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Multimedia Whiz
INEXPENSIVE QUADRA 630: HOT PERFORMER BUILT FOR EASY EXPANSION, PAGE 52
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<th>EPSON ES-1200C Pro</th>
<th>HP ScanJet IID</th>
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OLE and OpenDoc battle for developers' attention

Implementing OpenDoc means writing programs from scratch: developers must dedicate small tools to individual tasks and make sure those tools work together. If you have a spelling-checker tool and a hyphenation tool from different vendors, you want both to work with the text-editing tool you're using. To implement OLE, developers must either extract functions from a big program and turn them into independent programs or they must design tools that plug into a big program.

Windows programmers have complained about OLE 2.0 ever since Microsoft published the specification nearly two years ago, because it requires them to manage cross-application interactions they never had to worry about before, and at the same time it forces them to change how their current software works. Plus, OLE is a moving target. Microsoft keeps promoting development for new OLE versions planned for its forthcoming Chicago (Windows 4.0) and Cairo (Windows NT 4.0) operating systems. OpenDoc developers are likely to face similar hurdles. Apple and its OpenDoc partners have said that OpenDoc will also be revised to add new features about a year after it ships.

One illustration of the object-software challenge is Microsoft's own experience. The company's Office programs don't use OLE objects everywhere they could. For example, the new versions of Excel, Word, and PowerPoint all use OLE 2.0 but still have separate spelling checkers; and PowerPoint and Word have their own table tools. Even mighty Microsoft has limited resources, and full integration of OLE in these three programs (for both Windows and the Mac) would have required immense work. It will be several software generations before Microsoft Office fully exploits OLE 2.0.

Some of the Players

Outside of Apple, WordPerfect is OpenDoc's biggest booster—because it represents a way to break up Microsoft's near-monopoly of the word processor market, by getting users to switch to OpenDoc-compatible tools. A few companies, including Claris, CE Software, and Frame Technology, have committed to using either or both object technologies. And although OpenDoc got better reviews than OLE from most developers Macworld surveyed, even pro-OpenDoc developers are hedging their bets: "It's not really a one-or-the-other type of choice. No one, including Claris, knows which one will be the de facto standard," explained Larry Slotnick, vice president of development for Apple's Claris subsidiary.

To get a better idea of how a document-based architecture is likely to grow, Macworld asked 20 companies about their plans for OpenDoc and OLE 2.0. Most companies were fairly reserved and gave nonanswers like, "OpenDoc is a promising technology that we are exploring." About a half dozen gave no answers at all. A few explained their caution.

- Typical was a comment from Peter Warren, marketing director at Quark: "We offered AppleScript and [UserLand]..."
Frontier [scripting] support a while ago but are only now seeing useful scripts. We expected more end-user support. And we're not sure if OpenDoc will have the same time lag before anyone cares.

- David Schargel, president of Aladdin Systems, had other concerns: "Will vendors be able to price [OpenDoc] parts high enough to justify their investment? How will parts be distributed?"

- The bottom line for Steven Saltzman, then president of Now Software, was the payoff for investing in object technology. "Since it's a fair amount of development effort, we're not going to commit to one [technology] until we've got a pretty strong grip on which is ultimately going to win. It may be that both will win."

- Aldus is looking at implementing the two technologies in future products, but said it's too early to commit to specific products or times.

At present, Microsoft's OLE 2.0 has generated much interest, if not acclaim, among developers because OLE makes integrating multiple programs easier. But that enthusiasm is mostly among Windows developers, who see linking technology as a way to get around the issues of data transfer in a heterogeneous world. Expect OLE 2.0, if it goes beyond Microsoft programs, to be adopted first by cross-platform developers who want Macs to have the same capabilities as Windows systems. Aldus may be one of those, since it has demonstrated prototype software with OLE 2.0 compatibility.

OpenDoc is a more open question because it is still a promise. So why would developers choose OpenDoc over OLE when they can take advantage of OLE now? Several technical advantages make OpenDoc an appealing alternative, including the ability to keep multiple drafts, and an emphasis on smaller tools (and thus lower RAM requirements and faster switching between tools).

Perhaps the most important reason why developers may favor OpenDoc is the strong anti-Microsoft feeling in much of the development community. This feeling is fueled by the fear that cooperating with Microsoft today could mean being overwhelmed later by the company's seemingly endless expansion into ever-more application areas. The fact that OLE is controlled by one industry-dominating vendor, Microsoft, alienates major competitors such as Lotus, WordPerfect, and to a lesser extent, Apple.

Despite misgivings about Microsoft, developers are seriously considering support of OLE. Microsoft wields so much influence that developing for a competing technology may not make financial sense. As much as developers might prefer alternatives to Microsoft, they need to maintain high compatibility, especially in the PC market. That affects the Mac market, since so many developers make Mac programs function-compatible with their Windows versions.

Apple and other advocates of OpenDoc will have to convince developers that there is a compelling financial reason to develop for OpenDoc. The switch from big programs to smaller object-oriented tools won't be easy. The next step is for Apple to support developers with well-chosen technical and marketing programs for OpenDoc. The advantages of innovation can be realized only if developers translate technology into tangible business opportunities. Until then we may have to wait patiently while the new document-based technologies slowly evolve.

Additional reporting by JIM FEELEY, GALEN GRUMAN, and JOANNA PEARLSTEIN.
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**Letters**

**Macworld Online**

I WOULD LIKE TO CONGRATULATE the staff of *Macworld* on the contents and organization of the August issue. The material on the Internet and the information highway was the most informative I have yet read. Many thanks.

Benis Frank  
via America Online  

OUR SPECIAL ONLINE ISSUE DID A fairly good job of covering the bases that a beginning netter must consider, but it also confused a few issues. First, the Internet sidebar to Joanna Pearlstein’s online-services guide did not fairly assess the University of Minnesota’s TurboGopher application (“How to Ride the Internet”). The caption to the TurboGopher screen shot implies that TurboGopher is slower than other options. Since the legendary slowness of Mosaic (the World Wide Web browser) gets no mention, one could conclude that Mosaic is peppered than TurboGopher. But the reverse is true: Mosaic is nearly unusable over SLIP lines, while TurboGopher is about as fast as an America Online (non-SLIP) connection.

Second, Mel Beckman’s article, “Pick the Right Communications Software,” omitted Aladdin’s emulator, SITcomm. Not only does this program integrate Stuffit file compression, but its utilization of AppleScript (instead of a proprietary scripting language) makes SITcomm one of the most talked about communication programs on the Net.

Michael Hon  
via the Internet

**ONE TOPIC I DID NOT SEE COVERED in your guide to online services was hours of operation. I’ve been a member of America Online, CompuServe, andProdigy for years. AOL seems to shut down from 5 a.m. to 8 a.m. every day—a critical time for my E-mail and news-gathering activities. Prodigy seems to shut down around 1 a.m. to 4 a.m., which is no great inconvenience (but Prodigy is). CompuServe (my favorite) is always accessible.**

Yvonne Oliver Bowers  
Glastonbury, Connecticut

**WAKE UP, MACWORLD! I HAVE BEEN using America Online for almost two years (and have tried CompuServe, GEnie, Prodigy, and some BBSs), but I was blown away when I got a PPP account and started using Mosaic and a host of other Internet services. For $35 a month, I get complete Internet access (as opposed to the limited service offered by Delphi and others). By comparison, AOL would cost me, on average, at least $45 a month—and it’s limited to 9600-bps access speed, is censored and centralized, and makes you pay by the minute.**

Stephan Moskovic  
via the Internet

It’s true that using the Internet directly can be cheaper than subscribing to an online service, but direct access is also harder to configure and navigate—and it’s not always faster.  

We are awake, by the way; we just keep dozing off while waiting for Mosaic.—Ed.

John Boyarsky  
via America Online

**YOU NEGLECTED TO MENTION THAT America Online makes certain users pay a surcharge for connecting. I live in Alaska and get charged 20 cents per minute for connecting.**

America Online charges a 20-cents-per-minute telecommunication surcharge for users who connect from outside the 48 contiguous United States, including Alaska, Hawaii, and Canada. According to America Online, the extra cost comes from the phone companies providing the access.—Ed.

**Taligent Tangential**

I WAS SURPRISED TO FIND NEXTSTEP and OpenStep completely ignored in “Taligent Rising” (News, August 1994). The irony, of course, is that NextStep does today what Taligent promises for tomorrow. In addition, OpenStep—one result of the alliance of Next and Sun continues
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IN CONTROL 3.0—the calendar to plan on!

Microsystems—will bring Next's object technology to other operating systems. Sun's Solaris and DEC'S OSF/1 will both feature OpenStep layers within the next year. By the time Taligent reaches beta testing, NextStep will be running natively on Motorola, Intel, PA-RISC, and SPARC-based hardware. And OpenStep will be implemented on these same architectures, plus Alpha AXP and PowerPC.

Apple and IBM are foolish to ignore this proven technology. Instead, they would rather waste millions of dollars reinventing the wheel. Don't be misled by the Taligent propaganda: with an estimated one million seats installed by the time Taligent ships, NextStep and OpenStep are the future of platform-independent, object-oriented computing.

Robert A. Wyatt
Editor-Publisher, Next In Line via the Internet

MessagePad Musings

Dan MUSE LAMENTED IN HIS REVIEW of the Newton MessagePad 110 that he, and most of the business world, do not have a reason to use Apple's PDA (Reviews, August 1994). How delighted I am as a public school teacher to be—for once, perhaps—on the cutting edge of a technology! I can wander the classroom and jot down observations of children's behavior, which I can then export and print for later discussion with a child's parents. Perhaps business types could gather some ideas by visiting schools that are using the Newton.

Mike Mitchell
via America Online

WHAT A TEDIOUSLY CHEAP WAY FOR Dan Muse to conclude his review of the Newton MessagePad 110. Has no one any imagination left? It's like hearing all over again the comments made about the first Macs.

When one understands how and why to use a Newton and ceases to impose one's own unreal wishes on it, things start to make sense. It's not for using with Word or FileMaker, and it's not an origination tool; rather it's an exceptional organizational and communications tool. I previously used a paper organizer, which now sits in a drawer.

Agreed, many improvements could be made, but Newton will oust competing approaches just as the Macintosh philosophy has ousted DOS. In a few years we will look upon conventional organizers with the same derision we now do command-line interfaces.

Joel M. Sciamma
via CompuServe

Hooray for First Class

UDOS TO MACWORLD FOR GIVING FirstClass Client and FirstClass BBS the praise they deserve (The Desktop Critic, August 1994). FirstClass offers the most Mac-like service available in a BBS, and I've never been on one I didn't like. In fact, I've given up using all other types of BBSs and now use FirstClass exclusively.

The only thing your article lacked was a mention of Tyrell Inc. in Rochester, New York (716/461-5157). Sysop 'JF Sebastian' and his crew have worked countless hours to give us tons of files, conferences, and (after we used it for a little while) friends.

Marc Drumm
Peasfield, New York

REGARDING THE ABILITY TO DOWLOAD material while simultaneously browsing through a FirstClass BBS's other areas, David Pogue writes, "Try that on America Online." Actually, I do just that on a regular basis, and many others do as well. I use an extension called CONTIUNES
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AOL Aid that allows background uploading and downloading.

Tripp Elliott
Knoxville, Tennessee

Ear Phone Solution

Jim Heid's review of Jabra's Ear Phone Streamline AV mentioned that you could not hear the computer's other sounds, such as alert beeps and CD playback, unless you wear the Ear Phone or unplug it to reactivate the internal speaker (Reviews, July 1994).

Another option may be more viable. Purchase a stereo minisplitter from Radio Shack or an audio store, plug the Ear Phone into one of the splitter's jacks, and connect a pair of external stereo computer speakers into the other jack.

I like to have external speakers connected to my computer if I play audio CDs. Instead of groping behind my Mac for wires, I now simply take off the Ear Phone when I'm not using it and turn it off (or lower the volume on) the external speakers when I hold a private call or secretly play my favorite game.

Andrew K. Jung
Victoria, British Columbia, Canada

Levy Strikes Home

Just received your August issue in the mail and read Steven Levy's article on electronic shopping (The Iconoclast). Levy hit the nail on the head with his remarks. Ninety-nine percent of online shopping efforts have missed the mark. Catalog shopping has been with us for over a hundred years—why hasn't it replaced retail shopping?

Places like the Compact Disc Connection and the Internet Shopping Network are pioneers that have a chance of being around in a few years, but Prodigy, CD-ROM catalogs, and the others don't have a chance until they "get it."

Phil Trubey
via the Internet

Letters should be sent to Letters, Macworld, 501 Second St., San Francisco, CA 94107; via fax, 415/442-0766; or electronically, to CompuServe (70370,702), MCI Mail (294-8078), America Online (Macworld), elWorld (Macworld), or AppleLink (Macworld), or via 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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Adobe-Aldus Update  The merger between Adobe Systems and Aldus Corporation became final in early September. The combined companies will go by the name Adobe Systems and will shed some 200 to 400 employees in the process. To obtain FTC approval for the merger, the companies had to divest themselves of Aldus FreeHand. Altsys Corporation, which developed and updated FreeHand for Aldus, will regain control of the illustration program in January 1995. The FTC had maintained that without the FreeHand transfer, the merger could have led to higher prices and less innovation for professional illustration software.

The (Hand)Writing on the Wall  Palm Computing, one of the first names in the PDA game, has announced its Graffiti handwriting-recognition software for the Newton. Graffiti requires users to learn a simplified alphabet made up of distinctive pen strokes; the company claims that experienced operators can scratch out 30 words per minute with a recognition rate close to 100 percent. The software will be available near the end of September for $79. Palm Computing, 415/949-0147.

Merger, Layoffs at Radius/SuperMac  Radius and SuperMac officially became one company on August 31 after stockholder approval of the merger. The resulting company will be called Radius. Earlier, the companies had announced the elimination of 250 jobs, partly a result of contracting out production and partly due to duplication of effort.

Faster, Cheaper Wireless  As cellular-communications carriers deploy TCP/IP-based Cellular Digital Packet Data (CDPD) service, PowerBook users will be able to make 19.2-Kbps wireless links to the office computer network—and pay only for actual transmissions, not for the entire duration of the hookup. At press time CDPD service was available in nine U.S. metropolitan areas; the cellular companies are working toward nationwide service. A CDPD modem is required. Sierra Wireless (604/231-1100) makes the $1195 PocketPlus, the first CDPD wireless modem for the Mac; the compact device also supports 14.4-Kbps V.32bis data and V.17 fax transmissions over circuit-switched cellular and telephone wires.

Big Stat for Mac  SAS Institute, until now known to Macintosh users for the graphical exploratory data-analysis package JMP, is developing Mac versions of its entire line of traditional statistics software. The SAS line, one of the leading stat systems for minicomputers, includes about 20 modules. The first Mac SAS modules should be available in 1995. Pricing was not set at press time. SAS Institute, 919/677-8000.

Accelerator Market Slows Down  Under pressure from Apple’s low-cost, high-performance Macs, accelerator companies are falling by the wayside. Fusion Data Systems has shut its doors while it looks for a buyer for the company’s assets, and at press time Harris Labs was not answering its phones. Rival firm Brainstorm Technologies said it will give free technical support to owners of Fusion’s TokaMac or Harris’s Performer accelerators, as well as offer a $99 upgrade to Brainstorm’s own line of Plus and SE accelerators. Brainstorm, 415/964-2131.

Novell Cuts Jobs  Novell announced plans to cut 1750 jobs within its organization, newly merged with WordPerfect Corporation. At press time the company would not specify which departments will be affected, but a spokesperson said the move will eliminate duplication of effort. The leaner company plans to employ about 8250 people by the end of January 1995.
Spindler Says Clones on the Way

After a year on the job and with the challenge and opportunity presented by the upcoming new Windows version, Apple's president and CEO, Michael Spindler, recently outlined Apple's goals and directions. With Spindler were Apple's division heads, who detailed their product areas' plans. Apple has encapsulated its strategy in the slogan "stand out and fit in," meaning Apple intends to exploit unique Mac capabilities while promoting interoperability with PCs and other computers. That's not a new goal for the company, but Apple finally seems poised to shift from talk to action.

Clones Are Coming
Perhaps the most radical action will be licensing the Macintosh OS to other vendors, who can then develop Macintosh-compatible computers. Apple's vice president for licensing, Don Strickland, said on September 7 that at least two clone licenses have already been signed, but he declined to name the licensees. Industry rumors name Motorola in the United States, Acer in Taiwan, Vobis in Germany, and Olivetti in Italy.

Strickland added that Apple will not restrict Mac OS licensees to narrow geographic areas or markets; they will be free to sell anywhere. But Apple expects that near-term clones will be sold only where they might enjoy a competitive edge—in regions and segments where Macintosh sales are weak, such as large U.S. businesses.

Strickland confirmed that Apple will not license the Mac OS anytime soon to the top non-Mac PC makers, which include Compaq, Packard Bell, IBM, Gateway 2000, and Dell. Instead, Apple has targeted midsize computer makers, ranking between 8th and 20th in worldwide sales.

Strickland said that licensees will set the timing of announcements. He estimated that two to three announcements will come this year, and another three or four by early summer, 1995. Apple expects to expend considerable resources supporting clone vendors, and will therefore limit their number to about six in the first year.
Mac clones will not be able to use the Macintosh name, the traditional Mac logo at start-up, nor an Apple for the DA menu. Spindler said earlier that Apple insisted on restricting licenses to companies that spend money on research and development, to ensure that the Mac clone market will not offer just me-too machines.

Strickland explained that the first generation of Mac clones will be “Power Mac look-alikes,” mimicking the current Power Mac architecture within PC boxes. Around the first quarter of 1996, he added, Mac clones will emerge that will feature stronger compatibility with other operating systems. Apple hopes that these “Windows-environment” Mac clones will increase the Mac OS market share within large businesses that have standardized on Windows computers but want to integrate Mac capabilities for certain departments.

Meanwhile, Apple would probably keep the PowerBook market; people would stick with true Apple PowerBooks because the integration issues are more complex.

The Mac now holds about 10 percent of the worldwide personal computer market, and Apple hopes to grow its Apple-branded Mac share to about 13 percent in the next three years, according to Strickland. He expects clone sales to add an additional 3 to 4 percent during that period, for a total Mac OS market share of 16 to 17 percent. Strickland said that any convergence between IBM’s PowerPC Reference Platform (PREP) specification and the Power Mac would not occur soon. Such convergence could allow IBM PowerPC computers to run the Mac OS with no special modification (see “Glimpse of the Future,” Power Mac News, September 1994). “It would take us about two years to port [the Mac OS] to PREP,” Strickland noted. “It would require us to literally turn our software developer base over. We can’t do that in the next two to three years.”

Apple is pressing its suppliers to make Apple chips (ASICs and the like) available to clone makers at the same prices Apple pays. But such Apple-specific components would not be sold on the open market, Strickland added.

New Mac OS

A year ago, Apple officials downplayed the similarities between Microsoft’s upcoming Windows interface (Chicago) and the Mac’s current interface. But now Apple has changed its tune. “Interfaces are too complicated,” Spindler said, and he promised that Apple will beat today’s other interfaces in offering a simple, compelling interface that will present users with a stark choice, as happened a decade ago when the first Mac challenged the then-dominant DOS interface. Spindler said the AppleSoft division will create this interface. That’s a change in AppleSoft’s original mission to develop unique apps for the Mac that would differentiate Macs from Windows PCs. That mission now falls to Apple’s Claris subsidiary.

The new Mac OS will likely be released in early 1996. Code-named Copland, it will provide some of OS/2’s and Chicago’s technical capabilities, such as preemptive multitasking, that make system crashes less likely and allow better interoperability among programs in such schemes as OpenDoc and OLE. (OpenDoc will be made part of the Copland OS, although a System 7 version will ship in early 1995. Apple is banking on OpenDoc both to make multiprocessor development easier and to hobble Microsoft. See “OpenDoc and OLE 2.0,” elsewhere in this issue.) Apple would provide no interface details of Copland.

Users of Apple’s new-defunct A/UX variant of Unix will have to wait until sometime in the first half of 1995 for the replacement version of Unix, called PowerOpen, that is based on IBM’s recently completed AIX 4.1 Unix variant. PowerOpen will run only on Power Macs with a PCI bus, which should ship around the same time.

Video Future

Spindler stressed the need to integrate video into the Mac. Separately, next-generation Power Mac product manager David Limp said the PC-based Power Macs expected in spring 1995 would include AV technology and use Apple’s DAV (Digital Audio Video) bus in addition to the PCI bus to provide high-quality video-capture, editing, and playback.

Spindler said that MPEG compression would be a key component of future AV technology, since it was a requirement of entertainment giants like Time Warner to use movies and other motion video in CD-ROMs and other media. In fact, Apple will ship an MPEG playback board for the Quadra 630 in time for the Christmas selling season, according to Carlos Montalvo, product-line manager for entry-level systems.

Apple officials pointed to the new Quadra 630 as an example of the video Mac of the future, one where even inexpensive Macs will deliver audiovisual processing power. Spindler pointed out that “multimedia is a key driving criterion” for the small-office and home-office markets, the fastest growing markets in the PC and Mac industries.

Spindler also explained Apple’s interest in set-top boxes, devices used under development by several companies to manage data, such as interac-

In Brief

**Online Ethics for Profit**

Symantec has announced that it will give free copies of The Norton Utilities and Norton AntiVirus to the first 500 BBS sysops who post an approved code of ethics on their systems so that all normal users will see it in the normal course of use. Also, the sysop must agree that an approved code will remain as part of the sign-on process for at least four months. Contact the National Computer Ethics and Responsibilities Campaign on Compuserve for more information (GO CETHICS), or call 310/459-9565.

**Storage Price Cuts**

APS has cut prices by 5 percent to 35 percent on its entire SCSI storage line, including internal and external hard drives, removable hard drives, tape drives, and CD-ROM drives. Leading the price drop is APS’s IBM 1GB internal hard drive, now selling for $699 ($799 external). 816/483-1600.

**FolderBolt Pro**

Kent Marsh plans to ship FolderBolt Pro for all current Macs by September at an expected $75 street price. The software supports a password over a network to look and unlock folders using personal file sharing or AppleShare. The program can also encrypt a file or folder while locking it. Upgrades from the 680X0 version 1.02c are free for copies purchased after January 1; other customers pay $39. 713/522-5625.

**VideoShop 3.0**

Avid Technology has released VideoShop 3.0, a video-editing program that includes Apple’s new QuickTime 2.0. VideoShop 3.0 supports MIDI editing, which can substantially reduce the disk space required to store sound. Available now in a version for both 680X0 and PowerPC-based Macs, the program lists for $399; upgrades are $79. 508/640-3032.
Infrared Future?

Some day PowerBooks and desktop Macs might transfer files easily via infrared signals. Apple is working on prototype infrared devices—an internal one for future PowerBooks and an external one that would connect to current and future desktop Macs.

PC Interoperability

Elevated to a business strategy from a hotly debated experiment, DOS compatibility has become part of Apple's long-term strategy. The DOS Compatible board that Apple shipped for a few months this past spring sold well beyond expectations; plus early numbers show that nearly a third of Power Mac owners run Insignia Solutions' SoftWindows emulation software, according to Ian Diery, vice president of Apple's Personal Computer Division. Apple has shown a prototype PC coprocessor board for Power Macs that uses a faster processor and adds support for networking and SoundBlaster audio (which an Apple product manager conceded offers higher quality than standard Mac audio) for games and CD-ROMs.

Apple also promised that SoftWindows would be revised, perhaps by late December, to support Windows 3.1's 386 Enhanced Mode, which would more and more Windows programs require and which will be needed to take advantage of Chicago. Spindler said that Enhanced Mode-compatible SoftWindows would be "critical" to the success of Mac clones, which users would want to be compatible with both the Mac and Windows.

Some future PowerPC-based PowerBooks will also include SoftWindows, while others may include a PC coprocessor card.

Connectivity Highlighted

Scheduled for release before the end of the year is the long-awaited Telephony Tool extension, the component AV Macs need to handle voice mail and other voice communications along with faxing and E-mail. Spindler spoke of "the need to mask the complexity of E-mail, voice mail, and telecommunications," and he suggested this would be a main area of emphasis for the Mac.

Similarly, cross-platform networking was an important concern of Apple's, but one that Apple would rely on outside standards to supply. For example, Apple Business Systems vice president Jim Groff previewed native Mac Novell NetWare 4.1 server and client software running on a cross-platform network, and Groff said the Mac versions would ship shortly after Novell released 4.1 for PCs, scheduled for late this year or early next year. With System 7.5, Apple is also bundling MacTCP, which lets Macs connect to most Unix-based networks.

Relying on third-party technologies for enterprise-wide networking will let Apple focus on what Spindler called ad hoc networks—those where users come and go and manage themselves, the hallmark of a department LocalTalk or ARA (Apple Remote Access) setup. AppleSearch 1.5 is due this fall, and Apple is working on ARA 3.0.

As promised a year ago, Apple is porting its networking software to PCs and planning to deliver Windows versions of its network software by the end of 1994. First out will be AppleShare and AppleTalk for Windows. Later will come AppleSearch, ARA, and PowerShare. Apple previously announced that it and Microsoft had agreed that Apple's PowerShare collaboration services would support Microsoft's MAPI (Messaging Application Program Interface) standard in a future release.

Apple will focus on Windows 3.1 rather than Chicago, according to Groff. Groff could not say whether Apple's ARA would work with Chicago's built-in remote-access software.

PowerBook Promises

Rather than revise the PowerBook line every few months, as it has seemed to do in the last year, Apple will now develop notebooks with year-long life spans, according to Brodie Keast, vice president of the PowerBook division. When PowerPC-based PowerBooks ship in the first half of 1995, Apple will also provide PowerPC upgrades for all PowerBook 200- and 500-series notebooks. Till

Trend

Quad-Speed CD-ROM Drives

The CD-ROM drive market is a lot like New England weather—if you don't like it, you don't have to wait long before it changes. Quadra-speed (600-KBps data-transfer rate) drives are starting to arrive on the scene; and NEC, Toshiba, and Plextor are leading the charge.

NEC announced its MultiSpin 4X Pro earlier this year and is now shipping the drive in quantity. The $995 drive features a 180ms average access time and a 256K-cache. Plextor, the next to announce, sells both an external ($349) and a half-height, internal ($649) configuration. Plextor's drive, the 4PLEX, has a larger cache (1MB), but a slower average access time (220ms). Toshiba's XM-3501B (internal, $470) and TXM-3501E (external, $600) drives sport a 256K cache and an average access time of 155ms.

As with the step from single- to double-speed drives, the 4X performance increase comes with some caveats. Speed increases are always useful for anyone who searches on and retrieves data from CD-ROMs; but if you're playing QuickTime movies, a 4X drive won't make that much difference, as most developers have optimized their content for playback on 150-KBps (single-speed) or more recently, 300-KBps (double-speed) drives. NEC, 708/860-9500; Plextor, 408/980-1838; Toshiba, 714/457-0777.—CAMERON CROTTY
then, the only change in the PowerBook lineup is the phasing out of the 230.

Future PowerBooks will include PCMCIA slots, a popular technology on PC notebooks that Keast admitted Apple had “missed out on.” On PCs, PCMCIA cards are used to add everything from modems and hard drives to network support. Since Macnotebooks already include these capabilities, Keast said he expects PCMCIA to be used primarily to add wireless communications to PowerBooks. He also expects future Duos to have more built-in connectivity options and for Apple to simplify its docking options. One option is to revise the Mac OS to hot-swap cards and docking stations, which means users could insert and remove expansion options while the PowerBook was running. Chicago will add this to PC notebooks. Because as many as 15 percent of PowerBook owners use PCs, Apple is investigating whether to support Intel and Microsoft’s Plug and Play specification, which should allow hotswapping and automatic configuration of peripherals, so PowerBooks could connect directly to PCs.

Because about three-quarters of PowerBook owners also have a desktop computer, desktop connectivity is important to Apple. One option that Keast demonstrated in prototype form was infrared communication. He showed a PowerBook exchanging files with a desktop Mac that had an infrared pod plugged into a slot. Infrared technology, already available on the Newton MessagePad, might reduce the need for multiple ports and floppies on Duos while providing sufficient data exchange.—GALEN GRUMAN

with CHARLES PILLER

Hewlett-Packard’s DeskWriter 540 converts from monochrome to color printing by swapping an ink cartridge.

HP Adds Ink-Jets

A SPRAY OF COLOR

iming to make it simpler to choose an inexpensive desktop printer for the home or small office, Hewlett-Packard has announced the DeskWriter 540, an ink-jet model that replaces two of the company’s most popular ink-jet printers: the gray-scale DeskWriter 520 and the color DeskWriter 520C. With the introduction of the 540, HP will offer color as either an option or a standard feature on its entire DeskJet line. Users will easily be able to remove the black-ink cartridge that comes with the DeskWriter 540 and snap in an optional three-color cartridge. This will let users switch, for instance, from printing ordinary black-and-white business letters to getting out a color chart or party invitation. Hewlett-Packard says it sold two million color DeskJet/DeskWriter (the PC/Mac versions) printers in 1992, and it wanted to make color capability of some kind part of every ink-jet printer it sells. The one drawback to the three-color approach is that the printer combines cyan, magenta, and yellow to produce what’s called process black; the resulting black is not as pure and dense as black ink, and the process lays down more ink in the black areas, making the paper cockle a bit more until completely dry.

Nonetheless, the prospect of buying a $365 printer that you can later upgrade to color for $49 is appealing. The first color cartridge is more expensive because it comes with a humidifier, a case that keeps the ink from drying out. Later cartridges without the humidifier are less expensive.

The DeskWriter 540 has 600-by-300-dpi resolution with HP’s Resolution Enhancement Technology (RET). The 540 achieves 600-dpi horizontal resolution without performance cost because the print head now prints in both directions as it travels across the page. HP also improved the 540’s paper handling: it accepts paper as small as 4 inches by 6 inches, and it takes stacks of envelopes. It prints 3 ppm for black and about 0.5 ppm in color. The printer also offers a speedier EconoFast mode with lower print quality. HP said that it has made its inks more water-fast (an issue for some, especially those who print envelopes) and that they are nontoxic, for home use.

Hewlett-Packard expected to begin shipping the DeskWriter 540 on October 6. It includes 512K of RAM, a faster processor, and 33 TrueType fonts. HP, 800/752-0900.—T.M.

Apple Plans 3-D Chip

FASTER RENDERING FOR FUTURE MACS

Real-time rendering of 3-D images as you navigate and change perspective currently requires DSP chips to work smoothly, but Apple is working to miniaturize what now takes two NuBus cards into one chip that could be used on a motherboard or video card. Apple plans to continue

In Brief

ikegami’s 21-inch Trinitron Clone
ikegami Electronics USA plans to ship in September the CT-218, a $2495 21-inch color monitor. The display uses Mitsubishi’s Trinitron-clone technology with a 0.30mm aperture grille, and requires a $19.95 Mac cable adapter. Unique to the monitor are Apple-style 8-pin DIN serial ports, Apple ADB ports for use with special cables, and a set of front-panel dials that let you change the on-screen resolution. 619/280-0039.

OrangePC for Chicago
Orange Micro expects its existing PC coprocessor cards to support the forthcoming Windows 4.0 (known by its code name Chicago). A free software upgrade will likely be necessary, a spokesperson said. The OrangePC 200 Series coprocessor cards add a PC motherboard into any Mac with a 12-inch NuBus slot (all Macs with NuBus but the Quadra 610, Centris 610, and Power Mac 6100). Orange Micro may also add support for IBM’s OS/2 2.1 operating system. 714/779-2772.

Online Software
America Online, CompuServe, and Prodigy have upgraded their client software for Macintosh users. Expected to be available now, America Online 2.5 adds a redesigned interface, reorganized content, and the ability to view graphic images online. Due by October 1, CompuServe Information Manager 2.4 also includes reorganized content and the beginnings of a more graphical interface. Prodigy 2.0 has Mac-like menus at the top of the screen, and the software lets Macintosh users cut and paste and participate in live chats. This year Prodigy expects to ship the Mac version of the mail manager, which can receive Internet mail. Members can download the new software from the services when the new versions are available.
deliver “aggressive 3-D next year,” according to president and CEO Michael Spindler. Apple has quietly demonstrated a 3-D interface that makes manipulating 3-D elements straightforward, and the company is developing a chip (for use in future motherboards or add-on cards) that would handle the intensive computations needed for 3-D work.

The company characterizes its demonstrations as research, not a commitment to a product. One of the driving forces behind the research is Apple’s Advanced Technology Group, which has been at work on the 3-D interface, which uses shadows, sound, and visual clues to make manipulating and navigating 3-D objects easier.

—Galen Gruman

Motion Works Multimedia Utilities

Six-Pack of Software

Everyone needs tools to work with, and for anyone whose medium is multimedia, Motion Works has come out with a six-pack of software utilities designed for editing graphics, sound, and QuickTime movies.

The heart of the utility package is CameraMan 2.0, which records screen activity, including cursor motion and dialog boxes, to a QuickTime movie. QuickEdit is a multitrack version of the CameraMan movie editor; with it, users can add sound, titles, graphics, and additional video clips to their movies. For greater alterations, the Motion Works package includes QuickMorph, a mesh-based morphing utility; Motion Paint, a 24-bit cel-animation tool that supports overlaying and onion-skinning; and SoundMate, software that records, edits, and adds effects to 8- and 16-bit sound.

by looking at the disc for the letters CD+G imprinted on the inner ring.

OK, fun stuff aside, CD-ROM ToolKit 1.1 also lets you extract a digital copy of music or other audio from a disc. That means the music does not have to be converted from digital to analog and back to digital to bring it into your AV Mac. Instead of going over an analog cable, the audio data goes through a SCSI cable in digital form. So you can get much higher quality playback without the data loss that would normally happen during the two conversions.

Aiming to make existing drives faster, FWB has come out with new versions of its Hard Disk ToolKit (now version 1.6), Hard Disk ToolKit Personal Edition (also 1.6), and CD-ROM ToolKit 1.1. The new CD-ROM ToolKit supports CD-G, which means you can view pictures that some recording companies are putting on audio CDs (including Fleetwood Mac’s Behind the Mask).

Your CD-ROM drive also needs to support the CD-G format, and according to FWB, there are currently four or five models that do, including Apple’s. You can tell if an audio CD has graphics on it by looking at the disc for the letters CD+G imprinted on the inner ring.

Not everyone needs the very high speed of the HammerCDX4, which carries a somewhat hefty list price of $1099. For those who do need a very fast source of data—for instance, to pour into a recordable CD-ROM drive without causing data hiccups—the extra price could easily be worth it. The drive also supports High Speed Multisession CD mounting and comes with a 1MB cache, the CD-ROM ToolKit 1.1 software, and cables. FWB sells CD-ROM ToolKit 1.1 separately for $79, or $29 for an upgrade from a previous version. The toolkit software also supports Apple’s recently introduced QuickTime 2.0.

The company has begun shipping HardDrive ToolKit 1.6, the latest version of its disk-management utility software, which supports the larger 4GB maximum volume size permitted by System 7.5. Unfortunately, despite the recent appearance of more high-capacity drives and arrays, the maximum volume size will not go to one terabyte (1000GB) until Apple’s next system software revision, which will not be out for quite a while.

Version 1.6 expands the formatting and other capabilities of earlier versions, and it works on more different brands and types of drives according to FWB. It lists for $199, and upgrades are $39. FWB also updated its less complex incarnation of the software, HardDrive ToolKit Personal Edition, to version 1.6. Personal Edition lists for $79, and updates are $29. These latter two products and the latest CD-ROM ToolKit also include native Power Mac versions. FWB, 415/474-8055.—T.M.
Now Charges Up Utilities

REVISERS, ADDS COMPONENTS

Version 3.0 of Now Software's eponymous utilities package features two all-new components—Now QuickFiler and Now FolderMenus—along with several improvements to the bundle's regular lineup. Now QuickFiler complements the Mac Finder, combining enhanced file searching (including document contents) with compression technology borrowed from Now Compress. Portions of Now QuickFiler are written in native Power Mac code, as are pieces of Now WYSIWYG Menus and Now Scrapbook.

With Now FolderMenus, when you click on a volume or folder's desktop icon, a hierarchical menu of the contents pops up, much like Inline Design's PopupFinder. Another work-saver is Now Startup Manager's new conflict-isolation feature. Similar to Casady & Greene's Conflict Catcher II, Now Startup Manager leads you through a test sequence, automatically activating and deactivating extensions until it finds the offending one.

Some enhancements to Now Utilities rely on parts of Apple's new System 7.5—with 7.5 and Now Menus installed, users can create custom, draggable menus in the menu bar for accessing files, folders, and applications. Custom menus support drag and drop: users can drag files from the desktop up to the customizable menus and drop them on compatible applications—launching both the file and the application. Also, Now Scrapbook and Now Profile are compatible with Apple's PowerTalk. Now Utilities 5.0 is currently available for an estimated street price of $89.95; upgrades are available for $39.95. Now Software, 503/274-2800.

—CAMERON CROTTY

DynaTek Storage

A MULTITUDE OF DRIVES

Another company has entered the storage fray: DynaTek, out of Nova Scotia, is offering a line of SCSI storage products. The company carries DAT tape drives, ranging from 2GB to 8GB ($1429 to $1714 standard retail price), and a full complement of SyQuest removable drives ($570 to $714). DynaTek also sells 128MB, 230MB, and 1.3GB optical drives, as well as double-speed CD-ROM drives based on Toshiba mechanisms ($464).

Finally, DynaTek carries Quantum, SCSI-2-compatible hard drives ranging from 170MB to 1GB ($429 to $1257). All hard disk, optical, and CD-ROM drives ship with the company's ComPass Pro 3.0 SCSI-formating and -utility software, and the DAT drives come with Dantz's Retrospect Remote backup software. DynaTek received an excellent tech-support rating in a recent article testing hard drive mechanisms between 120MB and 540MB (see "Mainstream Storage," March 1994). DynaTek, 902/832-3000.

—CAMERON CROTTY

HP's First Color Laser

OFFICE COLOR SPREADING

It wouldn't be hard to envision Hewlett-Packard's motto as "Anything that prints." The HP Color LaserJet is the company's entry into the burgeoning office-color-laser market recently occupied by QMS and Xerox. The Color LaserJet prints 300-dpi black-and-white images on plain paper up to 11 by 17 inches in size—color printing is limited to letter or A4-size paper. Print times range from roughly 2 ppm for four-color documents, through 4 to 5 ppm for black pages with a single highlight color, up to 10 ppm for black-only pages. The HP Color LaserJet ships with a parallel interface, but Macintosh users will likely want to add a JetDirect card for 10BaseT, Token Ring or Ethernet, and LocalTalk support ($369, $619, $429). PostScript Level 2 is also available as an option—in its standard configuration, the printer supports HP PCL 5. With the PostScript SIMM installed, the printer holds up to 56MB of RAM (ships with 8MB), and the PostScript upgrade adds 35 Type 1 fonts to the printer's 10 TrueType fonts and 35 Intellifont (Windows) typefaces. The HP Color LaserJet is currently available for $7295. HP, 800/752-0900.

—CAMERON CROTTY

BUGS & TURKEYS

- Running Finale 3.01 with Vixen 5.0 installed will freeze your Mac. Coda Music Software, the maker of Finale, has no fix planned; furthermore, the company says it can't be responsible for compatibility problems with non-Apple software in a user's System Folder. Now that's proprietary.

- Prometheus's MaxFax 3.3.2, which comes with the company's fax modems, doesn't always work with 32-bit addressing active. If 32-bit addressing is active, some applications, including Microsoft Excel, may crash when users print or save. Prometheus hopes the problem will be fixed in version 3.5.1, expected by August.

- Users of the Apple Multiple Scan 17 Display have reported problems getting resolutions other than 640 by 480 to appear on the display when used with a Quadra 605 or 650 equipped with 1MB of VRAM. Apple confirmed the bug, saying the problem lies with the Display Enabler 1.0. The company hopes to fix the problem in the next version of the enabler.

- Apple boasts that its eWorld Apple Customer Center is "your direct connection to Apple Computer." But our determined digging unearthed only one response by Apple to the questions posted in its forum during a two-week period. And that response was to our question asking if Apple reads its boards. Apple says it is "continuing to work on setting up a permanent presence" on its own online service.

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.
When it comes to performance, the sky should be the limit—not your equipment. Introducing the Raven Pro disk array, our next-generation flying machine. Now you can open a 480 MB Photoshop file with lightning speed. Transfer dailies without losing a single frame. Gain access to mirrored business-critical data in less than 8 ms or mix and match RAID levels and partitions to meet your specific needs. With 17.2 MB/sec throughput and up to 52 GB on-line capacity, they’re four times faster and have 104 times the capacity of the native 500 MB drive you’re probably using now. To find out what Raven Pro can do for your company’s throughput, call 1-800-800-DISK. Then let your imagination and productivity take flight.

Raven’s flexible utility program allows you to optimize drive caching and each partition’s parameters, including location on disk and block size for maximum application performance.

Raven Pro disk arrays offer a flexible upgrade path for all high-powered Macintosh systems via PDS. NuBus or software, PDS and NuBus versions provide a 32-bit data path via Fast/Wide SCSI-2.

MicroNet’s Raven Pro is the newest addition to our family of award winning storage solutions. Based on proven Raven technology, it takes the science of disk array engineering to an unprecedented level.
Fixing Power Mac Bugs

WHAT TO DO ABOUT WHAT DOESN'T WORK

For most users, the path from Macintosh to Power Macintosh is relatively painless. Migration is no more difficult than turning on the new computer, installing your software, and hooking the machine up to your network. But some users will encounter a few problems.

• The Power Mac randomly locks up with various 680X0 applications. According to Apple, under emulation some programs may require more RAM to run on the Power Mac, due to the differences in the memory-addressing scheme on the new models. The easiest solution is to give an application 25 to 50 percent more RAM via the Finder's Get Info function. If this doesn't work, try turning off the Modern Memory Manager option in the Memory control panel. (However, this trick could slow down native Power Mac software.)

• The Power Mac crashes or performs inconsistently with fax-modern software. All the major fax software has been updated to be fully compatible with the Power Mac line. Current software versions are Delrina FaxPro for Macintosh 1.5.1, Global Village TelePort 2.08b, Telefocus FaxStf 2.6.1 updater (for users of 2.2.x) or FaxStf 3.0.1 (for users of other versions), and PSI FaxCultivate 1.7. Both FaxStf and FaxCultivate are bundled with several fax modems.

• The Power Mac's internal video doesn't support monitors that sync on green (neither does the internal video in any AV Mac, Duo Dock, PowerBook, Quadra 605, or 040-based LC and Performa). The best solution is an adapter plug, such as the one offered by Griffin Communications (615/256-5794).

• Connectix's RAM Doubler does not load at start-up. You need to install version 1.5 (updaters are available from major online services) and you must turn off virtual memory.

• Apple's Power Macintosh Upgrade Card uses a different version of the PowerPC 601 CPU than the Power Macs do. The result is that certain classes of floating-point-math operations, such as exponential and logarithmic calculations (called transcendental), will not be sped up. On AppleLink, Apple has released to developers a new version of its MathLib math libraries that may help.

• Apple's new System Update 3.0 has several fixes for the Power Macs (including 040-based Macs updated with Apple's PowerPC upgrade card). You can get a copy from any of the major online services or from Apple Customer Assistance at 800/767-2775.

• The recently released Berkeley Systems After Dark 3.0 and Adobe Systems Adobe Type Manager 3.8 address problems of slow performance on some scrolling operations.

• If you experience slow Power Mac network performance (especially on an Ethernet network), get Apple's Network Installer 1.4.5. You can find a copy on AppleLink, eWorld, or one of Apple's FTP sites. You can also order a copy from Apple Customer Assistance—GENE STEINBERG

Shareware Goes Native

POWER MAC UTILITIES

The initially slow trickle of native commercial software was frustrating for many buyers of Power Macs. But overlooked in the wait is a steady stream of native shareware programs.

• Bill Goodman's classic $25 file-compression program, Compact Pro, is available as version 1.33p. True to native-software form, the new version requires more memory than does its predecessor (622K versus 304K).

• Another classic shareware program, Scott Berfield's $10 Mac Speedometer benchmarking tool, is also available in a version that includes native-mode tests.

• John Neil & Associates' $20 SoftwareFPU, which lets programs that rely on the 680X0 math coprocessor run on a Mac without such an FPU, is now available in a Power Mac version. To get it, users must download the 680X0 version from online services and send in their registration. Still, it's best to upgrade to a native Power Mac version of such FPU-requiring programs as soon as they are available.

• John Schack's $15 Correct Fractal Generator draws stunning, full-color fractal patterns.

• Dartmouth College's Fetch 2.1.2 lets Power Macs using the MacTCP networking extension navigate Internet databases.

• Chipmunk Basic is a freeware BASIC programming language by Ronald H. Nicholson, Jr.

• Greg's Browser 2.2 by Greg Landweber is a four-paneled, Finder-neatening $20 shareware file manager; and Greg's Buttons 3.2, a $15 utility, colorizes and adds 3-D touches to common Mac interface elements.

• Enigma 2.4, a free file-encryption program by Mike Watson, now password-protects files at 100K per second. All this software is available from America Online, eWorld, CompuServe, and the Internet.—DAVID POGUE

Speedometer 4.0 lets you compare Power Macs against other Macs.
Think Of It
As Microsoft Word
In About 10 Years.

Sure, Word’s impressive. But it’s no Nisus Writer. By giving you the power to manipulate text in multimedia presentations, edit lengthy books, and create foreign language documents, Nisus Writer starts where ordinary Mac word processors stop. Of course, just because it’s big on features doesn’t mean it’s big on memory requirements. At just 2 MB of RAM, Nisus Writer lets you spend less time waiting and more time writing. No wonder why critics are calling Nisus Writer the ultimate document processor. And why a lot of people are calling those other word processors yesterday’s news.
New Products

THE LATEST MACINTOSH RELEASES

by Cameron Crotty

THIS SECTION COVERS MACINTOSH PRODUCTS FORMALLY ANNOUNCED BUT NOT YET EVALUATED BY MACWORLD. UNLESS OTHERWISE STATED, THE MINIMUM REQUIREMENTS FOR OPERATION ARE MAC PLUS WITH 1MB OF RAM. RUNNING SYSTEM 6.1 OR SUGGESTS THAT A NATIVE POWER MAC VERSION OF THE PRODUCT IS AVAILABLE. ALL INFORMATION AND PERFORMANCE CLAIMS ARE SUPPLIED BY THE PRODUCT VENDOR AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY MACWORLD. ALL PRICES ARE SUGGESTED RETAIL. PLEASE CALL VENDORS FOR INFORMATION ON AVAILABILITY.

ColorPoint 2 PSF Models 4 and 14
Siblings to the Professional ColorPoint 2, these 300-dpi thermal-wax-transfer printers support PostScript Level 2. The Model 4 prints letter-size (8 1/2-by-11-inch) pages, and can process full-bleed pages in one minute. The Model 14 prints tabloid-size (11-by-17-inch) pages, and can produce a single, full-bleed page in 80 seconds. Both printers come with 39 resident Type 1 fonts; the Model 4 comes with 16MB of RAM, and the Model 14 with 32MB. The ColorPoint printers have LocalTalk, Centronics parallel, and RS-232 serial ports standard; and both models support an optional Ethernet adapter. Model 4 $9999; Model 14 $9999. Seiko Instruments USA, 408/922-8800, 800/888-0817; fax 408/922-5835.

JX-330
This 24-bit color flatbed scanner has an optical resolution of 600 dpi (interpolated resolution is 2400 dpi) and a scanning area of 8 by 14 inches. The JX-330 comes bundled with Adobe Photoshop 3.0, and optional transparency adapters are available. $1500 (price not final at press time); transparency adapters $1100 to $1300. Sharp Electronics Corporation, 201/529-8200, 800/237-4277; fax 201/529-9636.

Mercury 4.2 GB Superfast Drive
If you've got a Mercury docking bay or a Mega Drive RAID array (MR/MK series) and an itch for more speed and more space, this 3.5-inch docking drive might be just the ticket. The 4.2 GB drive is based on the Seagate BarraCuda mechanism and offers an 8ms average access time and sustained data throughput of up to 4 MBps. $3999. Mega Drive Systems, 310/247-0006; fax 310/247-6118.

Mirror 14-inch Trinitron Display
The name of this 14-inch, multiresolution color monitor tells the story. The Trinitron tube features a 0.26mm aperture pitch, and the monitor supports resolutions up to 640 by 480 pixels at vertical refresh rates up to 90Hz. $499. Mirror Technologies, 612/632-5622, 800/654-5294; fax 612/633-3136.

QuickCam
Remember to smile and watch the birdie when you use this black-and-white digital video camera to record your own QuickTime movies. The QuickCam records at up to 15 frames per second, has a built-in microphone, and plugs into the Macintosh's serial port. Basic recording/editing software is included, as well as a disk accessory that you can use to capture still images through the QuickCam. $149. Conexx Corp., 415/571-5100, 800/950-5880; fax 415/571-5195.

Series 2000 Snappable Hub
You'll be the center of attention when you install an Ethernet hub in your office. These stackable 10BaseT hubs come with 16 RJ-45 ports and 2 expansion ports; you can stack up to 10 Series 2000 hubs using UTP wire as a backbone. The hub is SNMP manageable over TCP/IP or Novell IPX, and an optional 17th port can be filled with a thick (ALU) or thin (BNC) Ethernet connector or an FOIRL link (fiber optic). $1295; AU $250; BNC $275; FOIRL $325. NetWorth, 214/929-1700; fax 214/929-1720.

Spectra Com 28K-XL
When 28.8 Kbps just isn't fast enough, this fax modem can also handle two-wire leased-line connections, and it features autosend backup and line restoration. On the more mundane side, the 28K-XL's data modem is compliant with the ITU-T speed and error-correction standards up to V.32bis and V.42bis. The unit includes a 14.4-Kbps send/receive Group III fax. $249. Bay Connection, 408/270-8070, 800/475-8329; fax 408/270-0699.

TeleEyes/Plus
You can use your television as a display with this hardware. Compatible with any Macintosh that can produce VGA video (Quadra, Centris, LC, PowerBook 160/180, and Duo with dock), the TeleEyes/Plus comes with software for controlling image underscan/overscan and position. The box also features a microphone input that lets you add audio to your productions and 3-watt output jacks for driving speakers at a presentation. $449.95. Digital Vision, 617/329-5400, 800/346-0090; fax 617/329-6286.

Troll Touch PB500
In the grand tradition of point-and-click, this touch screen mounts inside the case of the 500-series PowerBook (installation by manufacturer). The Troll Touch screen is pressure-sensitive, provides 4096 by 4096 points of resolution, and records up to 60 touches per second. Because the company uses resistive technology, a capped pen or gloved hand will work just as well as a bare finger. The touch screen draws power from and sends input to an ADB controller box, which mounts on the lid of the PowerBook. $695. Troll Technology, 805/295-0770; fax 805/295-0771.

Art Explorer
Aimed at kids (and adults) who have outgrown basic paint programs but who aren't yet ready for expensive, full-blown art software, this software package has common graphics tools, plus textures, gradients, fill, special painting modes (dye, glaze, tint); and tools that mimic charcoal, airbrushes, and ink markers. Art Explorer also includes pre-cooked backgrounds and clip art, as well as stencils to color in. 4MB min. memory; requires color, System 7, 13-inch monitor. $49.95. Ads Consumer Division, 619/558-6000, 800/2888-6293; fax 619/695-7902.

CADMover 4
This vector-graphics translator can read the native file formats of more than 70 applications, including AutoCAD, Adobe Illustrator, Ray Dream Designer, and Canvas. CADMover also understands continues.
New Products

CD AutoCache
If you're interested in increasing the performance of your CD-ROM drive but don't want to spend hours tweaking packet and buffer sizes, this application-and-extension combination examines each CD and automatically adjusts the cache parameters depending on how the disc was mastered. The CD AutoCache package includes a mini-SCSI manager with full Logical Unit Number support, plus an Audio DA for listening to audio CDs. With the AutoCache software, users can also digitize CD audio to a hard drive.

Crossword Wizard
Addiction is a terrible thing to witness, so we hesitate to tell you about this way to support your crossword-puzzle habit. Against our better judgment, we inform you that Crossword Wizard automatically generates puzzles, up to 21 squares across, from its database of words and clues. Our dedication to duty demands that we mention its multiple hint modes, its letter-by-letter word-builder function for finding obscure words, and the included Idea Wizard software that reveals how Crossword Wizard relates words and ideas together. 3MB min. memory. $49.95. Cogix Corp., 415/454-7217; fax 415/457-4089.

DesignReality
This surface-modeling tool features skinning, surface offsets, extrusions, sweeps, and patch surfaces. Users can punch holes through surfaces, create hull shapes, generate surfaces from a section, and generate a profile along a contour. You can duplicate an object or mirror it to create a reflection along any axis. Stretch and mold tools let you dynamically alter geometric configurations. You can define multiple light sources and positions, plus assign a name and color to any object. Panoramic viewing lets you view a design from any location. DesignReality imports DXF, EPS, and Vellum files; it exports to Vellum, IGES, and DXF 3D. Among others 16MB min. memory; requires Mac III, math coprocessor, 8-bit color. System 7.1. $1995. Ashlar, 408/746-1800, 800/877-2745, fax 408/746-0749.

Dramatica
This tool can help you create blueprints for your stories, making sure that all the elements of character, plot, and theme are in place, and keeping track of these central threads through revisions. Dramatica starts with a query system; as a story develops, the software's story engine helps keep the important elements in sync and relates them to the overall structure of the story. Dramatica also includes character-building tools to help writers develop and flesh out characters with motivations and purposes. 4MB min. memory; requires System 7.1. $399. Screenplay Systems, 818/843-6557; fax 818/843-8364.

Even though PowerBooks are portable, they aren't always convenient. Batteries die, data gets lost or stolen, and controlling the cursor is, well, a curse.

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Launch Pad
You want to turn your kids loose on your Mac but you fear they’ll make a mess or scramble your settings. Launch Pad provides kids with a friendly desktop of their own and keeps their files and settings separate from yours. From behind the dashboard of an imaginary rocket car, kids can use applications that parents have approved. A graphic backdrop displays one of six worlds filled with animations and sounds. The interface also includes a talking calculator and clock. Expected street price $30. Berkeley Systems, 510/540-5535, 800/344-5541; fax 510/540-5115.

MacEmulate 3.0
Sad though it may be, not every platform has a GUI interface, and sometimes you have to connect to one that doesn’t. This terminal-emulation software supports 132 columns; multipage memory; programmable function keys; and over 15 terminal-emulation modes, including VT100 and VT220. The latest version (3.0) of MacEmulate supports Apple’s Comm Toolbox and includes Xmodem and text-transfer tools. $199. Cornerstone Data Systems, 714/772-5527, fax 714/772-2838.

MacLinkPlus/HP Palmtop
If you keep your addresses, numbers, or recipes in an HP Palmtop, you can transfer your data to and from your Macintosh. This package includes data-transfer and -translation software; you can import and export files in DynodeX, Address Book Plus, FileMaker Pro, Excel, and other formats. MacLinkPlus/HP Palmtop includes a serial cable kit. $129. DataViz, 203/268-0030. 800/733-0030; fax 203/268-4345.

Q Marathon
The aliens are at it again. You, as the science officer of a deep-space colon ship, are on the front line of defense against hostile and intelligent intergalactic troublemakers. Fortunately for the human race, you’ve got awe-inspiring, futuristic weaponry and you know how to use it. This 3-D, texture-mapped, action-adventure game features dynamic lighting effects and stereo sound. 3MB min. memory; requires 8-bit color. $69.99. Bungie Software Products, 312/563-6200, fax 312/563-0545.

Network Troubleshooting Starter Kits
Based on the AG Group’s EtherPeek and LocalPeek packet-level network-analysis programs, these kits combine tools, training, and reference manuals into a single package. In addition to the network analyzers, the packages each include two instructional videotapes, a reference textbook, and several network-management utilities. LocalTalk $795; Ethernet $1,095. AG Group, 510/937-7900, 800/466-2477; fax 510/937-2479.

Nok Nok
Recently acquired and updated by the AG Group, Nok Nok is a control panel that notifies you when an outsider connects to your machine; Nok Nok logs the name of the visitor, even if he or she is attempting to log on anonymously as a guest. Version 2.0 has sliding controls with which the host user can set how much CPU time will be dedicated to file-sharing tasks. Also, the utility can automatically open the File Sharing Monitor when a visitor logs on and close it when all visitors have left, and if Apple’s text-to-speech software is installed, Nok Nok will announce a visitor by name. $50. AG Group, 510/937-7900, 800/466-2477; fax 510/937-2479.

