this product (Macworld, February 1993), the InTouch window has become easier to customize. A scrolling window on the left lists the first line of every record in the current group, and the name/address and phone fields now sport scroll bars. You can also import data from any program that can export in tab-delimited text format. A control panel called Snap lets you look up and copy InTouch contact information from within other applications via a hot-key combination, but this approach is less convenient than menu-bar address finders like Now Software's QuickContact. Although InTouch still lets you set alarms to trumpet upcoming events, most calendar functions are now handled by a separate program called DateView.

The Last Word

If you have to keep track of names and addresses, but you don't need to perform complex sorts and searches, InTouch is a good choice.—FRANKLIN TESSLER
Paint Alchemy 2.0

Effects Tool

**PROS:** Unique; customizable styles; automatic scaling of styles; plugs into a variety of graphics and animation applications. **CONS:** Calculation intensive. RGB processing only; accessing all parameters clutters screen. **COMPANY:** Xaos Tools (415/487-7000). **LIST PRICE:** $199.

With the introduction of Paint Alchemy 1.0 in 1993, Xaos Tools seduced vast numbers of Macintosh artists with the sumptuous visual possibilities of its so-called intelligent painting technology. One of the new breed of malleable Photoshop-compatible plug-ins, Paint Alchemy creates fabulously organic-looking results by applying scalable, gray-scale PICT files as brushes on an RGB image. Built-in variation thresholds modulate parameter settings for opacity, color, brush angle, brush size, and coverage density, resulting in a free-form painterly quality. The sheer number of possible style settings available in Paint Alchemy makes it resemble a miniapplication tucked within its host app (possible hosts include DiVA's VideoShop, Fractal Design's Painter, and CoSA's After Effects, among others).

Though the initial release was well received, version 2.0 has addressed some of the quirks of the original. Because Paint Alchemy's core brushing engine uses individual strokes to build up an effect, a densely layered brush is calculation intensive. The new release has been accelerated for Power Macintosh, to provide a speed increase of 500 to 1000 percent depending on the particular effect.

An interface lift has jazzed up Paint Alchemy, changing its drab black-and-white stack of parameter index cards into colorful floating palettes and an expanded brush palette. While the new interface is a nice improvement, I'd still like a brief summary of all the parameter adjustments to appear in the main window, instead of having to keep in mind all the interrelated settings of five floating palettes as I work.

Previews are faster and larger, and styles now group both brush and parameter settings into one preset for easier archiving or exchanges with other users. Better still, styles are now resolution independent, so you can develop styles on a low-res proxy and then apply them to the original hi-res image. Other significant changes include more blending options, as well as improved animation controls for use with Adobe Premiere 4.0 and Equilibrium’s DeBabelizer 1.6. You can now animate Alchemy effects over time, either by smooth linear increments or with random jitter-frame variation for a more handmade look.

Paint Alchemy works only with RGB images, so if you want to apply effects to separate channels, you must first place each channel into a new document so that it reads as an RGB image and then reinsert the channel into the original file after processing.

A 68020 CPU running System 7 and an additional megabyte of RAM beyond the suggested size of the host application are the minimal requirements for running Paint Alchemy. But unless you use a 68040 machine or a Power Mac, you’ll find the processing time painfully slow. Even with a Power Mac 8100, certain densely layered styles put some drag on your system.

**The Last Word**

Paint Alchemy adds a distinctive, human look to computer-generated images. Like those of KPT Convolver, Paint Alchemy’s user-definable styles make the program vastly more flexible than traditional plug-ins. Though I could wish for more frills in version 2.0 (additional parameter categories and the ability to animate among styles, for starters), Paint Alchemy is an extremely valuable (and fairly economical) tool for a digital artist with the eye of a painter and the workload of a professional.—AVI HOFFER

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Intellihance 1.0

Photoshop Plug-in

PROS: Easy to use; good color-correction controls; includes batch processing macros.

CONS: No preview window; needs better focus controls; Pro Modules lack color-calibration targets. COMPANY: DPA Software (214/517-6876). LIST PRICE: $129 to $299.

Intellihance is a plug-in for Adobe Photoshop that corrects colors, enhances contrast and focus, and reduces graininess in scanned images. Like Light Source's Ofoto—which has long automated similar corrections outside Photoshop—Intellihance can't match the quality of a professional press operator applying adjustments manually. But Intellihance offers speed, consistency, and automation. Why waste your time fixing one image after another when you can teach the program to do it?

The $129 consumer version of Intellihance is designed especially for correcting gray-scale and RGB images. Using a straightforward series of pop-up menus, you specify how the program should correct such factors as contrast, brightness, saturation, and sharpness. For example, rather than boosting the contrast of an image by manipulating complex slider bars or numerical values—as you generally have to in Photoshop—you might just select Snappy from the Contrast pop-up menu. Intellihance analyzes your image and bumps up the contrast to whatever it considers to be snappy.

Despite its simplicity, Intellihance does a very good job of correcting colors in an image, and it's certainly a lot quicker than monkeying around with Photoshop's Levels, Variations, and Curves dialog boxes. But there's no preview window inside the Intellihance dialog box, so you have no immediate feedback. Some people might implicitly trust Intellihance to deliver snappy contrast, but I'd like to get an idea of what snappy means before I commit. Also, the focus controls leave something to be desired. Even with the Sharpness option at its maximum setting, Intellihance left the images I tested unacceptably soft.

Using a function called Intellihint, you can instruct Intellihance to base its color corrections on a detail from the image. This is particularly useful when you're correcting flash photography and other images that feature harsh contrast between highlights and shadows. The product also ships with four RGB-to-CMYK separation tables and several macro scripts for use with CE Software's QuicKeys or Affinity's Tempo II Plus.

The more expensive Intellihance Pro package—which costs $299 for CMYK, RGB, and grayscale modules—offers basic scanner and press-calibration controls. You can correct for brightness values measured from a grayscale calibration strip, and enter values for dot gain, maximum ink density, and minimum and maximum dot percentage. Press operators will find these controls helpful, but the RGB and CMYK products should include full-color IT8 targets or equivalents. All versions of Intellihance Pro are capable of eliminating dot patterns from scanned halftones, and you can specify black, white, and gamma points when correcting from a detail in the Intellihint window. The RGB and CMYK modules also correct for color casts and support monitor calibration.

The Last Word

Ofoto 2.0 matches most of Intellihance's features, provides better documentation, and offers a few extras such as automatic image straightening and ColorSync compatibility. But if you scan most images directly into Photoshop and you don't want to switch to an unfamiliar program such as Ofoto, Intellihance is both capable and easy to use, delivering color-corrected images with the predictable regularity of an assembly line.

—DEKE MCCLELLAND

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MICROBEAM'S ASAP IS A PRODUCT designed to make it easy for publishers and service bureaus to receive files from their clients. ASAP provides a simple way for users to send files to a distant reception point. Unlike with normal bulletin board system software, there is no complex setup on the part of the BBS operator or on the part of those wishing to send files. In fact, installation and setup can be done by almost any Macintosh or Windows user, with no problems, in about five minutes.

ASAP consists of a sender application that transfers files and a receiver application that accepts them. The receiver program is hardware-encrypted with a protection device that installs in the Macintosh's ADB port (between the Mac and the keyboard); you need to buy a multiuser license in order to install the receiver program on more than one Mac. The sender applications (which come in both Mac and Windows formats) can be freely handed out to clients, regardless of the number.

The applications themselves manage to get by on less than 1MB of RAM each, and the Macintosh version of each application takes up less than 250K of disk space. The receiver program can accept calls only from the ASAP sender program, which ensures the security of your network. In addition to using standard modems, you can also use alternate connection techniques, such as ISDN, AppleTalk links, and satellite feeds. After you've installed the software, setting up the connection involves simply choosing the appropriate connection tool.

Once installed, ASAP is a snap to use. You drag the file you want to send to the ASAP Sender folder and drop it in. The sender (or client) application launches, compresses the document, dials the receiver's number, and speeds the file along to its destination. The Macintosh client program compresses the files with Aladdin Systems' StuffIt; the Windows version uses PKWare's PKZip. The receiver (or server) program automatically expands received files. ASAP also offers extensive logging features in both the client and server programs, so you can easily monitor the status of the jobs that you've sent or received.

Although it supports the fast Zmodem file-transfer protocol, ASAP can't automatically resume a file transfer that's interrupted for any reason (for example, because of a line problem), but the sender does get notified that the transfer was aborted and that the file has to be sent again.

In order to put ASAP through its paces, I equipped two Power Mac 8100/80's in different cities with V.34 modems from Motorola and Supra. One served as the server, and the other, as the client. Installation and setup took just minutes. File transfers were so painless we barely noticed they were in progress, except for a status bar on screen.

My colleague and I tried hard to trip up ASAP, although without any success. Regardless of file size (or whether we were doing other work on our Power Macs), the files we sent came through in perfect condition, and transfer speeds were always quick. Once it was set up, ASAP was about as seamless as any Macintosh program can be.

The Last Word
If you need two-way transfers, you may want to consider purchasing a regular BBS program, such as SoftArc's First-Class, or something in the order of Apple Remote Access. But if you simply need a quick, convenient way for your clients to send you their files, ASAP is easy to use even for a Macintosh beginner, and its performance is first-rate. I recommend you give it serious consideration.

GENE STEINBERG
The Daedalus Encounter

**Adventure Game**

**PROS:** Excellent 3-D animation and integration of live action; challenging puzzles; engaging plot; can expand QuickTime movies to full screen.

**CONS:** Flawed save feature; you must watch 20- to 30-second videos every time you die.

**COMPANY:** Virgin Interactive Entertainment

(714/833-8710) LIST PRICE: $59.95.

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**FOR FIRST-RATE CELEBRITY INTERACTION on CD-ROM, nothing quite measures up to Tia Carrere (Wayne's World, True Lies) in the interactive sci-fi adventure game The Daedalus Encounter. Granted, as actress Carrere is, well, let's just say, still learning her craft. Yet, within the cozy confines of the computer screen, she comes across as less wooden, more personable than in her movie roles. The banter between herself and costar Christian Bocher even manages a fresh and impulsive quality, as if the two actually feel comfortable together. It's not high theater, but it's fun to watch.

How do you fit into this? Well, you're this character named Casey (note the unique name) who got blown to smithereens. Carrere and Bocher, aka war buddies Ariel and Zack, snagged your brain and stuffed it inside a robot. As a result, the texture mapping and 3-D animation are nothing short of excellent. The computer renderings with the live action—Ariel and Zack's language to be just a tad too authentic, so this game might not be for preteens. But with live-action celebrities, top-notch animation, three levels of difficulty, and multiple possible endings, it's adult entertainment at its best.

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Circle 232 on readers service card

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**THE LAST WORD**

Despite these flaws, The Daedalus Encounter easily qualifies as the most exciting game I have seen this year. I've been told that some concerned parents find Zack's language to be just a tad too authentic, so this game might not be for preteens. But with live-action celebrities, top-notch animation, three levels of difficulty, and multiple possible endings, it's adult entertainment at its best.

—DEKE MCCLELLAND
Apple Mobile Message System

**Remote-Messaging Service**

**PROS:** Supports Mac, Windows, and Newton platforms; basic service includes 800 number, voice and fax mailboxes, and an Internet mail address. **CONS:** Macintosh users forced to install PowerTalk; e-mail messages changed to uppercase. **COMPANY:** Apple Computer (408/996-1010). **LIST PRICE:** $549; basic monthly service $19.95.

**Skyline/Satellite**

**Network-Performance Monitor**

**PROS:** Remote traffic monitoring; extensive built-in traffic analysis; remote alarm handling with paging; AppleScript-capable. **CONS:** Expensive; requires AppleTalk routing for wide-area-network coverage. **COMPANY:** AG Group (510/937-7900). **LIST PRICE:** Single-station pack $795; five-station pack $1195; ten-station pack $1995.

Apple enters the alphanumeric paging market with a complete cross-platform hardware-software-service combo called the Apple Mobile Message System (AMMS). AMMS lets you receive alphanumeric pages on your PowerBook, Windows notebook, or Newton via an included PC Card (formerly PCMCIA card) the PageCard from Socket Communications. (Macintosh users need a 500-series PowerBook with Apple’s PCMCIA expansion module.) You can originate paging messages from your computer, E-mail services, and the Internet, as well as by calling your own personal 800-number message center.

The AMMS package includes the two-line LCD display PageCard; a nice leather carrying case; software for Macintosh, Windows, and Newton; copies of Adobe’s DateBook & TouchBase Pro Bundle; and crystal-clear documentation for the whole kit and caboodle.

You call a toll-free number to activate the service. The basic plan costs $19.95 per month and includes a wealth of services: five-personal 800 number, voice and fax mailboxes, an Internet E-mail address, and reception in the city of your choice. The basic service allows 60 messages, of up to 80 characters each, per month, with additional messages costing 25 cents each. The 800 number can take both voice and fax messages totaling up to 30 minutes per month, with additional time costing $1.95 per hour. You get automatic page notification of new voice or fax messages, and you can print out faxes by directing them to any fax machine. To change your reception city you call a toll-free number.

Callers to your 800 number can record a message for you to replay, or leave a message with a live attendant who transcribes it to your pager for 40 cents. You can add nationwide coverage, subscriptions to news and financial information, and other features to the basic service.

The message-management software—Ex Machina’s Notify and Update bundle—lets you send and receive pages. Unfortunately, Macintosh users must install System 7.5 and PowerTalk.

The PageCard receives messages continuously, showing them on its built-in LCD display and storing them in its own memory. You can carry the PageCard in your pocket and read messages on the display as they arrive. Or you can plug the card into your PowerBook’s PC Card slot; then your PowerBook automatically extracts all saved messages to your PowerTalk in-box and clears the PageCard.

Sending pages requires a 2400-bps-capable modem. To send a message, you compose it in AppleMail, select one or more recipients, and press the Send button. The software automatically queues multiple messages in your PowerTalk out-box and dials into Apple’s digital paging service. You can define paging groups if you want to broadcast messages to several people simultaneously.

The AMMS service also routes Internet messages to you. Each PageCard has a unique Internet address; any E-mail sent to that address is automatically transmitted to the pager. The PageCard strips down the sometimes lengthy headers on Internet messages to just the sender’s name and the subject.

The product’s flaws are minor. AMMS translates computer-originated messages to all uppercase, which can be irritating, and doesn’t indicate when messages are truncated. And while PowerTalk nicely integrates paging with other electronic-mail services, its sophistication may be more than some users need.

The Last Word

Apple Mobile Message System is an impressive bundle of capabilities for the price. If you need mobile messaging, this deal is hard to beat.—MEL BECKMAN

Monitoring large, multisegment Ethernet LANs (local area networks) is a difficult chore because most network monitors cannot detect traffic across the bridges and routers of WANs (wide area networks). AG Group’s Skyline/Satellite 1.1 transcends this limitation by moving data collection to remote monitoring engines (Satellites) controlled by a central display-and-analysis application (Skyline).

The single-station Skyline package ($795) includes both 680X0 and Power Mac versions of the Skyline application and a 680X0 (but Power Mac-compatible) version of the Satellite program. You can buy additional Satellites for $300 each, or you can purchase packages that bundle Skyline with five ($1195) or ten ($1995) Satellite units.

In the simplest configuration both Skyline and Satellite run on a single Mac. The Satellite program commanderies the Mac’s Ethernet port to observe LAN traffic around the clock, siphoning all packets transmitted over the network through the port for analysis. Satellite detects 11 network protocols—AppleTalk, NetBEUI/NetBIOS, SNA, IP, NetWare, Banyan VINES, DECnet, LAT, MOP, XNS, and OSI—tabulating network utilization, packets per second, and bits per second for each. Satellite compiles statistical snapshots of LAN traffic, which it archives to disk, and you can define the interval each snapshot summarizes—from one second to one hour.

To take advantage of Skyline’s remote monitoring capability, you run a remote Satellite on one Mac in each of your Ethernet LAN segments. Satellite communicates with Skyline via AppleTalk Program Linking, so any intervening routers or WAN links must be capable of carrying AppleTalk traffic. For example, an Internet WAN requires routers that encapsulate AppleTalk in TCP/IP, such as Apple Internet Router or Cayman.

监测大型、多段以太网LAN（局域网）是一个困难的步骤，因为大多数网络监控器无法检测通过桥接器和路由器的WAN（广域网）中的流量。AG Group的Skyline/Satellite 1.1打破了这一限制，将数据收集移动到远程监控引擎（Satellites）由中央显示和分析应用程序监控（Skyline）。

单个站Skyline包（$795）包括680X0和Power Mac版本的Skyline应用，以及680X0（但Power Mac兼容）版本的Satellite程序。你可以购买额外的Satellites，每个$300，或者购买捆绑Skyline的五个（$1195）或十个（$1995）Satellite单位。

在最简单的配置中，Skyline和Satellite都在单个Mac上运行。Satellite程序指挥它的Mac的以太网端口观察LAN流量。Satellite检测11个网络协议—AppleTalk、NetBEUI/NetBIOS、SNA、IP、NetWare、Banyan VINES、DECnet、LAT、MOP、XNS和OSI，统计网络利用率，每秒的包数，和每秒的比特数。Satellite根据每个的间隔收集统计快照的流量，将它存档到磁盘，你可以定义间隔每个快照总结一次从一秒钟到一小时。

为了利用Skyline的远程监控能力，你运行一个远程Satellite在一个Mac在每个你的以太网LAN段。Satellite通过AppleTalk程序链接与Skyline通信，任何中间路由器或WAN链接必须能够传输AppleTalk流量。例如，Internet WAN需要路由器将AppleTalk封装在TCP/IP，如Apple Internet Router或Cayman。
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**PhotoFix 2.8.8**

**Image-Editing Program**

**PROS:** Useful feathering and transparency controls; supports masks; good printing tools.

**CONS:** Some tools need refinement; no CMYK support. **COMPANY:** Microsoft USA (408/253-2000). **LIST PRICE:** $249.

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**PhotoFix** is a low-cost, unintimidating image-editing program designed primarily for photo retouching and enhancement. At first glance, this program has lots of appeal; it offers a fairly broad range of editing tools similar to those found in Adobe Photoshop—for about $640 less. It has a few specialized features that let you output photographic images to lower-end printers with good results. And it comes with a browser application that allows you to create searchable catalogs of PICT, TIFF, EPS, GIF, QuickTime, and Photo CD images.

As a photo-enhancement utility, PhotoFix goes far beyond the basics. In addition to letting you adjust the sharpness, contrast, brightness, and color balance of images, the program allows you to feather selected areas and control their transparency, separate RGB color channels, create and load masks, and clone portions of an image using a Clone Tool similar to the one in Photoshop. While the program supports plug-in filters, it doesn’t come with any, so you can’t stylize images without third-party add-ons.

One of PhotoFix’s real strengths is its High Quality Printing (HQP) feature. HQP optimizes images for output to lower-end ink-jet and laser printers. To use HQP, you first select your printer type in the program’s Printer Settings dialog box. Next, you calibrate the program to your printer using an easy-to-follow test chart. When it’s time to print your file, PhotoFix uses the printer profile to determine the brightness, contrast, and color corrections that will produce the best results. If you’re printing a color image to a black-and-white printer, HQP dithers the image before sending it to the printer and lets you preview and adjust the dithered version.

You can have PhotoFix apply the HQP corrections automatically when you print, or you can override these settings and adjust the brightness, contrast, and color balance manually using slider bars. These adjustments don’t affect the actual image—only the printed output.

If you’re not sure which settings will produce the best output on your printer, you can use the Print Variants command, which outputs a series of thumbnail versions of your file, each with slight variations. Once you’ve printed the variants, you choose the thumbnail that looks best and use the brightness, contrast, or color settings printed under it.

Though the PhotoFix interface is appealing, it’s weak in some areas. For example, the dialog boxes in which you edit brush size and line thickness provide no visual feedback; you can’t see how thick a 37-pixel-wide brush is until you actually use it. Likewise, you can rotate selections, but only by typing a number in a dialog box. Some of the tools are hard to use, too. Making detailed selections is difficult because you can’t create editable selection paths as you can in Photoshop; PhotoFix’s lasso tool allows you to draw free-form selections, but you can’t edit the resulting paths as Bézier curves. There’s also no way to skew, slant, or resize selections.

The program comes with the PhotoFix Browser, a straightforward browsing utility that can scan a volume and index all readable files into a catalog. You can attach keywords and comments to each entry and search for images by name, keyword, type, or size. Overall, it’s a passable image-management tool, but more limited than some; it has a 150-image size limit, for example, and it doesn’t allow you to reorder images.

**The Last Word**

PhotoFix costs more than bare-bones photo-enhancement utilities such as...
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Stephen Ingham uses only the latest digital tools, including electronic cameras coupled to PowerMacs, storing high-resolution images on drive arrays — no place for an old-fashioned fax machine. But you’ll find Delrina Fax is right for your business too, offering features no fax machine can match. And if you already own a fax modem and want to upgrade, rest easy. Delrina Fax supports most Class 1 and Class 2 fax modems, as well as the Apple Express Modem and GeoPort Telecom adapter.

Still unsure? Delrina Fax has a hassle-free, 60-day, money-back guarantee. Plus Macworld magazine says, “Furthermore if you do run into trouble, Delrina’s phone-help staff is jaw-droppingly good.” (October 1994)

To order Delrina Fax PRO for Macintosh, call 1-800-631-8118. Or visit your local software retailer.
The program provides a back door, known as ultraKey, to let you access a Mac if you’ve forgotten the password. ultraKey creates a file for each protected Mac; you should store this file on a floppy and put it in a safe place to prevent unauthorized access. If the password is lost or forgotten, the floppy can be used as a master key to unlock the drive. If you don’t have an ultraKey and forget your password, you’re out of luck; you have to reformat the drive.

ultraSecure has an almost bewildering set of features, and I’ve only touched the highlights here. But it’s not terribly hard to use. Most menu-bar commands and dialog boxes are clearly labeled as to function. To get the most out of the program, though, you’ll want to read the manual thoroughly.

There are some drawbacks to ultraSecure. As with other security software, driver-level compression programs are a no-no. But the list of unsupported procedures doesn’t stop there. You cannot use a software disk-partition program, such as Symantec’s Norton Partition. The background disk-diagnosis features of such programs as Symantec’s MacTools Pro must be turned off. Also, you cannot update or reinstall system software without first disabling ultraSecure.

In other respects, the program works well and intrudes little upon one’s regular work, and the publisher seems to be dedicated to resolving bugs as they are discovered. During the review process, I encountered some minor problems with Apple’s Control Strip and General Controls under System 7.5 and 7.5.1. These were promptly fixed in the 3.524 update.

The Last Word

Despite its trade-offs, ultraSecure offers just about every security trick one can imagine in a single product, and the program will be a boon to any business that needs to protect valuable document files and software. Anyone interested in security software should give it careful consideration.—GENE STEINBERG
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ChoiceStick 1.0.2

**Dual-Joystick Port**

**PROS:** Supports three- and six-button controllers from Sega Genesis and others; preconfigured for 140 games; flexible, easy-to-use software. **CONS:** Difficult to test and restore game settings; no printed manual; cannot set a default controller type. **COMPANY:** Kernell Productions (302/456-3026). **LIST PRICE:** $69.95

**FloorPlan Plus 1.1**

**2-D CAD Software**

**PROS:** Affordable; easy hardware requirements; good basic drafting tools. **CONS:** Limited object-positioning tools; unusual text handling; undisciplined zooming. **COMPANY:** Computer-Easy International (602/829-9614). **LIST PRICE:** $49.95

**TO THE DISMAY OF GAME PLAYERS,** the Mac doesn't come with a joystick port. Now, though, the ChoiceStick—a dual-joystick port for the Mac—lets you connect a pair of three- or six-button Sega Genesis, Sega Master System, Atari 2600, Atari 7800, or JDO controllers to any Mac except the 128K, 512K, or Plus. And with a Genesis four-player adapter, you can connect up to four controllers.

The tiny ChoiceStick box—a 4 by 3 by 1 inches—connects to any ADB port. Because the box includes two ADB sockets, you can connect it in series with your keyboard and mouse. On the front of the box are two ports to which you attach the controllers.

For the most part, the ChoiceStick software (three extensions and a control panel) is a pleasure to use. It comes preconfigured for 140 games; you can use the settings as is or edit them to your liking. You can also configure the ChoiceStick to work with other programs.

To configure or reconfigure a game, you either open the ChoiceStick software's control panel or press a hot key while the game is running. You can assign a mouse movement, a mouse-click, or a keystroke to every button and direction on the controller.

For many games, this assignment process is simple—even fun. However, games that allow free movement may require many adjustments before you get things right. Unfortunately, the ChoiceStick software does not allow you to test new settings without saving them over the current ones. And there is no command for restoring or reverting to the original settings.

You can also use the ChoiceStick software to control programs other than games. You can assign controller buttons to close windows and issue Copy or Paste commands, for instance.

In addition to the standard configuration options, the ChoiceStick works with games that take complete control of your Mac and lets you set advanced movement options, including gravity, desktop friction, mouse tracking mode, and edge settings. For most games, these features can be ignored. Still, it's nice to know they're around if you do need them.

Another ChoiceStick plus is that if a controller fails, you can get a new one for $15 to $20; joysticks that plug into the ADB port are rare and more costly to replace.

Most of the problems I had with the ChoiceStick could be traced to the manual. The documentation — provided only as a DocMaker file — needs more-though explanations.

The software has some shortcomings. The control panel needs an import command, and there should be a simple way to test new settings without overwriting existing ones. Since the two bundled controllers are both six-button models, the ChoiceStick programmers configured all games for a six-button controller. However, three-button controllers are more common, so a better approach would be to let players set the default controller type via a preferences setting.

Some games are better suited for joypads and joysticks than others, and some of those work better with a joystick. Pinball and action-adventure games are naturals for a joystick. But playing Pac-Man with a joystick was difficult, while a joystick worked beautifully.

**The Last Word**

With some additions to the manual and a few software adjustments, the ChoiceStick could be a world-class solution to the Macintosh joystick problem. The base package includes the device, an ADB cable, and the software. For an additional $10 or $20, you can get an Asciiware six-button Genesis joystick or joystick. Given the small increment in price, I recommend the bundle.—STEVE SCHWARTZ

**FloorPlan Plus** is a draw program designed to be used by nonprofessionals for rudimentary 2-D drafting. Simply constructed and affordable, FloorPlan Plus is intended for architectural and interior-design chores around the home or in a small business—for example, seeing the effects of moving the furniture around, or brainstorming the configuration of a new den or patio.

FloorPlan Plus provides standard tools for drawing lines and geometric shapes, and it offers basic CAD features, including a tool that builds wall objects to user-defined thicknesses. Another tool draws wires, pipes, and conduits, and a third produces pattern-filled shapes representing building or landscaping materials. The program recognizes the patterns created by the tools and, by calculating the dimensions of these objects, can produce bill-of-materials summaries for construction planning.

Other quasi-CAD features include object libraries. FloorPlan Plus comes with libraries containing window and door elements, furniture, landscaping objects, and general architectural symbols, such as those for electrical outlets and wall switches. And the program offers a basic dimensioning capability that lets you apply labels with measurements denoting the size of an object (such as a wall length) or the distance between objects (for, say, the width of an aisle).

FloorPlan Plus lets you create scale drawings that range in size up to 105,625 square feet (325 by 325 feet) at ⅛-inch resolution, and to over 27 million square feet at 1-inch resolution. The program provides a grid to aid in positioning objects, and you can use up to 16 layers for organizing drawing elements.

FloorPlan Plus is easy on hardware requirements. A single 800K floppy disk holds the uncompressed program, the tutorial files, and the four object libraries. The software runs on all Macintoshes from the Plus to Power Macs. (Yes, I tested it on my heirloom Mac Plus.)

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Bargain Planning FloorPlan Plus offers basic drafting tools at an affordable price.

It's hard to criticize a program with a street price around $35, but in practice FloorPlan Plus leaves a lot to be desired. For example, it supports only 16 colors. More significant is the omission of rulers, which leaves you with no visual reference for either the drawing's size, or its working scale. Consequently it's easy to get lost moving around a plan: zoom in to position an object, and you can't tell which grid line is which. With a small project—say a 20-by-20-foot room—the problem is annoying but manageable. But if you plan to push the program to its limits, be prepared for some pain.

FloorPlan Plus's interface looks very Mac-like, but start working with it, and its foibles become clear. For example, you can edit objects by moving individual control handles, but the command terminates if you miss a handle. Each miss requires a return to the Edit menu.

The program's text handling is poorly implemented. Instead of offering the standard options, the program sizes text relative to the drawing scale—for example, "one drawing foot" size. Use the wrong size and you must return to the text or measurement-label dialog box. Choosing another size has no effect on selected text; you must redo the notation.

And FloorPlan Plus's zooms to its own drummer. Even when objects are selected, a zoom-in can send you to a completely different part of the drawing, forcing you to scroll to where you want to go. Since the program is no speed burner (surprising, given its small size), scrolling gets tedious—even on a Power Mac.

Finally, FloorPlan's short manual does only a fair job, and some users may find the instances of non-Mac terminology confusing.

The Last Word
FloorPlan Plus is a bare-bones draw program with basic CAD features. Large projects are out of its league, but it's acceptable for small drafting chores. Of course, that's if you can live with its modus operandi, but at this price you can put up with a lot.—CARLOS DOMINGO MARTINEZ
MOUSE? TRACKBALL?

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InstantReplay 1.0

QuickTime Screen Recorder

**PROS:** Straightforward; easy to use; versatile file-conversion features.  **CONS:** Manual needs more details and an index.  **COMPANY:** Strata (801/628-5218).  **LIST PRICE:** $149.

Strata bills InstantReplay as a screen recorder: a program that enables you to create QuickTime movies of screen activity. While InstantReplay excels at this task, it also does a half-dozen other things extremely well. In fact, it's one of the most versatile multimedia utilities I've ever used.

InstantReplay has two components: a system extension and an application. The extension lets InstantReplay record screen activity when you press a hot-key combination. The application lets you specify capture settings and convert a variety of file formats into QuickTime movies.

Before recording, you can specify the size of the capture area. You can record a full-screen movie, but larger movies require more disk space and may not play back smoothly. It's generally better to use a smaller size. If you're recording a long mouse journey—such as dragging an icon across the screen—follow Cursor causes InstantReplay to pan as the mouse moves.

InstantReplay lacks the ability to shrink the Mac's display area to 512 by 384 pixels. But this shortcoming isn't significant—on most Macs, the Monitors control panel lets you specify a 512-by-384-pixel screen size. Doing so lets you record movies that appear full-screen but, when played, don’t fill a 14-inch monitor, thus leaving room for navigation buttons.

InstantReplay can record audio while recording screen movies. InstantReplay can also record conventional QuickTime movies on any Mac equipped with video-digitizing hardware.

When you stop recording, InstantReplay opens the movie. The program provides some useful editing commands that let you delete unwanted portions of a movie or paste a clip into an existing movie. Some of the most valuable commands are tucked beneath option-shift key sequences, however, and you might miss them if you don’t read the manual, which barely defines them.

If all InstantReplay did was record and let you edit screen and video movies, it'd be a winner. But its file-conversion features make a good thing even better. The program can import and create QuickTime movies from CD audio tracks, MPEG movies, PICS files, AIFF audio files, System 7 sound files, MIDI files, and even text-only files. You can also export movie frames as PICT or PICS files and movie sound tracks as AIFF files.

The Last Word  InstantReplay's screen-recording features make it a must-have for anyone producing Mac training materials. But its ability to record video QuickTime movies and convert all major multimedia file formats gives InstantReplay a much broader audience. If you're involved in QuickTime movie production—especially with projects involving a variety of file formats—you need this program.—Jim Heid

The Fuzzy Logic Toolbox 1.0

Math-Simulation Software

**PROS:** Nice graphical interface management; integrates with MATLAB’s Simulink.  **CONS:** Slow in Mamdani mode; engineers-only price.  **COMPANY:** MathWorks (508/653-1415).  **LIST PRICE:** $895.

**MATHEMATICS & SIMULATION SOFTWARE...**

MathWorks’ Fuzzy Logic Toolbox is a complete, easy-to-use graphical interface for constructing models using fuzzy logic. In traditional two-valued logic, a set of true/false inputs are evaluated, through a series of rules, to a true/false output. Fuzzy logic evaluates partially true inputs and produces an output within a range of values. Although many other multi-valued logical approaches, from neural networks to systems of linear equations, get results roughly equivalent to fuzzy logic formally, fuzzy has emerged as a favorite among engineers who have to design real-world chip-based systems.

The Fuzzy Logic Toolbox (FLT) is designed to use MATLAB ($1695) to develop models, but it can also construct stand-alone applications that use an included fuzzy-logic inference engine, and FLT exports a standard ASCII specification of fuzzy-logic models for use in other programming systems. FLT offers both the Mamdani inference method and the more recent, significantly faster, but more abstract Sugeno method, as well as adaptive neuro Sugeno-based systems (in which input functions “learn” from input data), and fuzzy clustering for pattern recognition. These methods cover nearly the whole range of current academic and industrial research options in fuzzy logic. And having MATLAB as a base allows extension and modification of the original MathWorks toolbox routines to implement any other techniques you want to use.

Beyond a comprehensive set of fuzzy-programming routines, FLT includes numerous examples of adaptive-control systems and data classifications (many of these are greatly enhanced by the Simulink graphical systems display). The examples are particularly useful for showing you how to scale up from creating simple, diagram-based systems to assembling complex applications that are code-based MATLAB M-files. The tutorial in the manual has the simple but profound virtue of being the best introduction to fuzzy systems ever written, since it offers a detailed guide to examples in FLT, and was clearly produced with control-systems engineers, rather than mathematicians, in mind (engineers have to understand fuzzy logic and make something work, rather than resolve the numerous philosophical issues surrounding fuzzy).

The Last Word  The Fuzzy Logic Toolbox is an introduction to fuzzy control systems for professionals, many of whom will already be familiar with MATLAB toolboxes for signal processing and different types of traditional control (state-space, robust, and m-analysis, among others). If you have any interest in these topics, FLT is clearly the product to buy.—Charles Seiter
In school, you and your friends talked about the ideal man.

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Trackball Pro ADB

**Input Device**

**PROS:** Ball fits snugly and rolls smoothly; button functions can be customized.

**CONS:** Limited cursor-acceleration control; buttons can't be programmed to send text strings. **COMPANY:** CH Products (619/998-2518). **LIST PRICE:** $119.95.

**O RATE CH PRODUCTS’ TRACKBALL Pro ADB, I compared it with Kensington Microwave's Turbo Mouse 4.0 (see Reviews, Macworld, November 1992), since the two input devices are almost identical in size and shape. The Trackball Pro has a cord, hardwired to its case, which connects to an ADB port via a pass-through plug that allows you to hook up another ADB device in series, an approach I find vulnerable to accidental separation. (The Turbo Mouse, by contrast, reduces this risk by using twin ADB ports, one for its own removable cord and one for connecting another device.) The Trackball Pro's ball is fixed in place by a flap that holds it snugly while permitting the ball to roll smoothly.

The Trackball Pro has four buttons (two more than the Turbo Mouse) located in pairs on each side of the ball, but only two are easily accessed by thumb and forefinger without lifting your hand from the ball; you have to press the others with your ring or pinkie finger, which I find awkward. The Trackball Pro's buttons provide less tactile and auditory feedback than do the buttons on the Turbo Mouse; however, the control panel lets you swap the functions of the two sets of buttons, to accommodate both right- and left-handed users.

The Trackball Pro control panel lets you customize the function of each button individually. You can set any button to click, click-lock, or double-click when you press it. You can also program it to generate single keystrokes (with or without modifier keys such as # and option), but you can't use a button to send strings of text (like your name and address) as you can with the Kensington Turbo Mouse.

CH Products’ approach to customizing cursor response is also less comprehensive than Kensington's. For example, the Trackball Pro control panel lets you specify normal and slow cursor speeds by means of slider controls, but it doesn't provide the fine control you get with the Turbo Mouse software, which allows you to define custom cursor-acceleration tables. Finally, the Trackball Pro doesn't offer anything resembling Kensington's Brilliant Cursor function, which jumps the cursor to a user-defined on-screen HotSpot whenever you move the cursor toward that spot—very useful for people with large monitors.

**The Last Word** Although the two trackballs are about even on ergonomics, the Trackball Pro isn't as programmable as the Turbo Mouse. The Turbo Mouse provides a two-year warranty, which beats the Trackball Pro's one-year warranty, and Kensington's printed manual is more lucid than the electronic guide that comes with the Trackball Pro. Overall, Kensington’s Turbo Mouse provides more functionality than the Trackball Pro, but if you don’t care about the missing functions, the Trackball Pro ADB, which lists for about $50 less, is worth a look. —FRANKLIN TESSLER

Gear 2.5

**CD-Recordable Software**

**PROS:** Speedily file conversion; saves hard disk space by converting files on the fly; good documentation; very good technical support.

**CONS:** Cannot record HFS CD-ROMs from just a portion of a hard drive; can't manipulate order of files in recording window. **COMPANY:** Elektroson (619/617-0850). **LIST PRICE:** $799.

**CD-RECORDABLE MASTERING software doesn’t just move digital data from a storage device to a CD-ROM; it must also convert that data from the 8-bit values of hard disks into the modulated 14-bit values of CD-ROMs. This conversion usually requires saving a copy of the translated material to a computer’s hard drive before transferring it to the actual CD-ROM. Elektroson’s Gear can bypass this storage-consuming step (for most CD-ROM formats) through its virtual-image feature, which allows you to convert files on the fly while recording to the CD-R drive. Gear features a familiar highlight-and-click interface. Your drives, folders, and files appear in a window on the left of Gear’s screen. You highlight the items you want to record and then click on the Copy button, which queues them in the recording window on the right (see “Familiar Windows”). Unfortunately, Gear doesn’t allow you to manipulate the order of files once they’re queued in the recording window.

Gear supports standard CD formats such as multisession, ISO 9660, HFS, Photo CD, hybrid, and audio. You can also save data to tape in the Disc Description Protocol format (DDP) preferred by some CD-ROM-pressing services.

Unfortunately, Gear creates HFS-format CD-ROMs (supporting Macintosh file names, icons, and deep directories) only from an entire hard drive or partition, not from individual files. Elektroson sends registered users of Gear a copy of FWB's Hard Disk ToolKit, which provides a soft-partition feature within Gear—as Astarte does with its CD-R mastering program Toast—to facilitate recording in the HFS format.

The 93-page manual explains Gear's functions and CD-R technology effectively, and Elektroson provides very good technical support for any questions not covered by the manual. The appendix explains all of the program's error codes—a nice touch missing in some other products—but the manual needs to provide more information on how to solve the problems that cause the errors. Beginners and occasional users would also benefit from more step-by-step instructions on how to build CDs in different formats.

**The Last Word** Gear 2.5 is as good as Astarte’s Toast (see “Desktop CD-ROM Publishing,” Macworld, March 1995). Joined with an AV-friendly 1GB hard drive, Gear works predictably and reliably, making it a good tool for Macintosh professionals planning to record one or more CDs per week. —JIM FEELEY

Familiar Windows Gear uses a simple highlight-and-click interface to build a CD-ROM. The log displays all actions that Gear performs.

**FAMILIAR WINDOWS Gear features a familiar highlight-and-click interface to build a CD-ROM. The log displays all actions that Gear performs.**
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Circle 204 on reader service card
On Cue II Utilities 3.0

PROS: Provides quick access to files and folders; enhanced open-file dialog box. CONS: Find function cannot search for embedded text; limited extension-manager functions. COMPANY: ComputerEasy International (802/829-9614). LIST PRICE: $99.95

On Cue II Utilities 3.0 is the latest incarnation of a utility that garnered a strong following when it first appeared a few years ago but has since lost ground to competitors like Now Utilities 3.0 (see Reviews, Macworld, January 1995). On Cue consists of eight modules, each of which adds a different set of functions to the Mac Operating System. An installer program lets you load as many modules as you like, with a complete installation requiring about 1MB of disk space. On Cue works with System 7.0 or higher and is Power Mac-compatible.

On Cue II's centerpiece is a file launcher, called On Cue Menu, that lets you open applications and documents by selecting them from a menu located at the upper left or right corner of the screen (see "Files on Cue"). (Another module, KeyLauncher, lets you locate and open any file by typing the first few characters of its name.) You can group related items in folders, and attach documents to specific applications in the menu. You can also define groups of items, called MultiSets, that automatically open at the same time when you choose a MultiSet from the menu.

Another useful module, Smart Open, enlarges the Mac's standard open-file dialog box. The enhanced version shows the name, type, creator, size, and modification date of all items in the current folder or disk. Icons at the bottom of the window let you search for, get information about, duplicate, or delete files and folders. If you're technically inclined, you can even change a file's type, creator, and Finder flags, and set access privileges for shared disks and folders. (A disk accessory called On Disk provides an alternate way to access all of Smart Open's tools.) Unfortunately, Smart Open lacks the ability to search by content; Now Utilities' Now SuperBoomerang can.

On Cue II Utilities' remaining components are less compelling. On Task facilitates switching between running applications, and On The Level lets you specify sound and monitor settings for particular applications. An extension manager called On Startup lets you control which extensions and control panels load at start-up, but it can't ferret out INIT conflicts the way Casady & Greene's Conflict Catcher can (see Reviews, October 1994). Finally, Quick-Finder displays a list of all files with a specified file type and/or creator.

The Last Word Configuring utilities like On Cue II can be daunting for first-time users. Fortunately, the manual is lucid and complete, despite a few misplaced references to DOS in the opening pages. While it's not nearly as comprehensive as Now Utilities, On Cue II offers several useful functions and may be a bit less intimidating for some people.—FRANKLIN TESSLER

In Control for Workgroups 3.5

PROS: Easy, flexible sharing of project and calendar data. CONS: No document-level security features. COMPANY: Attain (617/776-1110). LIST PRICE: $149.95; ten-pack $949.95.

