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New Microsoft Word 6.0
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®.

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Photograph by Paul Franz-Moore; server image by Tony Stone Worldwide.

NEC's newest MultiSpin CD-ROM drives, the 5Xp Plus and 4X, page 34.
The color laser printer that's so hot, even the reviews are glowing.

Kyla Carlson, PC Computing

The "first real color laser... The Xerox 4900's output is, in a word, dazzling."

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Suite Smell of Success

Can anyone challenge Microsoft’s dominance?

Bundling is a big deal on the PC side of things. The most important bundles are called suites—collections of several complementary packages. The best-selling PC suites are collections of business-productivity programs offered by Microsoft, Lotus, and WordPerfect. These suites typically include a spreadsheet and a word processor as the foundation. Depending on the suite, you also get some other applications, such as a database manager, an E-mail license, a presentation package, or an organizer.

But suites aren't much of a factor on the Mac. Microsoft Office is the only Mac suite that's as important as the ones you see in the PC market. Office is a pretty good deal. For under $500 you get Word, Excel, PowerPoint, and a workstation license for Microsoft Mail.

The unchallenged position of Office is the best symbol of Microsoft's domination of the productivity market on the Mac. It's obvious that Microsoft competes extremely successfully as an applications vendor on the Mac platform, and it does so without control of the system software. The biggest question is whether Microsoft will build a yet more dominating position in the Mac applications market or whether it has reached its zenith.

Office and OLE

Beyond its dominance, the most interesting thing about Office is its relationship to OLE (Object Linking and Embedding)—Microsoft's method of linking applications together. OLE lets you update and work on portions of documents, such as spreadsheets and charts, directly in your word processing document without leaving the word processing document for another application. (See the feature article "OpenDoc and OLE 2.0," Macworld, November 1994.)

Microsoft is using a certification program to push OLE developers to use the Office interface on their applications. Applications that meet the Office interface guidelines get to have a sticker on the box that shows they comply with Microsoft's requirements.

What would happen if OLE succeeds and third-party developers felt compelled to conform to the Office interface guidelines? Microsoft would be more likely to determine the way all sorts of applications look and behave. Also, developers might have less room to differentiate their own products, and that could reduce the survival rate of innovative non-Microsoft applications. Preventing a Microsoft monopoly is undoubtedly one part of the motivation behind OpenDoc—a linking technology that competes with OLE and is supported by a consortium called CILabs.

If you combine the possible implications of OLE's and Office's becoming unofficial Mac interface standards with the effects of bundling, you may wonder what the future holds for application developers other than Microsoft. Where they now compete to offer the best-selling spreadsheet or database-management program, developers' only option might be to create niche products in the space left unoccupied by the big suites. And if Office succeeds enough to alter the Mac interface standard at the application level, Office will further consolidate its position as the leading suite and thus crowd out other applications.

Microsoft as Brando?

Strangely enough, Microsoft's applications, so noteworthy for their stellar success, are now taking on a Brandoesque character. Microsoft has achieved such a massive stature that it approaches the market with no sense of urgency whatsoever; note the company's nonchalance in delivering its Power Mac applications. Also, many customers are balking at the memory and storage requirements of the latest versions of Excel and Word that are just now shipping. These programs have become shamelessly ponderous, and unfortunately, they are good examples of what happens to software design when it's driven by the marketing urge toward endless additional features. Initial reports on Word 6.0 are that it lurches through operations more slowly than Don Corleone talks. At this writing, it's not clear if Excel is substantially slower, but it doesn't appear to be as fast as the previous version.

For these reasons, competitors have an opportunity to challenge Microsoft's seeming invincibility. ClarisWorks is proof that you can beat Microsoft at its own game. The new Word's slow speed and large size appear to leave an opening for the competition. But it will take a concerted effort to make headway against Word's tremendous momentum. Perhaps the best way for other companies to challenge Microsoft's application hegemony would be to offer strong suites.

The Competition

Are there any challengers to Office in the Mac market? Possibly the strongest one to Microsoft Word is WordPerfect, with its rich feature set and loyal cross-platform following. WordPerfect was quick to debut innovative Mac technologies like QuickTime and was available in a native version when the Power Macs were introduced.

MACWORLD December 1994 19
duced. And despite Word’s dominance, WordPerfect continues to develop and promote its main product and appears to be slowly increasing its market share. In terms of a suite, the company offers Quattro Pro on the PC side, and it could possibly offer a Mac version (though it has made no announcement to this effect). The company also has a mail package and an integrated software package.

If not WordPerfect, what about Lotus? Lotus 1-2-3 was a nice spreadsheet on the Mac, and Lotus could always combine it with more serviceable Macintosh versions of Notes and cc:Mail. Lotus would also have to port the well-regarded AmiPro word processor. This would be a big investment and would require real commitment.

A few months ago Lotus damaged its credibility with Macintosh users by announcing that it will not support the Power Macintosh. Ironically, Lotus has yet to show that it can create a successful Macintosh product, despite several attempts. Lotus 1-2-3 was good but seemed to receive halfhearted parental support. Lotus seems to wilt in the presence of competition from a market leader. Hopefully, Lotus will develop a long-term strategy that will permit it to maintain a serious presence in the Mac market.

Claris has a full house of programs out of which to make an impressive suite including a word processor, spreadsheet, database manager, and personal organizer. And Claris has a unique advantage because it could upgrade its ClarisWorks users to a suite (if it had one). MacWrite Pro would have to challenge Word’s feature set without losing its own performance edge and superior interface. FileMaker Pro is the leading flat-file database manager with no obvious challengers in sight. Like other spreadsheets, Claris’s Resolve gave up the ghost in the face of Excel’s inexorable domination of the Mac market. Claris could round out its suite with a choice or two from its outstanding collection of graphics packages, such as ClarisDraw and ClarisImpact.

Claris has another ace in the hole. It is owned by Apple Computer. A few years ago any visible coordination of efforts between Apple and Claris would have been extremely controversial among Apple’s developers, but nobody much worries about this anymore. If Apple wanted to be really aggressive, it could put the suite on Macintosh hard drives and use that to sell Mac hardware-software packages.

**OpenDoc**

It’s more than an interesting coincidence that Apple, Lotus, and WordPerfect are all part of the OpenDoc consortium. Maybe they could work together and build a couple of OpenDoc-compliant suites that would help them sell individual products and demonstrate the superiority of OpenDoc technology. What about a WordPerfect, 1-2-3, FileMaker bundle? ClarisWorks customers might like a discounted upgrade to this bundle once they outgrow their integrated package.

The next version of Windows (at press time referred to as Windows95) is the equivalent of a software aircraft carrier, with built-in word processing and mail applications that are like cruise missiles aimed at the key assets of WordPerfect and Lotus. In the long run, some sort of cooperation will be necessary to challenge Microsoft’s domination of the software market, and OpenDoc seems the perfect means to do that. A suite would be a great way to showcase OpenDoc, provide a strong launch for this technology, and make it immediately meaningful.

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**How fast is Windows™ on a Macintosh®?**

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<th>IBM PC (Intel 486 DX/33)</th>
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<th>IBM PC (AMD 386 SX/25)</th>
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System 7.5: Mixed Blessings

WHY, JUDGING FROM LON POOLE’S article, System 7.5 isn’t for me (“System 7.5,” September 1994).

1. It appears to offer me nothing I need that the terrific System 7.1 combined with Now Utilities doesn’t already provide. If I wanted (and I don’t), I could download WindowShade. I’ve got drag-and-drop editing within Microsoft Word, and that’s plenty. I’ve got only one printer, and 386 gets me to it just fine.

2. I’ve gotta ask: Has everyone who is capable of writing plain, direct English left Apple? The wording in the Extensions Manager’s setup window could and should be reduced to “Use this control panel to turn off conflicting extensions.” Period.

3. One of the special delights of using the Mac is the way it (and the companies that write the best Mac software) respect my intelligence. My response to the Huh? button in the Macintosh Guide Answer window is, “Huh?”

Michael Bradley
Palo Alto, California

Windows developers, and more interested in Windows than in providing Macintosh users added functionality. As a user, I’ll be looking into programs that provide that functionality.

This is a terrific opportunity for smaller developers. Anyone who implements QuickDraw GX and does it well could leap past developers who are more interested in supporting commonality than excellence.

Timothy Rogers
Costa Mesa, California

T HANKS FOR THE VERY POSITIVE article on QuickDraw GX fonts (“Inside QuickDraw GX Fonts,” October 1994). I have a couple of comments on the article. In the “GX Fonts at a Glance” sidebar the author stated, “The word Plus after a font name indicates it is a GX font.” While one font vendor has chosen this convention, others have not. None of the new TrueType GX fonts Apple includes with the package (Apple Chancery, Hoefler, and Skia) use the word Plus to indicate GX-richness.

The author quite correctly stresses the need for GX-savy applications in order to give users the benefits of the new features. A little-known fact, however, is that SimpleText (Apple’s replacement for ’TeachText that ships with every copy of System 7.5) can actually take advantage of some GX typographic features when printing. To see this, create a new SimpleText document. Set the font to indicate GX-richness.

With QuickDraw GX, the Macintosh will do something that Windows doesn’t. Back in the days when Aldus, Adobe, and Quark were Macintosh developers, the Mac routinely did things that Windows didn’t. But now it seems that these same companies have become primarily

Dave Opstad
GX Line Layout Engineer
Apple Computer
Cupertino, California
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<th>IN CONTROL</th>
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<tr>
<td>Full-featured calendar</td>
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<td>FileMaker® Pro lookup</td>
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<tr>
<td>Lookup contacts from Touchbase® Pro</td>
<td>YES</td>
<td>Only Touchbase Pro</td>
<td>Only Now Contact</td>
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<td>Unlimited number of outline columns</td>
<td>YES</td>
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LETTERS

CORRECTIONS

- The letter about the Blacksburg Electronic Village project that appeared in the October 1994 Letters section was not written by Gordon G. Miller III. The identity of the person who placed the letter on the online service where Macworld received it is currently unknown. Macworld apologizes for the error.
- Our October review of the PowerBook 540c oversimplified the work required to upgrade the machine's memory, modem, and hard drive. Also, since the review was printed, Apple has changed its policy, saying that only dealers should install internal upgrades.

Axion Woes

IT NEEDS TO BE SAID (IN LIGHT OF Larry Woodard's letter in the August issue of Macworld) that Axion appears to be anything but solvents. In early 1994 I bought an Axion serial switch, but the product was incompatible with my hardware configuration. I called Axion, they gave me an RMA number, and I sent the switch back for a refund. After about two months, I called and was told that the company had reorganized and was just getting back on its feet—and that I should have my refund in about four weeks. After another month and half, I called again and left a message, but received no call in return. The next week (we're up to June 3 by this time) I called Axion again and was promised that my refund would be expedited, and told that I should have it within a week.

A full month later, I called Axion again. This time I got a person who called himself the manager of customer support, who told me my account had somehow been credited instead of my money refunded. After I had faxed him a copy of my packing slip, the manager of customer support said he would expedite my refund check, and I should have it in two weeks. Five and a half weeks and two phone calls later (August 8), I called the manager of customer support and told him that it was time to go over his head to maybe get something done. He said the only thing he could do was give me the number of his accounting firm. But for all practical appearances, their accountant doesn't take phone calls.

Please advise all potential Axion customers that the company does not stand behind its product or its warranty and all would be better off looking for hardware elsewhere. In fact, Axion has probably accumulated nearly as much in phone bills from me calling its toll-free number as it would have spent if Axion had simply sent me my $88.52 and moved on.

Marc Williams
Yuccaipa, California

After two weeks of repeated phone calls, Macworld obtained the following response: "Axion values its customers very much. We have spoken to Mr. Williams, apologized for the delay in taking care of the matter, and mailed him a refund check for $88.52. Axion has sold several thousand serial switches and Mr. Williams' case is an isolated one. He is entitled to his own opinion, but Axion has treated all its customers fairly, and the company stands behind its product 100%.

Macworld has confirmed that Marc Williams has received a check and an apology.—Ed.

Lighten Up on the 540c!

W AS GALEN GRUMAN HAVING A BAD DAY when he reviewed the PowerBook 540c (Reviews, October 1994)? I can't think of many other reasons for all the supposed cons he thought up.

Perhaps he just didn't spend enough time with the computer, which would explain why he thought the whirring noise it produces comes from a fan, rather than from the hard disk. Perhaps he is a PC user at heart, which would explain why he was surprised to find the start-up key placed on the keyboard in the standard Mac location. Maybe his repetitive strain injury was acting up, which is why he thought you'd have to like a trackball to like the (amazing) trackpad. Mr. Gruman calls the 540c's Ethernet port nonstandard, but it works fine with the same connectors as our office's Quadras and Power Macs.

Like most PowerBook owners I've heard from, I run out of superlatives when talking about my computer (a 520c), and I was surprised to read such a negative review. I hope Mr. Gruman is having a better day today.

Steven Haddock
Santa Barbara, California

The noise coming from the 540c was indeed the hard drive. There is no fan in the PowerBook—it just sounds like there is. I was wrong to say that Apple changed the standard for the Ethernet connector on the PowerBook 500 series, but I was not wrong that older AUI connectors are incompatible. The Ethernet port on the 500 series is recessed, while on desktop Macs the port actually extends out a bit from the back of the case (something you wouldn't want on a portable). Some vendors have been shipping Ethernet cables with an extra lip around the connectors. These fit in the desktop Macs' Ethernet ports, but they don't fit in the PowerBook 500 series' port.
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Apple’s own connectors work fine on both the 500 series and desktop Macs.—Galen Gruman

The Stars Control Our Destiny?

I had to check the cover of the September issue of *Macworld* to see that I wasn’t reading your April Fool’s issue. But there it was: David Pogue measures the accuracy of astrological programs, and with a fairly straight face (The Desktop Critic).

Does Pogue know that no scientific investigation of astrology has ever shown it to have any validity? Nowhere in his article does he explain the mechanism that supposedly relates planetary positions to our psyches. There’s a pretty big leap that he just assumes to be true. Pogue’s own attempt at statistical comparison is extremely flawed. I hope he finds some time to look at the night sky and see through the layers of superstitious myth (and New York smog) to the real and logical beauty of the stars.

Doug Wink
Midland Park, New Jersey

David Pogue has measured many things with a straight face but, by his own account, astrology software has not been one of them. *Macworld* leaves the question of faith in prophetic software up to the individual reader.—Ed.

Online Shopping

In the August 1994 issue Steven Levy reviewed some online shopping services and came to the conclusion that Compact Disc Connection was a hands-down winner (The Iconoclast). Although I have no experience with the other services that he reviewed, I was amazed by what I saw when I accessed CD Connection through its Internet address (cdconnection.com).

This kind of raw data makes online shopping services worthwhile.

Rob Breitkreuz
Winnipeg, Manitoba, Canada

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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 800-781-1466 For More Information.
Ask about multi-packs, site licenses and our Windows version.
MANY PEOPLE STRIVE FOR PERF.
WOULD YOU SETTLE FOR PERF.

Everything in your life may not always come together. But on your Macintosh, it's another story. Because now there's a family of leading, full-featured programs for the Mac that truly work together like one.

New Microsoft Office 4.2.

Think of Office as programs that look alike. Programs that act alike. Programs that work so closely together, you'll feel like you're using just one.

An example? Let's say you want to change a sales chart that's part of a report to your boss. Go ahead. Simply click on your chart and instantly your Microsoft Excel spreadsheet tools appear. Without ever leaving Microsoft Word.

Talk about being connected.
The fact is, the walls are down. You're now free to combine words, numbers and pictures with ease. Without leaving your document.

Better yet, no matter what you're working on, you're working smart. Thanks to IntelliSense technology,

built-in intelligence that senses what you want to do, then helps you do it.

Behind Office, you'll find even more smarts: Microsoft's unlimited product support. It's available at no service charge. Just call.

But first, call (800) 709-3787, Department YP4, to locate a retailer near you. They'll help you learn all about the new Microsoft Office Standard 4.2, in versions for both Macintosh and Power Macintosh.

So give us a ring.
Then give your Macintosh something that most people spend a lifetime searching for.
Introducing the Agfa StudioScan II.

Push a button, make a scan. Is it really that simple? With the new Agfa StudioScan II, it can be.

That's because StudioScan II was designed for simple operation. Two levels of scanning software are built in — easy-to-use Agfa FotoSnap and comprehensive Agfa FotoLook. Plus, our exclusive, 42-page Introduction to Digital Scanning will guide you through the scanning process.

What's more, every StudioScan II comes complete with Agfa FotoTune color management software and our IT-8 reference target, along with Adobe Photoshop" LE and OmniPage Direct" OCR software. All in a 400 x 800 ppi, 30-bit, one-pass scanner. And all for about $1,000.

So if you want an easy way to bring a scanner into your office, all it takes is the new StudioScan II. And your finger. Call 1-800-685-4271 to find out more information on Agfa's new scanners.
Apple, IBM Working on New Standard Platform

Apple and IBM have confirmed that due to technical incompatibilities the Mac OS will not be ported to PREP, the standard developed by IBM to run multiple operating systems on PowerPC machines. Apple and IBM have agreed to cooperate on a new standard PowerPC architecture that could run a variety of operating systems, including the Mac OS. The two companies said that their engineers have begun work on the standard, and IBM said the project is progressing.

Potential Data Loss

Symantec is once again warning owners of Norton Utilities for the Mac 3.0 (NUM) about a potential data-loss problem when using the SpeedDisk module, this time with older versions of FWB’s Hard Disk Toolkit. When hard drive optimizers such as SpeedDisk move data in large blocks (on systems with more than 32MB of RAM), a bug in Toolkit can cause data loss. This is not related to a previous data-loss problem with SpeedDisk 3.0 that the company resolved with its update to NUM 3.1 (see News, “In Brief,” in this issue). FWB is offering a free upgrade to Toolkit 1.6 for users running version 1.3.1 or older who have systems with 32MB or more.

Faster PowerPC 601

IBM Microelectronics began production on October 10 of a 100MHz PowerPC 601, the fastest version of this CPU yet. Apple has shown prototype Power Macs using experimental versions of this CPU running at 120MHz, but has not yet announced any Macs with the 100MHz CPU.

First Silicon of PowerPC 620

Motorola and IBM Microelectronics say they have achieved first silicon of the PowerPC 620 chip, which offers dramatically higher performance than the fastest current PowerPCs. The first 64-bit processor in the PowerPC line, the 620 should appear as the heart of file servers, computation servers, and very-high-end personal computers or engineering workstations. It is designed so that several 620s can work together in a single system, using a method called symmetric multiprocessing. Volume production should begin in the second half of 1995.

Adobe Joins OpenDoc Consortium

Adding to the momentum of OpenDoc, Adobe Systems has joined CI Labs, the consortium responsible for popularizing the component-software technology, and will develop components to work with Illustrator, Photoshop, and Premiere. Adobe joins other sponsors Apple, IBM, and WordPerfect; recent recruit Lotus Development is a member but not a full sponsor.

Better Values from Apple

Citing a drop in hard drive prices, Apple has increased the drive size on many Power Macintosh configurations while either keeping the price the same or reducing the price by as much as $300. The minimum Power Mac drive size is now 250MB (a 6100/60 with 8MB of RAM and a 250MB hard drive for $1819), and 8100/80 configurations top out at 1GB (an 8100/80 with 16MB of RAM, a 1GB hard drive, and a CD-ROM drive for $5379).

Photoshop’s New Year’s Surprise

Thanks to a time bomb Adobe inadvertently left on Photoshop 3.0, that recently released version will shut down for good on January 1, 1995, unless you roll back your system clock to 1994. Fortunately, a remedied 3.0.1 is shipping. A free patch is also available online and will be sent via disk to registered users.

230MB Bernoulli Drive

The Bernoulli 230 Transportable is Iomega’s latest, a removable-cartridge drive that stores up to 230MB. Expected to ship early in the fourth quarter of 1994, the drive will list for $582, including one 230MB cartridge ($99 list, separately) and a five-year warranty.
Power Macs Join Performa Family

In another milestone for PowerPC-based Macs, Apple is rolling out the Performa 6100 series, which offers unprecedented performance in systems intended for the home. The five systems in the series are the first Performas to incorporate PowerPC processors. The basic systems are identical to the highly regarded Power Mac 6100/60 (see Reviews, Macworld, June 1994), but they come with an Apple Multiple Scan 15" Display and an Apple Design Keyboard. The five new Performas differ from each other only in their hard drive capacity and their bundled software.

All five systems come with a 60MHz PowerPC 601 microprocessor, 8MB of RAM, a double-speed CD-ROM drive, a 14.4-Kbps send/receive modem from Global Village, and System 7.5. All ship with a truly formidable assortment of applications installed on the hard drive or on CD-ROMs. The following applications are installed on the hard drives of all five systems (native Power Mac versions are in boldface type):


As for differences, the Performa 6110CD comes with a 250MB hard drive, and the Performa 6115 includes a 350MB drive. Both of these systems have the following additional software on their hard drive: ClarisWorks 2.1v3, ClarisWorks 2.1v3.
**NEWS FLASH**

**PCI Power Mac Preview**

SPEEDS PAST NUBUS

The newest Power Macs represent the end of the line for NuBus-based Power Macs. In May or June according to several developers who have current prototypes, Apple will deliver as many as five new Power Macs and perhaps one 680X0 Mac that will use the Peripheral Component Interconnect (PCI) bus that has become increasingly popular on PCs. PCI offers the Macintosh high-speed, high-bandwidth data transfer, which is a must for Apple's plans to put AV technology on all Macs by 1997 (see "PCI to Boost Data continues on page 36)

**Color Ink-Jet for the Desktop**

**COLOR STYLEWRITER 2400**

Apple's latest ink-jet printer comes with a high-speed (885-Kbps) serial connector and ink cartridges for both black and color printing. The Color StyleWriter 2400, which will sell for less than $525, prints 3 pages per minute in black ink. A color page at 360 by 360 dpi takes about three minutes to print.

The 2400 handles plain paper, glossy stock, transparents, back-print film, and envelopes. It comes with ColorSync, ColorShare, and QuickDraw GX software.

Apple plans to ship the StyleWriter 2400 in early October, but the LocalTalk option (under $125) isn't slated to ship until January 1995. Apple Computer, 408/996-1010. —NANCY E. DUNN

**PowerBook PCMCIA**

APPLE SHIPS EXPANSION MODULE

Delivering on the promise made with the PowerBook 500 series, Apple is shipping its PCMCIA Expansion Module. The module, or cage, as Apple calls it, ships into the left battery compartment of a 500-series PowerBook, plugging into the Processor Direct Slot interface within, thereby providing a PCMCIA interface. The module accepts two Type I or II cards, or one Type III card. The cards are hot-pluggable, meaning that users can slip them in and out without restarting; the ejection mechanism is activated through the Control Strip utility.

Currently the Expansion Module works with several PC-modem, cellular-modem, and storage cards; users should call Apple for a list of compatible vendors. Apple is working on making it possible for card manufacturers to write system-level drivers for other types of cards, including networking and data-acquisition cards. The PCMCIA Expansion Module is shipping at press time; the street price should be around $219. Apple Computer, 408/996-1010. —CAMERON CROTTY

**In Brief**

**Serious Bug in NUM 3.0**

Norton Utilities for Macintosh 3.0 shipped with a serious bug in the Speed Disk module that at best requires a System reinstall and at worst causes data loss. Symantec mailed a new version, 3.1, to all registered users; a free patch is also available on America Online, Compuserve, AppleLink, and the company's BBS (503/484-6669, 9600 bps), or by calling Symantec at 503/334-6554 or 800/441-7234.

**Support for Orphaned Accelerators**

Extreme Systems is offering technical support and hardware repair for all SE and LC accelerators formerly sold by Total Systems, now defunct. Extreme, the original manufacturer of these products, also extends a $50 discount toward the purchase of new Extreme accelerators with the trade-in of any SE or LC accelerator. 206/575-2334.

**Central Point Unbundles Tech Support**

Central Point Software, which previously offered free tech support for the current versions of its Mac products, has begun charging for live tech support over the phone. Live support now costs $25 per incident (at 800/491-2764 or $2 per minute (at 900/555-7700). The company is also offering free tech support forums on CompuServe, America Online, and its own BBS. Information on the various options is available at 503/690-8090.

**New Batteries for Old**

Users of Battery Technology's SlimPack external battery packs for Apple PowerBooks can now turn in their drained battery cells and receive new cells for $85. The new SlimPack batteries normally list for $169.95. 213/728-7874.
News

"NEWS FLASH" continued Speed," Power Mac News, in this issue.)

Apple has previously told Macworld that at least some of these new PCI Macs will combine PCI with Apple's own Digital Audio Video (DAV) bus, which will let video data move directly to the Power Mac's CPU, rather than compete with other peripheral cards' data on the PCI bus.

According to sources who have seen prototypes, one new PCI Power Mac will have just one PCI slot and be similar in design to today's Power Mac 6100. There will also be an all-in-one Performa model that will have the same features as the 6100-like machine. Two of the Power Macs will each have three PCI slots and will otherwise resemble today's Power Mac 7100. A fifth model will have six PCI slots and fit into a taller version of a Power Mac 8100 case, the sources said. The sixth model is a PCI version of the Quadra 630, the only PCI Mac expected to use a 680X0 chip.

The six-slot Power Mac does not have its own video card—at least not in the early prototypes—according to one developer. It's not clear whether Apple will bundle a third-party PCI video card (as most PCI PC vendors do), include one of its own, or let dealers and buyers choose the video card. The six-slot prototype also has the CPU and system oscillator on a separate card, which may mean that Apple will support performance upgrades by letting users replace their CPU while keeping the rest of the system. Current Macs require you to buy a third-party accelerator, replace the motherboard (for few models), or buy a new system to increase performance.

Other sources say that Apple will begin selling components such as video cards separately from the CPU for at least some PCI Power Mac models, both to lower the list price and to create brand awareness for its peripherals. The reason, one source says, is to make Apple peripherals the no-brainer choice for Mac clones, which Apple has begun authorizing and which may ship in late 1995.

The PCI Power Macs will not support NuBus cards, although Apple has told Macworld that it is working with Second Wave, a manufacturer of NuBus expansion chassis, to develop a PCI-to-NuBus expansion chassis. Such a chassis would let owners of expensive NuBus cards—such as the multicard video-editing products from companies like Avid and Data Translation—keep their NuBus peripherals while reaping the benefits of PCI for other peripherals.

One unknown is the PCI Power Macs' RAM requirements. One source says that these new Macs will use a much faster bus than today's Power Macs, and that may require faster SIMMs than current Power Macs use. Another source says that the prototype six-slot machine uses 64-bit Dual Inline Memory Modules (DIMMs) in edge-connector-style mounts instead of the SIMM chips in chip mounts found in most Macs and PCs. This new design would boost the total RAM capacity of the six-slot machine to 1.5GB, but users upgrading even from first-generation Power Macs may have to buy all new memory. Apple says it has not yet determined what speed RAM will be required and would not commit to compatibility with today's SIMMs. One source said that current plans at Apple would make at least some models compatible with 60ns SIMMs—the kind the Quadra 800/155 requires—would that faster SIMMs (probably 40ns or 50ns) would likely be needed on the fastest PCI Power Macs. Faster SIMMs are not available today but are under development by memory makers, the source said. Apple had no comment on system details beyond the DAV bus. Apple frequently changes its product plans, so the models introduced in the spring may differ from the current prototypes.—GALEN GRUMAN

ScanJet 3p: Faster, Cheaper

300-DPI GRAY-SCALE SCANNER

 Hewlett-Packard is replacing its ScanJet IIp scanner with a faster, lower-cost model. The ScanJet 3p is a gray-scale (256 levels), 300-dpi true-resolution, flated scanner. It can handle documents up to 8.5 inches by 11.7 inches and can scan a single sheet of text in as little as ten seconds (real-world scan speeds depend on the speed of the CPU and the scanning software).

The ScanJet 3p supports the TWAIN scanning protocol, enabling such TWAIN-compatible applications as WordPerfect, Aldus PageMaker, and Adobe Photoshop to talk directly to the scanner. The ScanJet 3p connects to the Macintosh via an included SCSI connector. The scanner ships with HP's PictureScan scanning software and PicturePlace image-management and image-editing software. The ScanJet 3p also comes with Calera's WordScan 1.2 for the Macintosh, as well as an HP-designed utility called HP Copier that turns the scanner into a copy machine, sending a scanned image directly to a printer with a single button-click. The ScanJet 3p is currently available from Hewlett-Packard for a list price of $599; a 20-page automatic document-feeder attachment is available separately at a list price of $239.

The HP ScanJet 3p provides 256 levels of gray at true 300-dpi resolution.

The ScanJet 3p is currently available for $599, which Apple has begun authorizing and which may ship in late 1995.