PageMaker 5.0 Enhancement Pack Volume 1 for Macintosh
The package of utilities includes the QuarkXPress Converter, which translates XPress documents into native PageMaker 5.0 format. The software maintains XPress text attributes, style sheets, TIF and EPS formats, and image links. $9.95. Aldus Corp., 206/622-5500, 800/628-2320; fax 206/628-5737.

PageTools
Software is never perfect—fortunately, you can easily add utilities to programs like PageMaker. This package is a set of ten PageMaker utilities that add everything from a customizable menu bar of functions to expanded object-alignment and -distribution options. Elements of PageTools offer enhanced object-color manipulation; file-previewing capability; single-click guide creation; and extra floating rulers that operate independently of a document’s anchored rulers. Requires PageMaker 5.0. $129. Extensis Corp., 503/274-2020; fax 503/274-0530.

ResumeMaker for Macintosh with Career Planning
There is plenty of software that can help you when you’re on the job, but what about when you don’t have a job? ResumeMaker helps users create résumés and job-hunting correspondence, including cover letters and thank-you letters. In the Prospects section of the program, users can log information about their job leads, target companies, and contacts. The latest version of ResumeMaker features extra career guidance and job-search techniques in continues.

Introducing the coolest, least expensive video camera for the Mac. Rehearse with this until you get your own QuickCam.

Believe it or not, this really is a video camera. To experience how easy QuickCam is, cut this photo out, place atop most any Mac and pretend to plug into the serial port.

That’s it. QuickCam comes with a built-in microphone, separate base, and all the software you’ll need to immediately create 4-bit grayscale QuickTime movies and still PICT photos. Jazz up your presentations, quickly prototype multimedia videos, or simply amaze your friends.

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IT'S GONE. AND YOU DIDN'T BACK IT UP.

FACE IT. YOU NEED to back up your files. Use Retrospect, the number one Macintosh backup software — backing up over one million Macs, at last count.

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COMPRESSION. Retrospect's built-in Lessr™ compression cuts backups down to size without compromising performance.

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"For backing up and archiving, there's nothing better." Macworld. And Retrospect Remote is a MacUser 1993 Editor's Choice Award winner.

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the form of Richard Nelson Bolles’ New Quick Job-Hunting Map, which is drawn
from his book, What Color Is Your Para-
chute? $49.95. Individual Software,
510/734-6767, 800/822-3522; fax
510/734-8337.

Wolfenstein 3D
One of the hottest action/arcade titles for the PC is appearing on the Macin-
tosh. Captured by Nazis, you must find the plans for Operation Eisenfaust and
escape from the prison keep. Wolfen-
stein. You’ll rely on your wits and what-
ever weapons you can find in this fast-
paced first-person adventure. Wolfen-
stein 3D ships in both Power Mac and
68000 versions. 2.5MB min. memory;
requires 8-bit color. $49.95. MacPlus:
714/553-3522, 800/736-5738; fax 714/
252-2820.

World of Words
You can never be too rich, too beautiful, or too educated. This vocabulary-im-
provement software is aimed at high school students studying for their SATs.
World of Words is based on a teenager nanie’s who sprinkles stories and illustrations about his favorite bands with vocabulary words culled from previous SATs. Students can hear the words read aloud, words are linked with distinct images, and words are grouped into Word Families, creating a structure of relationships between words. $69.95.
Randolph Educational Services, 201/
328-1512; fax 201/328-2893.

CD-ROMS

Buried in Time
In this sequel to The Journeyman Project, you’ll once again become Temporal Security Agent #5, the time-traveling law-enforcement officer. When you discover that you’ve been framed for alter-
ing history, you must travel to past and
future worlds and solve complex puzzles in order to prove your innocence. Buried in Time combines rendered images, video, and animation with a stereo sound track to bring your quest to life. 5MB min. memory; requires Mac I.C. 8-bit color. $59.95.

Corel for the Macintosh
This disc contains more than 10,000 clip-art images in PICT format; 6000 of the images are in color, and the product includes browsing/selection software. The Gallery package also includes the Corel Professional Photo Sampler Disc, which contains 100 stock photographs in Photo CD format. $59. Corel Corp.,
613/728-8200, 800/836-3729; fax
613/728-9790.

Doctors Book of Home Remedies
Everyone needs a physician at some point, but this disc provides preventative-
health-care tips and advice. The product includes a database of over 2000 practi-
cal cures; 25 minutes of video; and
health-related tips and techniques, such as 29 tips for dealing with the common cold and 27 ways to reduce cholesterol. The Doctors Book of Home Remedies also includes toll-free listings of support and treatment agencies and an interactive personal checklist based on a user’s personal data and habits. $39.95.
Compton’s NewMedia, 619/929-2500,
800/862-2206; fax 619/929-2600.

Dracula Unleashed
It’s several years after Count Dracula took a stake through the heart in Bram
Stoker’s original novel, but he’s managed to inhabit another body, and it’s your job to find out whose. This adventure game uses 96 minutes of video to create 135 scenes through which you must navigate. Every choice affects your path, and there is more than one way to end this story. 2.5MB min. memory;
requires Mac I.C. 8-bit color. $59.95.

Dracula, 613/728-0566; fax 613/728-0562.

Weatherstock Weather Photo-CD
You can’t beat mother nature for images of beauty, power, and sheer destruct-
ion—this disc has 100, 24-bit images of lightning and thunderstorms, from moonrises and puffy clouds. All images are in Photo CD format. $99. Weatherstock, 602/751-9964; fax 602/751-1185.

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NoteBook Traveler Leather Carrier
If you’ve always wanted to wrap your PowerBook in black leather, this may be your chance. This carrying case is about the size of a double-wide briefcase and can accommodate a PowerBook and a portable printer, as well as business cards, magazines, papers, pens, power supplies, disk drives, floppy disks, and many of the other amenities of the modern mobile executive. $265.95. Kensington.

PowerAssist
Scratch a PowerBook user and you will find a ravening beast, hungry for both power and tiny accessories. PowerAssist is an AC adapter for 100-series PowerBooks that is roughly one-third the size of Apple’s power adapter. The PowerAssist will merely extend the life of your battery by four times while you are plugged in and working; when you put your PowerBook to sleep, PowerAssist will charge your PowerBook battery. $69. Newer Technology, 316/685-4904; 800/676-3726; fax 316/685-9368.

Red Guard
It never fails—just as you’re about to finish that four-hour download, someone picks up an extension phone and dusts your connection. You’ll never have that trouble again if you add a Red Guard device wherever you have a phone extension. The compact module locks extensions out of the circuit while your modem or fax machine is in use. Package of three $29.95. ORA Electronics, 818/772-2700; fax 818/718-8626.

SCSI PowerPlug
Some people’s idea of a removable hard drive is when you unplug the drive from the SCSI chain and trot it over to another workstation. The SCSI PowerPlug lets you add and remove devices to and from a SCSI chain without turning off your Macintosh. $79.95. ADCON Corp., 203/761-0651; fax 203/761-1444.

SCSI Switch/Extender
With this device you can connect two Macintoshes (or a Mac and a PC) to the same SCSI chain. The box has two inputs and one output—switching is controlled via an on/off switch on the front panel—and the device checks to make sure that the SCSI bus is quiet (no data is being passed) before switching from one line to another. Also users can extend their SCSI cable runs to about 20 feet.

Fantastic Fax Modems
Fax modems are easy to buy but not so easy to use. Author John McCormick teaches you how to buy both Mac and PC fax modems and software, and then how to get the most out of your purchases. The book covers troubleshooting, image and color transmissions, overseas faxing, converting faxes to text files, and faxing from the road. 240 pages. $21.95. Windcrest/McGraw-Hill, 717/794-2191, 800/822-8158; fax 717/794-2080.

MACWORLD November 1994 49
There is nothing like the feeling of losing your data. There is nothing like booting up to find that your twenty-page conference report has burned to a crisp. Or watching a month’s worth of virus-infected spreadsheets go up in smoke right before your eyes.

When it happens, a rush of job-security panic begins in your legs and rapidly bolts all the way up to your cerebellum. And the impact of losing all of your hard work affects you in a way you’ll certainly never forget.

Data loss. It’s one fiery disaster that makes for an awfully bad day.

**Proactive Protection For Your Macintosh.**

This being the way things are, at Symantec we subscribe to the theory that the best way to deal with a disaster is, well, to prevent it in the first place. Which is the very reason for our newly updated Norton Utilities® and SAM®. In a word, they’re proactive. But to put it more poetically, this improved data-protection software actually snuffs out fires without so much as the stirring of your mouse.

**New Norton Utilities Detects Damage Before Disasters Happen.**

For starters, look at our new Norton Utilities 3.0. We’ve taken the industry’s most powerful data recovery and repair program and improved it to where it’s almost invisible. So that now you can virtually load it and forget it.
The enhanced Speed Disk's unique customization feature lets you defragment everything from a whole volume to a selected file. And Norton Utilities 3.0 now also includes enhanced backup, which creates self-extracting and self-restoring backups of your data. This improved capability makes it even easier for you to restore data during emergency situations. And our backup now also supports tape drives.

The greatest level of protection against new viruses as they are discovered. The new SAM also scans thorough and destroys viruses in more types of compressed files than any other antivirus software can. SAM covers DiskDoubler, Compact Pro, Stuffit, and Now Compress. This ensures your ability to detect and eliminate a virus in any compressed file. And for all of you who have a healthy appreciation for speed, the means accelerated scanning speed, greater productivity, along with even more transparent protection.

What it shakes out into is that improved Norton 3.0 and SAM 4.0 now provide your Mac with the ultimate available levels of proactive protection against data loss. It's all rather amazing.

Then again, maybe all of these advancements are not so amazing. After all, Symantec is, of course, the proven industry leader when it comes to Mac data repair and recovery and virus protection.

**NEW SAM PROVIDES THE BEST PROTECTION AGAINST VIRUSES.**

However, that's just the half of this proactive pair. We've also fully redesigned SAM 4.0 to provide the most complete and most effective virus protection, detection, and elimination of known and unknown viruses. So that what could turn your entire system into a towering inferno never even becomes a spark.

One of SAM's exclusive features is automatic virus updating. Through your modem, SAM automatically dials the Symantec BBS daily, weekly, or according to any schedule you tell it to follow.

It then downloads the latest virus antidotes and updates your virus definition files. So you now no longer have to mess with manual updating. This assures you have the improved SAM is also the faster SAM. The 4.0 version scans for viruses significantly faster than its predecessor. Which makes virus protection more seamless and less disruptive to your work flow.

Want more? Okay, SAM is also the only virus protection software that allows you to create a custom decontamination disk specific to your machine. This lets you reboot your Mac easily should your system crash from a virus.

The 4.0 version also simplifies the user interface by combining SAM Intercept and Virus Clinic into one easy-to-use component. This advancement allows you to configure more expert options from one convenient location.

**POWER MAC NATIVE.**

While these new versions will protect your original Mac, they are also Power Mac native. So those of you with a Power Macintosh can take full advantage of the increased processing power. Ultimately, that means Symantec's enhanced decontamination disks are now available for your Power Mac, too. So you now no longer have to mess with manual updating. This assures you have the greatest level of protection against new viruses as they are discovered. The new SAM also scans for and destroys viruses in more types of compressed files than any other antivirus software can. SAM covers DiskDoubler, Compact Pro, Stuffit, and Now Compress. This ensures your ability to detect and eliminate a virus in any compressed file. And for all of you who have a healthy appreciation for speed, the means accelerated scanning speed, greater productivity, along with even more transparent protection.

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**POWER MAC NATIVE.**

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Quadra 630

Macintosh Computer

**PROS:** Inexpensive; good performance; basic AV capabilities included.

**CONS:** Sound input and output limited to 8 bits; no video-memory expansion; single slot for system RAM expansion.

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

**COMPANY'S ESTIMATED PRICE:** $1279.

The Quadra 630 may be the last of the 680X0-based desktop Macintoshes and one of the best entry-level Macintoshes ever. Not only is the Quadra 630 affordable, but its performance rivals that of more expensive Macintoshes like the Quadra 800 and 950. The machine also has enough expansion slots for add-ons to make it a multimedia whiz, and it is upgradeable to a Power Mac.

Apple estimates the street price of the basic Quadra 630 (4MB of RAM and a 250MB hard disk) to be around $1279, but has no estimate for a fully equipped machine. My guess is that a Quadra 630 with 12MB of RAM, a 300i double-speed internal CD-ROM drive, an Apple TV/Video System, an Apple keyboard, and a 14-inch monitor will be about $2400.

The Quadra 630’s case is a completely new design. Its footprint is about the same as that of a Power Mac 7100/66, but the 630 is not as tall. In addition to a power-on light, the 630’s front panel has a headphone jack, volume-control buttons, and a remote-control sensor (a good feature for TV channel-surfing and audio-CD track selection). The back panel includes the usual ADB port, printer or AppleTalk port, SCSI port, speaker and microphone jacks, and video port. There are also a few knockout panels that allow you to plug connectors into an optional PDS card or the TV/Video System interface.

The Quadra 630 is built for easy expansion and has a slide-out motherboard (a feature made popular by the Color Classic). To access the motherboard, just snap off a plastic panel and remove two screws on the back of the case; you can then pull the motherboard out easily. The motherboard shows an extremely low chip count due to the highly integrated chip set.

In the center of the motherboard is the 33MHz 68040—the same chip used in the Quadra 650, 800, and 950. The motherboard also sports an LC III-compatible 68030 PDS that accepts most of the cards designed for LC III machines such as the Quadra 605 and the LC 575. Memory expansion beyond the barely usable, standard 4MB is limited to a single SIMM slot. The Quadra 630 can be expanded to a total of 36MB of RAM—if you can afford the over-$1000 32MB SIMM.

The motherboard also sports a communications slot, first introduced with the LC 575 series, for either a fax modem or Ethernet module. There is a video-in slot for the optional Apple AV Card, which allows audio and video digitizing, and a connector for a TV-tuner card that supports both broadcast and cable TV. With the optional Apple TV/Video System setup ($249), you can now watch the Sci-Fi Channel and work on your spreadsheet at the same time. You can expand the TV window to full screen when something interesting happens, capture a still frame, or record the whole scene as a QuickTime movie. The AV card allows you to digitize video at a rate of up to 15 frames per second at a window size of 160 by 120 pixels, or 7 fps with a 320-by-240-pixel window. Although not considered high quality by today’s standards, the frame rate is adequate for beginners who want to learn more about digitizing video.
Unfortunately, there is no slot on the Quadra 630 motherboard for additional video memory—the video DRAM is limited to 1MB built into the video-display ASIC. The video DRAM does, however, support a monitor at 832-by-624-pixel resolution in 8-bit color depth, or at 640 by 480 resolution in 16-bit color depth. The only way to get 24-bit color is to use third-party hardware or software. For a Macintosh, Apple used an internal IDE drive that plugs into the LC III-style PDS. It would be nice to have an optional video-memory slot so you could get 24-bit color depth on a 14-inch monitor or 16-bit or better color depth on a 16-inch monitor.

Despite all the optional AV goodies, the Quadra 630’s built-in sound is only 8-bit stereo in/out—not the 16 bits of the other AV Macs and the Power Macintoshes (16 bits is the standard for professional CD-quality sound). Whenever you use your microphone through the microphone jack or play a recorded sound, you have only 8-bit audio resolution. Fortunately, CD playback is 16-bit. If you really need to input editable 16-bit sound, you can add third-party hardware or software. Unlike the other Quadra models, the 630 doesn’t come with a microphone; you can only use a PlainTalk-compatible microphone.

For Macintosh aficionados, here’s a surprise: instead of sticking to the SCSI storage standard synonymous with the Macintosh, Apple used an internal IDE (Integrated Device Electronics) drive common in PC clones. However, this means that standard third-party formatting software such as FWB’s Hard Disk Toolkit doesn’t work with the 630’s internal drive. The only software for formatting the IDE drive is the formatter that comes with the 630’s System disk. Fortunately, hard disk utilities like Central Point Software’s MacTools and Symantec’s Norton Utilities, and backup programs like Retrospect, work as expected. In Macworld Lab benchmarks, the internal IDE drive ran somewhat faster than a SCSI drive of comparable size. You can still attach SCSI devices externally if you have a spare drive. You can also replace the internal drive with a larger IDE drive, which is typically cheaper than the SCSI counterpart. According to Apple, almost all of the new IDE drives work with the Quadra 630.

The Quadra 630, like all of the latest Apple products, is Energy Star-compliant. After a certain period of inactivity (you define the period via the CPU Energy Saver control panel), the machine shuts itself down.

Even though Apple markets the 630’s 68040 microprocessor as a 66/33MHz chip, the CPU is the same 33MHz chip used in the Quadra 650, 800, and 950. Macworld Lab benchmarks show that the Quadra 630 is about as fast as the other 33MHz Quadras. Understandably, the Quadra 630 is not as fast as Power Macs running Power Mac-native software. If you are interested in the LC 630 and Performa 630 (which are available through the education channels and superstores), they should run just as fast as the Quadra 630 in tasks such as finding and replacing words, scrolling a document, or sorting a database file. However, the Quadra 630 is a lot faster than its LC and Performa counterparts at floating-point-intensive tasks like recalculating a spreadsheet or performing a Mathematica evaluation, since the Quadra 630 uses a full 68040, not the FPU-less 68LC040 processor of the LC and Performa 630 series. The FPU makes the Quadra 630 suitable even for business tasks.

Both the Quadra 630 and the Power Macintosh 6100/60 are marketed as entry-level machines, so a comparison between the two is inevitable. While the 6100 has PowerPC speed on its side, the 630 has a better price and more add-on flexibility. If you need performance, and Power Mac-native versions of your software are available, the 6100 is a better buy. However, if you don’t intend to upgrade to native Power Mac software soon, if your favorite application is not yet native, or if you just want to experiment with multimedia production and development, the Quadra 630 is a better choice. The best part is that the 630 is upgradable to a Power Mac so you can always move up when you need to (Apple expects the upgrade to cost less than $500 and to be available in October). And if the performance of the Power Macintosh Upgrade Card for the Quadra 610, 650, 800, and the 900 series is any indication, the Quadra 630 with the upcoming upgrade card should run at least as fast as a Power Macintosh 7100/66. As an additional benefit, the upgrade card can be switched back to 68040 mode so that nonnative applications run at full speed. Finally, the Quadra 630 costs less than the 6100/60; the cost of the Power Macintosh Upgrade Card makes it only slightly more expensive than the base 6100 by about $100 to $200.

The Last Word

Usually entry-level machines lack speed or expandability. Not so in this case. Even with the video and system-memory expansion caveats, I highly recommend the Quadra 630. If the Quadra 630 is any indication of future entry-level machines from Apple, I can’t wait for one that’s based on the Power PC.—MARK HURLOW

**Quadra 630 with FPU Compared with Other 680X0 Systems**

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*Results for Infini-D rendering not factored in due to lack of FPU.*

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MiniCad 5

CAD Software

PROS: Fast; easy to use; customizable interface; excellent architectural tools; inexpensive.
CONS: Lacks some mechanical- and civil-engineering tools.


GRAPHSOFT, one of the pioneers in bringing CAD to the Macintosh platform, is now among the first to introduce a Power Mac-capable two- and three-dimensional CAD software package. Architects, engineers, and industrial designers are well advised to look into MiniCad 5. For a suggested retail price of $795, it includes features normally found only in high-end packages, such as Autodesk's AutoCAD. Graphisoft's ArchiCAD, or Intergraph's MicroStation Mac, all of which list for well over $3000.

MiniCad 5 is a general-purpose 2-D and 3-D CAD package, but it's well adapted for the architectural, engineering, and construction industries. In addition to offering the accuracy these professions require (up to nine significant digits), MiniCad 5 includes autodimensioning, unlimited layers, a built-in spreadsheet, a database for tracking costs and bills of materials, and the MiniPaschal programming language for building custom CAD applications (you can use C++ if you prefer). And because MiniCad 5 can import and export files in DXF, it lets you exchange drawings with other CAD programs and modelers.

MiniCad 5's unique layer-linking capability allows you to treat multiple layers as if they were one. For example, you can link an elevation layer in a 3-D model to a floor-plan layer; then, any changes to the floor plan will appear in the elevation layer. If you assign a height (or z value) to a layer, objects created on that layer automatically show up in correct proportion when you switch to a 3-D view. You can also organize drawings by categorizing objects in classes that operate across layers. For example, you can put your lighting fixtures into a class even if they are scattered throughout the drawing; with one command you can then hide or show these fixtures.

In addition to the hundreds of architectural, mechanical, electrical, and design symbols that MiniCad 5 includes, third-party developers have released numerous discipline-specific symbol libraries for MiniCad, such as collections for classic furniture and kitchen design. You can edit symbols either individually or globally, if for instance, you place a six-panel door symbol in a number of rooms and later decide you want eight-panel doors throughout. This capability can save you a lot of time and frustration.

Like previous releases of MiniCad, version 5 has a "smart cursor" that shows you exact locations of possible snap or target points, letting you draw or modify objects precisely. The smart cursor, which changes shape depending on its location on a selected object, helps you perform certain operations or display information about that object. For example, move the cursor across the handles of a selected rectangle, and the cursor becomes a pair of calipers that calculates the rectangle's area and perimeter. MiniCad 5 also retains the "smart wall," which cuts an appropriate opening when you apply a symbol (such as a door) to it, and heals itself if you remove the symbol.

Besides Power Mac-native operation, MiniCad 5's major enhancements are the addition of externals, which are specialized tools and menu items geared toward a specific profession or discipline, and an OverlayEdit utility, which lets you add the externals to MiniCad's menu bar. You can select these custom environments from a menu and organize a group of externals into a module. Both of these additions allow you to customize the program to fit your particular requirements.

While MiniCad 5 lets you customize its interface with externals, it also includes three professional modules: architectural, mechanical, and advanced design. These modules are collections of tools, menu items, symbol libraries, and templates particular to a discipline; they can simplify your tasks and increase your productivity. For example, the architectural module provides tools for creating parametric symbols, so you can enter certain parameters to create, say, a door or window symbol. The module also includes tools for making linear and angular measurements, laying out parking lots, indicating revisions, and editing or duplicating symbols.

The mechanical-engineering module provides tools for creating 3-D objects, such as cams, gears, screws, and bolts. The property-display function calculates an object's area, perimeter, centroid, and moment of inertia. The module lacks some important features for mechanical designers, such as solids modeling and volume calculations; and civil engineers will be frustrated by the absence of terrain modeling and other features.

MiniCad 5's advanced-design module is useful in various disciplines. It enables you to create QuickTime movies of motion around 3-D objects, so you can create walk-through and flyby animations that any QuickTime player can run.

The Last Word

Compared with high-end CAD programs, MiniCad 5 is admirably easy to learn. Along with excellent printed manuals, it ships with a CD-ROM that contains an interactive tutorial and an electronic reference of MiniCad tools and commands. If you are new to CAD on the Macintosh or have used other CAD programs, you should be a MiniCad master after a few hours of practice with the expanded tutorial. MiniCad 5 is excellent CAD software offering major performance for the price.—FAYE S. O'NEAL
Dabbler 1.0

Art-Education/Paint Software

**PROS:** Excellent features for the price; supports pressure-sensitive pen input; fast; low memory requirements; native Power Mac version available.

**CONS:** Unsatisfying results with mouse input; recorded lessons are of questionable value; no transparency controls; idiosyncratic interface requires some learning. **COMPANY:** Fractal Design Corporation (408/688-5300). **LIST PRICE:** $99.

Fractal Design's new paint program is notable right off the bat for a number of reasons. First, version 1.0 is available for both Macintosh and Windows platforms as well as for Power Macs. Second, you get 16-bit color and a remarkably powerful paintbox for the price; and unlike Fractal Design's professional-class Painter, Dabbler is fast and responsive on LC- and Performa-class Macs. Third, Dabbler provides lessons from the well-known Walter Foster learn-to-draw series, both in the 50-page printed manual and in an on-screen tutorial.

Dabbler adopts the metaphor of a sketchbook on top of a drawing table that's fitted at the top with four drawers. Using a `@'-key or clicking on a drawer front toggles each drawer open or closed with a satisfying snap. The tool drawer contains a simplified selection of the "natural materials" found in Fractal Design's other paint programs; the most recently selected tools display on the front of the drawer (whether open or closed), keeping them conveniently close at hand. Most tools give you the option of small, medium, and large points (as opposed to the professional tools' infinite variability); switching sizes produces an audible "ping"—a different pitch for each size. An "extra" drawer opens automatically whenever a selected tool has options or special effects to offer. The color drawer contains 16 customizable palettes, including 8 gradients. You can reverse each texture in the papers drawer with a click of the button, yielding 40 drawing surfaces.

Dabbler's operation is generally intuitive and easy to learn, but Fractal Design took some bold liberties with the interface that may confound seasoned Macintosh users. For example, `@'-O does not open a painting but instead imports a graphic from another program (it works with PICT, TIFF, Adobe Photoshop, and various Windows formats). To work on an existing Dabbler painting, you open the tool drawer, click on the sketchbook icon, and page through until you reach the picture you want. Then when you close the tool drawer, the painting appears on the drawing table. Pictures save automatically to the sketchbook in Dabbler format; you can also save files in the common Mac and Windows graphics formats. To delete a work, just drag it off the open sketchbook and into the adjacent trash can; a pushpin inside the tool drawer lets you temporarily remove a page so you can reorder it in the sketchbook.

Other deviations from standard Macintosh conventions take even more getting used to. For example, in place of the Mac's familiar selection tools, Dabbler uses a series of stencil tools—rectangle, oval, star, heart, free-form, and polygon—and requires you to select a separate float tool to move a selection. Additional stencil tools let you apply surface textures that you choose from the textures drawer, and you can also apply Photoshop filters. Dabbler has no line tool, but you can select Draw Freehand or Draw Straight Lines from the Options menu. Another oddity is that to apply gradients or text at an angle, you must use the page-rotate tool to turn your sketch. Finally, Dabbler makes good use of keyboard shortcuts, but there's still too much opening and closing of drawers for my taste.

Now, can Dabbler really teach you to draw? Just possibly. First, don't be fooled by the old-fashioned Walter Foster sketches. If you faithfully practice the follow-along drawings in the manual's instructional pages, you might just achieve some commercial-art skills. True, the woman's profile looks suspiciously like that of a young Greta Garbo, and the perky bunny looks like Disney's Thumper, but this lends the lessons a measure of charm and whimsy. No matter what drawing style you ultimately develop, the content of Foster's lessons is genuinely useful and applicable: rules of proportion and perspective, advice on sketching with pencil or charcoal before proceeding to ink—and some words of encouragement as well.

On the other hand, while it's entertaining to watch sample drawings take shape before your eyes, I question the value of the recorded sessions that you can play back (frame by frame or at full speed) via VCR-type controls. If you're quick, you'll see the icons change when a new tool is selected, and some drawings have captions explaining the operations currently under way. But I didn't find it useful to watch the disembodied lines accrue on the page.

More significantly, perhaps, the Walter Foster drawing system was designed for natural materials—chalk, pencil, and so on—not electronic paint programs that emulate natural materials, and not all the techniques are transferable to the digital sketchpad. Whether you draw with the mouse (which I don't recommend) or with a pressure-sensitive stylus and tablet, the physical act of sketching on screen requires a different kind of hand-eye coordination from that needed for sketching on paper. Dabbler does a good job of re-creating the appearance of, say, charcoal on a toothy paper, but once on screen, pixels are pixels: it's hard to erase your pencil guidelines and leave only the ink-brush lines.

The manual is divided into two sections, one on the Dabbler application and one on the Foster lessons. The Dabbler portion does a fine job of introducing the program's tools and interface, but lessons on digital painting techniques would be helpful, especially when it comes to Dabbler's admirably advanced features, including its ability to acquire images directly from scanners, its autocloning capability, and a tracing-paper mode.

The Last Word

Whether you opt to study the Walter Foster drawing method or go it alone, the key to artistic skill is practice, practice, practice. By providing an excellent paint set with an appealing if slightly quirky interface at a great price, Dabbler makes it easy to stick with the program.—Marjorie Baer

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Introducing Delrina Fax PRO™ for Macintosh. You’ll wonder how you ever faxed without it.

Now you can use your Mac to send, receive and manage faxes – thanks to new Delrina Fax PRO for Macintosh. With Delrina Fax, sending faxes is as easy as printing a document – and you can fax directly from any Mac application. Simply select Delrina Fax in your File menu, type in a name and number – or choose a name from the built-in address book – then click on the “Send” icon and your fax is quickly on its way.

Don’t try this with a fax machine.

Delrina Fax also delivers stunning 16-shade gray-scale sharpness and clarity on-screen, as well as to any fax machine or printer. And, since it works in the background, you can send and receive faxes without leaving the application you’re working in and designate faxes to print automatically on receipt.

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Circle 137 on reader service card
Apple Personal Diagnostics

Apple Personal Diagnostics (APD) focuses on diagnostics for Mac hardware components. Given Apple's obvious advantages in this field, APD should be a winner. However, in trying to make a hardware-diagnostic tool for the rest of us, Apple has come up short.

Apple starts off on the wrong foot by omitting two emergency start-up disks. If you need an 800K disk, or if you own a Centris or Quadra 610, 650, 660AV; Quadra 800 or 840AV; a Macintosh TV; or a Workgroup Server 60 or 80, you need to order a $10 disk—which is not mentioned on the box. And APD 1.0 isn't compatible with the Power Macs, though version 1.1, shipping soon, will be. APD consists of an application and an Automated Diagnostics extension.

The Diagnostic Tests window presents check boxes for five sets of tests: Logic Board, Hard Drive, Floppy Drive, System Software, and Display Patterns, each of which you can optionally loop. Alas, APD has no preferences feature; relaunching resets all options to their defaults. And those options are limited. You cannot isolate logic-board components or individual System Software tests, for example. (It's worth noting, too, that Disk First Aid, included with the Mac system, provides the same functionality as APD's System Software tests.)

If your Mac passes all APD's tests successfully, a "Test Passed" message flashes on screen. But some tests are not thorough. For example, the floppy drive test accepts either an 800K or 1.44MB disk, rather than asking for both. Testing both encoding methods is essential to checking a SuperDrive. On one disk I used, APD locked out bad sectors during the verification test yet passed the drive without comment. Reinitializing the disk in the Finder yielded no media errors, but APD repeatedly locked out sectors—without ever notifying me. APD should have suggested that I retest with another floppy disk to see if the error was due to a bad disk or a problem with the drive or my software. In this case, the problem was not a bad disk, so it could have been a dirty or malfunctioning drive—exactly what APD is supposed to find.

The System Info and Benchmark Checks features aren't the primary focus of APD, but even so, superior software alternatives are available as freeware and shareware. System Info—which tells you what Mac you have, how much RAM is installed, the version numbers of parts of the installed System Software, information on installed extensions and applications, and a few details about SCSI devices—is useful but limited and inflexible. For example, Control Panels and Extensions Info gives the names and versions of installed extensions but not info on RAM usage, size of disk, traps patched, load order, disabled extensions, and so on. APD's SCSI and slot information is similarly skimpy; for example, the slot info covers NuBus but not the PDS.

APD's System Software rests.)

There are three math tests (integer, complex, and CPU); two speed tests (memory and CPU); one video test (which does not cycle through all bit depths); and a quick, generic read/write hard drive test that's too short to provide any reliable data and cannot be set to run multiple iterations and obtain an average. Without more control and detail, plus the ability to save, annotate, import, and export records, APD's benchmark checks aren't useful or meaningful.

The Automated Diagnostics extension (which requires System 7) performs a subset of the diagnostic tests during idle time. You configure Automatic Diagnostics from within the application; a control panel would have been a more convenient way to enable or disable the extension (you can't choose individual tests), set the idle-time threshold, and choose the way it notifies you that testing is active. Last, a status field reports when tests were last run and whether the system passed or failed. Vexingly, APD clears that field anytime you restart your Mac or run tests within the application.

To get specifics on problems that APD detects, you must create a report. Reports are highly configurable, but they're in a proprietary file format and can't be exported to text or pasted into another program. The Help window presents cursory, context-sensitive descriptions of control items. All the documentation is in the slim manual.

More significantly, the manual is uneven. The troubleshooting chapter gives explanations and responses for all APD error messages, but inexplicably recommends rebuilding the Desktop if the logic-board or RAM tests fail. An excellent section on SCSI termination and troubleshooting is preceded by references to drives being removed after launching the program, as if detaching SCSI devices with the Mac turned on were acceptable. While the manual suggests using third-party utilities for repairing directory damage, when it addresses lost folders and files it makes no mention of data-recovery utilities or services; instead, it suggests that you back up what you can and reformat. It has tables on RAM, VRAM, and card slot upgrades, but no tables of sad-Mac or system error codes.

The Last Word

The real question is, Do you need this type of program at all? For most users the answer is no. Most computer problems aren't due to hardware component failure, and those that are generally (1) are obvious enough to diagnose without software, (2) are severe enough to prevent you from running diagnostic software, or (3) involve hardware not checked adequately or at all by APD. The Mac already runs a thorough self-diagnostic test at every start-up and checks most of the things that APD checks—that's what the happy-Mac symbol means.

If Apple had provided a solid, versatile utility with an elegant interface and extensive documentation, I'd have recommended it. Such a program could be useful for everyone from advanced users to consultants and system administrators. Sadly, APD is not such a program, and it's just too pricey for the novelty of having your FPU checked in the background.

—Peter Stoller
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ScanPrepPro has modes for scanning line art, gray-scale images, and color images, with a lot of options for each. With gray-scale images, for instance, you can specify that the image has a full range of grays and that there are specular highlights (like reflections from chrome). When you work with images that are mainly, but not entirely, black and white, ScanPrepPro's dropout feature keeps the blacks and whites true while retaining subtle gray details—always a challenge.

ScanPrepPro doesn't do the best tonal correction on previously scanned images; a skilled Photoshop user can do better. But when ScanPrepPro controls the right scanner (an Agfa or a La Cie SilverScanner, for instance), it can do an excellent job of tonal correction.

ScanPrepPro does not address some of the real bugsaboos of color-image correction such as tonal shifts, color casts, and the like, but it does nicely in most other areas—notably separation.

ScanPrepPro's line-art mode doesn't use sharpening, which greatly reduces the quality it can provide. This is surprising, since its Copy Dot mode (designed to reproduce previously screened images dot for dot—essentially capturing them as line art) does use sharpening and provides the best results I've seen. The solution is to use Copy Dot for all line-art scanning.

While ScanPrepPro's single dialog box is a model of simplicity and functionality, the program itself is something of an octopus. For example, disabled menu items can still affect what's happening. Sometimes the process of jumping in and out of dialog boxes, choosing options, and tweaking settings stops inexplicably, resulting in a crashed Mac (this happened more than once with all system extensions off). And you sometimes need to remind ScanPrepPro to accomplish simple things—like copying the dimensions of an already scanned image.

ImageXpress updates ScanPrepPro constantly, which can be an annoyance. The previous version worked fine with the Hewlett-Packard ScanJet, for instance, but version 1.2.3 doesn't, and it's not clear how long that will have to wait for that particular fix. However, the company's unlimited free tech support (albeit on a toll line) does a great deal to obviate that problem.

The Last Word
ScanPrepPro is not perfect, but it goes a long way toward automating a process that can be confusing, difficult, and time-consuming. ScanPrepPro produces good results—sometimes better images than could be produced by any but the most skilled operator.—STEVE ROTH

ScanPrepPro 1.2

Photo shop Add-on

PROS: Automates scanning and image correction; incorporates understanding of image reproduction and Photoshop tools; excellent reproduction of previously screened images. CONS: Somewhat unstable; line-art mode doesn't use sharpening; doesn't correct for color shifts and casts. COMPANY: ImageXpress (404/264-9924). LIST PRICE: $695.

LogoMotion 1.0

Animation Tool

PROS: Affordable price; approachable 3-D tools; provides animation plug-ins. CONS: Middle-of-the-road rendering tools. COMPANY: Specular International (413/253-3100). LIST PRICE: $149.

F I F O U N T D E E P R O F E S S I O N A L - l e v e l 3-D tools, or you simply want to dabble in 3-D, take a look at LogoMotion, an easy-to-use 3-D package that's eminently affordable. As its name suggests, LogoMotion is designed to facilitate the production of 3-D flying logos, like those from TV-movie-of-the-week titles. LogoMotion enables you to extrude text objects from TrueType and PostScript Type 1 fonts, apply surface textures to the objects, construct animated sequences, and render finished images.

But LogoMotion is more than a type extruder. It offers enough modeling, rendering, and animation power to make it a decent all-around 3-D package for budget-conscious graphic designers, entry-level users, and budding animators.

LogoMotion keeps Infini-D's Workstation look and feel, but adds some nice touches to the package. For example, LogoMotion offers front, side, and top views, plus a camera view. The resizable camera-view window is the main work area; the other fixed-size views are for orientation. And LogoMotion's palette holds only text, lathing, and extrusion tools, along with object-manipulation and -scaling functions.

LogoMotion keeps Infini-D's Workshop feature, which lets you edit the outlines of lathed and extruded objects, as well as edit EPS outlines imported from Aldus FreeHand and Adobe Illustrator.
With A Little Imagination, You Can Use DOS And Windows Files.

Apple is bundling MacLinkPlus with the new Powerbooks because of its ability to translate files. Maybe you should consider buying MacLinkPlus for your Macintosh.

With MacLinkPlus, You Can Use Them On Your Mac.

A lot of products will let you move PC files onto your Mac. But only MacLinkPlus will let you actually use them with formatting and graphics intact. Across platforms. Across applications. Just double-click on virtually any word processing, graphics, spreadsheet or database file and MacLinkPlus will automatically convert it into your favorite Mac application. And, with a simple drag and drop, MacLinkPlus will also convert your Mac files into DOS and Windows formats. After all, there are many things you can do with PC files. But wouldn’t you really rather use them for what they were intended with MacLinkPlus?

Call 800-780-1466 For More Information. Ask about multi-packs, site licenses and our Windows version.
LogoMotion supports publish and subscribe, so editing EPS outlines in the originating program updates the 3-D model in the Workshop; it also imports objects in DXF and 3D formats. LogoMotion's modeling features are essentially equal to InfiDi's.

The same cannot be said for LogoMotion's animation and rendering tools, but its simplified animation Sequence is more than adequate for the program's flying logo mission. And LogoMotion includes important controls such as motion ease-in and ease-out, as well as some more-advanced animation features such as spline-based motion paths and the ability to morph both surfaces and objects. Overall, LogoMotion's animation capabilities strike a good balance between the sometimes contradictory demands of power and usability.

And LogoMotion makes it easy for novices to get started in movienaking, by providing a useful assortment of Stage-Hands—plug-in backgrounds, cameras, environments, lights, and props—that automate the creation of animations. LogoMotion comes with almost two dozen surfaces that you can edit for color, reflectivity, and specularities, and from which you can create new surfaces and new surface libraries. The program offers two levels of rendering: a fast setting that generates flat shadings, and a better setting that produces images with reflections, fog, and environment effects.

LogoMotion can produce 32-bit renderings with alpha channels, even on Macs without 32-bit video. Generally speaking, images produced with LogoMotion aren't the highest quality, but they're perfectly adequate for graphic design applications and corporate presentations. If you need better rendering, LogoMotion can export models to Infini-D for ray-tracing.

LogoMotion runs without a whimper. You know a developer is confident when the manual encourages you to learn the program by clicking about and seeing what happens. The manual itself is understandable and easy to read. It could be a bit more thorough, but that might run counter to the theme of simplicity.

The Last Word

All in all, LogoMotion is a terrific program. It's great for creating quick flying logos for corporate presentations—its intended purpose. However, with its excellent balance of modeling, rendering, and animation features, LogoMotion may find just as much use as an entry-level 3-D package for nonprofessionals and maybe even the education market.

—CARLOS DOMINGO MARTINEZ

TeamFlow 3.1

**TQM Flowchart Software**

**PROS:** Clear diagrams; can attach documents to steps; includes departmental and team hierarchies; can diagram main processes and subprocesses.

**CONS:** Simple Gantt chart; limited printing of reports; limited customizability of flowcharts and reports.

**COMPANY:** CFM (617/275-5258).

**COMPANY'S ESTIMATED PRICE:** $295.

**MW**

COMPUTER TOOLS TO HELP MANAGERS

in preparing TQM (Total Quality Management) projects are few and far between. TeamFlow lets you create special flowcharts, called process or deployment flowcharts, which show how tasks and reports pass from person to person and who has responsibilities at different stages of a project.

TeamFlow is easy to use. Since process flowcharts start with the team members, TeamFlow prompts you to first enter the names of the members of your team. The team database can consist of members' names and their positions in an organization chart or info such as address, E-mail address, phone number, and fax number. TeamFlow automatically draws the organization chart for the team.

Once you've created a team database, you use the work space to create flowcharts. Team members' names are displayed across the top of the work space. You add process steps to a flowchart by clicking on the work space and selecting the person responsible for that step. When you click, a palette of possible process types—task, meeting, report, decision, or milestone—appears. You can add details such as start and finish dates, budgeted cost, and team leader. You can include other team members in the step by dragging the symbol for the step you've defined to the columns corresponding to the other team members.

You can link process steps by dragging the cursor from one process step to the next. The program draws an arrow between the linked steps. If you have a decision point in your diagram and it leads back to a previous step, you can draw a feedback arrow, which is a dashed arrow rather than a solid arrow.

When you're dealing with any good-size project, your process chart is likely to get quite large and complicated. TeamFlow allows you to simplify the look of your chart by creating summary symbols, which when selected display new work spaces with additional details of a process.

If you include start and finish dates for each process step, TeamFlow also draws a Gantt chart to show you the sequence of events in the project. The Gantt chart doesn't include many of the features found in more complex project-management software, for example, you cannot customize the symbols on the chart or show allocated resources or slack times, as you can in Microsoft Project. But TeamFlow's Gantt chart gives you a reasonable idea of your project's schedule. You can also view a Gantt chart for just one phase of a project.

For tracking project costs, if you enter start and finish dates for a step, TeamFlow also allows the entry of the cost of each process step. The total cost of your project and its variance appears in the program information window. There is no way to print a report of the project's budget.

You can attach documents to any process step. In keeping with the TQM approach, TeamFlow calls attached documents either quality standards or reference documents. Quality standards might be objective criteria that must be met for a decision point, while reference documents might be meeting reports. TeamFlow also provides for referencing hard-copy documents.

**The Last Word**

TeamFlow's strength lies in making it easy for you to plan, or dissect, your work processes, concentrating on the details of your work, not the details of the program. For that reason, it's a valuable business tool that I recommend—there is no other Mac program like it.—DAVE KOSIUR

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The only thing missing is the wait.

New SprintScan 35 Slide Scanner from Polaroid — Brilliant Scans in Under a Minute.

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At under a minute per scan, the SprintScan™ 35 is 5 to 15 times faster than other tested slide scanners, with no loss of quality.* Scanning at resolutions up to 2700 dpi, it samples 10 bits per color (RGB) to deliver the best 24 bits. Which gives you a broader range of colors and better shadow detail. And at only $2,495,† SprintScan 35 won't change the color balance on your bottom line.

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First Things First Proactive 1.1

**Scheduling Program**

**PROS:** Outline view, event-entry templates; items are easy to reschedule. **CONS:** Events in adjacent months are hidden; no text wrap in monthly calendar; no contact-manager links.

**COMPANY:** Visionary Software (503/246-6200), **LIST PRICE:** $149.

I've lost count of the number of times the Mac has saved my life by alerting me to a crucial appointment. I've always liked First Things First (FTF) for basic reminders, but it lacked advanced scheduling features. With the release of FTF Proactive (FTFP), Visionary Software is trying to muscle in on its high-end competition by adding new features.

FTFP retains the standard version's handy clock that floats above the desktop. (If the clock gets in your way, you can dock it in the menu bar.) Double-clicking on the clock launches FTFP and automatically opens the default calendar file. The program provides a flexible suite of calendar views, with single-day, multi-day, monthly, and yearly options (the weekly calendar is simply a multi-day view with seven days showing). In the single-day and multi-day windows, each day is divided into two sections, with untimed to-do items at the top and an appointment-book-style grid at the bottom.

FTFP's monthly calendar suffers from a few weaknesses. For example, events that fall in the visible portion of the preceding or following month don't appear on the current month's display. Although the software lets you jump to days in adjacent months by clicking on miniature calendars, I found the tiny dates almost impossible to read on my 13-inch monitor. A bigger problem is the lack of text-wrap capability in the monthly view. If you're not careful when entering an event's description, you could be left guessing about who you're supposed to meet, since some of the event's text may not show.

In addition to the standard views, FTFP lets you look at your schedule in outline form—a boon for people who find it easier to organize to-dos and appointments in a hierarchical format. The outline accommodates up to 50 levels, which should be ample for even the busiest schedules. You can create events in the outline and drag them to the calendar to schedule them. Another handy option lets you assign project deadlines to FTF files, so you receive a warning when you try to book an item past the project's due date.

Unlike some other schedulers, FTFP doesn't distinguish between to-dos and appointments. When you post a new item, you have the option of entering a date and a start time or leaving the item unscheduled. You can also give an ending time to events that have a specific length. (Alas, there's no way to enter an item's duration directly.) You can assign items any one of four priority levels, and you can organize items into categories of your choosing; you can't, however, display categories in different colors the way you can with Now Up-to-Date.

FTFP sports a few other convenient features. For example, Quick Reschedule lets you move one or more events by a specified interval. I also like the way you can set reminders to appear both at and in advance of an item's scheduled time. Finally, if you find that you often book certain types of events such as lunch meetings, the program lets you create Stationery templates with many of the important details already filled in.

FTFP users can share schedules by hierarchically linking their calendars to master files on local or remote volumes. It's an unusual approach, but even new users should have little trouble getting up to speed in short order.

In an admirable effort to conserve resources, Visionary Software distributes the user's guide in the form of an Apple DocViewer file. However, the manual takes up almost 3MB on disk—a potential problem if space is tight.

**The Last Word**

All in all, First Things First Proactive is a capable performer that builds on the strengths of its predecessor. It's worth a look if you need a scheduling program and don't have to share information with a contact manager. —FRANKLIN N. TESSLER

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Kekulé 1.1

**Science Software**

**PROS:** Near 100 percent accuracy, even on poor scans. **CONS:** Mac version missing features compared with PC version. **COMPANY:** PSI International (410/821-5980), **LIST PRICE:** $495.

Now, why didn't someone think of this program ten years ago? Kekulé reads scanned chemical-structure drawings and interprets them, giving both a diagram for checking interpretation accuracy and a formal string representation of the structure. The need for an automated interpreter of structures has been desperate since the first appearance of computer chemical modeling. Let me explain.

In the mid-1980s, a number of firms developed the first practical chemical databases. These databases let users retrieve the chemical properties of a given molecule from a structure drawing or formula name; the databases could also be used as an inventory system. Inventory systems might sound trivial, but when the databases were actually implemented and lab notebooks converted to electronic files, some companies found to their dismay that in-house duplication of syntheses (that is, a chemist trying to create a compound that someone in the company had already made) ran a terrifying 30 percent.

The problem with these databases was that structural data had to be entered by hand. Companies hired platoons of data entry staff, who would sit at terminals drawing chemical structures, a tedious, time-consuming chore.

PSI, however, not only thought of automating structure-data entry but did a near-perfect job of implementing it. Kekulé is the chemistry equivalent of an OCR (optical character recognition) program—it's a utility that scans and interprets printed chemical structures. Since continues...
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these structures are usually of modest size on a page, Kekulé is oriented toward the use of inexpensive hand scanners. The structures are also black and white, so it’s actually hard to find a scanner that’s not good enough for use with Kekulé.

You scan the structure into a TIFF file using either your scanner’s own software or the KeKScan utility included in the Kekulé package. You select Convert Scanned Image from the Scan menu, indicate the TIFF file you want interpreted, and Kekulé grinds away turning the file into an interpreted structure. This program presents the result against a grayed-out version of the scanned structure—this makes it easy to compare structural details and make sure Kekulé captured everything correctly.

What’s amazing is how well Kekulé works. I assumed that by scanning tiny textbook figures and low-quality faxes of structures from *Science* I could provoke an interpretation-success rate like that of an OCR program, for which 98 percent accuracy on good material is typical. Kekulé processed 20 scans at 100 percent accuracy, including scans of molecules with unusual types of bonding. A likely explanation is that Kekulé takes advantage of a hierarchy of interpretation rules that take all possible chemical information into account. Even when a C looks like a closed blob in a scan, the program doesn’t mistake it for an O—bonding information undoubtedly gives Kekulé an edge over OCR programs in this regard.

The interpreted structure can be sent directly to Cambridge Scientific’s ChemDraw and hence to the whole ChemOffice suite. Unfortunately, in order to send structures to SoftShell International’s ChemIntosht or to software from MDL Information Systems you have to buy a third-party format converter from Exographics (201/728-0188). Different connection-table formats for exchanging structures with standard minicomputer programs are also supported in the PC version of Kekulé, but not in the Macintosh version.

These file-exchange infelicities are a problem, but Kekulé’s outstanding performance at its main function makes it a problem you’ll want to tolerate. The educational and student versions are the same program as the commercial product, making it a bargain for most of the people who need it.

**The Last Word**

Every lab that uses ChemDraw or ChemIntosht needs a copy of Kekulé and a scanner. It’s that simple. Kekulé will save you months of chemical-structure data entry work.—CHARLES SEITER

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**Drive7 3.0**

**Hard Drive-Formatting Utility**

**PROS:**
- Boosts drive performance; simple to install and use; on some Mac models, lets you format a drive while continuing to work.

**CONS:**
- Disk-caching capability can use lots of system RAM.

**COMPANY:** Casa Blanca Works
- **LIST PRICE:** $79.95.

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**Drive7** from Casa Blanca Works is a program that easily performs just about any hard drive-formatting chore. You can format, test, and partition most SCSI drives—and you can boost performance too, using the Mount Cache control panel, which sets aside system RAM to cache data.

Drive7 does most of its disk updating, formatting, and partitioning chores from a single window. Five buttons activate its basic functions (and provide online help). For more-sophisticated formatting options, you select Functions or Options from the menu bar.

In addition to the same basic operations as those in the application window, the Functions menu gives you the ability to set SCSI ID by software (for drives that support this function), test your drive after formatting, and even select a hard disk icon from about 48 choices.

The Options menu lets you configure your disk-formatting options, such as the default disk name and partition style, and driver options, such as blank or polled reads (useful for slower Macs, and required by some accelerator boards). The Options menu also allows you to remap a disk’s bad blocks automatically. One additional feature, Drive7’s automatic stop time, causes a hard drive to spin down after an interval of inactivity and, like a PowerBook, spin up again as soon as you read from or write to the drive.

Casa Blanca Works has added a unique feature that’s reserved for Macs with SCSI Manager 4.3 (the AV and Power Macintosh lines) and those that support SCSI-2 (the rest of the Centris and Quadra lines). If you own one of these models, you can actually format a drive and continue working in another program at the very same time. (I did the first draft of this review as Drive7 was busy formatting another drive.) At the worst, you’ll probably witness a slight performance slowdown. Since formatting a large hard drive is apt to take anywhere from half an hour to an hour, this is one neat way to stay productive (unless you’d rather take a lunch break).

The Mount Cache control panel handles several chores. The most important is its ability to set aside a portion of RAM to cache frequently used data from your drive. This feature is similar to System 7’s disk cache but more sophisticated in its execution. You set aside a specific amount of RAM for each drive. You have the option to turn off your system’s cache and let Mount Cache do all the caching, or let both the system cache and Drive7 cache work at the same time. If you have several drives installed on your Mac, RAM usage can add up. It also takes a little trial and error to get the best setting, but I observed a noticeable performance boost when I tried Mount Cache on an old and slow Maxtor 127MB drive (I gave it a 256K cache).

Drive7’s Mount Cache can also mount removable devices such as SyQuest and Bernoulli cartridges. You can also set partition options—for example, whether a drive is write protected, mounts automatically at time of start-up, has password protection, or is used as a boot partition.

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**The Last Word**

Drive7 doesn’t quite have the powerful driver-customization tools offered by FWB’s Hard Disk ToolKit—but it doesn’t really need them. For the vast majority of users, those features simply aren’t necessary. Drive7 easily formats and partitions most drives and provides all the options you need. And within its limitations, its Mount Cache utility provides a real performance boost. I recommend Drive7 highly.—GENE STEINBERG
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OmniPage Professional 5.0

OCR Software

PROS: Accurate on clean documents; compact; efficient; includes math type-symbol display.
CONS: Complex real-world documents still a challenge.
COMPANY: Caere Corporation
LIST PRICE: $695.

PowerAgent 1.1

Task-Automation Software

PROS: Easy script development; great management of FileMaker Pro
CONS: Difficult to implement scripting in many mainstream applications.
COMPANY: SouthBeach Software Corporation
LIST PRICE: $159.

IN MACWORLD'S LAST round-up of OCR (optical character recognition) software ("OCR: The Recognition You Deserve," November 1993) we predicted that if a vendor produced a PowerPC-based OCR program and put every state-of-the-art method into the package, recognition accuracy could approach 100 percent on "good" documents. We were right.

OmniPage Professional 5.0 is just such a program. It reads documents typed on an IBM Selectric with a Courier typeball, it reads clean laser-printed documents with standard fonts, it reads plain black-on-white magazine text (The New Yorker is a better target than Wired, for example), and it reads all three categories at 100 percent accuracy. That's a historic first in OCR. Earlier programs could approach this accuracy with extensive training on particular fonts (OmniPage Pro supports training, too), but this program produces this accuracy level right out of the box. The Power Mac has

got a page interpreted in 8 seconds or so. You can use a Mac IIci, but the processing time goes beyond a minute per page.

The interface has been greatly improved. All you do is click on a single button to scan, zone, and interpret a document. You can also click on the Check Recognition button in the tool bar and review doubtful readings case by case. The Auto Zones function works well enough for plain text blocks (a good thing, too, since overriding it is awkward). But even using OmniPage's True Page option, which isolates and preserves graphics scanned along with text, zoning (and with it interpretation) is often foiled by graphics that have text prominently overlaid. That's not a problem for scanning legal documents, but OCR, even in OmniPage, still couldn't scan in a standard Macworld article with infographics and get the whole thing right. Nonetheless, OmniPage and its slick new interface can handle most business OCR tasks.

As you would expect, this program supports every scanner currently sold in the Mac market and can save files in the formats of every common word processor. OmniPage Pro 5.0 also includes a copy of Image Assistant, an application with most of the features of Adobe Photoshop but without native-mode speed. Image Assistant is handy for touching up scanned graphics.

OmniPage Pro still makes some baffling, small errors on real-world documents. It usually preserves formatting (bold, italic, font size) correctly, but sometimes it puts the bold format on the wrong words in a line where bold text occurs. Occasionally, it blows up the point size of text in part of a line for no apparent reason, and it will lowercase random letters in the middle of an upper-case line. Finally, and this is hard to understand in light of the trigram-probability checking, in some fonts OmniPage persistently reads the as the. As long as I'm complaining, I should note that you can expect to wait a half hour or more to reach Caere's customer support, which fortunately has all the answers once you get through.

The Last Word

OmniPage Professional 5.0 is the first program to do what most users actually expect of OCR. On good text samples, its accuracy is 100 percent, which is realistically what's required for an OCR product in most businesses. At present OmniPage has no competition on the Power Mac.—CHARLES SEITER

HOW MANY HOURS PER DAY DOES your Mac actually need you? Do you ever find yourself sitting in front of the screen waiting for a database update to download? Are you simply babysitting your Mac while it grinds through mail merges? With PowerAgent, a little glimpse of the future of Macintosh computing, all the boring, time-consuming stuff can be automated and performed at off-peak times.

PowerAgent is simple enough that even someone with no programming background can use it for basic tasks. The program opens with a blank job list (see "Just Another Job"). You click on the Job Card icon to get a choice of action flags to set: Date and Time, Start Up, Shut Down, Check Data, and Apple Event. Start Up, for example, is the flag to pick if you want an action to be carried out every time your Mac starts up. Date and Time can be set for one-shot or every Tuesday-at-10-a.m. actions. Then you pick a task from another set of five possibilities: Alert Message (you can send alert messages to a whole network), Print Message, Send Mail, Run FileMaker Pro Script, and Run AppleScript. The E-mail function currently works with CE Software's QuickMail and Apple's Powertalk. In practical terms, this means that QuickMail is easy to use with PowerAgent, but for other E-mail programs you'll want to be on a network where a kindly system administrator has installed Powertalk for you, along with a Powertalk-capable E-mail system.