In Control for Workgroups lets you share In Control 3.0's excellent multicolumn outline, to-do, and calendar features (see Reviews, October 1994) over a network. In Control's main feature is the outline, which adds multiple columns to the familiar indented outline format. For example, every outline topic has columns for a description, start date and time, and end date and time (and of course, you can add more columns). The date-and-time columns link the outline and In Control's built-in calendar; you can use the outline to list to-do items and then schedule them on the calendar.

You can choose to share one or more columns in your outline, then pick which line items in the column are to be shared. You can also select which coworkers have access to your data, or share different parts of the data with different coworkers. For example, if you maintain a shared personnel list, you could limit access to the Salary column to department managers, and you could restrict access so that a manager could see only his or her department.

In Control does not have a server application that arbitrates data transfer between users; rather, users periodically connect to an intermediary file, called a Public File, on a shared network volume via AppleShare, System 7 file sharing, or NetWare. The Public File contains a copy of the shared data stored in each user's local file on the user's hard drive. To share data, a user opens an In Control file and selects Use Public File from the Public Files submenu in the File menu. Data in a local file can be updated with information from the Public File at user-definable intervals, or immediately, using the Update button in the tool bar. Shared data is indicated by a vertical bar near the start of each outline row.

Because the Public File does not need to be constantly accessed, PowerBook users can add or modify information on the road and still reconcile their data with that of the other users at the next connection to the Public File, either directly over the network or through Apple Remote Access.

In Control for Workgroups has no document-level security features, so any user can change any shared data; users should have the ability to lock selected items so that changes cannot be made. Another problem is that users aren't automatically alerted if columns have been added to a Public File.

The Last Word Many projects (and managers) need more tracking and brainstorming tools than multiuser calendar programs offer, yet don't need a full-fledged project manager. In Control for Workgroups is a good solution for workgroups that need to share project information. The flexible outline allows managers to view as much or as little of a project as needed, while the integrated calendar lets you easily track a project's progress.—TOM NERINO
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Circle 196 on reader service card
**Jetstick**

*Macintosh ADB Joystick*

**PROS:** Preconfigured for 120 games; easy to update, import, and export settings; one-year warranty.  
**CONS:** Inadequate manual; system crashes if you attempt to configure games that are running; can interfere with mouse operation; no button labels.  
**COMPANY:** CH Products (619/998-2518).  
**LIST PRICE:** $74.95.

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**THE JETSTICK IS A JOYSTICK THAT** plugs into an ADB port. (If you have only one ADB port, you can use the pass-through port on the Jetstick’s cord to connect it in series with your mouse and keyboard.) The Jetstick features a comfortable pistol-style handgrip, two firing buttons, separate trim wheels for the x and y axes, and a properly weighted base.

The Jetstick control panel enables you to view or change settings for games, other programs, and the Finder. The control panel contains settings for 120 games—you can store up to 200. To activate a setting you open the control panel, find the game in the settings list, click the Automatic Load check box, and close the control panel.

When you launch the game, the Jetstick is enabled. You can also choose a sound that plays when the game is launched to indicate that the Jetstick is active.

You can view and change settings, and associate each joystick direction and button with a keystroke or a mouse-click. Every program must use one of three modes. In Absolute and Relative Mouse modes, joystick movements replace mouse movements. In Keyboard mode, movements are controlled from the keyboard. Options include flipping the x or y axis or swapping the axes, setting the speed at which the cursor moves in relation to joystick movement, and setting the size of the active cursor area.

The included settings worked flawlessly. Using the control panel, however, can sometimes be challenging. When you select a game, its settings go into effect immediately. And choosing a program that is configured for an unusual-size screen or that uses Absolute Mouse mode can make the cursor jump erratically.

Although I couldn’t get the Jetstick to work with Microsoft Flight Simulator 4.0, most of my other problems were caused by the documentation. The Jetstick ships with a printed manual, a photocopied update, and several Read Me files. This material explains how each control-panel option works, but a tutorial would have been helpful. Also, some very basic information was omitted. For instance, the manual doesn’t mention when you can safely use the control panel. It’s natural to want to check or tweak settings while a game is running. However, this frequently resulted in a crash.

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**Menu Master Mac**

*Security Software*

**PROS:** Easy to register several users; toll-free technical support.  
**CONS:** Can’t restrict login to particular days or times; no limitation on disk space usage; encryption not compatible with all hard drives.  
**COMPANY:** Electronic Learning Systems (904/375-0558).  
**LIST PRICE:** $99; 15-site license $299.

**MENU MASTER MAC 2.5.0.7 ELIMINATES some of the worry when you’re sharing a Macintosh—or a roomful of Macs—by allowing an administrator to protect and budget a computer’s resources. The administrator can restrict a user’s access to specific files, folders, and applications; prevent users from inserting a floppy disk or launching a file from a CD-ROM; and limit them to a specified number of log-on minutes or printed pages per day (see “Restricted Access”). The manual provides step-by-step instructions for configuring Menu Master on AppleShare networks, and if you run into a snag, technical support is helpful and toll-free.

The administrator of a shared computer registers users by accessing the administrator’s account and entering a password-protected management mode. You can add users manually, or import them automatically from a tab-delimited text file—a timesaver if you have many users to process. You set access privileges by navigating dialog boxes to select the files, folders, and applications you want to make available, and Menu Master lets you set access privileges for several users at once by assigning them to groups.

You can also assign each user a personal folder for saving files and provide separate read-only and drop (write-only) folders for any user or group—handy for distributing and receiving documents.

Menu Master protects the Mac by replacing the Finder with an interface that lets users access only those files, folders, and applications specified by the administrator. (You can authorize use of the Finder by giving users the management password, effectively making them fellow administrators.)

Menu Master greets a user with a log-on screen demanding a name and password. After log-on, Menu Master displays the accessible files and folders as icons in windows similar to the Finder’s. A user can launch applications or access files and folders by clicking on the icons.

Menu Master suffers from a couple of omissions: you can’t restrict usage to particular days or hours, nor can you limit the hard drive space allotted for a user’s personal folder.

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**The Last Word**

Although I like the Jetstick hardware, the manual and the software forced me to do more work than necessary. Currently, the ChoiceStick dual-joystick port from Kernel Productions is a stronger choice (see review this issue). The ChoiceStick’s price is about the same, the software has more options, and you can reconfigure games and check settings while games are running.—**STEVE SCHWARTZ**

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**The Last Word**

The acid test of any security system is the degree of protection it provides, and Menu Master easily thwarted the usual workarounds, including starting up from another volume or disabling extension loading at start-up. For added security, the installer disk contains a program that encrypts all the files on your hard disks, but it’s incompatible with many third-party drives. Despite its limitations, Menu Master is a good solution for computer labs and other installations where Macs are shared.—**FRANKLIN TESSLER**
ers agree—wats out of Microsoft.

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Some top filmless devices, clockwise from upper left: Dicommed's Digital Camera, Fuji's Fujix DS-515 (co-marketed by Nikon as the E2s), and Apple's QuickTake 150.
begun to challenge traditional film units

Many futurists predict that silver-based film and conventional photography will soon go the way of 8-track stereo and polyester leisure suits. After all, once you buy a filmless camera, you never pay another nickel for film or processing, or worry about polluting the environment with dangerous chemicals. Just hook up the camera to a Mac and color printer, and you have a veritable home Fotomat. And filmless cameras are fast and convenient; they can produce a picture in minutes, or instantly transmit images anywhere in the world. Filmless photography is rapidly becoming popular among law enforcement officials, photo ID centers, photojournalists, real estate listing agencies, and insurance claims adjusters.

But don’t throw away that trusty conventional camera yet. Filmless devices (cameras and camera backs) still cost many times more than comparable-quality film-based counterparts. It would take most users quite a while to shot enough exposures to save money. And limitations in shooting flexibility, storage capacity, and image quality still dog filmless photography.

At the heart of every filmless camera is a photosensitive semiconductor called a charge-coupled device, or CCD (see the diagram “Filmless Photo Dilemma: Speed versus Resolution”). The performance and cost of CCDS—and by extension filmless cameras—varies widely. In evaluating filmless cameras, we found that relatively inexpensive ones—the $739 Apple QuickTake 150, the $795 Dycam Model 4, the $3200 Fujix DS-100, and the $3740 Canon RC-570—typically produce images comparable to those shot with a $20 box camera. Midrange handheld cameras, such as the $10,995 Kodak DCS420 and the $16,020 Fujix DS-515 (identical to the Nikon E2s Digital Camera System), deliver image quality analogous to that of a $100 point-and-shoot 35mm camera. Even the most expensive portable filmless camera, with the highest-grade CCD we worked with, the $27,995 Kodak DCS460, has approximately the image quality of an $800 semi-professional 35mm camera. And while filmless devices designed for studio use—like the $4995 Leaf Lumina, the $29,995 Leaf Digital Camera Back, and the $22,500 Dicomed Digital Camera—produce superb images that can be enlarged to poster or even billboard size, these cameras must generally be used with a tripod; most must be tethered to a computer; and others require long exposure times, precluding live action (see the table “Filmless Photography Spectrum”).

To test the talents of these devices, we photographed a still-life scene that presented various technical challenges—including a range of colors, subtle and varied highlight and shadow detail, and a variety of textures and reflective surfaces. We used strobe lights for the real-time cameras and high-intensity fluorescent lights for the time exposures required by the studio devices.

The crucial measure of any camera’s performance is output. We used three output media: print, electronic display, and...
Filmless Photo Dilemma: Speed versus Resolution

Entry-Level Cameras

The least expensive filmless devices are simple point-and-shoot cameras with fixed lenses, built-in strobes, few user-selectable controls, and only fair image resolution. As a result, they can't handle true wide-angle or telephoto shots, minute detail, output to slides, or enlargements bigger than 4 by 5 inches. Low-end devices work well for viewing photos on screen or for newsletter-type publishing. Their relative affordability, compact size, lightweight design, modest computer requirements (8MB of RAM, compared with the 24MB to 64MB some of the higher-end cameras require), and ease of use make point-and-shoot cameras well suited for hobbyists and business users.

The Apple QuickTake 150 (tested in a prerelease version, but now available) is virtually identical to its groundbreaking predecessor, the 100, but with a few important refinements: twice the internal storage capacity, a snap-on close-up lens, and a built-in infrared filter that sharpens images. The 150 also ships with a simple image-touch-up program, PhotoFlash.

The 150 is virtually foolproof: just slide open the lens cover, aim, and shoot. The camera automatically adjusts exposure to match lighting conditions. The 150's fixed-focus lens has a depth of field from 4 inches to infinity. The snap-on macro lens allows close-ups (10 to 14 inches), but the viewer is very difficult to focus. Off-loading images is easy—attach the camera to a modem or printer port, open PhotoFlash, and click on the thumbnail you want to move to your hard drive. The QuickTake 150's only significant limitation, aside from the mediocre image quality of all inexpensive filmless cameras, is its frame buffer. It holds only 16 to 32 shots (depending on resolution) that must then be either off-loaded.

We looked at a prerelease version of Kodak's $995 DC40, but it is now shipping. The DC40 uses the same CCD as the QuickTake, and both cameras' bodies are built by Chinon. There are several important differences, however. The DC40 comes equipped with 4MB of flash RAM, enough to hold 48 standard or 96 low-resolution images. To compensate for less RAM (the QuickTake has 1MB of flash EPROM), Apple masks part of the CCD to limit resolution to 640 by 480 pixels. The DC40 uses the full CCD for a resolution of 736 by 504. That translates into sharper, more-detailed images—should be well worth the extra $256.

The Dycam Model 4 comes with a $99 optional lens that focuses down to 2.5 inches and is designed to produce sharper images, but our evaluation showed no appreciable improvement over the fixed-focus lens. With no LCD display panel, the camera beeps when it's ready to shoot (up to once every 8 seconds

CCDs Turn Light into Data

The cameras reviewed in this article take photos without film. Their image-capture medium is a specialized semiconductor—called a charge-coupled device (CCD)—composed of hundreds, sometimes thousands, of separate photosensitive elements. CCDs transform light into electrical charges whose intensities vary based on the strength of the light reflected from the image being captured (for more on how digital cameras work, see Macworld, September 1994, page 142). The CCD passes these charges to an analog-to-digital converter that codes the light data for storage in RAM or on a hard drive.

CCDs Come in Two Main Types

In a studio digital camera, a linear CCD—a single row of photosensitive elements—captures an image as a series of narrow strips. This technique offers high resolution, but takes time. You can't use linear CCDs to photograph moving subjects; nor can you shoot subjects that can't withstand a slow exposure under bright, hot studio lights.

In real-time cameras, a CCD array exposes an entire grid of photosensitive elements at once. CCD arrays rival normal photographic film in image-capture speed, but CCD arrays create images with much lower resolution than do film or linear CCDs. (To produce an array with as many physical elements as a linear CCD can create virtually—through strip-by-strip exposures—would be prohibitively expensive.)
Filters Turn Light into Colors

For a filmmakers camera to capture color, incoming light must pass through color filters before reaching the CCD. One way to handle filtration is to make separate exposures through three filters—each one of the primary colors that make up a color digital image. (The Leaf Digital Camera Back uses this method.) This technique produces good image quality, but it’s slow. And some linear CCDs have difficulty registering the three images.

Three Embedded-Filter Solutions

Some digital studio cameras, such as the Dicomed Digital Camera, use embedded filters. Three rows of filters sit directly on top of the photosensitive elements. Each filter row of this trilinear CCD blocks a different primary color. The CCD captures all three colors in one pass, thereby eliminating the registration problems found in three-pass linear CCD systems.

Real-time cameras use color CCD arrays with embedded filters arranged in a pattern, as in the Kodak DCS460. Each photosensitive element captures just one of the primary colors. For each pixel of an image, the camera must then interpolate from nearby elements to get the other two colors. This method permits instant exposure but reduces resolution.

To get better resolution, real-time cameras can use a multiple-array system. A prism directs light from the image source onto two or three arrays, which have various embedded-pattern schemes for filtering the primary colors (the Sony Caddyte uses this method).

The information from each array is combined to create one color image whose resolution equals that of images captured with a single monochrome array. A multiple-array system can’t capture images in rapid succession, however. The data from just one shot fills the RAM buffer, and you must offload the buffer before shooting again.

in standard resolution) or when the frame buffer is full. The camera stores only 8 standard or 24 low-resolution frames.

The Dycam was the only camera we tested that has no automatic exposure control. For outdoor shooting, Dycam provides a neutral-density filter to avoid overexposure. That’s acceptable for cheap box cameras, but not for a nearly $800 device. Off-loading images was simple, but changing defaults (resolution, flash on/off, and shutter speed) has to be done through your Mac—a terrible flaw for a camera meant to be used on the go.

Significant differences separate the Dycam and the QuickTake. Both save to built-in memory chips. However, the QuickTake’s low-powered flash EPROM chips keep the pictures intact for up to a year, while the Dycam’s power-hungry RAM chip stores images for only a week. Theoretically, the Dycam’s etched viewfinder with parallax-correcting guides (which reduce the discrepancy between what you see in the viewfinder and what the camera captures) should be more accurate than the QuickTake’s simple unframed viewfinder. But the Dycam was so inaccurate that it took us ten exposures to guessimate where to center the camera to shoot our still life.

The Model 4’s biggest difference is image quality—a resolution problem sets it behind the other devices. The QuickTake’s 640 by 480 resolution is enough to give a sharp screen image and decent prints up to 4 by 5 inches. But with the Dycam’s 496 by 365 resolution, even with corrected software the screen image would probably be less sharp, as would prints larger than about 3 by 4 inches.

Slightly pricier, slightly better Moving up a notch in price, the Canon RC-570 adds an autofocus zoom lens, a parallax-correcting optical viewfinder, and virtually unlimited storage capacity. After you’ve clicked off 25 standard- or 50 low-resolution images, it takes only seconds to swap out the camera’s S10, 2-inch floppy and continue shooting.

Technically, the RC-570 is an analog-type still-video camera, rather than a digital camera. Digital cameras instantly convert images from analog to digital data; still-video cameras need expensive boards or boxes to produce their digital data. Still-video cameras generally yield poorer image quality at the same resolutions as digital cameras. The RC-570’s prints were not sharply defined and the colors shifted. However, still-video cameras offer the advantage of being able to instantly output a standard video broadcast signal to a TV, VCR, or color video printer.

The RC-570 really falls down on price. The basic system (camera, digitizer board or box, and software) costs $6000 or more—for image quality roughly equal to that of the $739 QuickTake.

The Fujix DS-100, which with all necessary equipment resides in the RS-570’s price range, has a push-button autofocus zoom lens and through-the-lens viewing. This camera features a true macro lens that can focus as close as 1.6 inches, several flash modes, manual-exposure compensation, optional remote control, a video-signal port, and the ability to time-stamp frames. These features make it well suited to scientific and medical applications. It focuses quickly and flawlessly at every zoom magnification.
## Filmless Photography Spectrum

<table>
<thead>
<tr>
<th>Company</th>
<th>Product</th>
<th>Phone, Toll-Free Phone</th>
<th>Evaluated for This Article</th>
<th>List Price/Company's Estimated Street Price</th>
<th>Resolution/File Size</th>
<th>Bits per Channel</th>
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<td>Apple Computer</td>
<td>QuickTake 150</td>
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*Actual prices may be higher or lower than estimated street price provided by company. NP = not provided by company. * Pre-release version evaluated. ¹ On 170MB memory card after. ² Direct sales price. ³ Video camera with frame grabber. ⁴ Fuji DS-505 and DS-515 are identical to Nikon E2 and E23, respectively. ⁵ On 15MB memory card. ⁶ For seven images; adapter for Mamiya RZ67 and RZ70. ⁷ Fits Mamiya RZ67 and certain Mamiya, Contax, and Hasselblad cameras. ⁸ Varies according to camera type used. ⁹ Includes two studio lights, flashes.
But the DS-100's memory card system leaves a lot to be desired. Like the Canon RC-570, the DS-100 saves images to a removable storage medium that you can swap in a matter of seconds. The RC-570 saves up to 25 high-resolution or 50 standard images on a floppy, while the FujiX stores only 5 to 21 digital images (depending on compression level) on $360 proprietary 1MB memory cards. What's more, the DS-100 requires a dedicated card drive that costs about $2500.

**Expensive Real-Time Cameras**

For the next jump up we looked at real-time systems costing between $11,000 and $28,000 that incorporate professional features, like auto-aperture or shutter-priority modes, manual shutter speeds and f-stops, fully interchangeable lenses, the ability to annotate each frame verbally via built-in microphones, burst modes (the ability to fire off several frames in quick succession) as fast as 1 fps, spot or matrix metering, various lighting settings, and precise exposure-compensation control. All real-time cameras use either removable PC (formerly called PCMCIA) Type III cards, or Type I or II solid-state flash-memory cards, and off-load their images via TWAIN-compliant Photoshop plug-in drivers. (The $850 FujiX CR-500 PC Card Reader reads from and writes to Type I, II, and III PC cards.)

Neither small nor light, high-end, real-time cameras are twice as large and two to three times as heavy as conventional 35mm cameras. These cameras are well suited for photojournalism; sports; annual reports; some portraiture, industrial, and manufacturing photography; and for specialized work requiring immediate viewing, short deadlines, or the rapid electronic transmission of images.

The Kodak DCS460 is the highest-resolution portable filmless camera on the market. Virtually all the controls and features are the same as on the conventional Nikon N90 body that the DCS460 is based on, with two important exceptions. The ISO, or film-equivalent sensitivity level of the CCD, is limited to a range of 50 to 200. This diminishes the DCS460's suitability for shooting candid photos with available light. The DCS460 also lacks a burst mode. The camera pauses for 12 seconds between frames to save the image file to the camera's 170MB removable hard drive. That, in photographic parlance, is half a lifetime. Another frustrating bottleneck: the three to four minutes it takes to off-load each image (unless you use a SCSI-2 accelerator board). As this article went to press, Kodak began shipping a new driver that says greatly

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*Extra-cost features required. *For fast images, 3 seconds per image thereafter. *For ten images, 3 seconds per image thereafter approximately 10-second wait for seven more images. *Includes 50mm macro lens. *Fits any 4-by-5-inch view camera interface card. *Includes camera body and one lens. *For specific Rollei models.
More Data Equals Higher Quality

The quality of images captured by filmless devices depends largely on the amount of visual information the devices can capture. Less expensive cameras capture less information—resulting in smaller file sizes—than professional-level units. The less data captured (and consequently, the smaller the file size), the smaller the image that can be printed clearly at the same resolution as an image captured by a better camera.

This series of images shows the effects of different amounts of visual information on image size. These images are not intended for direct comparison of image quality because lighting and other conditions varied during the photo shoot. On the far left, a 630K Canon RC-570 image created with a $3740 Canon RC-570 is printed as large as possible while offering full resolution at 300 dpi. (This is a crop of a larger image. For lower-resolution speeds off-loading of images for all its filmless units (except the DC40), as well as for the Canon EOS-DCS3 and the Associated Press News Camera 2000.

But the DCS460's image quality sets it apart. It's the only real-time camera that can produce photographs up to 11 by 14 inches that are virtually indistinguishable from those made with 35mm film. This quality doesn't come cheap; it costs $27,995 (not including lens).

The DCS420 is identical to the DCS460, except the 420 uses a smaller, lower-resolution CCD, which effectively reduces the lens's focal length (and viewing area) by about half and lowers the camera's cost by nearly $17,000. But the 420 has a conventional camera-like burst mode of better than 2 fps, for 5 successive frames. The 420 also records more frames before you must off-load images or swap hard drives. The 420's uncompressed file size (4.5MB) is one-fourth that of the 460 (18MB), transferring each 420 image to the computer takes about 50 seconds. Because of its handling capabilities, shooting speed, and recording capacity, the DCS420—of all the cameras tested—feels and works the most like a conventional 35mm camera.

In a similar price range, the Fujix DS-515 (also sold as the Nikon E2) is a complicated camera to learn and to use; the sheer number and complexity of controls on the DS-515 are enough to daunt even photographic wire-heads. But perseverance has its payoff: total control, more download options, a high degree of customization, and excellent image quality.

The DS-515 uses a novel optical condenser in which the image area fills the entire viewfinder. This means that, unlike with the DCS420, a 35mm lens on the DS-515 gives a 50mm field of view. Unfortunately, the largest aperture is a modest f/6.7, regardless of how fast the lens. To compensate, the camera's ISO goes up to 1600, fast enough for most available-light photography. The DS-515 comes equipped with a video interface for off-loading images to TVs, VCRs, or video printers. And images are quickly and easily transferred to the computer via a PC Card.

The $15,100 Sony CatsEye Digital Camera is a hybrid. This still-video cam­era shoots in real time like portable filmless cameras, but lacks an internal power supply, a viewfinder, on-camera controls, or built-in storage capability—relegating it to the studio. It is the only camera we tested that uses three CCDs instead of one, reducing color aliasing while boosting image resolution.

While the camera is difficult to set up, shooting is fast and easy. It allowed us to project what we were doing, in real time, on a TV or computer monitor. Thus, the camera can be mounted in one room and controlled from another, making the CatsEye a popular system among amusement-park operators, or at hospitals, labs, portrait studios—any place where decisions about composition are made remotely or by committee.

Studio Devices

A s a point of reference for evaluating portable filmless cameras, we also tested three other studio filmless cameras and CCD-equipped backs that attach to certain cameras. All can produce top-quality images virtually indistinguishable from images shot with film and professional view or roll cameras. Because it requires considerable skill and care to operate these cameras properly, this level of filmless device is almost wholly the province of commercial photographers and prep-s professional.

Two of the devices tested—the Leaf Digital Camera Back and the Dicommed Digital Camera (a portable or studio camera)—are backs designed to fit on various makes of professional view and roll camera bodies, to take advantage of swings, tilts, and top-quality lenses. The third studio-only device, the Leaf Lumina, has its own fixed body and takes interchangeable Nikkor lenses.

These three devices are controlled directly from the computer—the Dicommed and Lumina via a SCSI-2 interface, the Digital Camera via a proprietary ser-
4-by-5-inch prints or for on-screen viewing the Canon camera yields acceptable images.

Increasingly tightly cropped details are shown in successive images because printing 300-dpi images at the largest size possible would eventually exceed the size of this page. The second image from the left shows a detail captured by a $16,020 Fujix DS-515 camera. The full image (equivalent to the image at the far left) at 300 dpi would have measured 2.5 by 1.8 inches.

The next detail (third from the left) was taken with the $27,995 Kodak DCS460 and would have required 6 by 4.2 inches. The $22,500 Dicomed Digital Camera's 31.3MB image (below, at left) would have taken up 11.4 by 8 inches; an image from any of the other cameras would be extremely fuzzy if blown up to that size. The Dicomed captures so much information that its images compare favorably with a scan of 35mm film (far right). Bear in mind, however, that the film image was enlarged by 1525 percent—far higher than normal in professional-quality work. (Images created with the assistance of Crimson Tech, Boston.)

Dicomed Digital Camera, 31.3MB  
Film Scan

The Last Word

Filmless cameras are not quite mainstream yet, but at the low end they’re not far off. For home or small-business users, the Apple QuickTake provides easy input for desktop publishing, visual-information management, and snapshots. In scientific and medical work, the Fujix DS-100 is an excellent choice for nonphotographers, while the Fujix DS-515, Kodak DCS-420, and Sony Cat's-Eye offer greater precision for imaging professionals.

Professional photographers who need real-time capture would be well served by the Kodak DCS-420 or DCS-460, or by the Fujix DS-515. While the DS-515’s CCD has fewer pixels than the Kodak DCS-420’s, the DS-515 has better color fidelity and provides superb (if complex) controls. On the other hand, the higher density of the Kodak DCS460 is necessary for images that will be printed large.

The Leaf Lumina, Leaf Digital Camera Back, and Dicomed Digital Camera are venerable professional-quality studio devices when real-time capture is not necessary. There is a bargain for the quality, while the Dicomed provides superior images with some portability. But the best seller is the Digital Camera Back, due to its speed, reliability, quality, and real-time black-and-white capture.

This latest generation of filmless devices proves we’re not dealing with a passing fad. And Minolta, Casio, Olympus, Agfa, Logitech, Chinon, Fuji, and other major photographic or electronic manufacturers are readying filmless cameras for the market.

What will the next generation bring? Higher-resolution images in real time for the professional photographer and price reductions that will capture a larger percentage of the mass market. When that happens, the millennium will come for film, but it isn’t here yet.

Daniel Grotta, an imaging-technology consultant and journalist, and Sally Wiener Grotta, a digital artist, photographer, and educator, are coauthors, most recently, of Digital Imaging for Visual Artists (Windcrest/McGraw-Hill, 1994).

Technical assistance by Crimson Tech, Boston.
Today's sales environment is more competitive than ever. Which is why Whirlpool armed its field force with the ultimate sales weapon: the Macintosh PowerBook computer.

The reason? Says Erv Barnes, "After evaluating all the notebooks on the market, we chose PowerBook because it was by far the easiest for any salesperson to learn. Instead of becoming a doorstop, the PowerBook is being adopted by the field with unbelievable enthusiasm."

Salespeople are able to tap into Whirlpool's information base at the home office to get competitive information, pricing, inventory data—instantly, during a sales call. This way, they can answer questions more quickly and accurately, make better-informed decisions, appear more professional and, ultimately, close more sales. Plus, with the built-in multimedia capabilities of the PowerBook computer, salespeople can show videos and animations, making a normal sales presentation more persuasive than ever.

All of which can give your salespeople a new power, too. The power to be more responsive, more productive, more effective. The power of Macintosh. The power to be your best."
“Making the sale means having the answer. With this computer, we can get the information our customers need, right on the spot. Making the sale means being persuasive. By delivering presentations on the PowerBook, we can get our point across with enormous impact. Combine this with the fact that it works with our mainframes, Intel-based PCs and Windows, and we’re talking about a tool that’s not just giving us a competitive edge. It’s transforming the way we do business.”

—Ed Herreko
Once running Windows programs on the Mac was a grudging experiment. Now it’s a mainstay of Apple’s strategy; several options compete to offer you the best way to go. For several years, Orange Micro’s NuBus-based PC coprocessor cards were the only choice, and few people took advantage of the two-computers-in-one option. Then, 18 months ago, Apple shipped—for a mere 3 months—Quadra 610’s with a 25MHz 80486SX-based PC card to test the waters. The response was overwhelming; many people wanted to keep their Macs but also run a variety of Windows programs. Whether they were consultants, home users, educators, or office workers, they wanted Windows on their Macs.

When Apple first got its feet wet in the DOS-compatible market with the
short-lived Quadra 610, DOS Compatible, the company—and the Macintosh industry—was concerned that such a product would serve as a bridge to Windows, enticing users away from the Mac. Fortunately for Apple and the Mac's future, the reverse has been true. DOS Compatible systems have brought proportionally more former PC users into the Mac market than stand-alone Macs have.

Consider Apple's research comparing buyers of its Power Mac 6100 DOS Compatible with buyers of the regular Power Mac 6100. For every PC convert attracted to the 6100, three are attracted to the 6100 DOS Compatible. Plus, those former PC users spend on average three-quarters of their time using the Mac part of a DOS Compatible system and buy more Mac software than their Mac-only counterparts, Apple found.

**Time of Change**

In the 11 months since *Macworld* first explored the options to run Windows on a Mac (see “The Mac Does Windows,” October 1994), much has changed: Orange Micro has streamlined the number of variants for its cards. Apple came out with a Power Mac 6100 with a PC card in late 1994 and licensed the card's technology to Reply, an IBM motherboard maker that began selling 50MHz and 66MHz 486DX2-based PC cards for most Quadra models in late 1994. (Reply plans to sell 66MHz 486DX2- and 100MHz DX4-based cards for the Power Mac 7100/66 by this fall.) Apple also has two new systems, the Performa 640CD DOS Compatible and the LC 630 DOS Compatible, that come with PC cards.

The 630-based system also broke new ground for Apple: instead of just adding a card to an existing machine, the company actually redesigned a Mac's motherboard to make room for PC functionality (in this case, the PC's VGA video circuitry). Clearly, PC coprocessing was entering the Mac mainstream.

Now another set of changes is on the horizon. All the PC cards so far have used one of Intel's many 80486 CPU models, or a 486 clone CPU like those from Cyrix and Advanced Micro Devices (AMD). In the past year, the PC market has been shifting quickly from 486's to Pentium CPUs, just as the Mac market has shifted from 680XO's to PowerPCs. Initial Pentiums consumed a great deal of power, but the newest ones match the relatively low power consumption of the PowerPC 601. This points to an inevitable development: Pentium-based PC cards for the Mac.

Both Orange Micro and Reply have high-speed 486-based PC cards that include a Pentium OverDrive socket, which will let you add a Pentium CPU. (Both are expected to ship by October.)
## Hardware Options for Windows on a Mac

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<td></td>
<td></td>
<td>OrangePC Model 290</td>
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<td>66MHz 486DX2 (Intel)</td>
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<td>no</td>
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<tr>
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<td>$1837</td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>$2037</td>
<td>100MHz DX4</td>
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<tr>
<td>Reply</td>
<td>408/942-4804,</td>
<td>DOS on Mac</td>
<td>$495 / NP</td>
<td>50MHz 486DX2</td>
<td>optional ($95)</td>
<td>all Centris and Quads except the 630 and AVs</td>
</tr>
<tr>
<td></td>
<td>800/801-6898</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>$595 / NP</td>
<td>66MHz 486DX2</td>
<td>optional ($95)</td>
<td>all Centris and Quads except the 630 and AVs</td>
</tr>
</tbody>
</table>

**O** = PC and controller software runs as native Power Mac program. **NA** = Not applicable. **NP** = Not provided. **Actual prices may be higher or lower than the estimated street price provided by the suppliers; supplier is listed only when price varies. **Complete Mac system with PC card. **Expected to ship as this issue appears. **Price does not include Windows ($89). **Price does not include Windows. Networking software (Ethernet or Token Ring) costs an additional $50. **Parallel and serial port come with $150 SoundBlaster upgrade.

PC magazines have expressed disappointment in these $500 OverDrive upgrades, since the Pentium's performance is hobbled by the 486's slower bus. Better to wait for Orange Micro's following set of PC cards, which will use a Pentium from the get-go and be designed to take full advantage of it. They're due this fall. Reply's Pentium plans are not final, although a product manager made it clear that Pentium is also in Reply PC card's future. Apple won't say yet whether it has plans for the Pentium, but Apple's product managers say the company is committed to providing more PC options and expects to offer more cards in the coming months.

Orange Micro's Pentium-based cards go one step further: they will be the first PCI-based PC cards, taking advantage of both a PCI bus on the card itself for fast PCI processing and of the new Macs' PCI bus for faster communication with Mac peripherals. Apple has also committed to a PCI-based PC card and expects to have one available around November. Reply won't have a PCI card until 1996, at the earliest, since its license to Apple's PCI technology currently does not cover non-PDS (Processor Direct slot) systems. (Reply licenses several Apple components.)

Reply and Orange Micro have also started improving the video circuitry of their cards. Both companies are using faster VGA control chips for their video circuitry and are adding VRAM to their new models. The result will be a steadier display and support for more colors at larger screen sizes—up to 256 colors on a 19-inch monitor, 32,768 colors on a 17-inch monitor, or 16.7 million colors on a 14-inch monitor. The first PC cards used slower (cheaper) VGA controllers, and they supported just the minimum-standard VGA and SuperVGA resolutions (256 colors at 640-by-480-pixel resolution and 16 colors at 800-by-600-pixel resolution, respectively), which can sometimes flicker. Orange Micro's new video circuitry also bypasses some of the NuBus performance bottleneck, which should make scrolling and screen redraw faster; the company expects to bring that video technology to at least some of its NuBus products later this year.

### Which Option for Your Mac?

With these changes, what do you do if you need your Mac to run Windows now? The answer depends on the kind of Mac you have, since each option works with only a subset of the Mac lineup. For most Mac models, you have limited choices.

- If you have a NuBus-based Mac or Mac clone, the Orange Micro cards are often the best bet, since many Macs have NuBus and the cards are available in three speeds: 66MHz 486DX2, 80MHz 486DX2, and 100MHz DX4.
- For many NuBus-based 040 Macs (the Centris 610 and 650, and the Quadra 610, 650, 700, 800, 900, and 950) and the Power Mac 7100/66, a better bet may be Reply's DOS on Mac and DOS on Power Mac cards, which plug into the Mac's PDS. PDS cards are faster than NuBus cards (because PDS is faster than NuBus), but you can't move them to as many Macs. For Centris and Quads, the DOS on Mac cards come in just two speeds: 50MHz 486DX2 and 66MHz 486DX2. For the 7100/66, the planned DOS on Power Mac card also offers two speeds: 66MHz 486DX2 and 100MHz DX4. Power Computing (512/258-1350) expects to offer these Power Mac-specific Reply cards in some of its clones later this year, after Reply redesigns the cards to work in faster Macs like Power Computing's Power series.
- If you have a Mac that uses the LC III-style PDS (this includes the Performa 470 series, 550 series, 570 series, and 630, plus LC and Quadra equivalents), you'll have to use a software solution, as there is no hardware option for that slot. Apple does sell the LC 630 DOS Compatible and the Performa 640CD DOS Compatible, full Mac systems that include a PC card in the PDS.
- For a Power Mac 6100 or Performa 6100, you can add an Apple DOS Compatibility Card in the PDS. Apple also sells 6100's with the card installed.
- If you have or plan to buy a new PCI-based Power Mac from Apple or another Mac maker, your only option will be the Orange Micro series 400 cards, which should ship by October. Expect more PCI options from Apple and Orange Micro later this year.
- Any 040 or Power Mac can run Insignia Solutions' Soft Windows software, but it's slow—about one-fourth as fast as a card on a Power Mac, one-fifth as fast on a 68040 Mac—and you'll need
from one Mac to another. For example, neither a NuBus-based Orange Micro card nor a PDS-based Reply card works on a PCI Mac. And Reply’s DOS on Power Mac card will initially work only in the 7100/66, because the PDS in the other 7100 and 8100 models is too fast for the card’s bus controller and the card won’t physically fit in the 6100. (Reply hopes to have the cards working on the other NuBus Power Maces this fall.)

If you have a choice between a Reply card and an Orange Micro card—which you do for most Quadras and the Power Mac 7100/66—the decision is a tough one. Megahertz for megahertz, Reply’s cards are faster than Orange Micro’s because NuBus slows down the Orange Micro cards. If your performance needs are moderate—486DX2-level systems—the Reply cards are cheaper and a bit faster than the Orange Micro products with the same CPUs. But Orange Micro’s cards work on the Power Mac 6100, 7100, and 8100 series, while Reply is limited to the 7100/66.

Whichever card you get, be aware that all models include add-on ports (offer them as an option), so you can have a direct connection to a printer or modem, rather than use the Mac’s. (You can, of course, use the Mac’s serial ports for printers and modems.) Keep in mind that you can add one SIMM to an Apple or Reply card, which reserves that RAM for the card. If you add no memory to the card, it will share your Mac’s RAM. The Orange Micro cards come with onboard memory, and you can buy them with 4MB to 32MB of RAM.

**SoftWindows or Timbuktu?**  In a few situations, though, software is a better bet. Software is easier to move from one Mac to another, although SoftWindows 1.0’s performance is so sluggish that you’ll only want to use it on a faster Power Mac. That’s because it emulates a PC’s CPU—a complex process. We also tested a beta version of SoftWindows 2.0; it was slower still, but should attain version 1.0 speeds by the time it ships. And the new 2.0 version won’t run on a 680X0 Mac, so portability is not a strong argument for SoftWindows.

Timbuktu is another matter, since this remote-control software runs on any Mac. Where Timbuktu gets tricky is on the PC side. First, the type of network you have dictates what version of Timbuktu you can use on the PC that’s being controlled remotely. Timbuktu for Windows will work over an AppleTalk network (if your PC has an Ethernet or LocalTalk card installed), while Timbuktu Pro for Windows requires a TCP/IP or Novell IPX network. Timbuktu Pro for Mac handles all three network protocols. But the AppleTalk-based Timbuktu for Windows will not work with Windows 95, unless you install AppleTalk for Windows (which comes with Apple’s latest Workgroup Servers and with Miramar Systems’ Personal MacLAN Connect 5.0 software).

**Hardware versus Software**

For most Macs, you have a choice of at least one hardware option and one software option. I recommend hardware in almost every case, since that provides you the best performance. Even on a Power Mac 7100/80, SoftWindows runs at less than 25MHz 386SX speeds, which is a little slower than a Centris 610. The Macworld Lab benchmarks in “Are Windows Macs Good Enough?” show the performance of each Windows option for your Mac—it’s readily apparent that the hardware options are the quickest.

**Which Card?**  Hardware coprocessing is a better bet because you get a real PC motherboard operating at PC-level speeds. You don’t have the slowdown of emulation or very much contention for Mac resources (so you can have your PC card do work while you’re doing something else on the Mac).

The drawback to a hardware solution is that you can’t always move hardware by the company. *Companies often use different CPU include DOS or Windows (550 for DOS, 595 for DOS and

at least 16MB of RAM, or better yet, 24MB. Another significant limit is version 1.0’s lack of support for Windows’ Enhanced Mode, which many programs now require. Version 2.0 will support Enhanced Mode and is expected to ship in mid-August 1995. But expect no speedup with this Power Mac-only version.

* And you can run Timbuktu on any Mac, although you need to be networked and have a real PC that you control via Timbuktu. For occasional use, running Windows remotely is a great option, since the performance is more than adequate.
Software Options for Windows on a Mac

<table>
<thead>
<tr>
<th>Company</th>
<th>Phone</th>
<th>Product</th>
<th>Price (List/ Company's Estimated Street)*</th>
<th>SoundBlaster Support</th>
<th>Supported Mac Models</th>
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</thead>
<tbody>
<tr>
<td>Farallon Computing</td>
<td>510/814-5000</td>
<td>Timbuktu Pro 1.04 for Macintosh</td>
<td>$399/$300</td>
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<td>Timbuktu Pro 1.0 for Windows</td>
<td>$399/$300</td>
<td>no</td>
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<tr>
<td>Insignia Solutions</td>
<td>415/694-7600</td>
<td>SoftWindows 1.0 for Macintosh</td>
<td>$499/$300</td>
<td>no</td>
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<td>$399/$200</td>
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<tr>
<td>Insignia Solutions</td>
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<td>SoftWindows 1.0 for Power Macintosh</td>
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<td>all Power Macs</td>
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</tbody>
</table>

* Actual prices may be higher or lower than the estimated street price provided by the company. ** Expected to ship as this issue appears.

Price Differences The costs of hardware may seem to be dramatically higher than those of software, but once you upgrade your system to run the software, the cost differences are much less. For example, if you seek 66MHz 486DX2 performance for a Power Mac 7100, you have four options: an Orange Micro card, a forthcoming Reply card, SoftWindows, and Timbuktu. If you start with a 7100 that has a 500MB hard disk and 8MB of memory, you'll have to spend the following (based on current street prices as we went to press) for each option to get equivalent performance:
- OrangePC Model 220 card, $1127 (with 8MB of RAM); Windows, $89; and 365MB external hard drive, $375. Total: $1591.
- SoftWindows 1.0 or 2.0, $300; 16MB of RAM, $700; and 365MB external hard drive, $375. Total: $1375. (And performance will be fourth that of a card.)

You should add a cache card ($200) if you want six times as fast as a 33MHz 486DX PC (running a 1.0 version). Use these results to compare the performance of systems running Windows. Times as fast as the indexed PC (486DX = 1.0). Use these numbers to compare any Mac or Windows PC.

Products are listed in order of overall Windows performance, followed by a group of PC's from the 300- to 600-dollar class. Prices are for the Macintosh, and 365MB external hard drive, $375. Total: $1591.

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The problems is when working with external systems, both systems can access a soft drive that supports PCL and Epson-synys in the PC universe; and Mac modem and mouse (although you have to press a key like \ or control while clicking to simulate a PC's right-hand mouse-button click). All options let you exchange files between the Mac and PC by establishing shared folders on hard drives that both systems can access.