OF USED MAC PRICES

THE AMCoEx INDEX OF USED MAC PRICES

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<th>Monthly Change</th>
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Index provided by the American Computer Exchange of Atlanta, Georgia (800/786-0717). It reflects sales week of September 29. Configurations include keyboard and external monitor and video play board for supercompact models.
Camera Crotty

NEC has announced the MultiSpin 4X CD-ROM drive (left) and the company's portable MultiSpin 3Xp Plus CD-ROM drive.

and MultiSpin 4Xi ($415 estimated street price) are, respectively, the external and internal incarnations of NEC's new quad-speed (600-Kbps) mechanism. The two drives feature an average access time of 220ms. NEC is also offering the 3Xp Plus, a portable drive with an average access time of 240ms, a sustained data-transfer rate of 500 Kbps, and an estimated street price of $415.

For those with less stringent speed requirements, NEC has announced the MultiSpin 2V Mac, an external, tray-loading, double-speed (300-Kbps) drive with an average access time of 320ms and an estimated selling price of $345. All drives are expected to be available in October.

NEC, 708/860-9500.
-CAMERON CROTTY

Workgroup Printers from Apple and HP
LASERJETS VERSUS LASERWRITERS

For workgroups that include more than one type of computer, Apple Computer and Hewlett-Packard have each introduced a 600-dpi PostScript laser printer that simultaneously handles input from networked DOS/Windows PCs, Macs, and Unix systems. Although the printers are based on different RISC processors, the HP LaserJet 4MV ($3549) and Apple's LaserWriter 16/600 PS (about $2300) have many features in common.

These two competing printers have network connectors for Ethernet and LocalTalk, plus a bidirectional parallel port. Both printers can handle up to 850 pages in three bins, if you buy an optional 500-sheet tray ($449 for HP's; about $299 for Apple's). Both printers can hold an optional user-installable internal hard disk—HP's disk has a capacity of 42MB ($499); Apple's disk holds 245MB and has an estimated price of $399.

The HP LaserJet 4MV comes with 12MB of RAM, with room for up to 44MB. The LaserWriter 16/600 comes with 8MB of RAM, with a maximum capacity of 32MB. Both printers render halftones with screens as fine as 106 lines. (Although Apple's printer supports 600-dpi PhotoGrade, you really need 12MB of RAM to take advantage of it.)

Hewlett-Packard sets its Laserjet 4MV apart in a couple of important ways. HP's laser printer supports the company's proprietary page-description language, PCL 5, in addition to its built-in PostScript Level 2. The LaserJet 4MV also has a larger maximum paper size than Apple's printer. The 4MV accepts not only 11-by-17-inch stock but also custom 11.7-by-17.7-inch paper that permits 11-by-17-inch designs with bleed on all sides. HP's 4MV also handles postcard stock. Apple's printer handles letter, legal, A4, A5, and B4 sizes.

Although it can't handle large-format printing, Apple's LaserWriter 16/600 does offer another wrinkle of flexibility: with the addition of a user-installable network fax card (about $300) the printer can act as a Group III and PostScript fax machine for all users on the network.

Apple Computer, 408/996-1010; Hewlett-Packard, 800/752-0900 in the U.S., 800/387-1867 in Canada.

-NANCY E. DUNN

Color Printing on the Road
HP DESKWRITER 320

With a PowerBook and Hewlett-Packard's portable ink-jet DeskWriter 320 printer, you can redo report or presentation pages while on the road—in color. The HP DeskWriter 320 offers the same speed and 600-by-300-dpi resolution as the deskbound HP DeskWriter 540, but it is compact, weighs only 4 pounds without its paper feeder, and works from a rechargeable battery if AC power isn't accessible. It prints on letter-, legal-, and A4-size plain and glossy paper; and transparencies, labels, and some special stocks.

The DeskWriter 320 replaces the DeskWriter 310 at the same cost: $379 list. You can buy an optional 60-page sheet feeder ($99) and leave it at your desk, or you can carry it along; otherwise you feed the sheets one at a time by hand.

Color Printing on the Road continues
with fields for formatted, structured information. Both file types can be searched with some Boolean operations; accessed by multiple users over a network; and displayed in list view, record view, envelope view, or label view. The product is Power Mac-native; and data-import and -export, envelope-printing, and other features that existed as separate utilities for QuickDex are all integrated into InfoGenie. InfoGenie is expected to be available in November for $75.95. Casady & Greene, 408/484-9228.

Galen Gruman

### NEC Replaces FG Monitors

#### X SERIES LINKS TO MACS AND PCS

Nec Technologies has released its new MultiSync X series of monitors, which replaces the FG series. Available in 15-, 17-, and 21-inch sizes, the new monitors distinguish themselves from other companies' monitors by including a connector that lets a Mac or PC communicate directly with the monitor to control resolution, color temperature, and other characteristics. The NEC monitors use an Access.bus port, a new standard designed as a platform-independent equivalent of the Mac's ADB bus. Access.bus peripherals such as monitors, scanners, and input devices can be daisy-chained together, with as many as 128 devices on one chain. NEC plans to release an Access.bus device for Macs that connects to the Mac via NuBus; NEC is negotiating with Apple and PC vendors to include the bus in at least some PCs and peripherals. Developed by Digital Equipment Corporation and Philips, Access.bus is now an independent standard endorsed by 55 companies.

Other features include software controls over pixel resolution, color synchronization (using Eastman Kodak's CMS color model, which will be bundled with the next version of Windows and is now available for the Mac), color depth, screen geometry, and color temperature, plus the use of a nonreflective antiglare coating. An antiglare lens will continue to be available as an option for use in high-luminance settings, such as in a windowed office.

NEC estimates street prices of $2580 for the 21-inch model, $1295 for the 17-inch model, and $735 for the 15-inch model. NEC will also offer the MultiSync XE series of monitors, which won't have Access.bus or high-end color controls (although the color-control software in the XP series will be available as an option to XE owners). For the XE series, the estimated prices are $2095 for the 21-inch model, $1120 for the 17-inch model, and $575 for the 15-inch model. Separately, the company will release stereo speakers for use with the XE and XP monitors. NEC, 708/860-9500.

Cameron Crotty

### Bugs & Turkeys

In theory, Apple's new PowerBook 150 was designed to support most third-party 100-series fax modems. In practice, using an internal modem in a 150 can crash the computer, cause excessive battery drain while the PowerBook sleeps, and with System 7.5, disable any communications software that uses the Apple Communications Toolbox. Apple is working on an extension to fix these problems. It should be available online and by calling Apple (800/767-2775) by the time you read this. Global Village (415/390-8200) has a software patch for their own modems that fixes the problem.

Apple Remote Access 2.0 crawls and crashes on the Power Macintosh 6100/60. Apple says that ARA 2.0.1 fixes the problem. The upgrade is available for a small fee from Apple (800/767-2775, ext. 7851).

Don't expect even margins when printing a full-page graphic to the Apple Color StyleWriter Pro. The top and left margins are ¼ inch, the right margin is ½ inch, and the bottom margin is ½ inch. Additionally, it won't print at all if you have more than 32MB of RAM on your Mac. Apple says a forthcoming upgrade will fix these problems.

Those database report forms you laboriously created in Microsoft Works 3.0 are toast if you upgrade to 4.0. Microsoft says that the old forms creator was awkward and just not worth keeping. Microsoft also says that the new forms are much more usable and, since no data is lost, no fix is planned.

Aldus Datebook 4.0's alarms don't ring when scheduled. Aldus says a free fix will be sent to registered users and posted online by the time you read this.

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.
Introducing a printer for those who have ideas bigger than this page.

The HP DesignJet 650C/PS printer. Large-format at a small price.

$8,995*

Go on. Give yourself room to think. With the HP DesignJet 650C/PS, you can now print in sizes up to 2' by 9' (up to 3' by 9' with our larger model**). Right in your office. Right away. No tiling. No hang-ups. No problem. Just clean, inkjet output with PANTONE*-licensed colors. Adobe" PostScript™ Level 2 software and a built-in RIP are included. For an output sample, call 1-800-354-7622, Ext. 8277.
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, NaBAs or software. PDS and NaBAs 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.

Circle 139 on reader service card
PCI to Boost Data Speed

BUT PCI-BASED PCS WILL STILL BE FASTER

Peripheral Component Interconnect (PCI) expansion boards for the next generation of Power Macs will provide up to double the data throughput of NuBus boards, according to Apple (see “PCI Power Mac Preview,” News, in this issue). A Macworld survey of 20 video, storage, and networking card developers reveals that graphics and video professionals who grapple with huge image files will be the first to benefit.

The PCI bus runs at 33MHz, while NuBus runs at 10MHz. Current Pentium-based PCI computers can push data through their bus at 50MB to 60MB per second (MBps). Current NuBus Macs run at about 16MBps, although some are as slow as 10 MBps. Apple won’t release performance figures for its implementation of PCI yet, but one source said Apple is aiming for 40 MBps—a rate that developers welcome for high-end use like video editing and disk arrays. The same source said Apple is likely to achieve a rate of about 20 MBps—significantly faster than NuBus Macs but not comparable to what PCs can offer. The reason for the slower Mac PCI performance is the overhead imposed by the Mac OS. And according to one source, the forthcoming new version of Windows should reduce the PC’s overhead even further. Apple’s next version of the System, code-named Copland and due in early 1996, is being developed to reduce the Mac overhead, several developers said.

Regardless of the ultimate PCI performance on Macs, vendors hope to ship PCI SCSI and video accelerators within weeks of the PCI-based Power Mac’s spring debut.

For digital-video professionals, PCI’s increased throughput won’t just speed up their work. Avid and Data Translation said they’d each like to build editing subsystems that can both capture images with little or no compression and process multiple streams of real-time video data. PCI can handle the required 9MB-to-20MB-per-stream rate. NuBus can’t.

For users who don’t yet have such data-intensive demands, Mac vendors say the reduced cost of the chips required to build PCI rather than NuBus cards may result in cheaper cards.

Apple hopes developers of PCI cards for PCs will make inexpensive PCI boards available for Power Macintoshes. But while each of the six leading PC board developers Macworld contacted expressed interest in Apple’s plans, not one was willing to announce definite support for the Power Mac. Several Macintosh developers said they expect PC vendors to offer Macintosh PCI cards in late 1995, but they don’t expect to see anyone offer a video card that works in both PCs and Macintoshes. It does not make sense, they said, for a vendor to add VGA and QuickDraw circuitry to every board. Instead, PCI vendors are likely to design a board with about 90 percent of the components compatible with both PC and Macintosh PCI and then add the platform-specific circuitry and connectors for each market’s product lines.

—JIM FEELEY

Power Watch

THE LATEST ON PRODUCTS FOR THE POWER MAC

A n increasing number of companies have released native Power Mac versions of existing 680X0 software, including the following products. All these programs have both 680X0 and Power Mac versions in the same package.

• 4D First, $295; 4D Server, prices vary; 4th Dimension, $895, upgrades free. (Databases.) ACI US, 408/252-4444.

ACI US’s 4D database gets a Power Mac boost this fall.

• APL Level 3.0; $900, upgrade $450. (Compiler.) MicroAPL, 44 (71) 922-8066.

• Blueprint 5; $295, upgrade $99. (CAD.) Graphsoft, 410/290-5114.

• DeBabelizer 1.6; $399, upgrade $99. (Graphics translation.) Equilibrium, 415/332-4343.

• Multiframe 3D version 1.0; $1995, upgrade $975. Multiframe 3D version 2.0; $1495, upgrade $1050. (Structure analysis.) Graphic Magic, 408/464-1949.

• Omnis 7; prices vary. (Database.) Blyth Software, 415/571-0222.

• ultraShield 2.5; $149, upgrade $29. (Security.) uEZ Software, 714/756 5140.

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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.

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Circle 123 on reader service card
New Products

THE LATEST MACINTOSH RELEASES

by Cameron Crotty

Hardware

Accel-a-Writer 8200

This 16-ppm, PostScript Level 2 laser printer can print full bleed on pages up to 11 by 17 inches and can handle pages up to 11 by 25 inches. Shipping in a base configuration of 600 by 600 dpi (upgradable to 800 by 800 dpi or 1200 by 1200 dpi), the 8200 comes with 12MB of RAM; a SCSI port; and simultaneously active serial, parallel, and AppleTalk interfaces. An Ethernet card that supports EtherTalk and TCP/IP is optionally available. $4995; Ethernet card $995. Xante Corp., 205/476-8189, 800/926-8839; fax 205/476-9421.

Audio 15

With desk space at a premium, you'll appreciate the stereo speakers built into this 15-inch, multiresolution color monitor. The Audio 15 has a 0.28mm dot pitch, a maximum resolution of 1280 by 1024 pixels, and a vertical refresh rate of 72Hz to 75Hz at most common Macintosh resolutions. The price includes a required Mac adapter. $519. Tatung Company of America, 310/637-2105, 800/829-2850; fax 310/637-8484.

ClearVueColor 20T Enhanced

Defining white points isn't for everyone, but sometimes an artist's gotta do what an artist's gotta do. Users of this multiresolution color monitor can define and store custom white points, or just switch between the pre-defined 9300-degree and 5000-degree presets. The Trinitron tube features a 0.31mm aperture grille, and the monitor automatically synchronizes to Macintosh resolutions up to 1280 by 1024 pixels at a 74Hz vertical refresh rate. The monitor also has digital controls with 10 preset combinations and room to store 13 user-defined settings. The 20T Enhanced is Energy Star-compliant. $2499; RasterOps, 408/562-4200, 800/729-2656; fax 408/562-4693.

Grand Vision Pro

Grand Vision Pro

Connect your PowerBook or desktop Mac to nearly any television or projection system. The Grand Vision Pro accepts input from any Mac that can generate a VGA signal (most Macs produced after the Mac LC, and some PowerBooks); the unit sends out simultaneous VGA, RGB, and NTSC composite-video signals. The Grand Vision Pro package also includes alavatore microphone for adding narration to presentations—audio can be passed through to a television or VCR, or users can plug in a set of powered speakers for immediate amplification. $3499. Dobbs-Stanford, 214/350-4222; fax 214/358-0180.

Mac65

Connect your Mac to the real world: this SCSI box provides ports for four digital sensors (sampled at 10,000 times per second) and three analog sensors (sampled at 100,000 times per second). The company's Science Workshop software is included: it displays, graphs, and performs simple statistical calculations on gathered data. Digital and analog sensors sold separately. $249. Pasco Scientific, 916/786-3800, 800/772-8700; fax 916/786-8905.

Magic 230 IBM

Fitting 230MB onto a 3½-inch optical cartridge, this half-height removable-media drive features an average access time of 40ms and a data-transfer rate of 5 MBps. The Magic 230 can also read and write 128MB cartridges. Internal $799; external $899. MacProducts USA, 512/892-4070, 800/622-3475; fax 512/892-4455.

Magic Alleycat

IBM still has a smoking-hot R&D team, but little did you know that the product-naming division is also funky fresh. This 2GB Fast and Wide SCSI-2 hard drive is based on the 3½-inch half-height IBM Alleycat mechanism, and provides 9.5ms average access times and data-transfer rates of up to 20 MBps. The drive ships with ChasMac's Anubis formatting software. External $1249; internal $1149. MacProducts USA, 512/892-4070, 800/622-3475; fax 512/892-4455.

Magic NEC 1.3GB Optical Drive

A half-height, removable-media optical drive that fits up to 1.3GB of data on a 5.25-inch cartridge. The drive features an average access time of 63ms and sustained data-transfer rates of 1.3 MBps, and ships with ChasMac's TurboMO formatting and speed-enhancement software. $1999. MacProducts USA, 512/892-4070, 800/622-3475; fax 512/892-4455.

MagniView 850 and 864

Eliminate the need for a two-piece projection system with these overhead projectors that have color LCD projection panels built right in. Both the Model 850 and the Model 864 feature 640-by-480-pixel active matrix color LCD displays that can show up to 2 million colors simultaneously. The Model 864 also supports composite NTSC, PAL, and SECAM video-in; and it has a lamp-life meter and a brighter lamp than the Model 850. Model 850 $5995; Model 864 $8995. Dukane Corp., 708/584-2300; fax 708/584-5156.

MicroTower

Four double-speed (320-KBps data-transfer rate) Toshiba CD-ROM drives power this SCSI tower. The drives are tray-loading models, and they are multi-session Photo CD-compliant. Each drive in the MicroTower takes up a SCSI ID continues
The best of both worlds
Processor upgrades from DayStar

Currently there are two worlds out there. Macintosh and Power Macintosh. Only DayStar makes a family of processor upgrade cards that give you the best of both. DayStar upgrades save you time and money compared to purchasing a new Power Macintosh.

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68K upgrades for the Macintosh Classic, LC, Performa, Centris and II series
DayStar processor upgrades have launched over 100,000 people into a speed advantage, with full compatibility with their software. The PowerCache™ brings the power of PowerPC performance to the Macintosh LC and Performa 470, 570, 630 and 630 and 650.

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PowerPC upgrades for the Quadra, LC, Performa and Centris series
The promise of PowerPC has finally arrived, and there are hundreds of native PowerPC applications available. DayStar and Apple designed the PowerPro™ 601 and the new PowerCard™ 601 to give you all the speed and the same compatibility as Apple's Power Macintosh computers. The PowerPro™ 601 even gives you up to 128 MB of optional memory. And, unlike a new Power Macintosh, DayStar's upgrade cards offer the best of both worlds because they let you run your Macintosh either as a PowerPC or 68K based Macintosh.

Call 800-962-2077 for your DayStar Reseller

Circle 7 on reader service card

New Products

DragStrip
Another weapon in the war against desktop disorganization, DragStrip provides you with any number of strips of buttons that can hold files, applications, volumes, or folders. Clicking once on a button launches or opens its contents; clicking and holding down on a button pops up a list of documents recently opened with that application, or a hierarchical menu of the contents of a volume or folder. DragStrip also features Additions, which are mini plug-in applications that perform common actions such as changing your bit depth or sound volume. Requires Macintosh II, System 7, and Drag Manager (included), $59.95. Natural Intelligence, 617/876-4876, 800/959-4649; fax 617/492-7425.

Esperanto
Like the language after which it is named, this software is designed to make communication easier. Esperanto (the software package) is a graphical front-end client to DEC's All-in-1 and VMS Mail hosts (support for IBM PROFS and Unix mail is in the works). The Esperanto client is designed to be used either on a desktop or remotely. Connections are required only to deliver messages to the host and download unread mail. Users can connect serially, via modem, over the RAM Mobile Data Network (wireless), or over a network using Windows Sockets, LAT, or CTERM. Up to 10 clients $212 per user; 250 clients $112 per user; 500 clients $92 per user. Square One, 908/602-9100; fax 908/636-8886.

Layer It
With this QuarkXPress XTension, users can sort the elements of their documents into layers, organizing objects into logical groups. When working on a specific layer, users can hide other layers, speeding screen redraw and reducing screen clutter. Requires QuarkXPress. $89. Vision's Edge, 408/748-8411, 800/800-8476; fax 408/748-9984.

Links Pro Macintosh
As golf swings are digitized, Links Pro Macintosh will let you take practice swings. If you're not exactly Ben Hogan, you'll be able to complete control over your shot; you can adjust your stance, choose your club, and even take practice swings. If you're on an AppleTalk network, you can play head-to-head against as many as eight other players. Links Pro ships with the Harbour Town course in South Carolina, and other courses are available. 4MB min. memory, $69.95; additional courses continue.

SOFTWARE

AquaZone
So you had a fish tank when you were seven, but all your guppies died? Here's your second chance at aquatic stewardship. AquaZone simulates life in a freshwater aquarium, complete with fish, gravel, food, accessories, filter, water conditioners, and diseases. The base package comes with two fish types (neon tetra and catfish), and add-on disks are available with other species, including angel fish, dwarf penfish, and rainbow-tie and red phantom tetras. $2.5MB min. memory; requires 8-bit color. $79; species disks $19.95. Lists Compute, 714/955-4968; fax 714/955-4963.

AquaZone

Autoscore
If you don't have an instrument that lends itself to pitch-to-MIDI hardware, this software could help. Autoscore works with compatible sequencers and music notation programs to convert into MIDI data notes that are sung or played into the Macintosh microphone. The software can handle pitch bends and volume tracking, and it comes with filters that are tailored for the acoustic qualities of different instruments. Autoscore is compatible with Coda's Nightingale, Finale, and Allegro; ARS Nova's Practica Musica and Songworks; Opcode's Musicshop; and other sequencing and notation software. Requires Mac II with sound-input capability. $150. Wireless Canyon Software, 510/527-5155; no fax.

Link Pro Macintosh

DragStrip

Layer It

AquaZone

Autoscore

Links Pro Macintosh

New Products
Newton connects. When you carry a MessagePad 110, the new Newton' communications assistant from Apple, you carry the power that comes from having information at your fingertips. Which means no matter where you go, you always have access to the facts you need, at the moment you need them.

With the Newton Connection Kit 2.0 for Macintosh, you can exchange information with your Macintosh, as well as with a range of popular Mac software, such as ACT! contact manager, Lotus 1-2-3, Excel and Microsoft Works.

So now you can do things like reference sales leads from Dynodex and work with data created in Microsoft Word, all from the palm of your hand. And if you're working on a PC running Windows, the Newton Connection Kit 2.0 for Windows will allow you to easily do the same with all your current Windows applications.

To find out more, call 800-365-3690, ext. 100, for the Newton dealer near you. Or check out an on-line service for the interactive demo found on the Newton forum. Either way, you'll find that instead of giving you more technology, Newton gives you something you can really use: help.

Newton. It's there when you need it.
New Products

MarkzTools
Don't let multiple versions of QuarkXPress get you down. This XTension converts 3.3 documents back to 3.2 or 3.11 format. Moreover, MarkzTools alerts users when a document is about to be converted and saves as a higher version. The user can choose to save QuarkXPress documents in a compressed format; MarkzTools automatically decompresses a document when opening it. $69. Markzware Software, 714/655-0881, 800/300-3532; fax 714/241-3874.

Menu Master Mac Lite
Tired of younger guest users leaving your Macintosh a mess—files missing, applications in the wrong places, control panel settings scrambled? This software creates a Finder-like interface that limits users to programs, documents, and DAs that an administrator makes available. Guest users can be restricted to Open and Save operations on a floppy disk or specific folders on the hard drive. If desired, Menu Master Mac Lite will also protect your hard drive even when someone boots your Mac from a floppy disk. $49. Electronic Learning Systems, 804/375-0558, 800/443-7971; fax 904/375-5679.

PageNow
Carrying around an alphanumeric pager is a handy way to stay in touch, but the 240-character message limit can get in the way. PageNow automatically breaks up longer messages and transmits them sequentially via modem to a paging service. The software includes a preview window so you can see what your data will look like when it's received. $79.95. Mark/Space Software, 408/293-7299, 800/799-1718; fax 408/293-7298.

Remind Me
Tying string around your fingers is one way to remember stuff, but it's hard to type with fluffy-wrapped digits. When a Remind Me reminder is triggered, a Looney Tunes character pops up, complete with sound and animation, and lets you know what you should be doing. Even better, if you have PowerTalk, you can send a reminder over the network to someone else running the software—imagine having the Tasmanian Devil announce your next meeting. 4MB minimum memory, requires System 7, PowerTalk for network use. $49.95. Velocity Development, 415/274-8840, 800/856-2488; fax 415/982-3259.

SCSI-Share
Didn't your mother teach you to share? With this control panel, you can share any SCSI device (except a mounted volume where System 7 file sharing should be used) over any AppleTalk network, including EtherTalk and TokenTalk. The software arbitrates concurrent device requests, indicates network activity, and provides password protection. $89. Stalker Software, 415/927-1026, 800/262-4722; fax 415/927-1026.

Smart1/Tones
You might not need a whiter shade of paucity, just the right shade of gray. This halftoning software converts gray-scale images to screened images using a stochastic algorithm that suppresses moire patterns, preserves 256 levels of gray at all resolution combinations, and prevents text from breaking up into halftone dots. Smart1/Tones can produce screen frequencies of 85, 106, and 141 lpi for 600-dpi printers. $295. Xyptx Corp., 201/263-4628; no fax.

Sunrise Chinese Environment
Sure, you can do Chinese DTP using Apple's Chinese Language Kit or ChineseTalk operating system, but you have to wait for all your software to be localized. The Sunrise Chinese Environment (SCE) provides for text handling, page design, and PostScript output, all within currently existing English-language applications. The heart of SCE is a QuarkXPress XTension that handles Chinese text input and font management. The package ships with two Chinese typefaces, which customers select from a list of 14. Requires QuarkXPress 3.0. $2695. Sunrise Hotel Service, 312/777-8708; fax 312/777-9247.

VoiceAccess
Voice mail and E-mail keep growing closer and closer together. This telephone tool runs in the background and acts as a voice-mail system, depositing recorded messages (roughly 220K for a 30-second recording) in an Incoming Messages basket on the desktop. If PowerTalk is installed, VoiceAccess automatically places the messages in the Incoming Mail tray. Users can log in from a remote phone and listen to their messages, and the product can distinguish between voice and fax calls, routing each to the appropriate software. Requires Power Mac, System 7.1, GeoPort tele­com adapter $129. STF Technologies, 816/463-7972; fax 816/463-2179.

XFlow
By creating a document template in QuarkXPress you can save yourself a lot of time.

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.

Connectix PowerBook Utilities™ (CPU) solves these problems and makes your PowerBook a real pleasure to use. CPU is the award-winning, number one selling PowerBook utility. And now CPU works with all the new '04 PowerBooks.

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Circle 189 on reader service card
There's the one where your ex-girlfriend turns into a rabid dingo and chases you and you keep getting your feet stuck in some weird mucky stuff until finally you reach a cliff above a river and as you jump you see her mother waiting for you below holding a weed-whacker.

Then there's the one where it's 4:30 the day before your vacation and you accidently hit the delete button as you attempt to print the 46-page update you were supposed to show your boss at 5:00.

Not all dreams should come true. Check out Retrospect. It automatically backs up all the files on your Macintosh. (Or use Retrospect Remote—the network version.) Be it power loss, theft, fire or spilled cappuccino, it'll save you hours of therapy and recreating. Restores are quick and complete. It backs up data to any storage device whether tape, cartridge or disk. And has simplified scripting and incremental backups. Sleep better.

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Created for the designer, StrataVision 3d uses familiar desktop tools to model 3D images for high-impact brochures, package design, and photorealistic illustration.

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New Products

CD-ROMS

The 11th Hour
Sequel to The 7th Guest, this game chronicles the adventures of reporter Carl Denning, Jr., as he searches for his colleague and lover, Robin Morales. Robin has mysteriously disappeared while investigating a string of murders in the hometown of demented toy-maker Henry Stauf. The 11th Hour tells its story with a cast of 18 characters in over 60 minutes of live-action video combined with rendered 3-D graphics. $79.95. Virgin Interactive Entertainment, 714/833-8710; fax 714/833-8717.

A.D.A.M. The Inside Story
Take a tour of the body with Adam and Eve, the animated protagonists of this anatomy reference CD-ROM. Both male and female anatomy are presented, with over 3600 body parts. The 12 major body systems are identified, and those systems' functions are described with stories, video, and animations. BMB min. memory; requires Mac IIc, 8-bit color, System 7.1, double-speed CD-ROM drive. $69.95. A.D.A.M. Software, 404/980-8988, 800/755-2226; fax 404/955-3088.

Design Elements—A Digital Reference
An electronic library of symbols, icons, and dingbats, this collection contains 3200 images, including chess pieces, postage motifs, trees, Spencerian flourishes and accents, arrows, pointers, gears, and pinwheels. The elements are in Adobe Illustrator format, and each element has an EPS preview that is organized in an Adobe Acrobat file. With the Acrobat software, users can browse the images or search them by keywords: $49.99. Ultimate Symbol, 914/942-0003, 800/870-7940; fax 914/942-0004.

REBEL ASSAULT

The rebellion is looking for a few good pilots—do you qualify? If so, then strap yourself in for this ride through the Star Wars universe. From rookie training in Beggar's Canyon through the climactic trench run on the Death Star, Rebel Assault features both cinematic and interactive elements. The game incorporates both animation and digitized video, music from the original score as performed by the London Symphony Orchestra, and sound effects from Lucas Digital's Skywalker Sound. 4MB min. memory; requires Mac LC II, System 7, 8-bit color. $63.95 estimated selling price. LucasArts Entertainment, 415/721-3300, 800/782-7927; fax 415/721-3342.

ACCESSORIES

Composite Sync Adapter
In one hand you are holding a new Macintosh; in the other you've got an old monitor that uses the unofficial sync-on-green Apple standard. With the Composite Sync Adapter, you can use that old monitor with the Quadra 605 and 610, LC models, PowerBooks, AV models, and Power Macs. $40. Griffin Technologies, 615/259-2095; fax 615/259-0090.