The AppleScript and FileMaker Pro script functions are the real payoff in PowerAgent. It's nice to be able to send yourself alerts and to print message files at night, but it's not crucial. The FileMaker Pro script function, however, really makes a difference, mainly because FileMaker scripting is easy enough that people can actually use it. All the normal database tedium—printing 500 mail merge letters, checking mailing lists for duplications, updating inventory, generating standard weekly reports—becomes...
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a matter of recording the script in FileMaker and then telling PowerAgent when you want it done. There's no real programming involved, and PowerAgent becomes a sort of programmable timer for your FileMaker operations.

The AppleScript function (PowerAgent has a wonderful dialog-box-based scriptwriter) in principle lets you have the same kind of control over dozens of other applications. The snag in this arrangement is that not enough script development has been done at the applications level. FileMaker Pro figures prominently in the PowerAgent manual not just because it's the most popular Macintosh database but because scripting FileMaker Pro is relatively easy. You could also write AppleScripts that run tasks in Microsoft Excel, but you'll be on your own figuring out how to do it—even the Excel 5 manual has nothing to say about AppleScript. PowerAgent lists other scriptable applications, among them QuarkXPress and Aldus PageMaker, but you can expect to put in some long hours with Derrick Schneider's *The Tao of AppleScript* (Hayden, 1993) before you can make this happen.

In PageMaker, for example, you have to use AppleScript to issue the commands of PageMaker's own internal scripting language. That's a job best left to a programmer who will be developing scripts for companywide use. It's not SouthBeach Software's fault that the rest of the world isn't as script-happy as it should be, but the situation at present limits PowerAgent's value. Still, the idea of an agent program that manages scripts is extremely powerful, and SouthBeach Software can expect PowerAgent to be a hot item as more applications put AppleScript to work.

**The Last Word** If you're not scared of scripting, you can revolutionize your Macintosh work with PowerAgent. Support for automating FileMaker Pro functions is already superb, and PowerAgent will be able to handle other applications equally well once scripting gains wider acceptance.—CHARLES SEITER

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**White Knight 12.0**

Telecommunications Software

**PROS**: Solid performance; rich feature set.

**CONS**: Steep learning curve; quirky interface; lacks online help (except for scripting).

**COMPANY**: The FreeSoft Company (412/846-2700). **LIST PRICE**: $139.

Scott Watson's White Knight 12.0 is the latest descendant of a telecommunications program that dates back to the earliest days of the Mac. What began as a shareware program called Red Ryder, over the years became commercial, got a name change, and was revised many times. But the numerous updates have not changed the program's focus as an all-in-one telecommunications application. While other programs have become fatter and slower, and have acquired Windows-style shaded menus, Watson's vision of the ideal telecommunications software remains sharp and true. White Knight offers just about every telecommunications feature you need and likely have ever imagined, including one or two that are unique to the program.

Still, in the finest Mac programs you can open the application and figure out the basics with a minimum of fuss. White Knight is not such a program. Watson tells you in the beginning of the manual that he expects you to sit down and read it, thoroughly, before using White Knight. And you should definitely take him at his word.

In these days of Windows-like toolbars and buttons, White Knight has maintained its plain but cluttered interface (and its minimalism—the 680X0 and Power Macintosh versions each ship on one 800K disk). You work in a single application window with a bewildering array of menus and submenus. The basics, such as logging on to a BBS or an online service, are relatively easy. But the program's more advanced features, including its flexible scripting capability and multitude of terminal-emulation choices (from TTY to Televideo), are another matter. The online help deals only with scripting, and without the manual you can get lost in cyberspace real fast. Fortunately, the manual is written in an easy-to-read, friendly style.

Despite the sometimes awkward interface and strange, multicharacter keyboard shortcuts (such as 3E-M-H to hang up your modem), White Knight works impressively well. The native Power Macintosh version, for example, seems to execute steps in the blink of an eye.

Making connections through White Knight is fast and reliable. The program supports all the popular file-transfer protocols, including Xmodem, Ymodem, and Zmodem, as well as more arcane protocols like Classic Kermit, Long Packet Kermit, Sliding Windows Kermit, and CompuServe Quick B. White Knight also offers a proprietary transfer scheme called Flash. You can use Flash only to connect to other systems using White Knight, but in my tests, Flash provided more consistent performance and better transfer speeds than other telecom products.

White Knight's powerful scripting language allows you to automate every part of your connection routine, from simple log-ons to file and message trans-
ClickBook 1.1

**Print Utility**

**PROS:** Nearly foolproof pagination; easy to configure; good online help. **CONS:** Scaled graphics and fonts can be distorted. **COMPANY:** BookMaker Corporation (415/354-8161). **LIST PRICE:** $69.95.

**S**O YOU WANT TO BE A PUBLISHER? BookMaker’s ClickBook might take you one step closer to your Rupert Murdoch fantasies. ClickBook is a print utility that helps you format documents into double-sided booklet form, and automates the rather arcane process of pagination. The program comes with 20 preconfigured booklet types and allows you to create more layouts as you need them. The layout tools aren’t fancy, but then again, ClickBook isn’t aiming to be QuarkXPress.

Creating a booklet in ClickBook is easy. First you open a document (in almost any text or graphics application) and choose Page Setup from the File menu; then you check a box to make ClickBook active. Finally, you print the document using the standard Macintosh print command.

Instead of sending the pages to the printer, ClickBook captures them in a buffer and then allows you to select a booklet type. The program arranges the document pages so that they are printed in a smaller format, and they come out of your printer as page signatures: single sheets with multiple minipages printed on them.

While ClickBook makes it easy to print your documents as minipages, you’ll need to practice a little to get those pages to look right. Some of the layouts reduce the page size and the margins quite a bit—enough so that you will need to use a fairly large type size for it to still be legible after being reduced. You’ll also need to experiment with the margins to get the pages to print correctly.

*Gutenberg Never Had It This Easy* ClickBook’s booklet-layout dialog box enables you to design your own booklets and brochures, or just make double-sided copies.

Once you have the printed pages in hand, the next step is to assemble them. An option lets you print straightforward assembly instructions with your booklet, but adding page numbers to your document in the original application makes booklet construction a lot simpler.

ClickBook booklets are no substitute for professionally printed books, manuals, or brochures. ClickBook doesn’t use a page-description language such as PostScript to preserve letters and graphics. When it scales pages down, there can be a slight loss in image quality; gradients and gray-scale drawings suffer the greatest degradation.

To reduce the distortion that scaling causes, ClickBook has options that let you preserve graphic and text shapes. You can choose a no-scaling option and do the necessary scaling manually in the document’s original application.

The Last Word Overall, most people will be satisfied with the quality of ClickBook’s booklets. With just a little practice, I created address books, shareware manuals, and minibooks of poetry of variable length using such applications as Microsoft Word, No Hands Software’s Common Ground, and QuarkXPress. For small businesses or individuals who need to create inexpensive booklets quickly and without hassle, ClickBook is an excellent choice.—MATTHEW HAWN

PowerPort Mercury/PB 500 Series

**Fax Modem**

**PROS:** Solid performance; excellent fax software, capable telecommunications program. **CONS:** Difficult installation; fax software doesn’t support gray-scale images. **COMPANY:** Global Village Communication (415/350-8200). **LIST PRICE:** $399.

**A**T THE MOMENT, IF YOU WANT to install an internal fax modem on your 500-series PowerBook, you have one choice—Global Village Communication’s PowerPort Mercury. Fortunately, the PowerPort Mercury is a top-notch product capable of exemplary fax and data-communications performance.

If you decide to purchase this fax modem, you may want to get a PowerBook bundled with it. The design of the PowerBook 500 series makes modem installation a job you should not take lightly. The installation guide for the modem is 32 pages long and lists 68 steps that involve complete disassembly and reassembly of the computer.

Global Village’s GlobalFax software is a work of elegance. You can configure, view, and print faxes from within the Fax Center desk accessory (which uses just 20K of RAM). You can have faxes print automatically by setting the Print Fax option and leaving Fax Center open. As soon as your fax is received, the printing process begins. You can send faxes from within most applications by holding down the option key and selecting Fax from the File menu. The Fax window also lets you select an address book, search for individual names, or add new names. You can choose from a list of options for your faxes, such as whether to send a fax in standard or best quality, whether to include a cover page, and whether to fax the document now or at a scheduled time. You can also assemble separate fax documents and send them in a single operation.

For general-purpose telecommunications, Global Village provides a licensed version of the shareware favorite ZTerm (you don’t have to pay a shareware fee). For logging on to a bulletin board or online service, ZTerm is fast and easy to use. The program has a limited script-creation capability, and it transfers files at top speeds using the Zmodem protocol. You can also use ZTerm to set up address books for your most frequent BBS visits.

The PowerPort Mercury’s performance is virtually flawless. It sends and receives faxes quickly, and the quality is superb. However, the PowerPort software (version 2.08b) doesn’t support gray-scale faxes. When I used the PowerPort Mercury as a data modem, I was able to connect to all of my favorite online haunts without any problems. The PowerPort Mercury supports V.terbo (a subset of the V.32bis standard), providing a data-transfer rate of up to 19.2 Kbps. I was able to locate only one source—Global Village’s own BBS—that supports that speed, but I had no difficulty achieving reliable 19.2-Kbps connections there.

The Last Word All told, the PowerPort Mercury fax modem is a first-rate product. I recommend it without hesitation.—GENE STEINBERG
Overall Value? No One Beats Us!

Out in California the Berkeley Mac Users Group named us a Fall 1994 Choice Product, writing: “This is still the Best All Around Mac Mail-Order Company. Others have tried to beat them but have fallen short... They can answer technical questions almost as well as BMUG, and are always friendly.”

Closer to New Hampshire, the Boston Computer Society's 25,000 members recently gave us an UGLY Award (User Groups Like You) for Best All-Around Company. Other comments included: “Superior service,” “incredibly fast shipping,” “reliable,” and “a knowledgeable sales staff.”

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**Reviews**

**Terrazzo 1.0**

**Plug-in Graphic-Effects Module**

**PROS:** Fast; easy to use; easy to adjust; can export and import tiling; COMPANY: Fracta Tools (415/487-7000). **LIST PRICE:** $199.

**CONS:** No integrated 3-D bump or lighting effects. **COMPANY:** Xaos Tools (415/487-7000). **LIST PRICE:** $199.

**Tools for Tiling**

Terrazzo is a cool plug-in module that transparently places powerful mathematical algorithms into the hands of the digital artist. Using one of 17 planar-symmetry groups, Terrazzo creates intricate repeating tiles from any bitmapped image. It’s rather like having an adjustable kaleidoscope on your desktop.

Terrazzo works within Adobe Photoshop, Fractal Design Painter, and other graphics programs that accept plug-in modules; it adds 1MB to the host application’s RAM requirements. The filter’s uncomplicated interface displays a thumbnail of the source image (either the one you are currently working with or a user-specified alternate) along with a motif—a variable marquee that bounds the area used in the pattern calculations. The symmetry groups, carrying fanciful descriptions such as Honey Bees and Prickly Pear (named after American quilting patterns), dictate how much rotation, offset, and mirroring Terrazzo will apply to the sample. Once you’ve chosen a symmetry group and set the motif, Terrazzo displays a sample tile. You can adjust feathering, opacity, and color channels before rendering the tile into a repeating pattern across the image. You can also save individual tiles as discrete images, for later use as a tiled fill, in Photoshop, or as a repeating texture map for 3-D models.

Terrazzo is fun to use, but it’s not easy to control precisely, nor can you always predict your results. You can’t always tell whether interesting Terrazzo tiles will make attractive repeating patterns. While it is possible to gain a basic sense of how Terrazzo’s symmetry groups affect an image, experimentation and serendipity are still intrinsic parts of the tile-making process.

Beguiling as its geometric magic can be, Terrazzo lacks a few features that 3-D artists in particular might desire. Unlike Specular International’s TextureScape, Terrazzo does not allow the user to apply three-dimensional effects, such as lights, bumps, or bevels, to the surface of the pattern. One workaround is to create gray-scale patterns and use them as separate bump maps. Artists using Terrazzo with Fractal Design Painter can define tiles as paper textures to produce interesting relief and lighting effects.

The Last Word

Turning a random group of pixels into a geometric pattern may not be everyone’s consuming passion, but Terrazzo has definite appeal for a select niche of fabric, graphic, and video designers, as well as folks who just yearn for a little more balance and harmony in life.

—Avi Hoffer

**PostScript Utilities**

**Imagesetter-Simulation Software**

**CheckPost 1.3**

**PROS:** Good interface; background and batch downloading; can strip fonts from PostScript files. **CONS:** Can’t automatically scale pages; prints on a single sheet; limited error reporting; can’t print from applications: incompatible with non-Adobe PostScript interpreters. **COMPANY:** Working Software (408/423-5696). **LIST PRICE:** $249.95.

**LaserCheck 1.0**

**PROS:** Automatically scales pages; gives lots of job information; prints pages up to point of error. **CONS:** No on-screen interface; unreliable on/off toggle; incompatible with non-Adobe PostScript interpreters. **COMPANY:** Systems of Merritt (203/660-1240). **LIST PRICE:** $199.

**Tools for Tiling**

LaserCheck is resident in your printer’s control panel. You can toggle its operation on or off, but this toggle program is not very reliable, so you often have to reset the printer to clear LaserCheck out.

CheckPost provides the user interface that LaserCheck lacks. You can download a file using CheckPost (even in the background, via menus or drag and drop) and access its controls through menus and dialog boxes. You can see an on-screen report of fonts required by and included in a PostScript file, and you can remove any fonts, which speeds printing somewhat if the fonts are already on the imagesetter. But interface aside, CheckPost is a disappointment compared with LaserCheck.

CheckPost’s Draft mode emulates various imagesetters, much as LaserCheck does, but doesn’t automatically scale pages to paper size; you must manually specify scaling and orientation. And unless you download each page separately, CheckPost crams all the pages on one sheet—sometimes useful, but usually not.

CheckPost doesn’t provide nearly as much information as LaserCheck, nor does it print the part of a page that’s already imaged when an error occurs. Finally, CheckPost requires you to create a PostScript dump and then download it; LaserCheck lets you print directly to a printer that has LaserCheck loaded.

The Last Word

Between CheckPost and LaserCheck, I’d choose LaserCheck hands down; in fact, I find it essential. The program can save you hundreds of dollars, and many hours, on a single, large imagesetting job. —Steve Roth
**Newton connects to Windows.** With the Newton Connection Kit **for Windows**, you can easily exchange information between your Newton-equipped PC and your computer as soon as you plug in.

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The Multimedia Workshop 1.0

**Multimedia Presentation Tool**

**PROS:** Inexpensive; fun and easy to use; CD-ROM is packed with clip media. **CONS:** Lacks flexibility; does not create interactive presentations. **COMPANY:** Davidson & Associates (310/793-0600). **LIST PRICE:** $79.95.

Most multimedia programs cost hundreds of dollars and come with a long learning curve. The Multimedia Workshop is a different kind of media-integration tool—one that can be used by children or adults without a big investment of time or money. The Multimedia Workshop includes three authoring environments: the Paint Workshop, the Writing Workshop, and the Video Workshop.

The Paint Workshop is a color paint program with all the basic painting tools, plus extras such as snowflake and tree tools. The Writing Workshop doesn't offer footnoting or an outliner, but it includes a spelling checker, a thesaurus, a read-aloud feature, and desktop publishing capabilities. The heart of The Multimedia Workshop is the Video Workshop, which has a scene-generation module and a video-layout module. The scene-generation module allows you to place graphics, background templates, and QuickTime movies on the screen. Using the tool bar and menu commands, you might start with a background template of a picture frame, change the background color, type a title, and place a drawing in one corner and a movie in another. The screen shows what the scene will look like, except that the movie doesn't move.

You combine scenes in the video-layout module. The interface is similar to, but simpler than, the multitrack interface of Macromedia Director. By dragging icons and stretching bars on a timeline, you arrange the order of scenes and change their durations. It's just as easy to add visual transitions between scenes and to place sounds in the audio track. When you play your production, the visual effects, video clips, and sound are synchronized according to your time line. If problems occur, you can easily go back to the Video Workshop and tweak the scenes and the timeline.

The Multimedia Workshop is full of compromises: Each scene can contain only one movie. The time line lets you place cues only at one-second intervals. There's no sound editor. You can't layer narration over music (unless it is embedded in a movie). You can't create interactive presentations that respond to mouse-clicks.

**The Last Word** Still, it's hard to argue with satisfied customers. The adults and middle-school kids who tested The Multimedia Workshop for us produced eye-catching, snappy presentations in a few hours (including the time it took them to learn the program). They had a great time mining the CD-ROM full of clip art, music, and video for ideas and images, and they loved showing their masterpieces to anyone who passed by. For beginners, The Multimedia Workshop passes the screen test.

—George and Ben Beekman

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Decision Analysis 2.5

**Decision-Assistance Software**

**PROS:** Straightforward visual approach; new options encourage realistic models. **CONS:** Needs spreadsheet-style summary. **COMPANY:** TreeAge (800/254-1911). **LIST PRICE:** $379.

To understand what Decision Analysis from TreeAge (DATA) does, you have to understand the probability concept of expected value. In California, for example, the state lottery pays out about $0.25 in prizes for every dollar in tickets. In a Nevada blackjack game, your expected value is about $0.98 for every dollar you bet. The definition is as follows: expected value equals payoff times the probability of the payoff. This is easy to follow in simple gambling cases, but it's not clear how to apply this concept correctly to complex, multistep business decisions.

DATA handles complex business cases by constructing tree diagrams of probabilities and payoffs, with a separate subtree representing each step of a process. Although probabilities in a process must sometimes be assigned subjectively, this procedure is the most realistic model available for the chances of success in a new project. If you need to know whether a million dollars invested in developing a new project will give you $2.3 million or $0.4 million as the likelihood payoff, DATA gives you a structure for employing whatever information you may have for sharpening your estimate of the expected value. Pick New Tree from the File menu, choose Adding Branches from Display, fill in a few payoffs and probabilities, and you have a model. You can now ask for an Outline view of the information in your tree diagram.

Version 2.5 offers a generous list of improvements (TreeAge provides a manual supplement that's almost the size of the 2.0 manual). Sensitivity analysis now includes two-way sensitivity treatment and threshold analysis (essentially just a better way of handling ranges of payoff and expected values). Different scenarios can now be studied with comparative graphs. A new node type (Markov) makes it possible to construct models of simplified time-dependent processes. Version 2.5 explicitly incorporates, under the Bayes's revision choice in the Options menu, the fact that you will often be modeling processes with incomplete data or with probabilities that will frequently be modified as the result of implementing your model and collecting results. Tree manipulation (copying subtrees, identifying lines, details of path analysis) has been improved, although trees in DATA still don't behave like true Macintosh graphical objects.

**The Last Word** If you have the responsibility for business decisions involving thousands of dollars and are willing to learn a new approach, DATA is the product for you. DATA offers a type of modeling that is more realistic and easier to modify than an Excel "what-if" study or a Crystal Ball analysis (see Reviews, Macworld, October 1994). DATA should be considered an essential part of a business analyst's tool kit. —Charles Seiter

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**Up a Tree** This DATA tree (and its subtrees) allows detailed analysis of the steps in a product marketing plan.
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Network Hardware

DaynaPort Pocket SCSI/Link

**PROS:** Lightweight; can use ADB as power source; works with desktop Macs or PowerBooks.

**CONS:** None.

**COMPANY:** Dayna Communications

**LIST PRICE:** 10BaseT $299; 10BaseT and thin Ethernet $369.

Pocket EtherTalk Adapter

**PROS:** Lightweight; uses ADB as power source; works with desktop Macs or PowerBooks.

**CONS:** Costs more than Dayna unit; long hold time for tech support.

**COMPANY:** Xircom

**LIST PRICE:** 10BaseT $349; 10BaseT and thin Ethernet $399.

The DaynaPort Pocket SCSI/Link and the Xircom Pocket EtherTalk Adapter are lightweight, all-in-one SCSI-to-Ethernet connectors that work with both PowerBooks and desktop Macs that lack built-in Ethernet or NuBus expansion slots.

The garage-door-opener-size adapters have two SCSI ports that accommodate both DB-25 (found on desktop Macs) and HDI-30 (found on PowerBooks) SCSI connections; you can use only one port at a time. An HDI-30-to-DB-25 cable is provided to alleviate SCSI connection headaches. And setup is easy. A dial-style SCSI-termination selection switch facilitates placing the device anywhere on the SCSI chain. The adapters come preconfigured for a single device on your SCSI bus.

Except for price and tech support, both products are identical in form and function. They both transferred network information to my PowerBook with little effort. I attached one of the adapters to my PowerBook and moved the 10BaseT network connection from my desktop Mac over to the adapter. To use an adapter, you simply attach it to the PowerBook and attach the network connection from the desktop Mac to the PowerBook.

The device can be powered from either an external power supply or the Mac's ADB port. Use the ADB option sparingly, as it drains the PowerBook's battery and precludes the use of additional ADB-powered devices. This isn't such a big deal considering that most of the time, where there's Ethernet there's electricity as well.

Both products provide an Ethernet alternative driver that must be installed in the host Mac's System Folder. The driver reroutes the network traffic through the SCSI port. I experienced no compatibility problems and could log on to servers and print just as I had previously.

Dayna's tech support was quick, responsive, and accurate. After waiting on hold for Xircom nearly 30 minutes, I gave up. (Xircom and Dayna also provide support via fax and online services on the Internet.)

**The Last Word** With its cheaper price and more-responsive tech support, Dayna wins in my book.—Matt Clark

MicMac 2.0v1

Recording Software

**PROS:** Easy setup; relatively clean, crisp recordings. **CONS:** Uses lots of hard disk space; poor reproduction with highest compression settings; only partly compatible with AV Macs.

**COMPANY:** Nirvana Research

**LIST PRICE:** $89.

**MW**

MicMac turns your Macintosh into a portable tape recorder or transcription device. Instead of recording sounds onto a cassette tape, MicMac records sounds onto a disk file. The size of the file depends on the level of compression you select—61, 3:1, or none—and, if you have a newer Mac that supports CD-quality sound, which sampling rate you select.

There is no manual, but the program includes a complete online tutorial, and you should be up to speed on this program in a few minutes. The main interface consists of a single window that mimics a tape recorder's control panel. You can use your Mac's microphone to record, or use a tape recorder or another Mac as your input source. If you make a mistake, the program's trim function allows you to replace all or part of your recording.

MicMac can run in the background, while you are working on another project (for example, typing the transcript of a recording into a word processing program). You can start and stop playback using keyboard commands, skip back to hear a segment over and over again, and mark spots for quick retrieval.

For most purposes, MicMac works comfortably within its less than 400K memory allotment. But when I attempted to record at a 44kHz, 16-bit sampling rate (CD quality) on my PowerBook 540c, the program put up a warning message requesting that I allot a larger RAM partition to the program. I gave it 800K and had no further problem.

At the highest-quality audio setting, sound reproduction was crisp and clean, but my hard drive filled up rapidly. Nirvana Research estimates that an hour of recording at MicMac's standard setting (22kHz, 8 bits, 6:1 compression) uses 13MB of hard disk space. I found audio quality at this setting barely acceptable (lots of hiss and some distortion), and I settled on the 3:1 compression rate (which uses twice as much disk space) as a listenable alternative (although it was not as crisp and clean as the higher-resolution settings).

A high-density floppy disk can contain only a 3-minute MicMac recording made at an acceptable quality level. A full hour's recording requires a removable disk of some sort—if you intend to archive your recordings, the cost quickly adds up. According to Nirvana, version 2.1 of MicMac will allow you to record at one resolution and play back at a lower resolution, which, the company claims, will allow you to get a superior-quality recording and reduce file size.

**The Last Word** The concept of Mac-as-dictation machine is undeniably attractive, and Nirvana Research has pulled it off well. But when all is said and done, a minicassette tape recorder provides equal or superior sound reproduction and is easier and more flexible to use for recording than a PowerBook. The choice is yours.—Gene Steinberg
Samsung.
Mac's new point of view.

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MATLAB 4.1

Numerical Math Software

**PROS:** Complete and consistent program for numerics, with optimized matrix operations; extensive set of toolboxes. **CONS:** Adding toolboxes gets costly. **COMPANY:** The Math Works (508/653-1419). **LIST PRICE:** $1695.

MATLAB is the principal numerical math system for matrix computation on platforms ranging from DOS PCs up to scientific superminicomputers. The big news in version 4.0 and higher of MATLAB is the addition, at last, of two features that have been needed for years. First, MATLAB has done an excellent job of implementing 3-D color graphics, making it the last major piece of scientific software to offer this capability. Second, The Math Works has finally introduced a proper debugging facility for M-files, the command scripts that are the basis of most MATLAB operations.

MATLAB's language is like an interpreted version of C, so it's relatively simple to implement a toolbox—a toolbox is just a set of M-file scripts and some new function definitions. Image processing, statistics, and electrical engineering toolboxes (control, signal processing, system identification) all appeared shortly after the first release of MATLAB. I looked at two new ones: the Symbolic Math Toolbox ($595) and the Neural Network Toolbox 2.0 ($895).

A Neural Network Toolbox is a natural for MATLAB, since every neural-net model is implemented as a matrix computation. Version 2.0 includes a whole megabyte of M-files (in highly compact format at that). The set covers backpropagation; perceptron learning; delta rule nets; Kohonen and Hebbian association; Hopfield recurrent networks; and nine detailed applications, including character recognition. The 400-page manual is one of the best textbooks on the subject I've seen yet. The Symbolic Math Toolbox, instead of being yet another element in the endless repertoire of matrix computations, is a significant departure for MATLAB. Actually, it's Maple, appearing as a new set of MATLAB commands. The Math Works licensed Maple code from Waterloo Maple Software and packaged it as a standard symbolic-math toolbox and an $895 Extended Toolbox. The standard toolbox has about 60 Maple functions, including the linear algebra and ordinary differential equations sets, while the extended toolbox is essentially the full Maple package, including programming capabilities. The speed of Maple functions inside MATLAB is impressive, since MATLAB just calls Maple through its MEX gateway, and MATLAB doesn't impose much overhead of its own, being a simple command-oriented system.

The Last Word

By offering nearly 100 new graphics commands—which give precise control over lighting, shading, and other display features—MATLAB 4.1 has improved its treatment of sparse matrices and has added commands for sound processing. MATLAB is relatively expensive, and it's not very Mac-like even in this incarnation, but MATLAB's toolboxes make it a first choice over a large range of engineering and applied-science specialties.

—CHARLES SEITER

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PhotoMatic 1.01

Photoshop Utility

**PROS:** Automates repetitive Photoshop functions; allows batch processing of images. **CONS:** Inconsistent performance, accessing scripts in Photoshop is awkward; no way to pause a script. **COMPANY:** DayStar Digital (404/967-2077). **COMPANY'S ESTIMATED PRICE:** $199.

PHOTOMATIC IS AN APPLET-BASED utility that lets you automate tasks in Adobe Photoshop (version 2.5.1 or later) without messiing with AppleScript programming or a complex macro program. With PhotoMatic, you record a series of Photoshop commands and then use the resulting script to automatically process images.

Many Photoshop tasks can't be automated; tweaking an image generally requires an artist's eye. But for certain repetitive tasks, a scripting utility makes sense. For example, suppose you frequently change scanned images from RGB to CMYK and set their resolution to 166 dpi. You can easily set up a PhotoMatic script that steps through these processes automatically, saving you from the drudgery of repeatedly choosing the same commands. And because PhotoMatic can trigger these steps in the background, without opening Photoshop windows, jobs like this go a lot faster.

PhotoMatic places a Record menu in Photoshop's menu bar. To create a script, you choose Start, and PhotoMatic records your actions. When you're done, you choose Stop, and PhotoMatic then asks you to name and save the script.

You can play scripts from within Photoshop by choosing Play and opening the desired script. Unfortunately, there's no way to add frequently used scripts directly to the Record menu. (DayStar plans to add this feature in version 2.0, which should be available by the time you read this.) PhotoMatic's real strength, though, is its ability to play scripts with Photoshop in the background and to batch-process files—performing scripts on an unlimited number of images. For batch processing, you drag the image-file icons onto the PhotoMatic icon. A dialog box appears asking which script to use. Pick the script and PhotoMatic launches Photoshop, makes duplicate copies of the images, processes them, and places them in a Done folder. You can also create folders, each containing multiple files and a script, and have PhotoMatic process each folder using the script within it.

PhotoMatic also lets you use a remote copy of Photoshop over a network. PhotoMatic does the processing, then returns the final, processed images to your Mac.

Version 1.0 has deficiencies that limit PhotoMatic's practicality. The most significant limitation is that you can't create a script that pauses. This means PhotoMatic can automate only tasks that require no user input during processing. DayStar is adding a pause/continue feature in version 2.0.

Also, like any macro program or scripting utility, PhotoMatic requires a lot of debugging. Recorded scripts don't always perform as expected, and working out a script's kinks can eat up much of the time you're supposed to be saving.

The Last Word

PhotoMatic can save you time and relieve you of some mundane Photoshop tasks, but it's a little too awkward and limited. The good news is that DayStar has promised to add features in version 2.0 that will make it much more powerful and easy to use.—JOSEPH SCHORR
Mac Keyboard Deluxe

**Keyboard**

**PROS:** Smaller and lighter than Apple's Extended Keyboard; four ADB ports.  **CONS:** No tactile feedback on caps lock key; fold-down feet grate on desktop.  **COMPANY:** MicroSpeed (510/490-1400).  **LIST PRICE:** $125.

IT'S A SAFE BET THAT MOST PEOPLE—even enlightened Macintosh buyers—don't give a second thought to the one piece of hardware they handle most often: the keyboard. That's a shame, considering that your choice of keyboard can largely determine whether your computing experience is safe, comfortable, and efficient. And while you shop, remember that Apple isn't the only one handling the business for you; there is only one choice when it comes to keyboards.

The Mac Keyboard Deluxe's key layout is identical to the Apple Extended Keyboard's, but the Deluxe's footprint is slightly more compact. While the Apple keyboard is only an inch deeper, the difference is noticeable on a small desk like mine. The MicroSpeed keyboard is also lighter than Apple's, but it feels every bit as solid. Although I didn't assess the keyboard's long-term durability, it should stand up to routine use. (MicroSpeed says the keyboard is resistant to spills, a claim I wasn't brave enough to test.) The Mac Keyboard Deluxe comes with a one-year limited warranty and includes an ADB cable.

Although the MicroSpeed's key placement is the same as Apple's, its switches provide slightly more resistance than Apple's. I grew accustomed to the new keys in just a few hours; after that, the difference no longer mattered to me. My wife, Debbie, who rarely uses the Mac, said she was less likely to make typing errors with the MicroSpeed keys. (In general, I've found there's no right or wrong when it comes to key feel—only one way to tell if you like a particular design is to try it.)

The Mac Keyboard Deluxe includes four ADB ports (two more than Apple's keyboard), two of which are located at the back—useful if you like to have several ADB devices plugged in at the same time.

Unlike Apple's caps lock key, which clicks and recesses slightly when pressed, the caps lock key on the MicroSpeed keyboard provides no tactile feedback to tell you it's active. (An LED indicator next to the power key glows to show that caps lock is on, however.)

Maxima 3.0

**RAM Disk**

**PROS:** Provides a higher-performance RAM disk and allows more Mac models to use a RAM disk than does Apple's software.  **CONS:** Doesn't work with accelerated 80000-based Macs.  **COMPANY:** Connectix (415/571-5100).  **LIST PRICE:** $99.

RAM DISKS ARE CREATED BY A PROGRAM that tricks your Mac into thinking that part of its RAM is a disk volume, which shows up on your desktop just like any other disk. A RAM disk, however, operates at silicon speeds, much faster than any hard drive or floppy disk. For PowerBook owners, having the system software in a RAM disk can greatly reduce the amount of time the PowerBook hard disk is spinning, significantly boosting battery life. With the introduction of System 7, Apple built its own RAM disk software into the Memory Control panel. A Maxima RAM disk has several improvements over the Apple version. First, the RAM disk created by Maxima is nonvolatile, meaning the contents of the RAM disk are automatically backed up onto your hard drive and will survive a reboot.

You can also set Maxima to write-through mode, which saves to both the RAM disk and the hard disk on every Save operation. With the Apple RAM disk software, rebooting the Mac gives you a fresh, blank RAM disk. Second, Maxima uses memory-compression technology borrowed from Connectix's RAM Doubler program to double the size of the RAM disk created by Maxima. Maxima's installer copies the user-selected System Folder or applications to the RAM disk automatically. Finally, Maxima works with several older Macs that do not support Apple's RAM disk, such as the IIs and Iicx. Maxima runs under native mode on the Power Macintoshes.

Maxima's limitations are few but significant (and listed in the manual). Maxima won't work with a Mac Plus, SE, or Classic, even with an accelerator card. Only files that are limited by disk speed and not processor speed will have significant speed gains. For example, finding and sorting data in a FileMaker Pro database will be faster, but it won't speed up 3-D rendering, which depends on processor speed.

Maxima has an Easy Install option that scans your hard drive to check the size of your System Folder and your applications. It then lists all the found applications in a dialog box and asks which applications you use the most. If your System Folder is small enough to fit in the RAM disk, Maxima copies the folder to the RAM disk and makes the RAM disk the start-up disk. The next time you boot, start-up is quicker because the system software is held in RAM. If the System Folder won't fit on the RAM disk, Maxima allows you to place the most important components (System, Finder, and a few other files) in a System Folder on the RAM disk, then use aliases for things, like the Fonts folder. Maxima takes care of creating the stripped-down System Folder, but you must create the aliases to items within the System Folder and copy the aliases to the RAM disk. If there isn't space on the RAM disk for even a stripped-down System Folder, Easy Install uses the application choices you made and places as many of your frequently used applications on the RAM disk as will fit.

Connectix recommends 8MB of RAM to use Maxima, and I agree (the minimum required is 4MB). With less than 8MB of RAM, you don't have enough RAM for the RAM disk. With more than 8MB, you can allocate 4MB of RAM to the RAM disk (Maxima increases that to an 8MB RAM disk) and still have sufficient RAM to avoid out-of-memory messages.

**The Last Word**  If you have lots of RAM (more than 8MB) and want to use some of it to speed up disk-based applications, Maxima offers an inexpensive, painless way to accomplish that goal. —FRANKLIN N. TESSLER

MicroSpeed's keyboard incorporates fold-down feet at the rear that provide three different tilt positions. My only complaint about the feet: the plastic tabs covering them make an annoying grating sound when they rub against the desktop—rubberized feet would be better.

**The Last Word**  Minor gripes aside, MicroSpeed's Mac Keyboard Deluxe is well worth considering if you're in the market for a new or replacement keyboard for your Mac. —FRANKLIN N. TESSLER

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**The Last Word**  Minor gripes aside, MicroSpeed's Mac Keyboard Deluxe is well worth considering if you're in the market for a new or replacement keyboard for your Mac. —FRANKLIN N. TESSLER
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Only a few years ago the technology for videoconferencing cost $100,000 or more, filled a room, and required satellite hookups or expensive leased data lines. Now better compression, miniaturization, faster processors, and a market expanding as fast as business travel costs climb—plus the falling price and wider availability of digital telephone lines—are bringing desktop videoconferencing, or DVC, within reach of large and small businesses alike.

However, testing here at Macworld Lab reveals that while DVC in its current state can serve a purpose, it is not going to put the airlines out of business any time soon. DVC systems are difficult to configure and get running, they provide marginally useful video quality, and they often have audio quality worse than that of a cheap speakerphone. Not only that, but despite diligent work by the international standards committees, each vendor's system can communicate only with others of the same brand, which means that you can count on videoconferencing only with members of your own organization or others who agree to install the same product your office uses.

We looked at the four videoconferencing systems currently available for the Mac: Cameo Personal Video System from Compression Labs, Connect 918 from NUTS Technologies, ShareView 3000 from Creative Labs (formerly ShareVision), and Visit Video from Northern Telecom.

We tested them between Macworld Lab and remote sites over standard analog phone lines (which most people in the telecom industry call POTS, for plain old telephone service) and over Integrated Services Digital Network, or ISDN; within the Lab we tested over Ethernet. Some videoconferencing systems support only
one of those transport methods; others support more than one. While POTS is ubiquitous and Ethernet is easily obtained if your office doesn’t have it already, we discovered that, even here at the headwaters of Silicon Valley, getting ISDN lines installed, configured, and functioning was anything but easy. (For the lowdown on high-tech ISDN, see “Living with ISDN.”)

Desktop Pros and Cons
There are significant differences between traditional videoconferencing and DVC. Traditional systems are usually installed in rooms designed specifically for videoconferencing, with good acoustics and lighting, no distracting backgrounds, and equipment to suspend cameras and microphones where they can cover all participants. A large monitor and full-screen images make seeing all participants on the other end no problem. And these fancy systems often support multipoint conferences—the video equivalent of a conference call.

A DVC system is usually installed in the computer that sits on your desk. Your office was probably not designed as a conference room, probably has lousy acoustics, and probably doesn’t have space for a group to gather around the camera—DVC systems are ill-suited for group use anyway. In addition, currently available DVC systems don’t support multipoint conferencing. On the plus side, they are considerably cheaper than traditional systems, can transfer files, and have shared applications such as a multiscreen whiteboard. And the information you need for your meeting is right at hand since your own computer doubles as the videoconferencing system.

What Makes DVC Tick
One of the basic components of a DVC system is its codec, the hardware that compresses and decompresses the video and audio data—similar to the way a modem converts digital data from your computer into sounds for transfer over phone lines. The codec can be a card that installs inside your Macintosh or it can be an external box. With some systems the codec also digitizes the audio and video before compressing it, while for other systems you need a separate digitizer.

In addition to a codec you get a camera and a microphone. Like a speakerphone, the microphone tends to pick up every sound in the room, including the telephone calls and conversations of colleagues in adjoining cubes. A lapel microphone, which you can buy separately, works much better than most of the supplied microphones; the ShareView system provides a headset with earphone and microphone to isolate ambient sound.

The camera you use may depend on your application. The supplied cameras all have a limited angle of view, and spotty support for close focusing and other important capabilities; but the Compression Labs and Creative Labs systems have auxiliary video inputs that make it easy to attach another camera or video source—handy if you’re trying to show videotaped material on a small object.

Depending on which transport you are going to use, you may need an interface card. For example, to use ISDN as your transport, the Northern Telecom

**Talking Heads**

**Videoconferencing Image Quality**, as well as sound quality, varies widely between products due to the efficiency and integration of the compression algorithms they use, the efficiency of network use, and the raw processor speed.

These four mug shots were captured under ideal circumstances, with minimal motion and using dedicated communication lines. Note that each product divides access to its features between menu commands and a control panel that surrounds the video window (except ShareView, which uses a separate VCR-remote window; see “Couch Potato’s Videoconference”).

**Compression Labs’ Cameo**
This system uses a third-party video board with accelerated 24-bit color. It’s not surprising that it produces the best color of the lot. Sound quality was also ranked highly.

**NUTS Technologies’ Connect 918**
Over Ethernet running at 384K, the Connect image shows more posterization and more pixelization than either of the products we tested over ISDN. The high frame-rate setting may be partly responsible for the degraded image quality.

**Creative Labs’ ShareView 3000**
Considering that we tested the 3000 over normal telephone lines (the only transport method it supports), producing even this muddy, indistinct image is quite a feat of engineering on Creative Labs’ part—but could you live with it?

**Northern Telecom’s Visit Video**
This was the product that Macworld Lab’s panel preferred, not just for its good video quality, but also because it overcomes the unpleasant speakerphone limitation of allowing only one person to speak at a time.
and NUTS systems supply the third-party Planet ISDN card. In addition to this card, we learned, we needed an NT-1 interface between the card and the ISDN line; the NT-1 performs several functions, including providing termination and power for the ISDN line. A switched 56 line, a digital wide area network similar to ISDN, would also require special interface hardware (we did not test switched 56). If we had been working with a reseller or system integrator, he or she would have known about all of the hardware pieces and would have provided them as part of a package at installation.

**DVC's Enabling Software**

All the products we tested provide a phone directory that stores commonly called numbers; have the ability to transfer files to the system on the other end; can take a snapshot of incoming video; and give you control over initiating conferences and other access issues. This last is designed to save you the embarrassment of suddenly realizing that someone has been watching your every move.

All four DVC systems provide a whiteboard feature, that is, a drawing application that allows participants at both ends of a conference to draw or scribble remarks on a shared blank screen. The data resides on only one machine; the other just receives an image of the data. So if both parties want to keep a copy of the whiteboard session, the host must transfer the finished drawing.

Some products support screen sharing, which differs from the whiteboard in that it lets you show your guests an open document in any application; some, but not all, DVC packages let the guest modify the remote document using its application's features. For programs that don't support this kind of sharing you must paste a screen capture into the whiteboard. Some products can record the video and/or the audio of your meeting session to disk.

**ShareView 3000**

The Creative Labs ShareView 3000 package includes two NuBus cards—one a combined codec and digitizer, the other a transport card that is essentially a fax modem (it comes with fax-modem software as well)—a color video camera; and a telephone handset and headset. The ShareView runs only on POTS—standard phone service—and the line attaches to the transport NuBus card along with the handset and headset. The camera attaches to the codec/digitizer card. This second card is thicker than a standard NuBus card; and on the Mac II, IIX, and IIfx it blocks the slot next to it.

The camera supplied with the ShareView 3000 is very small and light, and it's designed to sit on top of your monitor. Creative Labs includes a bracket for mounting the camera there, but we found the device virtually useless. The bracket's camera-angle adjustment would not lock correctly, and the camera gradually slipped out of alignment every time we tried to adjust it. In addition, the camera has a manual focus and manual iris, requiring you to get within arm's length to adjust them even though you'll normally sit farther away than that. This makes accurate focusing impossible without a second person to assist.

The ShareView's software provides a whiteboard, screen sharing, and file transfer, and can record video and audio to disk, take screen snapshots, and convert recordings to QuickTime.

ShareView does not save shared documents at the remote site, so you must remember to transfer a shared file after you're done with it. The remote site cannot use the menus of a shared application; guests share only the document. Floating tool palettes from the ShareView application itself don't appear on the guest's screen, but they can obscure portions of the shared document.

**Connect 918**

The NUTS Technologies Connect 918 package comes with a NuBus card, a camera that contains a microphone, and a speaker. There are different versions for ISDN and Ethernet, and Connect 918 does not include the necessary interface for ISDN. This means that to connect to ISDN you'll need to use a second slot in your Mac (as you will for Ethernet if your Mac lacks on-board Ethernet). Except for when you initially position the camera, which is no problem, the camera and speaker are hands-off; their controls are incorporated into the software.

The Connect software provides a phone directory, a log that records the duration and cost of calls, screen sharing, screen snapshot, file transfers, and a whiteboard. The Connect can display an inset of what your camera sees inside the window showing the participant at the other end—a feature called picture-in-picture—and can record a session and convert it to QuickTime. The guest has complete access to a shared application's commands and the contents of its windows. Shared documents are not saved at the remote site and must be transferred, but whiteboard documents are saved at both sites.

**Cameo Personal Video System**

The Cameo system is the only system we tested that may not require any slots in your Mac. Its codec is an external box, and if you have an AV Mac, the Cameo can use the AV's special hardware to digitize the video—and the audio if you need it. The Cameo can run over Ethernet at a maximum throughput of 56K using the AV Mac's built-in Ethernet, but unfortunately, when doing so the Cameo does not support audio. Since the Cameo doesn't tie up your phone line, you could pick up the telephone and call your colleague down the hall as you look at each other's face on-screen.

With a non-AV Macintosh you will need to add a video-digitizer card; for switched 56 or ISDN, you need the appropriate communications interface as well. The Cameo's optional camera is fixed-focus with an electronic iris and has a mounting bracket with an adhesive patch that makes for a very secure attachment. The codec connects to the Mac's serial port and to the video port on your video digitizer. The codec has an auxiliary video-input port that could support a camcorder or VCR.

The Cameo's software includes a diagnostic utility to test that your hard-
ware and software are properly installed and that the external codec is functioning correctly. The Cameo also provides the usual phone directory, picture in picture, screen snapshot, screen grabber, whiteboard, and file transfer. The video portion of a call stops during a file transfer.

**Visit Video**
The Northern Telecom Visit Video comes in many different configurations. There are gray-scale and color versions, and versions that support most transports. We tested the color version over ISDN. It comes with a NuBus video card that includes the color codec as a daughterboard, an ISDN card, and a camera. The camera perches on top of your monitor and has zoom, pan, and tilt controls in software. (You can substitute any NTSC device such as a camcorder or VCR, but the software controls work only with the Visit camera.)

A major difference in the Visit package is its ability to interface with some PBXs—not surprising, considering that Northern Telecom is one of the world's largest suppliers of digital telephone systems. In this kind of installation, the Visit can control your phone and your video mail. You can dial with the mouse, keypad, or keyboard, or from the telephone-directory software. Call-information can be stored in a call log. All voice-mail options, including call forwarding, call parking, and conference calling, can be controlled from your Mac. (We did not test these features, but they could add considerable value if your telephone system supports their use.)

The Visit has the best phone directory of the lot, with elaborate features for managing entries. You can maintain multiple directories, sort directory entries, add custom fields to a directory, attach memos to directory entries, and perform searches on directories. The file-exchange feature runs in the background, allowing other functions such as the videoconference and the whiteboard to continue. Documents created in the whiteboard exist on only one machine and must be sent to the other machine if they are to be saved there.

With the Visit you can't share your applications' screens, but you can grab a screen and place it on the whiteboard for the other party to view. You can also open a text chat window.

**Comparisons and Test Results**
We assembled a panel of reviewers to look at each system running on Mac Centris 650s running System 7.1, with 14-inch monitors set to 16-bit color. The panel rated each system's video and audio quality from one to five, with five being the best and one the worst. The panelists rated the video based on distracting image-quality problems such as jerky motion, tearing (a broken or fragmented image indicating that the DVC system or the network is too slow to transmit a complete frame at the desired speed), pixelization (large, blocky groups of pixels that indicate where individual pixels have been combined), and posterization (a sharp reduction in the number of colors, which is a common technique for compressing an image). We planned to provide precise frame rates for each product under different circumstances, but we were not able to make accurate measurements of frame rates. In any case, it turned out that frame rate alone is not a major factor in the perceived quality of the video. We did note that none of the products was able to maintain an acceptable frame rate when there was a good deal of motion in the video image. This is not surprising: just as the system reduces the amount of data it must transmit by stripping out redundant color information to compress the image, it also strips out redundant location information by not resending parts of the image that haven't moved between frames; therefore, the more motion, the more information that must be sent for each frame.

We rated audio on sound quality and on synchronization between audio streams or sketches. How sophisticated is its electronic whiteboard?

**The Smart Shopper's Guide to Videoconferencing**

*Videoconferencing (VC) integrates hardware and software of several discrete computing systems. Until standards become widely accepted, make sure that all components in your system work together well. (Illustration shows only one side of a VC link.)*

### Input and Output
All Mac VC systems display talking heads on the Mac's monitor. For the microphone, camera, and speaker, they may use off-the-shelf, built-in, or custom components. Look for good components or the ability to substitute better ones.

### Software
Good software is what makes a VC system worth using. Is it easy to look up a colleague's number and initiate a connection? Can the software transfer files and display spreadsheets or sketches? How sophisticated is its electronic whiteboard?

### Digitizer
The digitizer (with codec) is VC's soft underbelly; digitizing multiple data streams in sync for real-time transmission is tricky. Some weak systems digitize with QuickTime, which was designed to digitize onto storage media and can't handle real-time synchronization.

### Codec
A compressor/decompressor squeezes bulky data to fit narrow digital networks. As the digitizer sends it data, a well-designed codec strips away only the information—color depth, object edges, motion—that someone on the other end is least likely to notice.

### Communication
Circumstances will determine your network type. Will you conference with others in your office? If so, Ethernet is your only choice. Will your conferencing go outside the office? If so, ISDN—if available at both sites—is superior to standard phone lines.
Desktop Videoconferencing Systems

<table>
<thead>
<tr>
<th>System</th>
<th>Cameo Personal Video System</th>
<th>Connect 918</th>
<th>ShareView 3000</th>
<th>Visit Video</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price</td>
<td>Ethernet $1499; ISDN $2500*</td>
<td>Ethernet $4299; ISDN $9899</td>
<td>POTS $3999</td>
<td>ISDN $5319; POTS $4499</td>
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<td>Vendor</td>
<td>Compression Labs</td>
<td>NUTS Technologies</td>
<td>Creative Labs</td>
<td>Northern Telecom</td>
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<tr>
<td>Phone</td>
<td>408/435-3000</td>
<td>408/441-2166; 408/428-0330</td>
<td>800/998-5227</td>
<td>214/684-4206</td>
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<td>O</td>
<td>800/667-8437</td>
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<td>POTS, switched ISDN, ISDN, Meridian 1 PBX</td>
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<td>Auxiliary video input</td>
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<td>Camera controls</td>
<td>fixed focus, auto iris</td>
<td>manual focus, auto iris</td>
<td>manual focus and iris*</td>
<td>fixed focus, auto iris, zoom, pan, tilt in software</td>
</tr>
</tbody>
</table>

**Software features**

- Shared whiteboard: ✓
- Transfer files: ✓
- Phone directory: ✓
- Picture in picture: ✓
- Screen sharing: ✓
- Connection timer: ✓
- Control frame rate: ✓
- Control data rate: ✓
- Record video to disk: ✓
- Record audio to disk: ✓
- Screen snapshot: ✓

**Security features**

- Control session start: ✓
- Control session recording: NA
- Pause (audio/video): ✓/✓
- Control screen sharing: ✓/✓
- Control file transfers: ✓
- Control snapshots: ✓

* = yes; O = no; ISDN = Integrated Services Digital Network; LAN = local area network; NA = not applicable; POTS = plain old telephone service.

The audio and video systems can get out of sync with each other. Video generally travels over a separate path. For example, the systems use separate digitizers and send audio and video together in a separate digitizer. Videoconferencing systems generally require more time to digitize, compress, and decompress video than audio, and so the video may lag behind the audio.

We present the ratings as averaged totals of the video and audio scores; they represent a subjective evaluation of the audio and video quality of each system. We ran the Ethernet tests on a dedicated network with no other traffic. We ran the POTS tests on Macworld's internal phone system, and they should be considered a best-case scenario. We ran the ISDN tests over newly installed ISDN lines provided by our local carrier.

**CAMEO: tested over ISDN.**

*Rating:* 4 The Compression Labs product got favorable marks from our reviewers. It requires a third-party video-digitizer, and the high-performance RasterOps 24STV is the recommended board. This board works in 24-bit mode, and we were able to test only in that mode. As a result, the Cameo's video looked a bit cleaner than that of the other products. The frame rate was only about 12 frames per second, but the audio sounded as good as a regular phone call. The user interface was also one of our favorites.

**CONNECT 918: tested over Ethernet.**

*Rating:* 1 The NUTS product lost points due to poor video and especially poor audio. Since the Connect 918 allows the user to set the frame rate, we experimented and found that the system gives the best results at around 15 fps. The video seemed to stutter at times when there was a lot of motion, yet appeared smooth at other times with the same amount of motion. One reviewer described the audio as "the worst phone connection ever heard," and we determined that clear audio is much more important than clear video for comfortable, efficient use of videoconferencing. We were also disappointed that the Connect system—even when set to transfer data at 384K, the maximum slice of an Ethernet's bandwidth it can use—performed worse than the ISDN products, which were limited to the two 64K channels we had installed. Finally, we found the phone directory difficult to understand and use.

**SHAREVIEW 3000: tested over POTS.**

*Rating:* 2 Like the NUTS product, Creative Labs' product lost points on video. Panelists complained about its low frame rate (about 7 fps), broken-up images, and lack of clarity. The standout comment...
was that "the image quality couldn't be used in the real world." On the audio side, only one person could talk at a time, but the sound quality ranked about the same as a normal phone call. The low rating is only one person could talk at a time, but used in the real sound quality ranked about the same screen- and window-sharing features are mostly a function of the system's reliance difficult to use.

VISIT VIDEO: tested over ISDN.
Rating 4  The Northern Telecom product got very favorable marks from our panel. The overall image quality and audio quality were considered the best of the bunch. While there was some stutter or jerk in the image when there was a lot of motion, the Visit recovered faster than did any of the other products. The frame rate was about 12 fps. The audio uses full duplexing, which allows both parties to speak and hear at the same time. The software-controlled camera is a nice touch, though rarely used in practice. The software is missing some features, but this may be balanced by the voice-mail features that we did not evaluate.

Important Factors to Shop For
In picking a DVC system there are many things you should consider. Clearly, poor video is more tolerable than poor audio, up to a point. The microphone quality is important, as is the speaker or headset. If users will be sharing a system, ease of use becomes more important. Consider if you'll need shared applications or just a whiteboard. Will you need to attach an auxiliary video source?

Where you set up your DVC system is also important. If you're not using a headset, you need a quiet location; otherwise, background noise will interfere with your conversation and lower video quality by flooding the transport medium. The lighting at your site is also important for video quality.

Just as with E-mail, there is a definite feel to using DVC that sets it apart from the telephone. The addition of a moving image provides an element of presence, though the small image size and poor image quality tend to mute that feel. The video and audio are often out of sync, and if you focus too much on the video image you get a surreal feeling, as if your conversation were taking place at the end of a long tunnel.

The Last Word
Given the poor quality of the video and audio, you may consider the shared whiteboard and screens of more use than the videoconferencing aspect of these systems. There are several products that provide those features without the talking heads of desktop videoconferencing. Until the image size and quality improve we can't recommend any DVC system for general use, but in some instances they offer greater benefits than remote-control programs like Timbuktu (Farallon, 510/814-5100) or whiteboard programs like Face to Face (Crosswise, 408/459-9060) and Vis-a-Vis (World Linx, 416/350-1000). If you do decide on DVC, determine which product has the best software for your needs, and check out the audio and video quality carefully, under controlled circumstances, before making your decision. Remember that our ratings are based on the audio and video quality, and do not reflect the feature set or ease of use.

MATT MATTHEW LEEDS is the technical services manager for a major software developer. His responsibilities include network management, WAN technology, and digital-video production.
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Monolithic programs will soon be a thing of the past; people will instead choose small, manageable tools to work on their documents. People will have a simple way of working with the computer, akin to selecting from screwdrivers and wrenches, not learning to operate a crane.

That’s the vision Microsoft offers with its Object Linking and Embedding technology, or OLE. (The ability to call one program from another is called linking, and the ability to put a piece of data—an object—into a foreign program is called embedding, thus the name OLE [pronounced ob-LAY].) It’s also the vision promised by OpenDoc, under construction by Apple and a consortium of other companies including WordPerfect (recently renamed the Novell Applications Group), IBM, and Lotus Development Corporation.

No longer need you worry about file importing and data exchange. You want a table in your page layout? Just drag a table from your spreadsheet or word processor. Have a picture in your presentation that you want to colorize? Just click on the picture, and the menus and palettes change to those you need for graphics. Even better, this approach has the potential to reduce the seemingly endless amounts of RAM and disk space that today’s programs devour.

Two things make OpenDoc and OLE 2.0 possible. One is object technology, which lets a computer manage components (whether tools or data) independently, no matter how they are presented on screen. The other is a document-centric approach to objects. In today’s application-centric systems, you think of your data in terms of the program that created it; in the document-centric scheme, you think of data in terms of its purpose—a layout, a presentation, a report.

The Object Evolution

The idea of multielement documents is hardly new. Apple introduced publish and subscribe with System 7 in 1991, and Microsoft introduced OLE 1.0 with Windows 3.1 in 1992 (and ported to the Mac shortly thereafter). Even before that, programs such as Aldus PageMaker and QuarkXPress maintained links to component elements: if you edited a graphic used in a layout, the publishing program would update the placed graphic the next time you opened the layout. Integrated software programs—the Works programs from Claris, Microsoft, and others—supported multielement documents, although only using Works-generated components.

And today, with System 7.5’s Drag Manager and Clippings extension, you can drag pieces of documents to documents in other programs or even to the Finder—as...
long as the originating and receiving programs are compatible with these system extensions and the receiving program supports the type of data being dragged into it, whether it be a TIFF image or a WordPerfect table. (It's just import without using an import dialog box.)

What makes OpenDoc and OLE 2.0 different from these earlier approaches is the fact that almost everything you use would be—or at least could be—a multi-element document. The scheme would work the same across all programs and tools—even across Windows and Mac platforms, enabling you to embed a database object from a Windows program in your Mac publishing program, for example. You still won't be able to run that Windows program from your Mac; instead, OLE or OpenDoc will look for a Mac program that can handle the database object. If no such program is present, the data remains intact but cannot be altered (though it can be deleted or moved within the document).

OpenDoc and OLE 2.0 have significant similarities, but don't mistake them for two versions of the same thing. Their differences are at least as significant as their similarities, and whichever technology dominates may well chart the future course of how both programs and the operating system itself work.