The only time you may encounter problems is when working with external SCSI hard drives from a PC. In the PC world, each SCSI card formats hard drives differently, so only rarely can you share a hard disk among PCs using different SCSI cards. In the Mac, the SCSI circuitry for all models handles drives the same way, so this is never an issue. But you may find that an external PC SCSI hard drive won't work reliably when connected to your Mac and accessed by the PC card—it's that format problem. Symptoms include incomplete file transfers and inconsistent directory contents. If your PC uses an Adaptec SCSI controller, you have the least chance of such problems.

The Last Word

If your work, family, or play forces you to choose between a Mac and a PC, take the third route and add a PC to your Mac. If you own any 040 or Power Mac except the 500, 630, 5200, or 6200 series, there are solid hardware choices available from Apple, Orange Micro, and Reply. If you do have a 500, 630, 5200, or 6200 series Mac, consider trading up to a model that supports a hardware option, since emulation limits Insignia Solutions' SoftWindows to a disappointing performance level. If you're in a networked environment where several people need Windows access, consider Farallon's Timbuktu.

The good news is that Windows support on the Mac is no longer an experiment. With Apple's recent blessing of products that run Windows from your Mac (occasionally, of course), you should have no trouble keeping your Mac and running Windows now and in the future.

Apple has clearly recognized that DOS and Windows are part of the Mac's future and has taken appropriate steps to create a scenario in which the Mac still thrives. Today, you can buy dual Mac/PC systems from Apple, add a PC via card to most current Mac models, control a remote PC from a Mac over the network via Timbuktu, or occasionally run Windows software in emulation via SoftWindows. Later on, you may find Macs that have the long-rumored PowerPC 615 CPU, which is supposed to run both Mac and PC software, removing the need for Apple or third parties to add an Intel CPU to a Mac.

Whether or not there is a 615, in a few years it won't really matter. In 1997, Apple, IBM, and others will sell systems based on the converged hardware reference platform, a PC specification that will run Mac, Windows NT, OS/2, and Unix software (see "Mac Hybrids," Macworld, April 1995). That would leave out only Windows 95 software, which a PC card or 615 chip would take care of until Microsoft merges Windows 95 and NT in its Cairo OS due the following year.

In the meantime, look for more changes as the transfer from NuBus to PCI and from 486 to Pentium gives companies the opportunity—and incentive—to make these Windows options even better. Changes are, your questions are no longer whether and how but when. Base that decision on your system—upgrade plans: hold off on getting a PC card if you plan to get a new Mac in the next year; otherwise, pick from today's options.

Macworld executive editor GALEN GRUMAN regularly uses both Macs and PCs, and at times loves and hates them both.

DOS/WINDOWS CARDS

MW EDITORS' CHOICE

Because most products for running Windows on a Mac are tailored to specific Mac models or work environments, users often have limited options for their specific needs. However, where there is a choice, the main considerations are performance, full Windows compatibility, and price.

For Most 040 Macs

DOS on Mac Because it plugs into a Quadra-style PDS, this card is a bit faster than Orange Micro's more expensive offerings. The DOS on Mac card (available in two speeds) also lets you add a SoundBlaster-compatible audio card, a must for PC games and multimedia. Company: Reply. Direct price: $590 for 50MHz model, $590 for 66MHz model (prices include MS-DOS and Windows).

For Most Power Macs

OrangePC Model 220 Although NuBus slows its CPU down a bit, the Model 220 works in any Power Mac except a PCl-based model. The 220's performance far outweighs that of a software-based emulator for not much more cost. You also have a choice of true-blue Intel CPUs or lower-cost 486 clones. Company: Orange Micro. Direct price: $1217 (includes 8MB of RAM, a 66MHz 486DX2 CPU from Intel, and Windows).

For Occasional Windows Access

Timbuktu For Mac owners on a network, this remote-control software lets you control a PC from any Mac, with speedy performance and a low cost. Company: Farallon Computing. List price: $199 per user.
Mathematical Cruise Control

Researchers at Drexel University use the mathematics program Maple IV on a Power Mac to model speed and power to help squeeze the best performance out of their experimental solar-powered car.
ENGINEERS AND SCIENTISTS FINALLY HAVE THE HORSEPOWER THEY'VE ALWAYS NEEDED WITH THE INTERFACE THEY'VE ALWAYS PREFERRED

In the Macintosh world, people sometimes forget that computers were originally designed for science rather than desktop publishing. Since the 1940s—when the need to model nuclear explosions was the driving force behind the development of the first vacuum-tube computers—typical science applications have not only been computation-intensive, they have also operated on huge data files. Science has always demanded the ultimate in computing power.

Although power was exactly what the Mac didn’t have until fairly recently, Macs nonetheless attracted many loyalists in math, statistics, chemistry, molecular biology, and related research areas. More than half of the 200 largest Mac sites are science or research organizations, which have historically adopted the Mac for the same reasons as design professionals—ease of use, flexibility, and great graphics. Scientists and engineers in a wide range of fields rely on computer modeling whose demands can put an imaging service bureau to shame.

Scientists loved the Mac so much that they often used it as a display device for huge data sets running on minicomputers or on Unix-based RISC (reduced instruction set computer) workstations. But the Mac’s relatively puny processing power couldn’t begin to address these users’ primary computing needs.
StatView Analysis  Dr. Michael Dunn, director of the spinal cord injury center at the Veteran's Administration hospital in Palo Alto, California, depends on StatView to handle factor analysis of huge data sets concerning patient-staff relations.

Has Apple at last rewarded the loyalty of the scientific community with low-cost Macintosh systems that offer workstation performance on scientific applications? Does a Power Mac 7100/66 that costs about $2500 have what it takes to be a computation workhorse? To answer these questions, we tested an array of scientific applications to compare Power Macintosh versus 680X0 performance (for a look at chemistry and biology software, see the sidebar "Power Mac and the Wet Sciences"). We wanted to determine whether the Power Mac enables applications and techniques that were impossible or impractical on a 680X0 Mac.

How RISC Helps
Many factors affect application performance, but for the science applications in this article, three are critical: integer calculation, floating-point calculation, and input/output (I/O). RISC processors like the PowerPC family outpace their CISC (complex instruction set computer) predecessors, such as Motorola's 680X0 series that powered the original Macs, by replacing a long list of commands with a small, highly optimized set. That vastly speeds up integer calculations—a top priority for PowerPC chip designers.

Those designers also paid careful attention to the floating-point operations built into the chip (the source of the annoying "no coprocessor installed" message you see when using some not-ready-for-RISC software). On-chip floating-point capability yields major speed increases in the matrix and Fourier operations typical in scientific applications.

Only in I/O does the PowerPC family fail to offer much help. This is not because of the CPU, however. In order to get its Power Macs out the door rapidly, Apple chose not to translate a large number of the Mac Operating System's toolbox routines; this means the PowerPC processor must emulate those operations' 680X0 code. In particular, I/O functions were not ported to native PowerPC code, which means that I/O performance on Power Macs is roughly equal to that on older Macs. I/O performance should improve significantly, however, as faster PCI-based data-transfer cards come to market to serve the new generation of PCI-based Macs.

Another consideration in RISC application speed is sheer programmer talent and diligence. In converting an application written in C or Pascal for a 680X0 processor into a PowerPC application, the programmer makes several decisions, all of which affect performance. All applications are mixed code to some degree. The programmer must decide how much of the original program to convert to native PowerPC code and which parts can run in emulated 680X0 mode. He or she also has to decide whether to rewrite parts of the original code from scratch, to take advantage of special data-alignment tricks and other RISC-specific efficiencies.

Worth the Wait
These delicate programming issues have had another kind of speed effect: slow shipment of applications. In some cases, the developers have been tinkering for months seeking better performance. Other developers encountered new problems when System 7.5 was released. Some developers were waiting for Symantec's native Power Mac version of the C++ compiler rather than using Metrowerks' CodeWarrior; the Symantec compiler finally shipped in spring 1995, more than a year late. Consequently, many familiar and important Mac science applications were still not quite shipping in June 1995.

The earliest shipping major applications—the symbolic-math program
In the fields of chemistry and biology, a Power Mac with native software is rapidly replacing expensive special-purpose hardware that only a few scientists can access. Gene Codes' Sequencher 3.0 ($2600 commercial, $1800 nonprofit; 313/769-7249) is an effective substitute for dedicated multiprocessor genetic-sequence-matching systems. Research Systems' imaging program, IDL, allows a Power Mac to replace high-performance medical-imaging workstations. CAChe WorkSystem, from CAChe Scientific, gives molecular-modeling results on a Power Mac that used to demand a scientific supermini.

In several key examples that do not involve I/O, the best 680X0 system was a little too slow for any serious scientist in these realms to rely on. The twofold to fivefold speed boost now available from a Power Mac makes this machine a workable alternative to systems costing $100,000 and up.

Sequencher was among the first molecular biology programs to appear for the Power Mac. Although managing DNA and protein sequences has more in common with the search-and-replace functions in word processors than with floating-point numerics, the Power Mac version of Sequencher squeezes out speed improvement of more than a factor of four. It happens that the PowerPC series of processors is well designed for comparing character strings as well as crunching numbers, and Gene Codes has found a way to exploit this capability.

Following the impeccable logic that no standard Mac had the floating-point computational horsepower to be anything more than a display station for calculations performed on bigger computers, CAChe Scientific designed previous versions of CAChe to run on a RISC-chip coprocessor board in 680X0 Macs. Thus, when the Power Macs appeared, the company had a considerable head start on porting this huge program (it requires a minimum of 244MB of RAM). But CAChe on a Power Mac is a self-contained, complete research system for molecular modeling; its computational speeds approach those of minicomputer chemistry software. CAChe is costly, but the educational-discount version, at $3995, makes it possible to do real molecular modeling in student labs—a pipe dream at any price a few years ago.

IDL, a particular favorite for medical-imaging applications, appeared in a Power Mac version in early 1995. Because the core of IDL is a flexible, interpreted programming language with a powerful set of image-manipulation commands, the Power Mac version of IDL can't take advantage of the full scope of floating-point speedups that's available to compiled applications. Everything runs approximately twice as fast rather than four or five times as fast, partly because of interpreted-language challenges but also because most IDL tasks involve transferring huge image files, and such operations suffer from Apple's failure to write the Mac OS I/O system calls into native PowerPC code. Fortunately, I/O performance should improve significantly on the new PCI-based Power Macs. (For a look at another scientific image processor, see the review in MacWorld, August 1995, of MacPhase 2.0.)

When we planned this article, we expected to report results for several other programs. Unfortunately, Power Mac versions of many important imaging, molecular biology, and chemistry applications are still in development. Developers are steadily—though slowly—debugging and optimizing, since unlike consumer- and business-market software buyers, scientists are, appropriately, quite unforgiving about half-baked software. Every important Mac science and engineering application should eventually come out in a Power Mac version—it's just taking a bit longer than anyone expected.

Mathematica ($995, Wolfram Research, 217/398-0700) and the molecular-design program CAChe WorkSystem ($3995 to $29,995, depending on configuration; most users pay $3995 to $4995) from CAChe Scientific (a division of Oxford Molecular Group, 503/526-5000)—were both already running on IBM's Power 180 RISC chips in other AIX-based systems when the Power Mac appeared. There's apparently no easy substitute for a year's experience with RISC compilers.

Math software vendors, already quite aware of the value of RISC, were among the first to release PowerPC versions of their products. We tested Mathematica 2.2, Maple V 3.0 ($795, Waterloo Maple Software, 519/747-2373), HiQ ($695, National Instruments, 512/794-0100), and MATLAB 4.2 ($1695, The MathWorks, 508/653-1415). (There isn't a PowerPC version of MathCAD yet, and since the other popular math program, Theorist, was acquired by Waterloo Maple Software, most of its symbolic-math routines are borrowed from Maple.)

Our lab tests show that the PowerPC versions of these applications offer a wide...
range of speed enhancements over the 680X0 versions. (These programs do not perform even the most basic functions in exactly the same way, so our speed timings are not meant for comparison across programs. The same caveat applies to our evaluation of statistics software.) Since floating-point operations on data elements that are all the same length are especially suited to RISC processors, National Instruments' HiQ was able to show how vast the RISC difference can be in the test of taking powers of a large real-number matrix. The Power Mac version of HiQ on a 7100/66 performed this test more than 13 times as fast as the 680X0 version on a Centris 650.

Graphics tests of all the math applications showed more modest, though still significant, native-mode enhancement—from 1.8 to 4.5 times as fast as the 680X0 versions. A typical graphics test involves some floating-point computation but also depends heavily on QuickDraw toolbox calls that run largely in emulated code. The final speed result, for graphics, is thus a mixture of fast computation and barely-speeded-up toolbox calls. Math application vendors say that faster graphing is a priority but will require extensive fine-tuning of code in the next versions.

A speed increase of two to four times was also seen in tasks that are mostly symbol manipulation, which provides an effective measure of integer arithmetic performance. This category of tests includes the loop assignment test in MATLAB and HiQ, the symbolic computation test in Mathematica, and the integer test (which includes both integer and symbolic computation) in Maple. On these tasks, the processor swaps data in and out of registers and performs comparisons, so the programming details of data handling largely determine performance. While Maple showed relatively small speed enhancements, HiQ, MAPLAB, and Mathematica showed a consistent twofold or greater improvement.

Because they are available on many other platforms, including Pentium-based Windows PCs and non-PowerPC RISC-based scientific workstations, mathematic programs are a good reference for deciding how Apple's new hardware fits into the larger world of scientific computing. In a spot test of Mathematica on a Windows computer using a 90MHz Pentium processor, and configured comparably to our Power Mac 7100/66 machine, the performance was about equivalent to that of the Centris 650.

The Power Mac's 10- to 13-fold performance improvement over 680X0 machines on some kinds of pure floating-point problems obviously turns heads, but is a 3-fold improvement in symbol-manipulation speed going to change the world? It might not change the scientific

---

**Scientific and Technical Software—How Much Faster on a Power Mac?**

These results show the relative speed of a 66MHz Power Mac 7100/66 running native Power Mac software and a 25MHz Centris 650 running 680X0 versions of the same programs. Software is ranked in order of average degree of improvement over 680X0 versions. The figures should not be used to rank applications by speed. (For example, while the Power Mac version of JMP is 3.3 times as fast as the 680X0 version, JMP may not be faster than StatView, another statistics program.)

---

**OVERALL TIMES AS FAST**

<table>
<thead>
<tr>
<th>Software</th>
<th>Speed of 680X0 version (1.0)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HiQ</td>
<td>7.1</td>
</tr>
<tr>
<td>JMP</td>
<td>3.3</td>
</tr>
<tr>
<td>MATLAB</td>
<td>3.3</td>
</tr>
<tr>
<td>StatView</td>
<td>3.2</td>
</tr>
<tr>
<td>Sequencer</td>
<td>2.9</td>
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<td>Mathematica</td>
<td>2.8</td>
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<tr>
<td>Data Desk</td>
<td>2.2</td>
</tr>
<tr>
<td>Maple V</td>
<td>2.0</td>
</tr>
<tr>
<td>IDL</td>
<td>1.7</td>
</tr>
</tbody>
</table>

**TIMES AS FAST AT SPECIFIC TASKS**

- **HiQ**: Floating point (powers of matrix), 13.2; floating point (with I/O), 9.9; mixed integer/floating point, 2.0; pure integer (loop assignment), 3.1.
- **JMP**: Import data (16,384 rows by 3 columns), 0.8; linear regression, 4.4; nonlinear regression, 3.3; plot large histogram, 4.8.
- **MATLAB**: Pure integer (loop assignment), 2.5; floating point (with I/O), 3.0; mixed integer/floating point, 5.0; graphics, 2.6.
- **StatView**: Import data (16,384 rows by 3 columns), 2.3; linear regression, 3.9; nonlinear regression, 3.9; plot large histogram, 2.6.
- **Sequencer**: Open Sequencer file (33 fragments), 1.2; import 100 fragments, 1.3; align 33 fragments, 4.5; align 100 fragments, 4.4.
- **Mathematica**: Mixed integer/floating point, 2.0; graphics, 2.9; integer (symbolic computation), 2.9; pure floating point (matrix), 3.9.
- **Data Desk**: Import data (16,384 rows by 3 columns), 0.9; linear regression, 2.4; nonlinear regression (uses Transform), 4.2; plot large histogram, 1.2.
- **Maple V**: Integer (symbolic computation), 1.1; pure floating point (matrix), 1.4; mixed integer/floating point, 1.1; graphics, 4.5.
- **IDL**: Mixed integer/floating point (with I/O), 1.1; floating point, 2.0; graphics, 1.8.

**BEHIND OUR TESTS**

These tests represent a typical range of tasks performed in each application; we averaged three trials for each test to come up with the final results. The most significant speed improvements come from applications that take advantage of a floating-point unit. These include all CAD and modeling applications. Most disk-intensive tasks showed little, if any, improvement, and some even showed slower performance using the Power Mac versions because portions of the Macintosh Operating System have not yet been rewritten in native Power Mac code. Macworld Lab tested all the 680X0 applications on a Centris 650 with 40MB of RAM, with internal 8-bit video driving a 16-inch Apple monitor, and using an external 1GB Micropolis drive. System 7.5 was installed with standard Apple extensions and Adobe Type Manager. Disk cache was set at 96K, 040 cache was set to faster, 32-bit addressing was on, AppleTalk was inactive, and file sharing was off. All native Power Mac software was tested on a similarly configured Power Mac 7100/66. Modern Memory Manager was turned on and virtual memory was turned off. All application memory partitions were adjusted to take full advantage of each platform. Macworld Lab testing supervised by Danny Lee.
Sequencher Maps  Technician Kristen Oberright of the Rockville, Maryland-based Human Genome Sciences uses Gene Codes’ Sequencher for chromosome mapping, sequencing, and analysis projects.

Mathematica Biomodels  Researchers at Massachusetts General Hospital use Mathematica to plot equations that help estimate measurement errors on CT scans of tumors.

world but it certainly changes the Mac’s position in it. A Quadra, even an 840AV, is simply not in the running, computationally, against SPARC workstations, fully loaded 90MHz Pentium PCs, the Silicon Graphics Indy R4000, or DEC’s Alpha series. The 8100 Power Macs will stand comparison with the fastest of these, and the 7100/66 travels right in the middle of this rather fast company.

For math purposes, the Mac is no longer an overpriced, very friendly computer—it’s a cost-effective system that can replace Unix-based workstations. Therefore, computation-intensive problems such as finite-element studies in mechanical engineering or control-systems design in electrical engineering are now Mac problems, rather than jobs for the university or company computer center.

Vital Statistics
The Macintosh has had a strong following among statisticians for years, despite some complaints about slow graphics, especially for large 3-D data sets. With statistics on the Power Mac, there are no complaints at all. As an indication of the speed improvement in statistics on the Macintosh over the last few years, the data set we used only two years ago is no longer viable. At 5000 rows by three columns, it was simply too small to allow accurate timing—the results just reflected the time of a single screen refresh.

We looked at Data Desk 4.2 ($595, Data Description, 607/257-0100), StatView 4.1 ($595, Abacus Concepts, 510/540-1949), and JMP 3.1 ($695, SAS Institute, 919/677-8000). (Power Mac versions of the other leading Mac statistics programs—SPSS’s SYSTAT and SPSS, and StatSoft’s Statistica/Mac—are still in development.)

Still, it’s remarkable how similar the improvements over 680X0 versions are for all three programs, particularly since they differ considerably in programming details. Abacus Concepts, for example, mainly converted StatView’s computation routines to native code, on the assumption that users with big data sets were mainly interested in floating-point speed. Data Description, in contrast, converted almost everything to get at least small speed improvements in every aspect of the program (other than actions speed-limited by Apple’s toolbox decisions).

One statistical function that provides a mostly floating-point challenge is linear regression. Power Mac versions of the three programs show approximately a 2.4- to 4.4-fold improvement over the 680X0 versions for this test. This demonstrates that the algorithms for computing regression statistics are well optimized.

In all three programs here, regression on a data set of 16,384 rows by three columns (the maximum allowed in Microsoft Excel, which we used for data preparation and storage) took less than three seconds. That means a middle-of-the-road Power Mac is capable of tackling Census Bureau-size data sets, with computation times for most statistical tests ranging merely into minutes. Power Mac 8100/110’s can effectively replace the minicomputers that have been doing heavy-duty statistics since the 1970s.

Nonlinear regression and histogram plotting show Power Mac speed increases, in nearly all cases, by factors between 2.6 and 4.8. Bigger improvements are possible, but would have required far larger data sets than most users would encounter. Power Macs are approaching performance levels that will handle most scientists’ statistical-computation needs for the foreseeable future.

The Last Word
If you have a scientific computing task that relies mostly on floating-point arithmetic, a Power Mac is the answer to your prayers, delivering great floating-point throughput for a modest price. On most other tasks—likely to be mixed collections of integer arithmetic, floating-point computation, and assorted nonarithmetic data manipulation—our results show that a 7100/66 Power Mac is a bit less than three times as fast as a Quadra 650.

That may not seem earthshaking, but it represents much more than just a new price/performance category for the Macintosh. Power Macs can now replace the vastly expensive specialized hardware systems that serious research scientists have been forced to rely on. That’s not just good for researchers’ grant applications—it also allows more scientists to conduct the kinds of experiments that advance the fundamental understanding of our world.

Contributing editor CHARLES SEITER is a consultant in biochemical-instrument design and author of The Internet for Macs for Dummies (IDG Books Worldwide, 1994).
No matter how fast can’t outrun a power

New Back-UPS: reliable power for your Mac

Just don’t have the time for power problems on your Mac? Don’t worry. They’ll 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.

**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 460 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 any Back-UPS, power problems are no longer my concern. I can focus my energy on my business instead.”

At Colophon Square, Seattle’s best known independent and alternative rock record store, Steve Marcus, Product Buyer, counts on APC to keep his Mac II XTS 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 Mass,” says Tom Givin, principal of Tim Givin 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.”

**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, IICl or on any other Mac system, PowerChute will shutdown your system and your applications in the event of an extended power failure.

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your Mac is, it problem
starting at $119

can be provided, 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
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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.

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- User replaceable, hot swappable
  batteries ensure uptime safe disposal
- $25,000 lifetime Equipment Protection
- 10 minute runtime with specified
  applications. For longer runtimes choose
  next largest unit.

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<td>1250</td>
<td>Multiple systems</td>
<td>$689</td>
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Color Printers Mean Business

THE WHOLE OFFICE CAN NOW BENEFIT FROM THE IMPACT OF COLOR.
MACWORLD LAB PICKS THE BEST PRINTERS.

by Jim Heid

Color printers are launching a takeover bid for your business. Historically, color machines have been relegated to specialized tasks, such as creating overhead transparencies for presentations or printing color diagrams for insertion into a laser-printed monochrome report.

A new generation of color machines is trying to change that limited role by offering the kind of speed and paper-handling flexibility that monochrome laser printers provide, enabling businesses to use color in places where it was often impractical: memos, reports, and other ordinary business documents.

It's a noble goal, but do the printers deliver? To find out, Macworld Lab put ten color office printers through a battery of performance and output-quality tests. We steered away from the low-end liquid ink-jet printers and the graphics-oriented dye-sublimation machines, focusing instead on technologies designed for business printing: thermal wax, historically the mainstay of color business printers; and color lasers—the newcomers, the big bruising that are leading the charge in color business printing. We evaluated four of these color laser machines: QMS's MagiColor LX; Hewlett-Packard's Color LaserJet; the Xerox 4900 Color Laser Printer; and a preshipping model of Apple's first color laser printer, the Color LaserWriter 12/600. (We also tested a Tektronix color laser, the Phaser 540, but at press time the company replaced it with an enhanced model, the 540 Plus, that wasn't available for testing.) In addition, we tested a new Tektronix machine, the Phaser 340, which uses an innovative variation on that company's solid-ink technology. We limited our testing to machines that could be attached via Ethernet, though we did make an exception for one of the Fargo printers because of its exceptionally attractive pricing.

The verdict? The current crop comes closer than ever to being able to handle everyday business printing chores as well as specialized color output such
Color Printer News  Apple's first color laser printer, the Color LaserWriter 12/600 (bottom), is nicely designed, but it consistently produced errors. The Tektronix Phaser 340 introduces a new solid-ink technology.
as transparencies. The color lasers and the Tektronix Phaser 340 can handle any type of office paper, from cheap copier bond to textured letterhead. And resolutions of 600 dpi and up enable them to do justice to text and graphics alike.

But even the best of the new breed isn’t about to replace monochrome laser printers (see “Top Office Printers,” Macworld, June 1995). One reason is cost. It’s easy to find a monochrome workhorse for between $2000 and $3000, while color machines of acceptable quality start at around $4000. Another reason is speed. That monochrome workhorse will gallop at 10 or more pages per minute, but even the fastest color machine trims at only a few color pages per minute. And although the color lasers tested delivered good-or excellent-looking black text, most still don’t measure up to high-resolution monochrome machines.

Four Times the Work
One reason color printers are slower and costlier than their monochrome counterparts is they have more work to do. While a monochrome printer applies just one pigment (black) a color printer must apply four (cyan, yellow, magenta, and black).

A thermal-wax printer uses a roll of pigmented wax that looks a bit like colorful plastic wrap. The roll is divided into successive panels of cyan (C), magenta (M), yellow (Y), and black (K) ink. (Many printers also accept three-color rolls and simply combine C, M, and Y ink to make black; this speeds printing a bit but produces somewhat muddy blacks.) As a page prints, the roll advances for each pigment, which is applied to the paper by a print head containing thousands of heating elements. In the Seiko and Fargo printers, the paper appears in the output tray and then gets pulled back in for the second, third, and fourth color passes. In the other thermal-wax machines tested, the page wraps around a drum, which rotates for each pass. The drum method tends to be faster and allows for a less-complex print engine but limits page length to 11 inches; the Seiko machines can print on legal-size stock, but the Fargo printers can’t.

Color laser printers work similarly to their monochrome siblings, relying on toners—fine plastic powders—that are attracted to the page. The engine applies all four toner colors to the printer’s photoconductive drum or belt and then transfers them to the paper in one pass. As in a monochrome laser printer, the paper then passes through a pair of fusing rollers, which use heat and pressure to fix the toner to the page.

The mechanism in Tektronix’s Phaser 340 is a horse of a different color. Like Tek’s publishing-oriented Phaser 300i, the Phaser 340 uses solid ink sticks—waxy, crayonlike affairs that are melted inside the printer’s engine. But the Phaser 340 applies those inks to a rotating, heated drum, which then transfers them to the paper (see “Innovative Technology for Color Laser”).

Regardless of the printing technology, it takes longer to apply four pigments than to apply one; it also takes longer for the printer to calculate how much of each color to apply. In PostScript printers—which make up the majority of machines tested—this process is performed by a printer’s built-in PostScript controller, a computer unto itself. Indeed, because PostScript printers require memory to store the page image, color machines often contain a dozen or more megabytes of RAM, many times the amount needed by a monochrome laser. There goes the cash register again.

Printer Setup
Color laser printers also require four times the work to set up. You must install four toner cartridges, an imaging cartridge or belt, and a developer cartridge or bottle. The whole process takes a good half hour. After that, you replace these consumables at varying intervals—an Apple Color LaserWriter toner cartridge, for instance, lasts for roughly 4000 pages, while the imaging cartridge lasts for 10,000.

We found Apple’s Color LaserWriter the easiest to set up; its Canon-built print engine uses the fewest components. The HP Color LaserJet uses more components, with many little plastic loops, foam pads, tape strips, and doodads to remove.

Innovative Technology for Color Laser
Two recent technology innovations give color laser printers, such as Apple’s new machine, much better control over toner placement. The result is more accurate prints.

**BETTER REGISTRATION**
The colored toners from the four developer drums collect on a metal transfer drum or belt (A), which deposits all four together on the paper (B). This method provides great control over color registration. Printers using older technology deposit colors one at a time on the paper. The paper can stretch and shift between color passes and distort the image.

**BETTER TONER**
The other major innovation is the switch from dual-component to mono-component toner. Mono-component toner holds a strong electrical charge so that it adheres to the transfer drum or belt (C) without special carrier particles, which dual-component toner requires. The new toner lies flat and even on the surface of the transfer drum and moves to the paper with great accuracy (D).

The older, dual-component, toner technology requires coarse, electrically charged carrier particles to hold the much finer color toner to the transfer drum (E). Toner particles wrap themselves around the carrier particles; the irregular surface and range in distances from toner to paper causes the toner to scatter as it makes the leap to the paper (F).
Macworld Lab’s PostScript test image comes out looking anywhere from awful to pretty decent. The Tek offset solid-ink printer’s relatively faithful reproduction of colors is marred by grainy textures and streaky blends, while the Xerox color laser produces smooth transitions and crisp edges but deep and somewhat oversaturated colors. The General Parametrics thermal-wax printer suffers from mysterious horizontal lines, blends reduced to stripes, and reds that pop off the page. With equally unacceptable results, the Hewlett-Packard color laser produces very coarse dot-patterns and lends a pastel cast to all colors, making output resemble a sand painting. With the ROM that Apple told us contained final code, the Apple color laser produced smooth blends, clean edges, and relatively faithful colors, but it couldn’t shake bugs that introduced trapping errors and replaced the gray cylinder’s white highlight with a black bar. Note that all printers were run in default settings. Color-calibration or other color-management methods would improve fidelity; some printers would show more improvement than others. (All printers tested include serviceable or better color-matching software.) The original image is a Pressmatch color-laminate proof.
shaking, slide, invert, or insert at various phases. The HP printer makes it easy to cause a mess spill: just add toner to a hopper that isn’t quite empty. Use a toner bottle as you empty it into the printer. The Color LaserWriter relies on slide-in toner cartridges that will look and feel familiar to anyone who’s fed a monochrome laser printer or photocopier. The QMS and Xerox machines use the same Hitachi-built print engine and fall between the HP and Apple machines in case of setup.

Setting up a thermal-wax printer is a breeze: simply install the ink ribbon. (Security is an issue, don’t forget that the spent ribbon contains a negative image of every page you print.) The solid-ink Tektronix Phaser 340 is equally easy to restock and more fun: the ink sticks for each color have a unique shape that prevents you from inserting them in the wrong chamber (see “Smart Designs”). Any kid with Fisher-Price experience can replace the ink in this machine.

The HP printer will learn a valuable lesson in patience, too, because the Phaser 340 takes about 15 minutes to melt its inks and prepare for printing—even if you just turn it off to reset it or the power flickers. SpectraStar GTx and PrimeraPro provide QMS and Xerox machines use the same technology, making the printers very similar.

One of the classic complaints about color Xerox 4900 can print envelopes. It feels familiar to anyone who’s fed a momentarily. A manual-feed slot for transparency film.

### Color LaserWriter: How Fast?

<table>
<thead>
<tr>
<th>Printer Type</th>
<th>Mode/Resolution</th>
<th>PostScript</th>
<th>Bitmap</th>
<th>Transparency</th>
<th>Publishing</th>
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### Macworld Lab testing

Macworld Lab tested each printer’s speed with a variety of documents designed to measure performance on real-world printing tasks. Solid ink and color lasers, two new and directly competing technologies, are shown together; the thermal-wax printers, some with optional dye-sublimation support, are shown separately.

The PageMaker test demonstrates the overall performance of the printer dealing with a typical publishing job. The logos and numerous type sizes, typefaces, and type colors in the 2-page Word document test the printer’s ability to render fonts and simple graphic elements. The 2-page Word document tests for the print engine’s overall speed.

Macworld Lab ran all tests on a Centris 650 with 16MB of RAM and an internal 230MB hard disk running System 7.5 and a LaserWriter 8.2 driver. Except for the Fargo Pictura 310, which used a NuBus-to-parallel adapter, and the Fargo PrimeraPro, which used a LocalTalk-to-Ethernet adapter, we tested the printers via EtherTalk.

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**BEHIND OUR TESTS**

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Macworld Lab ran all tests on a Centris 650 with 16MB of RAM and an internal 230MB hard disk running System 7.5 and a LaserWriter 8.2 driver. Except for the Fargo Pictura 310, which used a NuBus-to-parallel adapter, and the Fargo PrimeraPro, which used a LocalTalk-to-Ethernet adapter, we tested the printers via EtherTalk. —Macworld Lab testing supervised by Mark Hurfow
you manually print on both sides.

Thermal-wax printers are still finicky about paper. Thermal-wax technology benefits from extremely smooth paper; a sheet of copier bond or textured letterhead has pits that prevent the wax from adhering. All thermal-wax vendors sell special, ultrasmooth paper that provides excellent results. The Sharp-built print engine used in General Parametrics' SpectraStar GTx accepts a special ink ribbon that sacrifices its black panel in favor of a primer medium. Primer is applied to areas of the page that will be printed with ink. The primer attempts to smooth the paper's rough surface, but it is only effective on high-quality plain paper that's relatively smooth to begin with, such as Hammermill Laserprint. With typical photocopier bond, output is mottled. Thermal-wax machines remain best suited for creating transparencies and printing on their own special paper.

Three of the thermal-wax machines tested—Seiko's Professional ColorPoint 2 and Fargo's PrimeraPro and Pictura 310—can double as dye-sublimation printers, producing photo-realistic, continuous-tone prints, including gorgeous transparencies. Of the three, the Seiko does the best job of straddling the thermal-wax and dye-sublimation technologies; besides delivering superior output quality, the Professional ColorPoint automatically senses which type of ribbon you've installed. The Fargo machines require you to check a dialog-box option if you forget, the paper jams. Also, we found that the Fargo machines' color balance was significantly different in each mode. You wouldn't want to use their thermal-wax prints to tweak color balance if you planned to print the final proof in dye-sub mode.

The Fargo machines have additional drawbacks. They were among the slowest printers we tested, and they lack built-in PostScript, relying instead on a nicely designed QuickDraw-based driver. Fargo sells PostScript-interpreter software—a version of Adobe's Configurable PostScript Interpreter, or CPSI—at $795 for the Pictura and $399.95 for the Primera-Pro. CPSI runs on the Mac to which the printer is connected, so its performance depends on the Mac's. A native Power Mac version of CPSI is not yet available for the Fargo printers.

Still, the Primera-Pro and Pictura 310 have their appeal. The $1895 PrimeraPro was by far the least expensive printer we tested, and the $4995 Pictura 310 is the only tabloid-size dye-sublimation printer you'll find for less than $5000—or less than $10,000, for that matter.

Output Quality: Getting Better

In past years, most business color printers had a relatively coarse resolution of 300 dpi. Six of the ten machines tested provide at least 600-dpi or 600-by-300-dpi modes. Of the color laser printers, most provide 600 dpi or higher. The HP provides 300 dpi. The Xerox 4900 Color Laser Printer provides a 1200-by-300-dpi mode. In this mode, the printer's laser beam pulses four times as fast as in 300-dpi mode, enabling the printer to apply four times the number of dots in the horizontal direction.

Many machines also employ resolution-enhancement techniques—fine-tuning dot sizes, for example—to further improve the quality of text and scanned images. The Color LaserJet provides HP's Resolution Enhancement technology, for example, while the Apple Color LaserWriter employs Color PhotoGrade.

The trend toward higher resolutions pays off on paper. This year's machines produced the best-looking output we've seen in this product category.

To evaluate output quality, Macworld Lab assembled a jury of 11 Macworld staffers from the editorial and art departments. Because different types of documents tax a printer in different ways, we compared a scanned image printed in Adobe Photoshop, an illustration created in Adobe Illustrator, and a text document created in Microsoft Word.

In the scanned-image test, the top three finishers were Apple's Color LaserWriter, Tektronix's Phaser 340, and QMS's Magicolor LX. The Color LaserWriter earned high marks for color accuracy and detail (see the output samples in "Color Image Quality"). The Phaser 340 output, by contrast, seemed a bit oversaturated—artificially bright. Our least favorite results in this test came from the HP Color LaserJet (which earned comments such as "grainy," "fuzzy," "detail lost"), both Seiko ColorPoints ("colors way too dark," "muddy looking"), and the General Parametrics SpectraStar GTx ("grainy and streaky").

In the Illustrator test, Xerox's 4900 Color Laser Printer took first place, although many of our jurors complained about oversaturated colors. QMS's Magicolor LX finished second, with Apple's Color LaserWriter finishing third. Last-place finishers here: General Parametrics' SpectraStar GTx, Fargo's Pictura 310, and Fargo's PrimeraPro.

In the text-output tests (which involved both black and color text), Apple's Color LaserWriter regained first place, followed by Tektronix's Phaser 340 and Xerox's 4900. HP's Color LaserJet and Seiko's ColorPoint 2 and Professional-


Colorful Business: Comparing Color Printers

<table>
<thead>
<tr>
<th>Company</th>
<th>Phone</th>
<th>Product</th>
<th>Imaging Technology</th>
<th>Tested by Macworld Lab</th>
<th>Price (list/company's estimated street)</th>
<th>Ports (standard/optional/all active)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apple Computer</td>
<td>408/995-1010, 800/558-9696</td>
<td>Color LaserWriter 12/600C</td>
<td>color laser</td>
<td>yes</td>
<td>$6988/$6500</td>
<td>L, P, E/none/yes</td>
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<tr>
<td>Digital Equipment</td>
<td>508/493-5111, 800/777-4343</td>
<td>DEC Colorwriter 1000</td>
<td>thermal wax</td>
<td>no</td>
<td>$3399/NP</td>
<td>L, P, S/E/yes</td>
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<tr>
<td>Fargo</td>
<td>612/941-9470, 800/327-4622</td>
<td>PrimeraJet</td>
<td>thermal wax and dye sublimation</td>
<td>yes</td>
<td>$1895/$1499</td>
<td>L/E/no</td>
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<tr>
<td></td>
<td></td>
<td>Picture 310</td>
<td>thermal wax and dye sublimation</td>
<td>yes</td>
<td>$4995/$3995</td>
<td>P/none/NA</td>
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<td>General Parameters</td>
<td>510/24-3390, 800/223-6999</td>
<td>SpectraStar GTs</td>
<td>thermal wax</td>
<td>yes</td>
<td>$3399/$3795</td>
<td>L, P, S/E/yes</td>
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<td>Hewlett-Packard</td>
<td>208/323-2551, 800/752-0900</td>
<td>Color LaserJet</td>
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<td>yes</td>
<td>$8822/NP</td>
<td>L, E, P/E, T/yes</td>
</tr>
<tr>
<td>NEC Technologies</td>
<td>508/264-8000, 800/632-6366</td>
<td>SuperScript Color 3000M</td>
<td>thermal wax</td>
<td>no</td>
<td>NP/$5999</td>
<td>P/none/NA</td>
</tr>
<tr>
<td>QMS</td>
<td>205/633-4300, 800/523-2696</td>
<td>MagiColor LX</td>
<td>color laser</td>
<td>yes</td>
<td>$4999/NP</td>
<td>L, P, S/E, T/yes</td>
</tr>
<tr>
<td>Seiko Instruments</td>
<td>408/992-5000, 800/888-8817</td>
<td>Professional ColorPoint 2</td>
<td>thermal wax and dye sublimation</td>
<td>yes</td>
<td>$16,499/$13,199</td>
<td>L, P, S/E/yes</td>
</tr>
<tr>
<td>Tektronix</td>
<td>503/682-7377, 800/835-6100</td>
<td>Phaser 240</td>
<td>thermal wax</td>
<td>no</td>
<td>$3695/NP</td>
<td>L, E, P/E, T/yes</td>
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<tr>
<td></td>
<td></td>
<td>Phaser 340</td>
<td>solid ink</td>
<td>yes</td>
<td>$5590/NP</td>
<td>L, E, P/E, T/yes</td>
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<td></td>
<td></td>
<td>Phaser 540 Plus</td>
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<td>no</td>
<td>$9835/NP</td>
<td>L, E, P/E, T/yes</td>
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<tr>
<td>Xerox</td>
<td>716/423-5099, 800/349-3769</td>
<td>Xerox 4900 Color Laser Printer</td>
<td>color laser</td>
<td>yes</td>
<td>$6100/$5500</td>
<td>L, P, S/E, T/none</td>
</tr>
</tbody>
</table>

1 = LocalTalk; P = Parallel; S = Serial; E = Ethernet; T = Token Ring; NA = not applicable. Technical-support ratings are based on a series of calls made to each company by Macworld's tech-support team, including tests and data sheets, to derive the final rating. Ratings are for companies, not individual products, and we call only those companies whose products Macworld Lab tests.

At 300-dpi mode, for example, the Phaser 340 was 42 percent faster than the second-place QMS MagiColor LX in our Illustrator test and 46 percent faster in our fonts test. HP's Color LaserJet finished a close third in overall performance, with Xerox's 4900 Color Laser Printer coming in next.

But overall performance doesn't tell the whole story: a printer that excels at one type of job might fall flat in others. The Xerox 4900 is a good example. In our PageMaker and fonts tests, it was near the bottom of the list. In the Photoshop test, however, it was among the fastest. As you peruse our performance results (see "Color Business Printers: How Fast?") be sure to look for the printers that best handle the types of documents you create.

We ran another performance test on the color laser printers. To gauge how they'd fare as workgroup printers—and because no office needs color in every document—we printed a 20-page black-and-white text file. Surprisingly, the range in performance was negligible, with the fastest printer tested completing the task in 157 seconds and the slowest in 165 seconds.

And those times aren't exactly neck-snaping—in our June 1995 roundup of monochrome workgroup printers, Apple's S2299 LaserWriter 16/600 PS printed the identical document in about two-thirds the time.
The Last Word

The most impressive machine this time around is Tektronix's Phaser 340, which offers first-place performance, excellent output quality, plain-paper capability, and easy maintenance. The printer isn't a perfect office-mate—it can't print legal-size pages or envelopes and its 15-minute warm-up time can get old—but it does provide the best mix of features, output quality, and performance. If you want a color printer that's as easy to use as a monochrome laser, this is the one to buy.

The Phaser 340 also accepts an optional attachment that turns it into a color photocopier. The $1695 Phaser CopyStation is essentially a scanner that connects to the Phaser 340's SCSI port. It's a nice way to make a good printer even better.

Although thermal-wax machines lack the paper-handling versatility of the color lasers and the Phaser 340, they still have their place. They produce beautiful overhead transparencies, and they cost less than competing technologies. In this category, General Parametrics' $3995 SpectraStar GTx delivered solid performance and good text quality, although our jury preferred the graphics output of the the Seiko ColorPoints. (Tektronix is revamping its thermal-wax product line as this issue goes to press; the Phaser 240, which uses the same Sharp-built engine as the SpectraStar GTx, should be available by the time you read this.)