Phoenix
If you want to use this joystick, you're going to have to grab hold with both paws. There's a pivoting control provided for your off hand, and the Phoenix sports 24 buttons, each of which users can individually program through the twentieth century, including paintings, antique maps, heraldic imagery, and historical photographs. All 236 images are RGB TIFFs that have been color-corrected, dusted, and cropped, and come in two resolutions: 1MB to 2MB, 72-dpi files for browsing and composition; and 300-dpi, 24-bit color files for design and full-page output (compressed to fit on the discs using a JPEG algorithm). $299. PhotoDisc, 206/441-9395, 800/528-3472; fax 206/441-9579.

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Circle 114 on reader service card
with (included) software to execute multiple mouse-button or keystroke commands. $149.95. Advanced Gravis, 604/431-5020, 800/663-8558; fax 604/431-5155.

**Portable Laptop Workcenter**
You probably wouldn't want to hold this PowerBook carrying case up in a firefight, but it's made of the same ballistic nylon that's used to make bulletproof vests. The Portable Laptop Workcenter is designed so that you can just open it and work, without removing the PowerBook. The case has pockets for cards, pens, tickets, and peripherals; you can also leave some peripherals in their storage pockets while you use them, as there are holes and channels to manage the wiring. $129. Brookstone, 314/581-7113; 800/343-9855, ext. 099; no fax.

**Remote Point**
There's no longer any need to stay trapped behind your Macintosh when you give a presentation. This cordless infrared mouse has a 40-foot range, and to conserve battery power, automatically goes to sleep when not in use (remote requires two AAA batteries). You operate the mouse by pressing gently with your thumb on a button on top of the Remote Point—the cursor moves in the direction that you press. A trigger button under your index finger acts as a mouse button. The receiver plugs into the ADB port. $199. Intermec Electronics, 805/484-8895; fax 805/484-8899.

**Digital Imaging for Visual Artists**
You are a visual artist and think you want to start creating on the computer, but you don't have the first idea about where to start? Digital Imaging for Visual Artists starts out with a discussion of the pros and cons of a career in digital imaging (including copyright and creative issues); then the book moves through a tutorial on imaging hardware and software, from scanners to maskers and digital filters. Written by Sally Wiener Grotta and Daniel Grotta. 616 pages. $49.95. Windcrest/McGraw-Hill, 717/794-2191, 800/822-8158; fax 717/794-2080.

**Macworld FreeHand 4 Bible**
Macworld's very own contributing editor Deke McClelland leads beginners and experts alike on a tour through the latest version of Aldus FreeHand. Macworld FreeHand 4 Bible covers creating and editing your own typefaces; importing and exporting graphics; working with graphic objects; and using FreeHand in combination with painting programs, word processors, and other software. 736 pages. $29.95. IDG Books Worldwide, 415/458-1250, 800/762-2974; fax 415/358-1260.

**Photoshop Filter Finesse**

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

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**Unleash the Power!**
Click the button. It's so simple. Click. It's the easiest way to get things done. Which is why new WordPerfect® 3.0 for the Mac® puts all the things you want from your interface in your face.

Giving you more buttons to click than any other word processor. So features are easy to find. And use. Want to change your text formatting? Click. Apply a style? Click. Create a table? Click. Then you can bring up a different bar with all the table functions you want. Borders, editing—even math functions—it's all right there. Click. Our customizable button bars put your favorite tools right there, too. Like spell checking. Grammar checking. Our integrated drawing program. Whatever you want. There's even buttons for common tasks like bulleted indents. So you'll seldom have to do anything. Besides click. (And type, duh. This is a word processor.) But you can do other cool stuff, too, like run QuickTime.® Or WordPerfect native on the Power Macintosh.® So visit your local reseller or call us at (800) 526-7820 for our $99* competitive upgrade. If the number was nine buttons shorter, it'd be as easy as our interface. Click.
Here's no disputing the power of FITS (functional interpolating transformational system) technology. It enables you to load and edit very large images quickly and apply your changes all at once so as to avoid the continual image degradation you get with Adobe Photoshop. On the other hand, the first U.S. incarnation of Live Picture, which incorporates FITS technology, is less impressive. Despite the hype and steep price, Live Picture is surprisingly limited and even clumsy at times. It provides fewer functions than you might expect—several times fewer than those available in the image-editing standard, Photoshop—and it fails to fully exploit some of the inherent advantages of FITS. While Live Picture will intrigue professional image editors, who routinely composite 40MB and larger images, most folks can count this application among the $4000 programs they can safely live without.

The Paroxysms of FITS
To understand the purpose and potential of Live Picture, you need to understand how FITS allows the program to break with tradition. Conventional image editors—Photoshop and Fractal Design Painter among them—work by applying operations to every pixel in an image. When you drag with a paintbrush tool, for example, the program applies color to every pixel in the path of the brush. Barring the occasional Undo or Revert command, the pixels are permanently changed, much as a canvas is permanently stained when you apply paint to it.

There are two problems with this approach. First, the program has to load every single pixel into memory (whether RAM or virtual memory) and apply your changes one at a time to every pixel, a tremendous chore when working on large images. Minor operations, like panning and retouching, as well as major ones, like filtering and compositing, are slowed down in direct proportion to the file size. And unless the image fits (no pun intended) on your screen, you can never see the full measure of any alteration.

Second, the image degrades as you work on it. For example, if you resample an image to 50 percent, you permanently sacrifice data. If you later scale the image up to, say, 150 percent, you don’t regain that data but rather force the program to interpolate new data, which results in fuzzy details or outright jags. Even seemingly harmless adjustments like focus filters and color corrections sacrifice colors you never regain.

Armed with FITS, Live Picture successfully overcomes both these problems. The program converts all images into a Photo CD-like format called IVUE, which allows Live Picture to access specific portions of an image at various zoom sizes quickly, rather than interpolating every pixel. (Like Kodak’s Photo CD, the IVUE format saves an image at full resolution, ¼ resolution, ⅛ resolution, and on down, resulting in an image that is
about \( \frac{1}{2} \) larger on disk than when saved in a flat-file format.) As you edit the image, Live Picture doesn’t change so much as a single pixel in the original IVUE file. Instead, it stores your edits as mathematical paths and computations in a separate FITS file.

Because no real pixels are being changed—just screen pixels—most operations occur in real time. Generally speaking, you have to wait only when scrolling, zooming, or accessing a file on disk. Each time you change the view, the program re-applies your edits to the new chunk of the IVUE image on screen. In Macworld Lab’s unofficial tests performed on a Quadra 800 with 72MB of RAM, Photoshop was sometimes faster than Live Picture at zooming and opening images—and always faster at scrolling—but Live Picture was much faster at applying edits. The Power Mac-native applications occur in real time.

Generally changed—just screen pixels—most operations are almost instantaneously.

Live Picture is not only fast, it’s also flexible. Because the program saves all edits as mathematical objects, they have no inherent resolution. You can zoom in on a brushstroke, for example, to any extent you like and never see it degenerate into a bunch of enormous squares. (The imported images themselves have fixed resolutions, of course, but the edits are object-oriented, much as in Adobe Illustrator or Aldus FreeHand.)

When you are satisfied with your composition, you rasterize the final composition to an image file at any desired size and resolution. So you might resolve a small, 72-dpi image to show to a client, and then render the approved image overnight to a poster-size 300-dpi megafile. Because your edits are implemented only once—when you rasterize the composition—the edits are cumulative. Therefore, if you scale an image by 50 percent and then by 150 percent, Live Picture merely scales it by 75 percent (the product of 50 percent and 150 percent) when rendering. If you render to a higher image resolution, you may actually resolve the image up and not down.

**Layers upon Layers**

What I’ve described so far is equally applicable to any potential program that implements FITS or a similar technology. In fact, Live Picture’s biggest advantage is that it’s the first FITS program on the block. Judged on its own merits, however, the application doesn’t measure up nearly so well. Take, for example, layers. Live Picture’s most important and most befuddling feature. You create a composition by importing images onto different layers, much as in Specular Collage, Painter X2, and Photoshop 3.0. But in Live Picture, you use layers not only to hold images, but also to apply effects. For instance, if you want to sharpen the focus of an image, you overlay a special Sharpen/Blur layer and then paint on it with the paintbrush set to the Sharpen mode.

Though it’s hard to learn, this system has advantages. You can edit various effects independently of each other. For example, you might adjust sharpening on one layer, adjust color correction on another, and then come back and tweak the sharpening. Also, layers let you undo operations incrementally. At any time you can return to the Sharpen/Blur layer and erase a sharpening effect by dragging with the eraser tool.

But layers are a disappointment. Never mind that they are largely nonintuitive and badly explained in the manual; Live Picture does not implement them with nearly the care you see in less expensive programs. For starters, you can edit only the topmost visible layer, an arbitrary constraint that prevents experienced users from freely exploring a composition from multiple perspectives. The workaround is to hide all layers above the one you want to edit, but this prevents you from seeing key portions of a composition as you make changes to others.

Undoing another problem. Although you can erase effects, Live Picture provides only a single-level Undo command. If so one brushstroke overlaps another and you want to undo just one of them, you’re out of luck. Furthermore, even though Live Picture records all brushstrokes as paths, it provides no means for you to edit them as such. (The path tool provided with the program applies only to masks and stencils.)

The tool-based Sharpen/Blur layer offers its own problems. Simply put, scrubbing an image with a paintbrush or filling masked areas hardly qualifies as powerful or precise methods of fine-tuning the focus of an image. You have no means to numerically adjust, say, the strength or radius of the focus corrections, as you do in Photoshop. In fact, by HSC’s admission, Live Picture’s sharpening capability works like Photoshop’s Unsharp Mask set to a maximum of 100 percent, with a fixed radius and no threshold. In its attempt to make the program easy to use, HSC has made Live Picture less versatile and more static.

Sometimes Live Picture ties your hands. The program provides a Silhouette feature that ostensibly makes it easier to mask away a uniformly colored background. But in practice, the feature is about as capable as Photoshop’s magic wand, and less flexible, to boot. First of all, you can’t simply apply the automatic mask to an image that’s already inside your composition; you have to silhouette the image as you import it. You paint and erase to add to the masked or unmasked areas, then you click on a scissors icon when you’re finished. Once you accept a surprisingly complicated dialog box of options—HSC thinks Unsharp Mask is too complicated, yet it offers options with names like Computing Mode and Maximum Transition Edge—the program generates the mask. Though the process takes as much as a minute or more, you’re not allowed to switch applications. And when you finish, guess what? You can’t continue.
Reviews

Adobe Premiere 4.0

The Last Word

The amount of hyperbole surrounding Live Picture would make P. T. Barnum blush. One HSC employee told me, “You can’t think about Live Picture like any other piece of software you’ve ever used before. It’s a total paradigm shift.” I’m not sure any program could live up to that description, and Live Picture clearly doesn’t. Nevertheless, it’s a promising program that barely assembled atop some marvelous technology and burdened by an extremely high price tag. Though fast and blessed with all the benefits of a proxy-based system, Live Picture’s day-to-day functions leave plenty of room for improvement.—DEKE MCCLELLAND

Video-Editing Software


Even handier is the rolling-trim feature, which lets you quickly adjust a cut on the fly. You place the cursor between the out and in frames (indicated by A and B tracks on screen) and drag in either direction. We prefer to make a rolling trim first and then fine-tune the cut with a few clicks on the ripple-trim buttons. This way you can make audio and video edits quickly and precisely.

One challenge for video-editing software is to provide easy access to all functions and tools while keeping the interface simple and uncluttered. Premiere 4.0 accomplishes this in two ways: by consolidating many functions in a few new windows and by allowing you to define the main Construction window. By selecting options from the Windows menu, you can set icon size, track format, and track display. You can also snap the window edges together to create a console-style interface, and you can save your window design for future use.

The new Commands palette is a floating window for easy access and contains only those commands you use most frequently. Both the size and selection of this palette are completely user-definable. You select and add commands from a pop-up menu inside the palette window or from the Preferences option under the File menu. You can even adjust the number of columns in the window to make the palette fit better on your screen.

Premiere 4.0 also improves the file management of its Project window. A new hierarchy of folders and subfolders, all user-definable, enhances the organization of your clips and minimizes clutter. For replacing low-resolution work clips with higher-res real clips, Premiere offers the Project Trimmer. This tool recaptures the original clip at a higher res but only...
the portions of each clip you need for your project, to save hard disk space.

The Tool pop-up menu is an important enhancement to the Construction window. Rather than having to remember or look up keyboard shortcuts, you can choose all of Premiere's tools in one pop-up menu in the lower-left corner of the Construction window.

The range select tool, which eliminates the tedious repetition of executing the same command on a sequence of clips one clip at a time, has become one of our favorite tools. Range select lets you select a sequence of clips and work with them as a group. If you select a sequence and move it, the entire sequence moves as a unit, each cut intact; or you can select a sequence of clips and apply the same filter to all of them at once.

Anyone who uses Premiere for graphic design or special-effects work will be thrilled with 4.0's new filter capabilities. In addition to the filters provided in previous versions of Premiere—anialias, backward, camera blur—you can now apply Adobe Photoshop filters that ship with the software—such as emboss, solarize, and zigzag—to your video clips for unique impact. Once you select the clip you want to filter, Premiere displays a window in which you set the parameters of each filter. If you later forget just what filters you have applied to a clip, option-click on the clip and Premiere reminds you with a pop-up list. Audio filters include boost, fill left/right, and echo.

Still not enough filters for you? Try using the Filter Factory to create your own. From the Filters dialog box, select Filter Factory and click on Add. A Filter Factory Settings box appears, with a preview window and zoom and grabber tools. Once you have designed the filter you want by inputting mathematical equations and programming values, click on OK and it's yours. Or click on Build and save the filter for later use.

Likewise, Premiere includes both a wide variety of transitions and a new Transition Factory. Transitions range from a standard additive dissolve to the more spectacular gradient wipe. And the

Transition Factory lets you design your own unique effects. These facotories advance Premiere's effects capabilities beyond those of other desktop editing applications and challenge many high-money professional-level editing systems.

Which brings us to another new feature: uncompiled, or dynamic, previewing. In previous versions of Premiere, you could not preview your project or any segment of it without compiling the transitions and effects. Now you can preview without compiling by using either the Construction window, the Trimming window, or the new Controller window. You can also preview and print to video at the same time, with no delay, regardless of the size of your project.

And as for creating a professional-level project, Premiere 4.0 boasts support for true broadcast-quality video. To be considered broadcast quality, video must meet the NTSC standard of 29.97 frames per second. With the appropriate video hardware, Premiere 4.0 can capture video at this rate. You can now work in the Construction and Clip windows at 29.97 fps and output to tape at broadcast quality—again, with no delay.

Premiere 4.0 has several other new features. Stop-motion capture control lets you build an animated sequence a frame at a time. You can use the Show Previous command to animate— that is, to view the current and previous frames to assist setting the position and motion of the figure you’re animating. Video makers who need to online (finish a project in a broadcast-quality format) can output a second edit decision list (EDL) for the B-roll (usually used for dissolves) to eliminate conflicts with the A-roll. Finally, for clips containing window-burn time code, Premiere 4.0 can use OCR (optical character recognition) technology to convert it into an EDL, although OCR is still not totally dependable in any application.

Other features from 3.0 have been greatly improved. The EDLs now support four audio channels, and blue and green chroma keys now reduce the fringing effect of the background in a keyed composite image. Plus, the whole application is Power Mac-native, letting you take advantage of speedy filter rendering and smooth, 30-fps playback instantly.

The Last Word
While Premiere 4.0 is extremely powerful software on its own, professional-level digital video “for the rest of us” is still not a reality. Unless you have a workhorse CPU, lots of RAM, and very expensive disk arrays, you sacrifice video resolution, frame rate, or frame size. (We tested Premiere on a Quadra 950 with 20MB of RAM and a Radius VideoVision Studio 1.7, and also on a Power Mac 8100/80AV with 40MB of RAM.) The good news is that if you own the right hardware, you won’t regret investing in Premiere.

The most remarkable thing about Premiere 4.0 is the battery of exclusive features and functions that place it in its own class. The significantly simplified interface gives you greater accessibility to commands and functions. The Trimming window is a necessity long overdue, providing simple and precise tools for fine-tuning edits. The Filter and Transition factories give you full reign to design and store truly one-of-a-kind effects. And with the right hardware, Premiere can give the desktop video editor a broadcast-quality product with a minimum of compromises. Premiere 4.0 is not only a huge advance in desktop video software, it’s the new standard.

—ROB BRAKEY AND LAWRENCE JORDAN
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**PowerBook 150**

**Macintosh Computer**

**PROS:** Lightweight, decent speed.  
**CONS:** Not enough ports for an all-in-one computer; not a great value.  
**COMPANY:** Apple Computer  
(408/996-1010).  
**COMPANY’S ESTIMATED PRICE:** $1449.

APPLE’S POWERBOOK 150 IS A MIX-AND-MATCH COLLECTION OF FEATURES FROM THE 100-SERIES POWERBOOKS FUSED INTO A SINGLE FAST MACHINE THAT SHOULDN’T COST MUCH TO MAKE. IT’S AS IF THE 150’S DESIGNERS RAIDED THE LEFTOVERS SHELF AT THE POWERBOOK WAREHOUSE AND CHOSE SOME COMPONENTS THAT ARE NO LONGER STATE OF THE ART BUT WORK JUST FINE.

The 150 sports the same case as the 100-series models, complete with trackball. Inside is a 33MHz 68030 processor with no FPU, so the 150 is pretty fast compared with the 100-series PowerBooks it’s replacing. That speed is augmented by the 150’s Duo-style RAM, which lets you expand the standard 4MB up to a whopping 40MB. It also weighs a few pounds less than the older all-in-ones, thanks to a lighter screen, fewer components, and a simpler Duo-like interior architecture. At 5½ pounds, the 150 is the lightest all-in-one PowerBook.

The 150 includes a lightweight, manual-insertion SuperDrive floppy drive, a backlit passive-matrix LCD screen, and an IDE (Integrated Drive Electronics) hard drive. The display measures 9½ inches diagonally and offers 640-by-480-dot resolution, which is good for a passive matrix screen but doesn’t compare in quality with an active matrix unit. Without a video-out port, this is the 150’s only display option, and the passive matrix screen can really take a toll on your eyes.

Another way Apple kept the 150’s weight (and, presumably, cost) down was to eliminate a whole slew of accessory ports. Hence, the 150 has no Ethernet, video-out, or ADB ports, and no microphone. The flip-down back panel is gone, and what’s left is a single printer/modem serial port, a sound jack, a SCSI port, and space for an internal modem. The 150 is minimalist in the extreme.

Apple claims that all accessories for the original all-in-one PowerBooks, (including NiCad batteries) will work for the 150, despite some lingering internal-modem power problems; Apple is working to fix them by the time you read this.

The 150 comes bundled with ClarisWorks to create almost any type of document you could want, PC Exchange and MacLink Plus for exchanging files with the DOS world, Apple Remote Access client software and access to eWorld for telecommunications, and Apple’s PowerStrip for easy access to PowerBook utilities. It is a nice starter bundle that makes the 150 useful right out of the box.

Once again, Apple has left out the system disks, packing only a single utilities/emergency-start-up disk with the 150. The company expects you to provide the nine disks it takes to make a backup of your hard drive as soon as you get the PowerBook home (an included backup utility performs this task).

It’s worth noting that the 150 comes with an IDE hard drive. IDE drives, available in DOS and Windows machines for years, are cheaper than standard SCSI drives. If you want to reformat the 150’s hard drive, you’ll need to use the included formatting tools since most Mac hard disk formatters are SCSI specific. Other hard drive utilities and optimizers should work fine on the IDE drive for all but the lowest-level file-recovery and disk-optimization tasks. The 150 does include an HDT-30 SCSI port for attaching peripherals to the 150.

**The Last Word**

Apple could have made the 150 the Volkswagen of PowerBooks: just the basics, nothing fancy. For a decent bargain, some users would forgo the luxury of color, lose a few ports, and accept a less-than-top-of-the-line machine—no problem. Unfortunately, after all the sacrifice, you still get sticker shock when you pick up the 150. PC notebooks in the same price range offer PCMCIA expansion slots, larger hard drives, and up to three times the 150’s battery life. For budget-conscious shoppers, buying a used or reconditioned 100-series PowerBook might be better than buying a 150, especially as dealers clear the older machines from their shelves. Or, if you have an extra $700, consider the more expandable, PowerPC-upgradable PowerBook 520. While the 150 is a solid machine, it isn’t worth the premium price for a repackaging of older technology.

—MATTHEW HAWN

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**How Fast Is the PowerBook 150?**

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electricimage animation system 2.0

at $7500, electricimage animation system (ei) can hardly be called an impulse buy. but ei is aimed at professional animators. in demanding cine

matic production environments, where animation workstations can cost many thousands more, electricimage, with extraordinary animation and image rendering capabilities, is a bargain. and as its extensive list of credits (including sequences in terminator 2, jurassic park, and the mask) attests, ei is every bit the equal of workstation-based programs in image quality. so although ei is not a program for dabblers, professional users get great value for their bucks.

electricimage 2.0 is better integrated than its predecessors, incorporating the old mr. font module into the main program. now you can build and bevel text objects from postscript type 1 fonts right in the 3-d workspace (true type fonts are not supported).

gone also is the translator module. with 2.0, you can import 3-d models without an intervening step. ei can read more than two dozen file formats, making it compatible with virtually every modeler in use today. plus, it can write many of these formats, so it can translate files from one modeler to another.

although electricimage still lacks a built-in modeler, version 2.0 includes plug-ins for constructing primitive shapes such as cones, cubes, and spheres, and for generating mesh-surface objects. undoubtedly, more plug-in tools will be forthcoming, but you'll still need a separate program to build models.

once you import a model, ei provides unbelievably comprehensive control over every facet of the animation process. you can link objects hierarchically using a variety of pivots for defining and constraining motion. ei 2.0 offers tools that deform objects to produce twisting, shearing, tapering, and even rippling effects. and you can manipulate objects using bézier controls to produce organically flowing movements.

electricimage 2.0 also includes new plug-in animation routines. mr. nitro explodes objects into user-definable pieces, letting you edit variables such as air resistance, turbulence, and blast time. the particle generator creates a stream of fragments that you can edit for variables such as flow, lifetime, and bounce, simplifying hard-to-produce effects like flying sparks, and jets of water.

electricimage 2.0 is similarly exhaustive in controlling textures, letting you precisely adjust surface attributes such as specularly, reflectivity, and transparency. also, ei 2.0 can enhance images with adaptive antialiasing to sharpen high-contrast edges and with summing filtering to alleviate the unwanted moiré effects produced by some surface maps.

and ei 2.0 can render images using various user-definable, motion-blur techniques that produce the effect of faster-than-camera-shutter motion.

beyond standard lighting (point, spot, ambient), ei gives you the option of tube lights that mimic neon features and laser beams. all lights are infinitely adjustable, allowing for wonderfully subtle glows. in addition, a new plug-in produces lens flares simulating two photographic lenses.

the project window lets you coordinate the animation on a time line displaying each channel; the window can also display spreadsheetlike grids in which you can edit animation values for specific frames. also, you can import multiple sound files, which are displayed as waveforms in the project window. ei automatically parses the sound track and assigns segments to every frame. sound-synchronized animations can be previewed in real time and saved in quicktime format.

electricimage's separate camera module has a well-earned reputation as a speedy production renderer. much of that speed is derived from using gouraud and phong shading techniques with reflection mapping, instead of tracing every ray of light in the scene. the result is faster rendering with little, if any, compromise in image quality.

with ei's projector module you can view the completed animation. projector uses a proprietary playback routine that yields smooth performance even at a 640-by-480-pixel image size. in addition, projector lets you edit animation sequences and manages the transfer of finished productions to an assortment of professional video devices.

befitting a program this complex, ei's documentation is extensive. these manuals are comprehensive, well organized, and readable, making the learning curve more manageable. less convivial, however, is ei's use of an adb copy-protection key. pros who already use several programs with adb keys should be wary. string a few keys together, along with a normal complement of input devices, and you can overload the adb.

if you haven't guessed by now, ei's hardware requirements are steep. you'll need a large monitor to keep ei's multiple scene views, project window, and assorted tool palettes at hand. recommended ram dosages range from 24mb to 256mb, depending on the complexity of your productions. and of course, get the fastest mac you can afford. these days, think power mac—ei should be native by the time you read this. yes, workstation systems still outperform mac-based electricimage, but the power mac-native ei should change that, while maintaining a significant cost advantage.

the last word

depending on your perspective, electricimage 2.0 is either incredibly overpriced or a terrific bargain. in the end, there's no denying that electricimage is worth every penny, but you have to be a successful professional to afford it.

—carlos domingo martinez
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THE COMPETITION.
THEN WE CHALLENGED
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Internet Explorer Kit and Internet Starter Kit

Internet Membership Kit

It's the hot, overhyped topic of 1994: the Internet. Members of online services are able to explore some Internet functions, but how do you really get on the Internet? These three book-and-software combinations aim to help users navigate the information superhighway.

The Internet Companion
Voyager's package contains The Internet Companion, a HyperCard-based book written by Tracy LaQuay (Addison-Wesley, 1992). LaQuay's book is well-written but offers much less information than the other Internet references contain, and its information isn't completely current. For example, a search on the word Mosaic yielded nothing.

This electronic book is surprisingly easy to browse; you can search the text and earmark references. But The Internet Companion suffers from the drawbacks of all electronic books: you need a power source, and you can't use a highlighter pen. Also, you can print only one computer screen of text on an 81/2-by-11-inch sheet of paper, leaving half the page blank.

The Voyager package comes with MacIntercomm Lite, telecommunications software from New World Computing (818/999-0607). You use the book stack's Connect button to launch the telecommunications software and connect to CERFnet's Internet center, where you can find Internet addresses as well as search Gopher and WAIS, and Telnet. (For $49.95 you can upgrade to the full version of MacIntercomm, which gives you scripting and more transfer protocols.)

While The Internet Companion provides Internet access, you really get just a terminal-emulation screen; you can't use any of the graphical Internet clients—like TurboGopher or Fetch—that come with other packages. Plus you're subjected to the on-screen garbage that's typical of Unix, as well as the hard-to-decipher buttons for controlling access.

Internet Explorer Kit and Internet Starter Kit
Internet Explorer Kit (Hayden Books, 1994) is a companion book to Adam Engst's Internet Starter Kit for Macintosh (Hayden Books, 1993). The Explorer Kit package contains exactly the same software as Ventura's Internet Membership Kit does.

Starter Kit is one of the best introductions to the Internet I've seen for Macintosh users. It clearly explains basic terms and contains excellent resources for newsgroups, file-transfer servers, and mailing lists, all categorized by topic.

Explorer Kit tells you where to go once you're on the Internet. The book demonstrates ways to use the Internet and contains lots of quotes from online conversations.

Starter Kit comes with MacTCP, InterSLIP, Eudora, Fetch, TurboGopher, and StuffIt Expander. These pieces of software are the greatest hits of Internet shareware; with just these six, you can connect to your account, send mail, retrieve files, and decompress those files. (For more about navigating the Internet and using Mosaic, see "Taming the Internet," in this issue, and "How to Ride the Internet," Macworld, August 1994.)

Explorer Kit includes several lesser-known Internet tools, along with the University of Minnesota's elegant and popular gopher client TurboGopher. Peter Lewis's Anarchie (pronounced anarchey) helps users browse and retrieve files from Archie servers, which provide lists of which files are available on which FTP servers. Finger, also written by Lewis, lets you find information about people online. MacWAIS is a client that lets you search Wide Area Information Servers. MacWeather tells you the temperature in major cities around the world.

The software is easy to use, with familiar Macintosh commands and file names, and in most cases, simple dialog boxes. Once you get the hang of using these products, accessing the Internet is almost easy.

If you decide to buy one of these sets, choose Starter Kit unless you're an experienced Nethead. With Starter Kit's included software, you can find the software that continues...
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KPT Bryce 1.0

3-D Landscape-Rendering Program

**PROS:** Creates great graphics; presets give beginners a good jumping-off place. **CONS:** Noneuphonious appellation; innovative interface can be puzzling at times; occasional artifacts in rendering. **COMPANY:** HSC Software (805/566-6200). **LIST PRICE:** $199.

**IF YOU BUY KPT BRYCE, YOU CAN KISS YOUR SPARE TIME GOOD-BYE.** You'll find yourself at it for hours, adjusting a fog bank here and a rock texture there, until your 3-D scene has just the look you want. But consider the bright side: while you're waiting for your scene to render—which can take hours for an intricate landscape—you can catch up on the chores you've been neglecting.

The manual encourages you to dive in and experiment with lighting, camera angles, and textures, creating realistic or fanciful scenes: an iceberg lit by starlight, mist rising from a tropical island, sandstone buttes at sunset, a domed city on an alien world, you name it. The manual wisely suggests that when you render complex scenes, you put your Mac to work while you sleep.

Bryce is designed to let beginners jump right in and create scenes—many preset components are included—while providing deeper layers that let experts customize scene components. Advanced users can build 3-D terrain from a scanned image, create custom textures, or add PICT images using an alpha channel. In general, Bryce's interface is a work of art. Move the cursor from right to left on the Haze control in the Sky & Fog Palette, for example, and you'll see a postage-stamp-size scene get hazier and hazier, until the tiny landscape nearly disappears when the haze level reaches 100.