**OpenDoc Unveiled**

Apple is banking on OpenDoc to be the core interface of the next generation of software. Although the company is keeping mum on its next-generation operating system (code-named Copland and due in late 1995 or early 1996), Apple has made clear that OpenDoc will be part of that future. And in the meantime, Apple plans to release OpenDoc in winter 1995 for use with System 7.5.

How does OpenDoc work? Imagine that after you double-click on a document icon, the document appears along with a basic set of options like Print and Copy. There are no Save or Export or Import menu options—or, for that matter, Font or Style or Image or Record, either. But when you click on a block of text, Style, Font, and Edit menus appear. Select a graphic, and the menus change to Image, Crop, Color, and Background. Select a QuickTime movie, and the options change again, this time to Play, Edit, and Sound. To move elements between documents, you just drag them over.

Life will be simple: you just work with the documents you have and let the system worry about providing the needed components. Will either deliver?
tools for each type of data. This is an ambitious goal. OpenDoc will need to know which tools are appropriate for which kinds of objects, and it will need to know what kind of object is selected (see the screen image "OpenDoc Collection").

If OpenDoc is organized around documents, how do you create a new one? OpenDoc provides two ways. A New container or use the Embed command to the screen image documents, how do you create a new one?

program approach-gone is the object. (The Embed command can also OLE 2.0 Explained
Microsoft's OLE 2.0 is less ambitious than OpenDoc. Rather than getting rid of application-specific documents, OLE tries to make applications share data more easily. OLE 2.0 lets you embed pieces of data (tables, text, images, movies) created in other programs in the currently open document, no matter what program created that document. When you select an embedded piece, OLE 2.0 launches that piece's creating application and brings up the appropriate menus and tools. (This is called in-place editing; you have the context of the host document, even though you have essentially switched to a different program to work with it.)

Thus, if you have an Excel spreadsheet in your Word document, Excel's tools appear whenever you select the spreadsheet, and Word's tools reappear whenever you select the text (see the screen image "Two Programs in One"). But even with embedded objects from other programs, the document remains in essence a Word document, and double-clicking on its icon will launch Word.

Under OLE 2.0, both programs are active in memory. That means you need systems with at least 16MB or so to comfortably handle large programs like Word and Excel simultaneously.

OpenDoc Collection The OpenDoc approach gets rid of the program approach—gone is the File menu—and treats everything as a document containing collections of objects. When you select an object, OpenDoc figures out what tool to load to work with it.

Object Technologies Compared
OLE and OpenDoc have some welcome similarities, but also real differences.

Drag and Drop Both technologies support drag and drop across programs, which makes it easy to exchange data.

In OLE, the dragged data is embedded in the new location unless the new location directly supports the dragged data's format. For example, dragging a chart from Excel into Word embeds a chart object in the Word document, and you edit the chart via an OLE 2.0 link to Excel. But dragging text from Excel into Word just moves the text to Word, since both Excel and Word can directly manipulate text.

OpenDoc treats the dragged data, whether chart or text, simply as another object in the document.

Plug-In Support Both OLE and OpenDoc encourage the plug-in approach to software design, where capabilities can be added to an existing program (or tool collection).

In OLE 2.0, you're made more aware of the fact that you're plugging in a new capability, because you must explicitly link to or load the program that can handle the object or capability.

OpenDoc more transparently links objects to their respective tools, so you quickly forget about separate programs and begin to think of them as different tools within the Mac. It's as if the Mac itself becomes the biggest integrated software program ever invented. OpenDoc will also permit you to add tools that plug into existing tools, similar to the way filters plug into Adobe Photoshop and XTensions work with QuarkXPess.

Preferred Tools If you don't own the tool that created an object, or if you simply prefer not to use it, both technologies let you manipulate the object with a different tool. OpenDoc goes a step further by letting you define preferred tools for types of objects, so the system offers you those tools automatically; but this feature was not implemented in the prerelease version I had. OLE 2.0 requires you to explicitly ask for a different tool.

Contextual Feedback In a document-centered environment, feedback about what menus and palettes are available will be highly important.

OpenDoc's pointer changes to the appropriate tool as you pass over an object, giving you instant feedback on the type of object and the type of tool that will manipulate it. This feedback helps you distinguish object types as you work on a series of them, though you don't need that information to edit the object. In fact OpenDoc simply switches to the appropriate tool when you click once on an object. This can lead to more switching than necessary, but fortunately, OpenDoc's fast switching means this is not a burden.

Microsoft's OLE 2.0 programs display a message in their status windows when your mouse passes over an OLE object telling you that double-clicking on the object will open a particular program. OLE 2.0 switches tools only when you double-click on an object, so you're less likely to accidently switch tools. Microsoft says developers can implement single-clicking as a way to select an object, although having two methods could be confusing.

Common Look-and-Feel A collection of tools that look and act differently can confuse users, and developers need to ensure that basic expectations are consistent from tool to tool. To encourage consistency, the OpenDoc consortium has developed a set of interface guidelines.

For OLE 2.0, Microsoft is encouraging consistency by using its Office programs—Word, Excel, and PowerPoint—as a model. These programs look and act very similarly, and by giving developers an Office-compatible rating for OLE 2.0

OpenDoc's promised OLE 2.0 compatibility is a reality.
Two Programs in One The OLE 2.0 approach treats a program as the owner of a document but lets you embed objects created by other programs into the document. When you select an embedded object, OLE 2.0 launches the program that created the embedded object to let you edit it in place.

components, Microsoft hopes to encourage more widespread consistency. However, Microsoft's Office interface is not quite the same as that of either Windows 3.1 or the Mac, so consistency with Office may not mean consistency with, say, other Mac programs or Windows programs from companies other than Microsoft.

Text Wrap OLE 2.0 requires objects to be in rectangular frames, which poses limits on the placement of objects. For example, PageMaker or QuarkXPress would not be able to use OLE 2.0 to replace standard graphics and text import, since that would remove the two publishing programs’ ability to do circular or polygonal text wrap or to have overlapping objects. OpenDoc has no such limitation.

Scripting OLE 2.0 works with Microsoft's cross-platform scripting language, Visual Basic for Applications. VBA lets you tie OLE 2.0-compatible programs together to automate tasks and even develop your own extensions to a program. OpenDoc relies on the system to do its scripting, so tools will need to support AppleScript on the Mac and VBA on Windows (unless Apple ports AppleScript to Windows, something it has not committed to doing).

Sharing and Multiple Drafts OpenDoc lets users maintain several drafts of a document by storing multiple versions of objects within a document's container or linking those versions to it. That should aid collaborative work such as getting comments on a proposal—even from several users simultaneously. OLE 2.0 has no draft or sharing capability, but it does let you open linked programs over the network. OpenDoc works only on a single machine.

Which Is Better? OpenDoc is a simpler scheme than OLE 2.0. OpenDoc aims to get rid of huge, memory-hungry programs and help users focus on documents. Even better, OpenDoc's trim and efficient scheme is speedy and elegant, capable of maintaining multiple drafts and supporting nonrectangular object boundaries. By contrast, OLE 2.0 requires lots of RAM or lots of patience. To drag and drop data between documents you must have enough RAM to keep several programs open at once; otherwise, you'll be waiting while OLE launches the program you need to do each piece of inplace editing separately.

The reality is that the long-term success of either technology will be based on how well it integrates with the user's operating system. Both Microsoft and Apple are working on future versions of their operating systems that will do just that—Microsoft's Chicago and Cairo, the code names, respectively, for Windows 4.0 and Windows NT 4.0, and Apple's Copland, the code name for System 8. If both companies succeed, OpenDoc will have an advantage on the Mac that Microsoft will be hard-pressed to duplicate by grafting OLE 2.0 onto Copland; but under Chicago and Cairo, OLE 2.0 will have a comparable advantage over OpenDoc. Despite the two companies' best efforts, it's likely that the operating system you choose will ultimately determine the object technology you use, no matter how much better the competitions' capabilities are.

Possible Pitfalls Although object technology has the appeal of simplicity, it's far from clear whether the initial appeal will last.

Are Documents Better Than Programs? Apple claims that people don't think of programs but of documents—you mentally say, "I need to work on the 1995 budget," not "I need to load Excel to work on my 1995 budget." That's true for many people, but many others think, "I need to do some 'what-if' financial scenarios. Let me get the tool to do it." Document-centrism makes sense when you're editing an existing document, but task- or program-centrism makes sense when you're creating a document.

That's not to say that OpenDoc's document-centrism will preclude a task emphasis. You'll still be able to open, say, a text document and select a tool to accomplish a graphics task by using the Embed feature. How developers implement OpenDoc will play a large part in determining whether users feel like they're working with a set of tools or with a collection of stray pieces.

And OpenDoc will coexist with today's programs. You can use, for example, a database program for data analysis and a collection of OpenDoc tools to create reports. At worst, to get database information into your report, you'd need a tool that could extract the needed data from your database file.

How Open Is Open? Although the name OpenDoc might imply otherwise, developers could easily write OpenDoc tools that wouldn't work (fully or at all) with other companies' tools. A tool could create objects in a way that would limit access by other tools. Essentially, an object would make public only a limited set of information about itself.

Microsoft says OLE 2.0 does not present a similar possibility, since it is designed so tools can essentially ask an object about itself. Microsoft compares this to two people trying to settle on a common language—"Do you speak English? Nej. Parlez-vous français? Nej. Sprechen sie Deutsch? Gut!"—so they can speak with each other. (Apparently, objects can't lie.)

A developer may choose to implement proprietary tools to encourage customers to buy all their tools from one source, or it may limit object support simply because supporting the many types of data and tools will be too hard. For both technologies, being open does not mean being universal.

Object Technology at Work I don't expect object technology to be the dud that publish and subscribe was. But neither do I see traditional programs going away.

Enhancing Today's Programs In fact, I expect developers to use this technology to enhance traditional programs.

Developers can add capabilities to popular programs, as plug-ins do for Adobe Photoshop and XTensions do for QuarkXPress. OLE 2.0 makes the most
Object technology is shaping up to be a battle between competing visions: Apple and friends’ OpenDoc and Microsoft’s OLE 2.0. While many of the key issues on who will win this battle are political rather than technical (see State of the Mac, in this issue), how well the two schemes work is what the ultimate judges—you, the users—will care about. To gauge the strengths of the two technologies, I worked with a very early version of OpenDoc and a final version of OLE 2.0.

OpenDoc Crashes were extremely common, which limited my ability to use OpenDoc for more than a few minutes consecutively. Nevertheless, it’s clear, even from the limited number of sample tools provided by Apple, that OpenDoc can work well for compound documents. Switching tools was fast, even at this early stage of development. And I particularly enjoyed the ability to drag objects between documents.

Where I had the most nontechnical difficulty was in document creation. OpenDoc does a good job of making you forget about applications, so starting something new felt unnatural. Sure, I could start with a blank piece of stationery and drag in elements or use the Embed command to load a tool to create them, but that felt like more work than just opening a program dedicated to a particular purpose. I expect, though, that this unease will diminish as I adjust to working in a new way.

OLE 2.0 After using OLE 2.0 with late betas of Microsoft Word 6.0, Excel 5.0, and PowerPoint 4.0, it was clear to me that OLE 2.0 works as a way of creating compound documents. Its embedding works a lot like Word’s picture-import feature: serviceable but slow. However, dragging data between OLE 2.0-compatible programs was smooth.

Do expect, however, a noticeable slowdown as you switch between, say, an Excel object and the Word text it is embedded in so you can do in-place editing. With the prerelease versions, the delays were sometimes excruciating. Microsoft expected to remove much of the delay during final fine-tuning, but no amount of fine-tuning can change the fact that you must switch between two big programs in memory. After all, I experienced noticeable delays when working with OLE 2.0 on a 33MHz 80486DX-based PC (which is about as fast as a Quadra 800); and the Windows version of OLE 2.0 has been shipping for half a year, so it’s been optimized for best performance. On the Mac, expect the kind of delays you get now when using MultiFinder to switch between Word and Excel.

The plug-in approach makes sense for many types of tools. For example, do you really need a separate spelling checker for every program? Using OpenDoc or OLE 2.0, a developer could provide a universal tool. That’ll save disk space and make your spelling dictionaries consistent. A module for mailing data directly from your programs is another example. A universal table editor is a third. But for other programs—like databases, which aren’t really documents but redefinable views of information—the traditional program-centric approach makes sense.

Drag-and-Drop Future Object technology also has the potential for making drag and drop a more commonplace operation. First, operating systems like the Mac and Windows implemented it for files and programs. Then programs like word processors started supporting drag and drop internally. Now, with either OLE 2.0 or OpenDoc, you’ll be able to drag and drop data between programs, whether or not the program can directly manipulate the data. Many Windows developers are already using OLE 2.0 this way to achieve cross-program compatibility, and I suspect Mac developers will follow suit.

When’s the Revolution? If object technology appeals to you (or even if it’s something you don’t want) the question is, Will object technology become part of your reality, and if so, when? Probably not soon.

OLE is real—version 2.0 ships with the latest versions of Microsoft’s Office programs, which include Word, Excel, and PowerPoint—but it now works only with these programs and the utilities bundled with them (such as Equation Editor, TextArt, and Microsoft Graph).

OpenDoc is still under development. While Apple and WordPerfect have committed to using it, other developers are waffling. Privately, many say they’ll support it only by supporting OLE 2.0, which OpenDoc is being designed to interact with.

Both technologies are new, so don’t expect a revolution overnight in how you interact with your Mac. They first must gain acceptance, and that’s not a foregone conclusion, since developers remember the pain of developing for System 7’s publish-and-subscribe, only to see almost every user avoid it. Even OLE, which has been around for over two years in the less-capable version 1.0, has been adopted slowly outside of Microsoft.

Object technology will likely play a notable role in future software. If developers do the right thing, OpenDoc will prevail in a way that simplifies programs without sacrificing capability. At worst, we’ll have further domination by a few suites that require 64MB of RAM and 2GB hard drives. But all the hype notwithstanding, object technology appears to be an evolution, not a revolution. 

GALEN GRUMAN is a Macworld senior associate features editor who focuses on new system-level hardware and software technology.
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For those of you who ever wished that a computer could do more to make your work easier, we have some refreshing news: Your wish has been granted.

Introducing new Microsoft Word 6.0 for the Macintosh and Power Macintosh. While it would certainly be much easier to explain our improvements as some kind of magical hoo-ha, in truth it's merely superior technology at work.

We refer to it as IntelliSense technology. Built-in intelligence that automates routine tasks and makes complex tasks simple.

For instance, who amongst us doesn't invariably mis-type certain words? Now, our AutoCorrect feature can correct common mistakes automatically as you type. That goes for those pesky capitalization errors too.

But that's just the beginning. AutoFormat lets you instantly apply a variety of formatting options to your documents with a mouse click. Want to make it a memo? A letter? A newsletter? Your wish is our command. Just click on a new style from our Style Gallery.

This technological wizardry is also evident in something we call Table AutoFormat. To format tables, just point and click on any of the 34 different styles.

But what's truly magical about new Microsoft Word 6.0 is how it works with other Office programs. It's never been easier to exchange text, data and graphics between programs. All you have to do is just drag it and drop it into place.

As if that weren't the epitome of sharing, you can share Word files between Macintosh and Windows without conversion.

To find out more, just visit your retailer or call (800) 871-3273, Department RUA.

Either that, or start searching for a lamp inhabited by one of those subservient spirits in a fez.

Microsoft Word 6.0 is the latest version of the world's most popular word processor for the Macintosh. It's also part of Microsoft Office family.
Apple’s Multiple Scan 20 Display (top) is a great pick for most graphics and publishing professionals. Image editors and others with exacting color-matching needs should buy SuperMac Technology’s PressView 21 Display System (bottom).

Macworld Lab evaluates 22 two-page displays for graphics professionals

IF YOU FIND YOURSELF SCROLLING around pages of your work all day—and what designer or artist doesn’t?—you’ll likely find that buying a bigger monitor is more helpful than buying an accelerated video-display board to speed up the scrolling. After all, you need to scroll less if you have a bigger canvas.

Fortunately, these bigger canvases are getting more affordable—street prices range from $1200 to $3100. Two-page color monitors aren’t getting cheaper as fast as Macintoshes are getting cheaper, but prices are dropping. For example, Apple Computer’s current 20-inch offering costs about $2200—about a third less than its 21-inch product two years ago—and even a bargain-oriented company like MacUSA’s Mirror division has dropped the prices for its line by about $500 in that period, a 20 percent drop.

Measuring the Rainbow

The big mainstream application for these monitors in the Macintosh world, however, is color graphic design and image manipulation. For these jobs, color quality, uniformity, and color calibration are particularly important.

Macworld Lab put 22 two-page monitors through our standard set of critical tests and also performed perceptual evaluations. Typically, the perceptual evaluations echo the test results—monitors that show a pink or green cast in subjective

And where there used to be huge price gaps—sometimes a couple thousand dollars—between products, there is now fairly uniform pricing. That’s because the state of the art in blowing the giant glass tubes needed for 19- to 21-inch two-page monitors advances rather slowly and has been mastered by only a handful of companies. Many of the monitors we review here, for example, use tubes manufactured by just one company: Hitachi. And most Trinitron-based monitors use tubes made by Sony.

Three kinds of Mac owners will especially benefit from two-page monitors: publishers, graphic artists, and engineers and scientists. Publishers who don’t work much in color may prefer a gray-scale monitor instead of color (see the sidebar “Gray Is Cool”), but most artists and designers do work routinely in color, as do many high-end publishers. Engineers and scientists have specialized big-monitor color requirements (see the sidebar “Displays for Rocket Scientists”).

Gray Is Cool

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Displays for Rocket Scientists

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judgment give off-center white-point measurements in color-space tests—but the perceptual evaluations have the advantage of translating the objective measurements into what counts most for a user: how the monitor actually looks.

We also talked with graphic artists to learn what they find critical in a monitor for their day-to-day work. This testing and research point to six basic buying-decision issues, ranked here in order of importance.

**Size** Some of these monitors are listed as 20-inch-diagonal and some as 21-inch. In reality, they all display a 19-inch-diagonal viewing area, plus or minus a small fraction of an inch. Some vendors—Focus Enhancements, for example—offer a nominal 21-inch monitor that shows a smaller viewing area than their own 20-inch units. That’s because the vendors are reselling monitors (albeit with slightly different electronic specifications) from different tube manufacturers, who have their own way of labeling the tubes. Pay less attention to the monitor’s claimed size than to what you see on the screen.

**Quality** The range of image quality for these monitors runs from good to great in almost every case. None of the units looks twice as good as another in the set, according to our expert panel. All the manufacturers know the same phosphor tricks and mask technologies; and they use every trick they know for both Trinitron and tridot (also called Invar shadow mask) monitors.

Still, you’ll find that different monitors look, well, different. In fact, you will find about as much variation within a set of monitors from the same company as you will within a set of products from several companies. Even if you were to line up ten examples of the BigView Model 21 from XYZ Corporation, they would have different across-screen variations in color purity and different levels of color cast (tint). This is a strong argument for seeing the actual monitor you will buy at a dealer.

**Controls** The controls on these monitors represent the whole conceivable range of control ergonomics. The Finnish firm Nokia Display Products shows the rest of the world how it should be done. There are two buttons on the front of the Nokia monitor, Select and Adjust. These manage a set of choices that appear on screen for controlling details of picture geometry, focus, and color. Idex Iiyama North America has a more complex but still convenient control system, in which a little drawer full of buttons and indicator symbols pulls out of the bottom of the set. Nanao USA Corporation plans to add on-screen controls to its new FlexScan T2*20 monitor; its FlexScan F series, reviewed here, doesn’t include them.

By contrast, Mitsubishi offers a set of tiny *multifunction* LEDs and buttons in the true spirit of the 137-button handheld VCR control. The controls work, and you can tune up the company’s Diamond Pro 21T as long as you have the manual open in your lap to page 16, but if you lose the manual the controls become very difficult to use. Mitsubishi plans to offer software controls this fall.

As with input devices, different people prefer different types of controls. Most people—including the graphic arts professionals we consulted—use monitor controls rarely (typically, just at the initial setup), so you shouldn’t give excessive weight to a monitor’s controls. All are functional.

**Plug and Play** The Macintosh market is smaller than the Windows market for most monitor makers, even though Mac owners proportionally use more two-page monitors (thanks to the graphic-arts and publishing community). To sell to the Mac market, the PC-oriented companies include or sell separately an adapter cable that lets the PC-style video connector plug into a Mac. In many cases, Macworld Lab—which tests about 100 monitors a year—had difficulty figuring out the proper adapter settings. What should have been a 30-second operation sometimes took 10 minutes. You may safely assume that if a vendor is willing to send a monitor for review to Macworld with the wrong settings, it won’t hesitate to do the same to you.

You’ll see PC bias in software as well. For example, NEC Technologies sent us color-adjustment software that runs only on a Windows PC, although Mac software is promised for late 1994. Other vendors sent us documentation that chirped on merrily about SVGA and other PC matters, with nary a mention of the Macintosh. The traditional Mac vendors (Apple, Radius, RasterOps Corporation, and SuperMac Technology) of course do a better job with cabling, setup, and software than vendors for whom the Mac is an incidental business and something of a nuisance.

**Resolution switching** Now that Macintoshes support multiple resolutions, you can increase your working area (although at the price of smaller images) or zoom in on it (at the price of a smaller window on your desktop). We did our testing at 1152-by-870-pixel resolution, the setting that lets you display two 8½-by-11-inch pages side by side at near-actual size. However, there are situations (conference-room display, for example) where you would want a two-page monitor to be simply a very big one-page monitor at 640-by-480-pixel resolution.

**Price** A monitor needs to offer a good value. For layout and graphics-placement use, expect to spend about $2000. If you do demanding color work

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**Two-Page Monitors Compared**

<table>
<thead>
<tr>
<th>Company</th>
<th>Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apple Computer</td>
<td>408/996-1010, 800/775-2775</td>
</tr>
<tr>
<td>Focus Enhancements</td>
<td>617/938-8088, 800/538-6000</td>
</tr>
<tr>
<td>Idex Iiyama North America</td>
<td>215/957-6543, 800/394-4339</td>
</tr>
<tr>
<td>Iregani Electronics USA</td>
<td>201/368-9171</td>
</tr>
<tr>
<td>MacUSA Mirror division</td>
<td>612/832-5622, 800/651-5294</td>
</tr>
<tr>
<td>Mitsubishi Electronics America</td>
<td>714/236-6352, 800/843-2519</td>
</tr>
<tr>
<td>Nanao USA Corporation</td>
<td>310/325-5202, 800/5022</td>
</tr>
<tr>
<td>NEC Technologies</td>
<td>708/860-9500, 800/632-4636</td>
</tr>
<tr>
<td>Nokia Display Products</td>
<td>415/331-0322, 800/296-6542</td>
</tr>
<tr>
<td>Radius</td>
<td>408/343-1010, 800/227-2795</td>
</tr>
<tr>
<td>RasterOps Corporation</td>
<td>408/562-4200, 800/729-2656</td>
</tr>
<tr>
<td>SuperMac Technology</td>
<td>408/541-6100, 800/334-3005</td>
</tr>
<tr>
<td>ViewSonic</td>
<td>909/869-7976, 800/888-8583</td>
</tr>
</tbody>
</table>

* CEP = company’s estimated price; DP = direct price; LP = list price.  

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106 November 1994 Macworld
If you're using a Mac professionally and your output won't be printed in color, you are likely to find a two-page gray-scale monitor to be less expensive and more suitable for your applications. For monochrome or two-color publishing of books, magazines, or newsletters, a gray-scale monitor is ideal.

Text on all gray-scale monitors looks great. There are none of the color-fringing problems on text from misconvergence that occur with color monitors, since there's only one electron-beam gun lighting up the phosphors. Many graphics professionals claim that a gray-scale monitor is easier on their eyes in prolonged use than are the best color monitors.

Gray-scale monitors are a relatively specialized item compared with color monitors—the choices here represent the small range available in late summer 1994. Expect that range to get smaller, since diminished sales have prompted many companies to drop their monochrome lines. For example, Mobius Technologies has only a few hundred left and has no plans to make more.

- Focus Enhancements (617/7938-8088, 800/538-8865) acquired Lapis Technology last year and dropped the price of the 19-inch Lapis Two Page Display to $599.99. But it's not clear how long these monitors will be available at such a low price. (It looks to be an inventory close-out.)
- MacUSA's Mirror division (612/832-5622, 800/654-5294) has a two-page (19-inch) gray-scale monitor for $699. If you're setting up a publishing operation on a limited budget, this model combined with a low-end Centris would be quite effective.
- Mobius Technologies (510/654-0556, 800/523-7933) also offers a $699 19-inch monitor, the Two-Page Display GS. It features a low-curvature, low-glare screen.
- Nanao USA's 21-inch FlexScan 6500 (310/325-5202, 800/800-5202) supports resolutions up to 1664 by 1200 pixels. At Nanao's suggested price of $1119, it's essentially the gray-scale version of the color FlexScan F760•W reviewed here.
- Radius (408/434-1010, 800/227-2795) produces both 20- and 21-inch gray-scale monitors, the $999 Two-Page Display/20gs and the $1199 Two-Page Display/21gs. Both use the built-in video on Quadra and Centrils Macs to display 256 gray levels at 1152-by-870-pixel resolution.
- Sigma Designs (510/770-0100, 800/845-8086) offers the MultiMode 150 for high-end publishing users. At $1349, the 150 offers resolutions as high as 2048 by 1536 pixels (150 dpi) and can switch to black-and-white display.

---Charles Seiter

<table>
<thead>
<tr>
<th>Product</th>
<th>Price *</th>
<th>Mac Adapter</th>
<th>Tube Type</th>
<th>Perceptual and Operational Comments</th>
<th>Technical Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>MultiSync 20 Display</td>
<td>$2149 CEP</td>
<td>not needed</td>
<td>Trinitron</td>
<td>Bright; sharp text; Multiscan software worked fine.</td>
<td>unacceptable</td>
</tr>
<tr>
<td>LapisDisplay 20i</td>
<td>$1899 CEP</td>
<td>included</td>
<td>tridot</td>
<td>Lacks sharpness and purity.</td>
<td>acceptable</td>
</tr>
<tr>
<td>LapisDisplay 20t</td>
<td>$2099 CEP</td>
<td>included</td>
<td>tridot</td>
<td>Sharp text, but had geometry problems; adapter incorrectly set.</td>
<td>poor</td>
</tr>
<tr>
<td>LapisDisplay 21i</td>
<td>$2100 CEP</td>
<td>included</td>
<td>Trinitron</td>
<td>Clear, sharp display.</td>
<td>very good</td>
</tr>
<tr>
<td>Vision Master MF 8621</td>
<td>$2495 LP</td>
<td>$35 option</td>
<td>tridot</td>
<td>Color purity off, but text is crisp, adapter incorrectly set.</td>
<td>poor</td>
</tr>
<tr>
<td>C/N 20A</td>
<td>$1999 LP</td>
<td>$19.95 option</td>
<td>tridot</td>
<td>Good contrast; sharp text.</td>
<td>poor</td>
</tr>
<tr>
<td>C/T 20A</td>
<td>$2495 LP</td>
<td>$19.95 option</td>
<td>Trinitron</td>
<td>Sharp, bright display.</td>
<td>acceptable</td>
</tr>
<tr>
<td>ProView 20T</td>
<td>$1999 DP</td>
<td>included</td>
<td>Trinitron</td>
<td>Odd tinting; adapter not preconfigured.</td>
<td>acceptable</td>
</tr>
<tr>
<td>ProView 20V</td>
<td>$1399 DP</td>
<td>included</td>
<td>tridot</td>
<td>Geometry problems (keystoning, wavy sides); adapter incorrectly set.</td>
<td>acceptable</td>
</tr>
<tr>
<td>ProView 21</td>
<td>$1999 DP</td>
<td>included</td>
<td>tridot</td>
<td>Good picture.</td>
<td>acceptable</td>
</tr>
<tr>
<td>Diamond Pro 21T</td>
<td>$2399 LP</td>
<td>free option</td>
<td>Trinitron</td>
<td>Confusing controls, but good picture once adjusted; separate cables for each resolution.</td>
<td>acceptable</td>
</tr>
<tr>
<td>FlexScan F7600+W</td>
<td>$2069 CEP</td>
<td>$15 option</td>
<td>tridot</td>
<td>A favorite: sharp text; fairly bright appearance; adapter not preconfigured.</td>
<td>acceptable</td>
</tr>
<tr>
<td>FlexScan F7800+R</td>
<td>$3259 CEP</td>
<td>$15 option</td>
<td>tridot</td>
<td>Sharp text but screen appears dim; adapter incorrectly set.</td>
<td>acceptable</td>
</tr>
<tr>
<td>MultSync 6FGp</td>
<td>$2125 CEP</td>
<td>free option</td>
<td>tridot</td>
<td>Slightly green cast; squashed menu bar.</td>
<td>excellent</td>
</tr>
<tr>
<td>Multigraph 445M</td>
<td>$2475 LP</td>
<td>included</td>
<td>tridot</td>
<td>Slight purity problems in corners; uses on-screen menus for adjustments.</td>
<td>very good</td>
</tr>
<tr>
<td>Multigraph 445X</td>
<td>$3225 LP</td>
<td>included</td>
<td>tridot</td>
<td>Same as 445M, except for slight focus problem.</td>
<td>acceptable</td>
</tr>
<tr>
<td>PrecisionColor Display/21</td>
<td>$2499 LP</td>
<td>included</td>
<td>tridot</td>
<td>Appears dim; nemuniform brightness; easy setup.</td>
<td>acceptable</td>
</tr>
<tr>
<td>20/20 Multimode Color Display</td>
<td>$1869 LP</td>
<td>included</td>
<td>Trinitron</td>
<td>Good color purity, brightness, and text; tube shape is bulbous.</td>
<td>acceptable</td>
</tr>
<tr>
<td>SuperMatch 21TXL</td>
<td>$2599 LP</td>
<td>not needed</td>
<td>Trinitron</td>
<td>Excellent display after complete calibration; best color-control software; very flat tube.</td>
<td>very good</td>
</tr>
<tr>
<td>PressView 21 Display System</td>
<td>$3999 LP</td>
<td>not needed</td>
<td>Trinitron</td>
<td>Blue cast and low contrast, which reduce perceived brightness.</td>
<td>acceptable</td>
</tr>
<tr>
<td>ViewSonic 2D</td>
<td>$1795 LP</td>
<td>free option</td>
<td>tridot</td>
<td>Image bowing; greenish cast; adapter not correctly set.</td>
<td>very good</td>
</tr>
<tr>
<td>ViewSonic 21</td>
<td>$1995 LP</td>
<td>free option</td>
<td>tridot</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
that requires color matching and calibration, expect to spend about $2800. When looking at the prices in the table, “Two-Page Monitors Compared,” keep in mind that the price differences there are exaggerated—the $2600 difference between the cheapest and the costliest is more like $1900 if you compare street prices. For monitors with good quality, the price spread is about $1000.

For example, Focus Enhancements’ LapisDisplay 21i lists for a relatively modest $2100 and is sometimes sold as low as $1999, while SuperMac’s PressView 21 Display System has the grand list price of $3999 but sells for $2400 or so from a dozen sources.

Judging Image Quality

The overall image-quality range in these monitors is fairly small because they are produced by a handful of manufacturers in ferocious competition with each other. Because the vendors mix and match their own electronics with tubes and assemblies from different vendors, you can’t say, unfortunately, that “X is a good brand.” For example, the $1999 Mirror ProView 21 did well in perceptual and objective ratings, but the $1999 Mirror ProView 20T got little respect. Nanao’s lower-cost FlexScan F760i • W was more highly regarded than the costlier F780i • W.

One consistent brand-quality pattern, however, shows up in picture-tube sources. The high-ranking Ikegami Electronics USA monitor uses Trinitron tubes manufactured by Ikegami under Sony license, while the consistently lower-ranking ViewSonic units are both based on Matsushita tubes.

In the middle of the pack are nine monitors in the street-price range of $1850 to $2450: the Apple Multiple Scan 20 Display, the three Focus LapisDisplays (20i, 20t, 21i), the Ikegami C/N 20A, the Mirror ProView 20T and 21, the NEC MultiSync 6FGp, and the ViewSonic 20.

In our technical-support evaluations, Apple didn’t return most calls, a pattern that Macworld has seen for several months across product categories. Despite its habitual flaws in after-sale support, Apple has the monitor of choice in the pack of nine for two simple reasons. First, the picture quality is near the top for this pack, and second, there isn’t any kludging around with adapters and DIP switches and non-Mac software. And while the price is not bargain-basement, it is reasonable.

Getting the Color Right

Good color is important to graphic artists: they depend on high color fidelity when doing their work. The fundamental problems with choosing a color display may be described as the Circuit City syndrome. If you go into a store with a wall of color TVs, you can step back and see that many of them are out of calibration, featuring the same newscaster with a relatively green face in some cases and a bright orange face in others. But if you look at just one individual TV for a while, the perverse miracle of color-vision compensation takes over, and your brain makes the face look relatively normal.

As your monitor gets out of calibration (or if it never was calibrated), the same phenomenon occurs. That’s no problem if the only colors you use are those on your desktop pattern and icons, but if you are working with color on screen for printing later, that mismatch can hurt the output quality. Thus, to get professional results throughout the

### Two-Page Monitor Quality Compared

<table>
<thead>
<tr>
<th>Brightness</th>
<th>Contrast</th>
<th>Convergence</th>
<th>Gray Linearity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Most people prefer a brighter monitor. We turned up the screen’s brightness as high as it could go without showing scan lines. A monitor that puts out less than 20 footlamberts is considered dim.</td>
<td>The greater the contrast ratio, the more details show up in both light and dark areas of an image. We calculated the ratio between the luminance of white and solid color squares throughout the screen. A ratio of 6.0 or more is good. Longer bars are better.</td>
<td>Convergence denotes how closely a monitor’s red, green, and blue electron beams hit the same spot on screen. The better the convergence, the sharper the image and the truer the colors. A measurement of 0.45 or less is good. Shorter bars are better.</td>
<td>Gray linearity shows how accurately a monitor displays shades of hues across the spectrum from 100 percent to 0 percent. A perfect linear measurement is 0. The worst possible linearity is 2700.</td>
</tr>
</tbody>
</table>

| Apple Multiple Scan 20 Display | 20 | 6.0 | 0.45 | 337 |
| Focus Enhancements LapisDisplay 20i | 20 | 15.2 | 0.58 | 289 |
| Focus Enhancements LapisDisplay 20t | 20 | 8.8 | 0.39 | 290 |
| Focus Enhancements LapisDisplay 21i | 20 | 12.2 | 0.60 | 336 |
| Idex Iyama Vision Master MF 8621 | 20 | 11.8 | 0.28 | 475 |
| Ikegami C/N 20A | 20 | 12.9 | 0.56 | 294 |
| Ikegami C/T 20A | 30.0 | 12.2 | 0.33 | 282 |
| MacUSA Mirror ProView 20T | 30.8 | 9.4 | 0.60 | 500 |
| MacUSA Mirror ProView 20V | 32.0 | 14.2 | 0.44 | 391 |
| MacUSA Mirror ProView 21 | 34.4 | 13.7 | 0.50 | 417 |
| Mitsubishi Diamond Pro 21T | 32.8 | 14.2 | 0.50 | 364 |
| Nanao USA FlexScan F760i • W | 33.7 | 19.4 | 0.44 | 431 |
| Nanao USA FlexScan F780i • W | 36.7 | 19.4 | 0.41 | 397 |
| NEC MultiSync 6FGp | 33.5 | 9.4 | 0.33 | 397 |
| Nokia Multigraph 44SM | 33.5 | 11.1 | 0.33 | 431 |
| Nokia Multigraph 44SX | 33.5 | 13.8 | 0.49 | 384 |
| Radius PrecisionColor Display/21 | 32.8 | 13.8 | 0.49 | 384 |
| RasterOps 20/20 Multimode Color Display | 32.8 | 10.2 | 0.62 | 294 |
| SuperMac SuperMatch 211XL | 32.8 | 10.2 | 0.50 | 247 |
| SuperMac PressView 21 Display System | 32.8 | 11.1 | 0.57 | 223 |
| ViewSonic 20 | 32.8 | 11.1 | 0.57 | 223 |
| ViewSonic 21 | 32.8 | 11.1 | 0.57 | 223 |

Ratings are based on 12 tests. A perfect rating is 100 percent. The worst possible linearity is 2700.

**LAB**
design/print cycle, color monitors must be calibrated by something other than an individual user’s judgment.

The simplest scheme, used by Nanao, is a program called Colorific, developed by Sonnetech. With Colorific software, you set a gray-scale midpoint by matching a zone of gray to a zone of 50 percent black-and-white tiny checks; you set the white point using a calibration card specially developed for white-matching under standard office fluorescent lights. At press time, the Colorific software was still in development, but Nanao expected to have it bundled with its two-page monitors shipping in mid-September. Sonnetech plans to license Colorific to other monitor makers as well.

Colorific’s simple scheme gives a calibration accurate to one part in several thousand, nearly the range of Pantone printed-color possibilities.

Two other companies offer calibration through hardware-software combinations. Radius’s $599 PrecisionColor Calibrator and SuperMac’s $399 SuperMatch Display Calibrator both use an optical sensor to provide feedback to calibration software. This method lets the software correct the display through all the points of the gamma curve for the individual colors, and establish color-temperature settings. SuperMac also offers a $799 Pro version of its calibrator that uses an even more exacting calibration method and supports several color-matching systems, including Kodak and EfiColor. (The standard calibrator supports just the EfiColor matching system.)

The PressView’s bundled color-matching software, for example, runs through the calibration procedure mostly unattended. This procedure doesn’t necessarily guarantee that your color proofs from the printer will be perfect the first time out, but it does guarantee consistency.

SuperMac’s PressView monitor comes with the SuperMatch Display Calibrator, Pro hardware and customized color-control software (see the screen image “Calibration Controls”). That software offers a high degree of control over everything from color temperature to electron-beam adjustments, but its interface is not particularly intuitive, due primarily to the poor design of its icons. However, the controls themselves are very interactive and offer strong feedback. In some cases, such as pincushion correction and picture size, it’s easier to use the hardware controls. But when the PressView software is active, the hardware controls are disabled.

**Plug and Pray**

Because most monitors are designed with the PC user in mind, they don’t work as expected on a Mac. That’s partly because working with Macintosh internal video requires a cable or adapter that uses a wiring pattern called a *sense key*. Without this key, the Mac assumes no monitor is present and doesn’t generate a video signal.

This comes as a surprise to PC-oriented monitor makers, who expect a video card to generate a video signal whether or not a monitor is attached.

The adapters that PC-oriented vendors include with their monitors primarily tell the Mac that a monitor is present, and they tell the Mac what pixel resolution to display. However, to achieve this compatibility—and at the same time work with all computers and displays—several adapters we received are covered with many confusing dials and switches. Worse yet, most adapters came configured incorrectly.

For example, two cable adapters bundled with several monitors can be easily configured to display an 1152-by-870-pixel resolution—once you know how (see the photo “Advanced Degree Required”). To use the Liberty Cable Adapter from Enhance Cable Technology ($39.95, 408/293-2425), set the dial to P. To use the Unimac adapter from Total Technologies (about $15 from several distributors), set DIP switches 5, 6, and 7 to the on position (the switches are under a metal covering).

But getting the right resolution is only half the work. The switches also control the synchronization signals that the monitor needs to line up the pixels in their proper places on the screen. Incorrect sync leads to two common setup problems: sync doubling, where the entire screen appears to be covered with a light green ghost, and lack of sync, where the screen appears black.

Fixing a sync problem is usually simple—but, again, only if you know how. With the Liberty adapter, just change DIP switches 7, 8, and 9 from on to off,
Engineers and scientists need to look at large CAD drawings, circuit layouts, and DNA restriction maps—all applications where color is used to code information. That means that most applications use a limited palette, and a diagram is much more likely to have 16 colors than 16.7 million. Only a few scientific applications—in medical and bioanalytical imaging—involves display of color or gray-scale subtleties. Color accuracy, for example, isn’t critical if your output device is an eight-pen color plotter.

Text sharpness, however, is very important in big diagrams full of fuzzy little 6-point tables and labels. If you’re buying a monitor for technical applications, there are two columns in the table, “Two-Page Monitors Compared,” to pay more attention to: tube types and comments.

As a broad generalization, Trinitron monitors look good when displaying diagrams because the Trinitron mask gives you very sharp vertical lines. Because sharp vertical lines contribute to text clarity, these monitors are also good at the fuzzy little labels. My first choice for technical use is Apple’s own Multiple Scan 20, with the Ikegami C/T 20A a close (but more expensive) second.—Charles Seiter

or vice versa. With the Unimac adapter, toggle switches 2 and 3. Occasionally, you must toggle a switch on the monitor, or attach or remove a sync cable (this is generally just for BNC connectors, which are the ones with three separate connectors into the monitor).

To eliminate the confusion of setting an adapter, several vendors—Radius, SuperMac, Ikegami, Mitsubishi, and Mirror—ship either Mac-specific cables or Mac-specific adapters fixed to a particular resolution and sync. RasterOps, however, does not provide such a simple solution. But it is making up for the oversight by developing a special cable it plans to include with future monitors.

The new RasterOps cable has a sense key that tells the Mac that is a multisync monitor—one capable of displaying many different resolutions, which most of these monitors do—is present, taking advantage of new software from Apple that allows resolution switching on the fly. A new version of the Monitors control panel works with another extension called Display Enabler to let you change resolutions without restarting. These ship with System 7.5 and require built-in video. (The Power Macs and Power Mac upgrade cards, which use System 7.1.2, also include the software.)

But you don’t need the RasterOps cable to take advantage of this new capability. For example, you can use the Liberty adapter with Apple’s software, too. Set the dial to J; set pins 7, 8, and 9 to the appropriate position for your monitor’s sync; set pin 3 to on; and you’re on your way.

Of course a couple of similar solutions have been around awhile. With NEC monitors, you can use the bundled DPI-On-The-Fly software (it works with the Quadra 700 and 900 and the Centris and Quadra 610 and 650 models). Also, a shareware program called Monitor Switch performs resolution switching in Centris (with more than 1MB of VRAM) and Quadras (with more than 2MB of VRAM).

If this doesn’t appeal to you, look to a traditional Mac monitor maker instead of the PC-oriented ones. But keep in mind that a traditional Mac vendor may also offer monitors that succumb to configuration mania, since Radius, SuperMac, RasterOps, and even Apple are now trying to sell to PC users, too.

The Last Word

The 22 two-page monitors Macworld Lab examined may be similar, but they’re not identical. Besides the obvious modest differences in price, there are big differences in Mac-friendliness and color-adjustment capabilities.

If your career depends on good color work, you should get a SuperMac PressView 21 with SuperMac’s calibration system. Don’t let the high list price scare you—the street price is only a few hundred more than its closest rivals’. With a bit of patience, the PressView can be coaxed into the best results you can buy. (SuperMac recently started shipping the PressView 21•T, which uses a Trinitron tube and supports 1600-by-1200-pixel resolution but is otherwise the same as the regular PressView 21. The 21•T costs the same as the regular model.)

Otherwise, there’s a whole slew of perfectly good monitors to choose from. We’d start with the Apple Multiple Scan 20, Ikegami C/N 20A, Nanao FlexScan F760i•W, and RasterOps 20/20. Of these, the best bet is the Apple Multiple Scan 20 Display, since it comes at a fair price, has excellent image quality, and doesn’t put you through any of the connection and setup rigamarole that the PC-oriented monitors do. But we can’t award it an Editor’s Choice because of Apple’s dismal technical support.

Several other companies sell twopage monitors worth looking at, but they were changing their product lineups during our testing, so we could not evaluate them. These include Sony Computer Peripheral Products (408/432-1600), whose monitors have rated well in past evaluations; Sigma Designs (510/770-0100); Philips Consumer Electronics (615/475-0317); MAG InnoVision (714/751-2008); Tatung Company of America (310/637-2105); and CTX International (909/595-6146), a newcomer to the Mac market.

If you’re ready to buy a two-page monitor now, you can do so without fear that the price will drop by half or that 21-inch LCD panels will soon make your purchase obsolete—radical change is not imminent. Sure, a few sellers will have dropped out of the chase, a few will enter the fray, and prices will gently decline a bit. There are a few price/performance standouts, there are no outright horrors, and the field is ready for some aggressive comparison shopping at your local Mac dealer. m

Charles Seiter, a Macworld contributing editor, has designed colorimeters, densitometers, colorimeters, and other color-process equipment. Tim Warner is an associate lab editor at Macworld who specializes in display technology.
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"Blah, Blah, Blah."

Steve Tolleson, Owner, Tolleson Design.
San Francisco, California.

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We've all heard it a thousand times before. The "commitment to quality" mantra. But all clichés aside, to be the best there's only one way to do things— and that's the right way. How do I maintain excellence and still balance the bottom line? I skip the hype. I stick with Scitex.
Scanners Break the 24-Bit Barrier

Agfa and Epson America have both announced desktop color flatbed scanners that capture images at 30 or 36 bits but cost about the same as some 24-bit models.

Unlike 24-bit scanners, which record 8 bits of color information per red, green, and blue channel, the new high-bit scanners from Agfa and Epson record 10 or 12 bits of color information per RGB channel (depending on the scanner) for a total of 30 or 36 bits.

The scanners automatically downsample the images, a process that results in 24-bit files with less noise and better gradations and contrast than images captured on 24-bit devices, the vendors say.

In recent months, other scanner manufacturers such as Microtek and Umax Technologies have announced competitively priced flatbed models that capture images above 24-bits. For more information, see Graphics News, June 1994. The Agfa Arcus II (suggested retail price $3500), which replaces the 30-bit Arcus Plus model, is a one-pass, 36-bit scanner with an optical resolution of 600 dpi; maximum interpolated resolution is 2400 dpi for color, 3600 dpi for line art. The scanning area is 8.3 inches by 14 inches for reflective originals and 8 inches by 10 inches for transparencies (via an integrated transparency module). Bundled software includes Adobe Photoshop 2.5.1 (3.0 will be bundled when available) and Agfa's FotoTune Light for color management.

Agfa's new StudioScan II (estimated street price $995) is a one-pass, 30-bit flatbed scanner with an optical resolution of 400 dpi, interpolated up to 2400 dpi for color and line art. The scanning area is 8.5 inches by 14 inches for reflective artwork; there's an optional transparency module for slides (street price $400). Bundled software includes Adobe Photoshop LE, FotoTune Light, and Caere OmniPage Direct for OCR. Both Agfa scanners should ship in August.

The 30-bit ES-1200C-Pro Mac scanner from Epson has an optical resolution of 600 dpi, which can be interpolated up to 4800 dpi (for color and line art). This scanner, unlike most, lets you switch between one- and three-pass scanning, so you can choose the best method for a particular image. The scanning area is 8.5 inches by 11.7 inches. The scanner comes with Photoshop 2.5 (3.0 when available), Kai's Power Tools 2.0, and other software. Due to ship in August, the ES-1200C-Pro Mac lists for $1499; the ES-1200C (the same scanner but without Photoshop and Kai's Power Tools) sells for $1049. Agfa, 508/658-5600; Epson America, 310/782-0770.—J.A.M.
the PressMate's ColorMark color-management system, which supports the Trumatch swatching system and Specifications for Web Offset Publications color standards.

The PressMate has no PostScript interpreter of its own; instead, it must be linked to LaserMaster's Unity 1800PM-R plain-paper typesetter ($9995), which features an enhanced PostScript Level 2 interpreter from Pipeline Associates. The Unity is based on a Toshiba 600-dpi print engine, which LaserMaster's TurboRes technology bumps up to look like 1800 dpi. The two devices are connected via LaserMaster's VideoNet port, a video-signal technology that the company says offers real-time file-transfer speeds.

LaserMaster says that in addition to using a traditional half-toning method, the PressMate will incorporate stochastic screening—a more precise technology designed to eliminate moirés. Output speed will be about 10 minutes for each 12-by-18-inch color panel of a four-color separation. And while some service bureaus charge $80 to $150 for four-color separations, PressMate material costs will be about $30 for the same job, the company says.

Although the PressMate-Unity combination could produce an entire four-color magazine with little if any compromise in quality, according to a LaserMaster spokesperson the system will most likely be used for ads, direct-mail pieces, brochures, and annual reports.

The Unity 1800PM-R, which is scheduled to ship in early September, supports output up to 12 inches by 175 lpi. The printer includes 48MB of RAM and 40K of fast-cache memory. LocalTalk, parallel, serial, and Ethernet support is included. The PressMate is expected to ship in October. LaserMaster, 612/944-9330.—J.A.M.

**The Stock Market Soars**

**NOW YOU CAN MAKE THOSE INEVITABLE last-minute alterations to images after they've been placed in QuarkXPress—without going back to your image-editing program. ImageEditor, ImageEffects, and ImageBalance from PictureWorks Technology provide a range of editing options—including paste and color controls—previously available only in full-blown programs like Photoshop.

With ImageEditor, you can change existing images or add new ones with tools such as the airbrush, paintbrush, smudge brush, and pencil; brush options include Size/Shape, Brush, Pressure, and Hue Only. You can make rectangular, elliptical, or magic-wand selections or use the lasso selection tool; selections can be feathered or masked. The Paste Controls dialog box lets you control such effects as opacity and the colors in both the underlying and floating selections. In addition to supporting RGB, CMYK, Grayscale, Palette Color, and Black/White modes, ImageEditor lets you view an image's color values in RGB or CMYK. You can also load and save custom colors through QuarkXPress's Color Picker.

ImageEffects provides a variety of filters, including Sharpen, Noise, Outline, Emboss, Darken, and Lighten. It also accepts Photoshop plug-ins.

With ImageBalance, you can fine-tune an image's color and tone by individually altering highlights, shadows, and midtones; changing brightness and contrast; or generating a histogram.

All three XTensions require 4MB of RAM, System 7, and QuarkXPress 3.1 or later. ImageEditor ($249) is expected to ship in late August; ImageEffects ($129) and ImageBalance ($99) are due in September. They're distributed through XChange, 303/229-0620. PictureWorks Technology, 510/735-2910.—CATHY ABES

**Edit Your Images in QuarkXPress**

**N**eed quick, easy access to stock photos and background textures? If so, there's a variety of new CD-ROM image collections and browser catalogs that offer anywhere from 100 to over 1000 images. Here are some of the latest releases.

- Letraset's Phototone Unlocking Library is a 19-volume CD-ROM set of photographic backgrounds in more than 40 categories. The $199 purchase price gives you immediate access to the set's 1132 low-resolution (50-dpi) images for browsing and comp purposes only. The set also contains 1132 high-resolution (up to 9.6-by-12-inch, 175-lpi) versions of the same images, which you can download from the CDs for $249 each (usage rights are unlimited). You order an image by filling out a form (included with the CDs) and faxing it to Letraset or an authorized dealer. You then receive a fax containing the electronic code that unlocks the image. Payment options include check or credit card. Letraset, 201/845-6100.

- Westlight, a stock-photo agency, has announced its Questock Image Search System ($39.95), a CD containing 4500 photographs in Eastman Kodak's low-resolution Catalog format. The photos are for browsing and comps only; any other use requires licensing from Westlight (the agency offers Photo CD scans and film transparencies of the images). The disc also contains Questock, Westlight's extensive image-searching software, and Kodak Browser, an image-cataloging program. Westlight, 310/820-7077.

- Photo 24, a stock-photo agency, is now shipping its textures on CD. Each disc costs $79.95 and includes 100 backgrounds (in Kodak's Photo CD format), each reflecting a particular theme: Flowers and Leaves, Skies, Walls, and Water are the first four discs. Future themes include Fabric, Food, and National Parks. Photo 24, 818/999-4184.—J.A.M.
There are three types of computer users: those who have lost data due to a power problem, those who are going to, and those who have protected themselves against the inevitable surge, blackout or brownout with the most reliable UPS they can buy: Back-UPS by APC. In fact, editors and users alike agree that if your system demands absolute reliability, you can depend on APC Back-UPS.

According to a study by Bell Labs, undervoltages represent the overwhelming majority of power problems likely to hit your computer. The question is not if a failure will occur, but when. Whether due to construction, wiring, weather, other office equipment, or accidents, power problems are as inevitable as death and taxes. That's why you need instantaneous battery backup power from the Back-UPS to prevent data loss, hard disk crashes, and hardware damage.

If you're concerned about lightning, rest assured that when measured using the ANSI/IEEE 587 Category A test wave, Back-UPS are superior to virtually all separate surge suppressors. Surge performance is even backed by a $25,000 Lifetime Equipment Protection Guarantee.
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☐ YES! I'm interested in APC’s Reseller Partner Program. Please send more info and an application.

☐ No! But I would like a FREE Power Protection Sales Handbook.

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Company ..............................................................................................................

Street/City/State ..................................................................................................

Phone/Fax ............................................................................................................

Brands of UPS sold? ..............................................................................................

# of UPSs sold per month? ..................................................................................
The communications interface port (on models clients needs protection too, the $139 last just beyond their warranty period. My LANtastic, Windows NT, LAN Server, LAN Manager, AppleShare/System 7 and more, so your data Back-UPS sold separately.)

Don Truax knows first hand about Back-UPS reliability: “It ought to be against the law to buy a computer without an APC Back-UPS 250. I recently had a direct lightning hit right outside the house...my computer never blinked. Each morning I get a surge down the line and both APC’s hate it - they simultaneously ‘boiler ‘n clamp’ while my ‘Brand T’ quietly sleeps in. I’ve relegated that unit to non-critical household stuff like my VCR.”

Andrew Wargo, Manager at Baxter Land Company, tried two other brands before Back-UPS. “One lasted a few days, a second one went up in smoke after 48 hours, a third lasted less than 24 hours! 1 then bought my Back-UPS for less than half of what I had paid for the others. We’ve purchased three more Back-UPS, and for the past 14 months they’ve been just hummin’ away on the same power line that was eating the other brands alive!”

If you’re protecting a network server, a communications interface port (on models Back-UPS 400 and higher) provides the security of an automatic shutdown to all major OS including NetWare, Windows, Windows NT, LAN Server, LAN Manager, LANtastic, SCO Unix, OS/2, Banyan Vines, AppleShare/System 7 and more, so your data is safe whether the system is attended or not. (PowerChute software and interface kits sold separately.)

And since data processed on networked clients needs protection too, the $139 Back-UPS 280 provides an economical solution for all your LAN workstations. And if you have a new green PC, the price is even better at $119 for the new Back-UPS 200.

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Expert Graphics

GRAPHICS PROFESSIONALS SHARE THEIR SECRETS

by Cathy Abes

Artist: Greg Vander Houwen heads the Seattle-area computer graphics firm Interact, whose clients include Apple and Microsoft. His artwork is featured on the Adobe Photoshop 3.0 CD-ROM.

How It Was Done: This image, called *Starscape*, was generated from two simple geometric shapes—a plane and a sphere. The entire model required only one texture map and one light source.

Vander Houwen began in Strata StudioPro by creating a sphere with a light source inside it at the center of his 3-D model. In Photoshop, he created a texture map with scattered white stars, using a star-shaped brush with fairly high spacing and various opacity settings.

In Strata StudioPro, he combined the stars image with a refractive-glass texture he’d previously made in StudioPro to create a new texture. Below the sphere, he created a plane that tilted toward the viewer. For the final rendering, he placed the camera close to the plane and some distance from the sphere.

Back in Photoshop, he used a mask to lighten the foreground area without affecting the sphere. After saving a duplicate of the image into a new channel, he feathered the sphere, filled it with black, and deselected it to leave a soft black circle. Then he brightened the shadow areas with Curves. After loading that selection into the main image, he lightened it with Curves again. He further adjusted the foreground by saving another duplicate to a new channel and inverting the selection so he could enhance the areas that were originally very dark.

After making the glow mask, Vander Houwen loaded the selection into the main image channel. In Levels, he moved the gamma (center) slider about 20 or 30 points to the left to create the glow effect. He then selected the sphere with a slight feather, floated the selection, and applied the Fragment filter with an opacity of about 70 percent. In Hue/Saturation, he colorized the image by clicking on Colorize, reducing the saturation and moving the Hue slider to the desired blue.

1. In StudioPro, Vander Houwen placed a sphere (onto which he would later map a texture of transparent stars) and a light source in the center of the 3-D environment.

2. To create the stars texture map in Photoshop, he selected a star-shaped brush. In Brush Options, he set the spacing fairly high to put some space between the stars. He also varied the brush opacity to achieve the stacked effect. (He repeated this process with a larger brush.)