As for the laser printers, it's hard to pick a winner—not because all the machines are so good, but because each has significant flaws. The Apple Color LaserWriter is the easiest to use and produces the best output, but can be painfully slow. (We tested a prerelease model; however, the unit we tested contained the final version of the PostScript controller. And even with the final ROM and extra memory, the Color LaserWriter made errors on a particularly complex PostScript document that the other printers were able to get through accurately.) The QMS and Xerox machines are fast and can print envelopes, but they're harder to set up and maintain and their output isn't as good. The HP LaserJet performs well and has the matte finish laser printer vendors are used to, but its output quality falls short of the Color LaserWriter's. HP's technical support was unacceptable in our tests. We were unable to evaluate Xerox's and Apple's tech support.

As for Tektronix's newest color laser, the Phaser 540 Plus, it looks like a contender. We couldn't test a unit, but Tektronix supplied us with impressive output samples of scanned images showing virtually no halftone or dither patterns. The $9835 Phaser 540 Plus provides 600-by-300-dpi resolution and uses fewer consumables than the other color lasers we tested—besides the toner cartridges, the only consumables are an imaging unit and fuser unit, which both last 30,000 pages. The 540 Plus also accepts the CopyStation photocopier option.

At press time Xerox announced three new color lasers that should be shipping by the time you read this. The XPrint series is rated at 3 ppm for color and 12 ppm for black and white. The 4920 and 4925 models provide 600-dpi resolution; the 4915 prints at 1200 by 300 dpi. Pricing was not finalized at press time.

Normally, this would be the point where I'd say that someday every printer will be a color printer. At the low end, that day has by and large arrived—printers such as Apple's $379 Color StyleWriter 2400 can handle both monochrome and color. But in the rest of the market, color printers will play second fieldie to monochrome machines for the foreseeable future. Monochrome laser printers are becoming faster, sharper, and cheaper more quickly than are color machines, and it remains to be seen how many businesses decide color is worth the cost and performance penalties.

That doesn't mean there hasn't been solid progress in business color. Today's printers are better than ever, and the best of them come closer than ever to meeting not only specialized color-printing needs, but ordinary ones, too. If you've got the checkbook and the room, take the plunge. Just don't plan to put your monochrome workhorse out to pasture.

 Contributing editor JIM HEID has covered printers for Macworld since 1984. The fourth editor of his BMUG Choice—award-winning Macworld Complete Mac Handbook Plus Interactive CD, (IDG Books Worldwide) will be available in August.

### Resolution in Sheets (Cost), Page

<table>
<thead>
<tr>
<th>Resolution (in dpi)</th>
<th>Paper Capacity (base)</th>
<th>Consumables (Cost, Page Yield)</th>
<th>Technical Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>600 x 600</td>
<td>250/500</td>
<td>toner (C, M, Y $139), 4000</td>
<td>not rated c</td>
</tr>
<tr>
<td>600 x 300</td>
<td>100/200</td>
<td>ink ribbon ($65), 342</td>
<td>not rated c</td>
</tr>
<tr>
<td>600 x 300</td>
<td>50/50</td>
<td>thermal-ink ribbon ($45), 115</td>
<td>very good</td>
</tr>
<tr>
<td>600 x 300</td>
<td>65/65</td>
<td>dye-sub ribbon and paper ($379), 100</td>
<td>good</td>
</tr>
<tr>
<td>600 x 300</td>
<td>100/200</td>
<td>ink ribbon ($155), 342</td>
<td>acceptable</td>
</tr>
<tr>
<td>300 x 300</td>
<td>250/500</td>
<td>toner (C, M, Y $43.95), 2200,</td>
<td>unacceptable</td>
</tr>
<tr>
<td>300 x 300</td>
<td>50/50</td>
<td>toner (K $8.95), 2200</td>
<td>very good</td>
</tr>
<tr>
<td>600 x 600</td>
<td>250/500</td>
<td>toner (C, M, Y $59), 3000</td>
<td>acceptable</td>
</tr>
<tr>
<td>300 x 300</td>
<td>100/100</td>
<td>thermal-ink ribbon ($490), 1160</td>
<td>very good</td>
</tr>
<tr>
<td>300 x 300</td>
<td>100/100</td>
<td>ink ribbon ($480), 1160</td>
<td>very good</td>
</tr>
<tr>
<td>600 x 300</td>
<td>250/750</td>
<td>ink sticks (box of C, M, Y $79),</td>
<td>not rated b</td>
</tr>
<tr>
<td>600 x 300</td>
<td>250/750</td>
<td>1000: ink sticks (K $29), 1000</td>
<td>not rated b</td>
</tr>
<tr>
<td>1200 x 300</td>
<td>250/500</td>
<td>toner (C, M, Y $200), 4000,</td>
<td>not rated b</td>
</tr>
<tr>
<td></td>
<td></td>
<td>toner (K $45), 4000</td>
<td>not rated b</td>
</tr>
</tbody>
</table>

as customers to judge the accessibility, helpfulness, and accuracy of the company's support technicians. Macworld uses a

1. Actual selling price could be higher or lower than company's estimated street price. N= not provided by company. b. Laser pages. c. Prerelease unit tested, couldn't rate tech support. d. Requires 24MB of memory for 600 dpi. e. Seiko also offers the

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For general-purpose office use, perfect color is less important in a color printer than efficiency and convenience.

Tektronix Phaser 340 Speed, great output quality, and foolproof setup are three good reasons to buy this innovative printer. An optional photocopy attachment and very good technical support are two more. Company: Tektronix. List price: $5590.
Just as extensions enhance the power of the Macintosh Operating System, so XTensions and plug-ins make it easy to add the functions to QuarkXPress and Adobe PageMaker that the developers forgot. By taking on specialized tasks, these utilities reduce the pressure on XPress and PageMaker to include every function, and thus keep them from becoming slow and unwieldy behemoths like Microsoft Word 6. And no doubt about it, the right XTensions and plug-ins can be major productivity boosters, condensing as much as an hour's worth of work into a 15-second reply to a dialog box.

A Paucity of Plug-ins
PageMaker plug-ins (formerly known as Additions) pale in comparison to XPress XTensions in both number and diversity. This is partly because Aldus, PageMaker's original developer, was slow
to introduce plug-in technology. Additionally, many PageMaker users believe that the basic functionality of the application is enough for their needs and that plug-ins are unnecessary. For most users, however, both PageMaker and XPress have their failings, and plug-ins and XTensions can do a great deal to rectify these shortcomings.

PageMaker and XPress come with small collections of such add-ons that users shouldn’t overlook. (PageMaker pros especially recommend Drop Caps, Expert Kerning, Find Overset Text, PCGroupIt, and Printer Styles.) A multitude of third-party plug-ins and XTensions add yet another level of features and options.

But one could go bankrupt buying everything that sounds appealing. Thus, I polled a number of XPress and PageMaker experts to find out what they use. Although the list of their favorites is long and remarkably diverse, a few were cited repeatedly; those are the ones I look at here. Desktop publishers who have yet to discover the power of XTensions and plug-ins will find much of value in this collection. Even more-experienced XPress and PageMaker users, however, should find significant money-and time-savers they have so far overlooked (see the sidebar “Hot New XTensions and Plug-ins”).

The business of purchasing XTensions and plug-ins is very convenient, as two clearingsouses—XChange (303/229-0620) for XTensions, and Adobe Plug-In Source (206/489-3446) for plug-ins—handle all sales. Two free XTensions, Bobzilla and Thing-a-ma-Bob, are available from online services like America Online and CompuServe. For vendor and pricing information for all the utilities mentioned here, see the table, “XTensions and Plug-ins.”

**Tools for PageMaker Pages**

Topping almost every PageMaker expert’s list is a collection of ten plug-ins called PageTools 1.0 (see Reviews, Macworld, December 1994). Although different people respond to PageTools’ parts differently, almost everyone likes PageBar, which gives PageMaker a button bar much like Microsoft Word’s (see “Who’s Got the Button?”). PageGuides, another popular PageTools plug-in, copies guides from page to page, applies them to objects, and deletes guides on one page or all pages. PageAlign makes it easy to align objects according to a variety of options. PageMover quickly moves objects to a different page or to the pasteboard. PagePrinter prints only pages that have changed since the last print job. And PageColor searches for and changes colors.

Few appreciate PageMaker’s bad habit of allowing file sizes to mushroom over time to well beyond what is actually necessary. Zephyr CleanSweep 1.01 is thus a favorite among PageMaker power users because it locates all publications that are needlessly obese and, while you’re on a coffee break, removes all the wasted space. CleanSweep is also available as part of a trio of plug-ins called Zephyr Essentials, which includes another well-regarded plug-in, Zephyr Grids, which simplifies creating and copying complex page grids.

Zephyr SuperSnap 2.01 is popular for its enhancements to PageMaker’s Snap-to functions. In addition to the familiar snapping of object edges to guides, SuperSnap can snap the centers of objects to guides and snap objects to other objects. It can also snap to a grid (PageMaker’s or one specified in SuperSnap), nudge items by a customizable distance, and undo its last action (something many plug-ins can’t do).

Galley Oops 2.2 helps many pros find last-minute problems. It looks for the sorts of errors that spelling and grammar checkers tend to miss—multiple spaces, mismatched punctuation marks, mismatched quotes and brackets, quotation marks that fail the “smart” test, and numbers that should be spelled out or punctuated (see “Artificial Proofing”). This plug-in also locates items that can trip up PageMaker, including empty text boxes and spaces with unnecessary style changes.

**All Things XPress**

XPress experts have everything imaginable in the way of XTensions, including the package they cannot live without—Kitchen Sink 1.5.4. Its most popular and valuable feature is Command Pad, which is both a blessing and a curse. On the one hand, it gathers XPress tools and functions (many of which have convoluted key combinations, or none at all), additional Kitchen Sink commands, and other palettes from other programs from the vendor (a lowly apprentice production), and assigns them to buttons on a floating palette. There are, however, a rather dizzying number of buttons, and they...
change depending on what item you select and which modifier keys you press. Although I'm no fan of balloon help, it does aid in identifying the functions of so many buttons. Unfortunately, you can't customize Command Pad.

Kitchen Sink's Co-Pilot creates a floating window that contains a resizable miniature of the active page or spread. Click on a spot in the miniature, and the main window scrolls to the same location; click on a Co-Pilot button to jump to the next page, the previous page, or back and forth between any two locations. Both Command Pad and Co-Pilot have a come-here, go-home feature that summons or banishes these palettes with a mouse-click. Among its other features, Kitchen Sink also installs pop-up lists of all document pages, magnifications, and open documents, and adds a Nudge palette for precise adjustments.

ScaleIt 1.5.3, a tool for resizing text, graphics, or combinations of both, is especially valuable when you need to resize a collection of items, whether it be a logo with text and graphics or an entire page. (Some fans of XTensions from Vision's Edge prefer the slightly less versatile Resize XT 2.04, though.) With ScaleIt you can scale by a percentage, to a specific size, or visually with the scale tool; and you can choose whether or not to scale a variety of attributes (see "Selective Scaling"). When scaling some attributes and not others, ScaleIt can attempt to maintain the items' relative positions. This is especially helpful in ensuring that call-outs point to the correct location.

Where Cooler Blends Prevail While Cool Blends is cool (and free with XPress), SXetch Pad 1.12 is even cooler. SXetch Pad adds a new object, a SXetch image box, to XPress, and provides a basic set of illustration tools—box, circle, line, Bézier curve, scissors, and rotation—for use within the SXetch box. You can make SXetch drawings from scratch or edit imported Illustrator 88–format files (relatively simple ones, anyway; I had some difficulty working with complex files). Although you must enter and edit text in a separate dialog box (the vendor, DataStre a m Imaging Systems, says version 2.0 will allow on-screen editing), SXetch Pad can create, well, way cool blends (see "A Better Grade of Blends").

Many XPress experts use Xstyle 1.5 to circumvent XPress's labyrinthine style-sheets /dialog boxes. Xstyle places many character and paragraph style options, and the ability to edit existing styles and create new ones, on

PLUG-IN AND XTENSION EXPERT TIPS

Using plug-ins and XTensions can sometimes be a little bit tricky, so here are a few tips for getting around rough spots.

- Plug-ins and XTensions use program memory, so increase the memory partitions (in the Get Info box) for PageMaker or XPress to accommodate these utilities.
- XPress and PageMaker come with XTensions and plug-ins you may not need; remove these from the program folders to save program memory. Create a folder out of the Turned Off folder, and launch the application again. PageMaker owners can make this procedure much more convenient by making an alias of the plug-in folder (which is located in the Aldus Folder's Additions folder, in the System Folder) and putting it in the PageMaker folder.
- Resist the temptation to change the name of XPress's XTension folder to XTensions, even if the former is grammatically incorrect. XPress won't be able to find your XTensions if you change the folder's name.
- If you're unsure whether an XTension is installed, make sure XPress is running, then press the option key and select About XPress from the Apple menu; you'll see a list of installed XTensions. In PageMaker, most installed plug-ins will be listed in the Aldus Additions submenu (or whatever Adobe calls it in the next revision).
- Avoid using old XTensions with newer versions of XPress (check with your local XPress expert, if you're not sure); old XTensions can cause the program to crash. For example, don't use the Quark freebies Bob, Son-of-Bob, FeaturesPlus, or Stars & Stripes with XPress 3.31.
- Don't use XTension demos with your working copy of XPress or with original documents. Running a demo version of an XTension has been known to change XPress and any documents subsequently saved by it into demo versions. This change is irreversible. Instead, make copies of XPress and any trial documents first, then test the demos with the copies, not the originals.
Selectie Scaling  With ScaleIt, you can choose to scale some attributes and not others. Here, for example, the picture boxes and images of the four selected graphics will be scaled, but the frame weight will not.

A Better Grade of Blends  In a SXetch Pad image box, text can be fitted to a curve, converted to outlines, and filled with one or more blends.

two floating palettes. Another favored XExtension, ScaleIt 1.5, adds character styles to XPress's repertoire. Facet styles work almost like XPress's paragraph styles, except that facet styles apply to selected characters, not whole paragraphs. The facet palette also has five pop-up menus to which you can add commonly used but nonstandard character styles (such as 9.5-point type).

To remedy XPress's inability to print nonsequential pages and specific color plates, some experts use Print Tools XT 1.01, while others use Quark Print 1.04. Print Tools can print spot and process colors, and can save a specified portion of a page as an EPS file. Quark Print is the pricier way to go for most Mac users (although it's free for Power Mac users), but it can also place user-defined sets of print and page-setup options in a pop-up menu, print a specified part of a page, and prepare a detailed report of document statistics, including a list of XExtensions required for a particular print job.

Fine Fractions for Free

Two Quark freebies—both collections of unrelated functions—are often used by page-layout pros. Bobzilla 1.0 adds, among other things, a command that highlights possible typographic problems—such as loose justification, widows, orphans, and text-box overflows—and an option that improves the printing of high-resolution gray-scale TIFFs. Thing-a-Ma-Bob 1.0 excels at making clean, slanted-style fractions (8) and prices like the ones you see in newspaper ads, with the cents superscripted and underlined (S19).

Layer Manager II 2.5 allows you to assign individual document items to pseudo layers called view groups, each of which can be hidden or displayed as needed, making it easier (and faster) to work on certain items. Other tools assign items to one of four layers (which cannot be converted to view groups), move items up or down one layer at a time, jump from item to item according to layer position, and quickly restore all moved items to their originally assigned layers.

An anomalous but useful
Some plug-ins and XTensions are so new that the experts haven't had time to decide which are keepers. Here are some of the newest ones that have people talking. For vendor and pricing information, see the table, "XTensions and Plug-ins."

- **PM Design Set 1.0** Created by a former Aldus tech-support person, PM Design Set 1.0 is a collection of seven plug-ins meant to rectify the PageMaker lapses customers complain about most. It includes a plug-in that makes professional-looking fractions—the vertically stacked type (\( \frac{1}{2} \)) or the slanted kind (\( \frac{1}{2} \))—either one at a time or for an entire document. In addition, PM Design Set has an autosave function, an enhanced magnification feature, and a command that merges all the documents in a book list into a single publication.

- **Zephyr Specs** Zephyr Specs 1.0 is a storage bin for PageMaker items, including style sheets, text and graphic objects, column and ruler guides, color suites, and layouts. Most stored items can be edited, some of them extensively. For multipart items (such as style sheets), you can choose which parts to add to a document, and when you add, for example, style sheets, Zephyr Specs helps resolve name conflicts intelligently. Items are organized by type, and there's a Find command that searches for user-defined item names, authors, and keywords. Unfortunately, Zephyr Specs doesn't support drag and drop (a minor quibble), and you can't keep the Zephyr Specs dialog box open as you work on a document (a major hassle).

- **FingerType** This XTension takes the mathematical gymnastics out of XPress type adjustments. Instead of entering numbers in dialog boxes, you simply select letters, words, or paragraphs and manipulate them with FingerType 1.0's tools (see "Setting Type by Hand"). Different tools increase or decrease font size, tracking, kerning, superscripting and subscripting, the size and number of drop caps, paragraph leading, and type (or select user-defined presets from a pop-up menu), and you can't keep the Zephyr Specs dialog box open as you work on a document (a major hassle).

- **ShadowCaster** No more switching to Adobe Photoshop, creating a drop shadow, and then switching back to XPress. In final beta testing as this article went to press, ShadowCaster can create shadows for type and graphics and burn shadows directly onto TIFF (see "Easy Shadows, Mock Text"). You set the shadow's resolution, blur radius, offset, darkness, and type (or select user-defined presets from a drop-down menu), and ShadowCaster does the rest.

- **Item Master** Also seen in a final beta version, Item Master creates style sheets for XPress items other than text, such as boxes, graphics, and lines. Item Master styles are available from a submenu and an Item Style palette; the Item Style palette also has a Create mode for generating new items automatically formatted in the selected style.

- **Jabberwocky** A little tired of using Lorem ipsum for mock-ups? Then try Quark's Jabberwocky 1.0 XTension, which generates nonsense text to fit the available space (see "Easy Shadows, Mock Text"). Its artificial, not-so-intelligent engine creates paragraphs in your choice of nearly-Joycean English, politically incorrect Polticspeak, imitation Latin, fake Esperanto, and pseudo (I think) Klingon. Should you tire of Jabberwocky's word lists, you can create your own language.

Layer Manager II tool jumps from one linked text box to the next. For major enhancements to the Link tools, however, the pros turn to LinkIt 1.5. This XTension adds eight new linking tools that can easily accomplish otherwise difficult tasks, such as joining two text chains and combining their contents, splitting one chain into two and dividing the text between them, and unlinking the boxes in a chain so each retains its current contents.

**The Last Word**

Although the plug-ins and XTensions described above are rated highly by desktop publishing experts, remember that a given plug-in or XTension makes sense for you only if you will save more money using it than it costs to buy it. Some may earn their keep the first time you use them; others may take a little longer to justify themselves. But regardless of your specific publishing needs, as long as PageMaker and QuarkXPress are less than perfect, you will always be able to find cost-effective plug-ins and XTensions that bring them a little closer to that elusive goal. 

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**Contributing editor ROBERT C. ECKHARDT** would like to thank the many PageMaker and QuarkXPress experts whose recommendations helped shape the selection of programs that appear in this article.
"But I Thought My New Macintosh Would Run Windows Applications."

There's no need for tears. You thought your new Mac could run Windows applications right out of the box, but it doesn't. No problem. Just get SoftWindows and run thousands of Windows applications on Mac.

SoftWindows lets you run the DOS and standard mode Windows applications you need at work or at home. With a couple of clicks, you can run databases in Access. Edit spreadsheets from Excel or Lotus 1-2-3. Exchange documents, presentations, even access your company's e-mail, printers and networks.

Over 150,000 Mac, Power Mac and Performa users already run Windows applications with SoftWindows. So can you. Just look for our "Try-it" CD-ROM at your favorite retailer and test it for 30 days risk-free.

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You're sitting at your desk staring at the layout filling the screen of your Power Macintosh.

The photograph of the ostrich definitely isn't flying, so you exercise your artistic right to change it.

You import a scan from the Scitex system down the hall, but you don't wait.

You open Adobe Photoshop and scroll through...
lovely six-color photo of a peacock, but you don't wait.

You resize it, do a little retouching, make some separations, but you don't wait.

You send out dupes of your layout to twelve pubs electronically, but you don't wait.

And as you're walking out to lunch, it suddenly hits you:

It's not how powerful the computer is.

Introducing the Power Macintosh 9500.

It's how powerful the computer makes you.

The power to be your best.
PageMaker 6 Emphasizes High-End Publishing

In a bid to woo back some of the prepress and service bureau customers who've switched to QuarkXPress, the latest version of PageMaker features enhanced typography, color, and high-end production capabilities—but without sacrificing the intuitive method of designing layouts PageMaker has come to be known for. And as the first version to be released by Adobe (415/961-4400), PageMaker 6 clearly shows the veteran graphics developer's influence in its tight integration with Photoshop and Illustrator—enabling you to do minor image editing without leaving PageMaker.

Image-Manipulation Capabilities
With a completely redesigned drawing engine based on Adobe's Intellidraw structured-grafsics program, PageMaker 6.0 has added illustration capabilities that can streamline the production process and save a lot of time. For example, because you can now group and resize imported objects as well as edit colors in imported EPS graphics within PageMaker, you no longer need to go back and edit the original image in Illustrator and relink it to the PageMaker file. You can also select a color from an imported Illustrator EPS image and apply that color to another object in PageMaker; previously, you had to go back to Illustrator, look up the color in the color palette, and re-create that color in PageMaker's color palette. However, according to beta tester Bennett Peji, owner of Bennett Peji Design, you can now group a text block with a graphic, but you still can't scale a text block; you must change the type specs.

PageMaker's newly added support for native Photoshop filters, as well as third-party plug-ins, mean you can create multiple versions of one Photoshop image using different filters; you no longer have to make a separate file for every variation of an image in Photoshop and place each one separately in PageMaker. Because PageMaker 6.0 now supports clipping paths, TIFF images whose backgrounds have been masked out in Photoshop can be imported and placed directly in PageMaker. Previously, silhouetting an object meant placing the Photoshop image in Illustrator so you could create a mask, and then placing the masked object in PageMaker. Now, with the Object Masking tool, you can mask text or graphics with any PageMaker-drawn object.

Improved Type and Printing In response to criticism that its typography was not up to the level of QuarkXPress and PC competitor Ventura Publisher, PageMaker has added much finer typographic controls that compare favorably to theirs. Automatic kerning, support for kerning in 1/100-em increments, and typesetting measurements make it possible to achieve a level of quality comparable to that of traditional typography.

PageMaker 6.0 promises to fix some obstacles service bureaus have faced with the program in the past. For example, two-way printer communication, part of PageMaker 4.0 but dropped from 5.0 in order to speed up print time, is back in 6.0. Two-way communication streamlines printing by querying the printer directly to determine available memory and downloaded fonts. Without it, if you were to download fonts manually without updating the PPD, PageMaker would not detect them and so would download them again—a significant time-waster.

High-End Color PageMaker 6.0 will support multiple color-management systems (including Kodak Precision CMS and ColorSync 2.0), HiFi Color and Pantone Hexachrome (which use more than the four standard process inks), and Photo CD and LAB Color TIFF images. Ver-
New Portable Font Technology

RES SOFTWARE (415/578-9000), WHOSE Chameleon technology generates TrueType and PostScript Type 1 fonts from master outlines and preset description files, has developed MiniFont, a scalable, resolution-independent font system for embedding existing TrueType and PostScript fonts in portable documents. MiniFont consists of a reader that converts existing fonts to the MiniFont format, a player that makes a high-quality replica of the original font, and a rasterizer for displaying the MiniFont replica in antialiased black and white or gray scale.

Geared for online and CD-ROM publishers, the new technology will create an 8K to 16K MiniFont from the original (about 45K) font, or—if used in conjunction with Chameleon—a font as small as 4K. Tumbleweed Software, developer of Novell/WordPerfect's Envoyst portable-document system, is considering using the MiniFont technology in its electronic-publishing program, Publishing Essentials (due the third quarter of 1995), as well as in the next version of Envoyst. —C.A.

Wacom Debuts Erasing Pens

CONTINUING THE TREND OF DIGITAL pens that emulate the natural feel of traditional writing instruments, Wacom (360/750-8882) is introducing a new generation of graphics tablets that feature erasing pens. Five new ArtPad II and ArtZ II tablets ranging in size from 4 to 5 inches to 18 by 25 inches, will each ship with the Erasing UltraPen, which offers pressure- and tilt-sensitive erasing (the ArtZ II tablets are tilt- and bearing-sensitive). According to Wacom, the 256-pressure-level pen works like a real eraser—erasing more as you increase the pressure. The tilt determines the shape of a line, while the bearing determines its direction. You can blend colors by changing the amount of tilt and vary opacity by changing the pen's direction, in apps that support these features.

Once it's released, the erasing pen will become the standard one shipped with all Wacom tablets. Graphics applications supporting the Erasing UltraPen include Adobe Photoshop, Fractal Design Painter, Macromedia FreeHand, Live Picture, SmartSketch, and MediaPaint. Wacom's new driver will enable one-stroke erasing in nonsupporting applications such as word processors and spreadsheets—you'll simply select text and drag to erase.

Although the Erasing UltraPen won't be compatible with existing Wacom tablets, Wacom is considering an upgrade policy for owners of older tablets. Due in mid-July, the ArtZ II tablets with Erasing UltraPen will range in price from $389 to $2449.99. The ArtPad II will list for $174.99.—C.A.
Since 1990, graphic artists, printing professionals and photographers have used Adobe® Photoshop® software to create the world's most visually rewarding work. They've made it the industry standard for photo design and production, print publishing and even multimedia and on-line design. So it's no surprise that Adobe Photoshop has earned every major award. Today, Adobe Photoshop 3.0 includes multiple layers for flexibility in image composition, Color Range for precision masking, CMYK Preview and Selective Color Correction for accurate prints. It's compatible with the latest Macintosh®, Windows® and UNIX computing platforms, including Power Macintosh®, Windows NT™ and Windows® 95. Reward yourself. Just call 1-800-521-1976, Ext. J1268 for information or to purchase our exciting Adobe Graphic Sampler CD® with tryout versions, interactive tips, and more. Or visit our web site at http://www.adobe.com/.

If you can dream it, you can do it.
by Cathy Abes

**Artist:** Based in Palo Alto, California, Ruth Kedar does fine art, illustration, and design using digital and traditional media. She teaches design at Stanford University and is a Web master for Art on the Net ([http://www.art.net](http://www.art.net)), a site devoted to visual and performing arts. Her fine-art, digital, and mixed-media work is displayed there. She was previously art director of technical publications at Adobe Systems.

**How It Was Done:** This mixed-media piece, one of Kedar's *Kings and Amulets* series, combines two of the artist's nondigital monoprints with a gold-plated replica of an ancient Egyptian statue. Kedar began by opening a Photo CD scan of the first monoprint, called *Alexander the Great,* in Adobe Photoshop. She color-corrected it with the Levels command to remove a green cast in the scanned image and to enhance the contrast and brightness. Then, after selecting everything but the slate area (where the writing appears), she manipulated the curves, saturating the colors along the right edge while giving the rest of the image a smooth, claylike texture.

Next Kedar scanned the figurine and pasted it into the monoprint image as a floating selection. After opening the second monoprint scan, called *Charlemagne,* in Photoshop and converting it to Grayscale mode, Kedar darkened it and enhanced the contrast. Then she merged the first monoprint and figurine with the second monoprint using Apply Image in the Difference mode.

Next she rescanned the figurine, this time in a horizontal, rather than a vertical, position. This caused the light from the scanner to reflect off the figurine at an angle, producing the same colors as before but in different areas. After selecting the figurine, pasting it into a new layer, and positioning it over the original scan, Kedar removed parts of the second figurine with the rectangular marquee, a feathered lasso, and the pen tool.

Once she'd merged the two layers, Kedar darkened some areas with the burn tool to emphasize the second figurine.

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**THE TOOLS**

**Hardware:** Quadra 950 with 64MB of RAM, 240MB internal hard drive, Toshiba XM3401TA internal (multisession Photo CD-capable) CD-ROM drive, and E-Machines Futura MX 24-bit color graphics card; 1GB Hammer external hard drive; La Cie Silver-scanner; E-Machines ColorPage T16 II dual-resolution monitor; PLI 44MB SyQuest removable-cartridge drive; APS 270MB SyQuest removable-cartridge drive.

**Software:** Adobe Photoshop 3.01.
After scanning the figurine again, this time in a horizontal position, she pasted it into a new layer. This scan picked up similar colors, but the changed scanning position produced them in different areas.

After using the rectangular marquee to remove the lower part of the figurine and a feathered lasso to remove parts of the arms, Kedar drew a path around the upper torso, made the path a selection, and deleted the rest of the figurine.

With the two layers merged, Kedar used the burn tool to darken the lower right edges of the torso, which gave the image a three-dimensional effect and made it stand out from the background.

The second monoprint after Kedar converted it to Grayscale mode and manipulated it with the Brightness/Contrast command (Brightness -8, Contrast +13).

Kedar merged the two images using Apply Image, with Charlemagne Grayscale as the source file, Background as the layer, Black as the channel, Alexander the Great as the target file, and Difference as the blending mode.
Power Macs Flowing into Client-Server Mainstream

In response to the serious horsepower injection provided by the PowerPC chip, corporations are demanding client-server database development tools for the Power Macintosh, and vendors are responding. Unix is still the undisputed king of client-server databases, but by this fall, developers for the Power Mac will have a selection of tools rivaling those available for any other desktop platform, including Windows NT and OS/2.

Old Hands with New Tools
Some Mac client-server development tools have a surprisingly long history. Blyth Software's (415/571-0222) Omnias database development tools have been available for four years. In January, Blyth shipped Omnias 7.7, which it claims performs four to ten times as fast on a Power Mac as on the fastest 680X0 alternative. Omnias apps developed on a Mac can be deployed on Windows, OS/2, or Unix variants with no code changes.

The visual programming environment ProGraph CPX is now a client-server application-development environment called Peregrine. Peregrine's authors, Pictorius (902/455-4446), claim that it lets developers generate connections to Oracle, Sybase, and Butler (Everyware, 905/819-1173) SQL databases without programming any code; Peregrine is already in use as a front end for a Sybase database at MTV Europe, among other sites. Finally, Versant (415/329-7500), a database firm with roots in the Smalltalk programming community, has announced Argos, client-server Mac tools that support cross-platform development.

Mac by Popular Demand
But now, vendors with little or no previous Mac orientation are finding that Apple's evangelism and sheer customer insistence are driving them to make their tools available on the Power Mac. "We couldn't ignore the volume of demand from Power Mac users," reports Eric Block of JYACC (212/267-7722); product managers at client-server database heavies Oracle and PowerSoft make nearly identical comments. JYACC Application Manager (JAM) combines a complete cross-platform development environment with access tools for every major relational database in the minicomputer/mainframe world.

Other vendors currently shipping client-server tools include both smaller firms such as Forté (510/869-3400) and Uniface (510/748-6145), as well as industry giants such as Oracle (800/672-2531). Oracle has an entry-level product that uses Microsoft's FoxPro and ODBC as building blocks in client-server design, and a stand-alone product that's a complete object-oriented environment with native data drivers. Oracle's World Wide Web site (http://www.oracle.com) lets developers download either product for a 90-day trial.

Other major client-server-tools vendors with announced products include PowerSoft (508/287-1900) and Gupta Technologies (415/321-9500). PowerSoft's PowerBuilder for the Mac 4.0, a full enterprise-wide development environment, and InfoMaker for Macintosh, a smaller front-end product, are expected to ship in early August. Gupta's Gupta SQL for Mac is expected later this year.

When Gupta's and PowerSoft's products ship, every major client-server-tools vendor will have a Macintosh presence. And they agree that the performance of Power Mac and multiprocessing PowerPC systems (such as DayStar's Genesis MP) now make these systems appropriate platforms as both clients and servers in distributed database computing.

—Charles Seiter
New Mac Word Processor

Rub Your Eyes and Read that again—Israel-based WorldSoft (408/867-6757) is launching its Mac-only word processor, WorldWrite 3.0, in the United States.

Featurewise, WorldWrite compares well with the current word processing leaders, supporting tables, multicolumn text, and tagless HTML editing. But WorldWrite is relatively lightweight, consuming only 1.4MB of disk space in the Power Mac version. WorldSoft also takes a different tack when implementing some features, for instance, treating tables as graphic objects that can be dragged freely around the page. WorldWrite features a two-layer approach to documents: graphics and text each reside in a separate layer. Text can either print over or wrap around a graphic object, and the software supports irregular text wrapping. WorldWrite also fully implements Apple's WorldScript technology, supporting both right-to-left and vertical text input and display of 2-byte languages like Japanese. WorldWrite 3.0 is expected to be available by the time you read this, for a retail price of $249.—C. C.

PIM Market Abuzz with Activity

Tracking the recent changes in the PIM market is enough to make you wish for an information manager: Symantec has announced version 2.1 of ACT for Macintosh; Rae Technology has announced version 2.0 of Rae Assist; and Now Software has been a veritable beehive of activity, acquiring TouchBase and DateBook from Adobe, and releasing version 3.5 of Now Up-to-Date and Now Contact.

Symantec's (503/334-6054) focused contact manager, ACT for Macintosh, is the recipient of improved support for mobile users. ACT 2.1 will automatically synchronize contact files between a desktop Mac and a PowerBook when the PowerBook user plugs back into the base network, and remote users can synchronize their contact databases via e-mail. Version 2.1 also includes a scattering of interface improvements: calendars, task lists, and history windows are now modeless; users can attach documents to contacts; and Symantec has added Apple Guides to explain complex tasks. ACT for Macintosh 2.1 will be available in August for $169.95.

Rae Technology (408/725-2850) has done a more thorough reworking of Rae Assist. Version 2.0 has been rewritten from scratch in native Power Mac code (a 680X0 version is to come this fall), freeing it from its 4th Dimension underpinnings. The resulting application is smaller and faster, coming in under 1.5MB with a launch time of 3 seconds. Color has been added throughout, as well as the inevitable interface tweaks: windows are now resizable, and there are floating tool palettes. Rae Assist 2.0 is expected to be available in the fourth quarter of 1995. Pricing was not set at press time.

Both the engineering and executive offices have been busy at Now Software (503/274-2800). Macworld reported on version 3.5 of Now Contact and Now Up-to-Date in At Work news, August 1995. Now Software has also acquired TouchBase and DateBook from Adobe Systems, and Tom Swinford, Now's Director of marketing for PIMs, says the company plans to focus the newly acquired line on single-user information management, while Contact and Up-to-Date continue to evolve as workgroup information managers aimed at the corporate market.—C. C.

Novell Tweaks WordPerfect

Eventually you have to rebuild the house, but until then a fresh coat of paint can work wonders. By September, Novell (801/225-5000) will ship version 3.5 of WordPerfect, which is expected to be the last major revision before the company completely reworks the code base for the OpenDoc component-application architecture and Copland, Apple's next major revision of the Mac OS.

Version 3.5 will look better and feel faster: the WordPerfect team has tweaked the interface, eliminated some persistent display glitches, and tuned many parts of the program.

Novell has also added new features, both practical and whizzy. The latest incarnation of WordPerfect will read your documents back to you via Apple's text-to-speech technology and, through a new Make It Fit command, will automatically adjust font size, kerning, and line height to condense or expand text to fit a specified page length. Novell is stealing a march on Microsoft by making it possible to create and edit HTML documents without typing tags. Also, in response to customer requests, creating envelopes will be easier in version 3.5.

The CD-ROM configuration of WordPerfect 3.5 ($189) will include Envoy, the company's portable-document-creation software, and AppWare, Novell's graphical package for custom application development and integration.—C. C.
A picture is worth
But for some reason, Hew

In this case, a picture seems to be worth slightly more than a thousand words. Because after seeing the difference between printers, we just couldn't keep quiet. As you can see above, the Apple* Color LaserWriter* 12/600 PS with Color PhotoGrade delivers near-photographic quality that can make virtually everything you print more expressive. True 600 dpi resolution means that sharp, black text always comes out as sharp, black text. Your PostScript* and TrueType* fonts, as well as your
Hewlett-Packard Color LaserJet

a thousand words. Lett-Packard is speechless.

line art, have never had more impact. And it's incredibly easy to use. Just hit Print. With ColorSync® 2.0, our seamless color-matching technology, the color you see on your monitor is the color you see on your paper. To hear even more words about the Apple Color LaserWriter 12/600 PS (words like "surprisingly affordable" and "cross-platform compatibility," to name just a few), call 800-538-9696, extension 525, for the authorized Apple reseller near you. Or, if it's more convenient, visit us on the Internet at http://www.apple.com. Enough said. Apple
At DPT, we've always been real fans of the innovative Macintosh® products from Apple®. Now, we're pleased to announce that after being a Mac booster from afar, we are now ready to directly boost the performance of the new line of Macintosh computers with PCI.

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Call us today for your free Mac Booster Kit and find out for yourself how DPT SCSI products can boost your performance when you're using the new Macintosh computers with PCI from Apple.
Working Smart

Environmentally Friendly Computing

THE COMPUTER BUSINESS IS OFTEN described by its proponents as a clean industry. It's true that there are no beaching smokestacks at Apple's factories, but just the same, computers take their toll on the environment. Their manufacture involves a variety of chemicals and materials few of us would want in our backyards. And they use a lot of power. Imagine: well over 100 million electrical devices in use today that didn't exist 15 years ago—not counting printers and other peripherals.

I wouldn't suggest that people stop buying computers—besides putting me out of a job if they did, I like to think that a few of these machines are being used to develop ways to save the environment, or at least to enable telecommuters like me to avoid turning an ignition key to go to work. There's a middle ground: conservation. By using less power, less paper, and less plastic, we can have our computers and our planet, too. The good news about conservation, of course, is that it saves you money while it saves the earth.

This month I look at a dozen ways you can save the earth using your Macintosh—or not using it.

Your System

1. Power down. Unless your Mac is doing duty as a fax modem or dial-in server, turn it off at the end of the day.

If you often forget to shut down—or need to let your Mac run—use System 7.5's energy-saving features. The Auto Power On/Off control panel lets you specify times for the Mac to turn itself on and off. For unattended backups, use a scriptable backup program (I recommend Retrospect, from Dantz Development, $249, 510/253-3000), create a backup script, and stash it in your System Folder's Startup Items folder. Then use Auto Power On/Off to have the Mac turn itself on in the middle of the night, run the script, and turn itself off a while later.

Auto Power On/Off works with all Macintoshes that support soft power—those you can turn on and off using the keyboard's power key.

2. Control the power. What if your Mac doesn't support soft power? Or you have a gaggle of external devices you also need to control? The answer to both questions is Sophisticated Circuits' PowerKey ($110; 206/485-7979). This paperback-size box provides four surge-protected power outlets and connects to the Mac's ADB port. Press the keyboard's power key, and the outlets' juice is on. PowerKey does not allow you to shut down by pressing the power key, but does.

answer remote devices. When the phone rings, the PowerKey Remote signals the Mac to start up, and the unit shuts the Mac off again when the communications session is complete. (If your Macintosh doesn't support soft power—or if you want to run on other peripherals by remote control—combine the PowerKey Remote with the PowerKey.) But there's one catch: the calling device will only wait so long for your Mac to answer, so you need to use a utility to block unneeded extensions from loading.

Unless your system is a real power-guzzler, you might spend more for the PowerKey than you'll save on electricity in the short run. But there are other benefits, such as surge protection and reduced wear and tear on equipment, that still make the devices worth considering.

Your Monitor

3. Go dark. Turning off a monitor when you aren't using it saves energy and prolongs the monitor's life without making you wait through long start-up sequences or forget dial-in communication.

Apple's current monitors ship with a control panel, called Energy Saver, that powers down the monitor after a specified period of inactivity—the ultimate screen saver. Move the mouse, or hit a key, and the monitor springs back to life.

Berkeley Systems' After Dark 3.0 ($49.99; 510/540-5535) includes a powersaving module named EcoLogic that powers down your monitor and, if you like, the Mac itself. You can specify separate activity intervals for each. And no, you don't have to forgo the flying toasters—you can set up the infamous screen-saver module to control anything.
(or another module) to appear after a brief interval of inactivity, and have EcoLogic kick in after a longer one.

Your Printer
Printers impose significant resource demands of their own. The industry jargon for everything you put in a printer—paper, toner, and so on—would make any environmentalist cringe: consumables. Here are some ways to consume less.

4. Shop Energy Star. Most monochrome laser printers today have power-down modes that kick in after a period of inactivity. Just look for Energy Star compliance—that means a product meets the Environmental Protection Agency's energy-conservation standards.

5. Go ink-jet. Compact ink-jets such as Apple's Color StyleWriter 2400 use far less power than laser printers, and less plastic goes into ink-jet printers and their ink cartridges.

6. Print less. Use page preview to proof documents on screen. The page-reduction features most printer drivers provide to squeeze multiple pages on a single sheet of paper. (The layout feature in the LaserWriter 8 Page Setup dialog box is especially useful for this.)

7. Use both sides. Several workgroup laser printers on the market accept duplexer attachments that flip pages within the printer (see "Top Office Printers," *Macworld*, June 1995). You can also print on both sides manually. First print the odd-numbered pages of a document, then flip the sheets over and print the even-numbered pages. For multiple copies, print originals as single-sided copies and then use a photocopier to make the rest two-sided.

A variation on the both-sides theme: Don't throw away single-sided documents you don't need. Use them to print first drafts, E-mail, or other nonfinal output. If security or privacy requirements prohibit this, at least recycle the paper.

8. Don't pitch toner cartridges. Don't trash that spent laser-toner cartridge—recycle it (all major printer vendors now have free recycling programs) or refill it.