**If you don't need an Internet access offer, Hayden's Starter Kit is an excellent resource. If you do need access, I recommend the Ventana kit. I recommend the Voyager package only if you want an electronic book or text-based Internet access. Of course, once you're on the Internet, you'll find that the other million people who just discovered its utility are clogging popular servers and causing general gridlock. Be aware that while you're using a friendly Macintosh, it's talking to a grubby Unix box. Getting on the Internet is not going to be as easy or intuitive as you'd like.**—JOANNA PEARLSTEIN

The Last Word

The Last Word

**Online service, which can be confusing even for experienced computer users, Ventana's combination lets you skip the exciting task of entering arcane information about your domain name server and IP address, making connection to the Internet a whole lot easier.**

Internet Membership Kit

Internet Membership Kit by Ventana Media contains two books—Michael Frasaa's *The Max Internet Tour Guide* (Ventana Press, 1993) and Harley Hahn and Rick Stout's *The Internet Yellow Pages* (Osborne/McGraw-Hill, 1994)—as well as Michael Frasaa's booklet *A Brief Guide to Mosaic*, and all the software included with Adam Engel's Internet Starter Kit. Frasaa's Internet book isn't nearly as helpful, well written, or organized as Engel's. *Yellow Pages*, on the other hand, is clearly organized, useful, and funny; the only thing missing is a pad of Post-it notes to help you mark your favorite Internet sites.

Both the Voyager and Ventana products offer free access to CERFnet for a limited time, but the Ventana product gives more online time. The best part of the Ventana product is its inclusion of preconfigured software. SLIP proxies usually have to configure their own TCP software, which can be confusing even for experienced computer users. Ventana's combination lets you skip the exciting task of entering arcane information about your domain name server and IP address, making connection to the Internet a whole lot easier.

**The Last Word**

Virtually all the software included in these packages is readily available from user groups, online services, and the Internet, so these packages' true value is their convenience. And surprisingly, none of them can be confusing at first—for example, if you can't wait that long to see how things will look, you can isolate and render just a piece of the scene. (The manual wisely suggests that when you render complex scenes, you put your Mac to work while you sleep.)

The novel, graphics-heavy interface can be confusing at first—for example, icons are used to indicate standard actions such as Cancel and OK—but the manual does a good job of explaining the sometimes eccentric controls. My major interface complaint: if you're rendering a scene and quit the program or open a new file, Bryce doesn't ask if you want to save changes, and wipes out all rendering performed since the last save (the scene can be re-rendered, but that takes time and is a pain to any spouse who accidentally wipes out several hours' worth of rendering).

But back to raving about the program.

For less than $200, you get a remarkable graphics application, a CD-ROM full of images (you're welcome to dissect the images or add pieces to your landscapes), a slide-show utility, and even some screen-saver modules. I can enthusiastically recommend KPT Bryce to anyone looking for an artistic outlet, good stress relief, or just a great toy.——ERFERT FENTON
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Circle 110 on reader service card
**Square One 2.0**

**File-Launching Utility**

**PROS:** Elegant, flexible design; automatically lists recently opened documents; available from within any application; pop-up menus allow access to folders and disks placed on palettes. **CONS:** Requires at least 400K of additional RAM to run in background at all times.

Square One certainly isn't the only file-launching utility, but it's definitely one of the best. Square One provides easy access to every file on your Mac by displaying applications, folders, and documents as tiles on a resizable floating palette—the program's primary interface. To launch an item (or switch between running applications), you simply double-click on the appropriate tile.

Unlike some utilities, Square One doesn't limit you to a single palette. For example, you might create a Desktop Publishing palette loaded with your word processing, page-layout, and graphics applications, and a separate Games palette for entertainment programs. With each palette, you decide which file icons to include and in what order you want them arranged. You can fill the palettes with either large or small icons, displayed with or without file names.

Connected to each palette is a Document List window, which automatically lists up to ten recently opened files. (Displaying this window is optional.) When you click on an application icon, only those documents opened with the selected program appear in the list. Square One automatically assigns a # or %-key shortcut to each document appearing in the list—one, two, and so on—for quick keyboard-based launching. You have the option of making any of the listed documents permanent, so they always appear as choices in the Document List.

Square One also displays a separate Active Applications palette with tiles showing only those applications currently active on your Mac. A single click on any of the tiles jumps you to that application. Like Square One's main palettes, the Active Applications palette can display icons in two different sizes and with or without file names. You can also have it display memory usage for each of your active applications. Likewise, several other Finder-like commands and features have been added to Square One, so you can now use Get Info on a file, put a PowerBook to sleep, or shut down and restart your Mac without having to return to the Finder.

Another brilliant feature, new in version 2.0: clicking and holding down the mouse on a palette tile now produces a pop-up menu that allows you to launch the selected program or any of its recently opened files. If the tile contains a folder or disk, the pop-up menu displays the contents of the folder or disk with hierarchical submenus four levels deep.

In all this, Square One's hallmark is flexibility. For example, you can instantly access your palettes from within any application in five different ways—by clicking on a palette visible in the background; by pressing a definable hot key that jumps you directly into Square One; by pressing option-tab to cycle through all your active programs; by using the always-available Square One menu (which the program installs on your menu bar); or by simply moving the pointer to a hot spot on the screen.

Of course, for Square One to be most useful, you must have it running at all times. That means sacrificing some of your available RAM, but not much: the program requires only 400K, which shouldn't be a serious problem for most users. If you're really strapped for memory and have to quit the program, Square One's program-switching shortcuts remain fully functional, and you can relaunch the utility from within any application by using the Square One menu on the menu bar. (If memory is really tight, Square One also lets you quit the Finder to regain another 300K or so of RAM.)

**eDisk 2.0**

**File-Compression Utility**

**PROS:** Reasonably transparent operation; decent performance; easily copes with disk-full situations. **CONS:** Both installation and removal erase hard drive; does not support some hard disk formats; does not support driver-level security software. **COMPANY:** Alysis Software Corporation (415/928-2895) **LIST PRICE:** $149.95

eDisk from Alysis Software takes a driver-level approach to file compression. Rather than compress files individually or in groups, it compresses an entire drive. eDisk compresses data read to the disk on the fly, and automatically expands data read from the disk. The advantage is transparency—once you install eDisk, you don’t have to choose files to compress.

If you copy a file to another drive, eDisk expands it automatically, unless the second drive is also compressed. If you want to send compressed files via modem or copy them to a floppy disk, consider a file-level compression program, too.

eDisk comes on a single 800K startup disk containing System 7.1. If your Mac requires a System Enabler file or a later system version, you need to back up your System Folder (using the Disk Tools or Utilities disks that ship with your system software) and transfer it and the eDisk application to another floppy.

eDisk supports a number of hard disk formatters. I tried to install eDisk on a Maxtor 127MB drive formatted with Case Blanca Works' Drive7 3.0B. Although Drive7 is on eDisk's list of compatible formatting software, I got a warning that eDisk doesn't support it. Rather than take any chances, I formatted the drive with FWB Hard Disk ToolKit 1.6 and proceeded without further incident. Installing (and removing) eDisk erases all the continues.
You're well acquainted with this megabyte-eating beast.

But perhaps you're not yet familiar with DynaMO, the magneto-optical solution that eliminates the horrors of data storage.

Like Syquest, with DynaMO you save your files to removable cartridges. But unlike Syquest, you don't have to break the bank each time around. And the 128 and 230 MB industry standard 3.5-inch cartridges you use aren't nearly as vulnerable. In fact, Fujitsu cartridges come with a lifetime warranty.

There's nothing frightening about setting up DynaMO either. You just plug the drive into your PC or Macintosh.

Get the data on DynaMO by calling 1-800-831-4094. Or request information by fax at 1-408-428-0456 (document 1368).

We'll show you how to enjoy some monstrous savings.
data on the hard drive, so you must back up and restore your data for either operation. eDisk took about 25 minutes to prepare (or "expand," in the company's terminology) the Maxtor drive; a larger drive would take proportionately longer.

eDisk offers a handful of configuration options. You can set aside a disk cache (using your Mac’s RAM) to speed up drive performance, choose to see a more or less accurate indication of disk usage, and have eDisk optimize the disk when the Mac is not in use (which is supposed to increase compression ratios).

My first encounter with Alysia Software’s eDisk was not a happy one (see Reviews, October 1993). At the time, I had inconsistent results installing the program and experienced severe data-corruption problems. Happily, both problems have been resolved in version 2.0. Alysia claims a 40 percent performance boost for version 2.0, and it does perform noticeably faster than the previous release.

Once installed, eDisk doesn’t draw attention to itself in any significant way. I observed a 20 to 25 percent slowdown in reading and writing data to the compressed drive and in launching most applications when eDisk was installed on the 127MB drive (admittedly a slow mechanism), which was hooked up to a PowerBook 540c. This slowdown is not severe enough to be terribly obvious unless you are copying a lot of data. And don’t expect any speedup on a Power Mac, since eDisk runs in 680X0 emulation mode.

The weakness of driver-level compression until now has been its inability to handle disk-full situations, but eDisk 2.0 coped well. I couldn’t quite achieve the promised 2:1 compression ratio on a mixture of application and document files, however. The best I could manage was 1.45:1.

eDisk 2.0 also adds support for Connectix RAM Doubler (a utility that effectively doubles the amount of RAM available). In my brief tests, I found that the combo worked, but applications took noticeably longer to open.

The Last Word

eDisk 2.0 is a tremendous improvement over the original release. During my testing, the program worked as advertised (except for the amount of disk compression achieved), with no significant problems. But using driver-level compression software has trade-offs, both in terms of disk performance and because you’ll still need a file-level compression solution if you want to back up your data to a non-compressed disk. Within those limitations, eDisk is definitely worth further consideration. —GEE STEINBERG

PageTools 1.0

Publishing Utility

**PROS:** Several laborsaving functions for PageMaker users.

**CONS:** Dialog boxes can be hard to read.

**COMPANY:** Extensis Corporation

| LIST PRICE | $129 |

PageTools was not a happy one...}

OVER A YEAR AGO, ALDUS ADDED Additions to PageMaker 5.0, promising the kind of program extensibility that QuarkXPress owners have long had with XTensions. PageTools shows the real potential of Additions.

PageTools is a collection of several utilities. These tools were designed to work together, and that’s one of the prime benefits PageTools offers.

PageTools installs a button bar at the top of your screen that is decidedly un/PageMaker-like. PageTools gives PageMaker the feel of Microsoft Word. It took me a while to figure out PageTools’ icon scheme; if the name of the tool would pop up whenever you passed the mouse over the icon, as in Word 6.0, you wouldn’t have to memorize the icons’ meanings.

The series of icons at the left (plus, strangely, two at the far right) of the button bar take existing PageMaker features (line weight, fill type, stacking order, grouping, item guides, page insertion, and text sizing) and provide button-bar access. The series at the right all have a blue rectangle to identify them as PageTools features. The ten icons correspond to the ten features PageTools offers. (You can also access the Additions via the Aldus Additions submenu of the Utilities menu.)


PagePrinter lets you control printing even more than PageMaker’s superb print dialog boxes do; you can print all changed pages in a document. What a great idea!

PagePreview adds to the Open dialog box, so you can preview a PageMaker document before you open it. QuarkXPress has had this for about a year, but PagePreview lets you preview any page of a document, not just the first page.

PageColors lets you search and replace objects’ colors. Now you can change all boxes with a red border to azure blue.

PageRulers creates floating rulers (you can fill your screen with them if you’re not careful), which greatly aid the positioning and layout of elements.

PageThumb lets you see any page in a preview window. QuarkXPress’s Thumbnail view is always a favorite option of mine because I can quickly see what is on any page before moving to it. Now PageMaker offers the same function.

PageGuides lets you put guidelines with elements, so you can align elements with, say, a graphic’s corner or a center point. The Addition gives you full control over where you want guides to appear.

PageAlign lets you select objects and align them against each other or evenly distribute them over a certain area of the page. This old-time QuarkXPress feature should have been in PageMaker years ago.

PageMover moves selected elements to other pages (including master pages) or the pasteboard. It’s a deceivingly powerful Addition, since you can move objects without leaving your current page.

PageZoom—which lets you zoom in on an area of your page—is chunky to use and not much of an improvement over just changing your page view.

Overall, I have only a few quibbles. It’s easy to add buttons via the PageBar Editor—perhaps too easy. You can unwittingly create a blank button that does nothing. I’d also prefer being able to choose the order of buttons in the button bar so I could, for example, group the guide-oriented ones together. I also wish the dialog boxes used a larger, bolder typeface. They’re hard to read on my 16-inch monitor. These are minor complaints, and the paucity of them shows just how well designed PageTools is.

The Last Word

As with any utility package, the real value depends on whether your work benefits from what the utilities offer. PageTools offers several utilities that will benefit many people. PageAlign, PagePrinter, and PageRulers alone are worth the price; the others are frosting on the cake. PageTools is packed with utility.

—GALEN GRUMAN

MACWORLD December 1994 67
Out of chaos comes order.

Claris Organizer. The first P.I.M. that's got it all together.

If you've tried to use your computer to get organized, you know that most personal information managers (PIMs) do one or two things well. But the things they do, aren't well integrated. Until now.

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ErgoKnowledge 1.0

**ERGOKNOWLEDGE IS A CONVENIENT way for managers to acquaint office workers with the principles and practice of computer ergonomics. (If you're wondering why this is so important, see "Safer Computing," elsewhere in this issue.) Developed by Dr. David Rempel, who heads the Ergonomics Laboratory at the University of California, Berkeley, the ErgoKnowledge CD-ROM covers the basics in an interactive presentation that took me about 45 minutes to complete.

The first and longest chapter tells you how to set up your keyboard, chair, and monitor; reviews ways to reduce eyestrain; and goes over the proper use of telephone headsets and document holders. (Alas, in-depth coverage of mice and other pointing devices is lacking.) The next section, "Moving Your Body," tells you how to take periodic breaks to work out kinks in your body. The last chapter takes a look at medical management and reporting of repetitive strain injuries (RSIs) and other work-related illnesses. A short appendix on risk assessment and injury prevention rounds out the presentation.

ErgoKnowledge takes an informal approach, with a lot of graphics and just the right amount of text. Most of the important material is presented by two off-screen narrators, who provide a running commentary on animations that illustrate what to do and what to avoid (see "Ergonomically Correct"). Although the animations are well done, video clips of real people would be even more effective. ErgoKnowledge does include a few QuickTime movies featuring Dr. Rempel and the two narrators, but these clips add very little to the learning experience.

Each section includes a short multiple-choice test that drives home the basic concepts; a summary quiz at the end covers the entire presentation. Respond incorrectly and the program sends you back to review the relevant section. (Don't let the tests scare you—if anything, the questions are too easy, and the results aren't recorded.) My only complaint is that the CD-ROM's slow response makes the quizzes seem longer than they really are. I also got tired of hearing encouraging comments like "Good job!" when I answered the questions correctly.

ErgoKnowledge comes with an installer program that lets you run a specified number of training sessions; you can buy additional sessions directly from Visionary Software and install them by entering a code. A password-protected administrator's menu also lets you customize the program to some degree. For example, you can turn off the display of QuickTime movies if you're running ErgoKnowledge on a slow Macintosh, and you can enter reference text that describes available resources in your office or organization.

The Last Word

Despite a few shortcomings, ErgoKnowledge offers a good, basic review of office-computer ergonomics. For a subject that has been neglected for far too long, that says a lot.

—FRANKLIN N. TESSLER, M.D.
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Before you write. Think TDK.
for convenient organizationwide access to paging. Installing the software is simple: you enter a name and PIN number for each SkyTel subscriber you want to page. Type the message text, select your recipients, and press the Send button.

You can define paging groups for broadcasting messages to several people simultaneously, and you can set up any number of stock messages to make routine paging more convenient. The software automatically queues multiple messages and makes up to four attempts to dial into SkyTel. All messages are logged, noting date, time, and success or failure of transmission. A character counter in the message window helps you keep track of the size of each message. AirNote automatically breaks up long messages into several paging messages as required.

AirNote can also route Internet messages to you. Each AirNote pager has a unique Internet address, and any E-mail sent to that address goes automatically to the pager. This opens up all kinds of possibilities, including automatic notification of network problems, forwarding of local company E-mail, and even real-time monitoring of important Internet mailing lists. Beware, though-only the first 240 characters of an Internet message are visible automatically, so you must define text for easy routine paging.

Sending Notes AirNote's SendNote software lets you send messages to any SkyTel subscriber. You can set up recipient groups and standard message texts for easy routine paging.

The Last Word
The AirNote bundle has some minor flaws. While SendNote lets you print the message log, there is no convenient way to clear the log or archive logged messages to a file, nor does the software record the number of messages or 40-character message segments sent-information necessary for tracking costs. The pager doesn't identify Internet messages specifically and doesn't tell you that the message was truncated. But these nits notwithstanding, AirNote is a very handy way to get into alphanumeric paging.

-MEL BECKMAN

Cooperative Adapter

**Infrared Network Interface**

**PROS:** Easy to set up; no cables to string.

**CONS:** Expensive compared with wired alternatives; runs at LocalTalk speeds only.

**COMPANY:** Photonics Corporation (408/955-7930). **LIST PRICE:** $349.

**W**IRELESS NETWORKS ARE A HOT item these days. Photonics' Cooperative Adapter is a LocalTalk-only network interface that uses diffuse infrared (IR) instead of cables to connect Macintoshes, Newtons, and laser printers together. The system has two components: a network adapter and an optional base unit called an Access Point ($129). The adapter is small, about 2 1/2 inches wide and less than an inch high. A single cable is attached to it with two connectors: one is the standard serial connector plugged into the printer port of a Macintosh. The other connector goes into an ADB port to draw power for the adapter. It has a pass-through port that allows its use on Macs that have only one ADB port.

If you're using a device with no ADB port (such as a Duo, Newton, or laser printer), the base unit provides power via either an AC adapter or three AA batteries. This also provides a pass-through LocalTalk connection for hooking up to an existing wired LocalTalk network. The base unit is about the same size as the network adapter, and the two attach together to form a single unit.

Installation is fairly easy. I attached one adapter to a PowerBook 140 with no difficulty, then I hooked another adapter to a Quadra 840AV-a little tougher because I keep the Quadra on the floor under my desk. The cable attached to the Cooperative Adapter was just a little too short to let me place the unit on top of the desk, so I had to prop it on the floor. While the manual does not recommend this, it worked out fine.

Photonics claims that the range of the Cooperative Adapter is about 25 feet. This means that in order to cover a room larger than 25 feet, you must set up a wired LocalTalk network and then connect Access Point units to the network; the Access Points must be a maximum of 25 feet apart so that any receiver falls within the 25 feet. Otherwise, the adapters must all be in the same area-a room no larger than about 25 feet on a side, with a ceiling at least 8 feet but no more than 10 feet high. In other words, a typical classroom or office conference room is OK, but a warehouse or auditorium is not.

The range constraints are due to the Cooperative Adapter's use of diffuse IR technology. Each adapter is both a transmitter and receiver. The transmitter portion floods the room with IR signals that bounce off the ceiling, walls, and furniture. The receiver does not need a direct line-of-sight connection with any transmitter, and someone moving about the room won't break the connection. Since most of the IR light transmitted never reaches a receiver, diffuse IR is clearly not power-efficient. It's fine as long as you're running off AC power, but a set of batteries is good for only about 24 hours of operation.

Diffuse IR networks are inherently secure. The signal doesn't penetrate walls, quickly drops off in strength, and is not subject to electrical interference. It is, however, susceptible to "jamming" by bright sunlight, strong incandescent lights, and other IR sources. I ran a simple test using an IR remote control for a VCR. During a file transfer I pressed a button on the remote control. The watch cursor hands on the computer screen immediately stopped moving. As soon as I released the button, the transfer resumed. In addition, room windows reflect IR, so a room with more windows than walls might pose a problem for a Cooperative Adapter network.

**The Last Word**
I can imagine only a few scenarios where I might prefer to use a Cooperative Adapter network rather than a wired one. Setting up a class in a conference room or other area where stringing cable would be inconvenient or dangerous comes to mind. The high cost of each unit, the limitations and restrictions inherent in diffuse IR, and the extremely low cost of traditional LocalTalk adapters and cabling make the Cooperative Adapter an expensive niche product.-MATTHEW LEEDS
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Circle 103 on reader service card
SoundEdit 16

**Digital Audio Software**

**PROS:** Supports CD-quality audio; straightforward interface; good documentation. **CONS:** No record-level controls; editing QuickTime movie sound tracks is slow; some file-import glitches; slow audio processing. **COMPANY:** Macromedia (415/252-2000). **LIST PRICE:** $379.

IN 1988, WHEN FARALLON COMPUTING released its MacRecorder hardware and SoundEdit software, multimedia pioneers and fans of silly error beeps could record and edit sounds. The product was later acquired by Macromedia, which did a good job of keeping the SoundEdit software compatible with new Macs such as the AV machines, but didn’t add much in the way of features.

That’s changed. SoundEdit 16, like the name says, supports 16-bit sound; the higher resolution allows for a wider dynamic range and better-sounding audio. The new version also supports higher sampling rates—up to the 48KHz rate used by digital audiotape recorders. In English: SoundEdit 16 lets you record and play sounds on disc-quality sound.

SoundEdit 16 also supports QuickTime movies. You can open a QuickTime movie and edit its sound track—you can fix audio glitches, rearrange words, and so on—and you can mix in sound tracks, such as a musical score. This isn’t the only program that lets you do sound-track postproduction, and it has some surprising limitations, but by and large it is a solid upgrade.

You’ll encounter one of the program’s most serious limitations, however, when you go to record and realize that SoundEdit 16 doesn’t allow you to adjust the recording level. There’s no way to turn down the volume to compensate for a loud original or turn it up to make up for a soft one. You can boost soft sound levels after recording, but through a digital processing procedure that can introduce undesirable noise. Adjusting recording levels is important; the inability to do so hampers SoundEdit’s usefulness as a professional audio tool.

SoundEdit 16 makes it easy to cut and paste sounds and apply a variety of effects, such as echo and reverb. Unlike audio programs such as Alaska Software’s DigiTrax, SoundEdit 16 doesn’t take advantage of the digital signal processor (DSP) chip built into AV Macs or of the speed of the Power Macs to enable you to listen to various effects in real time. You must choose a processing command, wait, audition the results, and then undo and repeat if you don’t like them.

Adding and tweaking QuickTime sound tracks is easy—but often slow. SoundEdit 16 displays a small thumbnail view of the frames in a QuickTime movie above the waveform of the movie’s sound track. Because SoundEdit must scale each frame before displaying it, tasks like scrolling and selecting can be painfully slow. You can hide the thumbnails to boost performance, but then you can’t see the frames. I’d like to see a happy medium, such as showing only the frames that occur at cue points, which are electronic bookmarks you can create.

SoundEdit 16 can import and export a larger variety of sound formats than could earlier versions. The program can open and save WAV-format audio, a popular format in the Windows world. I encountered some import glitches, however. If you open an AIFF-format sound when the Open dialog box’s file-format pop-up menu is set to QuickTime Movies, you get a startling screech of a sound I guarantee will wake you up.

Tip: SoundEdit 16 compare to DigiTrax or OSC’s Deck II? These two programs are faster and better suited to mixing and recording audio (heck, you can adjust the recording level). But adding sound tracks to movies is easier in SoundEdit 16. More significant, SoundEdit 16 lets you edit a sound’s waveform; Deck II and DigiTrax do not.

The Last Word

It’s unfortunate that Macromedia didn’t enhance SoundEdit’s audio processing features to take advantage of the horsepower in a DSP- or PowerPC-equipped Mac, and it’s inconceivable that it didn’t add a record-level adjustment. But despite these flaws, there are enough goodies in SoundEdit 16 to earn it a place in a multimedia producer’s toolbox.—JIM HEID

Arrange 2.0

**Personal Information Manager**

**PROS:** More calendar functions and print options than in previous version; supports plug-in tools; forms designer. **CONS:** Some functions less convenient than those of dedicated address books and schedulers. **COMPANY:** Common Knowledge (415/325-9900). **LIST PRICE:** $349.

ARRANGE 2.0 WAS A GREAT PLACE TO store day-to-day information, but it couldn’t replace a contact manager or scheduler (see Reviews, May 1994). With 2.0, Common Knowledge is hoping to attract more PIM users by adding features already in dedicated calendar programs, such as recurring, untimed, and carry-forward events. Also new to 2.0 are reminder alarms that you can set to go off anytime, even if Arrange isn’t running.

Arrange 2.0 retains the outline-based approach to storing data in user-definable units called notes. Welcome additions include check-box fields for yes/no information; the ability to enter a date without a time in date/time fields; and support for centering, left alignment, and right alignment of text. And you can now add plug-in files into the Arrange folder. New forms-design tools let you create customized views that incorporate fields and graphics. And 2.0 sports enhanced output capabilities for printing labels.

The Last Word

Arrange is harder to learn than some address-book-and-scheduler combinations, and certain functions are less convenient than in dedicated PIM software. Still, with a little extra effort, Arrange can take the place of several programs. If your needs fall beyond the usual calendar and address-book functions, Arrange is a strong contender.—FRANKLIN N. TESSLER
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Circle 206 on reader service card
Reviews

FlexCam

Video Camera

**PROS:** Small; unobtrusive; flexible gooseneck for positioning.  
**CONS:** Slight fish-eye effect on images; connection between power adapter and cable harness is easy to dislodge.  
**COMPANY:** VideoLabs (612/988-0055).  
**LIST PRICE:** $595.

**Since the introduction of the later AV Macs and their onboard video-capturing and videoconferencing capabilities, I've been looking for a compact video camera for the lab bench. Desktop video-conferencing is slowly emerging in the Mac market, and most video cameras are bulky and noticeable. The less obtrusive the camera, the more likely it is you'll use it and the more value it can provide.**

The FlexCam's camera head is about 1.5 inches in diameter, connected to an 18-inch-long flexible gooseneck attached to a 7.25-inch-diameter base, and weighs only a little over 2 pounds. Because of its flexible neck, you can hide the FlexCam's base behind a monitor or on top of a shelf and position the camera head in front of your subject without the camera's being too obtrusive. If the image isn't straight, you can rotate the camera head 30 degrees in either direction. The camera is ideal for making "Candid Camera"-style QuickTime movies of your coworkers.

The FlexCam's high-resolution, 0.33-inch color CCD camera lens is designed to operate in high or low light (down to 2.5 lux). In most cases, lighting is not a problem but the CCD lens's sensitivity allows for better image detail. Keep in mind that the quality of the image displayed is only as good as that of the monitor displaying it. Whether you're viewing captured video or holding a videoconference, image quality from the FlexCam is at its best when used with a TV monitor (although you may experience audio feedback).

The focal length of the FlexCam ranges from 0.25-inch to infinity, which gives, at most, a 50:1 magnification. Zooming in close to an object is great but has one minor drawback—the fish-eye effect, where the corners of images are rounded and appear to be bulging. Most people will not notice the rounded edges, but the effect is visible on close inspection. The FlexCam captures an image at 510 by 492 pixels for NTSC—just under a full 640 by 480 screen.

Below the camera lens are two tiny microphones for audio input. The manual recommends pointed the camera directly at your subject's face at arm's length away for best audio quality. I didn't find any problems when I moved farther away or to the side.

The power connection between the FlexCam and the Mac leaves a bit to be desired. The original cable harness, which houses the video- and audio-out jacks and power cord, was quite fragile, but a heavier harness is now available with all shipping units. My one remaining peeve is how power is supplied to the camera. A standard, block power adapter is attached to the cable harness via a small miniplug. Unfortunately, this miniplug is easy to dislodge.

**The Last Word**  
Despite its fragile power connection, the FlexCam is my choice for a desktop video camera. It's small and unobtrusive—plus, how can you resist having something resembling the alien ship from H. G. Wells's War of the Worlds stationed on your desktop?—DANNY LEE

CA-Cricket Graph III 1.52

Graphing Software

**PROS:** Clean, simple, fast graphing; careful provision for black-and-white publication graphs.  
**CONS:** Only 12 graph types; lacks presentation features.  
**COMPANY:** Computer Associates International (516/342-5224).  
**LIST PRICE:** $129.

**CA-CRICKET GRAPH IS THE SIMPLEST POPULAR GRAPHING PROGRAM IN THE Macintosh market, and simplicity has its proponents. When Macworld surveyed 11 charting programs recently (“Graphing beyond Excel,” August 1994), our preference for DeltaPoint's more feature-laden DeltaGraph Pro resulted in a storm of letters from Cricket Graph fans. The essence of these letters was that Cricket Graph is a nice, comprehensible program that you can master quickly, and you won't need retraining each time you use it.**

Cricket Graph (CG) provides a spreadsheet for data entry, and easy text-file import (but not direct Microsoft Excel file import). Besides the basic four-function math on spreadsheet columns for producing new, transformed columns, CG offers advanced functions, along with binomial and moving-average data smoothing. For scatter, line, and quality-control data (CG supports standard quality-control chart types), there's a curve-fitting option that will fit data to arbitrarily complex curves, and the option includes error bars.