3. In StudioPro’s Texture Editing dialog box, he clicked on Copy From to load a refractive glass texture he’d made earlier in StudioPro. He combined the glass texture—including transparency, reflectivity, and gloss—with the stars, which he loaded into the map by clicking on Color Map and selecting the stars image.

4. After applying the texture to the sphere, he opened StudioPro’s Change Mapping dialog box, set Tiling to None, and made sure that the mapping was set to Spherical and that it completely covered the sphere.
By choosing the camera's view and doing a test rendering with ray tracing, Van­
der Houwen saw that the light source was projecting the stars across the plane. For the final rendering, he in­
creased the resolution.

To lighten the foreground, he used Photo­
shop's Duplicate com­
dand to put a copy of the image into a new channel as a mask. There, he made the sphere a feathered selection, filled it with black, and deselected it to replace it with a soft black curved shape. Then he used Curves to brighter the shadow areas to fully select them.

In Quickmask mode, he created a vertical blend—white (fully selected) at the top to black (unselected) at the bottom—which he loaded as a selection and filled with black. He loaded the result as a selection into the main image and then inverte its map to make the dark areas in the fore­
ground light.

To create the glow mask in a new channel filled with black, he selected the area of the sphere with a feathered elliptical marquee and filled it with white.

THE TOOLS

Hardware: Power Mac 7100 with 40MB of RAM and an FWB Ham­
mer 525MB internal hard drive; Apple 250MB external hard drive;
Macintosh 16-inch Color Display with 24-bit color support; Wacom UD-0608-A 6-by-9-inch Pressure-Sensitive Tablet; Hewlett-Packard DeskWriter 560C.

Software: Strata StudioPro 1.1; Adobe Photoshop 2.5.1.
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Special Effects

By itself, Adobe Photoshop is indisputably the most versatile image-editing program for graphics professionals. But combined with third-party plug-in filters from the likes of Aldus, Xaos Tools, and HSC Software, Photoshop becomes a high-powered special-effects laboratory as well.

Named for the filtered camera lenses that let you zoom, distort, and tint photographs as you shoot them, Photoshop filters extend well beyond anything available to traditional photographers. The third-party filters I evaluated allow you to transform a picture into a series of brushstrokes, wrap images around three-dimensional objects, and generate a never-ending supply of textures out of thin air—to name just a few capabilities.

I worked with nine plug-in special-effects filter packages, ranging in price from $89 to $199. Starting with the filters that are easiest to use and working my way up to the most challenging and capable, I've evaluated each filter package based on how it meets the needs of new and experienced users alike. I've also outlined the pros and cons of each package and even compiled a list of the best individual filters (see the sidebar, "The Top Five Plug-Ins").

While I used these filters with Photoshop, it's important to note that third-party Photoshop filters are usually compatible with any application that supports the Photoshop plug-in format, including Fractal Design's Painter, MicroFrontier's Color It, Pixel Resources' PixelPaint Pro3, Deneba Software's Canvas, Specular International's Collage, Adobe Premiere, Avid VideoShop, CoSA's After Effects, StrataVision 3D, and Ray Dream Designer. But it pays to be safe: if you intend to use a filter collection with a package other than Photoshop, double-check to be sure it's compatible.

Also, keep in mind that, while I tried to be as comprehensive as possible, this article doesn't cover all the third-party special-effects Photoshop filters out there. You'll probably discover some interesting freeware and shareware Photoshop filters if you hunt around. That's because the new version of Photoshop, 3.0 (which should be available by the time you read this), includes Filter Factory, a module that lets expert users create their own custom filters; you can expect to see some of these distributed via online services. For more information on Photoshop 3.0, see Graphics news, Macworld, September 1994.

ALDUS GALLERY EFFECTS, VOLUMES 1 THROUGH 3

Aldus Gallery Effects from Aldus Corporation (800/685-3570) comprises three separate collections: Volumes 1 ($199), 2 ($99), and 3 ($199). Despite the differences in price, each collection contains the same number of filters (16). The filters produce straightforward effects, such as making an image appear as if it were hand-painted. Each filter includes a preview window so you can apply your settings to a small area of a picture before investing time in filtering the entire selection. Volume 1 also includes a standalone utility for applying filters (helpful only if you don't own Photoshop).

But if I had to describe Gallery Effects in a word, it would be bo-bum. The fact is, you can duplicate most of the filter effects using Photoshop's native capabilities. For example, to mimic the GE Emboss filter in Gallery Effects Volume 1—which creates a color embossed effect ostensibly missing from Photoshop—you can enter a sequence of numbers in Photoshop's Custom filter. And emulating the GE Photocopy filter from Volume 2 is as simple as applying the High Pass and Median filters (both supplied with Photoshop) along with some Levels adjustments. The effects are not absolutely identical, but they are extremely close—and in many cases, Photoshop's built-in options are preferable to Gal-

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A buyers' guide to third-party image-editing filters

Among the Kai's Power Tools filters used for this image were the Julia Set options (part of the Fractal Explorer filter) for the eyes and background, and Special Blue Noise for the child's hair.
Filter Finance  Macworld paid a stock-photo agency nearly $2000 for usage of the example images in this article. The cost could have been almost double that amount, however, had we not been able to negotiate; the agency initially planned to charge for each use of the woman’s photograph that appears in the image “Creating Order within Xaos.” The bottom line: Filters can be fun, but unless you’re applying them to royalty-free images, they can quickly bust your art budget if you’re not careful.

Getting Around Gallery Effects  I created the two images at left using Aldus Gallery Effects’ GE Emboss filter (top) and GE Photocopy filter (bottom). To get the images on the right, I relied on capabilities built into Photoshop. The left and right effects aren’t identical, but the differences are subtle enough to cast doubt on the value of some of Gallery Effects’ filters.

lery Effects (see “Getting Around Gallery Effects”).

For instance, no matter how you apply Gallery Effects’ GE Photocopy filter, you get a gray-scale image with only 16 gray values and little detail. But by using Photoshop’s High Pass and Median filters, you retain much of the color and all of the detail of the original image.

Of course, not all Photoshop users are well versed enough to know they can emulate certain effects using built-in filters. To its credit, Gallery Effects names its filters fairly logically and makes them easy to use, providing novices with access to capabilities they didn’t know they already had. If Aldus took the next step and made the filters more versatile, the collection might be of more use to intermediate and advanced users as well.

THE BLACK BOX 1.1

From independent vendor Alien Skin Software (919/832-4124)—easily the best name for a software company I’ve heard this year—The Black Box ($89) is a collection of six filters that add highlights and shadows in and around selection boundaries. For example, one filter creates a drop shadow behind a selection. More interesting filters generate glass-refraction effects, distort images into whirlpool patterns, and add beveled edges to selection outlines (see “Pressed Text”).

Rather than filtering the selected area of an image—the standard operating procedure for most filters—The Black Box plug-ins affect the perimeter of a selection and the area just outside of it. As a result, these filters end up deselecting the selected area, which means you can’t composite the filtered image with the underlying original except by reverting to the image you saved to disk or stored in Photoshop’s Snapshot buffer. Furthermore, in a version I reviewed (1.1d), using the Undo command didn’t completely undo the effect. By using Photoshop’s Difference command, I found that colors in and around the selected region remained one to four times darker than they were before the filter was applied. Although this problem was fixed in version 1.1e, I still think it’s a good idea to save or take a snapshot of your image before applying a Black Box effect. You’ll also want to store your selection as a mask so you can retrieve it for later use.

The Black Box filters are far from perfect. The interface is fairly complicated, and the dialog boxes lack previews. Also, as with Gallery Effects, you can emulate most of The Black Box’s filters using Photoshop’s native capabilities. But rather than limiting your options—as does Gallery Effects—Alien Skin’s collection broadens your range of options and makes complicated tasks more straightforward. As a result, even experienced users will find these plug-ins useful, albeit in need of minor repair.

ANDROMEDA, SERIES 1 AND 2

Possibly the most diversified and unusual filter packages come from Andromeda Software (805/379-4109), the same company that programs Adobe Streamline. Andromeda’s Series 1 collection, Photography Filters ($129), includes ten plug-ins that
enable you to create everything from automatic rainbows to complex, repeating vector patterns. But while many of the effects are interesting—you can create starburst highlights, rotate repeating images inside the spokes of a circular grid, and apply variations on Photoshop's Motion Blur and Lens Flare effects—it's unlikely that you'll count any of them among your most beloved filters. Except for the mezzo-screen option offered by the Designs filter, Series 1 is a bunch of wacky special effects in search of a practical application.

Series 2, Three D Filter (also $129), however, is as pragmatic as a set of socket wrenches. The single Three D Filter plug-in enables you to wrap a selection around one of four three-dimensional forms—a sphere, a box, a cylinder, or a 2-D plane floating in 3-D space (see "The Three D's of Imagery"). Using the program is a bear, though: the interface has more than its share of unconventional controls, and the tiny manual is riddled with 8-point type and punctuated by cryptic headlines—like "3.2.8.2. (Save) Demo Parameters"—that only a robot could understand. But with a little patience and a whole lot of experience, you'll be using this program like a champ.

The options, though complex, are comprehensive. You can scale and spin the 3-D object, wrap and rotate the image around the object, and change the orientation and position of the light source. The preview is large enough so you can accurately judge the outcome of the filter, and you can interrupt the preview at any stage. As for features, my only wish is that the filter could generate its own mask around the finished 3-D object so you could easily composite it against other images. As it is, though, you can set the object against the equivalent of a blue screen and use Photoshop's channel operations to generate a mask.

Suffice it to say that if you've ever wanted to wrap images around 3-D renderings, create photographic cubes, or perform true perspective manipulations, Andromeda's Three D Filter can't be beat.

PAINT ALCHEMY 1.0.2
Paint Alchemy ($99) from Xaos Tools (415/487-7000) is less a collection of filters than a unique image-editing environment that happens to run inside Photoshop. The plug-in repeatedly applies an 8-bit brush shape to the selected portion of an image, resulting in impressionistic and painterly effects. For example, by applying a gradient sliver of a brush to an image, I was able to convert the smooth skin of a woman's face to a complex series of interwoven fibers (see "Creating Order within Xaos").

Any filter this versatile must take a while to master, and Paint Alchemy is no exception. In fact, the interface is complicated enough to put off even seasoned Photoshop users. The filter's single dialog box is made up of five dense panels of options. The preview window doesn't work unless you assign the filter sufficient memory, which is a surprisingly confusing process. You can load only one brush shape at a time, and assigning too little memory can prevent you from doing that as well.

If you manage to come to terms with these and other interface anomalies, you'll tap into Paint Alchemy's virtually limitless reservoir of powerful brush...
SPECIAL EFFECTS IN PHOTOSHOP

Creating Order within Xaos

I embellished this image using two separate filters from Xaos Tools. The strokes of the fibers on the woman’s face and arms are actually 8-bit brush shapes I applied using Paint Alchemy. The strokes rotate according to the hue of the image, and they stretch and shrink based on the brightness. To create the kaleidoscopic pattern of spinning faces in the background, I used a reduced version of the face as a source image inside Xaos’s Terrazzo.

Vortex Overload

This image features five applications of Kai’s Power Tools’ Vortex Tiling filter, which spins and duplicates an image into Spirograph patterns. I used the filter to create a mask and pasted the portrait of the woman inside it (upper right). I achieved other effects with the Fractal Explorer, Gradient Designer, Texture Explorer, and Glass Lens Soft filters, all part of KPT.

effects. Paint Alchemy offers 75 predefined brush shapes and gives you the ability to create brushes as well. (A second set of 50 brushes, called Floppy Full of Brushes, sells for $19.95.) You can control the layering, angle, size, and transparency of brush strokes, as well as randomize their placement. In addition, you can randomize brushes over time when using Paint Alchemy inside QuickTime applications such as Premiere and After Effects. Paint Alchemy doesn’t offer the ability to create gradual pattern morphing—which, alas, would be great for turning hairs into crawling worms—but you can move the filter pattern with the QuickTime movie so the pattern doesn’t look like a stationary screen.

Xaos Tools plans to release a native Power Mac version of Paint Alchemy before the end of this year. In the meantime, a special version of the program—version 1.02F—accelerates the filters on 680X0 Macs with math coprocessors. Regardless of how long it takes to apply the filter, the result is usually worth the wait. In fact, Paint Alchemy wins my vote as the single most versatile and useful plug-in currently available for Photoshop.

TERRAZZO 1.0

Xaos Tools’ other plug-in program, Terrazzo ($199), fills a selection with a repeating pattern from the same image (or another image saved to disk). You can select from 17 duplication symmetries: one positions a right-side-up duplicate next to an upside-down one; another flips the image left, then right, then up, then down; and so on. Pulling off any of these patterns would be next to impossible without Terrazzo.

Inside its dialog box, Terrazzo displays the selected region of your image along with an inset polygon that you can scale and move to surround the portion of the image you want repeated. If you want your pattern to hail from a different image, you can open any PICT file inside the dialog box. To ensure that the patterns mix smoothly, Terrazzo lets you adjust the feathering applied to each element. A preview window shows the results of your settings.

Terrazzo is useful and flexible, and it’s ideal for creating textural backgrounds. But it’s not without problems. First, compared with other plug-in packages, it’s overpriced. It’s about half as powerful as Paint Alchemy, for example, but it costs twice as much. Also, the dialog box badly needs a scale option. As things stand now, you have to reduce or enlarge the source image to change the size of the pattern elements. And the preview constantly tries to update the screen, slowing some editing operations to a crawl. Even if you turn off the Continuous Preview option, Terrazzo tries to sneak in a preview when the mouse is still. A simple Preview Now button would solve this problem. But despite my complaints, I found Terrazzo sufficiently capable to warrant the once-over from any serious Photoshop user. (See Reviews, in this issue, for more on Terrazzo.)

KAI’S POWER TOOLS 2.1

I prefer Paint Alchemy to any single filter in HSC Software’s (310/392-8441) popular $199 plug-in collection, Kai’s Power Tools (KPT). But when you
Suppose you're stranded on an incredibly beautiful tropical island. You discover an abandon beach house stocked with all the niceties of carefree living, including more daquiris, trash novels, and reggae albums than you can use in a lifetime. There's even a Power Mac equipped with Adobe Photoshop for those occasional times when you've had too much sun. But thanks to some irritating hard disk limitations, you can load only five Photoshop plug-in modules—from absolutely any collection or vendor—onto the computer. Which ones should you choose? If I were you, I'd pick the following filters, listed in order of preference.

1. **Paint Alchemy** (Xaos Tools). OK, it doesn't have the best interface on the planet, and its filter performance can be slow. But you can do more with this one plug-in than any other filter I know of. It's nothing short of a special-effects factory.

2. **KPT Texture Explorer**, part of Kai's Power Tools 2.1 (HSC Software). As its name implies, this filter requires some experimentation. You can't say, "Gosh, I'd like to create a pattern of interlocking turtles," and expect to find them. Rather, you have to play around until you stumble on something that looks like a turtle and then fine-tune it. Even if you never find your turtles, you'll run into a bunch of other patterns that may eventually prove more useful.

3. **Andromeda Series 2**, Three D Filter (Andromeda Software). Like any three-dimensional-rendering environment, Andromeda's Three D Filter takes some time to learn. But once you master its vast supply of options, you'll be able to wrap images around spheres, boxes, and cylinders without the need for more expensive, stand-alone 3-D applications. The renderings are superb.

4. **KPT Gradient Designer**, part of Kai's Power Tools 2.1. The gradient tool is one of Photoshop's most limited features. KPT Gradient Designer, on the other hand, is the best gradient generator I've seen inside any graphics application. This plug-in allows you to add as many colors as you like, position colors exactly, and mix in translucent gaps.

5. **Terrazzo** (Xaos Tools). This plug-in repeats a specified portion of an image to form a tile pattern. Terrazzo isn't limited to square upright tiles, like those you see on your Finder desktop every day; it lets you select from 17 different symmetry options and feathers the tiles together seamlessly. The interface needs some work, but the results are first-class.

**KPT** includes hundreds of predefined patterns. You can even colorize patterns using gradations defined in the Gradient Designer. Powerful capabilities plus a carefully designed (though highly unusual) interface make KPT the most extraordinary collection of filters available to Photoshop users.

**THE LAST WORD**

If you can afford to buy only one filter package, Kai's Power Tools is the one. It includes a handful of focus filters, some noise filters, and a few distortion filters, all straightforward enough to accommodate the new user while remaining stalwart enough to please the experts. And when you finally get around to the Explorer modules, you'll discover a whole new world of image editing—a world as rich and addictive as Photoshop itself.

Those who are looking to bolster an existing library should consider Xaos Tools' Paint Alchemy and Andromeda's Series 2 (Three D Filter). Both are first-rate tools that enable you to perform feats well beyond Photoshop's native capabilities. But be prepared for some complex working environments; it's not that these programs don't make sense, they just require a little experimentation. And if your appetite for plug-ins still isn't satisfied, check out Xaos Tools' Terrazzo and The Black Box from Alien Skin. Neither product is as all-out powerful as my first three recommendations, but both do provide access to unique effects that serious image editors will find useful.

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**Contributing editor DEKE MCCLELLAND** is the author of the Macworld Photoshop Bible (IDG Books Worldwide, 1994) and the host of "Digital Gurus," a how-to show airing on the Jones Computer Network that covers Photoshop, Painter, Kai's Power Tools, and other graphics programs.
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Please check one:  [ ] Home Address  [ ] Company Address

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<th>M.I.</th>
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- **YOUR INDUSTRY**
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  - [ ] Art/Design/Graphic Services
  - [ ] Arts & Entertainment
  - [ ] Communications/Printing/Publishing
  - [ ] Computer Reseller/VAR/VAD
  - [ ] Consulting
  - [ ] Corporate/General Management
  - [ ] Distributor/Dealer/Supplier/Service
  - [ ] Engineering/R&D
  - [ ] Government/Military
  - [ ] Health/Medical Services
  - [ ] College/University
  - [ ] Elementary/High School
  - [ ] Legal Services
  - [ ] Manufacturer (Computer Industry)
  - [ ] Manufacturer (Non-computer Industry)
  - [ ] Marketing/Sales/PR/Communications
  - [ ] Art Director/Graphics
  - [ ] Editor/Writer
  - [ ] Consultant
  - [ ] Network Manager
  - [ ] Programmer/Analyst
  - [ ] Manager/Department Head
  - [ ] Lawyer, Doctor, etc.
  - [ ] Engineer/Scientist/R&D
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**SIZE OF YOUR ORGANIZATION**
- (number of employees national & international; choose one)
  - [ ] Under 5
  - [ ] 5 - 9
  - [ ] 10 - 49
  - [ ] 50 - 99
  - [ ] 100 - 499
  - [ ] 500 - 999
  - [ ] 1,000 & over
  - [ ] Does Not Apply

**WHICH PERSONAL COMPUTERS DO YOU OWN/USUALLY USE?**
- (choose all that apply)
  - [ ] Apple Macintosh
  - [ ] IBM PC or compatible
  - [ ] PowerBook
  - [ ] PowerMac
  - [ ] Apple Macintosh
  - [ ] Macintosh Performa Series
  - [ ] Macintosh Powerbook Duo Series
  - [ ] Macintosh Powerbook Series
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DO YOU RECOMMEND, BUY, OR APPROVE MICROCOMPUTER SOFTWARE AND/OR PERIPHERALS?
- [ ] Yes
- [ ] No

**IF YES, PLEASE INDICATE**
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  - [ ] 1 - 10
  - [ ] 11 - 25
  - [ ] 26 - 50
  - [ ] 51 - 100
  - [ ] 101 - 500
  - [ ] 501 +

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*MACWORLD Expo conference sessions are on a first-come, first-served basis with no guaranteed seating and are subject to change without notice.*
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Hotel Accommodations
Participating hotels in the San Francisco area are offering MACWORLD Expo discounts. To receive the preferred rate, call one of the hotels listed and mention you'll be attending MACWORLD Expo. There are only a limited number of rooms at the preferred rate and they sell-out quickly. Make your reservations by November 30 for the best selections (rates and availability cannot be guaranteed). Prices reflect single and double occupancy. If you are reserving 10 or more rooms, you must supply the hotel with a rooming list and a non-refundable deposit for the first night, no later than November 18.

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Missed the pre-registration date? You can still register before the start of the show! On-site Early Bird Registration is from 11:00 a.m. - 4:00 p.m. on January 3 at the full registration rates of $150 for all Conference Sessions and Exhibits, and $40 (cash only at the door) for Exhibits-only admission.

Take the Shuttle and Enjoy the Free Ride.
Complimentary shuttle service is available from the Cow Palace and Cal Train. Look for specifics in your pre-registration package. Moscone Center is accessible from 80 East, 4th Street Exit; from the Bay Bridge, Fremont Street Exit; and from Golden Gate, Lombard Street Exit. Call 415-974-4000 for detailed directions.

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<td>(415) 772-5600</td>
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Quicken 5 Puts Money under Microscope

The biggest change in version 5.0 of Intuit's personal-finance and small-business bookkeeping package Quicken is a great increase in ways to look at your financial picture. For example, the program can show cash flow, bills coming due, and so on, in a calendar view; you can open and modify transactions (including recurring transactions) from the calendar; and you can add an individual financial event, such as a vacation or an estimated tax payment, to a financial-forecast time line to see its impact. Creating reports is also simpler than in version 4.0.

Quicken 5.0 borrows some tax capabilities from MacInTax, which Intuit acquired last year when it bought Softview, and it can categorize transactions for tax purposes and later transfer them to MacInTax. The new version of Quicken puts frequently used commands on an icon bar, lets you see and edit its list of memorized transactions, and can log on to CompuServe to download current securities prices. Quicken 5.0 should ship in October at $49.95; the upgrade from 4.0 is $29.95. Intuit, 415/322-0573.—D.L.

New Homes for Documents

PC Docs and the recently acquired WordPerfect subsidiary SoftSolutions, two leading vendors of electronic document-management systems, are developing Mac clients.

SoftSolutions' standard fields for profiling documents, where the user adding documents to the archive records topic, author, and other information, are static, but the profile includes 16 user-definable fields. SoftSolutions sells Windows and DOS add-ons for recording document usage, creating a custom interface, and other functions; the company has not decided which add-ons it will develop for the Mac. The Mac client should ship this year. Pricing was not set at press time. SoftSolutions, 801/226-6000.

PC Docs' Does Open runs on any standard SQL database engine and provides a point-and-click interface for adding or modifying fields in the document profile. The administrator can set up controls requiring users to fill in certain fields. Does Open can read and index data from about 150 common applications and can search the contents of documents as well as their profiles. The system's distinguishing feature is Check Out, which allows a user to work on a document offline and temporarily block other users from modifying the document. The ship date for the Mac client is expected to be in the first quarter of 1995. It lists for $295; volume purchases are less per user. PC Docs, 904/942-3627.—D.L.

DCA Takes On Lotus Notes

A new groupware system under development by a company previously known for mainframe connectivity products takes a different approach from that of Lotus Notes to gathering and sharing information.

DCA's OpenMind combines document archiving with group-discussion management; OpenMind indexes docu-
ments loaded into the system (DCA says OpenMind reads about 150 file types), and users can search using Boolean and proximity operators. You can navigate discussions—about indexed documents as well as unrelated topics—in the Transcript view, which shows the first line of each comment, supports threading and branching, and can notify participants in a discussion when new comments are added.

OpenMind is designed to be used with a modem or other remote-access tool, as well as on a LAN. It requires a Windows NT server, which lists for $995 and should be shipping by the time you read this; the Macintosh client should ship in October, and client pricing starts at $295 per user and drops to $225 per client for large purchases. DCA, 404/442-4495.—D.L.

Mac's Spreadsheet World Diversifies

A NEW SPREADSHEET WITH light hardware demands and a curious history will ship soon. U.S.-based Mariner Software's Mariner has long been available here as shareware; with help from a Japanese distributor, it was perfected for commercial sale in Japan and is now heading for the U.S. commercial market. It will list for $99 and be available late in 1994.

Mariner 3.05, the current beta version, isn't meant to challenge Microsoft Excel: it runs comfortably in 1MB of memory and takes up only 600K on disk. However, it provides one thing Excel can't touch: true 3-D worksheets—that is, the ability to arrange and manipulate data in rows, columns, and layers. Mariner creates graphs and provides 102 functions for math, trig, finance, statistics, time and logical operations, and manipulating worksheet objects. Other useful features include a set-print-area command, dynamic headers and footers, table-formatting templates, and filing or cascading of open windows. When Mariner ships it will support drag and drop and have a spelling checker. Mariner lacks array manipulation and a macro language; the program can import SYLK files but not native Excel files.

The company is also anglicizing its unnamed Japanese word processor, which the company says is on a par with WriteNow. It should ship by year's end for $99. Both programs will be available in 680X0 and native Power Mac versions. Mariner, 502/222-1308.—D.L.

Where Paper Goes When It Dies

WHAT TO DO WITH ALL THOSE OLD papers? You know, those bankers' boxes full of personnel memos and IRS documents from 1980? Why, throw them in the recycling bin, of course—after converting them to an electronic format.

Systems Engineering Solutions (SES1) is shipping Imaxis, a system for creating electronic documents from paper documents (Imaxis archives can also include documents created on a computer). Imaxis integrates tools for scanning documents, cataloging and annotating them, extracting their text, and finding the documents again when you need them. The interface is designed to make it easy to reproduce your office's filing system, and users can browse through files, search by document content or catalog information, and set bookmarks. Imaxis also provides a hierarchical security system for controlling the ability of individuals and groups to see or alter sets of documents.

Imaxis is geared toward small workgroups; it lists for $2695 for one server and one scanning module with four client modules—about one-tenth the cost of BlueRidge's Optix and Microdynamics' MARS, two Mac systems designed for larger installations. Imaxis components are available separately for later expansion. SES1, 703/573-4366.—D.L.
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- Forbes (6/20/94)

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Tools and Tips for Printing Labels

REMEMBER THE DYMO LABEL MAKER? It first flashed across the consumer-product sky in the 1970s. It was shaped like a science-fiction ray gun, with a dial gizmo on top bearing all the letters of the alphabet. You dialed a character, squeezed the plastic trigger, and the Dymo embossed the character on adhesive-backed plastic tape. After a few minutes of dialing and squeezing, you had a peel-and-stick label. It was state of the art back then, especially when Dymo came out with colored tapes, including one with a handsome faux wood-grain look.

Today's label maker comes with a mouse, keyboard, and printer connected to it. Any Mac attached to a printer can produce a wide range of label types—mailing labels, videocassette labels, "Hello, my name is" badges, and more. To spare you from frustrating trials and errors and wasted label stock, many application programs include templates for popular label sizes. There are also dedicated label programs and small, inexpensive label printers that free up your big printer for bigger things (see "Little Label Printers").

Software for Labels

Current versions of Aldus PageMaker, Claris FileMaker Pro, ClarisWorks, Microsoft Word and Works, and Softkey International's WriteNow, among others, include templates for labels by Avery (909/869-8514, 800/462-8379), the biggest supplier of printer label stock. All mailing list programs—packages such as Satori Software's Bulk Mailing Plus and Softkey Publishers' AccuZip6—also provide direct support for common mailing and shipping label sizes. (See the March 1994 Working Smart for details on mailing programs.)

Then there are dedicated label-printing programs, which combine basic page-layout features with built-in templates for label stocks, such as Avery's own MacLabelPro 1.63 ($99.95); Williams & Macias's $100 StickyBusiness 1.6.4 and $225 StickyBusiness Plus 1.6.4 (509/624-5170, 800/752-4400); and MySoftware Company's $29.95 MyLabelDesigner 1.0.1 and $59.95 MyAdvancedLabelDesigner 1.5 (415/473-3600, 800/325-3508). StickyBusiness and StickyBusiness Plus are identical except that Plus supports bar codes; MyLabelDesigner and MyAdvancedLabelDesigner are also similar, but Advanced has a built-in database.

All labeling programs work similarly. You select from a menu the type of label you want to create; labeling programs make this easy by describing the label stocks that they support, including brand names and part numbers. Some programs support a much wider range of label stocks than others. For understandable reasons, Avery's MacLabelPro supports only Avery label stocks (even though MacLabelPro is based on a 1990 licensed version of StickyBusiness). The MySoftware programs include slightly more than 100 templates, while the StickyBusiness programs are the reigning template champs, with more than 500 templates for Avery labels and stock from other suppliers. These include New England Business Services, a large mail-order supplier of preprinted labels, invoices, and other business forms (508/448-6111, 800/882-5254); Innam, a mail-order office- and computer-supply house (214/235-8600, 800/547-5444); and even United Parcel Service.

Laying Out Labels

After you specify a label size, the program provides a blank label and tools for creating text, lines, and boxes. The MyLabelDesigner and StickyBusiness programs import PICT and EPS graphics files; you can also paste graphics from the Mac's Clipboard. You might use these features to add a company logo or a scanned image to labels. The StickyBusiness packages can import icons to adorn labels for disks or removable-media labels.

These programs' layout features are crude compared with those of a desktop publishing program. Forget about fine control over letterspacing, for example, or even grouping objects to move and resize them together. MyLabelDesigner and MyAdvancedLabelDesigner have additional limitations; for instance, they provide just three line widths and don't support diagonal lines. But at least the MyLabelDesigner programs let you zoom in on a design to do detailed work; StickyBusiness doesn't.

Specialized Labeling Features

However, most programs provide more than bare-bones layout features and templates. MyAdvancedLabelDesigner has a built-in database manager that's suitable for keeping track of mailing lists, and both of the MySoftware programs can import text-only files from a database manager. StickyBusiness lacks a built-in data manager.
ager but provides a print merge feature.

As you might expect, a label program's real prowess is in printing, with features designed to cut down on wasting labels and to make printing labels easier. For example, if you print just a few labels, you'll be left with a partially used label sheet; these programs can skip blank spots on a sheet and use up the remaining labels. Label programs also let you print multiple copies of the same label. All the programs tested can print a unique serial number on each label—a great feature for use in inventory or forms.

Williams & Macias also sells myDisk-Labeller III (version 3.2.4, $80), with layout features similar to those of Sticky-Business but with templates only for floppy disks, SyQuest cartridges, and other storage media. myDisk-Labeller III reads the directory of a disk or cartridge and prints its contents on a label and in report format (see "Labels for Disks"). Williams & Macias sells laser-printer SyQuest labels and other label stocks, as does MySoftware Company.

Choosing a Labeling Program

If you print only a few labels now and then and you already have a program that includes label templates, you might not need stand-alone label software. But if you do, get one of the Sticky-Business packages from Williams & Macias. They support the widest array of label stocks, they provide the best layout features, and the programs themselves are easier to use and better designed than MySoftware's packages. Both Sticky-Business packages also include a disc accessory, QuickStick, that lets you dash off a quick label.

As I worked on this month's column, I wondered if label-printing programs represent The Software Category That Time Forgot. All the programs tested have a circa-1986 feel to them: no 3-D tool palettes, balloon help, or customizable user interfaces here. The Sticky-Business manual even has instructions on importing data from Microsoft's Multiplan spreadsheet, which was discontinued years ago. All the programs are compatible with System 7 and even the Power Macintoshes, but I wouldn't mind seeing them modernized.

But to their credit, all these programs run on a Mac Plus or SE and don't gobble gobs of hard disk space. In an era when more and more programs arrive on a dozen floppy disks, or even a CD-ROM, it's refreshing to install a program that comes on just two 800K disks. And hey, even a circa-1986 labeling package beats a circa-1970 Dymo Label Maker.

Stock You Can Stick With

Labeling software won't do you much good without labels to print on. There are many kinds of label stock available for computer printers, but be careful not to buy labels designed for typewritten or hand-written labels: they won't withstand the heat and curving paper paths of most printers, and you may end up with a gummy, expensive mess to repair.

Avery puts laser labels on an 8½-by-11-inch backing that fits in the standard paper cassette for most laser printers. The labels themselves range in shape and size from ½-inch-by-1½-inch rectangles (80 labels per page), to 3½-inch circles (6 per page), to full sheets measuring 8½ by 11 inches. The full-sheet labels are especially versatile, since they can be cut to any size after printing. All of Avery's white-label stock also works with ink-jet printers such as Apple's StyleWriter II. For laser printers only, Avery also offers pastel-colored stocks in various sizes, as well as see-through labels.

If you want your labels to make a fashion statement, get a catalog from PaperDirect (201/271-9300, 800/272-7377). This mail-order firm is the best source I've found for offbeat paper and label stocks. The company's Designer Laser Labels line comes in more than a dozen styles—everything from billowing clouds to geometric borders to faux marble—and PaperDirect also sells paper and folders that match its labels. A box of 20 sheets (120 labels) is $19.95.

Even more stunning is PaperDirect's Laser ColorStick line, brightly colored full-sheet label stocks. The Electrix and FireBrites lines come in pink, canary yellow, and something called Bermuda Blue, but my favorite is the Metallic series: glittering gold and silver for plaques, door signs, proposal binders, and other special jobs. A box of ten is $16.95. Avery and PaperDirect also have labels for video-cassettes and audiocassette tapes.

For high-volume jobs, you should use an ImageWriter II or other dot matrix printer instead of using up a laser printer or waiting for a sluggish ink-jet machine. Dot matrix printers don't deliver typeset-quality, but they have their own advantage: you can use fanfold label stock
LABEL-PRINTING TIPS

- **ImageWriter II** When using fanfold label stock, never wind the paper-feed knob backward. A label may peel off inside the printer and stick to internal components. Also, with most fanfold label stocks it isn't necessary to start printing at the top of a page because the distance between labels doesn't change where the stock crosses a page boundary.

- **StyleWriter and StyleWriter II** Apple's ink-jet printers can feed label stocks directly from their paper trays. Because label stock is thicker than paper, however, slide both paper-thickness adjustment levers to the envelope position. (One lever is next to the sheet feeder, and the other is inside the printer, just above the ink cartridge.) When manually feeding labels into an original StyleWriter, use the rear manual-feed slot.

- **Laser printers** Some laser printers, including Apple's LaserWriter II line, can feed label stock directly from their paper trays, which eliminates the need to hand-feed labels. Other laser printers put the stock through too many twists and turns. Double-check with the printer manufacturer before buying if you plan to make labels.

- **Plan ahead** Print a page of labels on plain paper. Superimpose it over a sheet of label stock and hold them up to a bright light to check the positioning and alignment of each label.

(sometimes called continuous-feed or pin-feed stock) to run thousands of labels without reloading the printer. Fanfold label stock is available in most office- and computer-supply stores, and Lyben Computer Systems (810/268-8100) is a good mail-order source, with a variety of sizes, colors, and quantities (up to 20,000 per box). Lyben is also a good source for laser and ink-jet label stocks, not to mention specialty papers and envelopes.

Next month: StyleWriter Tips and Secrets

Contributing editor JIM HEID is the author and producer of Macworld Complete Mac Handbook Plus Interactive CD, the third edition of which was recently published by IDG Books Worldwide.
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$39.95 USA/$45.95 Canada

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Quick Tips

Tips, Tricks, and Shortcuts

SYSTEM 7.5’s MENU-BAR CLOCK, WHICH you set with the Date & Time control panel, has a couple of tricks you may not have discovered. For example, you can temporarily hide the clock by holding down the option key and clicking the clock. Option-click the same spot again to reveal the clock. In addition, you can put a PowerBook to sleep quickly by pressing the control key while clicking the battery indicator in the menu bar.

Otto P. Kamsteeg of Almere-Stad, The Netherlands, incited me to investigate these System 7.5 tricks when he reported the control-click trick for SuperClock, the free system extension (available from user groups and online information services) on which System 7.5’s clock is based. Both control-click and option-click work with SuperClock and are described in its documentation.

Modems on Digital Phone Lines

Q: We want to get a fax modem, but we’ve been warned that our phone lines are powered. Must we add an unpowered phone line, or is there a device that would protect the fax modem?

A: There are two types of telephone lines: old-fashioned analog and newfangled digital. Most modems and fax modems are analog devices and don’t work with digital phone lines, which carry voltage and current levels that can damage an analog modem.

You are more likely to have digital phone lines at work or in a hotel—places where digital PBX machines are becoming common—than at home. It can be hard to tell by casual inspection which type of line you have. If in doubt, ask a phone company representative or other person who coordinates installation and of the phone for voice calls.

Gamma Correction

Q: I stumbled onto a smiley face in the Monitors control panel by pressing the option key. Then I double-clicked the smiley and got a dialog box containing gamma options (see “Hidden Monitor Options”). What does this mean, and how should I set these options?

A: The intensity of color on a video display does not correspond uniformly to the intensity of the electron beam that traces the picture on the video display tube’s phosphor coating. Therefore, the computer’s video circuitry compensates to provide the most accurate color. This compensation is commonly called gamma correction. The built-in video circuitry of color Macs and Apple video cards provides gamma correction for the phosphor composition of Apple’s original 13-inch RGB display (the de facto standard for Mac monitors). In addition, the built-in video on some Macs offers alternative gamma-correction methods for users who prefer nonstandard color correction, perhaps to simulate different degrees of paper whiteness. You select one of the available gamma-correction methods in the dialog box you discovered. Changing the gamma correction has no effect on video performance, only on color balance.

If a particular model of monitor has a nonstandard phosphor composition, the manufacturer can provide a gamma-correction method specifically for that monitor and can also offer alternative methods for users who prefer nonstandard color correction. The monitor maker supplies its gamma-correction methods in a monitors extension or in a special control panel that goes in your Control Panels folder; the Mac Operating System automatically installs the alternative methods as options in the Monitors control panel.

Incidentally, the smiling Mac icon designates the start-up monitor on a system.
Maximum AV Color Depth

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bpp – bits per pixel, NA – not applicable.

The maximum number of colors you can set on an AV Mac depends on the screen size, the amount of VRAM installed, and whether you’re using the VRAM for Mac graphics only or for both graphics and live-video input or output. The number of colors is listed here in bits per pixel. 4 bpp yields 16 colors, 8 bpp yields 256 colors, 16 bpp yields thousands of colors, and 32 bpp yields millions of colors. Some monitors can be set to smaller-than-standard screen sizes and more colors by clicking the Options button in the Monitors control panel.

AV Color Depths

Q I'm making QuickTime movies from VCR tapes with my 660AV Mac and AV monitor. When I set my monitor to 32,000 colors, I can't record or play back the movies, even if the movie window is small. Must I put up with 256 colors or buy a 24-bit color-graphics card to get better images?

Kazuhiro Yago
Ann Arbor, Michigan

A Sorry, but 256 colors is the best a 660AV or 840AV can do on any monitor while you’re using the video-input port, although the Power Mac AV models can do better on many monitors (see the table, “Maximum AV Color Depth”). When you record a QuickTime movie or display live video in a window, all the AV Macs split their video RAM (VRAM) fifty-fifty between graphics (the standard Mac display) and video-input. If the video-input port is inactive, all the VRAM is available for graphics, and with many monitor sizes you can set a higher color depth in the Monitors control panel.

Next Slide Ready

TIP When you present a slide show on screen, Microsoft PowerPoint 3.0 prepares the next slide in the background to facilitate a fast, smooth transition from the current slide. However, your verbal transition is hard to coordinate with the slide because PowerPoint gives no indication when the next slide is ready. If you try to advance the slide too soon, nothing happens. As soon as the next slide is ready, PowerPoint displays it, but you have briefly lost control of the timing of your presentation.

Connectix PowerBook Utilities (CPU) to the rescue! The CPU indicators (battery condition, caps lock status, and so forth) tell you when the next slide is ready. They disappear from the upper-left corner of the screen while PowerPoint processes the next slide, and they reappear when the next slide is ready. For presentations, you can create a special CPU configuration set that shows only one indicator, and then switch back to your regular configuration when the presentation is over. For desktop Macs, Connectix Desktop Utilities (CDU) offers the same benefits. For more information on CPU or CDU, contact Connectix at 415/571-5100 or 800/950-5880.

Bernard L. Gutnick
Santa Clara, California

Fonts Put Away Wrong

TIP You can disable a font by dragging it out of the Fonts folder (with System 7.1 and later), but you can't use the Finder's Put Away command to restore it easily. The Put Away command does put fonts dragged to the desktop back into the Fonts folder, but programs you open thereafter don't have access to the fonts you put away. To restore fonts that subsequently opened applications can use them, you must drag the fonts to the Fonts folder or the System Folder icon (not the System Folder window).

Elisa Azzone
Milan, Italy

Removing RAM Doubler Message

TIP My only complaint about Connectix's RAM Doubler is that at start-up it displays the message "Connectix RAM Doubler installed" under the "Welcome to Macintosh" message. You can replace that little phrase with one of your own, or with none at all. Begin by making a backup copy of the RAM Doubler extension, which you can do by option-dragging the original from the Extensions folder to the Startup Disk icon. Then use Apple's ResEdit utility to open the original RAM Doubler, and in the list of resource types that appears, double-click the DSAT type. Open the only DSAT resource, ID -4064, to see its contents. Then find the message on the continue...
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Circle 43 on reader service card
right side of the resource-editing window, select it, and type a replacement (see “RAM Doubler Start-up”). Save your changes and restart the Mac to view your handiwork.

Sam Wong
Amei, Iowa

ResEdit is available from user groups, online services, and APDA (800/282-2732; 800/637-0029 in Canada; 716/871-6555 for other countries). It also comes with the book ResEdit All-Night Diner by Dave Ciskowski (1993, Hayden Books; 317/581-3500, 800/428-5331).—L.P.

E-Mail Interchange Update

You can exchange E-mail between various commercial online services through the Internet, but the table of sample addresses in September’s Quick Tips contains a couple of errors. Howard Cornelli of Salt Lake City says you should use an address of the form $INTERNET@eecheetah@aol.com to send mail from ComputerServe to America Online. Stanley Wong of San Francisco says janc@eworld.com is the correct type of address for sending E-mail to Newton Mail (which is part of eWorld).

Update on Forcing Order Invisibly

After pasting blank lines at the beginning of folder names to make the folders appear first alphabetically (as suggested by a tip in August’s Quick Tips), Ken Pishna of Sheridan, Colorado, encountered problems printing in QuarkXPress and Aldus PageMaker. If he printed a document containing graphics that were placed in a folder whose name included a blank line (not a blank space), he got an “undefined PostScript” error. After he removed the blank line from the folder name, the same documents with no alterations printed flawlessly. If you encounter problems after pasting blank lines at the beginning of file or folder names, replace the blank lines with blank spaces.

Update on Word Tables in PageMaker

The method described in August’s Quick Tips for getting a table from Microsoft Word into Aldus PageMaker (by using the LaserWriter 8 printer driver to save the table as an EPS graphic) is hardly the easiest method, says Elizabeth C. Kliesewicz of Westborough, Massachusetts. She uses Microsoft’s OLE (Object Linking and Embedding) technology to embed the table in a PageMaker document as follows:

1. After creating your table in Word, select the entire table (or any part of it) and use the Copy command to put it on the Clipboard.
2. Switch to PageMaker and choose Insert Object from the Edit menu. The Insert Object dialog box lists all the types of OLE-compatible documents on your computer.
3. Select Word Document and click OK to bring up an OLE window in Word. Paste the table you copied in step 1 into this window. Close the OLE window and switch back to PageMaker, where you’ll find the table already placed in your document.
4. You can manipulate the embedded table like any graphic in PageMaker. Double-clicking the table in PageMaker brings up the OLE window in Word. There you can edit the text and formatting of the table.

If you plan to use the table in more than one place, use OLE to link the original Word document with the PageMaker document instead of embedding a copy of the table. To link the original table, use PageMaker’s Paste Link or Paste Special commands instead of Insert Object as documented in the PageMaker user manual. You can’t use System 7’s publish and subscribe feature instead of OLE, because the table ends up as unformatted text in PageMaker. When you upgrade to System 7.5, you may have to reinstall PageMaker 5.0 to make it work with OLE. OLE won’t work with the native Power Mac version of PageMaker 5.0.

RAM Doubler Start-up

The message that RAM Doubler displays during start-up is stored in DSAT resource ID -4064, which you can modify with ResEdit as shown here.

Insert Object from the Edit menu. The Insert Object dialog box lists all the types of OLE-compatible documents on your computer.

1. Select Word Document and click OK to bring up an OLE window in Word. Paste the table you copied in step 1 into this window. Close the OLE window and switch back to PageMaker, where you’ll find the table already placed in your document.
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We pay from $25 to $100 for tips published here. Send questions or tips on how to use Mac computers, peripherals, or software (by mail or electronically) to Tips, Lon Poole, at the address listed in How to Contact Macworld at the front of the magazine (include your address and phone number). All published submissions become the property of Macworld. Due to the high volume of mail received, we’re unable to provide personal responses.

LON POOLE answers readers’ questions and selects reader-submitted tips for this monthly column. His latest book is Macworld System 7.5 Bible (IDG Books Worldwide, 1994).
Do You Make These Six Common Mistakes On Your Taxes?

Six common mistakes can cause you big headaches on your taxes. An oversight here, an omission there. From unnecessary tax payments to full blown IRS audits—you can and you pay too much... or worse. But now, using MacInTax and Macintosh®, you can avoid these simple but costly mistakes:

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3. The Omitted Form
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4. The Misinterpreted Instruction
   At best, IRS instructions can be tough to understand. At worst they can be mind-boggling. What you need are clear directions in plain English.

5. The Overlooked Deduction
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6. The Exceeded Guideline
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Microsoft Switches to Windows NT-Based Mail Server

Redesigned and renamed, the successor to the Microsoft Mail server will offer many improvements—as long as you have a Windows NT-based computer to run it. Called Microsoft Exchange Server, the new software will merge mail-server and groupware-communications-server functions into a single product to provide a universal in-box for different types of messages, including E-mail, faxes, voice mail, and data from online services. The same in-box will handle forms, schedules, and other information exchanged by Microsoft, third-party commercial, or custom groupware applications. In fact, Microsoft Exchange Server will come with forms and scheduling applications.

The new client/server package, which won't ship until 1995, will let users format messages with rich text styles and embed OLE links, so you'll be able to drag an Excel chart into a message and edit it there, for example. Microsoft Exchange Server combined with Windows NT will let network administrators manage mail directories and monitor mail traffic and server status. (Windows NT is an operating system targeted at network applications, not to be confused with the ubiquitous Windows desktop system.)

Microsoft plans to continue to support—but not upgrade—the existing AppleTalk- and PC-server software for MS Mail. The company will keep upgrading the MS Mail client software for NetWare networks and for Macintosh, MS-DOS, Microsoft Windows, and Unix-based systems. Microsoft Exchange Server will require a PC running Windows NT Advanced Server (NTAS) version 3.5 (code-named Daytona), which was scheduled to ship in September. A pilot version of Windows NTAS Microsoft Exchange Server is due at the end of 1994, with a final release to follow once the pilot has been thoroughly field-tested and debugged. According to Microsoft, MS Mail Server customers will be able to upgrade to Microsoft Exchange Server without losing messages or applications based on MS Mail.

Customers who don't want to go the Windows NT route can consider forthcoming, unnamed migration tools from Apple—due in the first quarter of 1995—that will convert MS Mail messages and directories to a form compatible with PowerShare, Apple's communications server software. (PowerShare works with third-party mail clients and with the Apple PowerTalk clients that come with System 7 Pro and System 7.5.)

Customers who already have servers running Windows NT will probably not consider Microsoft's strategy an obstacle. Administrators of Mac-only E-mail systems are those most likely to switch E-mail brands, but they're not the only MS Mail customers who have taken advantage of CE Software's competitive upgrade to QuickMail.

MS Mail customer Rich Foster, who administers a NetWare network of 35 Macs and 200 PCs at TL Enterprises in Camarillo, California, said, "I'm very disappointed with the direction Microsoft is going." Already busy managing a varied electronic publishing shop, Foster doesn't like the idea of supporting yet another operating system (Windows NT), and he thinks Microsoft's move will limit rather than expand his options. Foster is trying QuickMail for now, while watching technology developments.

Apple Computer, 408/996-1010; CE Software, 513/221-1801; Microsoft Corporation, 206/882-8060.—Nancy E. Dunn
TCP/Connect II Improves E-mail

Version 2.0 of TCP/Connect II, InterCon's net-surfing software, sports a face-lift and a raft of mail and file-transfer improvements. This terminal-emulation software also now includes PPP, Gopher, and PowerMac support.

The e-mail component supports MIME and makes message handling easier. For example, the software can filter and sort incoming messages by multiple user-designated criteria, including sender and subject. Users can display MIME enclosures directly from an e-mail document—no separate downloading or decoding is necessary.

The revamped FTP software supports multiple connections. It lets users preview files before downloading them and automatically decodes several file types, including unstuffing a file if Aladdin's StuffIt engine is installed. TCP/Connect II costs $495. InterCon Systems, 703/709-5500.—Cameron Crotty

Blackbirds Make Analyzers Sing

The built-in Ethernet capabilities and 68040 processors of the 500-series PowerBooks make them an ideal choice for a network-protocol analyzer. The PowerBooks' design changes drastically increase performance over previous models, which were slowed by their external SCSI-to-Ethernet adapters. The AG Group reports that while a PowerBook 140 running the company's EtherPeek software captured all Ethernet frames at a 25 percent load, a 500-series PowerBook can handle an 82 percent load. In Neon Software's tests, a beta version of its NetMinder Ethernet software running on a 25MHz PowerBook 520 collected all packets at up to a 75 percent load.

Both Neon and the AG Group are updating their programs for the PowerBook 500 models. The AG Group offers a free EtherPeek upgrade via the Internet, CompuServe, AppleLink, or ARA. Neon's NetMinder Ethernet version 3.2 is available via eWorld, AppleLink, ARA, and the Internet. The AG Group, 510/937-7900; Neon Software, 510/283-9771.—Joel Snyder

Sonic Systems Supports SNMP

SONIC SYSTEMS' FALL ETHERNET lineup features a stackable 16-port hub and a switch that support SNMP.

With the IntelliStack 16 hub, a customer can combine a base hub with up to five expansion hubs to create a single logical hub with 80 ports. Network administrators can use the IntelliStack's SNMP software to manage the hub and other SNMP-manageable network devices from a Macintosh, or use another vendor's SNMP-management system to manage the hub. The IntelliStack 16 ships with 10BaseT support; 10Base2 and FDDI are optional. The base hub carries a modest price of $80 per port; the expansion hub's per-port price is $60.

The EtherSwitch ($2499), an Ethernet switch, has five 10BaseT ports that can support a maximum network throughput of 20 Mbps over two simultaneous 10-Mbps connections. Both the switch and the hub are expected to ship in September, Sonic Systems, 408/736-1900.—Martha Strizich

Lotus Mail Moves Closer to Notes

LOTUS DEVELOPMENT RECENTLY acquired SoftSwitch, a company that made its name with products that make it possible for everyone in a large enterprise network to exchange electronic mail, despite dissimilar mail systems. Lotus eventually plans to incorporate SoftSwitch technology in its LAN-based products. But initially, Lotus's new messaging server software, called Lotus Communication Server (LCS), won't include SoftSwitch elements.

Due in 1995, LCS—essentially a combined Notes server and cc:Mail post office—will bring Lotus Notes and cc:Mail closer together. Both products will use LCS as their messaging server, and Notes will incorporate cc:Mail to handle E-mail exchange. A new cc:Mail Client/Server Edition will make it easy to add cc:Mail for users who don't need Notes. LCS will support cc:Mail post offices that will work with versions of the familiar file-sharing clients enhanced to include the LCS message transport. In addition, LCS will support native X.400 and SMTP/MIME transports and native X.500 directories. LCS will be available in Unix, Windows NT, OS/2, DOS, and NetWare Loadable Module versions.

The forthcoming LCS Mac client, due in the first quarter of 1995, will include the ability to filter incoming mail and search for messages with Boolean operators. Prices for LCS and the new clients were not set at press time. Lotus Development Corporation, 800/448-2500.—Martha Strizich

IN BRIEF

ARA Users Get TCP/IP

A TCP/IP software gateway from Apple Computer allows Apple Remote Access (ARA) and LocalTalk users to access a TCP/IP network. Previously, ARA clients could not take advantage of TCP/IP services such as Internet access. The Apple IP Gateway ($249), which translates between AppleTalk and TCP/IP, is scheduled to ship September. Owners of ARA Multi-Port Server 2.01, ARA Personal Server 2.01, and Apple Internet Router 3.01 can purchase the gateway for $69. The client must have MacTCP. 408/862-3385.

Faster File Transfer

RUN's RunShare system extension accelerates Ethernet file transfers fourfold, according to the company, through proprietary technology. This version, due in August, supports drag-and-drop copying. RunShare costs $399 for 2 users, $749 for 5 users, and $2499 for 25 users. A LocalTalk-only edition is $199 for 6 users. 408/353-8423.

Software Wave

PC-compatible FileWave 2.0 from Wave Research automates software distribution over a network. It costs $895 for a server and 20 workstations. 510/704-3900.

The PowerBook 540c offers roving network managers a fast, lightweight platform for protocol analyzers like The AG Group's EtherPeek.
After This, You'll Think Of Remote Access Servers In One Of Two Ways.

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DaynaLINC for ARA is a mobile networking platform built on Dayna's multi-tasking MobiOS operating system, allowing all industry protocols and services to be added with PCMCIA-based software modules. Each module can be independently managed via SNMP, and SecureKey security software lets you control access to available services.

DaynaLINC’s ADVANTAGES: PCMCIA Type II and Type III compatibility, hot swappable data links, high performance RISC-based processing, trouble-shooting light panel and Dayna’s Two-Year Warranty and 24-Hour Replacement Program.
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A remote access server that uses PCMCIA technology is a pretty startling innovation. Especially when you realize it helps you avoid the rat’s nest of cords that come with external modem servers. Not to mention the inflexibility of those with proprietary internal modems.

But if you think simplifying dial-in remote access is all there is to DaynaLINK for ARA, you’re in for a bigger surprise. This patented technological breakthrough utilizes the multi-tasking MobiOS™ operating system, which will soon let you add such protocols as TCP/IP, IPX and NetBEUI, as well as services like dial out, fax in, fax out, paging, and both local and wide area wireless access. All as easily as popping in a PCMCIA card.

Which is precisely why we call DaynaLINK a Mobile Access Server. Any remote access server can give you dial-up network access once your mobile users finally find a place to connect. But only DaynaLINK is designed to cover you down the road by supporting cordless and cellular wireless networking. Now that’s what we call mobile access.

Consider the added value SecuriKey™ security software provides, and the new DaynaLINK Mobile Access Server will leave you feeling rather comfortable about your network’s future. Instead of shocked.

For a free guide to Mobile Access Communications, call 800-443-2962, ext.552
FAX Response: 801-269-7340, Doc.#3000

Dayna

Circle 161 on reader service card
These programs make it possible to track down illegal software on your network

Piracy Prevention

SOFTWARE PIRACY OFTEN RESULTS FROM BENIGN INTENTIONS. A graphic designer suddenly needs an application to complete a small project. The designer asks a coworker for the program, copies it, and finishes the report. Task completed, this user may not give another thought to the illegally copied application, which sits on the hard drive in perpetuity.

Multiply this experience by tens or hundreds of employees, and a network manager can face a real chore in sorting out and enforcing software licenses. In large corporations, policing the ebb and flow of software throughout the organization can be a full-time job by itself.

And this job is important because piracy can have serious repercussions. Companies risk stiff fines for illicit software, according to the Software Publishers Association, a worldwide trade organization.

Putting a company on the path toward legal software use can be daunting without a software-tracking system. Three dedicated products tackle the job: Quota from Proteus Technology, KeyAudit and KeyServer from Sassafras Software, and the Software Publishers Association's SPAudit. (On-site auditing services are also available, from InfoLink.) Once a solid auditing system is in place, the other components—writing up a company policy, educating employees, and setting up a license-monitoring system—are not so tough to assemble.

Taking Stock
Piracy proliferates mainly because of poor network management and a failure to understand what makes a piece of software illegal. For instance, a system administrator may buy new software for a new user, but may not follow up later with updates for established users. Some users will then update their software by copying the new employee's version. All of these "updated" copies could be illegal.

Because episodes like this happen frequently, a manager should take an initial inventory of software. This means the manager will have to create a list of all software on every Mac in the company. Fortunately, help is available in the form of asset-management software (see "Legal Eagles: Asset Managers Compared").

An asset-management program looks up the software on individual Macs and generates a database of the applications it finds, along with version numbers and creator codes—useful for identifying an application when a user has changed its name. Asset-management programs can also help a manager standardize and update the versions of each program.
Some programs, such as SPA’s SPA Audit and Tech Works’ GraceLAN Asset Manager, require you to go from Mac to Mac to build the database. Others, like Sassafras Software’s KeyAudit, use System 7’s file-sharing conventions and run off a server where all users have read and write privileges. Users log on to the server to conduct their own audits, and the information is collected on the server. Some users prefer this method, as a manager is not “invading” their machines to conduct the audit. However, this can be an extra hassle for the network manager who may need to do some follow-up to ensure that all users conduct an audit.