9. Conserve toner. Working Software's Toner Tuner ($24.95; 408/423-5696) extends cartridge life by printing draft copies in gray, using less toner or ink. If you're using QuickDraw GX, get Peirce Software's Peirce Print Tools ($129; 408/244-6554). Its Inksaver module performs a similar job, and its PaperSaver module provides n-up printing.

Your PowerBook
PowerBooks are designed around power conservation, so using one instead of a desktop Mac saves energy right off the bat. Batteries contain nasty toxins, but you can reduce their environmental impact by recycling them when spent. Combine a PowerBook with the following products to save even more.

10. Run on 12 volts. Most home alternative-energy products—solar panels, windmills, and the like—generate 12 volts of juice to charge car batteries, which in turn supply power to lights and appliances. You can run a PowerBook from a 12V power source using Lind Electronics' (612/927-6030) Automobile Power Adapter, which converts 12V DC into the lower-voltage DC required by a PowerBook. (One of these gems enabled me to keep working through a four-day power outage that struck the rural northern California coast during a winter gale last January. Even at 70-mph winds drove rain through the roof of his blacked-out house, your faithful correspondent was able to play Lode Runner—ER, I mean, meet his deadlines.) A model that powers an Apple StyleWriter printer lists for $49.

The PowerBook 100-series and Duo versions cost $69.95, while the PowerBook 500-series model is $99.95. You can also use a DC-to-AC inverter to power your equipment from a 12V source. Radio Shack sells a variety of inverters, including big honkers that can power a small desktop Macintosh and monitor. Statpower Technologies' Noteipower ($69.95; 604/420-1585) is a compact, 6-ounce inverter that generates enough juice to run a PowerBook using the AC adapter.

11. Run from the sun. You can get one step closer to the ultimate power source with Keep It Simple Systems' (800/327-6882) Solar System series—solar panels that, in direct sun, generate enough juice for a PowerBook. The $229 Neptune Model I tested was thoughtfully designed. Closed, it's an 8-by-14-inch nylon case less than an inch thick. Open it flat, and two amorphous silicon panels begin delivering 8.4W to a 10-foot cable that you plug into the PowerBook's adapter jack. Models are available for all PowerBooks (and other laptops).

Everything Else

12. Recycle it. And I don't just mean recycling toner cartridges and paper. Donate old versions of software to a school or charitable organization. And if you work for a big business, recycle your equipment—too many retired computers and printers are aging in store-rooms when they could be serving a school or organization that just can't afford the latest model. 

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Tips, Tricks, and Shortcuts

ARE YOU UNIMPRESSIONED BY DULL PRINTS from low-cost color ink-jet printers such as Apple’s Color StyleWriter and Epson’s Stylus Color? You haven’t seen what they can do with the right paper, say a couple of readers. René Korte of Huntsville, Alabama, claims no thermal-wax primer can come close to matching prints made with a Stylus Color on Hewlett-Packard’s glossy paperlike film. At a dollar a page it’s a rather expensive method, but it’s still substantially cheaper than dye-sublimation printing ($5 per page). Granted, dye sublimation looks great, but Korte contends it is sheer overkill for the average home or business.

Before printing with a Stylus Color, open the image and use the Page Setup command to specify 720-dpi printing. The only paper choice at that resolution is Epson 720 Coated; that’s OK. Although it normally has trouble taking up the film, the Stylus grabs it just fine if you put a strip of transparent tape at the top edge of the film on the nonprinting side. The printer takes its sweet time to print a full page in color, but Korte says it’s worth the wait.

For printing on an Apple Color StyleWriter Pro, designer Robert B. Riggs of Canton, Michigan, recommends the paper and film made by Rexham Graphics (413/536-7800 or 800/628-8604 for a dealer referral), which he considers the best on the market. He gets richer color and greater contrast with Rexham RH00M ink-jet paper (about 10 cents a sheet) than with a Hammermill premium ink-jet paper (about 2 cents a sheet). For even better contrast, sharpness, and clarity, he uses Rexham DMPL160HP lowglare photographic paper ($152.95 for 25, 24-by-36-inch sheets that he cuts down to 8½ by 11 and 11 by 14). Rexham expects to offer this type of paper in an 8½-by-11-inch size by fall 1995.

When Slow Is Fast Enough

Q. Like everyone else, I need more-disk storage. Removable-cartridge drives seem attractive, but they provide seek times of 18 milliseconds and slower, compared with 11 ms or 13 ms for hard drives. How noticeable is the difference in access time? Is it feasible to run applications from something as slow as Iomega’s Zip drive?

Dave M. Peck, Sr. via CompuServe

A. According to Tim Warner, a senior technical analyst for Macworld Lab, the Zip drive feels about as fast as an 80MB hard drive did four years ago, which means it’s noticeably slower than today’s hard drives (see Reviews, Macworld, July 1995). How much slower depends greatly on the types of applications you use and what you do with them. You don’t need blistering disk performance for word processing, spreadsheets, communications, ordinary business graphics, playing QuickTime movies, and many other everyday tasks.

The Zip makes a fine backup device, performs adequately as a start-up drive, and doesn’t feel particularly sluggish running graphics applications such as Adobe Photoshop and Fractal Design Painter—as long as you’re editing images that fit entirely in memory, and you don’t use the Zip as a scratch disk. However, you’d cry if you had to use a drive with seek times as slow as the Zip’s for random-access tasks such as sorting large databases or compiling programs, and you need a fast transfer rate for virtual memory storage or a Photoshop scratch disk. (Use your internal or external hard drive for those jobs, even if you start up from a Zip.)

Before buying a Zip drive, take a look at the new SyQuest EZ135 Drive, which the company claims offers about twice the performance for the same price (see Mac Bulletin, July 1995). Also, don’t overlook the fact that you can buy a pretty big hard drive for the cost of a Zip drive and the equivalent number of Zip disks—at least 500MB now and going up as hard drive prices tumble.

Desktop Rebuilding and At Ease

Q. When I tried to rebuild the desktop on my Performa 475 with At Ease installed, the rebuild froze just before it finished. Must I turn off At Ease prior to rebuilding the desktop, or was this a random occurrence?

Gregg J. Olson via the Internet

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Gregg J. Olson via the Internet
If you have access to the Finder from At Ease, and the Finder is not already open, you can rebuild the desktop by choosing Go To Finder from At Ease's Options menu and holding down the option and Option keys until a dialog box asks you to confirm rebuilding the desktop. If you don’t have access, you must turn off At Ease with the At Ease Setup program before rebuilding.

Here is the normal procedure for Mac OS versions 7.5 and later, as well as for other versions that have Macintosh Easy Open installed. Restart and hold down the spacebar until the Extensions Manager control panel opens. Name and save the current set of extensions by choosing Save Set from the pop-up menu. Then turn off all extensions by choosing All Off from the pop-up menu, but scroll through the list and click the Macintosh Easy Open control panel to turn it back on (see “Desktop Rebuilding with Easy Open”). Close Extensions Manager and hold down option-3 until you are asked to confirm rebuilding the desktop. After rebuilding, open Extensions Manager, choose the set of extensions you saved prior to rebuilding, and restart.

On systems prior to version 7.5, which generally do not have Easy Open installed, rebuild the desktop by restarting while holding down the shift key to turn off all extensions temporarily. When you see the message “Welcome to Macintosh. Extensions off,” release the shift key and hold down option-3C until asked to confirm rebuilding.

Rebuilding the desktop normally causes all Get Info comments to be lost. You can keep them by installing the freeware extension CommentKeeper prior to rebuilding. If your problems continue, try clearing the desktop database with a freeware program—either ResetDtdBs 2.0 or TechTool 1.0.6—then rebuild again. Norton Utilities 3.1 can also clear and rebuild the desktop without losing Get Info comments. CommentKeeper, Reset DtdBs, and TechTool are available in the Macworld forums on America Online and eWorld.

### Keys for Application Menu

**TIP** You can make the Application menu's Hide and Show commands as convenient as they are useful by assigning them #key shortcuts. Use ResEdit to open a copy of the System file; in System 7.5.1, open the System 7.5 Update file instead. Then open that file's MENU resource—16489. A menu-editing window opens, showing the Application menu with the name of Maura (see “Application Menu Shortcuts”). Select each of the first three menu items in turn and set the Cmd-Key field as you wish. I use an asterisk (*) for the Hide *item (which hides the frontmost application), a hyphen (-) for the Hide Others item, and a plus sign (+) for the Show All item.

After making those changes, select continues
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AT WORK: QUICK TIPS

the menu items individually, and for each one try to choose Remove Icon from ResEdit’s Menu menu. This step is necessary because in some systems the Hide and Show commands are marked as having icons even though they don’t. In that case, specifying 3-key equivalents for those commands causes the Mac OS to bloat the Application menu with blank space the size of a standard icon for each command. If the Remove Icon command is grayed out, then your system doesn’t have icon space to remove.

Save the edited copy of the System file or System 7.5 Update file and close it. Drag the original unedited file out of the System Folder and rename the edited file with the same name as the original. When you restart your computer, the Show and Hide commands will have the keyboard equivalents you assigned them.

Tom Carruthers
Laurel, Maryland

Apple Speakers Drop Out

TIP Though my Power Mac 7100/80AV recognizes audio CDs, the sound periodically drops out. An alert Apple technician told me my Apple-Design Powered Speakers have a noise-gate circuit that’s meant to suppress background noise while the speakers are amplifying sounds (such as an alert) from the computer. The circuits turn off the speaker input when the sound volume drops below a certain level. Quiet music passages from a CD may fall below that cutoff. The solution is to feed the sound from the computer’s sound-out port to the speakers’ dual RCA phono jacks with a Y-adapter cable that’s available at Radio Shack and other electronics stores. The noise gate is only connected to the speakers’ \frac{1}{4}-inch stereo jack, not to the dual RCA phono jacks.

Robert Denn
Winchester, Massachusetts

Netscape Bookmarks Redux

TIP Here are more ideas to add to those presented last month for organizing Netscape Navigator bookmarks more quickly. Instead of allowing the Add Bookmark command to put each new bookmark at the bottom of the Bookmarks menu, you can have Netscape automatically place new ones in a new submenu near the middle or top of the menu (see “New Bookmarks”). Keeping new bookmarks together in a submenu is also an advantage later, when you want to move them into more permanent locations. Rather than tediously moving each new bookmark through the list of menu items in the Bookmarks window, you can move the submenu as a group by simply selecting the submenu’s name in the list.

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and clicking the arrows displayed under the list. As you move the group through the list, you can drop off new bookmarks by selecting one at a time and moving it above the submenu name.

Here’s a quick way to move a bookmark up or down in the Bookmarks menu while connected to the Internet. Open the Bookmarks window and double-click the bookmark’s name to go to the corresponding Web page. In the window’s scrolling list, select the item just above where you want to place the bookmark and click the Add Bookmark button. Finally, select the old bookmark and click the Remove Item button. This method is usually much faster than clicking the up and down arrows in the Bookmarks window and has the added advantage of confirming the Web page’s URL link.

Chris Vargas
Wilmington, Delaware

Launcher Follow-Up

When Brian New York, New York, grouped items in the Launcher by placing them in specially named folders inside the Launcher Items folder (as described in the May Quick Tips), he found he could create only eight groups and wondered if that was the limit. In fact, you can create any number of folders whose names begin with a bullet (press option-8) in the Launcher Items folder, but the Launcher only displays category buttons for the seven whose names come first alphabetically. In addition it displays a category button named Applications, and that category contains everything in the Launcher Items folder except the seven specially named folders for which the Launcher makes category buttons.

Incidentally, installing System 7.5 Update 1.0 enhances the Launcher in two ways: you can choose from three icon sizes in the Launcher window, and—without opening the Launcher Items folder or its subfolders—you can drag icons to, from, and within the window (such as opening a document by dragging it to a compatible application in the Launcher). For instructions, look midway through the update’s read-me file.

In Retrospect

Reading my suggestions in the June issue about copying a large Retrospect catalog to a set of floppy disks prompted Craig Isaacs of Dantz Development to send in a homegrown alternative plus several other Retrospect tips.

To archive a Retrospect catalog or any other large file on floppy disks and automatically split the file across as few disks as possible, you can have Retrospect back up the file to a Macintosh Diskette of StorageSet. You can use the same technique to copy any selection of files and folders to any kind of removable disk.

Other tips: There is a unique two-letter shortcut for every button in Retrospect’s Directory window. For example, instead of clicking the Backup button in the Immediate operations panel, just type the two letters IB (I for Immediate and B for Backup). Anywhere you use a Delete or Duplicate button you can suppress the confirmation dialog box by option-clicking the button. To minimize scrolling in a dialog box, such as the one that lists catalogs and StorageSets, you can enlarge it by pressing +shift--; press again to reduce its size. This keystroke works like the zoom box in the upper-right corner of a regular window.

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A Checklist for Switch Shopping

Industry analysts at Dataquest predict that Ethernet switch purchases in 1995 will soar to $837 million—nearly three times the previous year's already record-breaking sales. Why are Ethernet switches becoming such hot sellers? Because switches, which multiply network bandwidth by interconnecting LAN segments at high speeds, offer higher performance than bridges and hubs; are easier to install and maintain than routers; and let network managers preserve their investment in Ethernet cables, software, and network-interface cards. And as prices drop and new features such as virtual LANs appear, switches are becoming even more attractive.

Nearly three dozen vendors are selling Ethernet switches, including Cisco Systems, 3Com, Digital Equipment Corporation (DEC), Sonic Systems, Alantec, and Tribe Computer Works. That's an overwhelming number of choices, so before you start shopping for a switch, take a close look at your users' present—and future—bandwidth needs. Ask yourself how much you expect your workgroups to grow over the next few years, how many file servers and other devices you need to connect to your switches, and what your plans are for installing a high-speed network backbone.

When you've decided how switches will fit into your network configuration, start looking for a switch that has the performance you need. The one you choose should have a big enough backbone and enough processing power to transfer data simultaneously between all of its port pairs at full Ethernet speed—14,880 packets per second. Decide whether you need a desktop switch, which delivers 10 Mbps of dedicated bandwidth to each user through a single port, or a workgroup switch, which allows each 10-Mbps port to handle several users and devices.

You'll also need to decide whether to buy a switch based on cut-through or store-and-forward technology. A cut-through switch, which has low latency but performs no error checking, might be your best bet if the number of bad packets on your network is small and you need the speed. If lots of errors are affecting your network's performance, you might want a store-and-forward switch, which has slower throughput but checks packets for errors before processing them. Some switches, such as Grand Junction Networks' (510/252-0726) FastSwitch, can operate in either cut-through or store-and-forward mode.

If you plan to connect your switches to high-speed backbones or a group of servers, you also need to make sure the switch you choose comes with one or more high-speed FDDI, Fast Ethernet, or ATM ports. To accommodate growing network needs, make sure you can add high-speed ports in a modular fashion to the switch you choose.

Don't forget to consider per-port cost, which may determine which switch you buy. Be sure to include in the cost of the unit any high-speed ports you'll need. Some vendors advertise a low per-port cost and then tack on up to $2000 for each additional high-speed port.

Still, there's good news as switch prices continue to drop. Earlier this year, for example, Grand Junction Networks slashed to $199 per port the price of its 25-port FastSwitch 10, a desktop switch that delivers a full 10-Mbps bandwidth to each desktop user on a network. Pushing prices even lower is start-up Amber Wave Systems (508/266-2900), which will be offering its new 32-port workgroup switch at $149 per port.
Top Ten Internet Addresses

MAC network managers with Internet accounts have access to valuable constellations of network information. The problem is finding them in the vast Internet universe. Here's some help—Macworld's top ten Internet sites.

You can use any World Wide Web browser to access these Web sites, but you'll need a browser with a built-in newsreader to access the newsgroup at number 8. Don't be surprised if you can't get through to some of these addresses on your first try; popular Internet addresses are often busy.

1. http://spock.austin.apple.com/cool/tools.html  Last September Apple issued Internet Cool Tool awards for Internet programming efforts to 11 individuals and organizations for their fabulous freeware and shareware creations. This site lists those worthies and links you to their sites. Winners for 1995 should be added by September.

2. ftp://amug.org/pub/peterlewis/ Peter N. Lewis is probably the most prolific author of Macintosh networking shareware. Here's the cache of all his current riches.

3. http://www.host.ots.utexas.edu/mac/internet-archive.html  This University of Texas page is one of the best jumping-off places for networking shareware.

4. http://alumni.caltech.edu/~dank/isdn/  ISDN is a hot topic in connectivity. Dan Kegel's ISDN page is an exhaustive index of all things ISDN, including things Macintosh.

5. http://www.dgr.com/web_mnj/  Aaron Anderson's Mac Net Journal focuses on Macintosh networking topics. This free online magazine is readable both online and as a slick downloadable multimedia program.

6. http://www.ncsa.uiuc.edu/SDG/Software/Brochure/MacSoftDir.html  The National Center for Supercomputing Applications developed the first WWW browser—Mosaic—and NCSA's Telnet application is one of the most versatile terminal-emulation tools around. Get the latest versions of both here.


8. news:comp.sys.mac.com  This newsgroup discusses anything and everything related to Macintosh communications. WWW browsers with built-in news readers (such as Netscape Communications' Netscape Navigator) can read the newsgroup using this URL.

9. ftp://rtfm.mit.edu/macintosh/comm-faq/  The mother lode of all FAQ (frequently asked questions) documents is MIT's RTFM site. This URL points to the Macintosh networking FAQ there.

10. http://www.dartmouth.edu/pages/TidBITS/TidBITS.html  For Macintosh news of any kind, and networking news in particular, read our perennial favorite—Adam Engel's free TidBITS newsletter. It offers one-stop shopping for networking coverage.—MEL BECKMAN

IN BRIEF

Dayna Restructures

Dayna Communications (801/269-7200) has launched two subsidiaries devoted to remote-access technology and wide-area wireless communications, while the parent company will focus on local area network products.

Meanwhile, Dayna is introducing a new line of 100-Mbps Fast Ethernet devices late this summer. First to arrive will be the $399 BlueStreak 10/100 NuBus Card and $259 BlueStreak 10/100 PCI Card, due in August. These will be followed by the BlueStreak 100Base-TX Hub (price not set) and a 10/100-Mbps bridge.

Using PowerTalk  In-house software developers moving to take advantage of the Apple Open Collaboration Environment (AOCE) are finding that they can automate workflow processes and other tasks by taking advantage of the PowerTalk 1.1 extensions included with System 7.5. One helpful resource for these developers is the International PowerTalk/Powershare User Group. A $40 membership includes a CD-ROM with tools, sample code, and the archives of the popular University of Michigan AOCE mailing list, which includes AOCE developers at Apple. For more information, E-mail gadensky@powershare.batnet.com.
Before you buy a color printer, you'd better double-check your facts.

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

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

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Charting the PowerBook’s Progress

THE IMMINENT INTRODUCTION OF A new generation of PowerBooks marks a good time to evaluate your choices, reflect on how far laptops have come, and predict how they’ll evolve from here.

Should You Buy a New One?
With the PowerPC PowerBooks about to ship, you’re probably wondering whether to buy one of the new models, keep your present PowerBook, or simply upgrade your processor. Well, that depends on several factors: what model you currently own and what you use it for, what features you need or want, and how much you’re willing to spend.

The new PowerBooks’ key improvements—a PowerPC processor, built-in support for PC Cards (formerly PCMCIA cards), an infrared interface, and the latest battery technology—don’t represent must-have features for most people. But if you find one or more of them useful and you don’t mind paying the premium the newest hardware always commands, then you’ll probably find these a better choice than any earlier PowerBook.

Or Take the Upgrade Route?
If you have a Duo or a 500 series, you have another option—upgrading to a PowerPC CPU. (For more information about CPU upgrades, see PowerBook Notes, Feb. 1995.)

Should you upgrade? If the PowerBook is your only Mac, an upgrade may make sense, depending on Apple’s pricing. But if your primary Mac is a desktop model, a PowerPC upgrade for a PowerBook is less compelling. The applications that benefit most from a PowerPC—high-end graphics, page layout, CAD—are rarely done on a PowerBook. For word processors, personal information managers, and the average spreadsheet, a faster CPU may not produce any dramatic improvement. Remember, the upgrade affects only the CPU; the hard drive speed won’t change, and starting up and waking up won’t significantly improve.

Eventually, new software will support only the PowerPC CPU, but that won’t happen to mainstream programs for several years, time enough for at least one more generation of PowerBooks beyond this year’s introductions.

A PowerPC CPU incorporates a floating-point unit (FPU), but it can handle floating-point calculations only for native PowerPC software; the FPU won’t work with 680X0 software. For 680X0 programs that do intensive math, adding an FPU improves performance far more than upgrading a 68040 to a PowerPC.

Sonnent Technologies ($74.261-2800, 800/943-3668) upgrades a 500 series or a Duo to a 68040 for $449 ($349 each for customers who order ten upgrades and are able to do a daughterboard swap). Dynamic Engineering ($08/336-8891) charges $449 for a 500 series, and $499 for a Duo. Sonnet’s upgrade leaves all PowerBook models with a 33MHz clock speed; Dynamic boosts the 500-series models’ speed to 36MHz, but will, on request, leave the speed at 33MHz for an additional safety margin. Thus far, users have reported no heat problems with the FPU and speed upgrades.

The FPU upgrade does cost some battery life—between 10 and 20 percent. And the higher the speed, the greater the power consumption.

Evaluating Your PowerBook

The 500 Series
When judged by its hardware features, the 500 series will probably remain the high-water mark for all-in-one PowerBooks. No previous models provided for an internal modem, Ethernet, and two batteries. Future PowerBooks will leave modems and Ethernet to PC Cards. But the 500-series models have their limitations: they’re heavy and bulky; the internal modems are limited to 14.4 Kbps (you can get 28.8 Kbps in a PC Card modem); and the keyboards are problem prone, especially if you hit a key off-center. However, their nickel-metal-hydride (NiMH) batteries do work well, and the built-in power manager can be programmed to handle lithium-ion batteries, although such batteries are in short supply.

The Duos
These remain excellent subnotebook computers, constrained mainly by a 14.4-Kbps internal modem and the inability to accept PC Cards. The Apple MiniDock provides all the standard ports (except Ethernet), while Apple’s full-size Duo Dock turns a Duo into a desktop Mac. Specialty docks from Newer Technology (316/685-4904, 800/678-3726) address most traveling needs.

The PowerBooks 140 to 180
The older PowerBooks are showing their age. The portability of these models is seriously limited by their internal nickel-cadmium (NiCd) batteries: a six-hour recharging time, compared with two hours for newer PowerBooks. As a result, many users have purchased external batteries, adding considerably to the weight and bulk they must carry around. The color models—the 165c and 180c—have very short battery life, making external batteries virtually a necessity.

The 100 series (except for the 100 and...
NET W O R K S : P O W E R B O O K N O T E S

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150) were the only PowerBooks with two serial ports (but no Ethernet). The $99 PB Serial Adapter from Sigma Seven Systems (604/733-2416) adds a second serial port to both the 150 and the 100 by plugging into the modem slot.

A PowerPC upgrade for the 100 series is technically possible but impractical for such old models. So don't expect to see any, since Apple won't make one and no one else has access to the necessary boot-up ROM code.

The PowerBook 100 and Mac Portable

The 100 remains in some ways the best PowerBook; it's nearly as small and light as the Duos (and like them, lacks a floppy drive), but it has built-in SCSI and ADB ports. Most important, it's still the only PowerBook that can handle a RAM disk gracefully; you can turn off the hard drive completely while working in a RAM disk, and RAM contents remain even after shutdown. The 100 runs efficiently on a tiny System, the nearly impossible-to-find System 6.0.8L. Dynamic Engineering says it still plans to have a 68030 upgrade for the Mac Portable by the end of the year; it hopes to offer a similar upgrade for the 100, but that would require an external battery, making the computer much less convenient.

How Far Have We Come?

Because of market demand, PowerBooks— and Windows laptops—are essentially miniature desktop computers, running the same bloated operating systems and applications software as their desktop cousins. The only real concession to portable operation, battery power management, is merely tacked on rather than an inherent part of the system. Despite ever faster processors and more megabytes of RAM, today's laptops respond very slowly at critical times. Current PowerBooks take over 45 seconds to start up with extensions off, 10 to 12 seconds to wake up (add 3 seconds with AppleTalk turned on), and about 8 seconds to spin up the hard drive.

Why should we have to put up with such sluggish performance? As far back as 1983, the very first laptop computer, the 4-pound Radio Shack TRS-80 Model 100, woke up in less than a second, ran on batteries for 15 hours, and held everything in static RAM—you never had to save a file. Of course, today's PowerBooks have far more computing power, but in many ways the Model 100 is still arguably a better portable computer.

Carrying on the tradition of the Model 100 is the 2-pound AlphaSmart Pro ($129; $279 to the education market) from Intelligent Peripheral Devices (IPD; 408/252-9400). IPD claims that the AlphaSmart runs for over 60 hours on two AA batteries. But its tiny screen shows a scant four lines of 40 characters each, and its only software is a simple text editor. The AlphaSmart stores 128K of text and connects to a Mac via the ADB port.

There are other portable computing devices, but if you need one—as I do—mainly for writing, most fall short because they either have too small a keyboard (such as the Psion) or lack one altogether (as does the Newton).

The Future of Laptops

In the four years since the first PowerBooks appeared, most improvements in laptop hardware have been modest. The next four years promise more interesting developments. The cost of active matrix color displays should start dropping considerably later this year, since LCD makers can now build many more such screens than the market demands. Many companies are working on field emission displays (FED), which work like an array of miniature CRT's, promising better image quality, higher resolution, and much lower power consumption than active matrix LCD's.

Hard drives will remain the principal laptop storage medium for this decade. Solid-state memory in the quantities that users crave will be too expensive. Optical's consume too much power to be a laptop's primary drive, while the 100MB and 1535MB magnetic cartridges hold too little data. And most of the current 3.5-inch optical and magnetic cartridge drives don't come in thin-enough packages, but Fujitsu has a 230MB optical drive—and will soon have a 640MB one—small enough to be interchanged with a floppy drive. The 4.7-inch size of CD-ROMs is very awkward for laptops. A 3-inch CD-ROM format does fit easily into a laptop drive bay, but aside from titles for Sony's handheld Data DiscMan, no software comes in that size.

So what should the next PowerBook offer? Number one, of course, is longer battery life—but don't expect to see the 15-hour battery life I got with Radio Shack's Model 100 anytime soon on a full-featured laptop. Beyond that, I envision a faster machine, patterned on the PowerBook 100, with a lean operating system and applications running in a RAM disk; on the flip side, it should also provide all the options of a desktop Mac when starting from the hard disk. I just hope there's enough demand for such a machine to convince Apple to develop one.

CARY LU is a Macworld contributing editor who covers mobile- and remote-computing issues in this monthly column.
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Clip 'N' Save

Now that we've got multimedia, what do we keep it in?

LET ME BOUNCE A THEORY OFF you: The technological progress of the Macintosh can be measured by that humblest of desk accessories—the Scrapbook. With each new digital medium comes the need for a new type of Scrapbook. First Apple rewrote the Scrapbook to accommodate color graphics, then to hold sounds, then for QuickTime movies. As a matter of fact, Apple has recently been demonstrating yet another version of the Scrapbook, this one incorporating the upcoming QuickTime 3-D technology; it accepts 3-D images that you can spin around to different angles.

Let me bounce another theory off you: The Scrapbook is lame. Here we are, cruising toward the year 2000, and this vehicle shows you only one stored item at a time. You still can’t search for a particular item (except by clicking through page after page). You still can’t type in searchable keywords or descriptions of each item. Yes, I know, System 7.5’s Scrapbook finally has a resizable window—believe me, I’m hysterical with gratitude. But there’s still no index, no editing functions, ... not even a Print command, for the love of Mike!

Of course, I’ve got one more theory: Anything Apple doesn’t do exactly right, somebody rushes in and does better. In this case, several somebodies. For the benefit of desktop publishers, graphic artists, and multimedia of every ilk, here’s a rundown of replacements for that disorganized multimedia shoebox in your Apple menu. (I’ve put the shareware programs in the Macworld forums of America Online and eWorld.)

ClipClop 1.1

As an example of independent minds out-designing Apple, examine this $14 shareware item by Michael Budiansky.

Instead of using the page-at-a-time metaphor of the Scrapbook, this program splits its window in half. The left side shows thumbnail (miniature) views of the current file’s entire contents, automatically resized according to the size of the window and number of items. Click on an item to see it, actual size, in the right side of the window.

Unfortunately, ClipClop can’t store QuickTime movies. And, although it seems like a good idea at first, that business of fitting all the thumbnails into the window quickly becomes ridiculous. By the time you’ve pasted in, say, 30 images, they’ve shrunk to the size of molecules. Programming tip: Wouldn’t a scroll bar be simpler?

Scraplt Pro 4.01

This $15 shareware program, on the other hand, is ready for prime time (John V. Holder, 2862 Lowell St., Eureka, CA 95501). It gleefully accepts anything the Scrapbook takes, such as sound, text blocks from PageMaker, PostScript drawings, from FreeHand, text, and—naturally—QuickTime movies. As with ClipClop, you get a split-screen design; this time, however, you can choose either a list view or a thumbnail view for the left pane (or you can hide it entirely).

Scraplt Pro offers a few bonus goodies, too. For example, it can suck the graphics out of any program (the backdrop from a game, the start-up screen from your favorite program, and so on). You can name each scrapbook entry—and you can search, not just for a name, but even for words within text you’ve pasted in. (Text is definitely the program’s strong point: you get in-scrapbook text editing—complete with font, size, and color—and a word-count command. Can you say replacement Note Pad?) Finally, the program will actually read your text items aloud (on speech-equipped Macs). Heck, that voice feature makes Scraplt Pro even more technologically with-it than the actual Scrapbook.

Considering Scraplt’s thoroughly modern design (it supports System 7.5 drag and drop), its crude QuickTime-movie interface is surprising. The usual playback controller bar is missing, so you’re forced to watch every movie from the very beginning. In every other aspect, however, this baby wipes the floor with Apple’s Scrapbook.

Now Scrapbook 5.0.1

Nobody ever writes about Now Scrapbook ($129.95; Now Software, 503/274-2800). It’s the component of Now Utilities that gets no respect. Well, I like it.

Actually, Now Scrapbook is surprisingly similar to Scraplt Pro (see “Open Books”). It has the same basic design (list on the left, pictures on the right), same System 7.5 drag and drop, same text-editing abilities. But Now Scrapbook handles additional file formats (like TIFF, GIF, and JPEG), lets you crop or resize graphics, and—oh, yeah—comes with a passel of high utility utilities (like Super Boomerang) at no extra charge. Now Scrapbook strikes a satisfying balance between the easy (but stripped-down) Apple Scrapbook and powerful (but tricky) Adobe Fetch.

Adobe Fetch 1.2

Adobe calls it a “tool for cataloging clip art, photo images ... in a common visual database for browsing and retrieval.” I guess if they’re going to charge $300 for it, continues...
of me in a junior-high production of *Dames at Sea* has faded another 10 percent. And every time, I chuck to myself that if that photo were on a Photo CD, it would remain in perfect condition forever. (Quick recap: A Photo CD is a CD-ROM containing your photos, created by a local Kodak developing joint for about $1 per picture.)

Shoebox is ideal for managing Photo CDs ($139; Eastman Kodak, 800/235-6325, 800/465-6325 in Canada). In many ways, it’s like Fetch—Shoebox can catalog an entire folder at once, it can launch other programs (to edit something you’re looking at), and it saves only pointers to the files on your disks (instead of storing the actual files).

But the interface is unique; it looks like a screen full of neatly arrayed 35mm slides on a light table (they even have realistic little white “cardboard” frames). You can rearrange the slides, crop them, and double-click on one to enlarge it to full size. When you’ve got them the way you like, the program can give you—all else?—a slide show.

Shoebox is a serious database, too. You can create up to 100 fields (such as date, film type, location, and so on) to fill in for each photo. Naturally, all this information is grist for the Search command.

Although it’s a durned fine program, Shoebox doesn’t quite qualify as a Scrapbook replacement; it accepts sounds, QuickTime movies, and graphics (PICT, TIFF, EPS), but not text. And—violation of violations—you can’t paste into it! You can only import.

**MultiClip Pro 3.1.3**

MultiClip Pro stores its contents just fine: you can view your scrapbooked material (sounds, text, movies and PICT files) either as thumbnails or as a list. You can even edit text or graphics, right there in MultiClip Pro ($59; Olduvai, 800/548-5151).

But storing is boring. Where MultiClip really shines is in getting stuff in and out—without copy and paste. No matter what program you’re using, one special keystroke (your choice) automatically tosses whatever you’ve selected into MultiClip’s waiting clutters. You never have to leave your original application. Later, you can reverse the process: you can press a special Paste keystroke repeatedly; MultiClip, backstage, automatically coughs up your previously copied clips in reverse order.

In fact, yet another keystroke makes a menu of MultiClip’s saved-up contents—boilerplate text, your logo, whatever—appear at your cursor click. Choose from that little pop-up menu to insert a MultiClip clip into whatever you’re working on. (Are you listening, lawyers?)

If this all sounds sort of breezy and fun, maybe I’ve been unduly influenced by the program’s breezy and fun manual. In any event, this is a well-executed program based on an irresistible idea.

**Captivate 4.5**

See if you can keep all of this straight. Captivate Store used to be called Click-Paste. It comes with a screen-capture program called Captivate Select, which for years was called Capture. Both programs, along with a simple graphics-viewing program called Captivate View, are sold today as Captivate 4.5 ($89.95; Mainstay, 805/484-9400).

Captivate View understands TIFF, GIF, and even start-up-screen graphics formats; View offers commands for cropping and rotating. Captivate Store, like MultiClip Pro, displays a pop-up menu at your cursor when you press the magic keys. In this case, however, it is a hierarchical menu listing the contents of a specified folder on your hard drive, which makes it easy to choose an item to paste into your document. This folder can hold text, PICT, sound, and movie files. (Captivate Store isn’t compatible with Microsoft Word—but then again, what is?)

Trouble is, View and Store are too little, too separate. View should be able to hold more than one image at a time; Store requires too much setup (naming your files in advance, placing them in appropriate folders); and the two programs really ought to be combined, à la MultiClip. The crown jewel of the set is Captivate Select; it’s the only commercial screen-capture program still on the market.

**The Upshot**

Do you really intend to forge ahead into the nineties with a multimedia holding tank that only shows one snippet at a time? If not, Scrapt Pro awaits those on a budget; Now Scrapbook beckons to the utility-starved; MultiClip Pro calls out to those who do a lot of copying and pasting; and Fetch is always there for workgroup types and graphics jocks.

I know what you’re thinking: Why should you replace your Scrapbook, if it works fine? Sure, and I know a woman who designs a monthly newsletter in TeachText, too. m

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While he was writing his new book, *Mac FAQs* (Frequently Asked Questions) (IDG Books Worldwide, 1995), DAVID POGUE’s exhausted arrival at the pillow each night gave drag and drop a whole new meaning.
OVER THE COMING MONTHS you'll be seeing some changes in this department. First, as she announced in her column last month, Deborah Branscum, Macworld's original Conspicuous Consumer, is moving on to tackle new journalistic challenges. She set a high standard during her six-year tenure, earning a reputation among readers and vendors alike as an outspoken advocate for the Macintosh user community. We wish Deborah the best of luck, and for our part, Macworld's reconfigured consumer-affairs department is committed to carrying on the good work she began.

The Conspicuous Consumer column was conceived as a service for the Macintosh-using community. By providing advice on buying and using computer hardware, software, and services in this column, our goal is to help readers become better-educated consumers. Collectively, Macworld's contributing writers are a vast source of wisdom (some of it gained through painful experience), and we'll be mining that rich vein for sage advice to pass along to you.

Our readers have never been shy about speaking their minds when they believe a company has wronged them. Macworld maintains consumer forums on America Online, eWorld, and now on our own World Wide Web page. Before you make an important purchase, check our forums for opinions on the product and the company you're considering giving your business. You might find information that will save you time, trouble, and moola. Similarly, the online forums are the place to share your recommendations with the reader community. But remember, in fairness to vendors and for your own protection, keep your comments judicious (no flaming, please). Libel laws apply to online communications. For guidance, see "Cyberspace Lawsuits," Conspicuous Consumer, May 1995.

New Light on Letters

The Conspicuous Consumer department will continue to be an unbiased intermediary in the event of disputes between consumers and companies. If you have a problem with a company, write to us. We'll forward your complaint to the company in question and attempt to obtain a satisfactory resolution. Beginning with this issue, we will publish a selection of the letters that come to us for action. For legal reasons, we must have your letter in writing, with your full signature; we can accept faxes, but not E-mail. Include as much specific information as you can, such as the date you purchased the product, the exact nature of the problem, the steps you've taken so far to resolve it, and the names of any company representatives to whom you've spoken.

Practicing Precaution

What, you say you haven't kept any of those records? Well, join the crowd. It's easy to get caught up in postpurchase euphoria and misplace the invoice (or—confess it—throw it out). Don't. Make it a habit to file the invoice away. Chances are you will never need it, but once it's gone, it's gone.

Another good habit to cultivate is jotting down notes when you call for customer service or technical support. Maybe you've finally passed through telephone limbo and reached a live service representative. Even if you're really steamed, take a moment to ask politely—the rep's name; write it down and put it in the file along with your invoice. If your problem persists and you have to call back, you can save some time by talking with the same person and picking up where you left off. If your efforts to rectify the situation still don't yield a solution, talk to a higher authority. But chances are good that one call will suffice, and it's a nice touch to thank the customer-support rep by name when you sign off.

One last tradition we'll be maintaining here is to honor vendors that provide exceptional service with Macworld's Service Hero distinction. You can post your nominations in our online folders or send them to us by mail or fax.

Watch this space for further developments in Macworld's consumer-affairs department, and keep in touch. The more intelligence we receive from the Macintosh user community, the better we'll be able to serve.—MARJORIE BAER

Letters

Banking on the Bureau Having seen an ad for the Port Juggler in your magazine, I bought one directly from the company, Momentum of Honolulu.

After talking on the phone with a representative for nearly an hour (at my expense) trying to make it work, I was disconnected. So I wrote to the company. They wouldn't return my calls, nor have they answered my letter.

I wrote to the Bank of America because the Port Juggler was billed on our credit card, but the bank has been of no help. I have also written the Better Business Bureau of Hawaii, in Honolulu, but it still appears I have to pay $104 for it. Please let me know if you have any idea how I can make these people make good on their product or refund my money.

Barbara Engstrom San Simeon, California

Engstrom was a careful consumer—paying with a credit card, keeping copies of her invoice and correspondence with Momentum, and promptly taking
CONSPICUOUS CONSUMER

appropiate steps when things went amiss—and her caution paid off. After she wrote to Conspicuous Consumer, the Better Business Bureau of Hawaii (808/942-2355) responded. A representative of Momentum contacted Engstrom and arranged a refund.—Suzanne Courteau

Mi problema es . . . James Kemmerer of Washington, D.C., wrote to Conspicuous Consumer about a problem he had with mail-order company Big Mac Computers (also known as Westwood Computers), based in Los Angeles. When he purchased a Quadra 660AV from the company last October, Kemmerer was told that the manuals would be in Spanish, but he was assured that Apple Computer would exchange them for English ones. When the computer arrived (with Spanish system software also), Kemmerer called Apple to exchange the manuals. He was told that since Big Mac Computers is not an authorized Apple dealer, Big Mac would be responsible for replacing the manuals itself.

Kemmerer called Big Mac, and a salesperson promised him new manuals and system software in English. After almost two months and numerous unreturned phone calls, he received one of the two promised English manuals. In the meantime, Kemmerer discovered that the CD-ROM drive had been installed improperly, and Apple Computer sent a repair person to his house to fix it.

Kemmerer says that Big Mac Computer owner Jack Sandi agreed in January to let him return the CPU for a refund. But when Kemmerer faxed Sandi a form to sign to ensure the refund, Sandi refused the return, agreeing only to send the system software, which never arrived. Kemmerer could not get his money back through his credit card company because he waited too long to request a charge reversal. At the same time Kemmerer wrote to Macworld, he also contacted the Better Business Bureau.

Owner Jack Sandi told Macworld Big Mac will not refund Kemmerer's money but has instead offered to send Kemmerer the manuals or give him a $40 credit toward buying them himself. Kemmerer confirms this but says he just wants to return the Mac.

The Los Angeles County Better Business Bureau rates Big Mac Computers as unsatisfactory, in part because of Big Mac’s failure to acknowledge two BBB requests for a response to Kemmerer’s complaint. Sandi told Macworld he is aware of his company’s rating and declined to comment further.

Kemmerer’s experience illustrates a couple of useful lessons. One is the value of looking into a company’s reputation before giving it your business. Call the Better Business Bureau to check out the company’s performance rating. Many reputable gray-market companies offer competitive prices and tech support that’s comparable to Apple’s, but because Apple monitors the operations of Apple-authorized dealerships, buying from them may buy you an extra measure of security when buying Mac equipment.

And though we’ve said it before, it bears repeating: always pay for purchases with a credit card. The Federal Trade Commission’s Fair Credit Billing Act dictates that if you’re having a dispute with a company regarding unsatisfactory goods or services, you may be able to get your money back through your credit card company.

If you have complaints about mail-order companies, write to the Division of Enforcement, Federal Trade Commission, Washington, D.C. 20580. The FTC does not resolve individual disputes but may use comments in its law-enforcement efforts.

—Joanna Pearlstein

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 and eWorld (keyword Macworld) and on the World Wide Web (http://www.macworld.com).
Everybody’s talking...

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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**

**MONITORS**

Small Color Monitors, Jan 94

- 14-inch display: Sony CPD 1430; Sony Corp. of America, 800/222-7669; $779.95.

Two-Page Color Monitors, Nov 94

- PresView 21 Display System; SuperMac Technology, 408/541-6100; $3999.

**NETWORK HARDWARE**

Remote-Access Servers, Oct 94

- Mixed Networks: NetConnect Remote Access Server; Asante Technologies, 408/435-8401; $3859 for eight ports.
- AppleTalk Networks: ARA Multisport Server; Apple Computer, 408/996-1010; four ports $1795, eight ports $3298.