If these features sound to you more like engineering than business elements, you're getting the point. CG includes a large assortment of black-and-white chart formats to accompany its 2-D—only chart types—you can add depth to columns or bars, but that's not true 3-D. Still, CG's formats will let you convert tables of data into aesthetically pleasing black-and-white charts ready for scientific publication in just a few minutes, and it's clear that careful design went into the font selection, sizing, and layout of these formats. The resulting charts, in color and black-and-white, look seriously better than any analogous default chart types in Excel.

That's a key point in the CG buying decision. It's not just that CG has 12 chart types compared with DeltaGraph's 50-odd. It's that Excel, the program where your data is likely to reside already, has 40 or so chart types itself. But CG's charts just look better than Excel's, unless you're willing to spend hours tinkering, customizing, and saving a repertoire of Excel Auto-Formats (the equivalent of style sheets in a word processor). Basically, when you buy this product from Computer Associates you're paying someone who has fine-tuned optimized chart formats for you. That's not a bad bargain.

**The Last Word**  
Cricket Graph's features are just right for charts in the physical and social sciences, but lack the pizzazz for a big-ticket venture-capital presentation. The program is easy to learn and use, and includes math features for data transformation and curve fitting.—CHARLES SEITER
FlightStick Pro for Macintosh

**Game Control**

**PROS:** Solid construction; authentic look and feel; smooth operation; extensive configuration options. **CONS:** No friction adjustment. **COMPANY:** CH Products (619/598-2518). **LIST PRICE:** $129.95.

**Jocekying Around the Sky in your F-16 jet fighter with a mouse in your hand is like playing tennis with a baseball bat; the experience loses a lot of its thrill.** True armchair pilots need a realistic flight stick. FlightStick Pro fills the bill, combining the authentic feel of a real aircraft control stick with flexible software that adapts to most Mac flight simulators.

The all-plastic FlightStick has a solid base containing vertical and lateral trim wheels and a throttle thumbwheel. The self-centering control stick is a life-size aviator's handgrip on very smooth gimbals, topped with a trigger, three option buttons, and a four-way directional switch. The motion and heft of the stick is very realistic, and it's absolutely silent, without the toylike sloppiness or grating sounds found in some flight controls. The only mechanical feature it lacks is a friction adjustment.

FlightStick's software is preconfigured to load an appropriate settings profile when you launch your flight-simulation program, so the control stick is immediately usable without changing control-panel settings. The supplied profiles cover most popular Mac simulation programs and even arcade games such as Prince of Persia. If you want to change the default configurations, or make your own for a program not covered, the supplied FlightStick control panel lets you configure all of FlightStick's physical controls, as well as the operation mode. The operation-mode features include relative and absolute positioning, keystroke equivalents, and preset screen colors and audio level. This last feature is nice because many entertainment programs have specific screen color requirements (for example, 16 colors) and often start out loud enough to blow papers around on your desk.

FlightStick offers an abundance of customizing features. For instance, graphic sliders let you set deflection rates and control resolution so that a quick snap of the stick racks the aircraft into a snap roll, while gentle tick movements provide fine-grained control. You can also assign a FlightStick button or wheel to any combination of mouse movements or keystrokes.

During extensive testing, the FlightStick showed no tendency to drift or lose its orientation. The control panel provides an alignment tool to recalibrate the stick when necessary, but I never found a need for this.

**The Last Word** FlightStick's only flaw—a missing friction adjustment—is minor. Its authentic look and feel, along with well-conceived software, make FlightStick a nearly perfect desktop pilot's companion.—Mel Beckman

Chamber Works 1.0.2

**Particle Physics Software**

**PROS:** Easy to use; nicely documented; extra HyperCard and in-program tools for particle identification. **CONS:** Handles only single-particle injections. **COMPANY:** OnScreen Science (617/776-6416). **LIST PRICE:** $79; ten-copy site license $249.

**The United States was for five decades the unchallenged center of elementary particle research, with huge amounts of government funding pouring into giant facilities. Although the Superconducting Super Collider in Texas appears to be a victim of hard times, Fermilab in Illinois recently reported some experimental evidence for the long-sought top quark. So particles are still the stuff of headlines.**

Chamber Works is a simulator for particle physics events, targeted at college-level instructional use but actually useful and interesting to anyone who follows physics at approximately a *Scientific American* level. The key element in Chamber Works is a simulated cloud chamber that displays the tracks of particles injected from a simulated beam. You can see the tracks in 3-D or in projections in the x-y, x-z, and y-z planes, and you can control the energy of the injected particles, the chamber's magnetic field strength, and the chamber's physical dimensions.

These are exactly the controls you want for this type of experiment. The basic principle in analyzing particle data is this: a particle sailing through space like a little bullet will show a curved track in a magnetic field. (This is actually the same principle used to steer electrons from an electron gun to different positions on your monitor screen.) The track curves one way for positive particles, and the opposite way for negative particles (Chamber Works also color-codes them). In the screen shot, "The Big Spin," a neutral (invisible) particle has decayed into two other neutral particles (also invisible), which in turn have decayed into pairs of positive and negative particles.

You can figure out the identity (from mass and charge and half-life) of the particles from the chamber tracks, using curvature, length, and direction of the tracks. Chamber Works includes an on-screen tape measure in projection windows and a HyperCard-based calculator that relates track length to half-life. Since the tableau of possible particles is large but still finite, you can usually identify a particle in a simulation after a few minutes of calculation. Chamber Works shows both finished track patterns and a slowed-down real-time simulation of tracks, so you can watch the tracks evolve. The program includes an LC version for Macs without a math coprocessor, but requires a 68020 processor or higher.

The only element I would add is the ability to inject groups of particles into the chamber, just to give a glimpse of the complexity of some real-world chamber results.

**The Last Word** Chamber Works is the best introduction to experimental particle physics yet produced, and it's even a bargain.—Charles Seiter

76 December 1994 Macworld
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**Writing Coach 1.0**

**Writing Skills Tutorial**

**PROS:** Skillfully worded worksheets assist with planning, organizing, and revising; concrete suggestions; flexible structure; recognizes importance of motivation and focus.

**CONS:**

More expensive than a book on how to write. **COMPANY:** WritePlace Software (503/484-6380). **LIST PRICE:** $89.

**Writing Coach is a Deceptive-Ly Simple Product.** On its face, it is a set of worksheets, outlines, and techniques that help you write whatever it is you're having trouble writing, from formal business proposals to love letters. On a deeper level, each of its 60 worksheets is a set of guided questions that help you unlock your creativity, discover what you have to say, and express it effectively to your readers.

Writing Coach doesn't spend much time on grammar or the mechanics of good writing; you won't find rules about split infinitives or ending sentences with prepositions. Instead, like a good coach it breaks down a complicated act into a series of discrete tasks that you can learn step-by-step—making explicit a process that is intuitive to a lucky few—and motivates you to do your best. The clear manual guides you through the program's eight sections, each of which focuses on an aspect of the writing process.

Each worksheet is a template that opens up in your word processing application (Writing Coach comes with templates for Microsoft Word, WordPerfect, and ClarisWorks). You open up a worksheet, type in your responses, and save the document to use in the next step of the writing process.

Brainstormer worksheets help you discover and express your ideas about a topic by encouraging you to write without worrying about structure, grammar, or technique (those come later). Reader Analysis worksheets consider the needs of your readers; the Organizers and Outline Banks help structure your writing; and the Revising, Editing, and Proofreading guides provide checklists of things to look for when editing. Writer's Notebook and Writer's Block exercises help you identify and overcome the negative ideas that can squelch your words before they get to paper.

The manual also covers techniques for improving your writing, such as through an audience of six-year-olds (to practice clarity), and creating tree diagrams to clarify the logical connections between your ideas.

Writing Coach has none of the question-and-answer routines some tutorials use. There's no rigid structure that guides you through lockstep writing. And the program doesn't suggest words or try to impose structure on your writing. Instead, it offers a series of well-designed exercises that you can use in any way and order you choose.

**The Last Word**

True, since the program is essentially a self-guided study course, this material could have been presented in book form. But one of its central themes is that to write well you need the right tools, the right time, and the right place. If you'd like help with your writing, and you normally feel motivated and focused when you're sitting at your computer, Writing Coach could be a great investment.—LIZA WEIMAN

---

**Souvenir 2.2**

**Contact Manager**

**PROS:** Very fast; always available. **CONS:** Field names cannot be customized; fields are not truly independent; poor documentation. **COMPANY:** CompostTel (415/327-0744). **LIST PRICE:** $49.

During the past few years, contact managers have evolved from simple desk accessories into complex applications. Souvenir tries to turn back the clock by combining simplicity with speed. Unfortunately, Souvenir suffers from a few quirks and deficiencies that could mean an uphill battle for market share.

Unlike other address books, Souvenir consists of only one system extension. Once the extension is loaded, tapping the # key twice opens Souvenir in less than a second. Although you can launch Souvenir no matter what you're doing—it even appears over modal dialog boxes like Page Setup—clicking anywhere outside Souvenir's window makes it disappear instantly.

Icons let you access Souvenir's major functions—browse, search, dial, print, and help—by clicking once. You enter search strings in a text box at the top of the window, and you select the active address-book file in a pop-up menu below the text box. (You can open and search more than one file at a time but can add new contacts only to the active file.) Souvenir also lets you share address-book files, even without turning on System 7 file sharing.

Souvenir provides 12 fields for contact information, plus a comment box that holds up to 3072 characters of text. Although the interface seems straightforward enough, there are a few surprises. For one thing, you can't customize the field names, a glaring omission for a program that has been available in Europe for six years. And since Souvenir treats all of its fields as one continuous text string, they're not truly independent. For example, if you select a person's city and press delete twice, all the information that follows the city scrolls up, shifting the phone number into the user field, and so on. Alas, this behavior isn't mentioned anywhere in the user guide.

Souvenir's documentation is weak in other areas, too. For example, a function that lets you customize dialing prefixes for different cities isn't adequately explained; this is only one of several instances where Souvenir's online help is more complete than the printed version. An entire menu— one that lets Souvenir work with other programs such as AppleLink—hardly receives mention at all. Finally, although the manual claims that Souvenir can print envelopes, the current release cannot. (According to CompostTel, a maintenance upgrade may be shipping by press time.)

The Last Word When you can buy an integrated contact manager and scheduler like Aldus Consumer Division's DateBook & TouchBase Pro for about the same price, it's hard to recommend Souvenir. Still, Souvenir is fast and simple; with beefed-up documentation and a few more features, it might be the ticket for people who don't want to bother with a full-blown contact manager.—FRANKLIN N. TESSLER
Anything can be improved upon. Even that paragon of smart design and intuitive use, the Macintosh® computer. So, to make your Mac quicker, simpler and more efficient, upgrade it to Now Utilities 5.0.

The new version sports a time-saving interface that makes features more accessible. You can create custom menus, jump directly to applications, or locate any misplaced files lickety-split.

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The original version won countless awards and praise from the experts. Not ones to rest on our laurels, we've spent the last year rethinking, refining and adding major features as well as subtle enhancements. New Now Utilities 5.0. Accelerated for Power Macintosh.™ Introductory street price under $70, after that $89. Upgrades available for just $39.95 until November 15, 1994. Call 1-800-689-9423 today, or see your dealer.
Reviews

FastSwitch 10

Switched Ethernet Hub

PROS: Provides greater bandwidth to individual nodes; good configuration options; outstanding documentation for novice users. CONS: Only one device (network address) can be used per port; beneficial only for certain network scenarios; no RJ-21 connection. COMPANY: Grand Junction Networks (510/252-0726). LIST PRICE: $6250.

SWITCHED ETHERNET SEEMS TO be the emerging low-cost champion of speedier network-data transport (compared with Fiber-Distributed Data Interface and Asynchronous Transfer Mode). Grand Junction's switched Ethernet hub is simple to install and manage and has a variety of configuration options. However, increases in network throughput depend on how you share files and access network services.

The FastSwitch 10 is a 24-port switched Ethernet hub. Its primary benefit compared with nonswitched hubs is its ability to deliver "personal," 10-Mbps Ethernet to and from each connected device. While standard hubs broadcast network traffic across all nodes, taking up bandwidth, a switched Ethernet hub can forward data directly to the intended recipient. Think of this as your own private expressway—you can go much faster on your own freeway than you can on one you share with other vehicles.

Another important issue is the quality of data forwarded. The FastSwitch 10 provides three methods of packet forwarding: FastForward, FragmentFree, and Store-and-Forward. The first two methods begin forwarding a packet before the entire packet is received; while this offers greater throughput, errors can occur if the later part of the packet is corrupt. The third option collects the entire packet at the hub before forwarding it, slowing down throughput but guaranteeing an error-free packet.

Other options include port monitoring, address aging, and congestion control (hub-memory allocation). In addition, the hub can be managed in and out of band and includes a 25th port (BNC, AUI, or 10BaseT) for backbone connectivity.

Macworld lab evaluated the FastSwitch 10 against a standard nonswitched hub. Our tests show that the FastSwitch does increase throughput in a peer-to-peer environment (using System 7 file sharing). As expected, in a client/server environment with one server and many clients, we saw virtually no difference in throughput. This type of switched Ethernet hub is meant to be used on a network where traffic is traveling peer-to-peer or in a low client-to-server ratio.

The drawback to this hub is the lack of an RJ-21 connector (for connecting harmonica-style punchdown blocks) and the one-node-per-port limit, which precludes the use of port-extending devices such as Farallon Computing's EtherWave adapters.

Crossword Wizard 1.0

Word Game

PROS: Fantastic play mechanics; best crossword generator yet. CONS: Clue generation is weak; some operations, like new-puzzle generation, are slow on old Macs. COMPANY: Cogix Corporation (415/454-7217). LIST PRICE: $49.95.

ROSSWORD WIZARD MEETS A NEED long unsatisfied. Computers should be ideal crossword-puzzle creators and players, but that's not been the case, with earlier software attempts being either too simplistic or too difficult to set up and use.

The puzzle-solving mechanics and options of Crossword Wizard are brilliant. Navigating and filling in puzzles using the keyboard and mouse is fast and easy, with color and sound used to excellent effect.

As you fill in a puzzle, the program is smart enough to move to the next logical open box or word without your intervention. If you want to solve the puzzle in a different order, you can do that, too. Optional visual hints tell you if the last letter you typed is correct. Even better are the optional audio hints, which perform the same function aloud. I wish paper crosswords had these.

Other puzzle-solving aids are Word Builder, which provides a list of all possible words, from the program's 70,000-word dictionary, that fit a selected square; and Idea Wizard, which shows definitions, related words, and grammatical data about any word in the dictionary. Idea Wizard can run as a stand-alone application and is useful for improving your vocabulary. It's unique among word games I've used.

Crossword Wizard comes with a mere five premade puzzles, and they're only so-so. But it excels at creating traditional-style puzzles up to 21 by 21 boxes square. It can't create acrostics, odd shapes, or any other crossword subgenre, however.

Puzzle-creating options range from letting the program do all the work to creating a puzzle from scratch using your own words and hints. You can choose any level of computer assistance in between. For example, you can specify ten related words and let Crossword Wizard do the rest, resulting in a theme puzzle using your ten words. The words and tips the program generates can easily be edited.

Watching Crossword Wizard build a puzzle from scratch is a pleasure. However, the dictionary has many odd and rarely used words, and it frequently comes up with weak clues. Would you know that Doha is the expected answer for "national capital"? You can't add your own words to the dictionary. Along with the weak clues, that's Crossword Wizard's only real drawback.

Tech support is a toll call to northern California and is excellent. You can print puzzles, and you can easily export them to word processing and page-layout programs.

The Last Word

The FastSwitch 10 is a great solution for networks that handle large amounts of data traded peer-to-peer, such as in desktop videoconferencing and in prepress environments. Also, the only cost in moving to the FastSwitch 10 is for the hub itself; no additional high-speed network interface cards or repeaters are required. If your network environment consists of E-mail and one file server, you probably won't see much benefit in stepping up to switched Ethernet.—Matt Clark

The Last Word

If you're a crossword fan, Crossword Wizard is a must. You can even create and sell, royalty-free, your own puzzles or those that Crossword Wizard builds.—Steven Robker
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Three-dimensional modeling is a peculiar product category in some ways. First of all, you can pay as little as $350 (list price) or as much as $3500 to buy the software. All of the Macintosh modeling products available provide the tools to create on-screen objects that look and behave like objects in the physical world. All of these products let you move objects within a workspace and change your point of view. You can illuminate the objects with a variety of light sources so that they reflect, glow, and cast shadows from their surfaces. And all the programs let you render objects in a number of ways to simulate surface textures.

In short, all of these products let you create digital images of a now commonplace three-dimensional photo-realism. How, then, do you explain the price range? How do you know how much you should spend to enter the field of 3-D graphics?

As you'd expect, the products at the high end of the scale are professional-grade tools. You see the results of their work all the time, from the car you drive, to the toys your children play with, to the TV ads that entice you to buy all these goods. High-end modeling products include some capabilities required by mechanical engineers, Hollywood animators, and package designers—such as a high degree of numerical precision, alpha-channel support, exportability to CAD/CAM programs, and ultrarealistic rendering effects. You can also anticipate a formidable learning curve.

What you might not expect is the power that's packed into midrange and even entry-level modeling products. The simple fact is that many 3-D modeling projects can be accomplished with excellent results using even the simplest of the 12 programs discussed below.

**Distinguishing Modelers**

When you build physical models using materials like cardboard, plastic, or clay, you need to understand the nature of those materials in order to use them successfully. Similarly, with 3-D modelers you need some basic knowledge of the digital objects modeling programs use and how to combine these objects to produce models. This understanding lets you determine which tools are best suited to the task in your head. Then you just need to balance your requirements against the features and prices of the products available.

To some degree, 3-D modelers can be described by their approach to representing objects, such as whether objects are treated as surfaces or as solids and whether objects' shapes are constructed and controlled by means of polygons or spline curves. However, some modelers let you switch between object-description modes—say, from spline to polygons—to suit your immediate task, so you can optimize for speed, precision, or flexibility as needed. Other factors figure into the pricing of 3-D programs, such as the rendering and animation capabilities included, if any, but modeling prowess is a primary consideration when choosing a professional-grade program. Nevertheless, remember that you can achieve remarkable realism using even the simplest 3-D packages.

**Surface Modelers**

Surface modelers build objects by stretching a skin over an underlying wire-frame structure. That skeleton can be constructed from either polygons or splines. The effect is like Buckminster Fuller's geodesic domes—a

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3-D modelers range from $350 to $3500. Macworld helps you pick the one that's right for you.
frame work and a skin containing empty space. Solids modelers produce objects that, like a brick, concrete slab, or wooden beam, have substantive characteristics defined by their spatial volume as well as by the shape of their surfaces. Some of the high-end surface modelers, such as Byte by Byte Corporation's Sculpt 3D and VIDT's Presenter Professional, can calculate an object's surface area and enclosed volume, making these programs capable of handling many, but not all, solids-type operations.

**Solids Modelers** Solids modelers offer greater modeling versatility than surface modelers but extract a heavier computational price. Surface modelers, with their inherently simpler object descriptions, usually have a performance advantage. All of the general-purpose modelers now out for the Macintosh, except FormZ, build surface objects. Solids modelers tend to be limited to building-block shapes for architectural applications. Solids modelers are not limited to simple constructions, however. More important, because they "understand" thickness and density, solids modelers are capable of performing certain tasks that surface modelers cannot do—for example, punching holes through objects.

**Polygonal Modelers** Polygonal modelers combine polygons to build objects (again think of a geodesic dome, its skin panels formed from interconnected triangles and hexagons); polygonal constructions can be either surface or solid, depending on the modeling package. A drawback of polygonal modelers is that curves are always approximations, produced from sequences of straight segments. However, polygonal modelers offer the advantage of computational speed (unless you really pile on the polygons). Polygon models are certainly adequate for simple shapes or preliminary design roughs.

**Spline-Based Modelers** By contrast, spline-based modelers build objects (either surface or solid) using mathematically defined curves similar to those of 2-D illustration packages. Artists and designers familiar with using Bézier curves in two dimensions therefore often find spline modelers easy to learn. Generally speaking, spline-based modelers offer greater precision than polygonal-based programs and are better at producing complex, organically shaped objects with smooth flowing lines.

Not all splines are created equal, however. Most 3-D modelers use uniform B-splines, which are defined by equally spaced points along a path. Nonuniform rational B-splines, or NURBS (a more advanced version), have irregularly spaced points, giving them extraordinary flexibility and smoothness. They're exceptional for accurately describing complex objects with compound curves, such as automobile fenders, that can cause lesser modelers to choke on their polygons. FormZ andAlias Research's Alias Sketch are currently the only Macintosh programs that use NURBS.

NURBS exact a price for this flexibility, and that's an explosion of data, even when defining the geometry and surfaces of simple objects such as cubes or spheres. If you're modeling a prototype for fabrication, you may need that degree of precision; but unless your application justifies the computational effort and consequent speed hit, NURBS can be like the proverbial sledgehammer solution to an ant problem.

**Tools of the Trade** Modeling programs are essentially multipurpose products. As with a child's construction toy, you use basic pieces to build models of everything from autos to buildings to spaceships. The difference is that modeling programs let you operate on those basic pieces using extrusion, lathing, vertex editing, and Boolean operators to build and manipulate a variety of objects.

**Primitives** Most 3-D programs produce object primitives—such as spheres, cubes, cones, cylinders, and sometimes more-complex shapes like dodecahedrons—that you can place directly in the work space. Although primitives are uneditable in some programs, they can nonetheless be useful for quickly assembling some complex models—for example, by combining simple shapes and shading their outside surfaces (see "Primitive Constructions").

**Extrusion** After primitives, extrusion and lathing operations are the modeling backbone of 3-D programs. Simply put, extrusion takes a 2-D entity, such as a square, circle, or other closed path, and extends it perpendicularly into the third dimension to produce, in the case of a circle, say, a tube or a cylinder. Some programs also let you extrude along a curved path to produce more-complex shapes. For instance, extruding a circle over a curving, looping path would create the structure of a spring.

These days, most 3-D modelers import EPS files and can extrude TrueType or PostScript Type 1 font outlines for text objects. However, if that's all the modeling you need, look to less-expensive three-dimensional illustration packages such as Pixel Typerst, Adobe Dimensions, StrataType 3d, Ray Dream's
addDepth, and Specular International's LogoMotion. After you import the 2-D outlines, these easy-to-learn programs let you extrude, render, light, and position the object in space—the most basic functions of a 3-D program—yet sell for under $300 and won't burden you with lots of unnecessary baggage.

**Lathing** Lathing produces shapes by turning an outline around an axis. The effect is similar to lathing in a woodworking shop, except that in the shop you carve the outline into a spinning block of solid wood, while the computer simply spins the shape from the outline (see "Lathing Beauties"). Related to lathing is the ability to sweep surfaces, whereby you spin a surface around an axis that extends in three dimensions. Some programs also let you sweep a surface along a curved path to produce structures like a threaded screw or a twisting DNA helix.

**Lofting** Lofting enables you to apply a skin over a series of rib elements to produce tapered shapes—the bow of a ship's hull, for example, or the cinched segments of an insect's body. In essence, each rib is a cross section that defines the shape of the object at a particular point (see "Going Aloft").

In addition, Alias Sketch, FormZ, and Presenter Pro provide putty tools that let you deflect or stretch the surface mesh of objects. These tools preserve intervertex relationships so that if you pull or push on a vertex, neighboring points are deflected as well. In effect, you're deforming the object as if it were made of putty (see "Pliable Shapes").

**Boolean Operators** The most computation-intensive modeling function, using Boolean operators on solid objects, is available only in FormZ. Sculpt 3D and Presenter can perform Boolean operations on surfaces and volumes. With Boolean, any 3-D object is a tool that can operate on any other object. Using functions such as union, difference, and intersection, you can use a sphere to gouge a crater out of another object, much as you might take a scoop out of a brick of ice cream (see "Carving Objects").

Programs like FormZ, Sculpt 3D, and Presenter Pro provide numerous options that expand the capabilities of the basic operations outlined above, plus CAD-like powers such as corner filleting and snap controls for precision alignment.

**Factoring In the Options** Although it's helpful and necessary to assess the modeling power your projects demand, personal working style and preference also count for a lot when you choose the 3-D package you're going to live with for a while. Working in three dimensions demands some adjustment on your part, whichever program you choose. But don't lose heart; once you get the hang of the various modeling tools, you'll find them extremely versatile.

If a modeler you like working with lacks a particular feature, another tool in your kit can often serve in its stead. For example, if your modeler can't loft a complex tapered circular object, you could produce it by lathing the shape in segments and joining the lathed pieces together. The result will look the same. So don't think you must have every possible tool—remember, the more tools and features, the more complex the program and the steeper the learning curve.

**Interface** Also, just because two products lathe or loft doesn't mean they do it in the same way. For example, with programs like Ray Dream Designer and Specular International's Infini-D you build individual objects in one mode and then place them in a scene in the 3-D work space. With Sketch and MacroModel you build objects immediately in the 3-D scene. Neither approach is intrinsically better, though each has advantages. Constructing objects in isolation lets you work without fear of disturbing other objects. In-scene construction enables you to build objects directly on the surface of other objects, making it easier to fit the pieces of a model together.

**Rendering** Another factor to weigh is the modeler's built-in rendering ability. Although rendering is usually considered to be a separate step from object building, in practice it can be an integral part of the modeling process. If your end product is to be a visualization rather than a precise representation of a given object, you can employ visual effects such as surface textures, bump and environment mapping, and high-quality Phong shading or ray tracing to transform simple
INSIDE 3-D MODELING

3-D Modelers Compared

<table>
<thead>
<tr>
<th></th>
<th>Alias Sketch 2.0</th>
<th>Design Reality 1.0</th>
<th>FormZ 2.6</th>
<th>Infini-D 2.6</th>
<th>MacroModel 1.5</th>
<th>Presenter Professional 3.0</th>
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<td><strong>Company</strong></td>
<td>Alias Research</td>
<td>Ashlar</td>
<td>autodesk</td>
<td>Specular International</td>
<td>Macromedia</td>
<td>VDH</td>
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<td><strong>Toll-free phone</strong></td>
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<td></td>
<td>800/433-7732</td>
<td>800/945-4061</td>
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**MODELING**

- 3-D primitives
- Extrusion
- Lathing
- Lofting
- Sweep surfaces
- 3-D vertex editing
- Spline modeling
- Clay modeling
- Boolean operations
- Font extrusion
- EPS file import
- DXF import

**RENDERING**

- Ray tracing
- Number of light sources
- Shadows
- Environment map
- Texture map
- Procedural textures
- Alpha-channel support
- File-import formats
- File-export formats

**ANIMATION**

- Keyframes and tweens
- Morphing
- Presentation

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<th>Modeler</th>
<th>Number of lights</th>
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<th>Environment map</th>
<th>Texture map</th>
<th>Procedural textures</th>
<th>Alpha-channel support</th>
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<td>yes</td>
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<td>DXF, EPS, PICT, QuickTime, TIFF</td>
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**Objects into naturalistic images.**

For example, say you need to produce a pitted metal object, like a wrought-iron rod. You could directly model the indentations—deforming the surface mesh by means of vertex editing or Boolean operations—creating a very complex object. Or you could model a simple rod, apply an iron texture to the object, and finish it off with a bump map that visually re-creates the pitted surface. That’s modeling the easy way.

**File Transfer** Nowadays most 3-D programs are integrated packages, incorporating modeling, rendering, and animation; but the programs vary a great deal with regard to the power of the separate components. Some of the most competent and demanding modelers, such as FormZ and Ashlar’s Design Reality, have relatively modest built-in rendering and no animation; other modelers, such as Sculptor and Macromodel, offer the high-grade renderer and animation modules as options. If photo-realism and movement are required, you can export the models to professional-quality rendering and animation programs. The stand-alone modelers are targeted toward professions that require a high degree of numerical accuracy, such as mechanical engineering and product design. Their principal function is to define an object precisely, not to create a graphically realistic scene. For applications such as these, a modeler’s ability to export to DXF or IGES for CAD applications and STL for rapid prototyping is essential.

Even with such standard file-exchange formats, transferring 3-D models can be a problem. If you plan to regularly move models to another package, look for a pair of programs that directly support each other’s files such as Ashlar’s Design Reality ($1995), which works with Ashlar’s CAD package, Vellum (2-D version $2495, 3-D $2995). And if you will be sending models to a prototyping
Graphic artists and animators who need to compose models with backgrounds in image processors, such as Adobe Photoshop, should look for alpha-channel support from the modeler's built-in renderer, or for the ability to transfer models to other renderers. Macromedia's Swivel 3D Pro and MacroModel provide links to Pixar's MacRenderMan through RIB export, as does Pixar's own ShowPlace; VIDIM's Modeler Pro and Presenter Pro support transfer to ElectricImage's ElectricImage Animation System. Both MacRenderMan and ElectricImage rank among the preferred renderers of imaging pros.