Programs like GraceLAN Server Manager ($395) from TechWorks (512/794-8533), netOctopus ($645 for 10 to 20 users) from Helios USA (408/864-0690), StatusMac ($29.95 per user for 25 to 75 users) from On Technology (617/876-9900), and Radar ($499 for one administrator and unlimited clients) from Sonic Systems (408/736-1900) are primarily network-management packages, but all can audit Macs along a network. The administrator on the server polls network clients and takes an accounting of the software on each machine. By the time you read this, Symantec should be shipping Norton Administrator for Networks, which includes audit and license-management functions but operates from a Windows administrator.

Armed with the results of the inventory, a manager is ready to perform an audit of the network’s software. To do this, the manager needs the purchasing records and licensing agreements for all the software, which will then be reconciled with the inventory. If the purchasing and licensing records indicate, for instance, that a company is licensed for 10 copies of Microsoft Word but the inventory shows that 15 copies exist, then 5 of these are probably illegal.

If you detect illegal software, destroy it and then replace it with a legal copy. Remember to register the new software in the database—periodic maintenance will keep the database current. If you don’t have the time to do all of this yourself, some network systems integrators offer this service. In addition, InfoLink’s Software Audit and Hardware Audit Service can do it for you. InfoLink will come out to a firm and use proprietary software to generate the inventory database, as well as a license database culled from purchase orders, manuals, and other proof of software license ownership. The company then generates a software-compliance report and offers advice on how to get the most out of software licenses.

Learning about Licenses

The results of an audit can serve as the impetus for changing the way you buy software. The larger your company, the more flexibility and leverage you have in the types of licenses you can negotiate.

The most common licenses are those given to an individual or to a computer. The former allows a single user to run the application, and the application stays with that user no matter which computer the person uses. Software licensed to a single machine means that the application can be used only on that machine. Multiple users, however, may log on to that computer to use the application. This licensing scheme is common among companies with fewer than 75 computers, because many software companies don’t negotiate discounts for small firms.

Site licenses grant the use of a product to a large number of people, but they are expensive. This is why site licensing is on the decline and so-called enterprise licensing is taking its place. An enterprise license is sold to a group of users at a discount. The number of users can be increased to a preset level; when growth reaches beyond that level you negotiate a new license. The net result: a manager has only one license to maintain for the application.

Managers should exercise caution when negotiating this type of license, however, particularly for a server-based product. When you renegotiate a license, the new price usually covers new users but not another server component. The new cost per user may actually exceed the cost per user in the original agreement. So it can be less expensive to simply purchase additional packages and have several licenses for an application rather than a single companywide license.

Another recent twist in licensing, concurrent use, is gaining popularity thanks to the wider use of networks in corporations. This setup saves an organization a lot of money because it needs to buy only as many copies of a program as are in use simultaneously at peak times.

Keeping Software Legal

A company may have several types of licenses, but it should have one way of enforcing them. License-management programs come with a main application that resides on either a server or a manager’s workstation, and with client software to let a manager monitor software usage and check on version numbers and legality. For this system to work properly, though, the license-management program must install license control in applications. Applications that do network
Legal Eagles: Asset Managers Compared

<table>
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<tr>
<th>Company</th>
<th>Product</th>
<th>Phone</th>
<th>Toll-Free Phone</th>
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<th>License Management</th>
<th>Software Use Log</th>
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<td>$680/10-20</td>
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* = yea, O = no, NA = not available. * Some large-volume discounts are available. ** When used with KeyServer, can distinguish between KeyServer-controlled and personal applications and convert the latter to KeyServer applications. Also available through AppleLink and CompuServe.

copy detection need to be compliant with the license-management software.

Two programs are dedicated to all the license-management functions outlined above: Sassafras Software’s KeyServer and Proteus Technology’s Quota. In each, an administrator sets the number of licenses available for an application and activates the program on either a dedicated server or a manager’s Mac. Users launch applications on their Macs as usual. With Quota, the client polls a license server to see if a license for a specific piece of software is available. With KeyServer, a client (an INIT called KeyAccess) initiates contact with the KeyServer machine.

In each program, the client software notifies the user if no license is available, places the user on a notification list, and then sends a message when the application becomes free.

To a lesser extent, TechWorks’ GraceLAN Server Manager also governs concurrent use. You can select the copy-protection option and then input the number of licenses available for a given product. For example, if there are five copies of Aldus PageMaker, the server then allows only five users to launch it at one time. But Server Manager won’t notify the sixth user when all available copies are in use, nor will it send notification when a program becomes free.

In KeyServer and Quota, license restriction extends to a mobile workforce, as users can “check out” applications to use on PowerBooks or on their Macs at home like people check out books from a library. For every application that is out, the number of licenses available for it on the network is reduced by one. Loaned applications are active only for a specific period of time, after which they cannot be launched.

When an application is under the watch of a license-management program, the license manager recognizes only the monitored copy for checkout. KeyServer also attaches a key to this monitored application. Without the key, the application will not launch.

These asset-management programs also generate usage reports—an accounting of such things as peak use, the number of users of a program for a given period, and the number of users waiting to use each program. With this information, an administrator can demonstrate the need to purchase more software.

The Last Word

License management carries a dual responsibility for any network manager. On the one hand, it is a manager’s job to ensure that all of an organization’s software is legal. But the manager should also consider the privacy concerns of users, who may perceive management attention to the contents of their hard disks as invasive. Managers should try to allay these fears before conducting an audit, and even perform the audit in the presence of the user. At the same time, a manager needs to explain what constitutes piracy and lay down the company policy governing software use. The SPA offers free sample policies as well as educational videos to help in developing such policies.

A manager can explain how the license manager and audit system work. When the network manager lets users in on the process and perhaps uses a server-based asset-management package like KeyAudit, users will be less hostile to the new system because they can exercise some control over it.

Adjusting to a license-management system is not likely to be a problem for most network managers. You’ll work comfortably knowing that the company’s software is perfectly legal and that there is one less task that requires you to be in all places at all times.

Freelance writer KRISTI COALE has covered network-management issues for three years.
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*Based on full-ink coverage

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Circle 103 on reader service card
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Circle 58 on reader service card
Ethernet for PowerBooks

ONE OF THE BEST FEATURES OF THE PowerBooks is their ability to fit into a Macintosh network with their desktop cousins. Every PowerBook has LocalTalk networking built in; it's effective but rather slow—essentially, floppy disk speed. Ethernet runs three to ten times as fast, at hard disk speeds.

Direct Connections
There are many ways to connect a PowerBook directly to an Ethernet network. I give approximate street prices for generic devices with 10BaseT connectors or thin coax. Many of the devices are also available with both connectors for an additional $30 to $60. I give list prices for specific products.

The best and fastest way to connect to Ethernet is via a full-speed port:

- An Ethernet transceiver that runs through the AUI Ethernet port costs about $60. The AUI port is built into 100-series PowerBooks and the Duo Dock II (and most current desktop Macs). Some older AUI transceiver plugs will not fit into a 500-series PowerBook; contact the maker for replacement cables.
- Ethernet docks for the Duo come in two flavors with 10BaseT connections. Newer Technology (316/685-4904, 800/678-3726) makes a very small Ethernet MicroDock ($249) with a 10BaseT connector and an ADB port; Asante Technologies (408/435-8388, 800/662-9686) sells the same unit as the NetDock ($259). The larger EtherDock ($699) from E-Machines/SuperMac (408/541-6100, 800/334-3005) has all standard ports (except for the modem). The EtherDock needs a hardware update for compatibility with the Duo 280/280c.
- A NuBus Ethernet card (for the original full-size Duo Dock) costs $100.

For a 100-series PowerBook or a Duo with other docks, adapters use the SCSI or serial port. Speeds run one-third to one-half as fast as the full-speed Ethernet port (see “Network Speed Tests”).

- Small, portable SCSI Ethernet adapters ($270 to $300) draw power from the ADB port. ADB powering does work, although these adapters push the limits of the power available. (Some of the more conservative designs use an AC adapter instead.) The adapters differ mainly in how they handle SCSI cabling. The Asante Micro EN/SC plugs directly into the PowerBook’s SCSI connector to save space, but you can’t attach any additional SCSI devices. The DaynaPort Pocket SCSI/Link (reviewed in this issue) requires a short cable and can accept more SCSI devices. These small SCSI adapters make sense if you need to connect to more than one network on your travels.
- Larger SCSI Ethernet adapters use AC power and go for about $220. Besides the larger box, these adapters have an AC power brick. If, like most people, you connect to Ethernet in only one location, you can leave the adapter and power supply in place. The larger SCSI adapters may need a cable adapter for the HDI-30 connector on the PowerBooks.

- Serial port-to-Ethernet adapters—such as The EtherWave PowerBook Adapter from Farallon Computing ($379; 510/814-5000) and the $309 DaynaPort EZ from Dayna Communications (801/269-7200, 800/531-0600)—provide a solution for Duos without docks. These adapters have a built-in clock that runs the serial port at half to two-thirds the speed of a SCSI Ethernet adapter; they do need their own AC adapter for power. Serial port-to-Ethernet adapters can also work on 100-series PowerBooks, but less expensive SCSI adapters leave the serial port free for other uses.

Indirect Connections
All the methods described so far connect a PowerBook directly to Ethernet. A PowerBook using LocalTalk can also connect indirectly to Ethernet through some intermediary device. Direct connection is always faster, but the indirect methods can be cheaper. Some LocalTalk devices—particularly printers—cannot be put directly on Ethernet.

- A hardware router connects Ethernet and LocalTalk devices together with as many nodes as the networks can support. If you have more than a handful of LocalTalk nodes to connect to Ethernet, a router is essential. Prices begin at $700.
- LocalTalk-to-Ethernet bridges work like routers for two to four LocalTalk devices. They handle all the LocalTalk traffic, so you can connect more than one node to them.
Talk nodes, $300 to $450.

- Software bridges use a Mac to connect Ethernet and LocalTalk networks. Farallon's PowerPath and PowerBridge from Sonic Systems (408/736-1900, 800/535-0725), both $149, can support just one PowerBook; others support up to ten nodes for about $250. A software bridge runs at the same speed as a pure LocalTalk network. Software bridges make sense for occasional use. Hardware routers or bridges work better for heavy use, for one thing, they won't crash.

Wiring Variations
Since wiring installation is often a network's largest expenditure, some Ethernet hardware offers variations on the usual 10BaseT or thin-coax cabling to simplify the wiring. If you can lay down standard Ethernet cable cheaply, such variations are less attractive.

- If you have PhoneNet LocalTalk cabling in place, you must replace it all for Ethernet unless you use Tut Systems' Silver Streak Ethernet hardware ($10/682-6510, 800/998-4888), which uses plain phone cable (all four wires), including existing PhoneNet cabling. To combine Silver Streak with 10BaseT, you'll need a $199 adapter from Tut.

- Farallon's EtherWave devices work like ordinary 10BaseT hardware except that you can daisy-chain them together using 10BaseT wiring without using a 10BaseT hub. But their prices (an additional $50 to $100 per node) cancel out their utility value, since the additional money you'd spend on four EtherWave devices would pay for an eight-port hub.

- A minihub combines a five-port 10BaseT hub with an AAUI transceiver. Apple's $149 10T/5 Workgroup Hub can draw power from the AAUI port or from an optional AC adapter to keep it operational even if the PowerBook is shut down. Asante's $239 NetExtender Hub gets AAUI power only from the AAUI port. These hubs count as one hop (a single Ethernet network can have four hops).

Servers and Software
When you plug into a network, you are usually connecting to a network server, a desktop Mac that supplies files and storage to any computer on the network, including PowerBooks. With System 7's file sharing, the server can run other Macintosh programs at the same time—with some restrictions. You have to pay attention to (and sometimes wait for) changes in file-sharing settings when you switch storage devices, including removable cartridges and CD-ROMs. Any disruption to the server will also affect any computer using the server. PowerBooks usually don't make good file servers because they are frequently turned off and in transit.

For heavy network traffic, a dedicated Macintosh server running Apple's full AppleShare software will outperform System 7's simpler file-sharing.

The server doesn't even have to be a Macintosh; Personal MacLAN Connect ($199 from Mirror Systems, 805/966-2432, 800/862-2526) turns an IBM PC or compatible on the network into a PowerTalk file server that can run Windows software at the same time, through MacLAN, a PowerBook can print to DOS printers. Personal MacLAN Connect supports many Ethernet and LocalTalk cards for the IBM PC.

For many situations, Farallon's Timbuktu Pro is simpler than file sharing from a server because it can send files from one Mac to another without going through a server or fussing with file-sharing settings. And Timbuktu lets one Mac see and control a second Mac (or a Windows PC; see PowerBook Notes, December 1993). But Timbuktu costs from $199 for one Mac to $999 for ten Macs.

Network Software Questions
Since Ethernet hardware is pretty much standardized, you can mix products from many vendors. Install whatever software comes with the device and then update with Apple's latest network software (as this is written, version 1.4.5). The Apple system software installer will probably put the A/ROSE extension in your System Folder if you specify Ethernet during installation. You need A/ROSE only if you run an SNA gateway to large mainframe computers on an Apple-brand NuBus TokenTalk card. For all other network connections, you can toss out A/ROSE.

When you change between LocalTalk and Ethernet, be sure to switch network types in the Network control panel.

The Personal Ethernet Network
Most PowerBook owners also have a desktop Macintosh; you can create a simple network by connecting the two. In my office, I use a PowerBook exclusively for telecommunications, E-mail, lengthy file uploads and downloads, and faxing while I work on the desktop Mac. Other tasks for a second computer include compiling programs, rendering graphics, running business simulations, and printing complex jobs that may not run in the background. Once you've gotten used to having two computers running simultaneously, you'll never go back to a single computer again.

CARY LU is a Macworld contributing editor who covers mobile- and remote-computing issues in this monthly column.
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*See below for details. Certain conditions apply.
Money In Your Pocket

The Newton gets down to business

BY DAVID POGUE

LONG AFTER THE MEDIA'S HELLING of the original 1993 Newton died away, a funny thing happened to Apple's hand-held pygmy computer: it got useful. The transformation took place slowly and silently, a result of software updates, mechanical improvements (such as the MessagePad 110), and neat new programs from non-Apple companies. This handwriting-recognizing, Mac-descended palmtop is finally approaching worthwhileness.

So why cover Newton software in a Macintosh magazine? Because Newton software holds a lesson for Mac software developers. Newton programs, as enforced by the machine's teeny screen and tiny memory, are simple and efficient. There are no submenus, no nested folders, not even icons for your documents. You rarely need a manual for a Newton program. (When I was your age, we used to say that about the Mac.) As you'll read here, a Newton program's motto is "Do one thing very well"...usually.

iambic TimeReporter 1.1

Each Newton program seems designed to eliminate a different category of paper scraps in your pocket. The Newton's built-in Note Pad, of course, replaces cocktail napkins and pocket penny pads.

iambic TimeReporter, on the other hand, is a Newtonized time slip ($129; iambic software, 408/746-3709). It can grab the names of your clients, or the dates of your appointments with them, from your Newton Names or Dates files, saving you handwriting. It can chat in the other direction, too: you can enter an appointment into TimeReporter (for billing purposes) and have it show up on your Dates screen. The stopwatch keeps track of your time even when the Newton is off—neat trick—or you can enter your working stints manually; a little Expense slip lets you bill your client for the occasional cab or pizza.

When it's all over, the program can display, print, and fax tidy summaries organized by client, project, or whatever. My only befuddlement: why can't you write in your hourly rate, so you can also see how much you earned (and print an invoice)? iambic's only answers: (a) we'll have that in version 2, and (b) lawyers let their secretaries do that stuff anyway.

ExpensePlus 1.0.1

Four aspects of the smooth, smart, solid ExpensePlus make using it better than recording trip expenses on paper ($139.95; State of the Art, 714/753-1222): First, ExpensePlus does the math for you, even converting foreign currency. Second, it looks clean and inviting on your little Newton screen; the 12 neat icons give you direct access to expense slips for things like Parking, Supplies, Tips, and Fares. Third, the program's brains save you effort: if you want to record a meal, for example, ExpensePlus automatically proposes breakfast, lunch, or dinner, depending on the time of day. Furthermore, you can scratch in, say, "$7.50 cab" in your Note Pad, and the Newton's Assist button automatically creates an appropriate expense slip. And fourth, ExpensePlus comes with Macintosh templates for Microsoft Excel and Claris's FileMaker. When you get back from your trip, connect the Newton to your Mac using a printer cable, transfer the data collected during your trip, and print out the beautifully formatted expense reports.

Still, ExpensePlus has a couple of SmallMinuses. It wolfs down 238K of memory; for this one-trick pony, that's a 12-course dinner. The serial number required before your first use is stupidly printed on the registration postcard, which, if you're a good little camper, you've already mailed away. A question, too: what are you supposed to do with the actual receipts that ExpensePlus so nicely summarizes? Despite your high-tech investment, you wind up with little scraps of paper in your pockets after all.

MobileCalc 1.03

Of all the computers on earth, the Newton, with its 3-inch-wide screen, would seem the worst choice for a spreadsheet. MobileCalc, for example, starts up showing only three columns ($819; MobileSoft Corporation, 408/376-0497). True, it has every conceivable feature for alleviating the real-estate problem—scrolling controls, zoom-out button, first-row/column locking—but you still feel like you're laying out the National Enquirer on a Mac Plus screen.

Believe it or not, that's not even MobileCalc's biggest problem, which is speed—MobileCalc doesn't have any. Not that the Newton is a Cray or anything, but this program is really slow on my original Newton: it takes three to five seconds for anything to happen.

There are 70 math functions; you can create formulas; and little on-screen palettes simplify entering numbers and words. But you can't change the size or style of numbers or text, and 367K is too much to cede to such lethargy.

QuickFigure 2.0.1

If MobileCalc's not quite your speed, there is, fortunately, another contender for the title Excel of the Newton world: QuickFigure ($39; PelicanWare, 503/221-continues)
Keep the Flame Alive

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For a Newton program, this spreadsheet is fast, cheap, and slim (a paltry 125K; 30K more for graphing). QuickFigure neatly ducks the cell-size issue by making you enter numbers in a little input bar, just as Excel does (instead of letting you write directly into a cell, à la MobileCalc). The benefit, of course, is that you can see 5 columns and 17 rows in QuickFigure's start-up setup.

If you had to name the bare essentials for a useful spreadsheet, you'd probably arrive at this program: formattable text and numbers; copy, paste, fill; 85 math functions plus IF-THEN statements; a rudimentary graphing program (installed separately); and an online 88-screen manual (also separate). QuickFigure also niftily integrates with the rest of the computer: you can scroll "Figure 23" through the Note Pad, for example, and tap Assist for the answer. You can also send chunks of your spreadsheet (but not graphs, alas) to the Note Pad for incorporation into your memos. The import/export to Excel is clumsy, but I'll take QuickFigure over the back of an envelope any day.

**Accountable 1.03**

Accountable ($39; Nomadic Technologies, 216/331-5771) is an ingenious idea. It's a checkbook balancer that's vaguely—vaguely—reminiscent of Intuit's Quicken on the Mac. As you scurry through your daily routine, paying bills, visiting cash machines, and so on, you can use Accountable to mind your checks and balances. Unlike Quicken, however, Accountable doesn't print checks, do graphs, offer a funds-transfer option, or make reports.

Ever hear the epithet "un-Mac-like" applied to a Macintosh program in which scroll bars and menus have been replaced by the programmers' own crude creations? Ladies and gentlemen, I give you: the first un-Newton-like software. Accountable substitutes dots for diamonds (to represent pop-up menus) and goofy-looking triangles for the standard Newton up and down buttons (for scrolling lists). I would have been utterly dismissive of this software effort until I learned that version 2.0, supposedly ready as you read this, addresses virtually every whine of mine so far. It also adds reports, graphs, a Mac front end, and exportability to the personal-accounting software god itself, Quicken. If that's all true, I won't mind holding Accountable.

**PocketMoney 1.0.2**

Until Accountable 2.0 crawls out of its cocoon, I'll be using this very similar—but better designed—shareware program ($20; Hardy Macia, 1413 Surrey Ln., Wynnewood, PA 19096, or in the Mac-World area of America Online). It has two crystal-clear screens: one that shows a register, like a checkbook, and another where you write in each transaction. Like a good little Newton program, its customizable pop-up lists save you handwriting. Incredibly, the Read Me file says that even this little shareware creature can export to Quicken, although I couldn't find any instructions.

**TapWorks**

My jaw dropped clear to the coffee table when I read about this one. In a single Newton program, you supposedly get a miniature ClariaWorks: four integrated applications that can dress up a full letter-size page ($119; Avail Technology, 408/730-6855).

Well, sort of. The four "applications" turn out to make text boxes, spreadsheets, graphs, and drawings. The mini-MacDraw is by far TapWorks' strongest feature: you can draw shapes, apply your choice of fill and line styles, and even align them (sadly, drawings are the only data you can't export to the Note Pad). The spreadsheet is so slow it's practically unusable; even if you write a word quickly into the cell-input box, TapWorks can't see it as a word, and instead interprets a letter or two at a time.

On one hand, the program has a million beautiful ideas, such as the Connect command that (at last!) lets you type on your Mac keyboard to enter text into the Newton. On the other hand, it has a million shortcomings: tapping a graphic object doesn't select it (you have to circle it); you can't use your spreadsheet data to continue.
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create graphs; and the whole thing creaks along like a swamped rowboat. On the other hand, maybe I'm like the guy who says the bear dances badly; I should just be grateful that it dances at all.

**Gulliver 1.22**

Gulliver is an electronic itinerary sheet ($95, on a 1MB RAM card $135 [a very good deal]; True North, 603/673-5040). Plugging in flights and reservations can be quick fun and involve almost no handwriting: you just tap to select from Gulliver's pop-up lists of airlines, hotels, car-rental outfits, and so on. (It prominently displays 800 numbers, too.) A minute or so should cover the creation of a complete country-crisscrossing excursion.

Gulliver's features for use en route are hardly Lilliputian, either. The program keeps your frequent-flier numbers ready at a tap, calculates the length of each flight, tells you the local area code and NewtonMail phone number for each city, and even reminds you to reset your watch when you cross time zones. Plus there's a convenient slip for recording your incidental expenses (only a few stylus-taps less handy than ExpensePlus). Gulliver integrates nearly with the rest of your Newton miniworld, too: you can enter expenses by writing them on the Note Pad, copy departure times to your Date Book, and copy your entire itinerary to the Note Pad. I was a tad confused by Gulliver's use of the little X button, which sometimes means OK and sometimes means Cancel; otherwise, as a punster might say, Gulliver is pretty swift.

**The Upshot**

You'd be a happy wanderer indeed with clean, well-designed programs like Gulliver, ExpensePlus, and TimeReporter nestled on your Newton. Unfortunately, the Newton's attic space for software isn't what you'd call yawning: it's an absurdly puny 150K on the original models and 450K on the MessagePad 110. (Apple advertises larger capacities but then uses up most of it for its own system software.) Since these programs consume up to 350K apiece, you can understand why you must buy an expensive RAM-expansion card to use even one of them.

If you're unfazed by that added requirement, then this new crop of software will generally stick by you. Your finances and travels will at last be well in hand.

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emptyWorld
Apple's online service is a slow starter

LOGGING ON TO EWORLD, ONE experiences a sweet thrill of arrival. You are welcomed by the sound of traffic—a busy urban street with impatient motorists honking horns. And then the eWorld Town Square comes into focus, a quaintly drawn cartoon of a city center defined by a set of picturesque buildings. By simply clicking on one of these structures, you can enter a component of the eWorld universe. Cyberspace as real space. Interface as geography. For those few seconds, you are justified in thinking that there is something new under the virtual sun, and that Apple has fulfilled the promise implicit in its major enterprises—formerly arcane technology has been transmogrified into accessible, and delightful, art.

But that is the high point of a trip to eWorld, a tourist town that, at least in the days following its much-hailed roll-out, hardly deserves a hotel stay. The Town Square turns out to be sort of a Potemkin village. Once you venture past the facades, the visual-geography representation is abandoned. As with almost every other online service, the metaphor of rooms and auditoriums and cafes is presented verbally, not graphically, and the cursor choices are words and icons, not map points. At its worst, the “places” you go with eWorld are throwbacks to the teletype days. I am thinking here of the implementation of Easy Saahe—the airline booking and information service is one of the most useful features of eWorld, but it retains its ancient command-based interface.

The contrast seems characteristic of the first days of eWorld. The designers of eWorld have obviously done some serious thinking about what an online service should be—this is apparent from the opening screen, the digitized sounds, and particularly the stylish visuals; they are clean, colorful, and generally consistent, a welcome evolutionary step from the previous standard, the interface of America Online. (Apple licensed AOL’s software and built eWorld upon that bedrock.) And the implementers have also done some good work, making navigation relatively bug-free. They have recruited an eager, if somewhat goody-goody, hand of online guides called the Community Conference Crew—a cyberspace version of a high-school pep squad, always willing to help puzzled folks and extol the virtues of alma mater at every turn.

But my excursions into eWorld have convinced me that Apple has been too parsimonious in its initial offerings. All too often one encounters the dread hard-hat icon, indicating that a crucial feature is “under construction.” Even worse is a paucity of content from the participants. One quickly learns that entering a conference room, a café, or an auditorium on eWorld results in a near empty screen, with a legend above noting “People Here: 1.” (Meaning me. Alone again, cyberspace has come into focus, a rock.)

Welcome, stranger, to emptyWorld.

Climbing the Curve
Now I know of course that any new service, just like a new settlement in a physical wilderness, will start with only the bare population base of its founders—every online service was empty at one time. But when beginning an online service in 1994, a time when millions of people have sampled the likes of CompuServe, Prodigy, and America Online—and millions more are keenly interested in what this Internet thing is all about—it is not enough just to open shop with a slick interface and a brand name that means something magical to about 14 percent of the computer market. The foundations of cyberspace have already been laid, by others.

Peter Friedman, general manager and director of Apple’s online services, doesn’t worry about this. He, in fact, professes delight with the very early response to the system. He explains that approximately 10,000 people were permitted to experiment with eWorld during a several-month beta period, and about half of those actually tried it for varying amounts of time. At the end of June, however, those accounts still active were notified that in order to continue they would thereafter be billed. Friedman proudly reported to me that “the vast majority” of beta testers who had significantly participated in the shake-down period signed up for the real thing, and in the first few weeks were visiting eWorld for longer periods than Apple had anticipated.
"We have to appeal to the untapped market," Friedman says. "There are 100 million personal computers out there and between 3 and 5 million use online services." (He doesn't mention the 25 million Internet users.) By this reasoning, Friedman feels justified in stating flatly that the real competition for eWorld is not so much America Online, CompuServe, Prodigy, Delphi, and the like, but things like video games and television.

This attitude is reminiscent of the early days of the Macintosh, when marketing director Mike Murray would draw a bell curve on a blackboard, point to the beginning of the upward slope, and say, "That's where we are in personal computers." Then he'd explain why the masses of people that would reside on the summit of the hill would use the Macintosh. He was correct in saying that millions would buy computers, even correct about the need for a graphical interface; but for various reasons (primarily the sort of hubris that assumed the Mac's superiority would sell itself, even at premium prices) it is not the Apple product that the masses use. There is a lesson here for eWorld.

As Murray thought about the Macintosh, Friedman thinks that eWorld will prove so superior that it will win a solid percentage of those bell-curve climbers. The reason there are so few user attractions on eWorld at launch time, he says, is that Apple is taking time to make sure that every attraction is a quality one, consistent with Apple's high standards. Once everything is in place, and features will be added weekly, eWorld will draw in many more people. At first they will be Macintosh and Newton users, attracted by the various discussions, databases, and support services offered by Apple and its third-party community. In 1995, the service will roll out software for Windows users. Friedman concedes that it's not easy to explain why the Windows world would gravitate to a service not only oriented to Macintosh but run by Apple itself. But he believes that eWorld will be sufficiently superior to the alternatives that Windows users will flock to it.

So how will eWorld do this? Can it indeed gain a critical mass, especially when at launch time it charges full freight for a system under construction? (And the starting price is not exactly a loss leader. eWorld costs $8.95 a month, plus $4.95 per hour after the first two hours—with a further $2.95-per-hour surcharge if for some reason you want to use eWorld during the day.) There is its interface, which is very pretty, to be sure, but not really revolutionary. There are the services directed specifically toward Apple users, like databases of arcane bug-fixes, and the presence of third-party companies. But most people don't spend their leisure time seeking answers to computer-support questions. There are the usual assortment of stock prices, magazines, movie reviews, and so on. But other services offer these, currently in greater numbers. And though Apple promises innovation, its competitors are capable of innovation as well.

People Who Need People

Ultimately, the success of a service rests on its people. It is of course essential to sign up a solid number of information features, online magazines, and glittery guest speakers (eWorld should have done so as soon as it began charging its customers full freight), but the most important aspect of computer communications is its two-way nature. And this is where I see continuing problems for eWorld.

First of all, you simply need a sufficient number of people to keep discussions going. Friedman may be correct that most eWorld beta testers have remained on the service, but my unscientific measure of the conferences showed a falloff of comments from the time that Apple began to run the meter. I'll bet that many of the defectors were some of the people new users most wanted to talk to—journalists and celebrities in the Macintosh community.

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community who would have added a bit of glitter to the proceedings.

Worse, the comments on the discussion boards seem desultory. It may well be that in individual conversation, eWorld users communicate with the path of Dorothy Parker and the authority of Samuel Johnson. But as an aggregation they produce a lacklustre bunch of comments. On a service run by Apple, one would certainly expect a heated, or at least informed, discussion of issues concerning Apple itself. Nuh-uh. For that you'd be better off going to MAUG, the discussion group on CompuServe that seems to generate more chatter about the Macintosh in an hour than eWorld creates in a week—and a lot of it is inside stuff. (You will never see an Apple staffer, or anyone else, really, dish out hot dirt about his or her employer on eWorld because the service bans anonymity—and is therefore whistle-blower-proof.)

Perhaps the lacklustre conversation is a function of eWorld's well-meaning but neo-draconian attempt to rid the service not only of anonymity but also of other practices that are often abused in electronic communications. It would take more than half my column to list the sorts of things you shouldn't say or do on eWorld. Key sentence: "You are expressly prohibited from posting on eWorld any unlawful, inaccurate, threatening, libelous, obscene, profane, sexually offensive, or objectionable information of any kind, including encouraging use of controlled substances, that would constitute a criminal offense, give rise to civil liability, or otherwise violate any local, state, national, or international law." Objectionable information of any kind? Check, please.

"We're not into censorship or control, just standards," says Friedman. "We're trying to have less random noise, to be more focused."

It's a justifiable approach, but I don't know if it's a competitive one. Despite what anyone at Apple thinks, eWorld's marketplace opponents are not Jerry Seinfeld and Sonic the Hedgehog but every alternative that links a personal computer with a modem. The people who run America Online want the same customers, and they have a head start. CompuServe undoubtedly will improve its look and feel. Delphi offers cheap and deep Internet access, a crucial approach that eWorld is planning to enter only gradually. Some of the ultraalternative local services like the WELL in the Bay Area and ECHO in New York City are planning to expand, opening nodes in major cities. It appears that Microsoft will soon begin its own online service. And literally millions of people are discovering the pleasures of surfing the hypertext-like Mosaic software on the Internet.

That is simply the market reality. For too many years, Apple Computer has frittered away its technological lead by not taking the necessary steps to make its products absolutely irresistible. Believing it had superior products, the company felt no need to take painful measures such as price-cutting. I see the same mistake being made with eWorld, a promising system introduced rather late in the game. Instead of waiting for the world to find it, Apple should be playing a pocket-draining round of catch-up. This means dirt-cheap prices (particularly in these empty opening days), an aggressive effort to recruit gregarious and/or famous participants, a more concerted effort to eliminate those hard hats, a less scary subscriber agreement, and a full range of easy-to-use Internet connections.

Cyberspace is not for the timid. While eWorld carefully ramps up, everyone else is recklessly racing up the same incline like Evel Knievel on a motorcyle. Dramatic measures are called for. If Apple doesn't heed the call, all it will be left with is an empty world. #

STEVEN LEVY's latest book is Insanely Great: The Life and Times of Macintosh, the Computer That Changed Everything (Viking, 1994).
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Authorized Macs by Mail

Apple changes its sales strategy—but does it offer enough choices?

Earlier this year Apple announced a change in the way it sells computers. It now allows qualifying Apple dealers to sell Macintosh products by catalog. Apple also authorized a small number of mail-order-only companies to sell PowerBooks, Apple peripherals, and supplies. The company established the Apple Business Direct Program (800/462-7733), which sells Apple products directly to small-business customers. And in August Apple announced that traditional computer dealers will now sell Performas, the all-in-one computer-and-software bundles that were previously sold only by large retailers such as Sears and Circuit City.

These changes mean that consumers have more ways than ever to buy a Macintosh. Finally they can buy Macintoshes by mail through authorized dealers. Apple currently allows only dealers with stores to sell its entire product line by catalog; mail-order firms without stores are not permitted to sell desktop systems—at least not yet. The company says it plans to assess its mail-order program by October; it’s possible that at that time it will allow mail-order-only stores to sell its full line.

Dealers versus Mail Order

Apple’s mail-order effort is an attempt to broaden its sales channels without alienating the traditional computer dealers who are responsible for many of the Macintoshes sold. But it may be impossible to give consumers more choice without angering at least some dealers.

“I’d rather not have mail order authorized at all,” says one Apple-authorized dealer, who asked not to be identified. “We go to the trouble and expense of leasing a storefront and getting demonstration machines. Mail-order companies have a financial advantage.”

The dealer may go into catalog sales “as a defensive move,” he says, adding that he fears that if Apple authorizes major mail-order companies to sell its full line, prices may fall so low that only businesses located in low-cost rural areas can survive. Moreover, he believes the success of Apple’s push to gain market share is dependent on storefront dealers.

“What I think a consumer has to understand—and what’s hard to understand because it goes against your pocketbook,” says the dealer, “is that if you want to see a computer and touch it and see a demo and talk to someone knowledgeable... you need a store. And that costs money—not a lot more than mail order, but a percent or two.” But this perspective isn’t universal. While some dealers share his concerns, others say Apple will not win more market share unless it opens up all channels.

“I believe that channel expansion does grow the market and brings more people to this industry and to these products than not,” says Alex Peder, executive vice president of Ballard Computer in Seattle. “I believe we are dealing with discretionary dollars, dollars that might be spent on a car or a vacation (instead of a computer).

To the degree that authorizing catalog companies to distribute the full line broadens the market, I’m all for that.”

The Apple List

Many Macworld readers prefer buying both hardware and software by mail. So it’s good news that you can buy Apple’s product line from authorized dealers. The bad news is that buying a desktop Mac through the mail from an authorized dealer may not be as easy as buying a Pow­erBook from a company like Mac­World or MacConnection. Many of Apple’s catalogers are not experienced mail-order firms but rather are resellers just beginning catalog sales or expanding regional catalogs. Some of the benefits associated with mail order—such as seven-day ordering, inexpensive shipping, and overnight delivery—may not be offered by all Apple catalog resellers. At the same time, authorized catalog companies may decide to offer services that traditional mail-order firms don’t, such as out-of-warranty repair services by mail.

Several Apple dealers say they participate or plan to participate in catalog sales to individuals, these include Computer Town (800/666-0004) of Boston; Comparative of Houston through its Syx Express division (800/289-7939); Computerware (800/267-0092) of Palo Alto, California; Crafterfield Corporation (800/955-9009) of Charlottesville, Virginia; Elekl (800/293-1000) of Skokie, Illinois; J & R Computer World (800/221-8180) of New York City; New MMI Corporation of Williamsport, Pennsylvania (800/221-4283); Oakbrook Computer of Oakbrook, Illinois, through its Technology Now division (800/566-9622); and Vanstar Corporation of Pleasanton, California, through its Computers 800 division (800/321-1234).

Currently at least two existing mail-order companies sell Apple’s full line of products. Club Mac (800/258-2622), owned by Pacific Business Systems of Oakland, California, and Creative Computers’ MacMail (800/222-2808) of Torrance, California, are owned by different Apple dealers that have been approved for catalog sales, so both carry desktop Macs as well as other Apple products.

continues
The five mail-order-only companies authorized to sell selected PowerBook models, peripherals, and supplies are Computer Discount Warehouse (800/509-4239) of Buffalo Grove, Illinois; MacWarehouse (800/255-6227) of Norwalk, Connecticut; MacZone (800/684-8080) of Bellevue, Washington; Egghead Software-owned Mac’s Place (406/738-8000) of Kalispell, Montana; and Tiger-Software (800/666-2562) of Coral Gables, Florida.

Authorized versus Gray Market
For mail-order Macs, consumers can now choose from different types of Apple dealers and so-called gray-market companies. Unlike authorized dealers, gray-market companies have no direct relationship with Apple and have not agreed to abide by specific Apple regulations in order to buy products directly from Apple for resale. As a result, authorized Apple dealers like to paint gray-market companies as outlaws—although the gray market is not illegal—and point out the low investment required to begin a mail-order business. Gray-marketers, on the other hand, suggest authorized dealers have limited inventory, experience, and expertise.

Neither stereotype is entirely true or entirely false. A dealer's direct relationship with Apple can certainly be an advantage to consumers. “We have direct support from Apple, including technical support,” says Sam Ryu, president of the Computize chain in Houston. If consumers have a problem with Computize, “since we value our authorization, they can directly complain to Apple, and Apple can have a direct handle on us,” he adds. In contrast, says Ryu, “Apple doesn’t have any influence on the gray-marketeer, so the customer has to rely on the goodwill of the gray-marketeer.”

Moreover, as the mail-order industry consolidates, Apple’s approval implies some level of review. That’s usually difficult for consumers to do on their own but can be especially important on the mail-order side, where it’s easier for individuals to go into business and sometimes even easier for them to go out of business.

On the plus side, because they don’t buy inventory directly from Apple but rather from a broad range of authorized dealers, gray-marketers may be able to get new machines that are not widely available through authorized dealers. David Goldman, president of Austin, Texas-based Bottom Line Distribution, says his company has an edge over Apple-authorized dealers because of its custom configurations and technical support.

“Our solution to a conflict with a CD-ROM drive is not just to tell the customer to send us the CD-ROM drive and we’ll replace it, because typically that’s not the problem. . . . There’s really a difference between offering solutions and selling problems.”

Other industry folks agree that a company’s authorization doesn’t automatically translate into a buyer’s good mail-order experience, because retail sales and mail-order sales are very different businesses. “The fact that Apple has authorized a dealer doesn’t necessarily mean it can provide good sales, technical support, and customer service by mail and over the telephone,” says Mike McNeil, president of Club Mac, an authorized Apple cataloger.

All mail-order companies are not equal. Large, experienced gray-market companies may do an excellent job and provide better service than authorized dealers that are new to catalog sales. Even so, a fair number of Macworld readers get burned each year by unscrupulous, unauthorized mail-order companies. Apple’s authorization does not guarantee a good experience, but it may offer some leverage if a company treats you badly. If that’s important to you, buy from authorized dealers. (Call 800/538-9696 for verification.) Since you may not be able to depend on Apple for prompt technical support (I recently spent 33 minutes on hold), check out any dealer’s support before you buy. And no matter where you buy, always use a credit card so you can dispute the charge if necessary.

Back to the Future
Alex Peder predicts that mail-order companies such as MacWarehouse, Mac-Connection, and MacZone will eventually be authorized to sell the full Apple product line. “Broadening their channel strategy gives Apple greater market share,” says Peder.

Consumers stand to benefit if Apple expands full authorization to established mail-order companies that can handle high-volume sales effectively and professionally. Ironically, though, Apple’s tentative foray into mail order may have boosted the fortunes of gray-market companies as much as its own dealers’

“People used to call up and ask, ‘Is this gray market? Will I go to jail over this?’” according to Goldman. “Today, there’s not the hesitation to buy mail order anymore, because Apple has said it’s OK to buy by mail.”

Send nominees for sainthood to Service Heroes, Macworld, 501 Second St., San Francisco, CA 94107, or via the Internet (Branscum@AOL.com). Conversely, drop Conspicuous Consumer a line if a company is ignoring you.
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Edited by Elizabeth Maffly

Macworld Editors' Choice is a complete listing of the hardware and software products selected as the best of their type in Macworld's comparative articles. A next to a product indicates that we chose more than one product in that category. A next to a product listing indicates that a native Power Mac version is available.

**Hardware**

**MONITORS**

- **BLACK-AND-WHITE MONITORS, May 93**
  - Portrait monitor: 15-inch Gray Scale Portrait Display: Mirror Technologies, 612/633-4450; $399, with video-display board $549.
  - Two-page monitor: @ L-View MultiMode, Sigma Designs, 510/770-0100; $1099, with video-display board $1399. MD 20 Two Page Display: Mobius Technologies, 510/654-0556; $699, with video-display board $798.

- **SMALL COLOR MONITORS, Jan 94**
  - 14-inch display: Sony CPD 1430: Sony Corp. of America, 800/222-7669; $779.95. Nanso FlexScan F340-W: Nanso USA, 800/502-0202; $799.

- **TWO-PAGE COLOR MONITORS, Nov 94**

**NETWORK HARDWARE**

- **HIGH-SPEED FAX MODEMS, Oct 93**
  - Teleport Gold and Silver with Global Fax; Global Village Communication, 415/390-8200; Gold $499, Silver $429.

- **REMOTE/ACCESS SERVERS, Oct 94**
  - AppleTalk networks: ARA Multiport Server; Apple Computer, 408/996-1010; four ports $1799, eight ports $3298.

**PRINTERS**

- **COLOR PRINTERS, Aug 94**
  - Low-end ink-jet: DeskWriter 660C: Hewlett-Packard, 800/752-0900; $719.
  - Solid ink-jet: Phaser 300i: Tektronix, 503/682-7377; $999.

- **LOW-COST COLOR SCANNERS, Nov 93**
  - $1300 to $1600: La Cie Silvercanner II; La Cie, 503/520-9000; $1599.
  - Hewlett-Packard ScanJet IIc: Hewlett-Packard, 800/752-0900; $1599.
  - Under $1300: Mirror 800 Plus Color Scanner; Mirror Technologies, 612/633-4550; $1299.

- **OCR, Nov 93**
  - OmniPage Professional; Caere Corp., 408/395-7000; $999.

**SYSTEMS/STORAGE**

- **DUAL-SCREW CD-ROM DRIVES, Jul 93**
  - Sheer speed: Pioneer DVR-M40X; Pioneer, 408/444-6784; $1495.
  - Overall value: AppleCD 300; Apple Computer, 408/996-1010; $599.
  - Budget choice: NEC MultiSpin 38; NEC Technologies, 708/860-9500; $465.

- **HIGH-SPEED HARD DRIVES, Aug 93**
  - 2.7GB drives: Nova XL 2700; Microtech International, 203/468-6223; $2999. Fuji 3.5GB; Relax Technology, 510/471-6112; $3499.

- **MACINTOSH UPGRADES, Jun 93**
  - SE/30 accelerator (50MHz or 33MHz): Universal PowerCache; DayStar Digital, 404/967-2077; 50MHz $999 (with FPU), 33MHz $449 (without FPU).

- **LC and LC II upgrades**
  - Macintosh LC III Logic Board Upgrade; Apple Computer, 408/996-1010; $999.
  - Mac II accelerators: Radius Rocket 25i; Radius Rocket 33; Radius, 408/934-1010; $299, 33; $2499.
  - Universal PowerCache series: DayStar Digital, 404/967-2077; $449 to $999.
  - Quadra static-RAM cache card: FastCache Quadra; DayStar Digital, 404/967-2077; $299 for Quadra 700 and 900, $449 for Quadra 800 and 950.

- **OPTICAL DRIVES, Dec 93**
  - 3½-inch: Epson OM3 5010; ClubMac, 800/258-2622; $599.
  - 128 MO: APS Technologies, 800/874-1428; $399.
  - 5½-inch: Sharp JS-70; ClubMac, 800/258-2622; $182.
  - Infinity MaxOptical 11m; Peripheral Land Inc., 800/288-8754; $4113.

- **PC COPROCESSING, Oct 94**
  - OrangePC Model 210; Orange Micro, 714/779-2772; $1283.

**VIDEO/DISPLAY**

- **24-BIT VIDEO CARDS, Apr 94**
  - Inexpensive acceleration: PrecisionColorPro 2AXP; Radius, 408/434-1010; $599.
  - Full-featured acceleration: Thunder II CX-1360; SuperMac Technologies, 408/541-6100; $4499.

- **HIGH-END VIDEO EDITING, Jun 94**
  - Presentation video: MoviePal2 Pro Suite; RasterOps, 801/785-5750; $4199. VideoVision Studio; Radius, 408/434-1010; $4499.
  - Corporate video (offline): Media Composer 4000; Avid Technology, 508/640-6789; $14,995.
**Software**

**ACCOUNTING/FINANCE**

GROWING A SMALL BUSINESS, Nov 93
Small-business system: M.Y.O.B.; Teleware, 201/586-2200; $199.

Home office/personal finance: MacMoney; Survivor Software, 310/410-9527; $119.95.

**BUSINESS TOOLS**

Statistics, Oct 93
Exploratory data analysis: DataDesk 4.1; Data Description, 607/257-1000; $595.

Comprehensive package: SYSTAT 5.2; SYSTAT, 708/864-5670; $895.

**COMMUNICATIONS/NETWORKS**

Communications software, Aug 94
Basic connectivity: ZTerm; David P. Alshov (no phone number available); $30.

Terminal emulation: CrossTalk for Macintosh; Digital Communications Associates, 404/442-4000; $195.

Internet exploration: VersaTerm; Synergy Software, 215/779-0522; $125.

**DOS WINDOWS ENWUL, Oct 94**
Timbuktu Pro 1.0.3 for Macintosh; Timbuktu 1.1 for Windows; Farallon Computing, 510/814-5000; $199 each.

**HIGH-SPEED FAX MODEM SOFTWARE, Oct 93**
Faxit; Telefocus, 816/836-9800; $79.

**NETWORK CONNECTIVITY, Sep 93**
NetWare for Macintosh: Novell, 801/429-7000; $495 for 5-user license to $2295 for 200-user license.

**PROTOCOL ANALYZERS, Jul 94**
EtherPeek, AG Group, 510/937-7900; $295.

**SOFTWARE ROUTER, Jul 93**
Apple Internet Router 3.0; Apple Computer, 408/996-1010; Basic Connectivity Package $499.

**TERMINAL EMULATOR, Oct 93**
VersaTerm, Synergy Software, 215/779-0522; $149.

**GRAPHICS**

3-D DESIGN, Aug 93
Price for performance: Ray Dream Designer 2.0; $299; Alias Sketch 1.5; Alias Research, 416/362-9181; $995.

**All-in-one solution**: Infini-D 2.5; Specular International, 413/253-3100; $695. Stratavision 3D 2.6.1; Strata, 801/628-5218; $995.

**CLIP ART'S GREATEST HITS, Jan 94**

**DRAW PROGRAMS (LOW-COST), Sep 93**
Budget draw: Expert Draw; Expert Software, 305/567-9900; $49.95
Budget draw/paint: UltraPaint; Deneba Software, 305/596-5644; $79.

Beginners' program: Aldus SuperPaint; Aldus Corp., 619/598-6000; $149.95.

Overall: Canvas; Deneba Software, 305/596-5644; $399.

**FONT BUYERS' GUIDE, Mar 94**
Text-face collection: Type On Call CD-ROM; Adobe Systems, 415/961-4400; 800/682-3623; $99 (includes the ability to unlock two families from preselected packages) plus $25 to unlock individual faces or $69 to $179 for unlocking families.

Display/decorative-face collection: Fontek, Letterset, 201/845-6100; $39.95 per face.

**Bargain collection**: Monotype ValuePack; Monotype, 312/855-1400; $89 for 57 fonts.

**IMAGE DATABASES, Oct 93**
Aldus Fetch 1.0; Aldus Corp., 206/628-5739; $299.
Multi-Ad Search 2.0; Multi-Ad Services, 309/692-1530; $249.

**PAINT AND IMAGE-EDITING, Sep 93**
Budget buy: Expert Color Paint; Expert Software, 305/567-9900; $49.95.

Overall program: Fractal Design Painter, Fractal Design Corp., 408/688-8800; $399. Image-editing program: Adobe Photoshop 2.5.1; Adobe Systems, 415/961-4400; $899.

**VIRTUAL MEMORY SOFTWARE**

Virtual memory software: RAM Doubler 1.0; Connectix Corp., 415/571-5100; $99.

Memory-boosting software: RAM Doubler 1.0; Connectix Corp., 415/571-5100; $99.
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Edited by Wendy Sharp

Macworld Star Ratings lets you compare hardware and software products for the Macintosh by providing summaries of Macworld’s authoritative product reviews from the past year. The number of stars at the beginning of each capsule indicates quality; our reviewers assign five stars to outstanding products and one star to poor ones. The symbol indicates that a product is available in a native Power Mac version, although unless stated otherwise the version we reviewed was the 68000 version.

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Software

**BUSINESS TOOLS**

★★★★ 4D First 1.0 (1.0.1), ACI US, 408/232-4444, $295. This entry-level relational database is a low-cost way to distribute the power of 4D and 4D Server to an office full of Macs. It’s not much easier to use, however, than the full-fledged 4D. May 94

★★★★ AccuZip 1.87, Software Publishers, 800/233-0555, $689. Bulk-mail software has informative progress indicators, batch and individual processing, low rates, and flexible processing during import, but the interface is incomprehensible. Sep 94

★★★★ BaseMap 1.0.1, GeoPoint, 415/957-1560, $149. For simple maps displaying simple data, this mapping tool may be useful. It’s not for the cartographic sophisticate, however, as it offers very limited data-display abilities and only one projection. May 94

★★★★ Bulk Maller CASS 1.0, Satori Software, 206/443-0765, $150. Unattended operation is possible with this inexpensive bulk-mail software, but batch processing is slow and the program has coding problems. Sep 94

★★★★ ClarisImpact 1.0 (1.0 v3), Claris Corp., 408/727-8227, $399. Business graphics, project management, object-oriented drawing, word processing, and presentation functions combine in this business graphics software. The outstanding integration offers versatility that dedicated programs are pressed to match. Jan 94 ★★★★ Cricket Graph III 1.5 (1.52), Computer Associates International, 516/342-6000, $129.