**PRESENTATION HARDWARE**

Portable Presenters, Jan 95

- nView, 804/873-1354; $5495.

**PRINTERS**

Color Business Printers, Sep 95

- Tektronix Phaser 340; Tektronix, 503/682-3411; $5590.

Dye-Sublimation Printers, Jul 94

- Precision proofing—tabletop size/least expensive: Phaser 480; Tektronix, 903/682-7377; $14,995.
- Precision proofing—tabletop size/most complete: Rainbow 3M, 612-728-1110; company's estimated price $20,000.
- Precision proofing—letter size: ProofPositive Full Page; SuperMac Technology, 408/941-6100; $7999.

General publishing and business: Phaser 4700; Tektronix, 503/682-7377; $9995.

**PERSONAL PRINTERS**, Sep 94

- Ink-Jet: DeskWriter 520; Hewlett-Packard, 800/752-0900; $365.
- Laser: $1000 to $1600: microLaser Pro 600; Texas Instruments, 214/995-6611; $1595.

**WORKGROUP PRINTERS**, Jun 95

- Tabloid-size printers: Laserjet-4VW; Hewlett-Packard, 208/328-2551; $3549.
- Laser/Writer 16/600 PS; Apple Computer, 408/996-1010; company's estimated price $2299.

**SCANNERS/IMAGE CAPTURE**

Professional Real-Time Filmless Cameras, Sep 95

- Arcus II, Agfa, 508/668-9060; $3495.
- PowerLook; Unisys, 510/691-8888; $4295.

Low-Cost Color Scanners, Nov 93

- Fujix DS-515/Nikon E2; Fujix, 914/789-8100; $1199.
- La Cie Silverstream II; La Cie, 503/520-9000; $1999.
- Hewlett-Packard ScanJet IIc; Hewlett-Packard, 800/752-9000; $1999.

OCR, Nov 93

- OmniPage Professional; Carre Corp., 408/395-7000; $995.

**SYSTEMS/STORAGE**

1.3GB Optical Storage, Dec 94

- Best low-cost solution: 1.3Gig MO; Club Mac, 714/768-8190; $2999.
- Best overall performance: Genesis 1300; Microtech, 203/463-6223; $2999.

**DISK 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.
Software

ACCOUNTING/FINANCE

GROWING A SMALL BUSINESS, Nov 93
Small-business system: MYOB; BestWare, 201/586-2200; $199.
Home office/personal finance: MacMoney; Survivor Software, 310/410-9527; $119.95.

BUSINESS TOOLS

PORTABLE-DOCUMENT SOFTWARE, Apr 95
Document Distribution: Common Ground 1.1. No Hands Software, 415/802-5800; $189.95.

COMMUNICATIONS/NETWORKS

COMMUNICATIONS SOFTWARE, Aug 94
Basic connectivity: ZTerm; David P. Alkerson (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.

DOCS WINDOWS EMULATION, Oct 94
Timbuktu Pro 1.0.3 for Macintosh, Timbuktu 1.1 for Windows; Parallels Computing, 510/814-5000; $199 each.

NETWORK CONNECTIVITY, Sep 93
NetWare for Macintosh: Novell, 801/429-7000; $495 for 5-user license, to $2995 for 200-user license.

PROTOCOL ANALYZERS, Jul 94
EtherPeek; AG Group, 510/937-7900; $795.

TERMINAL EMULATOR, Oct 93
VersaTerm; Synergy Software, 215/779-0522; $149.

GRAPHICS

3-D MODELING, Dec 94
Stand-alone modeler: formZ; autodesk, 614/488-9777; $1499.
Integrated-modeling package: Strata Studio; Strata, 801/628-9218; $1499.
Entry-level modeler: Infini-D; Spectra International, 413/253-3100; $695.

CLIP ART'S GREATEST HITS, Jan 94
Overall collection: ClickArt Studio Series; T/WebKit Company, 415/962-8919; $99.95 per volume.
Electronic clip art subscription service; Dynamic Graphics, 800/255-8800; $67.50 per month.
Images with impact series; 3G Graphics, 800/496-0224; $99.95 to $129.95 per volume; CD-ROM $499.
Metro ImageBase: Electronic Clip Art; Metro ImageBase, 800/925-1552; $74.95 per volume, CD-ROM $149.95.
Typographers' Ornaments; Underground Grammarius, 609/589-6477; $25 per volume; ten TIFF albums $200; EPS volumes $50 each.

DRAW PROGRAMS (LOW-COST), Sep 93
Budget draw: Expert Draw; Expert Software, 305/567-9990; $49.95.
Budget draw/paint: UltraPaint; Deneba Software, 305/596-5644; $79.
Beginners' program: Aldus SuperPaint; Aldus Consumer Division, 619/558-6000; $149.95.

OVERALL: Canvas; Deneba Software, 305/596-5644; $5399.

FONT BUYERS' GUIDE, Mar 94
Text-face collection: Type On Call CD-ROM; Adobe Systems, 415/961-4400; $99 (this price includes $297 per face).
Bargain collection: Monotype ValuePack; Monotype, 312/855-1440; $89 for 57 fonts.

IMAGE DATABASES, Oct 93
Aldus Felch 1.0; Adobe Systems, 206/628-5739; $295.
Multi-Ad Search 2.0; Multi-Ad Services, 309/692-1530; $595.

IMAGE EDITORS, Feb 95
Adobe Photoshop 3.0; Adobe Systems, 415/961-4400; $895.

INTEGRATED SOFTWARE

INTEGRATED SOFTWARE, Feb 94
ClarisWorks; Claris Corp., 408/727-8227; $299.

ONLINE SERVICES

ONLINE SERVICES, Aug 94
E-mail: America Online; America Online, 703/893-6288; 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.

PRESENTATION TOOLS

PRESENTATION SOFTWARE, Jul 94
Persuasion 3.0; Adobe Systems, 206/622-5050; $499.

VIRTUAL MEMORY SOFTWARE

VIRTUAL MEMORY, Jun 94
Virtual memory software: Virtual 3.0; Connectix Corp., 415/571-5100; $99.
Memory-boosting software: RAM Doubler 1.0.1; Connectix Corp., 415/571-5100; $99.

WORD PROCESSORS

HIGH-END WORD PROCESSOR (for fast 68040 Macs and Power Macs), Mar 95
Microsoft Word 6.0; Microsoft Corp., 206/882-8080; $325.
LOW-COST WORD PROCESSOR, Mar 95
MacWrite Pro; Claris Corp., 408/727-8227; $99.
What's a Good Measure of Success?

For Liz Brooking, Director of Marketing Communications at Macromedia, it's "Marketshare. With over 2 million business users and 400,000 developers, Macromedia ranks Number One in the authoring tools market. Advertising in Macworld helped put us there. Macworld's circulation reaches more people making purchasing decisions than any other publication."

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Software

BUSINESS TOOLS

★★★★ AccuZip 6.1.8, Software Publishers, 800/333-0555, $689. Bulk-mail software has informative progress indicators, batch and individual processing, low rates, and flexible parsing during import, but the interface is incomprehensible. Sep 94

★★★★ Adobe Acrobat 2.0, Adobe Systems, 415/961-4400, $195. The font fidelity of this portable-document software is uneven, and the software demands too much in resources compared with other options. Mar 95

★★★★ Adobe Acrobat for Workgroups 2.0, Adobe Systems, 415/961-4400, $1595. As a collaboration tool, this software is 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/wizard template. Jan 95

★★★★ Bulk Mailer CASS 1.00d (1.3), Satori Software, 206/443-0765, $150. Unattended operation is possible with this bulk-mail software, but batch processing is slow and the program has coding problems. Sep 94

★★★★ 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. Jan 95

★★★★ CA-Cricket Graph III 1.52 (1.53), Computer Associates International, 516/342-5224, $129. Graphing software’s features are just right for charts in the physical and social sciences, but lack pizzazz. The program is easy to learn and use, and includes math features for data transformations and curve fitting. Dec 94

★★★★ 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

★★★★ Decision Editor, 303/449-5177, $295. Compact business-simulation software is fast enough for complex projects and can pay for itself in disaster-avoidance in a variety of business tasks. Oct 94

★★★★ Decision Analysis 2.5, TreeAge, 617/536-2128, $379. Decision-assistance software handles complex business cases by constructing tree diagrams of probabilities and payoffs. It offers a type of modeling that is easy to modify. Nov 94

★★★★ Extend+BRP 3.0 (3.1), Imagine That, 408/365-0395, $990. Business-modeling software includes superior templates for business-process reengineering, but some programming experience is helpful. Oct 94

★★★★ InfoDepot 2.0 (2.3), Chena Software, 617/770-1210, $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

★★★★ Marco Polo 3.0, Mainstay, 808/845-9400, $895. Full-featured document-management system is significantly improved. The addition of OCR — both the handling of unrecognized words and the ability to batch-process TIFF files with OCR — make it very usable. Jan 95

★★★★ MicMac 2.01r1, Nirvana Research, 408/369-1200, $89. The concept of MicMac as a dictation machine is attractive, and Nirvana has pulled it off well. It takes lots of hard drive space to save recordings, though. Nov 94

★★★★ Microsoft Excel 5.0, Microsoft Corp., 206/882-8080, $339. Although the feature set of this Power Mac spreadsheet is stunningly rich, the system requirements for a full install are jaw-dropping, including 27MB of hard drive space plus 24MB of RAM without virtual memory. Still, it is relatively complete. Jan 95

★★★★ Microsoft Works 4.0, Microsoft Corp., 206/882-8080, $99.95. Although this isn’t the best integrated package around, it’s a sensible, low-cost choice. It offers a respectable word processor, database, spreadsheet, calendar, and address book, as well as a slide-show module, and drawing and communications tools. Jan 95

★★★★ OmniPage Professional 5.0, Caere Corp., 408/395-7000, $695. In a historic first for OCR, this Power Mac software has an accuracy of 100 percent on good text samples. It does not make occasional baffling minor errors on real-world documents. Nov 94

★★★★ 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 would be a help. Aug 95

★★★★ Street Atlas USA 2.0, Delorme Mapping, 207/865-1234, $79. For the most part, this geographical information software delivers what it promises at a great price. Oct 94

★★★★ TeamFlow 3.1, CFM, 617/275-5258, $295. Total Quality Management flowchart software is a valuable business tool. Its report printing and customizability are limited, however. Nov 94

★★★★ ZipZap 1.0 (2.0), True Basic, 603/298-8517, $34. You can use this data-reference utility to find an area code, the correct spelling of a city’s name, and more. The interface is intuitive, and the cost, low. Oct 94

★★★★ ZP4 12.1 (14.4), Semaphore Corp., 408/688-9200, $125. Inexpensive bulk-mail software supports batch and individual processing, but the progress indicators are uninformative. Sep 94

COMMUNICATIONS/NETWORKS

★★★★ BLAST Professional, BLAST Inc., 919/542-3007, $139. Our reviewer could not get this telecom software to work reliably and consistently during his tests, and found the minimalist and quirky interface frustrating. Jan 95

★★★★ 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. Maintains 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

★★★★ HoleGate 1.0, Information Access Technologies, 510/704-0160, $550. Two unique features—UUCP and Usenet news distribution—are the primary reasons to consider this product. Otherwise, it comes up price-rich, but feature-poor. Apr 95

★★★★ The Internet Companion, The Voyager Company, 914/591-5500, $299.95. Well-written, HyperCard-based electronic book offers less information than others. Internet access is available through accompanying software, but it’s a terminal-emulation screen. Dec 94

★★★★ Internet Explorer Kit and Internet Starter Kit, Hayden Books, 317/581-3500, $29.95 each. Well-written books and useful software combine to produce one of the best introductions to the Internet available for Mac users. Dec 94

★★★★ Internet Membership Kit 1.0 (2.0), Ventana Media, 919/942-0220, $69.95. If you need access to the Internet, this book and software combination is a good package. The best part about it is its inclusive features...
ed preconfigured software. Dec 94

MicroPhone Pro 2.0 (2.1), Software Ventures Corp., 510/644-3232, $195. The new feature set of this communications package includes multiple sessions, faxing, and more, but it’s a mixed bag. Oct 94

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 feature 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, InTec Software, 602/992-5515, $1295.95. 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, 515/221-1801, $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., 201/529-6600, $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 Macs or slow Macs. Feb 95

Saber LAN Workstation, Saber Software, 214/361-8066, $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

Snatchr 1.0, Software Ventures, 510/644-3232, $49.95. Simple, efficient 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 files. Aug 95

White Knight 12.0, The FreeSoft Company, 412/846-2700, $139. While this telecom software can be bewildering, it works impressively well. If you’re willing to read the manual from cover to cover, the program may become your favorite telecom tool. Nov 94

CheckPost 1.3, Working Software, 408/423-5696, $89.95. Interface and the imagesetter-simulation software is generally disappointing. It can’t automatically scale pages, it prints on a single sheet, and its error reporting is limited. Nov 94

ClickBox 1.1 (1.2), BookMaker Corp., 415/354-8161, $69.95. If you need to create inexpensive booklets quickly and without hassle, this print utility that helps you format documents in double-sided booklet form is an excellent tool. Nov 94

DownLoad Mechanic 1.0.2 (1.5), Acquired Knowledge, 619/587-6668, $249. The strengths of this PostScript downloader lie in its tools for dealing with problem files, but when dealing with large files, it performs slowly and occasionally crashes. Feb 95

FontChameleon 1.0.1 (1.5), Ares Software Corp., 415/578-0090, $295. New font-creation technology builds serif and sans serif fonts from a master outline file. It offers high-quality renditions of popular fonts, plus the ability to customize fonts. Sep 94

FontMixer 1.0, Monotype Typography, 312/855-1440, $79. Although a tad expensive, this font utility is a straightforward way to mix characters from different fonts to create composite fonts. Oct 94

Fontographer 4.0 (4.1), Macromedia, 415/252-2000, $495. No other font editor does more or works better than this one. For the price of a few font families, it can give you a universe of unique faces. Oct 94

LaserCheck 1.0, Systems of Merritt, 334/660-1240, $190. Imagery-simulation software can save you hundreds of dollars, and many hours, on image-setting jobs by letting you use a laser printer to proof your work. Nov 94

LetrRIP 2.0 (2.0.1). Lupin Software, 916/756-7267, $239. The flexibility, clean implementation, and attention to detail of this PostScript downgrader make it a pleasure to use. Feb 95


ReadySetGo 6.0.2, Manhattan Graphics Corp., 314/725-2048, $395. There’s no strong reason not to use this desktop publishing software if it tools meet your needs, but there’s no compelling reason to choose it either; its price is nice, but not enough. Oct 94

theTypeBook 4.0, Rascal Software, 805/255-6023, $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, 415/571-7711, $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, 404/988-0888, $79.95. Anatomy animation 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. This fish in this aquarium simulation are beautiful, but they’re dined hard to keep alive. Only two varieties of fish are included. Jan 95

Creative Writer 1.0, Microsoft Corp., 206/882-8080, $49.95. Graphics/image-layout/word-processor hybrid offers some terrific type effects, zany sounds, sound tools, and height graphics. Sep 95

Crossword Wizard 1.0, Cogix Corp., 415/454-7217, $49.95. If you’re a crossword fan, this crossword-puzzle generator is a must. Although it’s not perfect, the play mechanics are fantastic. Dec 94

CyberBoogie, Times Mirror Multimedia, 314/513-2503, $49.95. The easy interface, bunny sounds, and cute graphics of children's animation software make it a good choice for very young kids, but its relative lack of features restricts its to the same group. Apr 95

Digital Chisel 1.2, Pleasan Spring Software, 503/222-2044, $199.95, site license $995. If you 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

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

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

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, 612/560-1500, $69.95. Hoopla 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 realistic models of aircraft, an extensive database, and three flight simulators. Mar 95

Widget Workshop, Maxis Software, 510/254-9700, $449.95. Ideally clever mad scientist's laboratory allows you to build widgets out of metronomes, switches, lights bullets, and much more. It encourages imagination and exploration, plus kids think it's cool. Apr 95

FINANCE/ACCOUNTING

Program Works, 201/586- 
2200, $139 $239 w/payroll. A well-designed inter­
face, double-entry accounting easy enough for anyone

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 prob­
lems. 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 tighter control over your portfolio and to save on brokerage fees, you should consider this financial investment software. Feb 95

GRAPHICS

Adobe Dimensions 2.0, Adobe Sys­
tems, 415/961-4400, $199. 3-D effects software has added color support, as well as drawing and text tools. Its abil­
ity to create resolution-independent 3-D images and map continues.
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Star Ratings

two-dimensional art earn Dimensions a piece on a designer's hard drive. Apr 95

Adobe Illustrator 5.5, Adobe Systems, 415/961-4400, $595. Despite slight speed disappointments, this draw program’s upgrade is a bargain. It offers improved text-formattting and trapping capabilities. Sep 94

Adobe Photoshop 3.0, Adobe Systems, 415/961-4400, $895. Image-editing program both broadens its capabilities and simplifies its work environment in this dynamic upgrade. While not perfect, the pros far outweigh the cons. Jan 95

Alien Skin Textureshop 1.0, Virtual, 919/467-9709, $599. Applications to make textures to create custom patterns made 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 Divi

206/628-2749, $49.95. While its cartoon style is refreshing and its features promise, this paint/draw program for kids is still rough around the edges. Its biggest limitation is that it’s usually slow on 68030 Macs. Feb 95

Blueprint 5.0, Graphsoft, 410/290-5114, $295. For plain old 2-D drafting, this CAD software has a rich, easy-to-use interface and is shockingly fast. The Power Mac version in particular is a first choice for large architectural or engineering designs. Jan 95

CD-Q 2.0, Human Software Company, 408/741-5101, $145. Take advantage of Kickel’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 interface and per

functory documentation. Jul 95

Dribbble 1.0, Fractal Design Corp., 408/688-5300, $99. Art-education and paint software provides an excellent paint set with an appealing if slightly quirky interface. At a great price. Nov 94

ElectricImage Animation System 2.0 (2.1), Electric Image, 818/577-1627, $7495. Although the price may seem incredibly high, this software, with its extraordinary animation and image-rendering capabilities, is worth every penny for cinematio-production professionals. Dec 94

Flying Colors, Davidson & Associates, 310/793-0600, $59.95. While not the most dynamic kids’ program, this paint/draw program provides easy-to-use tools and nicely drawn stamps for ages eight to adult. Feb 95

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 tody interface. It offers a new level of complexity and artistic control. 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 heavier manual. Jul 95

Graphon Batch It 1.0, Graphon Software, 617/936-8915, $199. Analyzes files in a visual interface to automate repetitive graphics operations. Although it lacks conditional statements, this batch processor is a time-saver. Jun 95

IntelliDraw 2.0 (2.0.1), Adobe Systems, 415/961-4400, $99.99. Wonderful general-purpose graphics package works well, does a great job of automating drawing tasks, and is straightforward. Sep 94

KPT Bryce 1.0 (1.1), HSC Software, 805/566-6200, $199. For less than $200, you get a remarkable 3-D landscape-rendering program, a CD-ROM of images, a side-show utility, and some screen-saver modules. Although the innovative, graphics-heavy interface can be confusing, this software is lots of fun. Dec 94

KPT Convolver 1.0, HSC Software, 805/566-6200, $199. Create your own Photoshop filters that the intuitive way with this imaginative and absorbing plug-in module. The interface allows you to experiment, combine effects, tweaking results, and applying multiple undo's if necessary. Aug 95

LogoMotion 1.0 (1.5), Specular International, 413/253-3100, $149. Easy-to-use 3-D package is reasonably priced. It’s a terrific program, both for creating flying logos and as an entry-level 3-D package for nonprofessionals. Nov 94

MacDraft 4.0, Innovative Data Design, 510/680-6818, $449. Report- links to Excel and a clean interface make this 2-D CAD software an excellent choice for use in mechanical engineering and construction. Plus, it’s easy to learn. Mar 95

MacPhase 2.0, The Otter Solution, 315/768-3996, $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 makes this the drawing program to buy. May 95

MiniCad 5, Graphsoft, 410/290-5114, $795. Excellent CAD software for the Power Mac offers major performance for its price. It’s admirably easy to learn. Nov 94

MovieFlo 1.1, The Valis Group, 415/430-5404, $89, Tug, build, and pinch your siter—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

PhotoEnhancer 1.0, PictureWorks, 510/855-2001, $129. Nifty utility provides dozens of ways to improve the quality of QuickTime photos, from sharpening or softening focus to correcting over- or underexposed shots. Apr 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 easy to use and offers basic image-enhancing tools at a reasonable price. Jul 95

PhotoMatlc 1.01 (2.0), DayStar Digital, 404/576-1009, $100. Application-based utility lets you automate tasks in Adobe Photoshop 2.5 or later. Although it’s limited, it can relieve you of some mundane chores. Nov 94

Pikar Typesetcy 2.1, Pikar, 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 render-er lets you manipulate 3-D objects as if they were clay. It’s a capable package, but a bare-bones interface and skimp manual make it somewhat daunting for novices. Jun 95

Ray Dream Designer 3.1.1, Ray Dream, 415/960-0768, $349. 3-D graphics program provides competent 3 (or sometimes awkward) modeling tools, offers excellent surface-texturing capabilities, and produces high-quality ray-traced renderings. Mar 95

ScanPrepPro 1.2 (2.0), ImageXpress, 404/564-9924, $695. Adobe Photoshop add-on automates the scanning and image-massaging process and produces good results, although the program is somewhat unsta

ble. Nov 94

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 of the features of this CMYK color-correction plug-in can be found in Photoshop. Jul 95

Specular Camera 2.0.1, Specular International, 413/253-3100, $399. Practical image-composing solution supplies a smooth interface and strong support for Adobe Photoshop 3.0. As long as you’re willing to return to Photoshop to confirm your edits and make final changes, it’s a serviceable tool. Feb 95

Terrazzo 1.0, Kao Tools, 415/487-7000, $199. Turning a random group of pixels into a geometric pattern may not be everyone’s consuming passion, but this plug-in graphics-effect module has definite appeal for a select niche of fabric, graphic, and video designers. Nov 94

Texturescape 1.5, Specular International, 413/253-3100, $195. Algorithmic art program lets you manipulate and arrange PostScript shapes to create seamlessly repeating patterns. Like the best tools, it’s simple enough to be fun and flexible enough to give you meaning

ful control. Feb 95

TypeTwister 1.0, Adobe Systems, 415/961-4400, $209.99, inexpensive, easy-to-use, and fun type styler lets you create wildly styled text effects, although it doesn’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, 805/545-8315, $149.95. 3-D landscape render-er converts vast tracts 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

continues
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Star Ratings

** Chamber Works 1.0.2 (1.1), OnScreen Science, 617/776-6416, $95. Simultaneous particle physics and computer experiments is the best introduction to particle physics yet produced, at a great price. Dec 94

** JAM 3.0 (3.1), SAS Institute, 919/677-8000, $695. This statistics software uses it's a good choice for web derive applications. Nov 94

** Kekule 1.1, PSI International, 410/821-5980, $495. Science software reads smoothly connected and is a good choice for web derive applications. Nov 94

** Maple V 3.0, Waterloo Maple Software, 519/747-2373, $795. If you prefer to do your own programming and function creation, you'll benefit from this symbolic mathematics software's efficient and flexible representation of the structure. Nov 94

** MATLAB 4.1 (4.2c), The Math Works, 508/633-1415, $1,695. Relatively expensive numerical math software has added nearly 200 new graphics commands, improved its treatment of sparse matrices, and added commands for sound processing. This toolbox makes it a first choice for many applied science specialties. Nov 94

** MLab, Civilized Software, 301/652-4714, $1,495. Mathematical-modelling software lets you do fast computation on numerically complex real-world problems, using an ancient Mac II or higher. You must be willing to do the work yourself to get the most out of this tool. Professional researchers will find it a rewarding choice. Apr 95

** Spyglass Plot 1.0 (1.01), Spyglass, 217/835-6000, $295. This scientific charting software is the first choice for serious large-scale plot crunching. Oct 94

** Statistica/Mac 4.1, StatSoft, 918/583-4149, $695. At present, this statistical software is the undisputed features-per-dollar champion in the Mac market. Mar 95

** SuperScope II 1.25 (1.4), GW Instruments, 617/625-4096, $1,490. Despite a relatively small instrument library, this laboratory data-acquisition software effectively covers a wide range of needs. Oct 94

** Survival Tools 1.0 (1.1), Abacus Concepts, 510/540-1949, $295. The combination of survival analysis with the StatView template system gives you a virtual survival-in-a-box. It's a good set of tools, conveniently packaged. Feb 95

Organization/Productivity

** ACT 2.0, Symantec Corp., 502/334-6054, $249.95. Contact manager's life-level compatibility with DOS and Windows and its complete contact management makes it worth considering if you can live with its weak scheduling functions. Mar 95

** Arrange 2.0, Common Knowledge, 415/325-9900, $349. If your needs fall beyond the usual calendar and address-book functions, this personal information manager is a strong contender. It now has more calendar functions and print options. Dec 94

** Claris Organizer 1.0 (1.0v2), Claris Corp., 408/727-8227, $99. New personal information manager users, lured by the low price, excellent 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

** ClipperTrac 2.0, Whiskey Hill, 415/857-8700, $99. It's easy to enter contact information, but this PIM is slim on features and flexibility. May 94

** DateBook & TouchBase Pro Bundle 4.0, Adobe Systems, 415/961-4400, $89.99. Personal information manager package is now easier to use and offers many new features. The excellent linking between contacts and calendar is the most significant feature. Sep 94

** Day-to-Day Organizer 1.0, Portfolio Software, 802/434-6400, $149.95. The address-book and scrolling interface and the way it handles recurring events need to be improved. May 95

** Dynode for Macintosh 3.5 (3.5/2), Portfolio Software, 802/434-6400, $69.95. Although this program doesn't link to a calendar, it is an excellent contact manager. This upgrade has a few new features, improved performance, and an easier-to-use interface. Sep 94

** Expresso 1.0, Berkeley Systems, 510/540-5335, $69.99. The first-depths approach to 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 controls, but additional customization options would be helpful. Aug 95

** First Things First Proactive 1.1, Visionary Software, 503/246-6200, $149. A capable scheduling program has some convenient features. It's worth a look if you don't have to share information with a contact manager. Nov 94

** In Control 3.0.4 (3.0.7), Attain Corp., 617/776-1110, $85. Excellent to-do-list manager and calendar, coupled with a good calendar is a strong choice if you live and die by to-do lists. Oct 94

** Now Contact and Now Up-to-Date 3.0, Now Software, 503/274-2800, $99. Taken together, this contact manager and calendar provide a set of solid, reliable tools for keeping your life in order. Users who need to share information over a network may find it close to ideal. Apr 95

** Peanuts Family Organizer 1.0, Individual Software, 510/734-6767, $19.95. “Hey, Pep, can I borrow the car Saturday night?” “Look at the family PIM and check my calendar, Son.” This organizer's entertaining interface doesn't make up for missing or poorly implemented features. Jan 95

** Souvenir 2.2, Comparsoft, 415/327-0744, $49. While this contact manager is fast and simple, it's hard to recommend it when you can buy integrated contact managers and schedules for about the same price. Dec 94

Presentation Tools

** Adobe Premiere 4.0 (4.0.1), Adobe Systems, 415/961-4400, $795. Video-editing software remains as solid and reliable as previous versions, and also advances for and above its competitors with new and improved professional features. With the right hardware, it can give desktop-video editors broadcast-quality products with a minimum of compromises. Dec 94

** Amazing Animation 1.0, Claris Corp., 408/727-8227, $49. Cute pictures, funny sounds, and a kid-friendly interface come together in this package that lets children produce short animations or interactive presentations. The canned animations and scenes grow tiresome, however, Jan 95

** Animation Master 2.0.5 (2.09), Hash Inc., 206/750-0042, $639. Although this animation software packs extraordinary power at a reasonable price, it's difficult to learn and prone to instability. Oct 94

** Arrange 2.0, Common Knowledge, 310/793-0600, $125.95. This animation tool can create impressive demonstrations and on-screen presentations, but it needs better controls for modifying and preserving marker layers. May 94

** HyperCard 2.2, Apple Computer, 408/996-1010, $249. Authoring tool strikes a good balance between power and ease of use, and its price is reasonable. It may not satisfy all your wishes, but it should keep you happy building stacks. Sep 94

** Living Album 2.5, QuickMedia Labs, 408/749-9200, $125.95. A crowded interface detracts from the sophisticated—and aesthetics—of this multimedia album. May 94

** Macromedia Director 4.0 (4.0a), Macromedia, 415/522-2000, $1,195. Although this multimedia program remains far from easy to use, this admirable upgrade increases the program's power and improves its interface. Sep 94

** Microsoft PowerPoint 4.0, Microsoft Corp., 206/882-8080, $399. If you're in the market for a presentation graphics program, this is a good choice to use along with Word or Excel, as long as you don't mind the lack of animation functions. For general purposes, though, other alternatives have the edge. Feb 95

** MovieWorks 2.0, Interactive Solutions, 415/377-0136, $295. With diligence you can get decent results with this all-in-one QuickTime-based multimedia package, but other entry-level programs may be jumping into multimedia media sooner and more rewarding. Sep 94

** mPower 2.0, Multimedia Design Corp., 704/523-9493, $295. Despite a handful of sophisticated multimedia features, this authoring tool is too limited to be compelling. While its push-button interface is easy to understand, it's far too cumbersome. Apr 95

** The Multimedia Workshop, Davidson & Associates, 310/793-0600, $79.95. Children or adults can use this media-integration tool without big investments of time or money. It's full of compromises, though, such as the inability to layer narration over music. Nov 94

** Persuasion 3.0, Adobe Systems, 206/622-5500, $495. Users have plenty of new features to cheer about, including improved tool palettes, extensive charting options, and hyperlinks with this presentation graphics program's upgrade. Sep 94

** Presenter Professional 3.0, VGI, 818/358-3936, $1,995. The improved interface, enhanced animation module, and reduced price of this 3-D modelling and animation package make it an excellent choice continues
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Star Ratings

for multimedia producers. The new audio features are especially appealing. May 95

SoundEdit 16, Macromedia, 415/352-2000, $379. Digital audio software supports 16-bit sound and has enough goodies to earn it a place in a multimedia producer's tool box. But its lack of record-level controls limits its usefulness as a professional audio tool. Dec 94

Special Delivery 2.0, Interactive Media Corp., 415/948-0745, $399. Multimedia authoring software 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, $455. Multimedia authoring software 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

TransJamm, Elastic Reality, 608/273-6585, $149.95. Plug-in for Adobe Premiere and Avid VideoShop offers 100 customizable video-transition effects, ranging from the conventional to the odd (like falling cows). If you've ever tried to make your own falling-cows effects, ranging from the conventional to the odd (like falling cows), this software has become an everyday tool for desktop, and a calendar. Due to its easy access and user-friendly Interface, 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

UTILITY

IDL 3.5 (3.6), Research Systems, 303/786-9900, $1500. In this shockingly powerful, compact, graphics-oriented interpreter language, a single command is worth a page of C-language code. If you're an image processing professional, you should consider adding IDL to your tool kit. Oct 94

ScriptWizard 1.0, Full Moon Software, 408/253-7199, $99. Software attempts to make writing and debugging Assembly code 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 1.5 (1.5.1), Mainstay, 805/484-9400, $495. For convenience in producing 68000/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

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 database, and a calendar. Due to its easy access and ample power, this software has become an everyday tool for our reviewer. Jan 95

Cardoner 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, Insigia 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, Praxisoft, 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

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, ASO Software, 908/624-2594, $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, $39.5. Icon-based file and folder organizer brings a semblance of order to your cluttered desktop. But your troubles aren't over until a future version lets you label folders. May 95

Drive7 3.0 (3.9), Casa Blanca Works, 415/461-2227, $89.95. Highly recommended hard drive-formatting utility easily formats and partitions most drives and provides all the options you need. And with its limitations, it's Mount Cache utility provides a real performance boost. Nov 94

eDisk 2.0, Alysic Software Corp., 415/928-2895, $149.95. Driver-level software compresses data read to your drive on the fly and automatically expands data read from your drive. It offers transparent compression. Dec 94

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

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

Kaboom 3.0, Nova Development Corp., 818/519-9600, $49.95. Sound-effects utility with sound-encoding application is a fun program for anyone who wants to play with sound. Feb 95

Launch Pad 1.0, Berkeley Systems, 510/540-5535, $49.99. If you want to share your Mac with your kids, this desktop utility is a worthwhile investment. It can even speak menu items and file names out loud for kids too young to read. Jan 95

MacTools Pro 4.0, Symantec Corp., 503/690-8090, $149.95. This utility does a good job of diagnosing and fixing disk problems, but suffers from large RAM requirements and expensive technical support. May 95

Maxima 2.0, Connectix, 415/571-5100, $99. If you have more than AMIGA of RAM, you can use some of it as a RAM disk, speeding up disk-based operations, with this inexpensive utility. Nov 94

MultiClip Pro 3.1, Olduvai Corp., 305/670-1112, $59. Easy-to-use utility is exactly what Apple's Clipboard and Scrapbook should have been; a convenient repository of data that moves between documents without fuss or muss. Apr 95

Multimedia Utilities 1.1, Motion Works, 415/541-9333, $299. Six utilities address QuickTime movemaking, 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, $149.95. Data-protection and recovery utility collection is leaner, meaner, and faster than ever before, but it's also surprisingly unweildy. While Disk Doctor leads the pack for disk-repair utilities, the back-up module's weak and the new Untrash module is missing some features. Feb 95

Now Utilities 5.0, Now Software, 503/274-2800, $89. Three of the modules of this feature-packed, interlocking utility set—NowFinder, NowMenu, 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

OptiMem RAM Charger 2.0.1, Jump Development Group, 412/681-2692, $129. The RAM more efficiently with this memory-management utility. The Mac OS ought to work like this, but until it does, you should use this utility. (An added bonus: it works on older Macs, too, back to the Mac Plus.) Jul 95

PaperPower 1.0, Piplite, 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

Peice Print Tools 1.0, Peice Software, 408/444-6554, $29. Nine handy printing utilities works with QuickDraw GX. Most of the modules are useful, but not all are must-haves. Jan 95

PowerAgent 1.1 (2.0), SouthBeach Software Corp., 305/942-6005, $159. You can revolutionize your Macintosh work with this agent program that manages scripts. It provides excellent support for FileMaker Pro. Nov 94

PowerAgent 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 database, and a calendar. Due to its easy access and ample power, this software has become an everyday tool for our reviewer. May 95

RapidCD 1.04, Connectix, 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 Apple/CD Player and doesn't allow you to add its settings. Jul 95

RescueTat 1.0, Abbott Systems, 914/747-3116, $79. If you want decent performance and the ability to locate text in even a deleted file, this text-retrieval utility is a good choice. But it doesn't tell you what file the text comes from--so you can't just open the found file. Apr 95

SCSI Director Pro 3.0.6 (3.1.1), Transoft Corp., 805/655-2600, $99. Utility provides simple, one-button hard disk formatting, but when it comes to doing fancy tricks, the going gets tough. Sep 95

Square One 2.0 (2.0.1), Binary Soft

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ware, 310/449-1481, $74. The slick design, flexibility, and straightforward interface of this file-launching utility make it a pleasure to use. Dec 94

Stop & Go 4.0, Gramm International, 415/455-1100, $69.99. File-protection/relaunch utility facilitates, and extensions In a single, unified process, but it's unduly complicated. Oct 94

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 the 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 rescinding fonts from the menu. May 95

Vires 5.5.1, Datawatch Corporation, 508/988-9700, $99.95. Comprehensive, reliable, and speedy utility helps protect your files from those misguided lads who get their kicks 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. Customizable icons, scroll bars, cursors, buttons, menu bars, windows, and desktop patterns to create your own look. Aug 95

VERTICAL MARKETS

Autoscore 1.0, Wildcat Canyon Software, 510/527-7155, $150. Converting the human voice into MIDI note information is a challenging task. If you have the right software, music, and voice, this music-recognition software can actually pull it off. Feb 95

Bird Brain 2.0.1, 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, 415/917-7400, $159. Although it laggs 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, 408/730-3320, $349. If you're an amateur musician or a multimedia producer with modest sound-recording needs and have a Quadra AV, consider this audio-recording software. What it lacks in features, it makes up for in simplicity and a relatively low price tag. Mar 95

ErgoKnowledge 1.0, Visionary Software, 503/246-6200, $895. Despite a few shortcomings, this CD-ROM offers a good, basic review of office-computer ergonomics. Dec 94

Insta Software, Chang Labs, 408/727-8096, $29 per module. No-frills, preprogrammed relational database handles forms and record-keeping for specific businesses. Although they can't be customized, 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, multi layered Maya calendar. Although the design could be improved, it's a highly useful tool for both serious and casual Maya enthusiasts. Feb 95

Maya Hieroglyphic Fonts, Ecological Linguistics, 202/546-5862, $10 to $60 per set. Although these fonts based on Mesoamerican hieroglyphic scripts are beautifully rendered, the character spacing is sometimes uneven. Feb 95

Mayo Clinic Family Health Book, IVI Publishing, 612/996-6000, $99.95. Medical CD-ROM for home use deals with the full gamut of health-care topics, from AIDS to zoogears, although it doesn't include any reference to alternative therapies. Sep 94

Mayo Clinic: The Total Heart 1.0, IV1 Publishing, 612/686-0779, $21.75. Cardiologist-approved health-related subjects are the topics of this medical CD-ROM for home use. Although it makes liberal use of drawings, photographs, and animations, video sequences would have been more effective. Sep 94

Medical HouseCall 1.0, Applied Medical Informatics, 801/464-6200, $99.95. 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

MusicTime 2.0 (2.0.1), Passport Designs, 415/726-0320, $149. Music-notation program is praised for hobbiests and students. If your needs aren't complex, it may fit the bill, at a great price. Oct 94

Overture 1.02, Opcode Systems, 415/856-3333, $495. Easy-to-learn, multiinstrument notation software has a friendly interface and shows real notes. 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. 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 program to buy. Mar 95

Practica Musica 3.0 (3.1), Ars Nova Software, 206/889-0527, $1490. 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, $799.5. Jack Kerouac could have saved a lot of time if he'd used this route planner (unless he was planning to drive to Alaska, which isn't included). It's fast, but omits some cities and can't handle more than three destinations at a time. May 95

SAM-CD, Scientific American Medicine, 212/754-0550, $395. Despite a few shortcomings--such as the poor interface for case simulations, this medical reference work--a popular series of publications covering topics in clinical medicine--should prove a worthwhile addition to any medical library. Sep 94

Vision 2.08, Opcode Systems, 415/856-3333, $495. MIDI program's list of exclusive, creativity-laden features, such as endless count off and scribbling (which lets you hear the music as you draw across it), give the program a usability edge. Mar 95

WRITING TOOLS

Bookends Pro 3.1, Westing Software, 510/395-4242, $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

Writing Coach 1.0, WritePlace Software, 503/484-6380, $89. If you'd like help with your writing, this writing-skills tutorial could be a great investment. Skillfully worded worksheets assist with planning, organizing, and revising. Dec 94

Hardware

INPUT DEVICES

ArtPad, Wacom Technology, 206/750-8882, $195. Measuring less than 7 by 7¾ inches, this pressure-sensitive tablet is sheer convenience if you're looking for a device that you can hide away one moment and readily exhumate the next. Apr 95

Drawing Slate 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

FlightStick Pro for Macintosh, CH Products, 619/598-2518, $129.95. The authentic feel of this joystick, along with well-conceived software, make it a nearly perfect desktop pilot's companion. Dec 94

GlidePoint, Alps Electric, 408/432-2084, $49.95. This trackball provides fine cursor control and offers an additional mouse button. Oct 95
The BLUE line is an advanced storage architecture that goes beyond the current paradigm for storage design. Each component is engineered for the rigors of graphics or digital video production environment. Attention is given to every detail that maximizes SCSI stability and data throughput.

Build with BLUE! Protection investment is the cornerstone of our offering. BLUE can begin with a single drive and evolve into a complete system of fixed, removable, and DAT tape devices. To increase your productivity add our PCI or NuBus accelerators and state-of-the-art RAID 0 and 1 solutions. Thinking about speed? Think about BLUE!

**REMOVABLE OPTIONS**

BLUE Line fixed drive solutions can also be configured as removable, shuttle-based units mounted on front-removable sleds, providing up to 256 of Fast/Narrow or Fast/Wide portable storage. Available separate docking stations enable you to transfer quickbytes of data without unplugging a single cable — great for digital video, pre-press, and graphics applications.

**SCSI Chain Improvements**

SCSI chain mysteries were tough on you. So we got tough on SCSI chain design — the source of most peripheral errors and problems. We got rid of nearly all internal ribbons and peripheral cables and put in circuit boards, jumpers, and jumper packs, cutting cable length by nearly 98% — from 21 feet to 28 inches in a seven-device stack. Then we added Forced-Perfect Termination. Result: BLUE Line products take the mystery out of SCSI chain management.