Money Matters With high-end modeling capabilities becoming increasingly available at midrange and even low prices, why would anyone choose to pay premium prices? All the packages at the high end of the price spectrum offer excellent one-stop-shopping solutions, but what do you get when you shell out $2000 to $4000? The answer is an ongoing relationship with the vendor, and for some users, that can tip the balance.

Unlike mass-market, over-the-counter modeling products, the high-end packages are usually available only directly from their vendors or through trained value-added resellers (VARs). Typically, the purchase price includes some training, a good deal of hand-holding, and an introduction to local users who can provide assistance and share their experiences. In a sense, you're inducted into a community of users that receives careful attention from the vendor and participates in the continual development of the program.

Is all that worth the extra cost? That depends on the complexity of your projects, your own self-assurance, and the level of experience you bring to the purchase. But such user-vendor relationships can be invaluable as you learn complex programs and when you need to solve design problems.

The Last Word As you weigh the balance of requirements, preferences, and price, realize too that choosing a 3-D package is a highly subjective decision. That's not a bad thing. The tough part is that you have lots of programs from which to choose. Here are some quick evaluations and my cur-
inside 3-d modeling

Carving Objects Boolean operators let you use objects to reshape other objects. For example, with FormZ you can carve a recess for a bottle's label by using an extruded elliptical shape to remove material from the bottle.

Pliable Shapes Molding surfaces in claylike fashion is another form of vertex-level editing. Using the Putty tool in Sketch, you can transform this wheel into an improbable flat tire by deforming the surface-defining splines.

recent personal preferences, grouped generally by one last critical factor—price.

- In the under-$500-list-price set, the stalwart Swivel 3D Pro ($495) remains a good program for learning 3-D modeling techniques—and it offers simple animation tools. However, Ray Dream Designer ($349) is a stronger modeler and it provides an excellent renderer, making it better suited for graphic arts applications.

- In the $500-to-$1000 category, plug-in modeling tools have elevated ShowPlace ($695) from a basic scene assembler to a reasonably effective modeler. It comes bundled with MacRenderMan, as good a renderer as you can buy.

Both Infini-D and StrataVision 3D (both $695 list) are excellent all-in-one programs suitable for many professional applications. While they are comparable in rendering capabilities, StrataVision provides more competent modeling and Infini-D excels at animation. Overall, these two are coin-flip close, but Infini-D's general ease of use gives it the edge.

For sheer modeling prowess in this price range, consider Sketch ($695) and MacroModel ($895). Sketch's NURBS-based modeling, first-class rendering, and lower price make it the value standout. If animation is your goal, however, go for the $995 MacroModel-Macromedia Three-D bundle.

- At $1500 FormZ is pound-for-pound the best modeler in this survey, with its mix of solids modeling, Boolean operators, and NURBS surfaces. If you can digest its voluminous documentation, live with relatively simple rendering, and do without animation, FormZ can produce any object imaginable. Alternatively, StudioPro ($1495), with a terrifc balance of powerful modeling, rendering, and animation features, is the most complete all-in-one package this side of $3000.

- From about $2000 on, the competition between Presenter Pro ($1995) and Sculpt 3D ($2995) is another toss-up. Both are full-featured, integrated programs that rival CAD systems in power and complexity, and both vendors offer a modeler separately. Presenter Pro's emphasis on animation and sound are designed for multimedia work. Always a supercompetent modeler and renderer, Sculpt 3D at last has a Mac interface, reducing its learning curve. Sculpt 4D, at $3995, includes animation.

Ashlar's new Design Reality is a stand-alone modeler that offers direct compatibility with another Ashlar offering, Vellum, a full-featured CAD system.

A final word of advice: shop around. Street prices can be significantly lower than list, and special marketing promotions often reshuffle the standings. The trend is toward lower prices. Programs that last year lived in the $1000 neighborhood, such as Infini-D and Sketch, have moved several hundred dollars down the street. And MacroModel, bundled with either Macromedia Three-D or MacRenderMan, came down from $2495 to under $1000.

Entering the world of 3-D design can be a daunting prospect. Choosing a program and becoming familiar with its intricacies can be time-consuming and a bit perplexing. But once you're over those initial hurdles, 3-D modeling will change the way you think about design and suggest new creative approaches to your projects. Soon you'll discover that modeling in 3-D isn't really difficult, you just need to learn your way around.

Carlos Domingo Martinez is a regular contributor to Macworld. He has covered Macintosh design products since 1986, but his first experience working with a 3-D modeler was an early encounter with Tinker Toys.

3-d modelers

Editor's Choice

3-D modeling on the Macintosh has matured to the point of offering many appealing options in several price ranges. When it comes to choosing the one to buy, personal preference plays a very important role. All of these programs are available in native Power Mac versions.

Stand-Alone Modeler

FormZ The only Macintosh package capable of true solids modeling, FormZ also has an extensive tool set that merits the extra learning effort. Company: autodesys. List price: $1495.

Integrated-Modeling Package

StudioPro This all-in-one package offers an excellent combination of modeling, rendering, and animation features for the price. Company: Strata. List price: $1495.

Entry-Level Modeler

Infini-D This appealing program provides a good balance of modeling, rendering, and animation capabilities along with an interface that eases the transition from two dimensions to three. Company: Specular International. List price: $695.
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Comments:
Chris has become an indispensable member of the account team. He has demonstrated a high level of motivation and enthusiasm for the job. Perhaps the most compelling evidence of this can be found in his ability to work independently, where he picks up new tasks easily with little need for supervision or instruction. He consistently recognizes and works around obstacles to maintain productivity. Consequently, he often completes assignments ahead of schedule. At a time when collaboration is more critical than ever, Chris has also proven to be an excellent team player. He works effectively with coworkers on projects where teamwork is essential, and can easily motivate and inspire others to achieve. When delegating tasks, his thoughts are well organized and his ideas clearly articulated — an indication of his excellent communication skills. His projects are all distinguished by an attention to detail. His conclusions are always sound and logical. And he excels in time management, effectively compiling and analyzing information. He always manages to work efficiently, setting an example for effort throughout the company. Promotion and appropriate compensation are recommended at this time.

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EVERYWHERE YOU GO, IT SEEMS, PEOPLE ARE SEARCHING FOR WAYS TO REDUCE THEIR RISK OF injury from using a computer. Go into any computer store and you'll find a host of add-ons—from foam wrist pads to antiglare screens, from futuristic keyboards to trackballs—that promise to prevent injury. The truth is that using a computer can be risky—it's all too easy to unknowingly misuse your equipment and abuse your body. □ The injuries that can result, known as repetitive strain injuries, are serious medical problems for workers and their companies, and a significant share are related to computer use. For example, 1992 government figures (the latest data available) show that carpal tunnel syndrome—a painful condition sometimes associated with computer use—required a longer average recuperation period than any other type of work injury, including fractures and amputations. □ Just how widespread is the problem? According to the Bureau of Labor Statistics, in 1992, almost 11,000 cases of lost work time resulted from typing or key-entry jobs. And that doesn't count the other computer-related injuries, which the bureau doesn't track as such. It's also hard to tell how many of those cases were due to computer-related injury, partly because so many different ailments have been blamed on computers. □ If anything, computer-related illness is likely more common than official estimates, since many workers are reluctant to report problems to their supervisors. Also, government statistics don't include hobbyists and others who use computers at home or in small businesses. □ Part of the current epidemic of computer-related disorders may be related to heightened awareness among workers and health professionals. And there are steps that you can take to prevent such disorders, many at little or no cost. □ In this three-part article, I'll look at some of the health problems faced by computer users, with an emphasis on physical injuries. (For an update on the possible side effects of electromagnetic radiation, see Conspicuous Consumer, elsewhere in this issue.) First, I'll show you how you can prevent problems from developing to start with. Second, I'll help you learn how to tell if you might already be affected. Finally, I'll tell you where to turn for help. This advice is based on extensive research and interviews with leading medical experts. □ As you take action to reduce your risk, keep in mind that many companies offer solutions they claim to be ergonomic. Take all such claims with some skepticism: there are no accepted standards for ergonomic design. But no product—whether or not it has undergone rigorous testing by ergonomics experts—can address every person's needs.

MEDICAL CONSULTANTS: ROBERT E. MARKISON, M.D.; EMIL PASCArellI, M.D.; RICHARD UHL, M.D.; AND ELAINE VOLLOWITZ, P.T.
WHILE WORKING ON YOUR MAC
HOW TO PREVENT INJURIES

As with other types of illness, the most effective way to deal with computer-related disorders (CRDs) is to prevent them from happening at all. Even if you're not in pain, it pays to scrutinize your work area to make yourself more comfortable and less likely to suffer damage in the long term. Some changes, such as installing chairs and keyboard trays, will cost you or your employer money. But there are many improvements that you can implement at little or no expense.

In the workplace, adoption of new standards by federal, state, and local government agencies over the next few years will force many businesses to focus on the design of their employees' computer workstations. But even without the threat of lawsuits or regulatory action, many companies are discovering that paying attention to office ergonomics makes good sense. That's especially true when you consider the potential gains in productivity and employee satisfaction, not to mention the savings in medical costs and salaries for temporary workers. When you add it all up, the payoff to business could total billions of dollars annually.

To help you evaluate your work space, I'll use a commonsense approach that divides your computer setup into three main areas: the seating arrangement (your chair and desk), the computer setup (your monitor, input devices, and other hardware), and finally, environmental conditions (such as lighting, noise, and air quality).

As you are considering your office layout, though, remember that making all the components work together—coupled with not overworking—is the key to preventing or lessening CRDs.

Where You Sit

There's not much you can do about your physique to make you less susceptible to CRDs, although keeping physically fit and performing simple exercises may help. For example, taking frequent breaks to get up and move your head, neck, shoulders, arms, and legs is one simple step you can take. The goal of such basic stretching is to move your body around to work the kinks out. (Never continue an activity that makes your pain worse, and check with your doctor if you're unsure about any exercise regimen.) But the design of your chair—and how well you use it—can have a significant effect on your comfort and health.

Chair

To begin with, choose a chair that you can tailor to suit your body, instead of changing your posture to fit the chair. Seats with multiple adjustment points—usually available from office specialty stores—are best. (Because chairs fit each person differently, don't buy one without trying it out first. If you purchase from a catalog, make sure that there's a money-back guarantee.)

ASSURING THAT YOUR CHAIR FITS YOU WELL

A chair needs to fit your body size and shape, and adjust for different activities (such as typing, writing, and talking on the phone). Your chair should help you maintain your spine's natural curves. You also need to do your part: adjust your environment to fit you, change your working positions throughout the day, and vary the tasks you do so you're not in any one position too long.

You should be able to sit back all the way against your chair back and be able to move your knees and lower legs freely.

The seat should be low enough for your feet to rest flat on the floor and high enough to support your thighs evenly.

Arm rests should be high enough to support your forearms but not so high as to raise your shoulders. Arm rests should also be directly under your arms, and arm rests shouldn't bump against your work surface as you move close to it.

The angle between the seat and chair back should usually fall between 85 and 120 degrees—as is comfortable for you. It's OK to recline.

The chair should provide support for your lumbar region (at your waist). If you recline even slightly, you also should have support for your midback, at the base of your shoulder blades.
SETTING UP YOUR DESK TO MINIMIZE STRESS

As computers and peripherals get bigger, there’s less room at most people’s desks to work properly with their equipment. A larger space is what most people need, although most companies can’t afford to provide it. But no matter what space you have, follow as many of these guidelines as possible to reduce stress.

The equipment you use most should be in front of you. Other frequently used equipment should be within 15 inches of the hands that use it.

Keep the pointing device in easy reach: close to the keyboard, at the same height. If you have a keyboard with a numeric keypad, try using your left hand for the input device.

Your desk or keyboard tray should leave enough clearance for your thighs but should not be so high that your wrists bend upward or you raise your forearms.

To keep your wrists straight, tilt the keyboard so the key tops form a plane in line with the slope of your forearms and wrists. Taller people may find a reverse (backward) tilt comfortable.

If you have to raise your hands and arms to type—and you can’t adjust your seat, keyboard, or desk to compensate—try moving the keyboard away and resting your forearms on the desk (if you don’t use the mouse a lot, try placing the keyboard in your lap).

The area of the display you look at most should be slightly below eye level. The monitor should be as far away as possible while still being readable; 16 inches should be the minimum distance.

If you use a copy stand frequently, place it at eye level, directly before you, with the monitor to the side. For occasional use, place the copy stand below the monitor or to the side of the monitor.

Work Surface Like office chairs, desks and other work surfaces are available in a bewildering assortment of configurations, ranging from basic, utilitarian models to complicated designs with adjustable shelves and cubbyholes. No matter what style you prefer, choose one that’s appropriate for your body size, and make sure that there’s ample work area for your monitor, keyboard, and other peripherals.

If you use a desk, there should be at least 2 inches of clearance between the tops of your thighs and the underside of the desktop or the keyboard tray. Pullout keyboard trays are helpful, particularly for desks that aren’t adjustable, but they should have enough room for your keyboard and pointing device—you should not have to stretch to use your mouse or trackball.

It’s also important to pay attention to items that aren’t directly related to your computer. For example, placing your telephone opposite your writing hand makes it easier to hold the receiver and write at the same time. (Cradling the receiver between your head and shoulder is especially harmful, because it puts added stress on your neck muscles.) If you’re on the phone a lot, consider a lightweight headset or a speakerphone so you can keep both hands free.

Also make sure that you have enough room to write comfortably, without reaching awkwardly to either side. Perhaps you can set up a separate writing surface, such as an elevated desk return or cubicle work surface, that you move your chair to use. Be sure to move equipment as you change tasks—the equipment you use at the moment should be in front of you or in easy reach.

Your Mac Setup

Computer peripherals—especially keyboards and pointing devices—have received a lot of attention from vendors, who love to run ads touting their products’ ergonomic advantages. But it’s difficult to verify or refute specific claims without access to specialized test facilities and hundreds of volunteer subjects, and even then those results may not apply to you. Be especially suspicious about assertions that a particular product can prevent or heal injuries.

Still, there are things you can do when selecting peripherals to get ones that work well with your body and computer setup. While you’re shopping, keep in mind that if you’ve already grown accustomed to a poor design, a better piece of equipment may feel worse when you first use it. Try any piece of equipment before you commit to it, and make sure you can return it after a trial period. In the store, always ask to use a device with a working computer.

Keyboards Keyboards have been singled out as contributing to many CRDs, particularly problems with the fingers, hands, and wrists. Here’s what you should pay attention to when you’re looking for a keyboard.

• Do the keys provide a comfortable level of resistance? The keys should require more than minimal force to activate, but not so much that they’re hard to press.

• The keys should provide some auditory or tactile feedback. You can test this by watching the monitor as you type—can you tell when you’ve pressed the keys firmly enough to activate them?

• Is the keyboard’s angle adjustable? Some ergonomists believe that the keyboard should lie flat, while others advocate a negative tilt, with the front row higher than the back row. Unfortunately, the built-in feet on most keyboards only allow a positive tilt (front row lower than back row), although some keyboard trays let you achieve a negative (backward) angle. You can also tilt your keyboard by attaching a piece of wood or metal to the bottom.

• Does the keyboard provide function keys to help you cut down the number of keystrokes? (The sidebar “Stress-Reducing Software” shows you how to take advantage of keyboard shortcuts and other actions to save wear and tear on your fingers.) Does it provide scrolling keys like page up and home to minimize mouse movements?

• Does the keyboard provide any other ergonomic enhancements? For example, a numeric keypad that you can shift to the left side of the keyboard may be better for lefthanded users, and a built-in trackball or other pointing device can help minimize arm and hand movement.

Apple and various third-
STRESS-REDUCING SOFTWARE

You work at the computer all day, and you know you're at risk. After you've adjusted your workstation and learned the appropriate body mechanics, what else can you do to reduce the risk of repetitive strain injuries (RSIs)? Get your computer to do more of the work for you.

Make the Mac Do the Work Store commonly used phrases and paste them from your word processor's glossary. Microsoft Word 6.0 offers a technology that automatically corrects commonly misspelled words and replaces preconfigured abbreviations. Two programs offer similar capabilities for almost any program: Riccardo Ettore's TypeIt4Me shareware and MagicTypist 2.0 from Olduvai Corporation ($29, 305/670-1112). System 7.5 supports scripting of both AppleScript-compatible programs (like QuarkXPress) and the Finder, so you can automate common tasks, even across programs. Other programs, like FileMaker Pro, offer their own scripting. Charles River Analytics' Open Sesame ($99, 617/491-3474) also lets you automate common tasks.

Avoid the Mouse Apple's Easy Access, which came with your system software, lets you use the numeric keypad as a mouse, and it also provides Sticky Menus (which keeps a menu displayed until an item is selected) to reduce motion.

Use Shortcuts Reduce your keyboard efforts with CE Software's QuicKeys ($139, 510/221-1801) and Dave Lamkins' PwrSwitcher 1.1.3 shareware.

Use Your Voice AV Macintoshes support voice commands for Finder functions; that functionality should increase as vendors add PlainTalk support to their products. Articulate Systems' PowerSecretary ($2495, 617/935-5656) lets you enter text into a word processor by speaking.

Take a Break Several programs can help you remember to take breaks: Visionary Software's LifeGuard ($79.95, 503/246-6200), Exercise Break from Hopkins Technology ($39.95, 612/931-9376), and Coffee Break, a shareware program by Thomas Reed. Or just set alarms using Apple's Alarm Clock desk accessory.

I've posted the shareware mentioned here, plus a "Top Ten Things to Do with QuicKeys" file with some examples in the Macworld forums' software libraries on America Online and eWorld.

BY JOANNA PEARLSTEIN

party vendors have introduced newer designs that promise improved hand and wrist positions. For example, the Apple Adjustable Keyboard ($219 company-estimated street price, 408/996-1010) splits down the middle to lessen sideways turning at the wrist, and the Comfort Keyboard System ($795, HealthCare Keyboard, 414/253-6333) consists of three sections that adjust separately to fit your hands. More radical approaches like The BAT chord keyboard ($139, Ingroft, 805/566-1049) claim to reduce wear and tear by doing away with most of the standard keys; instead, you use key combinations called chords to enter letters and other characters. Although hard data is scarce, individual users have reported that alternative keyboards can make the difference in some cases. (See "The Apple Adjustable Keyboard," Macworld, November 1993.) However, other users dislike these devices.

Pads and Braces Wrist pads and other add-ons offer an inexpensive solution for some deficiencies in keyboards and other hardware. Padded wrist rests that sit in front of the keyboard are quite popular, but Pam Silverman, a hand therapist and director of Hand Therapy of San Francisco, cautions that you should never brace your wrists on them while you're typing, because the added wrist pressure may actually increase the risk of some CRDs.

According to Silverman, wrist splints can help sore wrists heal, but they're best used under direct professional supervision. It's important not to wrap your wrists too tightly, since that can make matters worse by aggravating nerves and blood vessels.

Pointing Devices With all the attention paid to keyboards, don't forget your pointing device. Many repetitive-strain-injury (RSI) experts say that the mouse and other pointing devices are becoming a major source of injury because people hold them incorrectly throughout the working day. Each major category of pointing device has its own legion of supporters—you should choose a device that feels comfortable to you and that works for the type of job you do.

Emil Pascarelli, an M.D. and director of ambulatory care at St. Luke's/Roosevelt Hospital in New York City, notes that mouse users increase their risk of injury by gripping the mouse too tightly. If you opt for a mouse, choose one that fits comfortably in your cupped hand. People who suffer from arm and shoulder pain may get relief by switching to a trackball, which requires less arm movement than a mouse to manipulate. Hands come in different shapes and sizes, so try to find a mouse or trackball that fits yours.

When shopping for a trackball, consider how resistant the ball is to movement. If the ball moves too easily or not easily enough, you'll have to work harder to control it using the small muscles in your hands and fingers, which are more prone to injury.

Pay attention to the placement and size of the buttons: Are they easy to reach and press, and do they provide adequate feedback? If you use the mouse or trackball a lot, look for user-definable shortcut keys to, say, replace a more stressful double-click with a single-click, to avoid the gymnastics of shift-clicking to handle multiple selections, or to save you the effort of switching back and forth from the mouse to the keyboard.

People who do a lot of graphics work, but not much word processing, may prefer a pen-based input device like a drawing tablet.
And since most input devices use the Mac's ADB port, you can plug several in at the same time and switch between them as needed. This lets you pick the right input device for the job—a pen, for example, is better-suited for illustration than a trackball, and a mouse is better than a joystick for fine movements in word processing—and prevents you from overusing one set of muscles and tendons.

**Monitor** The monitor is another component that plays an important role in certain CRDs, especially eyestrain. The monitor's height should be adjustable so that the top of the visible screen is just below eye level, and the monitor should swivel to help you get rid of annoying reflections. (If you have to pivot the monitor too far, you should try to eliminate the source of the reflections.) Choose a display that's sharp enough to read without straining your eyes, and one that's bright enough to match the ambient lighting.

**A Healthy Ambience**

Many computer users don't pay much attention to lighting and other environmental conditions, probably because they assume that anything outside of their immediate work area is beyond their control. In practice, though, small changes in your environment can have a major effect on your comfort level, and may help avoid some types of CRDs.

**Air Comfort** Secondhand tobacco smoke is only the most notorious example of poor air quality that can endanger a worker's health. Fortunately, most businesses have come a long way in regulating exposure to smoke and other pollutants in recent years. Not so obvious, though, are the ways in which other conditions, such as temperature and humidity, can affect your health.

For most people, a working temperature of about 68 degrees Fahrenheit (20 degrees centigrade) is ideal, although some people feel their best in warmer or colder conditions. (If you're especially bothered by temperatures that don't seem to affect your coworkers, check with your physician, since some medical conditions—such as diabetes, for example—can affect temperature sensitivity.)

**Noise** Whether it's the constant hum of a disk drive or the incessant chattering of a coworker at the next desk, noise in your work area also can cause harm by increasing your stress level. (Many experts, including hand therapist Silverman, believe that people who are under stress are more prone to develop CRDs than people who are relaxed.) You can cut noise levels by placing offending equipment on the floor, and you can use padded partitions to muffle noise from adjacent areas. If you're particularly sensitive, you should consider wearing earplugs or lightweight headphones that cover your ears.

## Adjusting Your Work Habits

Initially, it may seem strange that typewriter users tend not to suffer from RSIs—after all, for many people, using a computer mostly involves typing. But even electric typewriters only let you work in spurts; at the end of each page, you have to change the paper, and that gives the body a brief but welcome respite that computer operators don't enjoy.

Even more important, says Pascarelli, is the fact that, because of how a typewriter is designed, typewriter users can't rest their arms on the edge of the desk the way computer typists can. (Resting the arms that way while typing can lead to injury.)

When you're using the keyboard, your forearms and wrists should form a straight line, and your fingers should adopt a comfortable, natural curve downward. As you type, don't apply too much pressure on the keys. To avoid CRDs, take frequent, short breaks. At least once an hour, stop what you're doing and get up and stretch your body, arms, and legs. To give your eyes a rest, look away from the screen every five minutes or so and stare into the distance. And of course, don't overwork or work when you're in pain.

When you do make changes, make sure you give yourself time to adjust. Your body feels comfortable with the familiar, not the unfamiliar, and it may take as much as a week to know whether a particular work setup or set of work habits is going to work for you. And you may need to change your setup and habits over time. Your body is not static, and neither should your work be.
WHAT CAUSES INJURIES

Computer-related disorders (CRDs) are a varied group of conditions that share one common feature: they are all somehow associated with repeated computer use. Unlike fractures, where the connection between trauma and injury is usually straightforward, CRDs often can't be linked to specific actions or events, like a fall. However indirect, for many people the connection between computer use and illness is real.

In fact, when you consider how poorly suited the human body is to deskbound tasks like word processing, it's a wonder that more people aren't affected. The human body really hasn't evolved very far since our ancestors roamed the African countryside searching for food. To put it another way, our bodies were not designed for working at a computer.

Classifying CRDs is difficult because the interactions between a computer user and his or her environment are so complex. For example, poor body position—one of the causes of CRDs—is governed by many interrelated factors, such as the design and setup of your chair, and the height and placement of the desk, monitor, pointing device, and keyboard, to name just a few. Other conditions in and around your work area—lighting, temperature, noise, dust or other air pollutants—are equally important, so causes can be hard to pinpoint.

Even if it were possible to design your environment to eliminate all undue stress, overusing your muscles, tendons, and other body parts can still lead to injury. Taking breaks can help by giving your

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Common Ailments
Pain, tingling, numbness, loss of strength or dexterity—all possible symptoms of cumulative trauma disorders—can be caused by different kinds of stresses. Here are some of the most common causes. Note that not all medical experts agree on the causes or treatments.

- **Strained Pronator**
  - Your body was not designed to hold your arms out with palms down (which twists the forearms into a position called pronation) for extended periods, although typing and mousing with conventional equipment require it. Pronation tenses the pronator muscle, which applies pressure to the median nerve that travels directly under it. Sometimes this pain is mistaken for carpal tunnel syndrome.

- **Extensor Wad Strain**
  - Extending your fingers repeatedly and independently of each other, such as when clicking a mouse button or pressing the F-keys, can irritate the extensor muscle wads, which straighten the thumb and fingers. The radial nerve, which is sandwiched between these two muscle wads, can succumb to the pressure.

- **DeQuervain's Tenosynovitis**
  - Repetitive and/or forceful use of the thumb through a full range of motion can irritate the tendons (and their sheaths) that run to the thumb base and knuckle. This can lead to DeQuervain's tenosynovitis. Also, repetitive thumb motion, such as in regular use of the spacebar, can strain ligaments and cartilage where the thumb meets the wrist.
Poor Posture
Hunching forward and holding your head too far forward can tighten the scalene muscles in your neck, compressing a major artery and nerve trunk and reducing blood flow and nerve function in the arms. The first symptom of this thoracic outlet syndrome can be numbness and tingling along the outside of your forearm and hand.

**Two Types of CRDs**

CRDs fall into two main groups: problems that primarily involve nerves, bones, tendons, ligaments, and muscles; and problems that originate in or primarily affect the eyes.

### Repetitive Strain Injuries

The first category includes repetitive strain injuries, or RSIs, which are related to repeated motions like typing or manipulating a mouse. According to hand therapist Pam Silverman, poor posture, badly designed equipment, and overuse all contribute to your risk of developing RSIs. (For many years, RSIs have plagued low-tech occupations like meat packing and mail sorting. Now that office workers and other professionals are being affected, RSIs have gained increased attention.)

Although the precise cause of RSIs remains unclear, the best hypothesis is that repeated small motions injure tissue. Over the course of time, this minor trauma takes its toll and causes inflammation and pain. For example, in carpal tunnel syndrome (CTS), repeated use causes the tendons in the wrist to swell, putting pressure on the median nerve as it passes through a narrow passage called the carpal tunnel. Pressure on the median nerve causes pain, numbness, and other symptoms in the hand.

Visual Problems and Headaches The second group of CRDs is related to visual aspects of computer use. Just as the human body wasn’t designed to sit rigidly at a workstation for long periods at a stretch, our eyes aren’t adapted to cope with the close focusing that computers demand. Staring at a computer monitor without a break eventually takes its toll in the form of eyestrain, which causes symptoms like headaches and painful, itching, or burning eyes.

It’s possible that eye problems and headaches are more prevalent than other types of CRDs, say medical experts. But since these problems are relatively minor and fairly common, many people tend to brush them off as an unavoidable side effect of computer work, so they often go unreported. (Headaches also can result from body-alignment problems like poor head and neck posture.)

### Are You Affected?

In deciding whether you’re a CRD sufferer, the most conservative approach is to view any new symptoms with suspicion and assume that they may be computer-related. That's not always easy to do, since many CRD symptoms appear when you’re away from the computer. For example, a few years ago I began to experience sharp pains in my upper back during the daytime. Since most of my time at the computer was spent after work, I didn’t make the connection until an orthopedic surgeon asked me about my hobbies, which include computing at home.

To decide if you might be suffering from a CRD, jot down any unusual symptoms that you’ve experienced in various parts of your arm and compare them with the examples in the illustration at left. Remember that CRD symptoms can come and go, and you may not even be conscious of them if they’ve been around for a long time.

Urge your company to bring in an ergonomics consultant with medical training to diagnose such hidden symptoms.
WHERE TO GET HELP

APPLYING A FEW PREVENTIVE measures may be all the therapy you need if you're suffering from a mild form of computer-related disorder (CRD), so you may not have to consult a health practitioner. But if you have even the slightest uncertainty about what to do, or if your symptoms are likely to result in some sort of insurance claim, it's wise to seek outside advice. (If your symptoms are job-related, you may be required to visit a company physician first.) Also, remember that it's never a good idea to try to "work through" an injury by ignoring it, since that may make the problem much worse.