Basic and foolproof charting program produces cleaner charts than Excel with little effort, although its feature set is fairly modest. Apr 94 ★★★★★ Crystal Ball 3.0, Decisioneering, 303/449-5177, $295. Compact business-simulation software is fast enough for complex projects and can pay for itself in disaster-avoidance in a large variety of common business tasks. Oct 94 ★★★★★ DeltaGraph Pro 3 (3.5), DeltaPoint, 408/648-4000, $195. At its new lower price, this charting program is the best feature-for-feature value in Macintosh charting. There’s even a new Chart Advisor function that suggests the appropriate display for your data. Apr 94 ★★★★★ Extend-IBM 3.0, Imagine That, 408/365-0305, $990. Business-modeling software includes a superior set of templates for business-process reengineering, but it requires more than icon-based programming knowledge. Oct 94 ★★★★★ FastTrack Schedule 2.1, AEC Software, 703/450-1980, $279. Simple project-management software is ideal for managers who must quickly put together a schedule, but if you require more power to manage conflicts between multiple projects and resource allocation, you’ll need a more comprehensive program. Sep 94 ★★★★★ Helix Express 2.0 (2.0.4), Helix Technologies, 708/385-5698, $359. Icon-based relational-database software’s improved performance makes it a serious competitor for all-Mac networks. Especially notable is its much faster speed; multiuser operation is downright snappy. Jul 94 ★★★★★ Helix Tracker 1.0, Helix Technologies, 708/365-0242, $439. Well-designed workgroup-document manager has strong audit and annotation features. For large documents, however, Ethernet will look mighty attractive. Nov 93 ★★★★★ Map II 1.5, ThinkSpace, 519/858-5047, $395. Well-structured program has most of the functions a simple geographical information system needs and is suitable for introductory instruction in GIS and for alert first-time users who just like maps. May 94 ★★★★★ Micro Planner Manager 1.1, Micro Planning International, 303/757-2216, $965. When you require cross-project resource sharing and leveling for a reasonable price, this project-management software has the edge. Nov 93 ★★★★★ Microsoft FoxPro for Macintosh 2.5 (2.6), Microsoft Corp., 206/882-8080, $495. Dazzlingly fast and easy to use relational database has a greatly improved interface and cross-platform compatibility. For projects of 4 to 20 users that handle large amounts of data (hundreds of thousands to millions of records), it offers excellent performance. Apr 94 ★★★★★ Office Tracker 1.1, Milum Corp., 512/327-2255, $195 to $995. The efficient user interface of this software sign-on board makes it easy to learn and use; but it has some minor flaws. Dec 93 ★★★★★ Pablo 2.0.1 (2.03), Andynie Computing, 613/548-4355, $695. This effective end-user data-reporting tool puts a considerable workload on the corporate information department, but it sidesteps the hassles of SQL database access and produces great reports with minimal effort. Jul 94 ★★★★★ Street Atlas USA 2.0, Delorme Mapping, 207/865-1234, $169. For the most part, this geographical information software delivers what it promises at a great price. Although inaccuracies in the data are troubling, Delorme pledges to fix all reported errors in subsequent annual updates. Oct 94 ★★★★★ TopDown 4.0 (4.1), Kaetron Software Corp., 713/298-1500, $345. Flowcharting program’s custom symbols, multiple palettes, and automatic drawing aids, and its ability to let you easily create and navigate lower-level charts, make it a productive tool. Jul 94 ★★★★★ Useful Voice Processor for Macintosh 1.1v7 (1.1v9), Useful Software Corp., 508/774-8233, $179.95. Dictation software lets you record and transcribe on a Mac. It has some useful features, but you must take uncommon care to avoid crashes. Dec 93 ★★★★★ ZipZap 1.0, True Basic, 603/298-8517, $395.95. 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 ★★★★★ ZFD 12.1 (14), Semaphore Corp., 408/688-9200, $125. Inexpensive bulk-mail software supports batch and individual processing, but the progress indicators are uninformative, and unattended operation requires extra work. Sep 94

**COMMUNICATIONS/NETWORKS**

★★ AccessPC 3.0, Insignia Solutions, 415/694-7600, $129.95. Utility translates most word-processor and some database formats, but it doesn’t translate graphics and some of its translations result in data loss. Apr 94 ★★★★★ Crosstalk for Macintosh 2.0 (2.0.1), Digital Communications Associates, 404/442-4095, $195. Commendable communications product has a feature set that will match its competition. Still, the script editing is complex and you must manually enter phone numbers each time you use it. Apr 94 ★★★★★ Delrina FaxPro for Macintosh 1.0 (1.5.1), Delrina Corp., 408/363-2345, $129. Fast, efficient fax software has an excellent address-book feature, but also has some interface quirks. Feb 94 ★★★★★ DOS Mover Plus 4.0, Dayna Communications, 800/269-7200, $100. File-transfer and translation utility works with floppy, removable drives, and continues.
network volumes and supports wild cards in DOS extensions. Apr 94

EtherPeek 2.0.3 (2.0.4), LocalPeek 2.0.3 (2.0.4), TokenPeek 1.0 (2.0.3), AG Group, $10/937-2900, $495 to $995. Priced at a fraction of the cost of dedicated hardware analyzers, these network analyzer tools give you better analysis with a friendlier interface. They're a worthwhile investment. Jan 94

MacLink Plus/Translators Pro 7.5, DataVix, 203/268-0030, $149. If your PC files are in archaic formats, you'll need this file-transfer and translation utility. It's a great option for most users, but it doesn't support removable drives or network volumes. Apr 94

MicroPhone Pro 2.0, Software Ventures Corp., 510/644-3232, $295. The new feature set of this communications package includes multiple sessions, faxing, TCP/IP networking, and more, but it's a mixed bag. Not all the features are well integrated, although some are innovations for which users will be grateful. Oct 94

On The Road 1.1, Connectix, 415/571-5100, $599. Helpful PowerBook utility looks at what's hooked up to your computer and adjusts accordingly—for example, printing when a printer is available and otherwise deferring printing. Dec 93

QLogic-Corporation Servers, Apple Computer, 408/996-1010, $999. Before this collaboration software will be ready for prime time, Apple needs to overhaul the complex Admire application, add serious diagnostic aids, provide comprehensive documentation, and offer knowledgeable technical support at a price less than that of the program itself. Aug 94

Silver Cloud 1.2 (1.2.1), AG Group, 510/937-7903, $495 to $1595. If you are administering a large network and are drowning in a sea of devices and zones, this network-management software will make your life easier. Feb 94

StTom 1.0, Aladdln Systems, 408/761-6200, $120. Inexpensive telecommunications software is fairly easy to set up and use, and will do well for people who use just one or two online services. Still, it lacks true scripting and has limited protocol options. Apr 94

Snap Mail 1.01, Cassidy & Greene, 408/484-9228, $200 to $1440. Software will put you on the electronic-mail trail more easily and more cheaply than any competing product, if you can live with some minor (but surprising) shortcomings. Jan 94

SoftPC 3.1, Insignia Solutions, 415/654-7600, $499. While the speed of this Windows PC emulator is greatly improved, buying an add-in PC card for your Mac is more efficient. Apr 94

SoftWindows 1.0, Insignia Solutions, 415/654-7600, $499. You can run Windows software on a Power Mac with this emulation software, but although it's a viable solution, you pay the price in terms of performance, compatibility, and actual cost. Aug 94

Timbuktu Pro 1.1 (1.0.5), Farallon Computing, 510/814-5000, $199 to $1999. Terminal emulation product is a must-have for in-house technical-support staff and for people who need direct connection to computer systems on a variety of networks. The major enhancements of this version are TCP/IP support for Macs and noticeably faster screen redraw. May 94

TrafficWatch 2.0.0.1 (2.0), Neon Software, 510/283-9771, $495. The price of this Apple Talk traffic monitor is closer to that of full-blown network analyzers but without printing, alarms, or true multiprotocol support, this product misses the mark. Jun 94

VersaTerm 5.0 (5.04), Synergy Software, 215/779-0522, $195. The price and feature set of this network terminal-emulation package make it a terrific value, in spite of its complex documentation and limitations. If you’re looking for a fast path to Internet connectivity, this is it. Jan 94

DESKTOP PUBLISHING

AboutFace 1.1.1 (1.1.2), Big Rock Software, 716/228-8860, $695.95. Type-specimen generator has many serious deficiencies that need to be addressed. Jan 94

Aldus PageMaker 5.0, Aldus Corp., 206/622-5500, $895. Desktop publishing software has added the features, both great and small, that it's been lacking, while still retaining the ease-of-use advantages that it's always had. This is a superb upgrade. Nov 93

FontChameleon 1.0.1, Ares Software Corp., 415/578-9090, $295. Font utility introduces a new font-creation technology; it builds serif and sans serif fonts from a master outline file. It offers high-quality renditions of popular fonts, plus customizes fonts. Sep 94

FontMix 1.0, Monotype Typographic, 312/855-1440, $79. Although a tad expensive for a one-trick pony, this font utility is a straightforward, relatively painless way to mix characters from different fonts to create composite fonts. Oct 94

Fontographer 4.0.4, Altsys Corp., 214/680-2060, $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

Fototoone 1.1 (1.13), Agfa Division of Miles, 508/658-5600, $395. Color-management software has a capable engine, but it's not the complete color-management system Agfa touts. Apr 94

FrameMaker 4.0 (4.04), Frame Technology Corp., 408/433-3311, $895. For such projects as long, structured documents, instruction manuals and textbooks—this desktop publishing program is one of the best tools available. It's fast, well mannered, and a real time-saver. Mar 94

Print Shop Deluxe 1.0 (1.1), Broderbund Software, 415/382-4400, $49.95. Even the most ham-fingered can create professional-looking greeting cards, signs, banners, letterhead stationery, and calendars with these desktop publishing templates and graphics. While it’s not a substitute for a high-end program, it is easy to use and inexpensive. Apr 94

QuarkXPress 3.2, Quark, 303/894-8888, $895. This upgrade adds the efficient XTension to ensure the greatest possible fidelity of color images and is a must-have for professional color publishers who use Quark. For others, the enhancements are welcome but minor enough that they provide little incentive to upgrade. Nov 93

ReadySetGo 6.0.2, Manhattan Graphics Corp., 914/725-2040, $395. There's no strong reason not to use this desktop publishing software if its tools meet your needs, but there's no compelling reason to choose it over the competition, either. Its low price is nice, but not enough. Oct 94

Tableworks Plus 1.0.5, Npath, 206/392-7745, $299. Publishing utility adds a full table-editor to QuarkXPress and is a must-have for anyone doing even mildly complex tables. Jan 94

EDUCATION

Creative Writer 1.0, Microsoft Corp., 206/882-8080, $64.95. Graphics/page-layout/word-processor hybrid offers some terrific type effects, zany sounds, bright graphics, and wacky characters. While it doesn't teach kids to be better writers, it does encourage them to develop ideas. Sep 94

The Cruncher, Davidson & Associates, 310/793-0600, $59.95. If you want to teach a child spreadsheet basics, this combination educational spreadsheet and business application will do the job. It's creative and easy to use, but slow. Aug 94

Groler Multimedia Encyclopedia, Groler Electronic Publishing, 203/797-3530, $395. CD-ROM encyclopedia has excellent search capability, weighs much less than a shelf of books, and is lots of fun. Its timeliness and some hierarchical snafus were slight problems. Jul 94

How Computers Work, Time Warner Interactive Group, 818/955-9959, $43.60. Graceful, well-integrated CD-ROM tutorial guides the curious through brief but helpful explanations of basic computer technologies. Jan 94

HyperStudio, Roger Wagner Publishing, 619/442-0522, $179.95. Hypermedia authoring tool supports color and multimedia functions through easy-to-use dialog boxes, but the interface doesn't always follow Apple guidelines. Dec 93

MacGrade 1.5.5 (2.2.7), CaEd Software, 800/879-0681, $595. Grade-book program has a straightforward, simple interface and clear documentation. Although there's room for improvement, it's easy to use and flexible. Feb 94

The Rosetta Stone, Fairfield Language Technologies, 703/432-6166, $395. Foreign-language instruction on CD-ROM is a valuable educational tool and fun to use. The lessons are well paced, and the content is generally excellent and diverse. Jan 94

Small Blue Planet 1.2.1, Now What Software, 415/885-3432, $79.95. Nicely integrated collection of beautiful Earth-from-space images on CD-ROM lacks many features of standard atlases and doesn't have a search function, but is endlessly fascinating. Jul 94

ENTERTAINMENT

Crystal Crazy, Casady & Greene, 408/484-9228, $49.95. Ultra-glossy, superpolished version of the classic Crystal Quest is challenging and fun. Each level retains some old elements, and adds some new ones to keep you on your toes. Jun 94

Falcon MC 1.0, Spectrum Holobyte, 510/522-1164, $69.95. Whether you're an armchair jet jockey or an experienced fighter pilot, you're bound to be impressed by the 4-bit color, enhanced graphics, and sophistication of this flight simulator. Dec 93

Firefall Arcade 1.0 (1.0.2), Inline Software, 617/915-1515, $49.95. If you loved the classic video game Centipede, or are just looking for a fun shoot-'em-up, this arcade-style game will satisfy. Jun 94

Hell Cab 1.0.1, Time Warner Interactive Group, 818/955-9999, $35.97. Take a ride in New York cab with a penchant for time travel, add a few brainteasers, and you've got this engaging game on CD-ROM. It's slow and the arcade sections are hard to control, but overall it succeeds. Jan 94

Myst 1.0 (1.01), Broderbund Software, 415/382-4400, $59.95. The smooth pacing of actions and sounds in this beautiful CD-ROM game give it a dreamlike quality. This is a game that's been polished until it shines. Mar 94

SimCity 2000, Maxis Software, 510/254-9700, $54.95. In essence, your goal with this marvelous city-simulation software is to build a city and run...
it successfully. The game is fascinatingly complex, but it’s simple to use, and the elaborate graphics are so lovely that it’s even fun just to watch. Jun 94

Spectre Supreme, Velocity Development. 415/274-8646, $69.95 to $99.95. The pleasure of this game comes not only in high scores, but in the almost addictive sense of control you get from moving your tank around the screen. Dec 93

Spin Doctor (1.0), Callisto Corp., 508/655-0707, $59.95. In the tradition of the best Macintosh games, this game tests your wits and reflexes alike. It’s part strategy game, part kinetic sculpture. Jun 94

**GRAPHICS**

Adobe Illustrator 5.5, Adobe Systems, 415/961-4100, $595. Despite slight speed disappointments, this draw program’s upgrade is a bargain. It includes more than 200 file formats, fonts, and the Acrobat Distiller and Exchange utilities. Sep 94

Aldus FreeHand 4.0 (4.0a), Aldus Corp., 206/622-5500, $595. The new page-design and text-editing functions of this powerful draw program make it more than worth the price of admission. Aside from some bewildering interface elements, it’s an outstanding program. Mar 94

Canvas 3.5 (3.5.2), Danahea Software, 305/596-5644, $399. Draw program offers two to three times as many features as any competing program, but our reviewer would prefer an interface that you can navigate without scrambling for the manual. Jan 94

Collage 1.0.1 (2.0), Specular International, 413/253-3100, $399. Image-compositing software is a flawed but serviceable tool that allows you to combine and composite multiple RGB images stored in PICT, TIFF, and Photoshop 2.5 formats. Jul 94

ColorUp 1.0, Pantone, 201/935-5500, $59.95. Professional graphic designers don’t need the advice of this color tutorial and series of palettes. Although nonprofessionals might benefit from the information on color theory, it may not be worth the money. Nov 93

Debabelizer 1.5 (1.5.5), Equilibrium Technologies, 415/382-4343, $299. If you spend any significant time dealing with file conversion, you should have this bitmapped-graphics-conversion software. Nov 93

Debabelizer Lite 1.0 (1.1), Equilibrium Technologies, 415/332-4343, $129. Terrific graphics utility converts graphics files from one format to another. It offers a choice selection of capabilities at a nice, slim price. Jan 94

Design Workshop 1.0 (1.1), Artifice, 503/435-7421, $895. The accessible interface and versatile modeling environment of this 3-D modeling software may be worth the fairly high price, particularly for architectural-design conceptualization. May 94

Infini-D 2.5.1 (2.6), Specular International, 413/253-3100, $695. Serviceable 3-D graphics program has a wide range of modeling, rendering, and animation options, with a straightforward interface and quick operating speed. Feb 94

IntelliDraw 2.0, Aldus Consumer Division, 619/558-6000, $129. Wunderful general-purpose graphics package works well, does a great job of automating drawing tasks, and is straightforward. While its breadth of features, it always feels approachable. Sep 94

Kal’s Power Tools 2.0a (2.1), HSC Software, 310/392-8441, $199. Phenomenally powerful suite of Photoshop plug-ins have an addictive quality typically associated with arcade games. There’s no end to the automated effects you can generate, the ways you can apply them, and the artwork you can create. May 94

Koyln Fractal Studio 2.02, Koyln Software, 314/878-9125, $149.95. Software lets you generate beautiful fractals of your own design. It’s a reason- able choice if you are interested in Sierpinski triangles or naturalistic forms, but it’s not an all-fractals-for-all-people program. Aug 94

MacroModel, Macromedia, 415/252-2000, $1495. This 3-D modeling software is a solid resource to have along when you venture out into 3-D space. The interface is elegant precisely, making the Mac’s inner space a more pleasant place to work. May 94

MetaFlO, The VALIS Group, 415/435-5404, $595. Graphics utility yields interesting visual effects with a minimum of fuss. It imparts elasticity to 2-D images, letting you push and pull collections of pixels while retaining the visual integrity of the image. Aug 94

Paint Alchemy 1.0, Xaos Tools, 415/487-7000, $99. For the price, these plug-in graphic effects are a tremendous value that both casual users and professional artists can use to design a little chaos into their work. May 94

Pointillist, Pictor GraFX, 310/865-0495, $39.95. Stereogram software creates images that look like random dots, but as you focus beyond the page, a 3-D image emerges from the pattern and appears to hover inches in the front of the background. It’s glibly wacky. Jul 94

Ray Dream Designer 3.0.3 (3.1), Ray Dream, 415/960-0768, $349. Although this 3-D illustration software remains a price leader, unstable operation, misbehaving features, and sluggish performance are problems that need to be rectified. Jul 94

Scenery Animator 1.0.4 (1.1), Natural Graphics, 916/624-1436, $149. Landscape rendering and animation software uses U.S. Geological Survey data to create remarkably realistic 3-D representations of terrain. Its flaws are few, and we reviewer recommends this one for the professional artist. Sep 94

Showplace 2.0 (2.1), Pixar, 510/236-4000, $495. Entry-level, 3-D modeler is suitable for illustration and other graphic arts applications. This version offers improved access to MacRenderMan, one of the best renderers around, plus plug-in modeling tools. Apr 94

StrataVision 3d 2.6.3 (1.3), Strata, 801/628-5218, $695. 3-D program includes animation, and is a superior rendering tool and versatile modeler. It’s a challenge to learn, however, as the interface is overly dense and sometimes sluggish. Feb 94

StudioPro 1.0 (1.1), Strata, 801/628-5218, $1495. If you need a well-balanced, all-in-one 3-D modeling, rendering, and animation solution, this application is an excellent choice. Mar 94

Transvector Pro 1.0 (1.51), TechPool, 216/291-1932, $395. Remarkable graphics-conversion software can read PostScript files and convert them to a variety of formats. As you might expect of a program attempting to fill such a tall order, its conventions are not always flawless, but it can be a lifesaver nonetheless. Nov 93

Typetray 3.0 (2.1), Pixar, 510/236-4000, $299. An approachable interface, animation support, and outstanding Renderman rendering technology make this 3-D type-renderer a popular choice. This version still lacks canned positioning effects. Jun 94

upFront 2.0, SketchTech, 612/379-9181, $299. Capable modeler is something of an acquired taste. However, take the time to learn it and you’ll find useful, if unconventional and demanding, tools that are well suited for architectural modeling. Jan 94

**MATH/SCIENCE**

Caduceus Science Review Macintosh Project 1.0 (1.1), Scientia, 617/776-4327, $250. If you’re taking the MCAT, you’d be nuts not to buy this interactive science review. With proper use, its 998 files of content are certain to improve your score. Apr 94

CSC ChemOffice 2.0, Cambridge Scientific Computing, 617/491-6862, $995. Comprehensive chemistry software is the Mac equivalent of software that seven years ago would have cost $200,000. continues
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InStat 2.01, GraphPad Software, 619/457-3909, $95. For scientists with limited statistics backgrounds, the clutter-free clarity of this lab-oriented statistics software's help screens will be invaluable, while the limited variables and minimal graphics won't be a problem. Nov 93

JMP 3.0, SAS Institute, 919/677-8000, $695. This statistics software can be used for a wide range of biological, chemical, and physical-science investigations. New features include floating tool palettes, an annotation tool for data tables, and an experimental-design module. Sep 94

LabView for Mac 3.0, National Instruments, 512/238-9119, $1995. For large-scale, demanding projects in data acquisition and analysis, this scientific software is an unchallenged standard, in a class by itself. Jul 94

Maple V 3.0, Waterloo Maple Software, 519/747-2373, $795. If you prefer to do your own programming and function creation, you'll benefit from this symbolic mathematics software's efficient use of your Mac's resources. This version hits most of the points on your symbolic-math wish list. Oct 94

OC Tools 1.0, Abacus Concepts, 510/540-1994, $245. Quality-control tool kit for StatView appears to introduce a slight slowdown in program response, but is well designed, well documented, and suitable for quality-control nophytes as well as professionals. Jan 94

Resampling Stats 1.0, Resampling Stats, Inc., 703/522-2713, $225. Innovative statistics software has proved itself to be a superior teaching tool in numerous classroom tests. If you have any interest in statistics, you should give this admirably straightforward approach careful consideration. Jun 94

SerePlot 2.12, ScientificVisions, 301/593-0317, $135. If you have piles of data and don't need animated, exploding bar-charts in 24-bit color, this scriptable plotting software should be part of your analysis tool kit. Jun 94

Spysglass Plot 1.0, Spysglass, 217/355-6000, $295. This scientific-plotting software is the first choice for serious large-set plot crunching. Oct 94

SuperScope II 1.25, GW Instruments, 617/625-4096, $1490. Despite a relatively small instrument library, this laboratory data-acquisition software effectively covers a wide range of needs, and learning to use it won't become your life's work. Oct 94

Turin's World 3.0, CELI Publications, 312/569-1550, $19.95. Computer-science educational software lets you investigate some fundamentals in computing at an almost unbelievable bargain price. Feb 94

Visualization of Natural Phenomena, Telos/Springer Verlag, 408/249-9314, $59.95. CD-ROM introduction to applying all aspects of computer graphics to scientific imaging covers all disciplines and offers definitive analysis of methods. No other source covers this much material, at this level of clarity. Jan 94

Arrange 1.1 (2.0), Common Knowledge, 415/325-9900, $349. This personal information database's flexible, intuitive approach to data-handling makes it an excellent tool for storing all kinds of day-to-day information. May 94

DataBook & TouchBase Pro Bundle 4.0, Aldus Consumer Division, 619/558-6000, $85.95. Personal information manager package is now easier to use and offers many new features. The excellent linking between contacts and calendar is the most significant feature. Sep 94

DateView 1.0.1 (1.0.2), Advanced Software, 515/225-4163, $99.95. If you're willing to sacrifice some features to get simplicity and speed, this calendar/to-do manager makes sense. It integrates with the contact manager, InTouch. Aug 94

Dynodex for Macintosh 3.5, Portfolio Software, 802/434-6400, $69.59. Although this program doesn't currently link to a calendar, it's an excellent contact manager. This upgrade has a few new features, improved performance, and an easier interface. Sep 94

In Control 3.0.4, Attain Corp., 617/776-1110, $85. Excellent to-do-list manager and outliner, coupled with a good calendar; a strong choice if you live and die by to-do lists. It does have some oddities, though, such as not allowing you to copy across views. Oct 94

Now Contact 1.0 (1.1), Now Software, 503/274-2899, $69. This contact manager has some innovative features and could easily become the top address-book program for the Mac by adding some features, such as file reconciliation. May 94

Rae Assist 1.0.2 (1.5), Rae Technology, 408/725-2850, $99. Although this personal information manager offers some fresh ideas, including automatic linking of company and contact information, it's too big and too slow. Jan 94

TimeSquare 1.0, Team Building Technologies, 514/278-3010, $149. Fast, flexible, network calendar program has lots of handy features, but it's missing a few as well, such as multiday events and label grouping. Aug 94

Adobe Premiere 3.0 (4.0), Adobe Systems, 415/961-4400, $695. Solid and dependable QuickTime video-editing software offers a structured, responsive, and flexible interface with enhancements that range from the mundane to the dramatic. It can now mix 99 tracks. Jan 94

Animation Master 2.0.5, Hash Enterprises, 206/750-0042, $699. Although this animation software packs extraordinary power at a reasonable price, it's needlessly difficult to learn and prone to instability. Oct 94

Astound 1.0, Gold Disk, 408/982-0200, $399. Presentation software lets you include sound, text, and graphics animation with no more effort than pasting in a chart in other programs. It's a good value. Nov 93

Authorware Professional 2.0.1, MacroMedia, 415/252-2000, $499.50. Multimedia-authoring and -presentation software lets you develop complex presentations with amazing speed. Although expensive, it's wonderfully done and will pay for itself in time saved. Feb 94

Avid VideoShop 2.0, Avid Technology, 508/640-6789, $499. QuickTime video-editing program shines in its intuitive, easy-to-use interface, although it may fall short on features for hard-core video professionals. Feb 94

Deck II 2.1, OSC, 415/252-0460, $399. AV Mac turns into digital-audio workstations with this software that enables you to record, mix, modify, and play back CD-quality sound. It doesn't include equalization. Jun 94

Elastic Reality 1.0 (1.2), Elastic Reality, 608/273-6585, $349.95. Exciting morphing tool can create professional-caliber results—if you can figure out how to use it. The needlessly convoluted interface, poor documentation, and inadequate tech support make that a difficult task. Feb 94


HyperCard 2.2, Apple Computer, 408/956-1010, $249. Authoring tool strikes a good balance between power and ease of use, and its price is reasonable. It may not satisfy all your wishes, but it should keep you happily building stacks until the next version comes along. Sep 94

Macromedia Director 4.0, Macromedia, 415/252-2000, $1195. Although this multimedia program remains far from easy to use, this admirable upgrade increases the program's power and improves its interface. Multimedia professionals will continue to find it the best package available. Sep 94

Morph 2.0 (2.5), Gryphon Software, 619/544-6836, $239. Easy to use, morphing software is beautifully designed, with delightful new features, including the ability to morph QuickTime movies. Using it is as painless as morphing gets. Apr 94

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 make leaps into multimedia easier and more rewarding. Sep 94

Passport Producer Pro 1.0 (1.1.2), Passport Designs, 415/726-0280, $995. Supper, albeit quite expensive, media-integration package makes assembling even complex presentations surprisingly easy. Path animation is limited to entrances and exits. Apr 94

Persuasion 3.0, Aldus Corp., 206/622-5500, $329. Users have plenty of new features to chew about, including improved tool palettes, extensive charting options, and hypertext functions with this presentation graphics program's upgrade. High memory and disk-space requirements are drawbacks, however. Sep 94

QuickFlix 1.0 (1.1.1), VideoFusion, 419/891-1069, $149. Approachable QuickTime movie-making software lacks the high-end features of other programs but costs a whole lot less. Feb 94

IDL 3.5, Research Systems, 303/786-9900, $1500. In this shockingly powerful, compact, graphics-oriented, interpreted language, a single command is worth a page of C-language code. Oct 94

Object Master for Think C and C++, ACI US, 408/242-4444, $255. Object-oriented development environment is now full of goodies and will pay for itself in a week due to increased programmer productivity. Apr 94

Smalltalk/v for Macintosh 2.0 (2.02), DigitalTalk, 714/513-3000, $495. Object-oriented development system is now even more viable for commercial projects, while DigitalTalk's customer support and documentation set a standard other vendors should emulate. Feb 94
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Star Ratings

★★★★★ Symantec C+ for Macintosh 6.0 (7.0), Symantec Corp., 503/334-6054, $499. If you like Think C, you’ll like this software-development system, too. For the Mac, it’s an excellent opportunity to catch a new wave in programming. Nov 94

★★★★★ VIP BASIC 1.0.1 (1.0.3), Mainstay, 805/484-9400, $295. Popular programming language lets programmers who know only BASIC get started producing real, if interpreted, Mac programs. It’s a serious developer’s tool, though it’s not on the same footing as VIP-C. Jun 94

★★★★★ VIP C 1.0.1 (1.5.1), Mainstay, 805/484-9400, $495. If you’ve mastered the rudiments of C, this programming-code generator will let you code about ten times faster than you could using only an editor. Its real strength is in rapidly assembling smaller projects. May 94

Utilities

★★★★★ AppleSearch 1.0, Apple Computer, 408/996-1010, $1799. Although it has some rough edges, this product for archiving and retrieving text is highly useful. It presents retrieved information clearly and extracts text from documents in many formats. May 94

★★★★★ Atticus Vista 1.0 (1.0.2), Atticus Software Corp., 202/896-5050, $59.95. Control panel and application automation catalyzes the disks you mount on the desktop. It has a few problems, including limited search options, but it can help bring order to disorganized disk collections. May 94

★★★★★ Automap Road Atlas for Macintosh 2.01 (2.04), Automap, 206/455-3552, $99.95. Mapping software tells you how to get where you’re going better than any other map software or software reviewer has seen. Although screen redraw is slow, it’s worth it for the written directions and maps. Jun 94

★★★★★ CD AllCache 2.0, CharisMac Engineering, 916/885-4420, $79.95. CD-ROM accelerator improves access time by caching a CD’s directory and putting its most frequently used data into RAM. Despite this software’s limitations, most CD addicts will find the speed improvement worth the trouble. Sep 94

★★★★★ CD-ROM Toolkit 1.0.5 (1.1), FWB, 415/474-8055, $79.95. Software accelerator can halve the time it takes to open files and search on a CD-ROM. Problem: QuickTime movies are often uneven. May 94

★★★★★ Conflict Catcher B.2.1.1, Cassidy & Greene, 408/484-9226, $79.95. Customizable, fast, and safe extension-management utility goes well beyond the basics. For Power Macintosh users, it even tells which extensions aren’t written in native code and are likely to slow down Power Macs. Oct 94

★★★★★ Connectix Desktop Utilities 1.0 (1.0.4), Connectix Corp., 415/571-5100, $99. Although some of the 16 utilities offered in this package are more at home on a Powerbook, this collection offers one-stop shopping at a low price. Nov 94

★★★★★ Copyright Pro 1.0.3, CSG Technologies, 412/471-7170, $79. Utility takes over the Finder’s copying function, copies in the background, and allows you to regularly schedule copying. Nov 93

★★★★★ CryptoMatic 1.0.1, Kent Marsh, 713/522-5625, $99. Security software offers fast file-encryption and decryption with effective file-rewriting. Although its simplest encryption algorithm isn’t quite hacker-proof, it’s worth considering. Feb 94

★★★★★ DiskDoubler 4.0, Symantec Corp., 503/334-6054, $79.95. In pure efficiency terms, this file-compression software is a winner, but it lacks many features of previous versions, including passwords on self-extract-
I want a full-featured, proven market leader which can handle any job: 2D, 3D, cost estimation and client presentations.

I want a program that runs on both the 68K-based Macintosh and the Power Macintosh. At no extra charge!

I want a CAD program that is tailored to my needs, with specialized tools for architecture, mechanical engineering and design.

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MiniCad 5 offers all of the above and more. The award-winning software has been hailed as the “features champion” by Macworld Magazine (March, 1993). Further, Graphsoft is dedicated to aggressive investment in CAD R&D. Graphsoft customers stay more productive than their competitors because Graphsoft supports both the latest technology and evolving user needs. MiniCad has long been the price/performance leader in Macintosh CAD. Don’t be steered away from MiniCad by VARS who want you to buy high-priced CAD products that are hard to learn and only do a few things well. The VARS won’t tell you that MiniCad 5 ships with a multi-media training CD, or that you receive 18 months of free technical support with Graphsoft products or upgrades. In short, MiniCad keeps more of your money in your pocket. Buy MiniCad 5 and save!

MiniCad 5 also includes: speed increases up to 100% even on 68K-based Macintoshes, a Claris CAD conversion program including a S495 upgrade price, a Claris CAD translator, and a helpful conversion guide, translators for importing and exporting to the other major CAD products, an upcoming Windows version, multi-media training CD 18 months of free technical support and a no-hassles 30-day money-back guarantee through authorized dealers. Contact Graphsoft today for detailed literature. To order immediately, call MacWarehouse, MacConnection, or your local dealer. Demo: $19.00
**BUYS’ TOOLS**

**Star Ratings**

Item with myriad utilities and system software tools. Mar 94

- Toner Tuner 1.0.3 (1.0.6), Working Software, 408/423-5696, $24.95. Inexpensive, incredibly useful extension adds a slick bar to print dialog boxes, allowing you to adjust the amount of toner applied to each print job. If you can't save trees, you can at least save toner. Dec 93

- ultraShield 1.252 (2.0), uszE Software, 714/756-5140, $149. Sophisticated security product combines practically every feature you might need into an integrated package. Dec 93

- UnderWare 1.0.1, Bit Jugglers, 415/968-3908, $59.95. Inspired, silly fun for your Mac’s desktop comes from a control panel that adds three features: a screen saver, desktop patterns, and animations that run on your desktop while you work. The price for this whimsy is mostly in disk space. Jun 94

- Vires 5.0 (5.03), Datawatch Corp., 919/549-0711, $99.95. The extremely fast, trouble-free performance of this software makes the task of guarding against computer viruses almost painless. Its speed puts it ahead of the pack. May 94

- VirtualDisk 1.1a (2.0), Continuum Software, 206/695-8136, $79. Rapid disk cataloging fast, efficient, and excellent disk-copy utility make this software package a wonderful value. Jul 94

- Working Watermarker 1.02 (1.06), Working Software, 408/423-5696, $49.95. Simple, useful system extension allows you to print or fax text and/or graphics “watermarks” in the background of virtually any document. Although it has improvements, it’s earned a permanent spot in our reviewer’s System Folder. Jan 94

**VERTICAL MARKETS**

- Claire, The Personal Music Coach 1.0.1, Opcode Systems, 415/856-3333, $129.95. Musicianship program teaches pitch and interval recognition, sight singing, and intonation. Although the interface is nonstandard, it’s logical and easy to learn. May 94

- Finale 3.0.1, Coda Music Technology, 800/843-2066, $749. Upgraded music notation software is now infinitely more pleasant to use. Its comprehensive feature set makes it the standard against which all other music notation products must be judged. Dec 94

- MacInteors 1.0 (1.3), Microspot, 408/253-2000, $129. Correctly placing objects is unduly cumbersome in this interior-design software, but once you catch on to the program’s quirks, it’s useful. Feb 94

- Mayo Clinic Family Health Book 1.2, IVI Publishing, 612/686-0779, $69.95. Medical CD-ROM for home use deals with the full gamut of healthcare topics, from AIDS to yogenes, although it doesn’t include any reference to alternative therapies. Sep 94

- Mayo Clinic The Total Heart 1.0, IVI Publishing, 612/686-0779, $59.95. Cardiovascular health and related subjects are the topics of this medical CD-ROM for home use. Although it makes liberal use of drawings, photographs, and animations, video sequences would have been more effective. Sep 94

- MusicTime 2.0, Passport Designs, 415/726-0280, $149 to $245. Music notation program is geared for hobbyists and students. If your needs aren’t complex, it may fit the bill, at a great price. Oct 94

- Sailing Master 1.1, Starboard Software, 313/662-4393, $64.99. Though the slow speed and jerky motion point to less-than-polished programming, this sailboat-racing simulation offers good tactical play and is fun—well worth the price for sailing competitors. Nov 93

- 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

- WillMaker 5.0, Nolo Press, 510/549-1976, $69.95. Legal software quickly and easily automates the creation of wills, health-care directives and proxies, and final arrangements documents. It offers excellent supporting explanations and background. Jun 94

**WRITING TOOLS**

- MacWrite Pro 1.5 (1.5 v2), Claris Corp., 408/727-8227, $249. The clean, uncluttered interface of this low-to-middle-level word processor is still one of its major assets. This upgrade adds support for QuickTime, PowerTalk, AppleScript, and more. May 94

- The Oxford English Dictionary, Oxford University Press, Electronic Publishing, 212/679-7300 ext. 7370, $895. CD-ROM dictionary contains 20 print volumes, including half a million words, but the flaws, omissions, unreliability, and unforgivingly poor design are unacceptable. Apr 94

- Random House Unabridged Dictionary, Random House Electronic Publishing, 212/572-2600, $179. The most comprehensive American-made dictionary on CD-ROM works within any program and is good at guessing misspelled words. Although some functions don’t work reliably, the quality and design of the software are better than those of other on-disk dictionaries. May 94

- TextBridge 2.0, Xerox Imaging Systems, 508/977-2000, $99. Optical character recognition software is impressive on good documents and can be trained and automated. You won’t find that anywhere else at this price. Sep 94

- Thunder 7 1.5.3, Baseline Publishing, 901/682-9676, $99.95. Stand-alone spelling checker and thesaurus automatically monitors your keystrokes and alerts you to potential errors as they are entered. It quickly and transparently prevents you from making embarrassing typos. Nov 93

- WordPerfect for Macintosh 3.0 (3.0a), WordPerfect Corp., 801/225-5000, $495. The innovative interface of this word processor uses context-sensitive button bars and expandable rulers to make innumerable features accessible with a click of the mouse. It’s an accomplishment in ease of use. Mar 94

- WriteNow 4.0.1, WordStar International, 617/494-1200, $119.95. Tidy word processor’s conservative use of memory (the application fits into a dainty 680K portion) and graceful interface will continue to win it enthusiastic fans. This version adds elegant table capabilities and PageStar-friendly features. Jun 94

- A Zillion Kajillion Rhymes 1.0, Eccentric Software, 206/628-2687, $49.95. Rhyming dictionary is quick, small, simple, and self-contained; but it only rhymes with the roots of search words (and ignores -ed, -s, and -ing endings). Nov 93

**HARDWARE**

**INPUT DEVICES**

- DrawingState, CalComp Digitizer Division, 714/821-2000, $395. Digitizing tablet is a good, compact, low-cost implementation of pressure sensitivity, although the battery-powered stylus is a bit heavy. Jun 94

- Ear Phone Streamline AV, Jabra Corp., 619/622-0764, $169. As a hands-free telephony tool—and as a replacement for the Apple PlainTalk microphone—that telephone/speech-recognition expertise is a winner. Its biggest drawback is that you can’t hear other Mac sounds, such as modem tones, when it’s plugged in. Jul 94

- PenDirect ADB, FTG Data Systems, 714/959-3900, $398. Input device lets you manipulate items on the Macintosh screen using a special stylus called a light pen. It works well, although it seems ergonomically inferior to a mouse for routine tasks. Mar 94

- TrakMate, Key Tronic Corp., 509/928-8000, $149. Input device integrates a trackball into a wrist pad. While the design is interesting, it’s not for everyone. Feb 94

- Wacom UD-1212R, Wacom Technology Corp., 206/750-8882, $749. Graphics tablet with pressure-sensitive stylus is easy to use and highly customizable, though it’s incompatible with AppleTalk and AppleTalk Remote. May 94

**MISCELLANEOUS HARDWARE**

- ACS100, Altoc Lansing Consumer Products, 717/296-2818, $180. Lightweight powered speakers don’t sound as good as they should. There’s too much emphasis on the high end at the expense of the midrange, and they hiss noticeably. Dec 93

- ACS150, Altoc Lansing Consumer Products, 717/296-2818, $150. Subwoofer rounds out the sharp tones of the ACS100, but the bass response is neither punchy enough nor loud enough, and the unit is about the size and weight of a concrete block. Dec 93

- AppleDesign Powered Speakers, Apple Computer, 408/996-1010, $179. Tall and curvy powered speaker set looks and sounds good and can produce uncomfortably high volumes without noticeable distortion, but the bare-wire-and-terminal connections aren’t user-friendly. Dec 93

- Apple Newton MessagePad, Apple Computer, 408/996-1010, $699. Although Apple released this personal digital assistant too early and marketing hype led to mistaken expectations, this is a very intelligent piece of work with an impressive variety of serious business uses. Dec 93

- Apple PowerCD, Apple Computer, 408/996-1010, $400. This extremely versatile and beautifully designed portable CD-ROM drive offers impressive audio and Photo CD features, but if you’re a serious CD-ROM user, it’s too slow to satisfy. Jan 94

- G-Vox, Lyrrus, 215/922-0880, $399. Hardware-software guitar-instruction package lets your Mac “hear” the notes you play on your guitar. Although the hardware works well, the software has some basic problems and doesn’t live up to the hardware. Apr 94

- Hello Music, Yamaha Corp. of America, 714/522-9240, $499. MIDI starter kit includes an impressive tone generator that’s compatible with General MIDI Level 1 and Roland MT-32, but the included software is functional at best. Dec 93

- Macintosh TV, Apple Computer, 408/996-1010, $2079. As a computer, this combination computer-television-CD player is sleek but slow. You can get faster performance and better expandability from several less-expensive Performa models. Apr 94

- PowerLink Presenter, E-Machines, 503/ continues.
With LOGICODE'S new QUICKTEL DATASAFE™ 28,800 fax/modem, you not only get the fastest available data transmission speeds, but you gain the added security of having total control over the use of your modem.

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Circle 297 on reader service card
BUYERS' TOOLS

Star Ratings

646-6699. **$499.** Simple, compact Duo deck wobbles a bit but provides fine support for a variety of displays, plus ports for AOB, floppy drive, and sound output. Nov 93

PowerNet, Tecnologgin, 513/321-1777, $169.95 to $299.95. Line of long-lived, external PowerBook battery packs, each of which lets you work for three to five times as long as the usual Power Book battery. Unfortunately, the System 7 power manager periodically alerts you that your battery is not charging and dims the screen though battery pack has hours of time left. May 94

SCSI Sentry, APS Technologies, 816/483-6100, $99. Although the price of this terminator may seem steep, this device may well be the cure for SCSI woes. Our reviewer heartily recommends it. Sep 94

ThinPack, VSP Power Systems, 508/287-4600, $199.95. External battery pack for PowerBooks is compact, with a lightweight design. It comes with handy power-management utilities. Mar 94

TurboDialer, Advanced Software, 408/995-3264, $69.95. Automatic telephone dialer is a well-executed good buy, except for occasional computer noise that seeps into phone conversations. If you constantly dial numbers that are stored in your computer, this product will save you time and energy. Jul 94

Yamaha YST-M10 Powered Monitor Speakers, Yamaha, 714/522-9240, $149.95. Powered speakers have a good balanced sound and a great volume range at an astounding price. Apr 94

MODEMS/NETWORK HARDWARE

AsanteHub 1012, Asante Technologies, 408/435-8388, $1299. This 12-port, 10BaseT Ethernet hub works right out of the box and is a premium device at a bargain price. Dec 93

Cypress PhonePro 1.2 (1.4), Cypress Research Corp., 408/752-2700, $349 to $950. By improving its integration with FaxPro and with PowerTalk and PowerShare, this powerful telephony software has greatly extended its business scope. May 94

DataLink PB: AxcelCell Cellular Interface, Applied Engineering, 214/241-6600, $824. If you need a full-blown office on the beach, this PowerBook cellular-modem package with automatic answering machine is a well-executed solution. Each recorded second requires 25k of disk space. Nov 93

EtherWave, Parallon Computing, 510/814-5000, $129. If you need to expand your network at a reasonable price with minimal fuss, get this Ethernet transceiver. Instead of providing only 10BaseT twisted-pair jack, it includes a second jack that allows you to daisy-chain to another device through an additional 10BaseT line. May 94

OneWorld Fax, Global Village Communication, 415/390-8200, $999. Easy-to-use network fax product lets an office share fax-sending resources without dedicating a hand drive and CPU, however, it can't receive faxes and can't queue more than one fax document at a time from a single CPU. Aug 94

PerFit Port-A-Com, PerFit, 303/530-7333, $3149. Compact, 10BaseT-powered, high-speed fax/data modem is difficult to configure, due to its Spartan and poorly organized documentation, but it's still a solid product at a reasonable price. Nov 93

Spectra-Com P192mx, Bay Connection, 408/270-8070, $199.95. If you must have absolute portability and AC power isn't available, this pocket data/fax modem can do the job. It's not that much smaller than a regular desktop modem. However, Oct 94

SupraFaxModem 144PB, Supra Corp., 503/967-2400, $349.95. If you're looking for a high-speed internal modem for your PowerBook, and you want to save a few bucks, this modem is worth considering. Disabling its fax software solved occasional transfer problems. Nov 93

SupraFaxModem 288, Supra Corp., 503/967-2410, $329.95. This 28,800-bps fax modem is a very good performer, as good as or better than 14,400-bps modems, and the price of admission isn't terribly steep. Combined with fast, stable fax software and a good terminal program, it's hard to beat. Aug 94

Watermark Message Central 2.0.2, High Tide Software, 510/704-9927, $499. If you're willing to put in a lot of effort, you'll find this highly sophisticated voice-mail system supremely flexible. It includes a specially modified modem with voice chip, as well as fax software and telecommunications software. Jul 94

PRINTERS

Apple Portable StyleWriter, Apple Computer, 408/996-1010, $439. Sleek, portable ink-jet printer weighs 4.5 pounds and is a pleasure to use. It uses standard StyleWriter cartridges, Jan 94

Brother JH-400, Brother International, 908/356-8880, $369. Compact, 360-dpi ink-jet printer is fairly slow and does not allow background printing. Some large files require additional application memory to print correctly. May 94

Yamaha YST-M10 StyleWriter Pro, Apple Computer, 408/996-1010, $629. Color printer represents one of the best values in the inexpensive color-printing market. It's fast, produces nice-looking output, and has some good features, including a great way of handling color ink cartridges. Sep 94

DeskWriter 310, Hewlett-Packard, 800/752-0900, $379 to $455. Versatile, low-cost ink-jet printer is a 4.3-pound, battery-powered moderm. With its 80-page sheet feeder, it's also a great desktop printer, and with a $19 color print cartridge, it offers inexpensive three-color printing. Mar 94

HP LaserJet 4ML, Hewlett-Packard, 800/752-0900, $1279. Primarily for those of you who use a PC or work in a small, mixed-platform environment, this energy-efficient laser printer offers automatic port and language switching, and is a good buy. Its advanced PC features may not be worthwhile for those who use Macs only. May 94

LaserWriter Select 360, Apple Computer, 408/996-1010, $1599. Low-cost, high-performance, 40-ppm perfect for small LocalTalk or mixed networks. For bigger networks, consider buying more than one; they're more cost-effective than a 20-ppm printer. Apr 94

MobileWriterPS, Mannesmann Tally Corp., 206/251-5524, $999. Fast, portable printer is currently the only PostScript portable available. While the print quality is quite good on glossy laser paper, it’s mediocre on inexpensive bond. Dec 93

Notebook Printer II, Citizen America, 310/453-0614, $399. If weight and size are your biggest concerns in choosing a portable printer, and you print primarily in black and white, this thermal-fusion printer may be a good choice. If speed is an all or issue, however, other options may be preferable. Jun 94

Personal LaserWriter 320, Apple Computer, 408/996-1010, $599. If you’ve been holding out for a high-quality personal laser printer that’s fast enough to share over LocalTalk, the small inconveniences of this 300-dpi printer are easily outweighed by its low price, good speed, and PostScript Level 2 support. May 94

PowerPrint 2.5, GDT Softwalks, 604/291-9121, $149. Inexpensive hardware-software combo lets you print from your Mac to almost any PC printer. It supports over 1000 printers, ranging from aging dot matrix models to the newer color ink-jet and laser printers. Sep 94

P-Touch PC, Brother International Corp., 908/356-8880, ext. 4307, $449.95. Versatile label printer is easy to set up and use, and produces high-quality output. The cost per label is high, though, and the documentation is weak. Sep 94

QMS ColorScript Laser 1000, QMS, 205/633-4300, $7799. Color laser printer succeeds in combining the versatility of monochrome laser printing, with attention-getting color, but if you don't need to chase rainbows right away, you might wait and see if competition drives capabilities up. Jul 94

Silentwriter 640, NEC Technologies, 508/624-8000, $825. With 3MB of RAM, PostScript Level 2 support, and a 6-ppm engine, this printer is a capable performer. Generally, it represents hassle-free printing, but it doesn't handle single sheets of paper well. Jun 94

Smart Label Printer Pro, Seiko Instruments, 408/922-5900, $299.95. If you need to print only a few labels at a time, this label printer may be an expensive but good choice. It prints very quickly, and with excellent print quality. May 94

SCANNERS

Coolscan LS-10e, Nikon Electronic Imaging, 516/547-4200, $2600. Compact desktop scanner for digitizing images from 35mm transparencies is slow, but delivers images good enough for newspaper publications and some catalogs. Dec 93

IX-4015 Color Image Scanner, Canon Computer Systems, 714/438-3000, $1169. The price of this color flatbed scanner is competitive, and its speed and excellent bundled software make it easy to use and a good choice for the small office. If you can get by without legal-size scans, it should serve you well. Jul 94

LightningScan Portable, Thunderware, 510/254-6581, $459. Powerbook owners will find this hand scanner's modular or serial-port connection, lightweight interface, and total portability well worth the cost, although the scanner is incompatible with some desktop Macs. Dec 93

Mirror 800 Plus Color Scanner, Mirror Technologies, 612/830-1549, $999. Add the NuBus JPEG board ($300) and easy-to-use 35mm transparencyscanning module ($599) and you get a mill—far—desktop-scanning package for a reasonable price. Jan 94

ScanMaker 35t, Microtek, 310/297-5000, $1999. Speedy 35mm film scanner accommodates loose film and delivers a good image, but the included software is weak. Dec 93

SYSTEMS/STORAGE

Alacrite PM 6100, KS Labs, 614/374-5665, $165. Installing a clock booster is the quickest, easiest, and cheapest way to extract more power from Apple's continues
Introducing the ScanMaker® III, the first 36-bit, single-pass, color flatbed scanner that's also the best value in the cosmos.

The ScanMaker III's 36-bit color scanning capability allows it to capture an astronomical 68 billion colors. It has an optical density that reaches 3.4, unprecedented for a flatbed scanner, which results in a vastly expanded dynamic range. What all this means is, that your scanned images will have smoother color gradations, denser color values and substantially increased detail in shadow and highlight areas.

Performing like scanners priced somewhere in the stratosphere, the ScanMaker III's scans are so sharp, you will actually reduce the amount of time spent in post-scanning software to sharpen images. And its optical resolution of 600 x 1200 dpi (enhanced through software to 2400 x 2400 dpi) is great for enlarging small originals.

For accurate scanned color, DCR™ (Dynamic Color Rendition), Microtek's award-winning color calibration/correction system calibrates the ScanMaker III to a photographic industry-accepted calibration target creating a custom profile of your specific scanner. This ensures the most accurate color possible as you scan an image, so you spend a lot less time adjusting the color of your scans to match your originals.

Windows users also get Microtek's ScanWizard™, a drag and drop application for instant image management, faxing and printing. The ScanMaker III also includes the full-version of Adobe Photoshop for complete image editing and color separations.

See why Microtek is the universally accepted leader in image quality. For more information about the ScanMaker III, DCR, ScanWizard, or for the name of your nearest authorized Microtek reseller, call 1-800-654-4160.

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Better Images Through Innovation.

Circle 287 on reader service card
entry-level Power Mac. Oct 94

Conley SR2 RAID System, Conley Corp., 212/682-0162, $25,315. 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. For critical tasks requiring redundancy and round-the-clock operation, this is one of the best Mac RAID systems shipping. Sep 94

EtherDock, E-Machines, 408/541-6100, $569. Heavy-duty Duo docking option is equipped with a set of 11 ports, including an Ethernet port. The locking mechanism is alarmingly wobbly—although reliable enough to ensure a good connection. May 94

Expert Pad PI-7000, Sharp Electronics Corp., 800/237-4277, $589. Personal digital assistant features the advantages of the Newton, in a better industrial design and at a competitive price. This battery lasted longer and the message network were implemented, the PDA revolution could begin. Feb 94

HP Optical Disk Library 10LC, Hewlett-Packard, 800/752-0900, $9495. Optical jukebox may fill the need for 10 gigabytes of online storage, but its performance is poor, and the software lacks the features needed for adequate management. Jan 94

LC 375, Apple Computer, 408/996-1010, $1699. For students and small-business professionals who want high power and the convenience of having everything integrated into one case, this 33MHz 68040 system is an ideal choice. Jun 94

Newton MessagePad 110, Apple Computer, 408/996-1010, $559. This is the personal digital assistant that Apple should have shipped in August 1993, with improved handwriting recognition, including deferred and letter-by-letter recognition. It also has more memory, longer battery life, and a more efficient design. Aug 94

NuTeq Duo, NuTeq USA Corp., 408/973-8799, $2996. Macworld is both a PC and a Mac in a single box, but because of incompatibilities and problems, the Duo is not a computer anyone should consider using for serious work. Feb 94

OrangePC Model 200 Series, Orange Micro, 714/779-2772, $1139 to $3237. If your goal is to get a Mac that runs Windows as fast as a PC, you can't get there from here. If your goal is to get business-level performance for day-in, day-out use, these PC/compatibles are probably your best choice. Aug 94

PLI Infinity 270 Turbo, PLI, 510/657-2211, $565. This 270MHz SupeRive drive is fast, reliable, and a very good product. The cost of the medium is competitive with that of drives. Sep 94

PowerBook 140 F/25 Upgrade, Digital Eclipse Software, 510/547-6101, $399. By changing the oscillators and adding an FPU, Digital Eclipse changes PowerBook 140s into 170s, minus the active matrix screen. While the upgrade seems expensive, it is the only way to extend the viability of a 140. Dec 93

PowerMac 540c, Apple Computer, 408/996-1010, $4839. The prestige PowerMac du jour, this sleek, crude and futuristic-looking notebook makes a good computer for both on-the-road and in-the-office use. Its nonstandard battery, memory, and Ethernet ports are not ideal features, however. Oct 94

PowerBook Duo 270c, Apple Computer, 408/996-1010, 4/240 $3099. Notebook computer meets all the demands of power users: it weighs less than five pounds, features a color active matrix display, and offers longer battery life. The lack of a floppy drive can be inconvenient, though. Feb 94

PowerBook Duo 280c, Apple Computer, 408/996-1010, $3759. If you travel a lot, this notebook computer is hands down the best Mac to get. It offers ease to the power of a Quadra 450 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. If you don't need NuBus expansion, consider other options. Oct 94

Power Macintosh 6100/60, Apple Computer, 408/996-1010, base model $1819. Given its price and performance, this Power Mac is hard to resist. When developers offer in PowerPC format the software that most businesses run daily, this should be a system that will give you power to spare. Jun 94

Power Macintosh 7100/66, Apple Computer, 408/996-1010, $2899. Midrange Power Mac makes an outstanding workstation whose power should last for several years. The price is nothing to take lightly, but this system delivers every dollar's worth. Aug 94

Power Macintosh Upgrade Card, Apple Computer, 408/996-1010, $699. Current 33Mhz 68040 machines will get the best bang for the buck with this card, which is a less expensive upgrade path than a standard motherboard replacement. However, other Macs won't realize as much of a performance gain. Oct 94

Quada 605, Apple Computer, 408/996-1010, 4/80 $597. Never before has Apple offered so much performance for so little money. The price and performance of this 040-based machine match those of a standard entry-level 486sx-based Windows PC. Mar 94

Quada 840AV, Apple Computer, 408/996-1010, E/230 $4069. Technological tour de force uses a 40MHz 68040 and an AT&T 3210 digital signal processor, and is brimming with sophisticated speech-recognition and audiovisual technology. Beware of hardware and software incompatibilities. Dec 93

SCSI MicroDock, Newer Technology, 316/685-4904, $175. Tiny Duo docking station is just under 4 1/2" inches and barely 5.5 inches long. It adds only an ADB port and a SCSI port—but both are useful. May 94

SledgeHammer2000FMMF, FWB, 415/474-8055, $1379. RAID drive is both fast and inexpensive. Although it can be a bit noisy when accessing data, it's a good deal. Apr 94

Turbo 040, DayStar Digital, 408/967-2077, $1899. This accelerator card is equipped with the fastest 68040 chip available and is as fast as or faster than any Macintosh in processor-intensive tasks. For the price, however, it may make more sense to trade up to a faster computer. Dec 93

VIDEO/DISPLAY

Apple Macintosh Display Card 24AC, Apple Computer, 408/996-1010, $1579. 24-bit accelerated graphics cards offer a satisfactory price/performance ratio, although it can't switch resolutions from the keyboard. Oct 94

Apple QuickTake 100 for Macintosh, Apple Computer, 408/996-1010, $749. If you're in the market for a medium-quality, digital color camera that costs less than $1000, this is the best deal around. But if you're not in a hurry, you may want to wait until some of the camera's more obvious problems, such as its fixed-focus lens and lack of a zoom option, are ironed out.

AudioVision 14 Display, Apple Computer, 408/996-1010, $769. Monitor integrates audio and video with built-in speakers that produce surprisingly rich, full-bodied sound. The display, while nice, is small for multimedia work. Dec 93

Editing Aces Suite, RasterOps, 801/785-5750, $3899. Video professionals can record and play back full-screen movies in 24-bit color with 16-bit color-quality sound with these products. Despite flaws, this package represents a step forward in QuickTime technology. Nov 93

Intellicolor Display/20, Radius, 408/ 424-1010, $3299. Although with its exceptional brightness and clarity this monitor would be a fine addition to any designer's desk, the included Intellicolor software, which lets you control the settings of your display, doesn't offer much added value. Apr 94

L-TV Portable, Focus Enhancements, 617/938-8088, $299. Studied, inexpensive, external TV-converter plug into your Mac and converts video output to NTSC. It provided a crisp, clear image, but mild flickering and conspicuous phosphors were present. Aug 94

L-TV Pro NuBus, Focus Enhancements, 617/938-8088, $3999. NuBus card converts your Mac's RGB video signal to NTSC to use your Mac with a TV or VCR. It supports a wide range of Macs, but the image has some flicker and distortion, despite flicker-filtering software. Aug 94

MovieMovie, Sigma Designs, 510/ 770-0100, $349. This 7-inch NuBus video-capture board may be what you've been waiting for. The price is right, and the addition of on-board audio input is a plus, even if it is only mono. Dec 93

The Presenter Plus Mac/PC, Consumer Technology Northwest, 503/643-1662, $429. Small, external TV-converter supports output to television from most Macs with built-in video. It does a barely passable job of providing a stable image. Aug 94

QA-350 LCD, Sharp Electronics Corp., 800/237-4277, $2495. At less than half the cost of a typical active matrix LCD panel, this passive matrix projection panel offers an economic alternative for presenters who don't need multimedia capability. Jul 94

L-Radius LeMansGT, Radius, 408/434-1010, $2499. Fast, 24-bit accelerated graphics card has automatic 30-bit CLUT calibration and can switch resolution on the fly via a pop-up menu. Aug 94

RasterOps Horizon 24, RasterOps, 408/ 562-4200, $1999. This 13-inch 24-bit accelerated graphics card is slower than anticipated and overpriced. The ROM can, however, be upgraded via software. Oct 94

Simply TV, E-Machines, 408/541-6100, $439. Easy-to-install video card plugs snugly into a PDS slot and allows you to use your Mac with a television for display. The image is impressively flicker-free, but the resolution is limited to 256 colors. Aug 94

SuperMac Spectrum Power1152, SuperMac, 408/541-6100, $1399. Fast, relatively inexpensive, 24-bit accelerated graphics card can switch resolutions from the keyboard and offers zoom and pan options. Oct 94

Tornado Graphics Card, Mirror Technologies, 612/382-5622, $599. Inexpensive 24-bit accelerated graphics card is fast enough to zoom and pan options but is relatively slow. Oct 94
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Circle 29 on reader service card
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Tektronix

Circle 143 on reader service card
Selected and edited by Charles Barrett

The following listings include both time-sensitive promotions and open-ended offers being sponsored by Macintosh vendors and their resellers. Each listing indicates which products have been awarded a star rating in Macworld's Reviews (products rated ** or lower are not eligible for inclusion), have been selected as an Editors' Choice, or have won a World-Class award. In some cases, the editorial evaluation quoted is for an earlier product version. The symbol indicates that the product is Power Mac related.

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.

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**BUNDLES**

- **Canvas 3.5 + Clip Art + TrueType Fonts** Deneba Software is including 10,000 clip art images cataloged in an Image Browser graphics database and a cross-platform collection of 2000 text, display, and novelty TrueType fonts on CD-ROM with all versions of its $399 Canvas draw program (Jan 94 *** for the 68000 version). Call 305/596-5644 for more information.

- **Creatrix/Texas + Creatrix Potpourri + Clip Art** Actum Design is offering its $59 Texas collection of 44 EPS images plus its $39 Potpourri collection of 60 EPS images for $69. Call 972/447-6522 to order or to obtain a free interactive demo disk. Offer expires 10/30/94.

- **Dynamo 230 + Macmedia Director 4.0** Fujitsu Computer Products is bundling Macmedia's $1195 multimedia/animation program (Sep 94 *** with its $1295 Dynamo magneto-optical external drive (includes optical disk stand, power supply, software drivers and formatter, and 25-pin SCSI cable). Available through Rocky Mountain Computer Outfitters, 800/908-0009.

- **FileMaker Pro 2.1 + PowerAgent 1.1** South Beach Software is offering its $159 PowerAgent for accessing and distributing FileMaker Pro data, or running its scripts, for $49 (regularly $89.95). PowerAgent also automates AppleScript and distributes information using PowerTalk and QuickMail. To qualify, the latest version of FileMaker Pro must also be purchased ($269, or upgrade for $89 and sidegrade for $99). Available through MacWarehouse (800/255-6227; ask for RAA# 0012). For more information about PowerAgent call 305/908-8416. Offer not to expire before 12/31/94.

- **Kai's Power Tools 2.1 + Color It 2.0** HSC Software is bundling MicroFontier's $149.95 Color It image-editing application (Apr 93 *** for version 2.0.1) with the latest version of its $199 Kai's Power Tools collection of plug-in extensions (May 94 **** for version 2.0a) for such applications as Adobe Photoshop and Fractal Design. Call 310/392-8441 for more information.

- **PenMouse Tablett + Dabbler 1.0** Kurta Corporation is including a free copy of Fractal Design Corporation's $99 Dabbler natural-media draw and paint application (Nov 94 *** with its $249 PenMouse cordless pen, 4-by-5-inch drawing tablet, driver software, and accessory package. Call 800/445-8762 for nearest reseller. Offer expires 12/31/94.