**BLUE Line**

Design Enclosure

It's not just a better box. It's a better idea. Interlocking BLUE Line cases — each with four-inch power jumper — make rock-solid vertical or horizontal stacks a snap to build and to run off a single cord. Side-mount power-supply vents heat away from the drive. User-modifiable, front-mount LCD panel supports Power-Up, SCSI addressing, and Power Up sequencing. Need tech help? The LCD even provides Microtech's support number. All this plus enhanced data channel and subsystem design mean true BLUE Line excellence.
Star Ratings

6000, $59. If you find moving the mouse a pain in the arse, you might want to try this alternative pointing device, and it lets you position the cursor by moving your finger across its surface. Jul 95

Mac Keyboard Deluxe, MicroSpeed, 510/400-1403, $125. If you're in the market for a new or replacement keyboard, this one, which is both smaller and lighter than Apple's Extended Keyboard, is worth considering. It has four ADB ports. Nov 94

MacAlly, The Mac 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

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 with through OCR software for fax or E-Mail. May 95

QuePoint, MicroQu, 800/261-1833, $149. Tired of shoving a mouse around? Slide your fingers 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 best choice for desktop work, this handheld pointing device is an elegant workaround for users who don't want to be tethered to their Mac. Apr 95

Thinking Mouse Macintosh ADB, Keytangent, 408/572-2700, $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

MISCELLANEOUS HARDWARE

AirNote 1.0 (1-1), Notable Technologies, 510/208-4400, $299. Remote-message writers let you create alphanumeric paging messages from your own computer, eliminating both dialing charges and errors in translation. It's a very handy way to get alphanumeric paging. Dec 94

Apple PCMCIA Expansion Module, Apple Computer, 408/996-1010, $219. Well-integrated, well-designed unit offers 500-series users an efficient and easy-to-use expansion module. Adding features to your PowerBook is much easier than on older Macs. Apr 95

ColorHawk, Light Source Computer Images, 415/925-4200, $1195. Getting the colors on your screen to match those in your printed output is not easy and affordable. Thanks to this hand-held spectrophotometer, which measures both transmissive and reflective colors. Jun 95

EABA40IP Speakers, Panasonic Communications & Systems, 800/742-0886, $99. Smaller, more expensive speakers provide less than half the ear of stereo-at-the-art performance. The audio is thin and veiny. May 95

EABA70IP Speakers, Panasonic Communications & Systems, 800/742-0886, $249. The sound of these speakers is thin and slightly harsh, although they are attractive in a high-tech sort of way. Apr 95

MM5557, Audio-Technica USA, 216/686-2600, $149.95. Among a huge selection of similarly priced speaker systems, these stand out as a best buy. They look good, as well as sound good. Apr 95

MultiSpin 4KX, 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 player, the sound quality is nothing to shout about. May 95

Photo Engine, Radius, 408/541-6100, $1099. Photograph accetion hardware's suite of 64-mil 32-bit DSP chips offers sufficient processing power to speed up 25 percent of the more complex applications, including Power Macs. Feb 95

Reno Portable CD-DM Player, MediaVision, 510/770-8600, $349. Have CD-ROM, will travel? Portable player is lightweight, versatile, and easy to set up. The only complaint is its short battery life. Jan 95

SCTI Scansiy, APS Technologies, 816/482-6100, $79.95. Although the price of this terminator rises steeply, this device may well be the cure for SCSI maladies. Our review heavily recommends it Sep 95

Vivace, Code Music Technology, 612/979-9611, $2295. As an intelligent and endlessly patient patient, 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, 714/442-1080, $149.95. This sound-enhancement system uses the 3D technique to produce 3-D sound from a pair of speakers. While it's great for fax system sounds and games, it's less impressive for audio CDs. Aug 95

YST-S5110, Yamaha Corporation of America, 714/522-9140, $349.95. With a name like YST-S5110, 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

Cooperative Adapter, Photonics Corp., 408/955-7930, $449. The high cost of each unit, the bandwidths and restrictions inherent in digital faxes, and the extremely low cost of traditional LocalTalk adapters and cables make this infrared network interface an expensive product. Dec 94

DaynaPort Pocket SCSL-Link, Dayna Communications, 801/269-7200, $299 to $369. The affordable, lightweight SCSL-1144-compatible connector works with both Mac and PowerBooks and can use the Mac's ADB port in a PowerBook. Nov 94

FastSwitch 10, Grand Junction Networks, 510/252-0726, $625. Switched Ethernet hub is a great solution for networks that handle large amounts of data typed at peer-to-peer, but if your network consists of email and a file server, you probably won't see much benefit in dropping up to switched Ethernet. Dec 94

OneWorld Internet 1.0, 700 Series, Global Village Communication, 408/523-1000, $1695 plus monthly fees. Users of an office network can connect to the Mothers of All Networks with this Internet gateway. It offers email and direct Internet access in an approachable format. Jan 95

Pocket EtherTalk Adapter, Xicrom, 805/376-9300, $349 to 399. An offline SCSI-to-

Ethernet connector is lightweight and works with desktop Macs and PowerBooks. Nov 94


Spectra-Comm P192mx, Bay Connection, 408/770-8070, $169. If you must have absolute portability and AC power isn't available, this pocket data/fax modem can do the job. It's not that much smaller than a regular desktop modem, however. Oct 94

TelePort Platinum, Global Village Communication, 408/532-1000, $279. If you want V.34 (88-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 2400, Apple Computer, 408/396-1010, $525. Economical, QuickDraw-based color ink-jet printer offers gorgeous color output and true 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 6/600 P5, Apple Computer, 408/996-1010, $2399. If speed is what you need, this fine laser printer is the best buy. Oct 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

Picture 310, Fargo Electronics, 612/941-9470, $4959; optional Adobe Level 2 PostScript package $795. While this tabloid-size thermal-wax and dye-sublimation printer is affordable and produces acceptable print quality, it's not for dye. For its substantial color-matching capabilities don't measure up to those of its competition. Jul 95

PowerPrint 2.5 (2.5.2), GDT Software, 604/391-9121, $149. Ingenious hardware/software combination lets the Mac print to almost any PC printer. It supports over 1000 printers, from aging dot-matrix models to the newest color ink-jet and laser printers. Sep 95

PrimersPro, Fargo Electronics, 612/941-9470, $1895. The photo-realistic output of this therm-wax and dye-sublimation printer beats that of any other printer in the price range. With expensive consumables and slow print time, it's best suited for routine thermal-wax use and occasional dye-sub work. Jan 95

P-Touch PC, Brother International Corp., 908/356-8880, ext. 4307, $449. Versatile label printer is easy to set up and use, and produces high-quality output. The cost per label is high, though, and the documentation is weak. Sep 95

Color StyleWriter, Epson America, 310/783-0770, $699. This color ink-jet printer is no speed demon at 720-dpi resolution, you need special paper for higher output, and it offers no color correction. But who cares? The print quality is superb and the price is reasonable. May 95

190 September 1995 MACWORLD
Macworld is the direct route to knowing your Mac. You'll never be lost. You'll never have to ask directions. And you'll never need to get a second opinion. Because Macworld gives you the clear path information you need (and more of it than the other publications) to make intelligent decisions and stay informed. And with Star Ratings, Editors' Choice and Macworld Online, you'll always know the best way to go. So take the only road that leads to greatness. Macworld. It's all you need to know.
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WHY NOT MAKE LIFE EASIER INSTEAD OF MAKING IT MORE DIFFICULT?

Transparency is what people ask for. It was and is our aim to design CD software to be as functional and efficient as possible. The award of four and a half "mice" out of five for our CD-write software TOAST CD-ROM Pro in the German edition of Macworld shows that we are on the right track. Our CD-write software TOAST CD-DA which conforms to the "Red Book" standard has been programmed to the highest specifications. With our new ASTARTE's CD-COPY we are happy to be able to offer a complete CD tool set. Individual tracks of Audio-CDs, CD-ROMs, Photo-CDs, Video-CDs or CD-i can be easily copied to your hard-disk, so that you can then write a CD with the help of one of our tried and tested products. Just like that!

See our products at the Macworld exhibition in Boston: Eastman Kodak Company, FWB Inc. # 500. Macintosh company Direct Connections # 1619, MicroNet Technology Inc. # 5352, Pinnacle Micro Inc. # 5458.

### SCANNERS

<table>
<thead>
<tr>
<th>Star Rating</th>
<th>Product Name</th>
<th>Manufacturer</th>
<th>Price</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>****</td>
<td>Fujitsu ScanPartner Jr.</td>
<td>Fujitsu Computer Products of America, 408/432-6333</td>
<td>$499</td>
<td>Fujitsu ScanPartner Jr. is a compact scanner with good OCR software that makes converting hard-copy documents to editable text a snap. While it's an economical and fuss-free scanning solution, its price tag doesn't offer the paper-size and shape flexibility of a flatbed scanner. Jul 95</td>
</tr>
<tr>
<td>****</td>
<td>Pro Imager 4000, PixelCraft</td>
<td>510/562-2480, $2995</td>
<td></td>
<td>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</td>
</tr>
<tr>
<td>****</td>
<td>Pro Imager 8000, PixelCraft</td>
<td>510/562-2480, $129.95</td>
<td></td>
<td>Demanding preparers 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</td>
</tr>
<tr>
<td>****</td>
<td>Reel 4B3OT, Reelsys</td>
<td>408/943-9000, $1659</td>
<td></td>
<td>Fujitsu ScanPartner Jr. is a compact, efficient scanner for a cost-effective way to transfer images from 35mm slides or negatives to a Mac. Oct 94</td>
</tr>
<tr>
<td>****</td>
<td>Pro Imager 35, Polaroid</td>
<td>617/386-2000, $2495</td>
<td></td>
<td>Fujitsu ScanPartner Jr. is a compact, efficient scanner off that offers a cost-effective way to transfer images from 35mm slides or negatives to a Mac. Jul 95</td>
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### SYSTEMS/STORAGE

<table>
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<tr>
<th>Star Rating</th>
<th>Product Name</th>
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<th>Price</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>****</td>
<td>Alacrity PM 6100, KS Labs</td>
<td>KS Labs, 14/174-56'5, $165</td>
<td></td>
<td>Installing a clock booster is the quickest, easiest, and cheapest way to extract more power from Apple's entry-level Power Mac. Oct 94</td>
</tr>
<tr>
<td>****</td>
<td>Brainstorm Accelerator for the Macintosh SE</td>
<td>Brainstorm Products, 415/988-2500, $199. Your SE will never be a Power Mac or even a Mac, but if your budget won't buy a new Mac, you can't do better than this accelerator, which pushes an SE's speed to close to a Classic's in overall performance. Mar 95</td>
<td></td>
<td></td>
</tr>
<tr>
<td>****</td>
<td>Conley SR2 RAID System</td>
<td>Conley Corp., 212/682-0162, $21995. While RAID technology is typically praised for its fault-tolerance rather than its speed, this high-performance storage system proves that you can have both. Sep 94</td>
<td></td>
<td></td>
</tr>
<tr>
<td>****</td>
<td>Envoy Wireless Communicator</td>
<td>Motorola, 800/894-7353, $1000 to $1500.</td>
<td></td>
<td>Environ Wireless Communicator is a Newton OS-based PDA 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</td>
</tr>
<tr>
<td>****</td>
<td>Joule System, La Cle</td>
<td>503/520-9000, $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</td>
<td></td>
<td></td>
</tr>
<tr>
<td>***</td>
<td>Marco Wireless Communicator</td>
<td>Motorola, 800/894-7353, $900 to $1400.</td>
<td></td>
<td>This Newton OS-based PDA includes a radio modem. 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</td>
</tr>
</tbody>
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BUYERS' TOOLS

Star Ratings

Master CD Pro, MicroNet Technology, $499.95. With support for multiple formats, this quad-speed, multilesson, recordable CD-ROM drive is a good tool for professional CD production. It isn't cheap, though. Aug 95

MessagePad 120, Apple Computer, 408/996-1010, $599, 2MB model $699. Apple's FDA offers about three times the storage space of the other PDAs tested, and its industrial design is great, but handwriting recognition still needs work. With support for vertical applications, it's a good choice for specialized tasks like medical or inventory work. Aug 95

PLI Infinity 270 Turbo, PLL, 510/657-2211, $599. This 270MHz STeOut drive is fast, reliable, and a very good product. The cost of the medium is competitive with that of optical drives. Sep 94

PowerBook 540c, Apple Computer, 408/996-1010, $4839. The prestige PowerBook du jour, this sleek, carry and future-looking notebook makes a good computer for both on-the-road and in-the-office use. Its nonstandard battery, memory, and Ethernet ports are not ideal features, however. Oct 94

PowerBook Duo 280c, Apple Computer, 408/996-1010, $3759. If you travel a lot, this notebook computer is the best Mac to get. It offers close to the power of a Quadra 650 in a subnotebook. Oct 94

PowerBook Duo Dock II, Apple Computer, 408/996-1010, $969. Apple has added Ethernet to this full-featured docking station, but installing NuBus cards is still absurdly difficult. Oct 94

Power Macintosh 8100/110, Apple Computer, 408/996-1010, $6279. High-end users who have invested heavily in NuBus cards can protect their investment with this top-of-the-line Power Mac. Mar 95

Power Macintosh Upgrade Card, Apple Computer, 408/996-1010, $699. Current 33MHz 040 machines will get the best bang for the buck with this card. However, other Macs won't realize as much of a performance gain. Oct 94

Quadra 630, Apple Computer, 408/996-1010, $1279. Fast, inexpensive, expandable 33MHz 68040 machine may be the last 680X0-based desktop Macintosh, but it's one of the best entry-level Macs ever. Nov 94

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

Sony Magic Link, Sony, 800/571-7669, $699.55. Using this FDA 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 inexpensive, 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 speed, performance, convenience, and economy in an attractive package. It uses 100MB cartridges the size of a floppy disk, and boots near-hard-drive speeds. What's not to like? Jul 95

Apple Macintosh Display Card 24AC, Apple Computer, 408/996-1010, $1579. 24-bit accelerated graphics card has a satisfactory price/performance ratio but can't switch resolutions from the keyboard. Oct 94

Apple Multiple Scan 15 Display, Apple Computer, 408/996-1010, $509. The trident 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

FlexCam, VideoLabs, 612/988-0055, $595. Small, unobtrusive desktop video camera has a flexible gooseneck for positioning. Dec 94

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. It doesn't offer Photoshop acceleration. Aug 95

Pannelight 2X, Pannelight Display Systems, 415/772-3800, $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, 301/529-8731, $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 at 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

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

Tornado Graphics Card, Mirror Technologies, 613/832-5622, $999. Inexpensive 24-bit accelerated graphics card has zoom and pan options but is relatively slow. Oct 94

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
Professional Graphics
Built for the new PCI Power Macintosh computers and the powerful 9500, ATI's XCLAIM GA meets the demands of design and publishing professionals. It provides fast graphics, true color and high resolution detail and clarity, without breaking the bank.

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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 less are not eligible for inclusion), have been selected as an Editors' Choice, or have made a World-Class award. In some cases, the editorial evaluation quoted is for an earlier product version. The ** symbol indicates that the product is in 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 MessagePad 120 + Notion + External Modem + PowerNews + NewtonMail + Pocket Quicken

The following products, which have a retail value of over $200, are being bundled with the 2MB $699 version of Apple Computer's MessagePad 120—Editor's-Note: The List Manager, an external 2400-bps modem, one month of free usage for new subscribers to PenTalk Software Technologies' PenNews news service, Apple's NewtonMail online communications system, and a coupon that entitles the buyer to a copy of Intuit's Quicken personal finance software. Call 800/909-0260 for product and reseller information.

Diamond Javelin Video 3000 Series + KPT Convoluer 1.0

Diamond Multimedia Systems is including HSC Software's $199 Photoshop-compatible filter (Aug 94 ** ** *) with its 3000-series PCT-based Macintosh multimedia accelerators. The 3240XL ($399) and 3440XL ($569) models provide 2MB and 4MB of VRAM, respectively, both support 16.7 million colors at resolutions as high as 1152 by 870. Call 800/468-5846 for more information.

Digital Chisel 1.2 + Strata StudioPro 1.5 + Strata MediaPaint 1.0 + MiniCad 5

Academic Distributing is offering students, academic staff, and faculty a "virtual reality studio" bundle consisting of Aerial Spring Software's $199.95 Digital Chisel educational multimedia authoring tool (Jun 94 ** **), Strata's $1495 high-end 3-D design application (Mar 94 ** ** * for StudioPro 1.0) and $695 paint tool (Sep 94 ** ** *), plus GraphPoint's $795 CAD software (Nov 94 ** ** *), all for $795 (regularly priced at $1249 if purchased separately). Call 800/531-3227 for nearest authorized dealer. Offer expires 9/31/95.

Master CD Plus + Toast Pro + MicroNet Technology

is including Astarte GmbH's $649 Toast Pro authoring software with its $1895 double-speed CD recorder (Aug 95 *** for Master CD Pro). Toast Pro supports hybrid and multisession standards. Call 714/453-6100 for more information.

Open Sesame 1.1 + Managing Your Money 5.0 + The Diet Balancer + Manga

Charles River Analytics is including the following software free of charge with its $99 Finder-automation utility (May 94 ** ** * for Open Sesame 1.02): MECA Software's $69.95 personal financial software (Jan 93 ** ** *), Nutridata Software's $99.95 nutrition program (Dec 92 ** ** * for The Diet Balancer 1.0), and Utop!Software's $49.95 Manga electronic cookbook. This bundle is available only from Charles River Analytics (800/913-3535, ext. 526) for $39.94. Offer expires 9/30/95.

Thunder IV Accelerator + ColorComposer

includes a copy of its $349 screen color adjuster with all 24-bit Thunder IV color graphics cards. ColorComposer modifies the display of screen images to match printer output and works with all color-management systems. Call 800/227-2795 for more information.

SIDEGRADERS/UPGRADES

Astill 2.0 for Power Macintosh

Gold Disk is offering this $249.95 multimedia presentation software package (Nov 93 ** ** * for version 1.0) for $99.95 to registered owners of Microsoft PowerPoint, Persuasion, Action, and Director. Call 800/465-3375 for more information.

ClarisImpact 2.0

Claris is offering this $129 charting and diagramming application (Jun 94 ** ** * for 68000 version 1.0) for $69 to registered owners of other graphics products, FileMaker Pro, and ClarisWorks. Call 800/544-8554 for more information.

MacDraft 4.1

To promote MacDraft's ability to link to Excel, Innovative Data Design is offering a special price of $99 (SRP regularly $149) for its architectural/engineering design and drafting and technical-illustration program to all licensed users of Excel 4.0 or later. Call 914/060-6818 for more information and to order. Offer expires 8/31/95.

PCC ISCI jackhammer + Hard Disk Toolkit 1.7.5 or RAID Toolkit 1.7.5

FVH is offering owners of any NuBus or PDS ISCI accelerator card a trade-in upgrade to the $499 Hard Disk Toolkit bundle for $295, while owners of any NuBus or PDS ISCI accelerator-based disk array can upgrade to the $699 RAID Toolkit bundle for $499. Call 415/235-4392 for more information.

RAM Doubler 1.5.2

Connectix is offering this $99 RAM-enhancement utility (May 94 ** ** * and Jun 94 "Virtual Memory Realities" Editors' Choice for version 1.0.1) to registered users of any Connectix product for $49. Call 800/950-5880 for more information.

SPECIAL DISCOUNTS/OFFERS

AppWare 1.2

Novell is offering this $459 application development system on CD-ROM for $199. AppWare provides reusable software components, including those found in Reach Software's WorkMan for AppWare, which enhance the building of applications with workflow-tracking capabilities. Call 800/277-2717 for more information. Offer expires 8/31/95.

Calendar Manager 5.0

Russel Information Sciences, which has priced this new version of its cross-platform group-scheduling application at $995 for the first server, is offering additional servers at a 40 percent discount if ordered within 90 days of the initial purchase. Call 714/362-4000 for more information.

Claris Organizer 1.0

Claris is offering this $99 personal information organizer (Jun 95 ** ** *) for a suggested pro­motional price of $19. Call 800/235-2747 for more information. Offer expires 12/31/95.

Contact Base Enterprise

WestWare is offering this $550-per-user client-server sites-automation system for $179 per user to customers who purchase a $757-per-user annual maintenance contract. The system lets users connect with an Omn 7 database server or any corporate SQL, Sybase, or Oracle database. Call 800/869-0871 for more information. Offer expires 9/30/95.

Envoy Viewer

Novell is offering a free copy of this platform- and application-independent document viewer on its Internet home page (http://www.novell.com). The viewer permits reader feedback, but not document distribution. The complete $189 Envoy package's publisher distributes the viewer with documents, allowing recipients to see original layouts, fonts, graphics, and colors. It also provides document thumbnails and permits annotations.

FreeHand 5.0 Software Developer's Kit

Macromedia is offering this SDK as a free download from both AOL (keyword Macromedia) and CompuServe (go Macromedia). Offer expires 8/31/95.

HyperView

Novell is offering a free copy of this platform- and application-independent document viewer on its Internet home page (http://www.novell.com). The viewer permits reader feedback, but not document distribution. The complete $189 Envoy package's publisher distributes the viewer with documents, allowing recipients to see original layouts, fonts, graphics, and colors. It also provides document thumbnails and permits annotations.

WebSpace 1.0

AOL is offering this $299 program for modeling human forms for an introductory price of $99. 

Poseur models are exportable in several different formats for use with print, illustration, and rendering applications. Call 800/297-2665 for more information. Offer expires 8/31/95.

WebSpace

Netscape Communications and Spyglass. Online users can download the software from several public File Transfer Protocol (FTP) sites on the Web, including those from Silicon Graphics (http://www.sgi.com) and Template Graphics (http://www.template.com).
**Adobe Systems**

Adobe hardware and software products and technologies enable users to create, view, communicate and print electronic documents across platforms. The company licenses industry-standard Adobe PostScript™ software to over 40 leading computer and printer manufacturers worldwide. Retail products include Adobe Acrobat™, Adobe Illustrator™, Adobe Photoshop™, Adobe PageMaker™ and the Adobe Type Library.

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**APS Technologies**

APS Technologies designs, develops, manufactures, and markets a full line of high performance, high reliability mass storage subsystems which address the demand for value-based data storage solutions. APS products are consistently recognized for performance, value, and above all, a level of service and support unequaled in the industry.

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**BottomLine Distribution**

Bottom Line, founded in 1985, is a leading developer and reseller of Macintosh products. Our Web site is updated every 15 minutes with the latest pricing and technical information. Check out our monthly contests. You may be our next winner of a Macintosh computer!

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**Claris Corporation**

Claris Corporation is a leading worldwide vendor of Macintosh and Windows software for business, education and home. You can visit ClarisWeb to find trial software, product "updaters", templates, technical support articles and product literature for the entire Claris product line. See for yourself why users around the globe rank Claris #1 in customer satisfaction.

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**Fractal Design Corporation**

Fractal Design Corporation’s mission is to be a major force in multi-platform graphic software, creating and marketing next generation paint, photo design and image processing software for the Apple Macintosh and Microsoft Windows platforms.

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Macromedia's WWW site is a 'must see' for graphic design and multimedia enthusiasts. From the leader in multimedia and digital arts software for Windows and Macintosh, get comprehensive product information, tips and tricks from leading developers, visit the interactive gallery, and read hot content from New Media Magazine, The Red Herring, Multimedia Producer, Morph's Outpost and more!

http://www.macromedia.com/

Nisus® Software Inc. was founded in 1984 to develop and publish high quality Macintosh software for business, school and home. Best known for its award winning multilingual Nisus® Writer word processor, the company distributes its products worldwide. Nisus Writer has been localized for many languages, including Roman, Asian, Right-to-Left and Cyrillic.

http://www.nisus-soft.com/~nisus/

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http://www.procd.com/

The Mac Zone, one of the largest computer mail order companies in the world is dedicated to supplying a complete inventory of hardware, software, and accessories for Macintosh and IBM compatible computers. Low prices, online ordering, overnight delivery, and a chance to win great gifts. The Mac Zone Internet SuperStore.

http://www.maczone.com/maczone

Nec Technologies

Thousands of Internet surfers have visited the NEC USA World Wide Web site, launched April 1995. The site offers in-depth information about the full line of NEC products, including Macintosh-compatible MultiSync® monitors, MultiSpin® CD-ROM drives and SuperScript™ printers.

http://www.nec.com/

Power Computing

The Macintosh world now has a new name: Power Computing. Backed by investors worldwide, Power Computing was tapped by Apple as the first company licensed to manufacture and sell Macintosh compatibles. Power Computing delivers all models direct to the customer, complete with Macintosh System 7.5 and a 100% guarantee of Macintosh OS compatibility.

http://www.powercc.com/

Texas Instruments web site features technology building blocks that will bring life to the digital revolution. Of special interest to the Macintosh community, TI's product pages include the full range of Mac-compatible printers. TI's other selections feature information on notebook computers, calculators, semiconductors, as well as a wide range of company information and employment opportunities.

http://www.ti.com/
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A. Including yourself, approximately how many people are employed at your workplace (e.g., employees in your office, building, or cluster of buildings)?

B. Which of the following computers are installed at this entire workplace?

C. What is the total number of Macintosh products installed at this entire workplace?

D. For how many Macintosh products within this entire workplace do you have purchase involvement for print and/or software?

E. Over the next 12 months, how much will this entire workplace spend on Macintosh products and/or software?

F. Considering the entire workplace, which of the following Macintosh hardware and software products are currently installed? (Check all that apply.)

G. In which ways are you most involved in purchase decisions for Macintosh products at this entire workplace?

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Drum Scanner Quality, Superior color with outstanding reliability
- 90-bit 2680dpi (900dpi software)
- CCD one-pass scanning
- True 3D dynamic range for brilliant color
- 50% faster than other scanners
- Maximum document size: Reflective 8.5" x 11.7" / Transparent 8.5" x 10" 

UC1260
1200dpi, 24 bit color scanner
- UltraSilk Technology provides max. resolution of 5600dpi
- CCD one-pass scanning
- Fully TWAIN compliant
- Scale from 15% to 1600% in 1% steps
- Maximum Document size: 8.5" x 11.7"

Includes: Full version PhotoShop 3.0 and Kai's Power Tools 

UC1260
$839.99

UC1260
$399.99

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microLaser 600

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Texas Instruments
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Stacker 2.0

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Photo/Graphic Edges is a fabulous collection of over 1500 different edge effects that can easily be applied to any photograph. All effects can be colored and resized up to 200%. Works with any Mac or Windows - Photoshop 2.51 - 3.0, Photopaint 5, Picture Publisher 5, Fractal 3.0, Quark and Pagemaker. Includes a large catalog of effects. Give your design and extra edge... order today.

NEW RELEASE! Video/Graphic Edges - Really Cool Multi-Media Edge Effects

NEW RELEASE! Page Edges - Edged Layout Design Elements

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HARD DRIVES
Seagate Elite 9 gig. $2595.

514MB - 1200MB

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<th>BRAND/MODEL</th>
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1.76GIG - 9GIG

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CD RECORDERS

Yamaha 4 speed recorder $3095

- Multimedia
- Archiving
- Distribution
- In-house publishing
- Back-up
- Image Data handling

CD Recorder External $3095

- Create music, interactive, and photos.
- 10 Cds for $99
- Call for information on this drive!

OPTICAL DRIVES

<table>
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<tr>
<th>CAPACITY</th>
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1 YEAR WARRANTY

- Includes One Cartridge
- With 2.5mb/sec sustained transfer, the DLT2000 is perfect for digital video or press with large data files.

RAID SYSTEMS

- Stick with a vendor such as Direct Connections that understands how to prepare a RAID for desktop video.
- MacWorld April '95

- 2.6GB RAID Level 0. Perfect for highspeed requirements.
- This Array is the one to beat!!! 4.6G Wide RAID.

- $2199
- $3399
- $3999

VideoVision Studio

- Full screen and full motion recording and playback with JPEG hardware compression and decompression.

- $3649

- 128MB Optical
- 230MB Optical
- 6560IG Optical
- 1.36G Optical
- SYQUEST 44MB
- SYQUEST 80MB
- SYQUEST 200MB

- $29
- $29
- $29
- $29
- $29
- $29
- $29

Direct Connections provided excellent technical support.

MacWorld July '95

"Direct Connections' Array offered the best performance per dollar of the drives tested." Digital Video Oct. '94

"Your next option is to locate...highly visible digital video suppliers like Direct Connections." NewMedia June '95

"I tried...Direct Connections...configuration without encountering any problems." Video Pro April '95

"This array is the one to beat!!!" Ken Gray Writer for WIREO, Computer User, Moviemaker, Computer Video, and Digital Video Magazine.

"Stick with a vendor such as Direct Connections that understands how to prepare a RAID for desktop video." MacWorld April '95
Authorized Catalogue Reseller - SOFTWARE

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**Global Village TelePort Platinum** 28,800 BPS External Data/Fax Modem
- Send & receive data up to 28,800 bps
- V.34 standard
- Includes GlobalFax™
- OCR & Data communications software

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- **$199.99**

**Global Village PowerPort Gold for PowerBook 100 Series**
- For PowerBook 100 Series
- **$189.99**

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- For PowerBook 500 Series
- **$399.99**

**Visioneer PaperMax™ & MaxMate™**
- page scanner & document management software
- Integrated document communications solution
- Scan documents into your Mac & distribute immediately by email or electronic fax
- Ultra-compact & simple to use

- **VIR PAPERMA**
- **$399.99**

**RasterOps ClearVue 20™**
- 20" Trinitron
- 640x480 to 1280x1024 resolution
- Anti-ghost, anti-alias, Energy Star
- Supports built-in Macintosh video on Centris, Quadra and PowerMac

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Circle 382 on reader service card

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**DIGITAL LINEAR TAPE DRIVES**

- Provides ability to easily remove and transport data.
- Ideal for disk array environments.
- Compatible with single ended price list.
- Ideal for disk array environments.
- Provides backup solution for network servers.

**LT Super Capacity External Storage**

- 3.5" Stackable/Removable ADisk Subsystems
- Quantum 365MB
- Quantum 535MB
- Quantum 850MB
- Seagate 4.0GB
- Quantum 9.0GB

**PRODUCTS DIRECT**

- No surcharge on credit cards
- Most orders shipped same day
- Free Shipping on all tape backup drives
- 30 day money back guarantee on all hard drives

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**Removable Carrier Datasheet**

<table>
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**OPTICAL DRIVES**

- Headway PACKARD
- Micropolis 2.1GB
- Quantum 850MB
- Seagate 4.0GB

**MEMORY PRODUCTS**

- Always call for the most competitive pricing on memory!

**Free Shipping on Fridays!**

<table>
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- Provides ability to easily remove and transport data.
- Ideal for disk array environments.
- Compatible with single ended price list.
- Ideal for disk array environments.
- Provides backup solution for network servers.
**CLUBMAC REMOVABLE STORAGE**

**CLUBMAC IS DOING IT AGAIN!**

Once again, the first 1000 ClubMac Syquest 200MB External Subsystems will include two 200MB genuine Syquest cartridges.

INCREDBLY BARGAINING DEAL!

Tell Your Friends!

**3.5" ClubMac 105MB Removable**

Two Free Cartridges

**$468**

Perfect for Mac users on the go.

**5.25" ClubMac 105MB Removable**

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**$468**

Perfect for Mac users on the go.

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**Quantum**

- **365MB Lightning**
  - 365MB Lightning
  - **1.0GB**
  - **$399**

- **540MB Maverick**
  - **$129**

- **540MB Fireball**
  - **$129**

- **730MB Lightning**
  - **$129**

- **1080MB Fireball**
  - **$129**

- **2200MB Capella**
  - **$129**

- **4300MB Grand Prix**
  - **$129**

**CLUBMAC CD-ROM DRIVES**

- **ClubMac 2X CD-ROM**
  - Speed: 300KB/sec data transfer late
  - 350ms average access time
  - F/R read
  - LED light, headphone jack
  - Volume control
  - Write weight
  - Supports Mac's CD AutoMount driver software
  - One Year Warranty

**$99**

**ClubMac 4X CD-ROM**

- Speed: 600KB/sec data transfer late
- 10ms average access time
- F/R read
- 3500 RPM rotational speed
- Supports Mac's CD AutoMount driver software
- One Year Warranty

**$229**

**DAT AND OPTICAL STORAGE DEVICES**

- **ClubMac Tape Backup Drives**
  - 2.0GB
  - **$699**

- **4-8GB**
  - **$899**

- **1.3GB**
  - **$1499**

**CLUBMAC 3.5" Optical**

- Speed: 5.25" Olympus Optical Mechanism
- 3500 RPM rotational speed

**$579**

**230MB**

**MacUser**

February 1995
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Apple Newton MessagePad 100

$159.95

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21" MultiSync XE21

- 21" Diagonal Viewable Screen
- 15.5" Towards Image Area
- Max Res: 1440 x 900
- 1024 x 768
- Fire 0.28mm dot pitch
- MultiView Manager
- Analog/Digital Control
- Energy star complaint for true energy savings

$1829

15" MultiSync XV15

Outstanding performance at an affordable price
- Larger viewing area that is easier to read
- Plug and Play compatible for real performance enhancements
- Energy star compliant for true energy savings
- 15" Diagonal Text Area
- 13.8" Viewable Image size
- Max Res: 1024x768
- Fire 0.28mm dot pitch

15" XV15 (D0261013) $435
15" XE15 (D0261014) $549
15" XPS (D0261015) $799

17" MultiSync XV17

Large Screen performance at an affordable price
- Plug and Play compatible small office/home office
- Anti-Glare Design
- 16" Diagonal Image Area
- 15.5" Diagonal Text Area
- 1024x768
- Fire 0.28mm dot pitch
- MultiView Manager

17" XV17 (D0261010) $1799
17" XV17 (D0261014) $2049

15" VideoVision Studio 2.0

- With P35 silicon
- Constructions and configuration for Macintosh
- Native moving and playing from a hard disk
- VideoVision Stick contains the plug and Play ability of the Macintosh
- Energy Star compliant for true energy savings

$979

Thunder Series Super Resolution at 21"

Thunder Series Cards Blow the doors off Power Mac

EPSON

Epson ES-1200 Pro Max Scanning System

$1269

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100 MHz Turbo 601 Turbo 601

$1589

DAYSTAR DIGITAL

GLOBAL VILLAGE

PaperPort

$29.95

$35

IN STOCK!

100 MHz Turbo 601 Turbo 601

$1589

Circle 96 on reader service card
**Optical Cartridges**

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<th>Model</th>
<th>Capacity</th>
<th>Price</th>
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- Panasonic 128MB
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- Panasonic 33MB

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# Mac Systems & Peripherals

**PowerMac 8100/1001**
- 16·1000 CD
- 17in Multiscan Display
- Extended Design Keyboard
- Sale Price: $1899

**PowerMac 8110**
- 16·2000 CD
- SuperMac 21T•XL, 1600x1200 Color Display
- Premiere 4 & VideoFusion Ext KB, Apple Design Speakers
- Sale Price: $17199

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- Apple 20" Multiple Scan
- Apple 17" Multiple Scan
- Apple 15" Multiple Scan
- Apple 14" Color Plus
- SuperMac 21+XNL
- SuperMac 20 Plus
- Radius IntelColor/2X/2
- SuperMac Preview 21 T
- Sony 2051 w/adapter
- Sony 1752 w/adapter
- Sony 15" SFZ w/adapter
- Sony 1425S, 14" Trinitron
- RasterOps Clearvue 20T
- RasterOps 20T Plus
- Color LaserWriter 12/600 PS
- LaserWriter 16/600
- LaserWriter 4/600 PS
- LaserWriter Select 360
- Personal LaserWriter 320
- StyleWriter 2200
- StyleWriter 1200
- GCC Elite XL1200
- GCC Elite XL616
- GCC ColorFast
- HP 4MV
- HP 5MP
- Sale Price: $169

**Powerbooks**
- 150, 4-120
- 320, 4-240
- Sale Price: $939

**Printers**
- GCC WriteMove II
- Sale Price: $149

**Scanners**
- Agfa StudioScan II
- Agfa Arcus II w/transp.
- HP ScanJet Ilccs
- UMAX Vista 56 Pro
- UMAX Vista 58 Pro
- UMAX 1260 Pro
- UMAX PowerLook
- Microtek Scanner III
- Microtek IHR

**Hard Drives**
- SyQuest 200c w/cart
- Syquest 270c w/cart
- 1 GB Conner
- 1 GB Quantum Atlas
- 2.1 GB Quantum Empire
- 4.3 GB Quantum Grand Prix
- 2.1 GB Seagate Barracuda
- 4.2 GB Seagate Barracuda
- 4.4 GB Seagate Barracuda
- 4.9 Seagate Fast SCSI-2
- 2.1 GB Micropolis
- 4.1 GB Micropolis
- 4.3 GB Micropolis
- 4.9 GB Micropolis
- Heavy Duty Enclosures
- $117

**Monitors**
- Apple 20" Multiple Scan
- Apple 17" Multiple Scan
- Apple 15" Multiple Scan
- Apple 14" Color Plus
- SuperMac 21+XNL
- SuperMac 20 Plus
- Radius IntelColor/2X/2
- SuperMac Preview 21 T
- Sony 2051 w/adapter
- Sony 1752 w/adapter
- Sony 15" SFZ w/adapter
- Sony 1425S, 14" Trinitron
- RasterOps Clearvue 20T
- RasterOps 20T Plus
- Color LaserWriter 12/600 PS
- LaserWriter 16/600
- LaserWriter 4/600 PS
- LaserWriter Select 360
- Personal LaserWriter 320
- StyleWriter 2200
- StyleWriter 1200
- GCC Elite XL1200
- GCC Elite XL616
- GCC ColorFast
- HP 4MV
- HP 5MP
- Sale Price: $169

**Video Boards**
- Thunder IV/GX1600
- Thunder IV/GX1360
- Thunder IV/GX1152
- Radius P/Color Pro 2AX
- Radius P/Color 24XK
- Radius P/Color 24TX
- Radius Thunder 24GT
- Radius VIDEO VISION v2 3399
- SuperMac GX1600
- SuperMac GX1360

**CD Recordable & MO**
- Pinnacle RCD 1000
- HHB 680 MB blank CD
- 32X CD-R
- 28X CD-ROM
- 24X CD-R
- 16X CD-R
- 12X CD-R
- 8X CD-R
- 4X CD-R
- 2X CD-R
- 1X CD-R
- Magneto-Optical System

**Leasing Advantages**
- Take advantage of possible tax savings while saving capital for profitable ventures.
- Monthly payments, fixed cost, no down payment, Desirable for new equipment.
- Leasing allows you to keep equipment up-to-date, keep current, and have new equipment every 3 years.

**Small Business Station**
- PowerMac 7100/80, 8-700 w/CD
- 15 Multiscan Display
- Extended Design Keyboard
- Sale Price: $2625

**CyberMac 81 Workstation**
- PowerMac 8100/100AV, 16-1000 CD
- 17in Multiscan Display
- Extended Design Keyboard
- Sale Price: $2189

**Demon Workstation 8110**
- PowerMac 8100/100AV, 16-1000 CD
- 17in Multiscan Display
- Extended Design Keyboard
- Sale Price: $117

**Arrays from FWB**
- SledgeHammer 4100 Wide
- SledgeHammer 8200 Wide
- SledgeHammer 17400 W
- SCSI JackHammer

**DAT from FWB**
- HammerDAT 2000
- HammerDAT 5000
- HammerDAT 16000
- HammerDAT 4800
- AutoLoader
- HammerDL 1700
- (Digital Linear Tape Drive)
- HammerDL Blank2:75

**CDs**
- FREE
- 14 CDs
- In System Purchase

**Promotions**
- Over 2600 Apple products to choose from - call for unlimited products

**DigiCore**
- All Major Credit Cards • CODs • Wire Transfers • POS on Approval

**Contact Information**
- Call Toll Free: 800-858-4622
- In California: 800-858-0311
- 24 hr FaxLine: 818-786-9700
- International & Dealers: 818-785-2800
- Circle 269 on reader service card
HP DeskWriter 660C

Advanced-technology color inkjet printer

- Print speed: up to 4 ppm (monochrome, 1.5 ppm color)
- 16MB Motorola 68000 CPU
- 512KB RAM standard
- User-selectable resolution: 600 x 300 dpi
- 1.2MB on-board memory
- Resolution Enhancement Technology (RET) HP ColorSmart color optimization and management
- AppleTalk and RS-422A serial interface
- Includes: 100 sheet and single envelope feeders
- 3 year warranty
- HP-C2165A

$465.23 CDW 53420

Sony CSD-7611M

External quad-speed CD drive

- 100ns average access time
- 600KB/s read/write data transfer rate
- 256KB buffer for smooth audio/video playback
- Includes Macintosh installation software
- SCIF-2 interface

$322.97 CDW 53643

Xclaim GA

True color PCI graphics accelerator

- ATi mach64 processor
- 2MB or 4MB VRAM versions
- 2MB version upgradable to 4MB with plug-in memory module
- Supports resolutions up to 1600 x 1200
- Dual connectors support both Apple and VDA style monitors
- AppleGuide implementation
- User-definable hot keys control:DeskScope extended desktop up to 2300 x 1740, automatic zoom, instant resolution and color depth switching
- Five-year world-wide warranty

2MB... $349.91 CDW 55976
4MB... $458.17 CDW 55856

2MB VRAM upgrade... $249.77 CDW 56252

Leather Notebook for Apple PowerBooks

- Luxurious full grain leather
- Padded computer section: 11" x 13" x 2.5"
- Large exterior pocket: 13" x 9" x 2.5"
- Detachable padded shoulder strap w/stitched fittings
- Expanding file with 3 divided sections

Notepac... $99.00 CDW 27505
Universal... $39.00 CDW 23607
$69.00 CDW 19486

Top-Selling Macintosh Software

Dolrina Fax Pro V1.5.1

- 24.16"/s high-speed printing
- 53341 base unit + $24.16/s per millimeter

$54.32 CDW 45422

ClarisWorks V4.0

Version upgrade...

ONLY $66.49 CDW 56799

MacWorld 9/95
MEGAHAUS

- Low price guarantee!
- Selling quality drives at incredibly low prices since 1987.
- 30 Day money back guarantee.
- Fast service. Most orders shipped same day!
- Lifetime technical support.
- 24 Hour turnaround, 1 year replacement policy.
- Friendly, helpful staff. We appreciate your business!

OPTICAL DRIVES

230MB FUJITSU
- Read and write 125 or 230MB disks
- Dynamo external $550 1 free disk
1.3 Gig NEC
- Read and write 650MB or 1.3Gig disks
- 2 Year warranty 1 MB data buffer.
- External only $1589 1 free disk

1.3 Gig Maxoptix
- Read and write 650MB, 1.3gig or 1.3Gig disks
- 4MB data buffer, 1 year warranty.
- External only $2269 1 free disk

Quantum

850MB Internal $269 External $329

FUJITSU

1GIG Internal $379 External $439

SyQuest

800MB Internal $329 External $439

ATTO SCSI ACCELERATOR
Set the full performance from your drives.
SAVE $20 with hard drive sale.
Alano
Nubus SiliconExpress II FAST SCSI $459
Nubus SiliconExpress IV WIDE SCSI $499
Vantage PCI for new Macs WIDE SCSI $569

The Ultimate Powerbook Drive
- 523MB -5400rpm 12ms
- 512KB Cache ONLY $399

FUJITSU

1-800-786-1184

FUJITSU OFFERS THE BEST VALUE ON THE MARKET!