Computer users who suffer from CRDs face a dizzying choice of places to turn to for help, ranging from medical doctors to proponents of various forms of alternative therapy. There's also a huge assortment of reference materials. I've listed the best on Macworld's forums on America Online and eWorld. Here's a brief rundown of the major medical options.

Choosing a Caregiver

Although most physicians (M.D.s and D.O.s) have probably heard of conditions like carpal tunnel syndrome, few receive intensive training in dealing with CRDs. Your best bet is to look for a board-certified doctor who specializes in hand surgery, or physical or occupational medicine. (If you're having visual symptoms or headaches, see an optometrist or ophthalmologist.)

Ask other computer users in your area for referrals, and take the time to interview potential candidates: how extensive is their background in diagnosing and treating CRDs, and what is their approach to therapy?

If you don't like the advice you get, consider a second opinion, but be aware that your medical insurance may not cover it—check with your insurance carrier. Also, be aware that workers' compensation often limits your ability to change doctors once treatment has begun.

A variety of other practitioners—including chiropractors, occupational therapists, hand therapists, and physical therapists—can also treat CRDs. (In many cases, these practitioners work along with or are referred by physicians in occupational medicine and other specialties.)

Some RSI sufferers have also obtained relief with alternative therapies such as acupuncture, meditation, and relaxation techniques. Although I try never to dismiss any approach out of hand, it's important to remember that some treatments, including medication, may only mask the symptoms without doing anything to correct the cause and prevent further injury.

As always, rely on personal recommendations for referrals, and beware of therapeutic claims that seem too good to be true.

Although it's impossible to make any workplace completely risk-free, following these simple guidelines should help make your computing experience safer and more rewarding.

Franklin N. Tessler, M.D., is a radiologist and Macworld contributing editor with a special interest in computer-related disorders.

REPETITIVE STRAIN INJURY TREATMENTS

by Robert E. Markison, M.D.

While treatment for repetitive strain injuries will vary from person to person, use these general guidelines in consultation with a medical provider. Good diet, exercise, keeping the arms and hands warm, varying your activities, taking breaks, staying well-hydrated, avoiding caffeinated beverages, and not smoking all help reduce injury and speed recovery.

**Poor Posture**

**Cubital Tunnel Syndrome and Ulnar Tunnel Syndrome**
Self-help: Keep arms and hands warm (via clothing and fingerless gloves), don't overuse hard-to-reach keys, try alternative keyboards and input devices, don't keep arms in a palms-down position. Professional care: Varies.

**Strained Pronator**

**Carpal Tunnel Syndrome and Flexor Tenosynovitis**
Self-help: Take breaks, keep arms and hands warm (via clothing and fingerless gloves), avoid salt, don't smoke (it reduces blood flow by as much as 60 percent), use dictation or voice recognition, type more gently. Professional care: Night splints, hand therapy, steroid injection if recommended.

**DeQuervain's Tenosynovitis and Thumb Ligament Strain**
Self-help: Change use of thumbs for pressing spacebar (for example, use rolling thumb movement or alternate use of thumbs), do gentle massage and stretches, keep hands warm (via fingerless gloves). Professional care: Night splint, steroid injection if recommended.

**Extensor Wad Strain**
Self-help: Avoid sustained pronation, do gentle massage and stretches, keep arms and hands warm (via clothing and fingerless gloves). Professional care: Physical therapy, steroid injection if recommended.
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today's business environment often poses massive storage challenges. Quick access to large amounts of data and stores of archived information can be vital to staying competitive. In publishing, where a single file can occupy 600MB, the flexibility of removable, rewritable optical disks can save time and money. Now affordable optical drives with capacities of 1.3GB or more, available from more than 20 companies, offer much larger storage volumes and much faster performance than earlier drives.

The cost of 1.3GB optical media averages an enticing $0.12 per megabyte—a fraction of the cost per megabyte for removable hard disks. And optical cartridges can withstand high heat, strong magnetic fields, humidity, and dust without loss of data. As you slip a 1.3GB cartridge into your briefcase, rest assured that your data will arrive intact.

For this review, Macworld Lab tested 18 drives and discovered some clear trends. Prices are mostly under $3000, less than last year's 650MB units. (Cartridges for this capacity range from $96 to $125, depending on the vendor.) Although the 1.3GB capacity has been available for less than a year, optical is a mature, reliable technology.

Of the ten mechanism types we tested, the MaxOptix T3 showed the most impressive performance and strong cross-compatibility. Nearly half the products reviewed use the T3, increasing the chances that you'll run into the same drive mechanism on other 1.3GB drives. Also, MaxOptix's formatting software and media support industry standards to a high degree, which makes those cartridges more interchangeable than media from some other vendors.

Speed Factors
For specialized needs, such as permanent archiving, WORM (write-once, read-many) drives may be your best option. And companies that have standardized on the 1GB optical format may want to stay the course with that capacity range. But for most buyers with huge storage needs, the key buying considerations for optical storage are price, performance, compatibility, and support. And among most 1.3GB opticals, the primary distinguishing factor is performance.

Drive performance fell into three basic groups. The fastest drives performed at the level of a slow hard drive, better than the Quantum 80 of a few years ago, but slower than today's standard Apple drives. The fastest drives—from Pinnacle Micro, Microtech, Lovie!, PLL, and FVB—use either the Pinnacle OHD-1300 or the MaxOptix T3-1304 mechanism (see “Optical Velocities”). Somewhat slower drives from MacProd-
Caching Considerations
Caches in optical drives are designed to overcome the chronic problem of sluggish write operations. The slow-switching magnets of magneto-optical drives require two write passes—the first one erases old data and the second writes new data. Given this limitation, the 10MB writes in our tests should be slower than the 10MB reads. However, to speed things along, drive makers such as Pinnacle, MaxOptix, HP, and others include massive caches—as much as 4MB of RAM—to accept data quickly and return control to the computer.

A write cache can lead to dramatic improvements. For example, the Pinnacle Micro Sierra 1.3GB saved our 3.9MB Aldus PageMaker document in 67 seconds on the first trial; this put it in the middle of the pack for this test. But on two subsequent trials, the Sierra drive took 19 seconds and 15 seconds, just over a quarter of the original time. The same dramatic effect occurred for our 4th Dimension sort. In each case, the size of the test files fit within the Sierra's cache.

But remember that our tests did not flush the cache between trials; flushing would happen if you used a series of large files. When we opened a 10MB Adobe Photoshop file between the PageMaker or 4th Dimension trials, the Sierra's performance dropped off significantly.

For most optical drives, caches are designed to handle a large number of...
reads and writes at once—as would be the case in copying many files for archiving. Caches help maintain a consistent flow of data even when the file is larger than the cache. When optical drives are used to approach hard-drive-like speeds, large caches are ideally suited to small and medium-size files used repeatedly at one sitting (see “Caching Strategies”).

Because caches are complicated beasts, and because each user’s data-usage pattern is unique, the drive with the largest cache may not be the fastest. Vendors customize caches to fit the specific performance needs of a particular set of customers. The MaxOptix T3 is a good example. The PLI MaxOptical 1.3GB did well on the 4th Dimension sort test, taking only 92 seconds, but poorly on the 10MB read test, taking 42 seconds, whereas the Iomega LaserSafe Plus did well on the 10MB read (34 seconds) but poorly on the 4th Dimension test (158 seconds). Both companies use similar cartridges and software. (Historically, our tests have shown that driver software has little impact on overall drive performance.) The results were due to different cache configurations on the two drives.

Cache configurations seemed to play an important role in determining the overall rankings in reading-based versus writing-based tasks. For example, the Pinnacle Micro Sierra 1.3GB wrote a 10MB file to its cartridge in 38 seconds, reading the same file in 52 seconds. In contrast, the FWB hammerDisk 1300 wrote in 42 seconds and read in only 36 seconds.

In some cases, write verification played a large part in distinguishing the fast drives from the slow. The write-verify feature forces a third pass over the disk (after erase and write). On this pass, the drive reads back newly written data to ensure that it is correct. Write verify is especially useful in extremely dusty environments where contaminants might obstruct the laser, or in applications where even small data losses could spell disaster. But verification adds about 20 percent more time to any write operation. Many vendors, such as Pinnacle Micro and FWB, ship their products with write verification turned off although their software supports it. Others, such as Club Mac and PLI, ship with write verify permanently on. A few vendors take the opposite approach and do not allow write verify at all (see "Optical Velocities" for settings that products ship with).

In general, first decide whether your data-security needs require write verify, then compare performance.

**Compatibility and Reliability**

Compatibility represents another important factor in picking a drive. Even more than other removable media, optical cartridges—often used in long-term archives—should be readable by other drives. Interchange standards have long been in place for optical media, including 1.3GB cartridges. Drives can read any cartridge as long as the media conforms to standards issued by one of the two industry standards groups, ISO and ECMA. Occasional driver incompatibilities can easily be solved by removing mounting software and restarting with the cartridge in the drive. (Only the Panasonic LF-7300A, which uses a read-write technology called phase change instead of magnet-to-optical, is completely incompatible with other drives.)
<table>
<thead>
<tr>
<th>Toll-Free Phone</th>
<th>Product</th>
<th>List Price</th>
<th>Tested</th>
<th>Tech Support</th>
<th>Warranty</th>
<th>Capacities Supported</th>
<th>Media Types Supported</th>
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<tr>
<td>800/874-1428</td>
<td>1.3Gig MO</td>
<td>$2499.00</td>
<td>tested</td>
<td>very good</td>
<td>1 year</td>
<td>650MB, 1.3GB</td>
<td>MO</td>
</tr>
<tr>
<td>800/258-2622</td>
<td>1.3Gig MO</td>
<td>$2099.00</td>
<td>tested</td>
<td>excellent</td>
<td>1 year</td>
<td>1.3GB</td>
<td>MO, WORM</td>
</tr>
<tr>
<td>800/235-9749</td>
<td>IBM 1.3 Optical</td>
<td>$2299.00</td>
<td>tested</td>
<td>very good</td>
<td>1 year</td>
<td>594MB, 650MB, 1.2GB, 1.3GB</td>
<td>MO, WORM</td>
</tr>
<tr>
<td>NA</td>
<td>HammerDisk 1300</td>
<td>$2399.00</td>
<td>not tested</td>
<td></td>
<td>1 year</td>
<td>594MB, 650MB, 1.2GB, 1.3GB</td>
<td>MO, WORM</td>
</tr>
<tr>
<td>800/826-4111</td>
<td>C2590 Model 1300T Optical Disk Drive</td>
<td>$3495.00</td>
<td>tested</td>
<td>excellent</td>
<td>1 year</td>
<td>650MB, 1.3GB</td>
<td>MO</td>
</tr>
<tr>
<td>800/426-7299</td>
<td>0632 Model CHA</td>
<td>$2995.00</td>
<td>not tested</td>
<td>not rated</td>
<td>1 year</td>
<td>595MB, 650MB, 1.3GB</td>
<td>MO, WORM, CCW-WORM</td>
</tr>
<tr>
<td>800/777-6654</td>
<td>LaserSafe Plus</td>
<td>$3995.00</td>
<td>tested</td>
<td>acceptable</td>
<td>2 years</td>
<td>650MB, 1.3GB</td>
<td>MO</td>
</tr>
<tr>
<td>800/115MO 1.3G</td>
<td>$2599.00</td>
<td>tested</td>
<td>very good</td>
<td>1 year</td>
<td>594MB, 650MB, 1.2GB, 1.3GB</td>
<td>MO, WORM</td>
<td></td>
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<tr>
<td>800/688-3695</td>
<td>Lighting MO 1300</td>
<td>$2999.00</td>
<td>tested</td>
<td>very good</td>
<td>1 year</td>
<td>1.3GB</td>
<td>MO</td>
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<tr>
<td>800/622-3475</td>
<td>Magic NEC 1.3 Optical</td>
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<td>very good</td>
<td>2 years</td>
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<td>800/1300T</td>
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<td>$1999.00</td>
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<td>2 years</td>
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<tr>
<td>800/484-2092</td>
<td>MaxLyb Model 1.3</td>
<td>$3850.00</td>
<td>tested</td>
<td>poor</td>
<td>1 year</td>
<td>650MB, 1.3GB</td>
<td>MO, CCW-WORM</td>
</tr>
<tr>
<td>800/786-1184</td>
<td>MAC1.3TAX 8</td>
<td>$2489.00</td>
<td>not tested</td>
<td>not rated</td>
<td>1 year</td>
<td>650MB, 1.3GB</td>
<td>MO, CCW-WORM</td>
</tr>
<tr>
<td>NA</td>
<td>SB-TMC-1300</td>
<td>$3995.00</td>
<td>tested</td>
<td>very good</td>
<td>2 years</td>
<td>650MB, 1.3GB</td>
<td>MO, WORM</td>
</tr>
<tr>
<td>800/662-4276</td>
<td>Genesis 1300</td>
<td>$2899.00</td>
<td>tested</td>
<td>very good</td>
<td>2 years</td>
<td>650MB, 1.3GB</td>
<td>MO, WORM</td>
</tr>
<tr>
<td>800/654-5294</td>
<td>Sony 1.3GB</td>
<td>$2399.00</td>
<td>tested</td>
<td>very good</td>
<td>2 years</td>
<td>650MB, 1.3GB</td>
<td>MO, WORM</td>
</tr>
<tr>
<td>800/347-4027</td>
<td>Maxplex 1.3GB</td>
<td>$2899.00</td>
<td>tested</td>
<td>very good</td>
<td>2 years</td>
<td>650MB, 1.3GB</td>
<td>MO, WORM</td>
</tr>
<tr>
<td>NA</td>
<td>Diskover 1300 MO</td>
<td>$3195.00</td>
<td>not tested</td>
<td>not rated</td>
<td>2 years</td>
<td>650MB, 1.3GB</td>
<td>MO, WORM</td>
</tr>
<tr>
<td>800/724-8086</td>
<td>LF-7300A</td>
<td>$3995.00</td>
<td>tested</td>
<td>acceptable</td>
<td>1 year</td>
<td>500MB, 1.5GB</td>
<td>phase change, WORM</td>
</tr>
<tr>
<td>800/553-7070</td>
<td>Sierra 1.3GB</td>
<td>$2995.00</td>
<td>tested</td>
<td>very good</td>
<td>2 years</td>
<td>650MB, 1.3GB</td>
<td>MO, WORM</td>
</tr>
<tr>
<td>800/788-9440</td>
<td>MaxOptica 1.3GB</td>
<td>$4225.00</td>
<td>not tested</td>
<td>not rated</td>
<td>2 years</td>
<td>650MB, 1.3GB</td>
<td>MO, WORM</td>
</tr>
<tr>
<td>800/800-8600</td>
<td>MEGO 1301</td>
<td>$2829.00</td>
<td>tested</td>
<td>very good</td>
<td>2 years</td>
<td>650MB, 1.3GB</td>
<td>MO, WORM</td>
</tr>
<tr>
<td>800/476-0923</td>
<td>551300 MACX</td>
<td>$2269.00</td>
<td>tested</td>
<td>not rated</td>
<td>1 year</td>
<td>594MB, 650MB, 1.2GB, 1.3GB</td>
<td>MO, WORM</td>
</tr>
<tr>
<td>800/352-7689</td>
<td>RAMOS570</td>
<td>$3095.95</td>
<td>not tested</td>
<td></td>
<td></td>
<td>594MB, 650MB, 1.2GB, 1.3GB</td>
<td>MO, WORM</td>
</tr>
</tbody>
</table>

To each company by Macworld staffers (posing as customers) to gauge the accessibility, helpfulness, and accuracy of the company's support technicians. Macworld uses a point system.

Ratings are for companies, not individual products, and we call only those companies whose products Macworld Lab tests. CCW = continuous composite write; MO = magneto-optical; mechanisms of tested drives, see "Optical Velocities." 8 Uses a Sharp JY-800 mechanism. 9 Uses with 1MB cache costs $3995. 0 Uses an NEC D0155 mechanism. 1 Drive does.

The compatibility issue is particularly important one for optical cartridges because they are used in publishing, digital-image manipulation, computer-aided design, video, and other fields where data must commonly be created on one drive and then transported to another drive located in either a service bureau or a remote office.

Between magneto-optical drives, we found only minor compatibility problems, with one exception: Pinnacle Micro's cartridges, when formatted with Pinnacle's driver, would not mount in other drives. (The Sierra drive will accept most other cartridges, however, and can use other media without difficulty.) Pinnacle claims its media provide better performance than competing disks, but our tests revealed no significant differences.

Good compatibility also means that large data sets that would otherwise fill several hard drives can be accessed simultaneously from a jukebox. Hewlett-Packard, Pinnacle Micro, MaxOptix, Optima Technology, and Olympus, among others, sell Macintosh optical jukeboxes with capacities ranging from 6.5GB to mammoth towers holding over 100GB; these units use hard-drive caches to reduce cartridge changes.

**Similar Values**

Apart from performance and compatibility, the drives were remarkably similar. One-year warranty and rapid repair policies are the norm. Four companies—Procom Technology, MicroNet Technology, Olympus, and Microtech—offer two-year warranties. (Bear in mind, however, that the products could in some cases outlast the companies themselves; some optical companies have gone bankrupt long before their disks—or even drives—go bad.) DGR, MacProducts, PLI, and Sony do not guarantee quick turnaround on drive repair, citing times closer to two weeks. For an extra $65, however, Hewlett-Packard throws in its Express Exchange 24-hour turnaround guarantee. And for $75, Transcom will ship a replacement drive overnight.

Prices are surprisingly reasonable; on average, these drives cost nearly $1000 less than 650MB optical drives did two years ago. Naturally, the least expensive...
## Optical Velocities

All times are in seconds.

<table>
<thead>
<tr>
<th>Relative Speed</th>
<th>Overall Fastest</th>
<th>Overall Slowest</th>
</tr>
</thead>
<tbody>
<tr>
<td>100% (fastest)</td>
<td>0.49 Club Mac 1.3Gig MO</td>
<td>0.49 APS 1.3Gig MO</td>
</tr>
<tr>
<td>90% - 99%</td>
<td>0.75 HP C2560A Model 1300T Optical Drive (HP)</td>
<td>0.75 Mirror Maxoptix 1.3GB (SO)</td>
</tr>
<tr>
<td>80% - 89%</td>
<td>0.93 PLI 1.3GB MaxOptical (M)</td>
<td>0.58 Mirror Sony 1.3GB (SO)</td>
</tr>
<tr>
<td>70% - 79%</td>
<td>0.94 Microtech Genesis 1300 (M)</td>
<td>0.49 APS 1.3Gig MO (SO)</td>
</tr>
<tr>
<td>0% - 69%</td>
<td>0.94 Lovel Lighting MO 1300 (M)</td>
<td>0.94 Love!! Lightning MO 1300 (M)</td>
</tr>
</tbody>
</table>

**Mechanism Key**
- HP = HPC1716T
- I = Iomega LaserSafe Plus
- IB = IBM 0632CHX
- M = MaxOptix T3-1304
- MA = Matsushita LF-7300
- N = NEC ODC141-195
- O = Optima SMO-F521-81
- P = Pinnacle OHD-1300
- S = Sharp JY-800
- SO = Sony SMO-F521-00

### BEHIND OUR TESTS

Although nearly all of the drives in this review can act as a start-up device, most people use optical drives for secondary storage. Using a Centris 650 and System 7.1 with standard extensions, we tested access speeds with a 4th Dimension 3.1 sort of 4300 records. To test reads and writes using real-world applications, we opened and saved a 3.9MB Aldus PageMaker 5.0 document and a 10MB Adobe Photoshop 2.5.1 file without compression.

### OPTICAL EXPANSION

The Club Mac 1.3Gig MO, based on a Sharp mechanism, costs only $2099 and offers excellent tech support. APS Technologies' 1.3Gig MO ($2499) is another good deal, with its excellent documentation and very good tech support. Only APS included software besides a format-ter (APS bundles various utilities and shareware) with the drives submitted for our review.

Nearly all of the drives we received have large, sturdy enclosures. Two drives are designed to be portable themselves: the Liberty 225MO 1.3G and the APS 1.3Gig MO are both small enough to be carried easily.

### The Last Word

Although Pinnacle Micro’s Sierra 1.3GB drive was the fastest in our tests, using Pinnacle’s recommended cartridges may limit your choice of service bureaus or lock you into one product—a potentially serious drawback if you rely on optical drives at service bureaus, as many users do. The Microtech Genesis 1300 is right on the Sierra’s heels in performance and offers the greater flexibility of the MaxOptix T3 mechanism. I have to tip my hat to Microtech as the overall best choice among fast drives, with its reasonable price and two-year warranty.

Considering the general quality of the products reviewed, you have the luxury of bargain hunting without nasty consequences. The six companies that sell their products direct—APS, Club Mac, Liberty Systems, Lovel! Computer, Microtech, and Mirror—all provide very good to excellent technical support. Club Mac’s 1.3Gig MO is the best choice of inexpensive drives, but the MacProducts Magic IBM 1.3 Optical at $1999 is awfully tempting.

While smaller 3.5-inch optical drives at 128MB and 230MB are still fighting for respect in the removables market, 1.3GB optical drives have arrived to replace their 650MB predecessors at just the right time. The flood of image-, video-, and sound-manipulation tools, as well as the growing data-storage needs of business and industry, have created a need for cheap, flexible archives. Better than any other medium, 1.3GB optical drives meet that challenge.

Associate lab editor TIM WARNER has used, tested, and written about optical drives and a wide range of other storage technologies for the past four years.

*Tested in standard mode. **User configurable. ***Cannot be changed.

### HIGH-CAPACITY OPTICAL DRIVES

In a market with many good options, two drives hold the right combinations of price, performance, and support.

**Best Low-Cost Solution**
1.3Gig MO Although this drive’s speed leaves something to be desired, bargain hunters will appreciate the excellent tech support and quality of this drive. **Company:** Club Mac. **List price:** $2099.

**Best Overall Performance**
Genesis 1300 Excellent performance, very good tech support, good compatibility, and a two-year warranty make this drive stand apart from the pack for demanding applications. **Company:** Microtech. **List price:** $2899.
Presenting the Holiday Gift for Our Registered Users: KPT Convolver™. A $199 Value for Just $79.95!

Super cool user interface by Kai Krause!

Three-in-one lead you to amazing filtering effects!

Incredible dual-filter axis in "Design Mode"!

Random kernel convolutions in "Explore Mode"!

Real-time preview window!

Only the ultimate power user will make it to five stars!

3-D digital scratch pad remembers what you've done!

Real-time click and drag filters in "Tweak Mode"!

Incredible new color correction controls!

No more boring cancel or OK buttons!
You must be a registered owner of an HSC product to get this incredible offer!

KPT Convolver: Just $7995*!
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*Please add $10 shipping and handling.
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1,000,000+ Filters!

Only the awesome KPT Convolver provides unheard of control over the custom kernel filter engine. Apply infinite combinations of filtering effects to your graphics! In real time! Without guessing how different effects work together! Using an incredible graphic interface designed by the master, Kai Krause!

- **Explore Mode.** Randomly shuffle kernel convolutions for startling, unexpected results. Fifteen mini-previews pop up each time.
- **Design Mode.** Incrementally adjust two different parameters of convolutions, such as hue rotation and edge detection, then instantly see 15 variations. Save hours of time experimenting!
- **Tweak Mode.** Scrub through blur, sharpen edge detection, relief level, hue, saturation and other operations in real time simply by clicking and dragging over your image. It's fine tuning beyond belief!

Happy Holidays from HSC Software and the KPT Team!

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"We have a way with worlds..."
Taming the INTERNET
Mosaic is to the Internet what the Macintosh is to personal computers. Sort of. Actually, Mosaic today represents what the Macintosh was in 1984: a little buggy, a little slow, limited in many ways—but a heck of a great idea. Mosaic tries to be a complete, graphical front end to information retrieval on the Internet, a single interface to all of the various information servers.

Traditionally, Internet users have many different tasks, and each task requires a different tool. For example, terminal emulation takes one tool, electronic mail another, and file transfer a third. When network tasks are easily partitioned, this makes sense: I log on to the mainframe to do payroll, then I check my mail. However, when the task is information retrieval, switching between tools is more a hindrance than a help because there is no separation of tasks.

Let's say you're looking for information about System 7.5. You would probably start in one of the Macintosh-oriented Internet newsgroups—for example, comp.sys.mac.system. From there, you might find out about a server at Apple Computer that talks about System 7.5. This would likely be a Gopher server—a client/server information-retrieval system that allows you to navigate menus to find information.

Gopher's strength is that all Gopher servers can be linked transparently so that users can access a large number of Internet systems without connecting to each system individually. On the Gopher server, you might find out about another server with some beta System 7.5 software. This is likely to be an FTP server—a server that uses the TCP/IP file-transfer protocol that lets you move files from an FTP server to your client across the Internet. In the traditional Internet world, you'd have to use three tools—Gopher, NTP, and TCP/IP—to accomplish one task. The goal of Mosaic is to replace those tools with a single, easy-to-use front end.

Mosaic is a client application that talks directly to Gopher servers and World Wide Web (WWW) servers—an information-retrieval system similar to Gopher except that instead of menus, WWW uses hypertext documents. Mosaic also needs helper applications; without them, Mosaic can access or use only a fraction of the information on the Internet. With these helper applications, you can view different kinds of graphics files and listen to sounds. For example, Mosaic doesn't know how to play QuickTime movies. But it does know how to send them to a helper application that can handle QuickTime. Helper applications also allow you to connect to a Telnet server—a TCP/IP virtual-terminal program that creates a terminal session across the Internet as if you were directly connected to a minicomputer or mainframe with a dedicated terminal.

What's Mosaic Like?
Mosaic is a hypertext-based information browser. If you're comfortable with the world of HyperCard, you'll probably be able to handle Mosaic. You start your Mosaic explorations by telling Mosaic which Home Page to find. Usually, a Mosaic Home Page is a HyperText Markup Language (HTML) document that is available from a WWW server or from a Gopher server.
your local hard disk. The Home Page—like any page—can have text, graphics, and links to other pages. With Mosaic, you can see the Internet as a single, extremely disorganized system. The links can point to pages on any Internet-connected system using any of the protocols that Mosaic understands: Gopher, WWW, FTP, News, and Telnet. For the Mosaic user, jumping to an Internet resource of almost any kind is as simple as pointing to the link and double-clicking.

Most Mosaic users will start off with a network-based Home Page and then graduate to their own, custom-written page with their favorite jumping-off points and network resources. Inside an HTML document are universal resource locators (URLs)—text strings that Mosaic (and other WWW clients) use to find other network resources.

URLS identify the type of resource (such as news server or WWW server), the server where the resource is located, and a pointer the server uses to retrieve the data. For example, the URL http://www.opus1.com/HomePage.html identifies a WWW server (HTTP is the HyperText Transfer Protocol, used by WWW servers) running on the system www.opus1.com and a resource called /HomePage.html on that server.

URLs point to pages on any Internet—just as the Mosaic user, jumping to an Internet resource of almost any kind is as simple as pointing to the link and double-clicking.

The Web has become the hot new place for information services. The combination of a user-friendly Mosaic client and a huge population of Internet users has fueled a growth industry for information providers.

Joys and Sorrows on the Net
With the tools we've discussed so far you can find just about anything available through Mosaic. Click on a pointer to Yale University and hear a voice read the current time. Click and get stock quotes, buy a teddy bear, see an X-rated movie, download software, read customer-support bulletins, or check on the level of a coffeemaker in Cambridge, England. Suppose you are wiring an Ethernet network using Farallon EtherWave hardware and are having problems with some Quads. Through Mosaic you can connect to Farallon's WWW server and get the latest notes on system compatibility.

This is all tremendously convenient and easy, but Mosaic is far from foolproof. For example, when you read a particular document using Mosaic, there's no assurance that the pointers to other documents are still accurate. Things change fast, and it's not uncommon to follow a particularly promising set of links only to discover nothing at the end. Mosaic also has serious problems, including implementation bugs, poor design in some places, and conceptual limitations in others. (If your network link is slow, you'll get a poky response, but that's not Mosaic's problem.) Many of these flaws will never get fixed in the public domain versions of Mosaic, but they have not kept Mosaic from becoming one of the most popular Internet browsers and spurring the development of commercial products in search of the ultimate Internet interface.

Where to Get Mosaic
Mosaic was developed as part of a continuing series of projects at the National Center for Supercomputing Applications (NCSA), located at the University of Illinois at Champaign-Urbana. NCSA is a
research center in the area of computational science, a style of scientific investigation that blends computers (and supercomputers) with more traditional laboratory and theoretical science. In keeping with this charter, NCSA has found itself writing a suite of software tools to help scientists acquire, analyze, and visualize data.