- **PressView 21-T Display System** SuperMac Technology is including a $799 Weekmate SuperWatch Display Calibrator Pro (Nov 94 "Big Screen Close-up" Editors' Choice) with its new $399 21-inch diagonal- aperture-grill display, which supports a top resolution of 1600 by 1200 when used with SuperMac's Thunder II GX1600 graphics card. PressView display-control software and a ColorShield antiglare display hood are also included. Call 800/334-3005 for more information.

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**COMPETITIVE UPGRADES**

- **Apple IP Gateway** Apple is offering this $249 AppleTalk software server to owners of Apple Remote Access Personal Server 2.0.1, MultiPort Server 2.0.1, or Apple Internet Router 3.0.1 for $60 with proof of purchase. In combination with Apple Remote Access products and MacTCP, this gateway makes easy-to-use dial-up access to IP-based services such as Internet. Call 408/862-3385 for more information.

- **Drive 7.3** Casa Blanca Works is offering this $89.95 drive-formating and -acceleration program (Nov 94 *** for owners of any other formatting utility for $40. Call 415/161-2227 for further information.

- **First Things First Proactive 1.1** Visionary Software is offering this $149 scheduling program (Nov 94 *** in 68000) and PowerPC versions to users of competing products for $59 ($39 to current users). Call 800/877-1832 for more information.

- **OmniPage Professional 5.0** Corel Corporation is offering this native-mode version of its $695 OCR package (Nov 94 ***; Nov 93 "OCR: The Recognition You Deserve" Editors' Choice for version 2.1) for $199 to users of competitive products. CorelTextBridge owners can upgrade for $239. Call 800/885-7226 for more information.

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**SPECIAL DISCOUNTS/REBATES**

- **Day-to-Day** Portfolio Software is offering this $149.95 bundle for $89.95 (the Contacts and Calendar modules are available separately for $49.95 each; the Notepad for $29.95). The bundle consists of the following: Day-to-Day (formerly Dynamic) address-book manager (Sep 94 *** and 1993 World-Class for DYDX 3.5); Day-to-Day Notepad (formerly DynaNotepad) for creating outlines, to-do lists, and notes; a new Day-to-Day Calendar module; and a leather organizer. Day-to-Day Contacts allows you to view contacts without opening the application, and features a linking button that automatically creates new Notepad files to keep ongoing records of contact information. Call 800/329-8632 to order. Offer not to expire before 12/31/94.

- **Microsoft Office 4.2** Microsoft Corporation is offering this upgrade of its integrated business-application software for $259 (regular nonupgrade street price is approximately $499) to users of Microsoft Works, Excel, PowerPoint, or Word with the return of a $40 coupon that accompanies the package. Office's applications include Excel 5.0, PowerPoint 4.0, Word 6.0, and a workstation license for Microsoft Mail 3.2. A free copy of Connectix Corporation's $99 RAM Doubler memory-enhancement product will also be included through 3/31/95. A second coupon accompanying the 68000 version entitles you to a free copy of the Power Mac version prior to 11/1/94, at which time both versions are to ship in the same box. Call 800/622-4445 for rebate information. Offer expires 12/31/94.

- **Note-it! Souvenir** ComposeTel is offering a special introductory price of $44 on its $79 Note-it electronic stenotype program, which allows notes to contain styled text with embedded sounds, PICT images, or QuickTime movies; and $49 on its $89 Souvenir networkable contact manager, which is always available by pressing the "key" twice. Call 800/283-5872 (415/327-0744 in California) for more information. Offer expires 10/31/94.

- **Now Utilities 5.0** Now Software is offering a special introductory price of $69.95 ($89.95 regular estimated street price) on the new version of this system utility collection (Aug 93 *** for version 4.0.1). Special multipack prices are also available. Call 800/685-9427 for more information. Offer not to expire before 10/31/94.

- **Signature Series (Professional Stock Photography)** Digital Stock is offering an introductory price of $249 per disc (regularly $349) for this series of photo CDs that highlights the best work of noted photographers in distinct subject areas. Released so far are Western Scenes (Mike Sedom), Undersea Textures (Robert Yin), and Food (Joshua Ets-Hokin). Each disc contains 106 royalty-free photos together with a hi-res, color contact sheet. Call 800/945-4514 to order and for more information. Offer not to expire before 10/15/94.

- **Summagraphics Plotters** Summagraphics is offering reduced list prices on the following series of pen plotters: HiPlot 7000, D- and E-size multipen DMP-160, and single-pen DMP 60SP. HiJetPro C-size monochrome ink-jet plotters are also included. The $3995 A- to D-size HiPlot 7100 is $2949, and the $4995 A- to E-size HiPlot 7200 is $2999. The $2995 DMP-161 is $1799, the $3995 DMP-162 is $2199, and the $5495 162R is $5999. The $1799 HiJetPro V50 is $1499, and the $2495 V10 is $1999. Call 512/895-0900 for more information. Offer expires 10/31/94.
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A. Including yourself, approximately how many people are employed at your entire work site? (i.e., employees in your office, building, or cluster of buildings?)
   01 1000+
   02 999 - 1000
   03 99 - 25
   04 Under 25

B. Which of the following computers are installed at this entire work site?
   01 Apple Workgroup Servers/
      Mac Quadra-series
   02 Mac Centris/IIe/IIePro/Percept/Performa 600/610/SE 30
   03 Mac LC/LC II/Performa 450/650/400/200/Classic Series/SE/Plus/SE/Plus/Portable
   04 Mac PowerBook-series/Duo-series

C. What is the total number of Macs installed at this entire work site? (Check one.)
   01 5000+
   02 499 - 1000
   03 99 - 50
   04 49 - 10
   05 9 - 1
   06 None

D. For how many Macintosh computers within this entire work site do you have purchase involvement for products and/or services? (Check one.)
   01 5000+
   02 499 - 1000
   03 99 - 50
   04 49 - 10
   05 9 - 1
   06 None

E. In which ways are you ever involved in purchase decisions for Macintosh products at this entire work site? (Check all that apply.)
   01 Initiate/Determine need for products and/or services
   02 Evaluate, recommend, or approve brands/models
   03 Evaluate, recommend, or approve purchase source
   04 Authorize purchases

F. Over the next 12 months, how much will this entire work site spend on Macintosh products and/or services? (Check one.)
   01 $1 million or more
   02 $999,999 - $500,000
   03 $499,999 - $100,000
   04 $99,999 - $50,000
   05 $49,999 - $10,000
   06 Under $10,000

G. Considering the entire work site, which of the following Macintosh hardware and software products are currently installed? (Check all that apply.)
   01 Business software (Word processing, spreadsheet, database, etc.)
   02 Graphics publishing software
   03 Monitors/displays
   04 Printers/scanners
   05 Networking/communications hardware and/or software
   06 Multimedia/AV hardware and/or software
   07 Mobile computing products (Powerbook, peripherals, software, etc.)

H. What is your primary job function? (Check one.)
   01 Computer Reseller/MR/A&D
   02 MIS/IP/IS/Network Management
   03 Engineering
   04 R&D/Scientific
   05 Corporate/General Management
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POWER TRANSLATOR

There's a whole new world of new opportunities out there just waiting for you. Reach for these opportunities with the help of Power Translator, you can quickly and easily translate practically any document right from your PC or Macintosh computer. It's an indispensable tool for business that need to translate any document, or for students who want to learn a new language or refresh language skills.

Power Translator can simplify your needs:
- Bi-directional translations. You have the flexibility to use Power Translator regardless of whether your original document is in English or in Spanish, French or German.
- Fast processing power. Power Translator translates over 20,000 words per hour. A manual translation that can be used to take days can be completed in a matter of hours with Power Translator.

$409.99

SPECCULAR COLLAGE 2.0

The Composition Tool of Choice for Adobe Photoshop Professionals
Specular Collage 2.0 lets you manipulate and combine multiple hi-res files quickly and without a lot of RAM. Each image remains a separate object, even after it's been blended and layered with others. Choose from a rich selection of effects like automatic drop shadows, feathering and selected Photoshop plug-ins. This popular image composition tool is a real Power PC active and supports CMYK and large images.

$239.99

POWER TRANSLATOR

There's a whole new world of new opportunities out there just waiting for you. Reach for these opportunities with the help of Power Translator, you can quickly and easily translate practically any document right from your PC or Macintosh computer. It's an indispensable tool for business that need to translate any document, or for students who want to learn a new language or refresh language skills.

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$239.99

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- 15" Digital Multiscan® computer display with 14.0° maximum diagonal viewable area
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- USB Free PWB CD-ROM ToolKit and SCSI cable included.
- Refurbished NEC 3x. Case may vary.

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**VividSpin™ 2x**
Double Speed External CD-ROM Drive!
- High Speed Access: 320m Sec (average)
- High Speed Data Transfer Rate: 300KB/sec 4Kbytes buffer memory
- SCSI cable extra. Case may vary.
- Free CD-ROM ToolKit

- **$189**

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## Quantum's Hard Disk Drives

Quantum's hard disk drives are available in 2.5 and 3.5-inch form factors in storage capacities ranging from 170 megabytes to 2.1 gigabytes.

### LPS 270MB INTERNAL

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Access</th>
<th>Internal</th>
<th>External</th>
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<tbody>
<tr>
<td>170mb</td>
<td>17ms</td>
<td>$259</td>
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<tr>
<td>256mb</td>
<td>17ms</td>
<td>$339</td>
<td>$459</td>
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</tbody>
</table>

### MultiSpin World's Fastest Triple Speed CD-ROM Reader

199

### SEAGATE Hard Drives

Seagate drives include a 30-Day Money Back Guarantee and a 5-Year Warranty. Seagate drives are preformatted and thoroughly tested. The latest Apple system software supported. Also includes formatting utility, software, and cable for internal configurations, and user manual are included.

### 3.5" POWERBOOK DRIVE

<table>
<thead>
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<th>Capacity</th>
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<td>1080mb</td>
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<td>1400mb</td>
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<tr>
<td>2100mb</td>
<td>9.5ms</td>
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<td>$1229</td>
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### 3.5" HIGH PROFILE

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<th>Capacity</th>
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<td>2.9GB</td>
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<tr>
<td>9.1GB</td>
<td>11ms</td>
<td>$3739</td>
<td>$3839</td>
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</table>

### 5.25" FULL HEIGHT

Seagate drives carry a ONE Year Warranty

### NEC MultiSpin 3Xp

The 3Xp combines 3X transfer rate performance, 250ms access time and a 256 KB continuous-data cache in a compact design, making it an incredible value. At only 2.4 lbs the 3Xp is the world's lightest triple speed CD-ROM reader.

### CD-ROM READERS

<table>
<thead>
<tr>
<th>MultiSpin 3Xp CD-ROM Reader</th>
<th>w/o bundle</th>
<th>w/ClubMac CD Bundle</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$385</td>
<td>$485</td>
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### CLUBMAC COMPAQ CD BUNDLE

$800 VALUE

<table>
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<tr>
<th>ClubMac Dual-Speed (External, 320ms access time)</th>
<th>w/ClubMac CD Bundle</th>
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<tbody>
<tr>
<td>$199</td>
<td>$299</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ClubMac Quad-Speed (External, 140ms access time)</th>
<th>w/ClubMac CD Bundle</th>
</tr>
</thead>
<tbody>
<tr>
<td>$199</td>
<td>$299</td>
</tr>
</tbody>
</table>
E-Machines T16 II
The T16 II delivers 75% more display area, providing you with the extra room for full-page keying as well as working with several documents in multiple windows at the same time. Multiple resolutions range from 640 x 480 to 1024 x 768. Additionally, you can view multiple windows with mouse, plus works well with all the standard graphics on the Qaudra and Centris.

MONITORS
14" MultiSync 2V (UC1421VMA) up to 1024 x 768 $449
15" MultiSync 3V (UC1531VMA) up to 1024 x 768 $429
15" MultiSync 4F6e (IC1531VMA-3) up to 1024 x 768 $629
17" MultiSync 5F6e (IC1741VMA-3) up to 1280 x 1024 $899
21" MultiSync 5F6e (IC1741VMA-3) up to 1280 x 1024 $1999
NEC MultiSync carries a THREE Year Warranty. After NEC $55.00 rebate. **After NEC $50.00 rebate. Offer ends 09/30/94

PRINTERS
Silentwriter 640 4 ppm, 300 dpi, 52 form, 5 ppm 1 second $769
Silentwriter 1097 10 ppm, 600 dpi, 33 form PM 575 $789
The Silentwriter 640 carries a Limited Two Year On-Site Replacement Warranty. The Silentwriter 1097 carries a ONE Year Warranty. After NEC $500.00 rebate. Offer ends 09/30/94
HP DeskWriter 310 Printer 600 dpi, 20 ppm, Optional Color $399
HP DeskWriter 310 Printer $439
HP DeskWriter 520 InkJet Printer 9 ppm, 300 dpi, 25 form $259
HP DeskWriter 560x InkJet Printer 9 ppm, 300 dpi, 25 form $259
HP DeskWriter 1200C/PS PostScript Printer 15 ppm, 1200 dpi $2215
LaserJet 4ML Printer 20 ppm, 600 dpi, 20 ppm, 600 dpi $429
LaserJet 4MP Printer 20 ppm, 600 dpi, 20 ppm, 600 dpi $429

POWER PRODUCTS
66 MHz PowerPro 60 (090078) $1315
80 MHz PowerPro 60 (090075) $1999
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80 MHz w/1MB Cache Bundle (000885) $2425
PowerCache without FPU $1689
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30 MHz PowerCache (PC13F 0240) $1415
PowerCache Adapter $99
Not used for 6x, 6xv, Performa 600

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...AND THE AWARD GOES TO

APS MS 4110
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Get the APS 1/"540 internal for only $299!
The APS 1/"540 delivers seek times as low as 12ms and transfer rates as high as 2.5MB per second. As an extra bonus its Magneto Resistive Head technology allows data to be more densely packed on the drive platter.

APS 1/"540
$399*

APShardDrives

<table>
<thead>
<tr>
<th>Model</th>
<th>Capacity</th>
<th>Internal</th>
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<tr>
<td>APS Q 270*</td>
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<td>APS M *</td>
<td>340 MB</td>
<td>199 $299</td>
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<tr>
<td>APS ST 720</td>
<td>700MB</td>
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<tr>
<td>APS M1 1.2AV</td>
<td>95MB</td>
<td>199 $299</td>
<td></td>
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<tr>
<td>APS M1 1.0</td>
<td>1003MB</td>
<td>199 $299</td>
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</table>

For your Mac or Power Mac

<table>
<thead>
<tr>
<th>Model</th>
<th>Capacity</th>
<th>Internal</th>
<th>SR2000</th>
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<tr>
<td>APS Q 1080*</td>
<td>1029MB</td>
<td>699 $799</td>
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<tr>
<td>APS MS 1.7AV</td>
<td>1612MB</td>
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<td>APS MS 1.75</td>
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<tr>
<td>APS 2.0*</td>
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<td>1299 1399</td>
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<tr>
<td>APS ST 2.0*</td>
<td>2040MB</td>
<td>1399 1499</td>
<td></td>
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<tr>
<td>APS MS 3.0G*</td>
<td>2845MB</td>
<td>1999+2199</td>
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<tr>
<td>APS ST 3.0*</td>
<td>424MB</td>
<td>2799 2899</td>
<td></td>
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<tr>
<td>APS ST 3.0*</td>
<td>867MB</td>
<td>4149+4349</td>
<td></td>
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</table>

SCSI Sentry

When all was said and done, SCSI Sentry did its stuff. All the problems have been corrected because hungry...and the drive may well be the core for your SCSI Wars. Even if your SCSI bus is working OK, I'd really recommend SCSI Sentry as an extra source of protection.

Benefits

- Optimizes Overall SCSI Performance
- Provides Ideal Termination Power
- Dramatically Reduces SCSI Interference
- Regulates SCSI Line Voltage
- Solves Bus Impedance Issues
- LED Activity Indicators Diagnostic Tool
- Easy Installation/ Takedown Seconds

Model | Capacity | Internal | SR2000 |
<table>
<thead>
<tr>
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<th></th>
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<tbody>
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<tr>
<td>APS ST 3.0*</td>
<td>867MB</td>
<td>4149+4349</td>
<td></td>
</tr>
</tbody>
</table>
Get the Best: APS DAT

Only APS DATs bring you all the benefits of our SR 2000 enclosure with DATerm, Digital Active Termination.

APS HyperDAT
If you need high-speed backup (not the kind that ties your server up and slows down your network), you need the DDS-2 power of the APS HyperDAT. Back up locally at rates as high as 210MB per minute! Pack up to 10GB on a single tape. Best of all, your regular DDS and DDS compression tapes can be read in the APS HyperDAT, too!

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<table>
<thead>
<tr>
<th>Model</th>
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<td>APS Turbo DAT</td>
<td>4.0-6.5GB</td>
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<td>APS HyperDAT</td>
<td>8.0-12GB</td>
<td>1149</td>
<td>1199</td>
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</table>

*Actual data compression and tape capacity vary greatly depending on the type of data recorded, other system parameters, and environment.

DAT Media (Dantz)
- 60 meter DAT Tapes — $10
- 90 meter DAT Tapes — $15
- 120 meter DAT Tapes — $20

All APS DAT Drives Include Retroset by Dantz & 1 FREE DAT Tape.

APS HyperDAT™ $1199

APS DAT $799

Macworld's 1994 World-Class Award for Alternative Storage goes to the APS line of DAT Drives.

APS DAT 1.3 MO $1999

MAGNETO OPTICAL

<table>
<thead>
<tr>
<th>Model</th>
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<td>APS 230MB MO'</td>
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<td>APS 1.3GB MO'</td>
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<td>2109</td>
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</table>

All MO Drives Include 1 FREE Cartridge

MO Media (unformatted)
- 1.4-1.5GB cartridge — $35
- 2.8GB cartridge — $45
- 1.3GB cartridge — $10

CD ROM

<table>
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<tr>
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<tr>
<td>APS T 3401</td>
<td>399</td>
<td></td>
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</table>

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APS Intl. Sales Line (816) 920-4109
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- Ikegami CN-ZDA
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- 24-bit Accel Video Card Bundle $1,799

Microtek 45T Slide Scanner $5895
35mm to 4x5" Slide Scanner,
36-bit 1000 x 1000 dpi,
Includes full version of Adobe Photoshop & DCR Color Calibration Software

JVC CD-ROM Products
Personal Archiver - External $3559
Personal ROMMaker $5649
Includes 1GB Hard Drive, writes all CD-ROM standards, including Red-Book Audio
BLANK CD MEDIA - 74 Minute, 640 MB $19

Leasing Now Available
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800-521-6111
Fax 512-327-0921
We accept Visa, MasterCard, American Express, Discover, Diners Club, and C.O.D.

Circle 83 on reader service card
### Fujitsu

<table>
<thead>
<tr>
<th>Capacity</th>
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### Optical Drives

**1 Year Warranty**

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<td>4200 RPM</td>
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<td>650MB</td>
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<td>40MS</td>
<td></td>
<td>$2099</td>
</tr>
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</table>

**Tape Backup**

- 8Gig External for $999 includes tape + retrospective software

### Raid Systems

- "This Array is the one to beat." - Ken Grey
- Writer for Wired, Computer User, Movie Maker, Computer Video, and Digital Video magazines.

**RAID**

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Model</th>
<th>Media</th>
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<td>DC6250</td>
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<td>$2179</td>
<td>$2279</td>
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**Media**

- 4.0 gig Barracuda 2 RAID
- $810 Users!
- Turn your 1gig into a 2gig RAID for only $999

**Monitors & CD ROMs**

<table>
<thead>
<tr>
<th>Product</th>
<th>Price</th>
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</thead>
<tbody>
<tr>
<td>Sony GDM-155S1 15&quot;</td>
<td>$469</td>
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<td>Sony GDM-175E1 17&quot;</td>
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<td>Sony GDM-205E1 20&quot;</td>
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<table>
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<td>Sony CDU-561</td>
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<td>Ricoh 1000</td>
<td>$2495</td>
</tr>
<tr>
<td>Yamaha 4 speed recorder</td>
<td>$5245</td>
</tr>
</tbody>
</table>

**Direct Connections**

- 800-572-4305
- 30 Day Money-Back
- Shipping
- Drives for 7 Years

**Macworld November 1994**

Circle 121 on reader service card
Upgrade now!

Norton Utilities 3.0 Upgrade

If you have a Mac with a hard drive, then you NEED the #1 Macintosh Utilities program, Norton Utilities 3.0. Packed full of new features, Norton Utilities 3.0 is the best-selling data recovery, protection and backup software. Upgrade today! Proof of ownership required. Call for details. Publisher: Symantec

Full version of Norton Utilities 3.0

UTI 0569 $99

$39.95

New Wild & Wacky Modules!

After Dark 3.0 Upgrade

All new modules like Bad Dog, You Bet Your Head, New Fish and more! *Upgrade price reflects $10 REBATE from manufacturer. Price without rebate is $29.85. Call for details.

Publisher: Berkeley Systems

Simpsons Screen Saver

Join the whole Simpson clan in these hilarious modules that will keep you laughing all day! 

Publisher: Berkley Systems

New HP DeskWriter 550C

HP DeskWriter 550C

HP DeskWriter 550C. It's never been this easy or affordable to add color to your documents! Comes with both color and black ink cartridges built right in, so printing is simple. A print speed of up to 3 pages per minute in b&w and 4 minutes per page in color. Features: clear, crisp 300-dpi black and color printing; 35 type fonts, scalable to 250 pts; standard AppleTalk and serial interfaces; built-in print spooler; quiet operation and more.

Manufacturer: Hewlett-Packard

Now only $399!

item # 0569 while supplies last

$399.95

UPGRADE NOW!

SAM 4.0 Upgrade

The best-selling, highest rated virus protection, detection and repair program is now even better! SAM (Symantec Anti-Virus for the Mac) is the worldwide standard in Mac virus protection. Key Features: Virus detection & repair, proactive prevention, automatic virus updates, faster scans, custom decontamination disk and more. Order New SAM 4.0 today! Proof of ownership required. Call for details. Publisher: Symantec

Full version of SAM 4.0

UTI 0567 $69

$19.95

Power-XPress!

QuarkXPress Power Macintosh

This new version of QuarkXPress is the clear choice for publishing professionals. In addition to the features of QuarkXPress 3.3, this program includes: new XTensions™, new fonts, sample Quark Libraries, superb typographical control, file compatibility with both Mac & Windows, professional trapping tools, polygon text boxes, many helpful patches (like measurements, style sheets, tools, colors, etc.) and much more.

Get QuarkXPress today and move production and creativity to a new level!

Publisher: Symantec

Full version only

UPG 0116

$99

$659.95

Microsoft Excel 5.0 Upgrade

Microsoft Excel 5.0

Works the way you want! Features like AutoFill, AutoFill & Auto-select simplify tasks for you. The customizable Toolbar and Shortcut Menus put your favorite commands at your fingertips.

Publisher: Microsoft

Full version of Excel 5.0

BUS 0443 $295

UPG 0104

$99

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- Thousands of sounds!
- Thousands of images!
- Hundreds of maps and charts!

Ask for item # BND 0348

For only $89!

$89

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A Power User memory upgrade will dramatically increase the power of your Mac. Memory chips come factory-installed on plug-in cards, called SIMMs (Single Inline Memory Modules). Please call for the latest prices and availability and our sales staff will help make your choice an easy one.

CHP 0012

$49.95

$49.95

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document in a single step. And all the Microsoft
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to items from one program into another. The
cue cards feature provides step-by-step
instructions for any task as you work through the job.

Publisher: Microsoft
Full version of Office 4.2.
Ask for Item# BND 0430 $75

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Address
City
State
Zip

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MW1194

(To expect to receive your first issue within 4-6 weeks.)

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Circle 150 on reader service card
Our 8th year selling quality drives at incredibly low prices.

30 Day money back guarantee.

Fast, friendly, and smart service.

Lifetime technical support.

24 Hour turnaround, 1 year replacement policy.

We appreciate your business!

MegaHaus is your #1 source for Quantum drives.
- Low price guarantee on all Quantum Drives!
- Same day shipping on most orders!

Quantum

#1 HARD DRIVE FOR MAC!

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Speed</th>
<th>RPM</th>
<th>Buffer</th>
<th>Why</th>
<th>Model</th>
<th>Internal</th>
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<td>2yr</td>
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<td>EMP2160S</td>
<td>$1099</td>
<td>$1159</td>
</tr>
</tbody>
</table>

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!

Syquest

Genuine Syquest Media

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Speed</th>
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<td>128K</td>
<td>$429</td>
<td>$489</td>
</tr>
</tbody>
</table>

HARD DRIVES

CD ROM DRIVES

CD-ROM CHANGERS

- No more changing disks over and over.
- Low price guarantee on Pioneer.
- Requires only 1 SCSI ID address.
- vec. 6 Drive, Double Speed $719
- DRM604X, 6 Drive, Double Speed $819
- DRM604X, 6 Disc, Quad Speed $1069
- DRH1804, 10 Disc, Quad Speed $2099
- 500 Disc, Quad Speed w/ 2 drives $15.150
- 500 Disc, Quad Speed w/ 4 drives $17.550

PIONEER

- High performance optical drives.
- Ask for your free "Data to Compare" specification brochure.
- Includes SCSI Manager 4.3 compliant driver, cables, and a free disk.

 capacity | Model | Speed | Transfer | Buffer | Warranty | Internal | External |
<table>
<thead>
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<th></th>
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<td>330KB/sec</td>
<td>256K</td>
<td>Fujitsu</td>
<td>1 Year</td>
<td>$259</td>
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<td>NEC</td>
<td>CDR510</td>
<td>196ms</td>
<td>450KB/sec</td>
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<td>Fujitsu</td>
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<td>$285</td>
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<td>Plextor</td>
<td>4PLEX</td>
<td>150ms</td>
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<td>Fujitsu</td>
<td>5 Years</td>
<td>$285</td>
</tr>
</tbody>
</table>

Includes driver software with music play, $25 Photo CD processing coupon, and cables. Multi Drive CD Towers in stock.

TAPE DRIVES

Capacity | Type | Brand | Internal | External | Capacity | Type | Brand | Internal | External |
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<td>DDS DAT</td>
<td>Conner</td>
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<td>$999</td>
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<td>MiniCart Type</td>
<td>$589</td>
<td>$699</td>
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<td>DDS DAT</td>
<td>HP</td>
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<td>75-Lignt</td>
<td>MiniCart Exabyte</td>
<td>$589</td>
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<td>Sony</td>
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<td>$819</td>
<td>$869</td>
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<td>DDS DAT</td>
<td>HP</td>
<td>$1299</td>
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<td></td>
</tr>
</tbody>
</table>

Includes Retrospect 2.1, 1 tape, and cables. OPTIMA DeskTape Software mounts DAT on desktop $289.

- 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!

OPTICAL DRIVES

Capacity | Speed | Brand | Cache | External | Capacity | Speed | Brand | Cache | External |
<table>
<thead>
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<td>19ms</td>
<td>HP</td>
<td>512K</td>
<td>$2489</td>
</tr>
</tbody>
</table>

Includes optical drives, 1 disk, and cables. 230MB Fujitsu and 650MB HP models also in stock.

- New AV series hard drives are specifically designed for enhanced digital video.
- Includes multimedia, desktop publishing, and video editing.
- We will beat any advertised Micropolis prices.
- No sales tax on hard drives.

MICROPOLIS

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Speed</th>
<th>Brand</th>
<th>Cache</th>
<th>External</th>
<th>Capacity</th>
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<td>12ms</td>
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<td>$1299</td>
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- New AV series hard drives are specifically designed for enhanced digital video.
- Includes multimedia, desktop publishing, and video editing.
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- No sales tax on hard drives.

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<thead>
<tr>
<th>Model</th>
<th>Capacity</th>
<th>Access</th>
<th>RPM</th>
<th>Cache</th>
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GO Power Books

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MicroPolar

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SyQuest

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<td>13.5ms</td>
<td>$320</td>
<td>128K</td>
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<td>455</td>
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<table>
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<tr>
<th>Capacity</th>
<th>Size</th>
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<th>Warranty</th>
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HP LaserJet

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<td>C2490</td>
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<td>11ms</td>
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<td>1975</td>
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QMS Printers

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<td>PS 410</td>
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<td>PS 860</td>
<td>$825</td>
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<td>PS 1725</td>
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Hewlett Packard

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<td>1995</td>
<td>1355</td>
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<tr>
<td>Optical Drives</td>
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<td>1 Year</td>
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TAPE BACKUP DRIVES

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<td>$1315</td>
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<td>20-50 GB</td>
<td>HP5333 &amp; Auto Tape Loader</td>
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<td>2-3 GB</td>
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EXTERNAL CABINETS

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<td>8mm</td>
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<tr>
<td>20-50 GB</td>
<td>Exabyte 10 Auto Tape Loader</td>
<td>$CALL</td>
<td></td>
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</tbody>
</table>

Circle 135 on reader service card
## For the Best Deals Around!

**1-800-300-9091**

### Teleport Gold
**External Fax/Modem**
1.84 error correction/data compression
2.400 kbps data speeds
Ideal for use with AppleTalk Remote Access
Includes Global Fax OCR software
Global Village #02627

### Multiscan 15sf
15" monitor with 23mm dot pitch and five preset resolutions
1280x1024 at 60Hz maximum resolution
Meets all monitor standards worldwide
Energy Star and VESA compliant
Two user-adjustable temperature presets for more accurate whites
Sony #05146

### Performantz 270MB 3.5" SyQuest Drive
- 270MB of storage on a single 3.5" cartridge
- 13 sec access time
- Reads and writes 150MB SyQuest cartridges
Performance #97989

### INPUT DEVICES & SCANNERS

<table>
<thead>
<tr>
<th>Brand</th>
<th>Model</th>
<th>Description</th>
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<td>Microtek</td>
<td>9900</td>
<td>319MB SyQuest 15sf Drive</td>
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### POWER BACKUP

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<tr>
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<td>9200</td>
<td>319MB SyQuest 15sf Drive</td>
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### MEMORY UPGRADES

- Mac Bargains carries memory upgrades
- Prices valid for configurations and current prices

### MEDIA

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<td>Bernoulli CDROM 150</td>
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<td>9558</td>
<td>Bernoulli CDROM 150</td>
</tr>
</tbody>
</table>

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- Call Now!

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### MAC WORLD November 1994 223

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Please mention this source code when ordering **MUB11**
NEW AND DEMO SPECIALS!

CRA SYSTEMS
1 (800) 375-9000

DISPLAYS

<table>
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<tr>
<th>Product Description</th>
<th>Price</th>
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<tr>
<td>Radius PrecisionColor Display 21</td>
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<td>Radius PrecisionColor Display 20v</td>
<td>$1299</td>
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<tr>
<td>Radius Display 20 inch Trinitron</td>
<td>from $1499</td>
</tr>
<tr>
<td>• Runs off built-in video or dedicated video 1152 x 882</td>
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<tr>
<td>PrecisionColor Display/19</td>
<td>from $1199</td>
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<tr>
<td>• Multiple resolution switching on-the-fly</td>
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<tr>
<td>RasterOps 20 inch Color Display</td>
<td>$1199</td>
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<tr>
<td>Radius PrecisionColor Display/17</td>
<td>CALL</td>
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<tr>
<td>Sony 17 inch Trinitron</td>
<td>$899</td>
</tr>
<tr>
<td>Sony 17&quot; Trinitron w/24-bit video card</td>
<td>$1198</td>
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<td>Radius 21 inch Grayscale Display</td>
<td>$799</td>
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<td>Radius 20 inch Grayscale Display</td>
<td>$699</td>
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<tr>
<td>Radius LeMans GT</td>
<td>$1799</td>
</tr>
<tr>
<td>PhotoBooster (Up to 10X faster than 950)</td>
<td>$499</td>
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<tr>
<td>Radius PrecisionColor Pro 24x</td>
<td>$1299</td>
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</tbody>
</table>

PrecisionColor 24X

The Radius PrecisionColor 24X is the 'Best Price/Performance Value' (MacUser) 24-bit board on the market!
- $1000 plus savings vs. Thunder/24!

Radius Universal 24XP/24XX | $299/599
Radius 8XJ | $399
Radius Pivot Cards
SE/30, LCs, Mac II family, Centris & Quadra available | CALL
Radius Two Page Display cards | CALL
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Radius VideoVision Studio | from $2999

$799

$1849

$1299

from $1499

from $1199

$1199

CALL

$899

$1198

$799

$699

$1799

$499

$1299

ROCKETS/ACCELERATORS

Radius Rocket 68040 | $399

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<td>Radius Rocket 25</td>
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<td>Radius Rocket 25i</td>
<td>only $399</td>
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<tr>
<td>RocketShare</td>
<td>$299</td>
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<td>• Multiprocessing on your Mac</td>
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<tr>
<td>33MHz or 40MHz Upgrade for Quadras for the Quadra 950, 800, or 700</td>
<td>$349</td>
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<tr>
<td>80MHz Upgrade for Power Macintosh 6100/7100</td>
<td>Accelerate to PowerMac 8100 speed!</td>
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$199

$299

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### Product Index

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<td>Shannon Smith</td>
<td>415.974.7414</td>
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<tr>
<td>Clayton Haberman</td>
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**POS Credit Developers since 1981**

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Returns at discretion of Mymt./15% Restocking fee.
# Systems & Peripherals

## Macintosh Upgrade

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<th>Product Type</th>
<th>Specifications</th>
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## Apple Monitor

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## Apple Printer

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<td>LaserJet 4/600</td>
<td>4 ppm</td>
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## Kodak

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## Printers & H.P.'s

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**Power Macs 7100, 66MHz**

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<td>16MB / 500 HD</td>
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<td>8MB / 160HD</td>
<td>$349</td>
</tr>
<tr>
<td></td>
<td>4MB / 8MB</td>
<td>$599</td>
</tr>
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</table>

**Power Macs 6100, 60MHz**

<table>
<thead>
<tr>
<th>Model</th>
<th>Capacity</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>8MB / 160HD</td>
<td>$599</td>
</tr>
<tr>
<td></td>
<td>4MB / 8MB</td>
<td>$999</td>
</tr>
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</table>

**Books 820/520**

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<tr>
<th>Model</th>
<th>Capacity</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>12MB / 240 MB HD</td>
<td>$299</td>
</tr>
<tr>
<td></td>
<td>8MB / 200 MB HD</td>
<td>$349</td>
</tr>
<tr>
<td></td>
<td>4MB / 160 MB HD</td>
<td>$499</td>
</tr>
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**Books 520/320**

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<tr>
<th>Model</th>
<th>Capacity</th>
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</tr>
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<tbody>
<tr>
<td></td>
<td>16MB / 500 MB HD</td>
<td>$349</td>
</tr>
<tr>
<td></td>
<td>8MB / 160HD</td>
<td>$499</td>
</tr>
<tr>
<td></td>
<td>4MB / 8MB</td>
<td>$799</td>
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**Books 160**

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<th>Model</th>
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<tr>
<td></td>
<td>8MB / 160HD</td>
<td>$599</td>
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<tr>
<td></td>
<td>4MB / 8MB</td>
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**PowerPrinters**

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<tr>
<td></td>
<td>14&quot; AV/4&quot; plus</td>
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<tr>
<td></td>
<td>Standard/Extended key</td>
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**Quadra 630**

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<tbody>
<tr>
<td></td>
<td>9MB/230MB/CD</td>
<td>$399</td>
</tr>
<tr>
<td></td>
<td>72MB/1G/GB/C</td>
<td>$599</td>
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**Quadra 640/660AV**

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<thead>
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<th>Model</th>
<th>Capacity</th>
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<tr>
<td></td>
<td>8MB/230MB/CD</td>
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<tr>
<td></td>
<td>68MB/240MB/CD</td>
<td>$599</td>
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**Quadra 650/670**

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<th>Model</th>
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<th>Price</th>
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<tr>
<td></td>
<td>68MB/240MB/CD</td>
<td>$599</td>
</tr>
<tr>
<td></td>
<td>146MB/1280MB/CD</td>
<td>$999</td>
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**Apple Micros**

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<td></td>
<td>1.4g 250MB/10ms</td>
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<td></td>
<td>85MB/240MB/CD</td>
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**Microtek**

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<tr>
<td></td>
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**IBM**

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<td>$399</td>
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<tr>
<td></td>
<td>12MB/250MB/CD</td>
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**Seagate**

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**Micros 210**

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<tr>
<td></td>
<td>10MB/10ms</td>
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**Fujitsu**

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<td>2MB/10ms</td>
<td>$299</td>
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<tr>
<td></td>
<td>1MB/10ms</td>
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**Seagate**

<table>
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<tr>
<th>Model</th>
<th>Capacity</th>
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<td>$599</td>
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<td></td>
<td>60MB/10ms</td>
<td>$499</td>
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**IBM**

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<tr>
<th>Model</th>
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<tr>
<td></td>
<td>10MB/10ms</td>
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<tr>
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<tr>
<td></td>
<td>1MB/10ms</td>
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<thead>
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<th>Model</th>
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<th>Price</th>
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<td></td>
<td>60MB/10ms</td>
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<tr>
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<td>10MB/10ms</td>
<td>$499</td>
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<td></td>
<td>10MB/10ms</td>
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<td>$299</td>
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<td></td>
<td>1MB/10ms</td>
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<tr>
<td></td>
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<td>$599</td>
</tr>
<tr>
<td></td>
<td>60MB/10ms</td>
<td>$499</td>
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</table>
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IBM PowerBook 140/170 Battery $45
IBM Mouse $49
IBM 3-Meg Internal for Mac Portable $149
IBM Quadra/MacPower Supply $145
IBM 250 Base Personal Monitor Replaceable $25
IBM 250 & 256 (Internal) $185
IBM 250 8-Mode Video $45
IBM Ethernet Board $45
IBM & 1-Port Async - Plus $65
IBM Mouse $95
IBM 4-Port 1440 Internal Module $95
IBM 4-Meg External Hard Drive $169
IBM Case & Power Supply Mac 800 $164
IBM Classic Power Supply $95
IBM Personal Kit Logic Bo $175
IBM Logic Bo $125
IBM Mac Plus... $60
IBM Power Supply $115
IBM M & POWER ADAPTER $45

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APPLE 12" MONOCHROME $189
APPLE BASIC COLOR $169
APPLE 12" COLOR $223
APPLE 14" PERFORMA PLUS (NEW) $299
APPLE 14" TITANIX (NEW) $299
APPLE 16" TITANIX (NEW) $899
APPLE ARTSABOR 17" COLOR (NEW) $599

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ADVANCED MAC SYSTEMS

CIRCLE 403 ON READER SERVICE CARD

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Resolution 852 X 624
Dot Pitch 0.26mm
Colors Millions

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1x8: $39
2x8: $49
4x8: $59
8x8: $39
16x8: $39

PC MEMORY - 30 PIN
1x7-3 chip: $42
4x9: $159
16x7: $309

MAC MEMORY - 72 PIN
2x3270/66: $114/169

POWER MEMORY

Bmeg Ks $288
1meg Ks $578
2meg Ks $1078
4meg Ks $1988

POWERBOOK

520, 520c, 540c, 540c

8meg $339
3meg $339
1meg $339

SYQUEST Memory Direct BSC - $399 (Ex) $58

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MAX O48 $99 $159
MAX POWER PC $139 $199

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**Photoshop Unsharp Mask**

**Word Scroll**

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- 2 Megabyte 75.00
- 4 Megabyte 137.00
- 8 Megabyte 299.00
- 16 Megabyte 559.00

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- 256K Quadra 700/900, Performa 46X VRAM 18.00
- 256K Quadras, LC 570 VRAM 19.00
- 256K Centris, LCIII, Performas VRAM 19.00
- 512K VRAM for LC, LCII, IIfx, IIfx, DuoDock, and Performas 36.00

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- 25 MHz for Macintosh LC 55.00
- 20 MHz w/2 slots for Mac II 119.00
- 25 MHz for Mac Classic II 55.00

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- 128K Cache Card for LC III and Performa 450 159.00
- w/25 MHz FPU 209.00
- IIfx 64K Cache Card 159.00
- IIC 64K Cache Card 125.00
- IIfx 256K Card and 68882 119.00

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- 68882 20 MHz FPU 45.00
- 68882 25 MHz FPU 49.00
- 68882 33 MHz FPU 59.00
- 68882 50 MHz FPU 59.00
- 68882 16 MHz FPU 45.00

**Miscellaneous**

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- LaserWriter Pro 810 8 MB upgrade 459.00
- T.I. MicroLaser 1 MB 49.00
- Mac Classic 1 MB Board 75.00
- 68851 16 MHz PMU 89.00
  - If required, MB0 32 software included free w/PMU
- Mac Portable 3 MB Card 369.00
- Mac Portable 4 MB Card 399.00
- Mac Portable 5 MB Card 449.00

**PowerBook Memory**

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<td>265.0</td>
<td>265.0</td>
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<td>335.0</td>
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<td>12/14 MB</td>
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<td>569/649</td>
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<td>-----</td>
<td>949/1265</td>
<td>949/1265</td>
</tr>
</tbody>
</table>

**68040 PROCESSOR w/FPU**

**$249.00**

**AS LOW AS**

- 25 MHz w/non FPU type processor trade in $299.00 w/out trade

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**PowerBook Memory**

- 100
- 160
- 165/180
- Dims
- 89.00
- 89.00
- 90.00
- 155.0
- 170.0
- 170.0
- 235.0
- 199.0
- 199.0
- 265.0
- 265.0
- 315.0
- 309.0
- 335.0
- 569/649
- 949/1265

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**68040 PROCESSOR w/FPU**

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**HOURS:** Monday–Thursday 7AM–7PM CST, Friday 7AM–6PM
### MEMORY UPGRADES

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<td>4X8X80 II/IX</td>
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<td>16X8X80 (Low Profile)</td>
<td>$619</td>
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<td>1X8X80FX</td>
<td>$42</td>
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<tr>
<td>4X8X80FX</td>
<td>$155</td>
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<tr>
<td>4MB 72Pin (70NS/60NS)</td>
<td>$145/$149</td>
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<td>16MB 72Pin (60NS)</td>
<td>$535</td>
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<tr>
<td>32MB 72Pin (60NS)</td>
<td>$1115</td>
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### POWERBOOK UPGRADES

<table>
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<tr>
<th>Model</th>
<th>Price</th>
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<tbody>
<tr>
<td>PB 520-540C 4MB/8MB</td>
<td>$197/$339</td>
</tr>
<tr>
<td>PB 520-540C 16MB/32MB</td>
<td>$795/$1565</td>
</tr>
<tr>
<td>PB 140-170 4MB/6MB</td>
<td>$135/$205</td>
</tr>
<tr>
<td>PB 160-180 4MB/6MB</td>
<td>$135/$205</td>
</tr>
<tr>
<td>PB 160-180 8MB/10MB</td>
<td>$269/$329</td>
</tr>
<tr>
<td>PB 165C-180C 4MB/6MB</td>
<td>$139/$229</td>
</tr>
<tr>
<td>PB 165C-180C 8MB/10MB</td>
<td>$299/$335</td>
</tr>
<tr>
<td>PBDUO 4MB/8MB</td>
<td>$175/$355</td>
</tr>
<tr>
<td>PBDUO 12MB/14MB</td>
<td>$535/$592</td>
</tr>
<tr>
<td>PBDUO 20MB/28MB</td>
<td>$930/$1429</td>
</tr>
</tbody>
</table>

### MODEMS

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
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<tbody>
<tr>
<td>PowerBook 14.4 Inter.</td>
<td>$244</td>
</tr>
<tr>
<td>PowerBook Home Office 14.4 Int.</td>
<td>$279</td>
</tr>
<tr>
<td>Zoom AMX 2400</td>
<td>$62</td>
</tr>
<tr>
<td>Zoom FX2 2400/3600 S/R Fax</td>
<td>$116</td>
</tr>
<tr>
<td>Hayes Accura 144/Fax 14.4 Mac</td>
<td>$164</td>
</tr>
<tr>
<td>Optima 144/Fax 14.4 Mac</td>
<td>$403</td>
</tr>
<tr>
<td>Optima 144/Fax 14.4 Pocket</td>
<td>$303</td>
</tr>
<tr>
<td>Optima 208 V/F/C/FAX Mac</td>
<td>$449</td>
</tr>
<tr>
<td>US Robotics Sportster 28.8 Mac &amp; Fax</td>
<td>$232</td>
</tr>
<tr>
<td>US Robotics 14.4 Mac &amp; Fax</td>
<td>$152</td>
</tr>
<tr>
<td>US Robotics 2400 Mac &amp; Fax</td>
<td>$136</td>
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### NETWORKING

<table>
<thead>
<tr>
<th>Product</th>
<th>Price</th>
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</thead>
<tbody>
<tr>
<td>Dayna DaynePort Socket CSIC Link-T</td>
<td>$231</td>
</tr>
<tr>
<td>Dayna DaynePort CSIC Link Powerbook-T</td>
<td>$247</td>
</tr>
<tr>
<td>Dayna DaynePort CSIC Link Powerbook-T</td>
<td>$269</td>
</tr>
<tr>
<td>Dayna DaynePort TX (Friendly Net Adp)</td>
<td>$54</td>
</tr>
<tr>
<td>Dayna DaynePort TX (Friendly Net Adp)</td>
<td>$104</td>
</tr>
<tr>
<td>Dayna DaynePort E/T/T Nubus</td>
<td>$88</td>
</tr>
<tr>
<td>Dayna DaynePort E/T/T Nubus</td>
<td>$143</td>
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<tr>
<td>Dayna DaynePort E/T/T Nubus</td>
<td>$143</td>
</tr>
<tr>
<td>Dayna DaynePort E/T/T Nubus</td>
<td>$163</td>
</tr>
<tr>
<td>Farallon EtherWave Nubus Card</td>
<td>$99</td>
</tr>
<tr>
<td>Farallon EtherWave Nubus Card</td>
<td>$99</td>
</tr>
<tr>
<td>Farallon EtherWave Powerbook Adapter</td>
<td>$278</td>
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<tr>
<td>Farallon EtherWave Powerbook Adapter</td>
<td>$99</td>
</tr>
<tr>
<td>Farallon EtherWave Powerbook Adapter</td>
<td>$170</td>
</tr>
<tr>
<td>Farallon EtherMac LC-10T</td>
<td>$84</td>
</tr>
<tr>
<td>PhoneNet Connector</td>
<td>$28</td>
</tr>
</tbody>
</table>

### ACCELERATORS

<table>
<thead>
<tr>
<th>Model</th>
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<tr>
<td>Daystar Turbo 040 33MHz VCache</td>
<td>$795</td>
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<td>$979</td>
</tr>
<tr>
<td>Daystar Turbo 040 126kHz Cache</td>
<td>$165</td>
</tr>
<tr>
<td>Daystar Turbo 030 33/33 with FPU</td>
<td>$275/$357</td>
</tr>
<tr>
<td>Daystar Turbo 030 50/50 with FPU</td>
<td>$415/$537</td>
</tr>
<tr>
<td>Daystar Turbo Power/PRO Cards</td>
<td>CALL!</td>
</tr>
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### PRINTERS

<table>
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<tr>
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<tbody>
<tr>
<td>SuperMac Proof Positive Full Page Color</td>
<td>$6,805</td>
</tr>
<tr>
<td>Hewlett Packard Deskwriter C/600C (Color)</td>
<td>$407/$604</td>
</tr>
<tr>
<td>Deskwriter 310/210 (Mono)</td>
<td>$307/$382</td>
</tr>
<tr>
<td>Call for HPI Printer Supplies</td>
<td>CALL</td>
</tr>
<tr>
<td>Texas Instruments MicroWriter Basic L.E.D. 5ppm</td>
<td>$524</td>
</tr>
<tr>
<td>PS2/3/5 L.E.D. 5ppm A4</td>
<td>$690/$960</td>
</tr>
<tr>
<td>PRO PS2/3/5 6ppm</td>
<td>$1,398/$1,572</td>
</tr>
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</table>

### DRIVES

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Xtra Drives SyQuest 44/88MB w/Cart</td>
<td>$289/$409</td>
</tr>
<tr>
<td>Xtra Drives SyQuest 200MB w/Cart</td>
<td>$539</td>
</tr>
<tr>
<td>Xtra Drives SyQuest 105/207MB w/Cart</td>
<td>$429/$559</td>
</tr>
<tr>
<td>CDROM Printer CD 2x/4x</td>
<td>$129</td>
</tr>
<tr>
<td>MicroNet Int/Ext 170MB Fast SCSI-2</td>
<td>$264/$288</td>
</tr>
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<td>MicroNet Int/Ext 270MB Fast SCSI-2</td>
<td>$302/$337</td>
</tr>
<tr>
<td>MicroNet Int/Ext 300MB Fast SCSI-2</td>
<td>$347/$382</td>
</tr>
<tr>
<td>MicroNet Int/Ext 1GB Fast SCSI-2</td>
<td>$940/$976</td>
</tr>
<tr>
<td>External 2.7GB Fast SCSI-2</td>
<td>$2,932</td>
</tr>
<tr>
<td>Verbatim Verbatim 128MB Optical</td>
<td>$30</td>
</tr>
<tr>
<td>Verbatim Verbatim 650 Optical</td>
<td>$79</td>
</tr>
<tr>
<td>Verbatim Verbatim 1.3GB Optical</td>
<td>$105</td>
</tr>
<tr>
<td>Verbatim Verbatim RCD (for RCD Drives)</td>
<td>$20</td>
</tr>
<tr>
<td>Komag Komag 128MB Optical</td>
<td>$28</td>
</tr>
<tr>
<td>Komag Komag 256MB Optical</td>
<td>$59</td>
</tr>
<tr>
<td>Komag Komag 1.3MB Optical</td>
<td>$99</td>
</tr>
<tr>
<td>Samsung Samsung 128MB Optical</td>
<td>$30</td>
</tr>
<tr>
<td>Samsung Samsung 650MB Optical</td>
<td>$79</td>
</tr>
</tbody>
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### XTRA MEDIA

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<tr>
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### MONITORS

<table>
<thead>
<tr>
<th>Product</th>
<th>Price</th>
</tr>
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<tbody>
<tr>
<td>Radius Precision Color 17&quot; Multiscan</td>
<td>$1,075</td>
</tr>
<tr>
<td>Radius Precision Color 20&quot; 20V</td>
<td>$1,417</td>
</tr>
<tr>
<td>Radius Precision 21&quot;</td>
<td>$2,110</td>
</tr>
<tr>
<td>Full Page Display 16.5 Mono</td>
<td>$465</td>
</tr>
<tr>
<td>NEC NEC 17&quot; Multiscan</td>
<td>$1,036</td>
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<tr>
<td>NEC NEC 17&quot; Multiscan</td>
<td>$594</td>
</tr>
<tr>
<td>NEC NEC 17&quot; Multiscan</td>
<td>$652</td>
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<tr>
<td>SuperMac SuperMatch 17&quot;</td>
<td>$1,063</td>
</tr>
<tr>
<td>SuperMac SuperMatch 17XL 17&quot;</td>
<td>$1,075</td>
</tr>
<tr>
<td>SuperMac SuperMatch High Res 20&quot;</td>
<td>$2,753</td>
</tr>
<tr>
<td>SuperMac SuperMatch 21T XL 21&quot;</td>
<td>$2,257</td>
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- Every unit individually tested
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Variable Speed Overdrive-Quadra 700/90...
Speeds processor up to 30MHz
VSO-Quadra 950...
Speeds processor up to 40MHz
VSO-IIfx...
Speeds processor up to 60MHz
VSO-IIi...
Speeds processor up to 31MHz
Quadrax Overdrive (Centris 650, 610, Quadra 610, 700, 900, 605)...
Doubles speed of 50 MHz for up to 100% speed increase (Centris 610 up to 40MHz) as well as math functionality
Quadrax Overdrive+ (Centris 650, 610, Quadra 610, 700, 900, 605)...
Combines the Quadrax Overdrive with 128KB high speed cache

ACCESSORIES

PowerExtend–Nubus...
Super high speed RAM drive of up to 256MB in the Quadra 840AV computer. Complements high-end graphic imaging software.
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Power MacCache...
256K level 2 Cache raises the 6100/7100 performance to a new height to maximize productivity

MEMORY

Power Mac, Centris, Quadra, LC III, Performa
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4MB-70ns/4MB-60ns...
6MB-70ns/8MB-50ns...
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32MB-70ns/32MB-60ns...
16MB-70ns (LC III)...
32MB-70ns (LC III)...

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1x8x70...
2x8x70...
4x8x70...
4x8x70 (II,IIx)...
4x8x70 (IIfx)...
6x8x70...
8x8x70 (IIfx)...
8x8x70 (Radius Rocket)...
16x8x70...
16x8x70 (IIfx)...
16x8x70 (Radius Rocket)...

VRAM
256K VRAM...
512K VRAM...

PRINTERS MEMORY

PowerBook

POWERBOOK MEMORY

PB100–2/4/6...
PB140/145/170–2/4/6...
PB160/165/60–2/4/6/8/10...
PB165/180–2/4/6/8/10...
PB530–540c–4/8/16/32...
PB210–280c–8/12/20/28...

Base Module–4/12...

UPGRADES FOR BASE MODULES–4/16

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PowerBook Duo can quickly and easily be attached to networks

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- 44MB SyQuest (FREE Cartridge) $299

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- 270MB Internal $209
- 253MB Internal $209
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- 2.0GB Internal $109

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128MB Optical Drive Double Speed with TEAC Mechanism

Rumi ScanMaker Bundle Includes

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- Where In the World Is Carmen Sandiego?

CD-ROM Bundle Includes

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- HP Deskwriter 51389
- Nikon Coolscan
- Sony 17SE1
- Sony 51229
- Sony 454-7258

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HP IICX .................. $999
HP IP .................. $799
UMAX UC630 FS/LE ........ $699
UMAX UC840 ........... $999
UMAX 1260 FS/LE ........ $1099
Microtek ScanMaker IIIG .................. $499
Microtek ScanMaker IIISP ........................ $499
Microtek ScanMaker IISHP .................. $499
Microtek ScanMaker IISDX .................. $499
Microtek ScanMaker IIHR .................. $499
Microtek ScanMaker IIIH .................. $499
Microtek ScanMaker 35T .................. $499
Nikon Coolscan .................. $499
Citizen Notebook II Color Printer .................. $499
Notebook II Hi-Res Battery Pak ........ $49
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HP Deskwriter .................. $199

HP Deskwriter Printers

HEWLETT PACKARD

HP Deskwriter Printers

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- Sonic Micro SCSI PowerBook ........ $237
- Sonic FriendlyNet 10T/Thin ........ $198
- Sonic Starbase 79 ........ $198
- Sonic Hubble 5 port ........ $145
- Sonic PowerBridge ........ $192

ASANTE

- Asante Friendly Net Adapters ........ $59
- Asante Mac/IBM Nubus 10T .... $159
- Asante En-SC 10T PB ........ $259
- Asante Net Extender Hub 120-T ... $159
- Asante Mac Con-1 II Series T .... $159
- Asante SCS w/Thick/Thin/10T*299

SCANNERS / PRINTERS

HP IICX .................. $999
HP IP .................. $799
UMAX UC630 FS/LE ........ $699
UMAX UC840 ........... $999
UMAX 1260 FS/LE ........ $1099
Microtek ScanMaker IIIG .................. $499
Microtek ScanMaker IIISP ........................ $499
Microtek ScanMaker IISHP .................. $499
Microtek ScanMaker IISDX .................. $499
Microtek ScanMaker IIHR .................. $499
Microtek ScanMaker IIIH .................. $499
Microtek ScanMaker 35T .................. $499
Nikon Coolscan .................. $499
Citizen Notebook II Color Printer .................. $499
Notebook II Hi-Res Battery Pak ........ $49
Labelwriter II XL .................. $299
HP Deskwriter .................. $199

NETWORKING

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PaintBoard Lightening .......... $1999
PaintBoard Professional .......... $1999
PaintBoard 20/20 Multimode .......... $1999
PaintBoard 20T .................. $1999
Color Monitors ........ $1999
RasterOps Clearview .......... $1999
RasterOps 20/20 Multimedia .......... $1999

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RasterOps Color Monitor .......... $1999
RasterOps Color Display .......... $1999
RasterOps Color Monitor .......... $1999
RasterOps 20T .................. $1999
RasterOps Color Display .......... $1999
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8X8-70
16X8-70
72 PIN SIMMS
1X32-70/60 4MB
2X32-70/60 8MB
4X32-70/60 16MB
8X32-70/60 32MB
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140,145,170
2MB,4MB,6MB
160,165,180
4MB,6MB,8MB,10MB
165C,180C
4MB,6MB,8MB,10MB
DUO 210,230,250,270C
4MB,8MB,12MB
14MB,20MB,28MB
BLACKBIRD 520, 520C, 540, 540C
4MB,8MB,16MB,32MB
DRAM
256K DIPS
1MB DIPS
PMU/CHIPS
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