- Low price guarantee on all Fujitsu drives!

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Speed</th>
<th>RPM</th>
<th>Buffer</th>
<th>Wty</th>
<th>Model</th>
<th>Internal</th>
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Quantum

#1 HARD DRIVE
FOR MAC!

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<td>$439</td>
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SyQuest

Genuine Syquest cartridges
- Qty 4/6 or 10s or with drive.
- 44MB $42 $40 20ms
- 88MB $47 $45 18ms
- 115MB $53 $50 17ms
- 200MB $76 $71 16ms

CD ROM DRIVES

<table>
<thead>
<tr>
<th>Brand</th>
<th>Capacity</th>
<th>Speed</th>
<th>Transfer</th>
<th>Buffer Internal</th>
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<td>1024K</td>
<td>$2479</td>
<td>$2539</td>
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We also stock Pioneer disk changers, Sony, and NEC drives.

MegaHaus is your #1 source for Quantum drives.
- Low price guarantee on all Quantum drives!
- Same day shipping on most orders!

MegaHaus is your #1 source for Syquest drives.
- Low price guarantee on all Syquest drives!
- 1 FREE cartridge with each drive!
- 2 year warranty on drive and case!
- 5 year warranty on all cartridges!
- Same day shipping on most orders!

Brand | Capacity | Speed | Transfer | Buffer Internal | External |
<table>
<thead>
<tr>
<th></th>
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Brand | Model | Speed | Transfer | Buffer Internal | External |
<table>
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<td>$329</td>
</tr>
<tr>
<td>Plextor</td>
<td>6Par</td>
<td>145ms</td>
<td>900KB/sec</td>
<td>256K</td>
<td>$559</td>
</tr>
</tbody>
</table>

We also stock Pioneer disk changers, Sony, and NEC drives.

Circle 245 on reader service card
THE ALL NEW (STACKABLE) PHASER LINE OF ENCLOSURES
A DirectTech Exclusive...Available for All 3.5" External Drives

**HARD DRIVES**

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Model No.</th>
<th>Enclosure</th>
<th>Size</th>
<th>Seek</th>
<th>RPM</th>
<th>Warranty</th>
<th>Price</th>
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<td>DT-395LT</td>
<td>Quantum</td>
<td>3.5&quot;</td>
<td>11 mm</td>
<td>5400</td>
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<td>540 MB</td>
<td>DT-595MV</td>
<td>Quantum</td>
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<td>11 mm</td>
<td>5400</td>
<td>2 yrs</td>
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<td>720 MB</td>
<td>DT-795LT</td>
<td>Quantum</td>
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<td>11 mm</td>
<td>5400</td>
<td>2 yrs</td>
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<td>1.0 GB</td>
<td>DT-1080GB</td>
<td>Quantum</td>
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<td>5 yrs</td>
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<td>DT-31250</td>
<td>Seagate</td>
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<td>5400</td>
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</table>

**AUDIO/VIDEO TUNED HARD DRIVES**

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Model No.</th>
<th>Size</th>
<th>Seek</th>
<th>RPM</th>
<th>Warranty</th>
<th>Price</th>
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<tbody>
<tr>
<td>1.0 GB</td>
<td>DT-31225W</td>
<td>Seagate</td>
<td>3.5&quot;</td>
<td>9.0 mm</td>
<td>5400</td>
<td>5 yrs</td>
</tr>
<tr>
<td>2.0 GB</td>
<td>DT-3122W</td>
<td>Micropolis</td>
<td>3.5&quot;</td>
<td>8.5 mm</td>
<td>7200</td>
<td>5 yrs</td>
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<tr>
<td>2.1 GB</td>
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<td>Seagate Barracuda</td>
<td>3.5&quot;</td>
<td>8.0 mm</td>
<td>7200</td>
<td>5 yrs</td>
</tr>
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<td>Micropolis</td>
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<td>5 yrs</td>
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<td>DT-1991W</td>
<td>Micropolis</td>
<td>5.25&quot;</td>
<td>12 mm</td>
<td>5400</td>
<td>5 yrs</td>
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<td>9.0 GB</td>
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<td>Seagate Elite 9</td>
<td>5.25&quot;</td>
<td>11 mm</td>
<td>5400</td>
<td>5 yrs</td>
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</table>

**SPECIAL!!!**

**DISK ARRAYS**

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<th>Capacity</th>
<th>Model No.</th>
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<th>Warranty</th>
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<td>DT-151500-2AR</td>
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</tr>
<tr>
<td></td>
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<td>3.0 GB</td>
<td>HP-43316</td>
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<td>$2,000</td>
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**OPTICAL**

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<th>Warranty</th>
<th>Price</th>
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<tbody>
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<td>DT-312200-2AR</td>
<td>0, 0, 1</td>
<td>$5 Call</td>
<td></td>
</tr>
<tr>
<td>4.0 GB</td>
<td>DT-312250-2AR</td>
<td>0, 0, 1</td>
<td>$5 Call</td>
<td></td>
</tr>
<tr>
<td>8.0 GB</td>
<td>DT-151500-2AR</td>
<td>0, 0, 1</td>
<td>$5 Call</td>
<td></td>
</tr>
</tbody>
</table>

**CD-ROM**

<table>
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<th>Serial Number</th>
<th>Warranty</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.3 GB</td>
<td>HP-43316</td>
<td>18 ms</td>
<td>$2,000</td>
<td></td>
</tr>
</tbody>
</table>

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<thead>
<tr>
<th>CAPACITY</th>
<th>INTERNAL TORNADO</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 Hawk LP 2GB</td>
<td>$849 $949</td>
</tr>
<tr>
<td>Q Grand Prix 2GB</td>
<td>$899 $999</td>
</tr>
<tr>
<td>Q Atlas 2GB</td>
<td>$999 $1099</td>
</tr>
<tr>
<td>Q Atlas 4GB</td>
<td>$1499 $1599</td>
</tr>
</tbody>
</table>

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<tr>
<th>CAPACITY</th>
<th>RAID 0,1</th>
<th>RAID 0,1,4,5</th>
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<tr>
<td>4GB</td>
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<td>$3799</td>
</tr>
<tr>
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<td>$4999</td>
<td>$5199</td>
</tr>
</tbody>
</table>

PowerBook Drives

Spin 2.5" drives are fast, easy to install, and offer the capacity you need when you are on the road.

- Quantum 170MB $179
- Quantum 256MB $249
- Quantum 341MB $299
- Quantum 514MB $379

Whirlwind

Whirlwind Fast/Wide drives are for graphics and other users who need superior throughput but not the horsepower of our Whirlwind RAID system.

- 2GB Seagate Barracuda $1299
- 4GB Quantum Atlas $1999
- ATTO SE IV with drive $895

Internal RAID

Fast/Wide RAID that fits inside your 800, 840AV, PowerMac 9100, or Workgroup Server 80 and 8150. ATTO SE IV and Remus RAID software included.

<table>
<thead>
<tr>
<th>CAPACITY</th>
<th>RAID 0,1</th>
<th>RAID 0,1,4,5</th>
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<td>4GB</td>
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Hard Drives

Spin introduces the new, affordable Quantum Fireball and Trailblazers! Perfect for home/office users.

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<tr>
<th>CAPACITY</th>
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<tr>
<td>420MB</td>
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<td>540MB</td>
<td>$219 $319</td>
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<tr>
<td>1.0GB</td>
<td>$399 $499</td>
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</table>
Configure Your Own System
Package or Choose A Bundle

Below

FREE CLARIS ORGANIZER with All System Purchases

7100/80 Publishing System 5183 p/11'
• PowerMac 7100/80 40/1 GB/CO
• SuperMac 17” Monitor
• 1600dpi Scanner
• Adobe Photoshop, Corel Draw

NEWI Power Mac 6100/66 8/500 HD/CO
• 800MHz 21” Trinitron Monitor
• Ext. Keyboard, Mouse, Case

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• ADF/Scanner
• A4 Printers
• 5-in-1 Wireless Mouse
• CD Media Player

NEWI POWERBOOK 540c Power Package (13x: as above, but w/
PowerBook 520c, 8/160, one battery) $2775/$579

NEWI Mac Clone Authorized Dealer

• PowerMac Clone Systems
  "Quadro" 850 4/500 132MHz '040' $989
  "Quadro" 850 4/500 (401Hz '040') $989
  POWER PC 8100 8/700 Compatible (120 MHz) $2450

Unfortunately, the content is not formatted into a table or list. It appears to be a mix of text and prices related to computer equipment and software. The text includes details about various computer systems, software packages, scanners, monitors, and printers, along with prices and contact information for a CD-ROM rental club and Mac clone authorized dealers. It also mentions a free color inkjet printer with every lease over 510,000.
## QUANTUM

<table>
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<tr>
<th>Model</th>
<th>Capacity</th>
<th>Seek</th>
<th>Buffer</th>
<th>Warranty</th>
<th>RPM</th>
<th>Size</th>
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## MICRONPOLIS

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## POWER BOOK

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</table>
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The PowerPak $224.99

TRINITY WORKS PowerPak 71/80 with 256K Level 2 Cache Card

The PowerPak is a motherboard upgrade which directly boosts operating speed across the entire system. The computer recognizes the PowerPak boost and portends the change in "About This Macintosh" window.

The PowerPak $224.99

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TurboNet ST connector for LocalTalk® networks offers low latency and saving features. Focus indicator lights give you instant feedback about signal presence and strength. Improved signal quality and lower termination problems. It's 100% compatible with all PowerMac® LocalTalk®, and other third-party connectors, and supports star, daisy chain, trunk or combination network topologies.

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EtherLAN TR-TM (Thin MUI Transceiver) $139.99

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TurboNet ST Din 8 Apple® LocalTalk® Connector, D IN 8 style

TurboNet ST connector for LocalTalk® networks offers low latency and saving features. Focus indicator lights give you instant feedback about signal presence and strength. Improved signal quality and lower termination problems. It's 100% compatible with all PowerMac® LocalTalk®, and other third-party connectors, and supports star, daisy chain, trunk or combination network topologies.

EtherLAN TM (Thin MUI Transceiver) $139.99

EtherLAN TR-TM (Thin MUI Transceiver) $139.99

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- You can choose from different mailbox types to complete a sophisticated call center.
- Customers can call into your Macintosh and navigate through the menu selections you provide, using their touch tone telephone.
- Digital Storefront can forward your calls, page you, or notify you at another number if someone has just left you a message.
- Using the fax-back feature, and as a fax-reader,

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Digital Storefront comes with a custom telephone dialer and a modem that automatically dials your number. Unlike modems, whose sound quality is limited by the serial port, Digital Storefront uses the high-fidelity audio system of your Macintosh to play announcements and record messages. This unique advantage provides the professional sound quality that you and your customers expect.

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- You can choose from different mailbox types to complete a sophisticated call center.
- Customers can call into your Macintosh and navigate through the menu selections you provide, using their touch tone telephone.
- Digital Storefront can forward your calls, page you, or notify you at another number if someone has just left you a message.
- Using the fax-back feature, and as a fax-reader,
Some people donate money to keep the air clean. Jeff Angus wrote 2000 lines of code.

Jeff Angus has regularly donated money to the Natural Resources Defense Council. Now he also supports them in a different and maybe even more valuable way. By donating his skills to modify a dBASE program that generates customized reports about toxic substances.

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516-2050MB

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4064-8669MB

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APS DISK ARRAYS (0-5)

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<td>8 GB</td>
<td>5 Parity</td>
<td>4999.95</td>
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<table>
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<th>Model</th>
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<td>APS DLT40</td>
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*Actual data compression and tape capacity vary greatly depending on the type of tape media, drive, system parameters and environment.

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## Power PC 6100/66 3/0:
- $1495.00

## Power PC 7100/80 8/0:
- $2139.50

## Power PC 8100/100 8/0/16/1000/cd:
- $3025.00

## Power PC 8100/110 8/0:
- $4495.00

## Color Monitors:
- 14" Color Monitors as low as $299.00
- 17" Color Monitors as low as $799.00
- 21" Color Monitors as low as $1599.00

## Free Interest and NO Payments for 90 Days

## Accessory/Hard Drives:
- CB & Mounting Kit: $299.00
- AV Cards: $450.00
- Extended Keyboard: $75.00
- 1 Gigabyte Hard Drive: $495.00
- 2 Gigabyte Hard Drive: $945.00
- 4 Gigabyte Hard Drive: $1495.00

##記者

## Never Undersold Guaranteed

## Recordable CD Blanks
- GTDK or MTC: $7.49

## Optical Cartridges
- 120mm '15"230mm'19"650mm'145"1,300'153"

## Syquest Cartridges
- 4mm'33"8mm'37"10mm'50"20mm'70"20mm'56"

## Tape Cartridges
- 4mm'60"5"4mm'80' 16"8mm'90' 5.5"8mm'120' 5"

## Zip Discs
- 100 MB: $14.99

## Recorders & Hard Drives
- PowerBook 150: $999.00
- PowerBook 540 C/4/320: $2699.00
- PowerBook 520 C/4/160: $2125.00

## Computer Pros
- 1-800-319-41MAC (4622)
- Fax: (714) 457-1033
- Call: (714) 457-1090

## Buy Today, and Make NO Payments for 90 Days

## CPU's: Build Your Own Configuration
- Power Mac
  - Power Mac 6100/66 3/0: $1495.00
  - Power Mac 7100/80 8/0: $2395.00
  - Power Mac 8100/100 8/0: $3025.00
  - Power Mac 8100/110 8/0: $4495.00
  - Power Mac 9500/120/16/1000/cd: $4369.00
- POWER MACINTOSH
  - Power PC 6100/66 3/0: $1495.00
  - Power PC 7100/80 8/0: $2395.00
  - Power PC 8100/100 8/0: $3025.00
  - Power PC 8100/110 8/0: $4495.00
  - Power PC 9500/120/16/1000/cd: $4369.00
  - 14" Color Monitors as low as $299.00
  - 17" Color Monitors as low as $799.00
  - 21" Color Monitors as low as $1599.00

## Memory
- 4 Megabyte SIMM: $199.00
- 8 Megabyte SIMM: $295.00
- 16 Megabyte SIMM: $565.00
- 32 Megabyte SIMM: $969.00

## Accessories/Hard Drives
- CB & Mounting Kit: $299.00
- AV Cards: $450.00
- Extended Keyboard: $75.00
- 1 Gigabyte Hard Drive: $495.00
- 2 Gigabyte Hard Drive: $945.00
- 4 Gigabyte Hard Drive: $1495.00

## QuoRA
- 605/1460: $999.00
- 605/2450: $1990.00
- 605/51000CD: $1795.00
- 607/51000CD: $1795.00
- 637/51000CD: $1795.00
- 611/51000CD-syntax: $1795.00
- 611/51000CD-mounted: $1795.00

## Fax: 310-358-9100

## Free Interest and NO Payments for 90 Days

## Never Undersold Guaranteed

## Recordable CD Blanks
- GTDK or MTC: $7.49

## Optical Cartridges
- 120mm '15"230mm'19"650mm'145"1,300'153"

## Syquest Cartridges
- 4mm'33"8mm'37"10mm'50"20mm'70"20mm'56"

## Tape Cartridges
- 4mm'60"5"4mm'80' 16"8mm'90' 5.5"8mm'120' 5"

## Zip Discs
- 100 MB: $14.99

## Recorders & Hard Drives
- PowerBook 150: $999.00
- PowerBook 540 C/4/320: $2699.00
- PowerBook 520 C/4/160: $2125.00

## Computer Pros
- 1-800-319-41MAC (4622)
**Systems, Storage and Savings!**

- **Quantum**
  - 1.0GB Hawk 2LP: $95
  - 2.1GB Hawk 2LP: $195
  - 4.3GB Hawk 4LP: $495
- **SyQuest**
  - 50MB Drive: $99
  - 170MB Drive: $199
  - 320MB Drive: $299

**PowerMac**

- PCI PowerMacs:
  - PowerMac 7200/75 CALL: $499
  - PowerMac 7200/90 CALL: $549
  - PowerMac 7200/100 CALL: $599
  - PowerMac 9500/120/1000CD: $1,499
  - PowerMac 9500/132/1600CD: $1,599

**Mac Alternative**

- floppy drives: 1.4MB storage, $99

**Lowest Prices Guaranteed**

- Quantum: 170MB, $129, 320MB, $249
- Micropolis: 50MB, $49, 100MB, $89, 200MB, $159

**FCVECC (50 days on 90 days) Drives**

- Book w/ 3 year 우리나: $495
- 1GB: $695
- 2GB: $995

**UNBELIEVABLE LOW PRICES**

**Power Mac Power Books**

- 680k: $299
- 1Mb: $499
- 2Mb: $799

**MacUSA**

- Since 1983
- 800-809-0880
- Mac Duo Mini Dock: $279

**Printers**

- Apple, Hewlett Packard
- Monitors: Apple, NEC, Radius, Sony
- Scanners: Agfa, Apple, Hewlett Packard

**Software**

- Microsoft Office: $225
- Microsoft Excel: $119

**Accessories**

- Mac Duo Mini Dock: $279
- Mac HD 2.1 Floppy Drive: $119
CDG has everything for the graphics, digital video and prepress professional.

**Publishing/Prepress System:**
- PowerMac 9500/120 48 RAM/1000 HD/4x CD
- Radius Intellicolor 20E Display
- Radius ThunderColor 30/1600 PCI video accel.
- Agfa Arcus II flatbed scanner
- NewGen ImagePlus 12XF Printer
- Adobe Illustrator 5.5
- QuarkXPress 3.3

**NEW PowerMac Computers:**
- New PowerMacs are in! Call for current pricing.

**Imaging**
- New Gen ImagerPlus
- 12XF 1200 DPI
- Nikon SuperCoolscan LS-1000 $799
- Nikon LS-450QF Slide Scanner $991
- Nikon Scansnap AX1200 $1,132
- Agfa Arcus II $2,677
- Pixelcraft Pro Imgr. 4000 $1,899
- Umax Powerlook $2,599
- AND MUCH, MUCH MORE

**Video**
- Radius PrecisionColor 17 $1,029
- Radius PrecisionColor 21 $2,029
- Radius PrecisionView 17 $979
- Radius PrecisionColor 5/1800 PCI Video Card $499
- Radius ThunderColor 30/1152 $1,599
- PCI Video Card NEW $2,099

**Output**
- NewGen ImagePlus
- 12XF 1200 DPI
- NEW $5,299
- Apple Color LaserWriter 12/600
- NEW $5,493
- Apple LaserWriter 4/600
- NEW $6,749
- Call For Price
- Apple Portable Color StyleWriter 2200
- NEW $8,199
- Call For Price
- AND MUCH, MUCH MORE

**Storage**
- Radius ThunderColor 30/1600 PCI Video Card
- NEW $6,749
- Radius PrecisionColor 21 $2,029
- Radius PrecisionView 17 $979
- Radius PrecisionColor 5/1800 PCI Video Card $499
- Radius ThunderColor 30/1152 $1,599
- PCI Video Card NEW $2,099
- AND MUCH, MUCH MORE

**Sony**
- Quantum Fireball Fast SDR/2 HDs
- $8,199
- Quantum Fireball Fast SDR/2 HDs
- $6,749
- Quantum Fireball Fast SDR/2 HDs
- $4,999
- Quantum Fireball Fast SDR/2 HDs
- $2,999

**Call for Price**
- Quantum Fireball Fast SDR/2 HDs
- $8,199
- Quantum Fireball Fast SDR/2 HDs
- $6,749
- Quantum Fireball Fast SDR/2 HDs
- $4,999
- Quantum Fireball Fast SDR/2 HDs
- $2,999
- Quantum Fireball Fast SDR/2 HDs
- $1,999

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MORE THAN 27,000 PRODUCTS FOR THE MACINTOSH AND PC

CIRCLE 416 ON READER SERVICE CARD
### Power Macintosh CPUs

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
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<tr>
<td>8100/100 8/700</td>
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<td>8100/100 10/1GB/CD</td>
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<tr>
<td>8100/100 72/16/5GB</td>
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<td>8100/100AV 16/700/CD</td>
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### Newton Pad 120 (1MB) | $579

### PowerBooks

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<td>PB 520 8/240/G.V. Mercury</td>
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<td>PB 540c 4/240</td>
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<td>PB 540c 12/512 Mod</td>
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<td>Dino 280c 12/320M</td>
<td>INSTOCK</td>
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<tr>
<td>Dino Duck II+ 1MB/16MH/ETHER</td>
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### MODEMS

- Global Village P.P. Mercury $529
- Global Village T.P. Platinum $529
- Global Village PP Duo Mercury $539
- Global Village Teleport Gold II $129
- Global Village Teleport Plus $255

### Monitors

- Apple 14" Plus $298
- Apple 14" AV $298
- Apple 15" M-Scan $349
- Apple 17" M-Scan $399
- Apple 20" M-Scan $1097

### SONY

- Sony CD-3425 13" $438
- Sony Multiscan 15sf $438
- Sony 17"f $2889
- Sony 17"e $2889
- Sony 20"e $2889

### SPECIALS

- Mac LC 550 4/160 w/Trin $699
- Apple 15" MultiScan $449
- LW Select 360 W/TONER $1229
- StyleWriter II $199

### MACBASE MEMORY DIVISION

<table>
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<td>256K/512/1K</td>
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### Video/CACHE

- $155/369

### EZQUEST

- SyQuest 88MB Ext. kit $389
- SyQuest 200MB Ext. kit $489
- SyQuest 270MB Ext. kit $479
- HP DAT DDS II 8GB SCSI EXT. $1259

### EPSON

- EPSON ES-1200 Pro Mac $1249
- EPSON Styles color inkjet $529

### Custom Configuration & Business Leasing Available

**MacBase USA (800) 951-1230**

INTERNATIONAL (310) 498-1230, FAX (310) 498-0032

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Macintosh II to 11x with RAM exchange

Upgrade your old Mac II or 11x with a new 11x logic board. We'll even exchange your Mac II simms for a like amount of 11x simms.

Working boards only, please.

LCII to Quadra 605 exchange $349 new
MC68LC040 at 25MHz • 88MB on-board RAM • 4MB on-board RAM

LCII to LCII exchange $199 reconditioned
MC68030 at 40MHz • 4MB on-board RAM

Classic to Classic II exchange $199 reconditioned
MC68030 at 25MHz

Centris 610 to Quadra 660av exchange $399 new
MC68LC040 at 25MHz • 24MB on-board RAM • Ethernet

Quadra 800 to 840av exchange $599 new
MC68040 at 40MHz • 66MHz AT&T 3210 DSP chip

iici to Centris 650 exchange $398 new
MC68LC040 at 25MHz • 4MB on-board RAM

lvi to Centris 650 exchange $399 new
MC68LC040 at 25MHz • 4MB on-board RAM

New Quadra 605 4/160

- On-board video supports large color and grayscale displays (try that with a Quadra 630)
- VRAM upgradable to 1MB or 64MB color on up to 17" displays or 8-bit on 20"
- MC68LC040 processor at 25MHz upgradeable to MC68040/FPU with processor upgrade
- Includes software bundle with Claris Works, Quickken, and others

Free Global Village Bronze Fax/Modem System 7.5
Includes disk & user manual $25.00

GLOBAL VILLAGE Teleport Bronze Fax/Modems $25.00
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Power Mac 7100/5 8/0 2.59
Power Mac 7100/8500/CD 2.59
Power Mac 8100/8700/CD 2.99

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APPLE MULTISCAN 17" $995
APPLE MULTISCAN 27" $1,020
APPLE COLOR SCANNER WHITE $125

P1 520C/4/240 $208
P1 520C 12/240/M. $208
P1 54C/4/33L. $278
P1 54C 12/90/M. $389
Q 980 WITH CPU. $289
PM 7100/300 9500. $289
PM 7100/300 167000CD. $329
PM 8100/100 8/70L. $319
PM 8100/100 167000CD. $329
PM 8100/100/AV 161000CD. $419
PM 8100/100/AV 161000CD. $329
PM 8100/100/AV 161000CD. $329
PM 8100/100/AV 161000CD. $329
PM 8100/100/AV 161000CD. $329

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<table>
<thead>
<tr>
<th>Time</th>
<th>Product Name</th>
<th>Price</th>
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<tr>
<td>9:30 AM</td>
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**Additional Options:**
- macOS Monterey $299
- macOS BIG SUR $249
- macOS CATALINA $199
- macOS LION $149

*Please call ahead for availability and pricing.*
**CALL for NEW PCI MAC's & PowerBook 5000 Series**

**Scanners**
- AGFA Studio Scan II: $855
- AGFA Horizon: $16400
- AGFA Arcus Plus II: $2525
- AGFA ProColor Premier: $2797
- Umax Color Look: $2055
- LaserCraft (Vga) 8000: $955
- LaserCraft (pro) 8000: $1705
- ScanMaker III (650): $250
- ScanMaker 2SP: $810
- Umax 1250 Pro: $1075
- Epson 1200C: $1250

**Video Cards**
- Radius Vision Studio V2.0: $3550
- Video Vision ProPack: $7895

**Power Books**
- 540C: 20/500M: $3950
- 540C: 12/320M: $3950
- 540C: 36/600M: $4950
- 520C: 8/650: $2450
- 520C: 20/800M: $3650
- 150: 4/120: $195
- 150: 8/320: $185
- 520: 8/650: $1975
- 280C: 12/320: $3650
- Upgrade Card to 5000 Series: CALL

**Quadra's**
- 650: 16/500CD: $2955
- 950: 0/64: $1899
- 950: 16/500CD: $3450
- 630: 4/500: $1650
- 630: 20/650: $1605

**WorkGroup Server**
- 910/500: 16/1GB (W4.1): $5150
- 910/520: 16/2GB.CD: $5750
- 95: 16/1GB.DAT: $3450
- 80: 16/1GB.DAT: $3195

**Apple's**
- Apple Share 4.0: $495

**Performa's**
- 6820: CALL
- 6119CD: 8/320CD: $1995
- 630CD: 8/320CD.DT: $1799
- 630CD: 12/320CD: $1799
- 630: 4/250: $1250
- 576: 8/320CD: $1650
- 577: 5/320CD: $1495
- 575: 2/250: $1399

**Apple Monitors**
- Apple 20X Multiple Scan: $1849
- Apple 17X Multiple Scan: $910
- Apple 15X Multiple Scan: $499
- Apple 14" Color Plus: $295

**Apple Printers**
- Style Writer II: $169
- Color Style Writer 220: $395
- LaserWriter 16/650: $1895
- LaserWriter Select 360: $1150
- Color Laser 12/1660: $8150
- Laser 4800: $885

**New Arrivals**
- Radius/Quadra
  - Thunder IVGX 1600: $2595
  - Thunder IVGX 1900: $2175
  - Thunder IVGX 1152: $1850
  - Supercard 17T: $875
  - Precision Card 17X: $989
  - IntelliColor 25E: $1875
  - SuperMac 210: $2050
- PressView 11T: $3050
- Radius Vision Studio V2.0: $3550

**Drives**
- Pinnacle RCD 1000: $1995
- Zip Drive: $1995
- Radius 4GB Pro Array: $4795
- Apple 700MB HD: $200
- Apple 500MB HD: $175
- Apple 340MB 2.5 HD: $395
- Toshiba 800MB 2.5 HD: $650
- Apple 1GB HD: $505
- Apple IC3 300e Plus: $1150
- 4.2GB Seagate Barracuda: $1050

**Parts**
- 810/110 Logic board: $1955
- 7100/80 Logic board: $1595
- Quad. 800/440 LBoard: $1195
- Quad. 950/650 LBoard: $1495
- Generic Mouse: $29
- Superfloppy: $199
- Softwindow: $100
- Apple IC1 300e Plus: $217
- Apple Ext. Keyboard II: $29
- Apple Std. Keyboard: $69
- Power Supply 810/710: $275
- PowerBook 500 Battery: $120
- GEO Port: $130
- System 7.5 on CD: $25
- External Case iCD300+: $25

**Demo Mac's**
- 8100/10AV: 80: $395
- 8100/100: 16/700CD: $285
- Quadra 840AV: $230
- Quadra 800: $230
- Quadra 850: $230
- Quadra 685: $230
- Quadra 610: $230
- PowerMac 1000: $230

**Exchange any old MAC to NEW POWER MAC**

**Exchange Your MAC**
- 510: 8100/10AV: 7100/80: $1290
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- 800/80: $1290
- 650/650: $2675
- 700/80: $2795
- 500/500: $1530
- 900/90: $1795

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<table>
<thead>
<tr>
<th>PowerBooks</th>
<th>This Month's Specials</th>
<th>Software &amp; Drives</th>
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</thead>
<tbody>
<tr>
<td>DuoDock II Plus w/ Ethernet</td>
<td><strong>$29</strong></td>
<td><strong>Liquid 5.0 w/ InControl 3.0</strong> $42</td>
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<tr>
<td>DuoDock 24/40</td>
<td><strong>$29</strong></td>
<td><strong>MYST CD-ROM</strong> $47</td>
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<td>DuoDock 12/20 Modem</td>
<td><strong>$29</strong></td>
<td><strong>Microsoft Encarta 1995 (CD-ROM)</strong> $86</td>
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<td>150/410</td>
<td><strong>$29</strong></td>
<td><strong>Norton Utilities 3.1</strong> $39</td>
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<td>150/420</td>
<td><strong>$29</strong></td>
<td><strong>FileMaker Pro 2.1 &amp; InControl 3.0</strong> $75</td>
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<td><strong>Canvas 3.5</strong> $299</td>
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<td>200/410</td>
<td><strong>$29</strong></td>
<td><strong>Excel 5.0</strong> $299</td>
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<tr>
<td>200/420</td>
<td><strong>$29</strong></td>
<td><strong>MS Office 4.2 (CD-ROM or Disk) SCALL</strong></td>
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<tr>
<td>200/430</td>
<td><strong>$29</strong></td>
<td><strong>Alude PageMaker (800PowerMac) SCALL</strong></td>
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<tr>
<td>250/430</td>
<td><strong>$29</strong></td>
<td><strong>Adobe Photoshop 3.0</strong> $570</td>
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Modems

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<td>Super 14.4K LQ</td>
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<td>SuperFax 32Bis</td>
<td><strong>$129</strong></td>
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<tr>
<td>Supra 28.8K (w/Cables &amp; Software)</td>
<td><strong>$217</strong></td>
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<tr>
<td>GeoPort Adapter 1130</td>
<td><strong>$217</strong></td>
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<td><strong>(Available for Power PC's &amp; AY)</strong></td>
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<td>GV PowerPort Gold</td>
<td><strong>$132</strong></td>
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<td>GV PowerPort Platinum</td>
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<tr>
<td>GV PowerPort Platinum</td>
<td><strong>$224</strong></td>
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<td>GV PowerPort Mercury 500 Series</td>
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<td>GV PowerPort Mercury For Duo</td>
<td><strong>$224</strong></td>
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- **$42**
- **$47**
- **$86**
- **$39**
- **$75**
- **$299**
- **$217**
- **$570**

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Powerbooks

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<td>400/430</td>
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<tr>
<td>600/430 Modem</td>
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SOFTWARE

- **Apple Color Plus 1.0** $288
- **Apple Multiscan Trion 15" Display** $462
- **Apple Multiscan 15" Display** $462
- **Sony Multiscan 15" Display** $459
- **Sony 17" CPD-1730** $459
- **Apple Multiscan 20" Display** $639
- **SuperMacs Monitors** $239
- **E Machines T 16** $999
- **NEC SGF** $1999

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- **Apple Color CD 600 External** $308
- **Apple Color Moda Media Kit** SCALL
- **Color LaserWriter 12/600 PS** SCALL
- **Apple Color LaserWriter 4600 PS** SCALL
- **Portable Color StyleWriter 2200** SCALL

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- **Apple One Scanner** $594
- **Apple Color One Scanner** $594
- **HP ScanJet 3p** $594
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- **AGFA Scanners** **CALL**

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- **StyleWriter 1200** $239
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<table>
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<tr>
<th>Model</th>
<th>16MB/1GB HD/CD-ROM</th>
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NEW POWERMAC

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<td>660/233 MB/500MB HD/CD/DO</td>
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68882 50 MHz FPU ...99.00
25 Mhz for Macintosh LC/LCII ...55.00
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25 Mhz for Mac Classic II ...55.00

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4 Megabyte Static RAM Storage Card ...179.00
2 Megabyte Static RAM Storage Card ...239.00
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4 Megabyte Flash Storage Card ...169.00
8 Megabyte Flash Storage Card ...299.00
16 Megabyte Flash Storage Card ...569.00

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MACWORLD September 1995 271
### Optical Drives

<table>
<thead>
<tr>
<th>Model</th>
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<tr>
<td>CD-ROM</td>
<td>$539</td>
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<td>5.25&quot;</td>
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<tr>
<td>ZIP Drive</td>
<td>$1999</td>
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<td>2MM 250MB-WD DRIVE</td>
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<td>100MB 250MB - MG</td>
<td>$195</td>
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<td>ZIP DRIVE</td>
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<tr>
<td>ScanSnap 10MB W/CArt</td>
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<tr>
<td>ScanSnap 4MB W/CArt</td>
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### PowerDrive Memory

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### Hard Drives

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<td>RIM 32GB 16GB Internal</td>
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### New at LLB!

- New Airborne Express Overnight $6 and up

### Accessories

<table>
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<th>Model</th>
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<td>4MB 8MB 12MB 16MB</td>
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<td>128MB 128MB 256MB 256MB</td>
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<td>512MB 512MB 1GB</td>
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### Scanners

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<td>Visioneer PaperPort for Mac</td>
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<td>Visioneer PaperPort for Windows</td>
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<td>Micronet IIR II</td>
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<td>Nikkon EK Extender</td>
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<td>Codieprint</td>
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<td>ScanSnap AX-1200</td>
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### Modems

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### Media

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### Accelerators

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### CD-ROM

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<td>Encore 95</td>
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<td>Encore 95 Plus</td>
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<td>Dell Precision</td>
<td>$1599</td>
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<tr>
<td>EIO 1000</td>
<td>$1799</td>
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### CD-ROM Packages

- Orders received before 8:00 pm EST weekdays shipped same day
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#### Memory

<table>
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<tr>
<th>Type</th>
<th>Price 1 MB</th>
<th>Price 2 MB</th>
<th>Price 4 MB</th>
<th>Price 8 MB</th>
<th>Price 16 MB</th>
<th>Price 32 MB</th>
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<tr>
<td>4M/8M</td>
<td>$145/282</td>
<td>$495/928</td>
<td>$1,290</td>
<td>$3,120</td>
<td>$6,240</td>
<td>$12,480</td>
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<tr>
<td>16M/32M</td>
<td>$155/299</td>
<td>$515/930</td>
<td>$1,300</td>
<td>$3,250</td>
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<tr>
<td>64M</td>
<td>$2,150</td>
<td>$6,450</td>
<td>$16,350</td>
<td>$32,700</td>
<td>$65,400</td>
<td>$130,800</td>
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</table>

**Powerbook**

- 4M/8M/16M/32M
- MAC 72 PIN
- 2X32 60/70
- 4X32 60/70
- Power Book
- 720/520C, 720/540C
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<table>
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<th>Software</th>
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<td>Painter 3.1</td>
<td>$219</td>
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<td>Kai's Power Tools 2.1</td>
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<td>Director 4.04</td>
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<td>Alias Sketch 2.0</td>
<td>$249</td>
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<td>Strata Studio Pro 1.5.1</td>
<td>$495</td>
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<td>Canvas 3.5.2</td>
<td>$175</td>
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<td>Minicad +5.02</td>
<td>$319</td>
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<td>Omnipage Pro 5.0</td>
<td>$349</td>
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<td>Freehand 5.0</td>
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**4TH Dimension 3.2** $475  
**Action! 1.04** $99  
**AEC Fast Track Sched 3** CALL  
**After Dark 3.0** $319  
**Allegiant Multimedia Prod.** $249  
**American Heritage Talk CD** $75  
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**Arrange 2.01** $149  
**Artworks 1.0** $69  
**Astound 1.5** $129  
**Autocad R12** $199  
**Authorware Pro 3.0** $978  
**Blueprint 5** $149  
**CA Cricket Draw III 2.01** $79  
**CA Cricket Graph III 1.5.2** $79  
**Calendarmaker 4.1** $45  
**Camerasan** $79  
**Chem Draw Plus 3.1** $179  
**Chem Office Pro 2.0** $299  
**Claris Impact 1.0** $129  
**Claris Works 4.0** $89  
**Coda Finale 3.2** $275  
**Code Warrior Platinum 6** $149  
**Dabbyler 1.0** $55  
**Dataset 4.2** $329  
**Debabelizer Toolbox 1.6** $219  
**Deltagraph Pro 3.5** $95  
**Design Workshop 1.2** $249  
**Digital Chisel** $299  
**Director II/Immedia Studios 1175** $199  
**Elastic Reality 1.2** $219  
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**Pascal Alchemy 3.0** $279  
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**Power Merge** $79  
**Quickcam QC1** $109  
**Quicken** $39  
**Quickeys 3.01** $95  
**Ram Doubler 1.5** $55  
**Ray Dream Designer 3.0** $179  
**Smalltalk V 2.0** $99  
**Soft PC 3.0** $229  
**SoftWindows 1.0** $89  
**Spanish Power Translator** $99  
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**Virex 5.5.1** $60  
**Virtus Alien Skin Text. Shop9** $249  
**Virtus Walkthrough Pro 2.0** $249  
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**VistaPro** $79  
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<thead>
<tr>
<th>BUSINESS/MATHEMATICS/UTILITIES</th>
<th>Price</th>
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<td>$140</td>
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Mac Battle
Guy's guide to driving your competition crazy

Two columns ago I expressed my belief that the people using lawsuits to compete with Microsoft were wimps. Little did I know this column would create great interest among Macworld readers in competitive tactics—not only in the specific case of competing with Microsoft, but also in driving any enemy crazy. For this reason, I now provide the top ten ways to drive your competition crazy.

Just Say Know

Method 1: Know your customer. Complete knowledge of your customers is the first step to pleasing them. And your customers' satisfaction drives the competition wild. Being willing to listen to the customer is 80 percent of the battle, and creating mechanisms to make communication easy is the other 20 percent. Exercise: Does anyone at your company read the comments on warranty and registration cards?

Method 2: Put your customer's interests before your own. The single best way to drive your competition crazy is to do the right things for the customer—things that are not specifically aimed at your competition. Exercise: Call your voice-jail system. Send your company an E-mail or fax. Are you pleasing your customer or trying to keep personnel costs down?

Method 3: Create a cause, not just a product. A cause is a way of doing things that catalyzes loyalty. A product is a collection of disks, manuals, slipcases, and shrink-wrap. One of the few Macintosh markets Microsoft has not been able to dominate is databases. This is because 4th Dimension is a cause, not just a product. Causes transform customers into evangelists, and evangelists are unpaid salespeople.

Just Say No

Method 4: Concentrate on stuff that matters and ignore the rest. Business is remarkably simple. You have to create a good product, ship it, and support your customers. Yet many companies get obsessed with superfluous, newfangled multimedia technology. Exercise: Compare how much you're spending on a Web page to how much you're spending on technical support.

Method 5: Resist the known and defend the unknown. When Apple was creating Macintosh, the experts told the company to "buy Compaq or become another Compaq" to be successful. Apple did exactly the opposite and invented a new kind of interface (or at least copied a new kind of interface). It resisted the known ("build an MS-DOS clone or better Apple IIe") and embraced the unknown: a cute, graphics toy with icons, pull-down menus, and no software.

(My revisionist way of thinking.) Microsoft copied Apple's copy before it was truly known that this interface was the way to go. Thus, when Microsoft copied the Macintosh interface, it was resisting the known and defending the unknown.

Carpe Diem

Method 6: Seize the day. If word processing companies just shortened their product's boot time when an unreasonably high number of fonts—say four—are loaded, they could drive Microsoft crazy. A printing routine that doesn't require repaginating an entire document twice to print a single page would be neat, too. I'd love to get off Word, but I need paragraph-oriented style sheets, footnotes, endnotes, outlining, and table-of-contents generation. Go ahead: seize me.

Method 7: Draw inside, outside, around, and through the lines. In a previous life, before I wrote for Macworld, I sent out a letter (with a ballot form) to the registered owners of my company's product asking them to vote for my company's product for Macworld's World-Class Award. The Microsoft PR department went nuts. I didn't break any rules because I wasn't falsifying ballots—I simply redrew the lines. Also, it's not my fault Microsoft didn't think of doing this first. [Sorry, Guy. You get full marks for a highly creative strategy, but we have to lower your score on the success portion of the program. We thought something fishy was going on when all those copies started coming in, and in the interest of fairness we decided to count only ballots that had originally been bound into the magazine.—Your editor]

Method 8: Suck up to a librarian. A librarian armed with Dialog, Lexis-Nexis, and an Internet browser can uncover more facts about your market, customer, and competition than you can imagine. It's also pretty inexpensive and easy to become your own research librarian with a Macintosh, a modem, and some software.

Method 9: Convert competition to cooperation. It's often possible to stop competing and start working together for mutual benefit. Apple and IBM, for example, seem to be working cooperatively to defeat Microsoft. This relationship yields an important additional lesson, though: Make sure you get married because you love each other, not because you hate someone in common.

Method 10: Play with their minds. Dan Eilers, the guy who now runs half of Apple, was once the CEO and president of Claris. While at Claris, he cut a great deal on ClarisWorks with the school district in the Bellevue, Washington, area. Why? So that the kids of Microsoft's employees would tell their parents they were using ClarisWorks at school. I love it.

Guy Kawasaki is the author of How to Drive Your Competition Crazy (Hyperion, 1995). His views are his own and only sporadically represent those of Macworld. He has investments in America Online, Apple, Bit Jugglers, BookMaker, Global Village Communication, and Intuit. He is the president of Fog City Software, the creator of Claris Emailer. He can be reached at kawasaki@radiomail.com.
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