The freeware version of Mosaic is widely available on the Internet (anonymous FTP to ftp.ncsa.uiuc.edu will get you started), with the helper applications ranging from freeware to shareware. By the time you pay the fees and send in the postcards for all the helper applications, you'll be out about $50 and 6MB of disk space. Mosaic isn't just disk-hungry, it's also memory-hungry. Mosaic wants 3MB of memory, and the helpers will take even more. To use Mosaic, you need TCP/IP access. You can obtain this either via SLIP (serial line internet protocol) or some more powerful linkage, such as being on a school or workplace net that has a direct Internet connection (see "How to Ride the Internet," Macworld, August 1994).

NCSA has licensed Mosaic to Spyglass, which claims that it will "toughen up [Mosaic]" to commercial quality. Spyglass won't sell directly to users, though. It plans to sublicense Mosaic to others. For example, Digital Equipment Corporation has announced that it has bought rights to the Spyglass version of Mosaic and will be including the software with all of its new personal computers. Spyglass expects Macintosh network software vendors to include Mosaic in their commercial products by the beginning of 1995.

Mosaic is already up against committed competition. Microelectronics and Computer Technology Corporation, the Austin, Texas-based technology consortium, has a similar product (MacWeb), which is free to noncommercial users and available via anonymous FTP to ftp.einet.net. The original authors of NCSA Mosaic have also taken off to form their own for-profit enterprise, Mosaic Communications, which hopes to have products available early next year. They have been joined by former Silicon Graphics exec Jim Clark, and should be a formidable player.

The Last Word
The idea of a single interface to the chaos of the Internet is so attractive that users are ready to hail Mosaic as the salvation of the Net. Mosaic is a great first attempt—with a great number of flaws. Mosaic doesn't work with many FTP servers; it has a poor interface to Usenet news; it doesn't allow users to see what they're about to click into.

Even if Mosaic were perfect, the chaos problem remains. A key characteristic of the Internet is anarchy. There are no guidelines or central registries for information services. Because most of the information available on the Internet is the product of volunteer effort, we're left with a mishmash of services, systems, tools, and access methods. For the little corners that are well organized, Mosaic is just one piece in the overall puzzle of the Internet.
NEED TO SEND OR RECEIVE FAXES WITH YOUR MAC? INTREPID CONSULTANT MAX LEFACQUES OFFERS PRODUCT PICKS AND TIPS.

"I'm Max LeFacques," said the trim, bow-tied little man in the doorway. He offered his hand with a flourish. Terry Trueblood, 25, freelance writer, shook it with a worried look.

"I can't afford another phone line, and I can't afford a fax machine," Terry said. "But I need to fax. Can you help me?"

"I'm a fax consultant, miss," he replied, stepping neatly over the threshold. "It's my job."

Faxing for One
As Max LeFacques has always been fond of saying, in a perfect world there would be no faxes. Everybody would own a Mac and a modem to transmit files to one another, instead of sending only pictures of files—faxes. But in today's real world, LeFacques figured out early on it was up to him to make sense of fax modems, fax software, fax printers, fax switchers, and even fax "answering machines" for his Macintosh-enlightened clients. Like Terry Trueblood.

Max looked around: a basic home office, with a Quadra 605 on the desk, a telephone, a row of power outlets.

"If your faxing needs are light, Miss Trueblood, perhaps you don't really need to do your faxing yourself. You can simply send E-mail to CompuServe or America Online, and for a dollar or two they'll forward it as a fax. No long-distance charges, either."

"Oh no, Max; I want my letterhead to appear on my faxes."

"Ah. Well, even in that case, Miss Trueblood, you don't need a fax machine," he said, briskly unsnapping his immense stainless-steel briefcase. "What you need is a fax modem."

He extracted a silver box the size of a paperback book and connected it to her Mac. "You see, a fax modem receives..."
incoming faxes automatically in the background; your Mac will scarcely slow down." He installed the fax software on her Quadra. "When you get a fax, you can read it on the screen, save it, trash it, or print it. No curly fax paper for you, m’dear!" And sending a fax is just like printing, really. You create a document, issue the fax command, and your fax is on its way. What’s more, you can schedule faxes to go when phone rates are lower.

Terry was glad to learn that fax modems start at about $125—real fax machines start at $300. And Max mentioned that faxes sent by fax modem look better than traditional faxes because they’re never scanned in by some fax machine’s cheap lens.

"Now, many fax modems come with skimpy software, but you’re not stuck with what comes in the box. For example, FaxPro for Macintosh ($129; Delrina Corporation, 408/363-2345) can transmit gray shades, such as photos, and can antialias faxes on-screen for easier reading. If you want more information about third-party fax software, I’ll fax you David Pogue’s Desktop Critic column from the October 1994 issue of Macworld.

"Meanwhile, this will work beautifully for you," said LeFaeques, completing his installation, "though unless you add a scanner you can’t fax anything that’s already on paper, of course—only documents you create on the Mac.”

**FIVE FAX TRIK**

The world is filled with fax devices: Class I, Class II, Group II, Group III; manual, automatic; fax modems, stand-alone fax machines. But it is possible to get your Mac to work with all of them. Here are some tips on making faxing less taxing.

1. **The GeoPort.** If you have a Macintosh Quadra AV or a Power Mac model with an Apple GeoPort Adapter ($129; 408/996-1010), which is supposed to take the place of a fax modem, you probably already know that the Adapter can be a problem. Get the latest version of its software—Express Modem version 1.5 or later, which takes care of the bugs—and make sure that you get the correct version for your computer. The Quadra AV, Power Mac, and PowerBook series each use different versions.

2. **Power Mac problems.** The Power Mac’s modem port has some problems. The one you hear most often mentioned is the "latency" problem: when receiving a fax, the port delays communication so long that the sending fax machine gives up and disconnects. Solution: Try connecting the GeoPort Adapter or fax modem to the printer port instead of the modem port. Or use fax software that solves the problem, such as version 1.5.1 or later of Delrina’s FaxPro.

3. **Unreliable faxing and system freezes.** Fax software is temperamental, and more so when confronted with other fussy software, especially system extensions. You can use a program like Conflict Catcher II to figure out which extension doesn’t like your fax software. Meanwhile, here’s a head start. Get rid of out-of-date copies of Adobe Type Manager, Symantec’s Suitcase, and Berkeley Systems’ After Dark. Make sure you have only one company’s fax software installed.

4. **EPS graphics.** If you try to fax a document that contains a PostScript or EPS graphic image, you’ll get a blobby mess or nothing at all. Here are four solutions: (a) make a printout and fax it; (b) get a PostScript fax card for your laser printer; (c) import the graphic into a draw program, save it as a PICT file, and fax that; or (d) use T-Script ($145; TeleTypsetting, 617/734-9700) to convert the document into a TIFF file, which will fax.

5. **QuarkXPress 3.3.** Faxing from QuarkXPress 3.3 is rarely successful, even with no embedded EPS files. While Quark is developing a bug-fix, here’s a workaround. Choose your printer, issue the Print command, and then cancel the print job. Now select your fax modem in the Chooser and try again. It should work this time.

Terry nodded, uncertain. “But I only have one phone line,” she said. “Won’t I have to unplug this thing every time I want to make a phone call?”

LeFaeques reached into his shiny case yet again. This time he extracted a device shaped like a ham-and-cheese sandwich. "Most people use something like this gadget," he said. It was an Automatic Fax Switch from Radio Shack ($79.99; item number 43-1241). LeFaeques explained that the switcher intercepts your incoming calls and listens for the presence of those loud, long fax-calling beeps known as CNG (Calling) tones; if the switcher doesn’t hear them, it assumes a live person is on the line and rings your telephone.

"Unfortunately," LeFaeques continued, “some older or cheaper fax machines don’t produce CNG tones. The sender must press a Start button when the receiving fax machine answers. So your fax modem won’t answer until the switcher hears CNG tones—and the sending fax machine won’t send the CNG tones until it’s connected to a fax machine! The same drawback, he told her, applies to Silent Answer, a built-in voice/fax switcher in such PSI or Supra fax modems as the SupraFaxModem 144LC ($169.95; 503/967-2410). Silent Answer eliminates the need for an additional gadget, but it does not recognize non-CNG fax machines.

“The alternative,” he said, holding up a second sandwich-size box, “is this.” It was the DLE-300 Fax Switch ($120; TT Systems, 914/968-2100). “This listens for calling tones, too, but it starts listening after you or your answering machine picks up the phone. If it hears CNG tones, it switches the call to the fax modem. If some old fax machine calls and doesn’t make CNG tones, you’ll answer the phone and hear silence. At that point, either you or the sender can dial #1, and the DLE-300 will route the call to your fax machine.

"This setup will work like a charm," he said, shaking smartly. "Just remember to include the instruction ‘Press #1 to send a fax’ on your answering-machine message.”

Terry Trueblood shook his hand gratefully. "Oh, thank you, Consultant LeFaeques! Are you going to leave me an invoice?”
LeFacques stood in the doorway, his fedora at a rakish angle. "I'll fax it to you, miss," he said, and then he was gone.

The Network Fax Story

The consultant's next stop was at a small office. Harvey Fiddler, the nervous, teapot-shaped network administrator, was nearly hysterical. "I got ten people on this network, OK? So I buy ten fax modems—we're talking 1500 bucks, OK? And guess what? They don't work on our PBX phone system! So now we gotta install a standard, non-PBX phone line for every desk—another $2000, plus $350 a month. Help us, fax man!"

"I hope you kept the empty boxes," LeFacques said sternly, tugging at his bow tie. "You'll have to return the modems."

He rummaged briefly in his big stainless-steel briefcase. "Here you go, Mr. Fiddler," he said. He handed Harvey a OneWorld Fax server ($999 for one-line model; Global Village Communication, 415/390-8200). "Plug this into your network and install the software on all ten Macs. Then everybody can send faxes at once; this little gadget oversees sending them in the proper order. And it doesn't require a dedicated Mac. It's simple to set up, too."

Harvey Fiddler looked at the gadget suspiciously. "Does it receive faxes?"

"No, I'm afraid not," said LeFacques. Fiddler looked uncertain, so LeFacques went on: "OK, well, how about this instead?"

He pulled out a FaxPro II ($550 for server software-only version, which supports unlimited users per zone and is compatible with about 50 popular modems; $999 with a 14,400-bps modem; Cypress Research Corporation, 408/752-2700). "It's a genuine network fax system. You install the software on a Mac that somebody actually uses, but it would slow down a lot whenever a fax goes out. Now everybody can send faxes when it's convenient. The server Mac stores outgoing faxes and feeds them to the phone line in order." (PSI Network is similar and works with most modems; $99 for server software plus $199 for five users or $299 for ten.)

"FaxPro and PSI Network give you three choices," came the reply. "Faxes can go directly to the printer. They can be stored until an administrator reads them on screen and forwards them. And both products come with OCR software that can read the beginning of the fax and figure out who it's to, although I can't say it works very well."

Fiddler liked it. "We'll set it up to print incoming faxes, and we'll distribute them from there," he said.

"Fine," said LeFacques. "Just two words of advice. First, be sure your server Mac has every font your staff uses. If you image the faxes on the server, they'll look terrible without the right fonts available. My second tip: you said you're going to have your incoming faxes print automatically. Send them to a QuickDraw printer, like a StyleWriter—they'll print many times faster than they would on a PostScript printer."

"Oh—speaking of PostScript," interjected Fiddler, "our art department is having a terrible time trying to send Adobe Illustrator graphics using a fax modem."

"It's true," said LeFacques. "Fax modems are allergic to PostScript; they usually just send a black square. Or they crash. You need a laser printer with a PostScript fax card, such as Apple's LaserWriter Select 360 PostScript Fax Card or the LaserWriter Pro 810 PostScript Fax Cartridge ($309 each; 408/996-1010). With a PostScript fax card on each end of the call, your artists won't really be sending faxes at all: they'll be sending PostScript files by phone. The images print.
out at the other end with the full resolution of the recipient's laser printer.

"So we have to have a PostScript card, and the other guys have to have one too?" asked Fiddler.

"For best results, yes," said the consultant. "But you could use one just on this end. The Illustrator files will print only at fax-machine resolution when they arrive, but at least they'll print."

Fiddler thanked him and then scurried off and went to pack up the ten useless fax modems.

**Have Fax, Will Travel**

Max LeFacque's third client of the day was no picnic: Tiny McKee—a broad-shouldered, six-foot-five, and in no mood for small talk.

"I'll put it to you straight, Max," Tiny said. "I live my life on planes, and I do my business by fax. But I got a problem."

"Let me guess, sir," said LeFacque. "When you're on the road, you have no way of reading faxes sent to your office."

He reached for his big silver case. "Then this Cellular/Data Link will fit the bill," said Max, holding up a gray appliance. "It's a futuristic-looking appliance. It was the Vomax 2000 ($370; Macronix, 408/453-8088). "A marvelous device," he explained. "It's a 14,400-bps fax modem, as well as a digital answering machine for voice and faxes. It can store 20 minutes of phone messages and 50 pages of faxes (for $150 you can quadruple its capacity). You can dial in from the road and retrieve them or have them forwarded to another number. You can even have the Vomax call you, at a number you specify, when messages come in. When somebody answers its call, the Vomax says, 'Please put Tiny McKee on the line; he has messages. You'll look great at parties.'"

LeFacque pulled a second, equally odd-looking device out of his case. "Or there's this: the Fax Recorder 800 ($299.95, TT Systems). "This one's just a fax-answering machine—no voice answering. It stores up to 60 pages until you get home, or you can dial in and give it a number where you want faxes forwarded." He patted the box. "Another benefit: if your real fax machine jams or runs out of paper, the Fax Recorder intercepts faxes until you can fix it."

"My fax software will be ready by the time it's ready to receive, the sending fax machine will have given up." LeFacque considered this. "Well, most fax machines will attempt to resend if there's no answer. But we could add this." From his pocket he extracted a copy of Conflict Catcher II ($79.95; Casady & Greene, 408/484-9228).

"An extension manager? How's that gonna help?"

"Easy. We create a minimal set of extensions that includes only your fax and ARA software. When you go on a trip, select that fast-loading set to run when the PowerKey Remote turns your Mac on. When you get home, you boot up holding down the hot key you've chosen to reactivate your full set of extensions."

**ARA versus Fax**

The huge man was impressed but not satisfied. "Nice try, Max. But it's still not gonna work. My fax software will be running in the background, answering every incoming phone call. So when I call in with ARA to look at my faxes, the fax software will intercept the call."

For the first time, Max LeFacques was worried.

"Well, that's true," he rummaged frantically through his silver case while Tiny puffed on his cigar. "That's why they invented LineShare," he announced triumphantly (LineShare [$79; Stalker Software, 415/927-1026] works with Class 2 fax modems, which rules out Global Village modems). "LineShare runs in the background watching your modem port, ready to analyze calls and route them to ARA or your fax-modem software, as appropriate."

"I'm impressed. OK, one more: what if I need to fax something from a site where there's no phone lines?"

"You carry a cellular phone?"

"Of course, fax man."

"Then this Cellular/Data Link will fit the bill," said Max, holding up a gray adapter the size of a Mac mouse ($249; Ora Electronics, 818/772-2700). "It plugs in between your cellular phone's power jack and your modem's phone-line jack."

"You're amazing, LeFacque," said Tiny, leaning back in his chair.

Max LeFacque flipped his hat expertly onto his head. "I know," he said. And with that, he was gone.

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Got a Problem? Get Online

Graphic artists who live and work outside major metropolitan areas have few opportunities to exchange information, share tips, or keep up with the latest hardware and software releases. With that in mind, a group of artists in the Midwest have launched a national computer network, Regi, specifically for graphics professionals.

At the core of Regi are help documents written by graphics experts for users of QuarkXPress, Adobe Illustrator, and Adobe Photoshop. Subscribers with a technical question can perform keyword searches to locate the document that may contain the solution to their problem (Boolean logic isn’t supported, however). After logging on, for instance, a QuarkXPress user with a technical question could click on the Library icon, where the help documents are stored, then click on the QuarkXPress folder. Within that folder would be at least four other folders: XPress FAQ (Frequently Asked Questions), XPress Troubles, XPress Quick Tips, and Glossary. At this level you could perform a keyword search or browse any of the folders directly. If all else fails, you can post a question in Regi’s Blackboard forum; a Regi staff member who uses the program you’ve inquired about will post the answer.

In addition to help documents, Regi offers an online glossary of technical terms and a trade-show calendar. Regi costs $19.95 per year; flat online service fees are 35 cents per minute. There are no local access or toll-free numbers for logging on, however, and currently the network offers no Internet access. Regi supports modem speeds up to 19.2 Kbps. The DCS 460 includes Kodak’s digital-camera back affixed to a Nikon N90 SLR camera. The 460 includes a 3060-by-2036-pixel CCD and captures 36-bit color images, which the camera’s Photoshop plug-in module resamples into optimized 24-bit image files. A spokesman said, however, that Kodak is working on revising the plug-in so that users can obtain full 36-bit graphics files, for use in applications such as HSC Software’s Live Picture; that capability should be available when the DCS 460 ships in early 1995.

Like the recently introduced DCS 420 (see Graphic News, September 1994), the new Kodak camera stores images on Type III PCMCIA cards; a 200MB card will hold 33 images, according to Kodak. The camera doesn’t ship with a PCMCIA card, however. Shutter speed is one image every 12 seconds after warm-up; unlike many high-resolution RGB cameras, the DCS 460 captures each image in a single shot. A standard SCSI interface links the camera to a Mac. Eastman Kodak, 800/242-2424.—J.A.M.

35mm Digital Camera

Eastman Kodak has announced its latest digital camera—the DCS 460, a single-shot, color, portable device capable of capturing images with up to 6 million pixels. Kodak claims the DCS 460 (with a suggested retail price of $27,995) is the first 35mm single-lens reflex (SLR) digital camera capable of capturing images at such high resolution.

The DCS 460 includes Kodak’s digital-camera back affixed to a Nikon N90 SLR camera. The 460 includes a 3060-by-2036-pixel CCD and captures 36-bit color images, which the camera’s Photoshop plug-in module resamples into optimized 24-bit image files. A spokesman said, however, that Kodak is working on revising the plug-in so that users can obtain full 36-bit graphics files, for use in applications such as HSC Software’s Live Picture; that capability should be available when the DCS 460 ships in early 1995.

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**Doing 3-D in a 2-D World**

A new version of Alias Sketch offers more than 30 new features and a redesigned interface that lets artists create 3-D objects in an environment that simulates 2-D work methods.

The powerful new pen tool lets you draw perfect arcs, draw lines to create any kind of 3-D shape, and build a 3-D profile from any drawn path. You can also draw on the surface of a 3-D object, such as drawing a label on a bottle; your path automatically conforms to the object's 3-D plane.

You can align and blend objects, and you can join them by drawing a line between them. You can apply a mask to a texture map; you can also use masks to apply transparency, color blends, and bump maps.

Other new features include the ability to render or rerender any part of an image (a major time-saver); lofting; beveling; cutting holes in curved surfaces; true depth of field; and polygon support for export to animation programs. Sketch supports EPS, PICT, TIFF, DXF, IGES, and RIB formats. Sketch’s newly reduced price—$695—includes SketchNet, a distributed rendering application, and RenderQ, a batch processor; upgrades are $199. Alias Research, 416/362-9181.—CATHY ABES

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**Better Textures through Genetics**

![Alias Sketch's curve-on-surface capabilities let you draw directly on curved objects, which can be used as holes or as profiles to loft together.](image)

Rain Drop is among the 500-some textures that ship with Virtus Corporation's Alien Skin.

Better Textures through Genetics

Everywhere you look lately, there's another program or plug-in that lets you create an endless array of textures for your images. The latest entry, Alien Skin, from Virtus Corporation, adds a few twists to the genre. For one, Alien Skin is both an Adobe Photoshop-style plug-in and a stand-alone application. And unlike Xaos Tools' Terrazzo and Specular International's TextureScape, it works only with the mathematically defined textures (about 500) supplied with the program.

Alien Skin produces scalable resolution-independent texture tiles in RGB or CMYK. To create a new texture, you choose one of the presets, move a slider to set the Mutation rate, and click on the Mutate button. You'll get 12 new tiles, each a variation of the original; you can even "mate" two existing texture tiles.

Alien Skin lets you generate height maps for 3-D textures; it also supports transparency, light, and darker modes. The $99 program, optimized for the Power Mac, is due to ship in October. Virtus Corporation, 919/467-9700.

—CATHY ABES

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**Bitstream's Portable Font Technology**

For something that comes in a suitcase, Macintosh fonts aren't very portable. Unless the sender and receiver of a digital document have the same fonts, problems will arise. Although several products have tried to tackle the font/portability problem (among them Adobe Acrobat and Farallon's Replica), none have been universally accepted.

Bitstream hopes to change that scenario with TrueDoc, a tool that will allow software developers to add font portability to their applications. TrueDoc, which is platform- and application-independent, consists of three major components: Character Shape Recorder, Portable Font Resource, and Character Shape Player.

Character Shape Recorder reads Type 1 PostScript or TrueType character outlines, curve-fits the character shapes, and generates hints. This information is stored in a compressed format called the Portable Font Resource, which can be attached to a document and sent along with it. When the recipient wants to view the document, Character Shape Player rasterizes the characters, producing a high-fidelity version of the original document.

No Hands Software has licensed the TrueDoc technology for a new release of Common Ground. Rather than imaging fonts at a fixed set of resolutions, as the earlier version did, Common Ground 2.0 allows the user to zoom in and view characters at any resolution. In addition, the new version supports printing at resolutions higher than 300 dpi. Common Ground 2.0 is expected to ship for the Macintosh later this year. Bitstream, 617/497-6222; No Hands Software, 415/802-5800.—ERFERT FENTON
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.

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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.

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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.

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To keep data loss from casting a glow on the office landscape, call 1-800-628-4777, ext. 9FF1. If you own Norton Utilities and SAM, you can order upgrades for $39.95 and $29.95 respectively. Or you can purchase the new versions at your software store.

Peter Norton has always been well ahead of the pack when it comes to desktop data recovery and antivirus protection software.
by Cathy Abes

Artist: Steve Campbell is a San Francisco-based digital artist who has been a prizewinner in the MicroPublishing News/3M Digital Art Contest for the past two years. His work will appear on the Expo '94 CD that accompanies Fractal Design's Painter 3.0, and in The Painter WOW Book, to be published by Peachpit Press in spring 1995.

How It Was Done: This image was designed to illustrate this month's feature about the Internet. Since he doesn't have a scanner, Campbell first made a video grab of his rough pencil sketch. After turning it into an EPS file, he placed it in a two-layer Illustrator file, where he built the foundation of the image, defined the areas of color, and created various masks that he would later use in Photoshop. After placing the EPS file on the background layer, he locked the layer and dimmed the placed image so he could trace it on the top layer without accidentally changing it. After drawing the circus performers with the pen tool, Campbell used the Scribble filter to create a ragged-edge effect, while deselecting some areas of the figures so they would retain a clean edge.

Before importing the image into Photoshop, he created three separate masks for the tornado shape. To keep each of the mask files the same size as the original art so they could be composited in Photoshop, he applied a white fill with no stroke to all the paths except the area making up the mask, which was filled with black. Unfilled, stroked paths were stroked with white at the same point size as their color counterparts.

After importing the illustration and its masks into Photoshop, he applied several gradations to define the edges of the tornado and to create a transparent effect over the circus ring. Next he imported the file into Painter, where he defined more masks and applied a number of effects, including several paper textures he'd created, Paint Alchemy textures, Painter's Distorto brush, and the Lighting command to the tornado.

Hardware: Macintosh Centris 650 with 36MB of RAM and 80MB internal hard drive; RasterOps 245STV video board; Sony CCD-V101 high-band video camera; Wacom UD-1212 pressure-sensitive tablet; two external 120MB hard drives.

Software: Adobe Illustrator 5.1; Adobe Photoshop 2.5.1; RasterOps Mediagrabber Photoshop Plug-in; Fractal Design Painter 2.0 with Painter X2; Ray Dream Designer 3.0.4; Xaos Tools' Paint Alchemy 1.0; HSC Software's Kal's Power Tools 2.0.
The custom brush the artist created in Paint Alchemy with Internet-related text using two shareware fonts: Attic Antique by Three Islands Press (for the word WAIS) and Harting by David Rakowski (for the words TCP/IP and Gopher).

To create the whirling smears, Campbell designed a custom variant of Painter's Dirstorto brush. He reduced the penetration level in the Brush palette to 17 percent, reduced the brush size, made adjustments in the Brush Behavior palette to accommodate the new brush size and maintain a constant stroke, and set Size, Penetration, and Concentration to Pressure in the Expression palette.

First he used the brush within areas at the edge of the shape, picking up the colors already incorporated into the artwork.

Next he extended the selection into the white background using Painter's frisket tool and reapplied the same brush using white as the foreground color, while picking up the background color from the artwork.
Pollution Solution.

This symbol identifies energy-efficient computers that save you money and reduce air pollution by "powering down" when not in use.

Over 2000 computers, monitors and printers have earned the right to bear the Environmental Protection Agency's Energy Star logo. These computers are so smart, they go to sleep when not in use and wake up with a simple touch of the keyboard or mouse. Energy Star Computers don't cost any extra, will save money on your energy bill, and prevent pollution from electricity generation. Be part of the solution and look for this logo when you make your next computer purchase. To receive a list of available products call the Energy Star Hotline at 202 775-6650.

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So, in an industry that changes every second, it's reassuring to know that Macworld continues to be the Best Computer Magazine and the Macintosh authority.
Better Help in ClarisWorks 3

Claris's all-in-one integrated application, ClarisWorks, is being upgraded to version 3.0. Where Microsoft went for accumulating new capabilities with the recent 4.0 release of its head-to-head competitor, Microsoft Works, Claris is focusing on improving access to its contender's features.

ClarisWorks 3.0's major innovation is what the company calls Claris Assistance Technology, which walks users through certain complex tasks, including creating footnotes, tables, envelopes, and labels; designing newsletters; and making presentations. Claris Assistance Technology will appear later in other Claris applications. The other major innovation in version 3.0 is an open architecture that makes it possible for third-party developers to create ClarisWorks add-ons; for example, the footnotes feature cannot generate a bibliography, but someone could write an add-on that would. ClarisWorks 3.0 should ship in native Power Mac and 680X0 versions in October. The list price will drop to $129 from version 2.0's current $299. Claris, 408/727-8227.

Acrobat's New Act

Adobe Acrobat is getting a major upgrade that includes permission for users to distribute, with no licensing fee, the Acrobat Reader utility required for viewing Acrobat files. Adobe is also making other changes that suggest a broader marketing strategy for the electronic-document-creation system.

Acrobat 2.0 comes in several versions. Acrobat ($195) includes PDF Writer, the application that creates Acrobat documents, and Acrobat Search, a text-searching add-on based on Verity's Topic engine. Acrobat Pro ($595) adds Acrobat Distiller, which is similar to PDF Writer but can process 24-bit color and PostScript files such as QuarkXPress and Aldus PageMaker documents. Acrobat for Workgroups ($1595) includes a ten-license version of Acrobat. (It also comes with Acrobat Catalog, the program required to index text for Acrobat Search, but Catalog runs only under Windows; networked Macs can send Acrobat files to Catalog on a Windows server.)

In addition, the version 2.0 products can scroll automatically to article jumps; give each person annotating a document a distinctive note style to make the authors easy to identify; and provide password protection to control who is allowed to read, annotate, copy, or print documents.

Work Scheduling Made Easy

Time Domain's WorkTime is new software intended to solve a gnarly old problem: scheduling workers. Unlike project-management software, which is used to make sure that the correct human and material resources are designated to keep a project on schedule, WorkTime is designed to establish work routines for shift workers—clerks in retail stores, nurses and doctors on the hospital floor, welders on the assembly line, and so on.

The manager creates profiles for the
FolderBolt Adds Network Support

KENT MARSH IS UPGRADING FOLDERBOLT with control of folders on AppleShare volumes or available through Apple's file sharing. This makes it possible to control access to your documents residing on a colleague's machine or the office server.

Besides completely locking folders against unauthorized access, FolderBolt Pro can create drop folders and read-only folders. FolderBolt Pro also adds the encryption capabilities of Kent Marsh's CryptoMatic, sidestepping federal restrictions on security software exports by making each encryption algorithm a separate, removable module. Foreign developers (or third-party U.S. developers) can add new encryption-algorithm modules to the product. Self-decrypting files can be created and then decrypted overseas without violating restrictions, although the overseas user must somehow be provided with secure access to the correct password.

Multiple copies of FolderBolt Pro can run on one Macintosh, so you might protect work documents with a copy that the system administrator could crack, and protect personal documents with a copy that only you could open. FolderBolt Pro lists for $129.95. Kent Marsh, 713/522-5625.—D.L.

Cash: The Ebb and Flow

EVER WONDER IF YOUR BUSINESS will have the cash to open that new sales office in Miami next quarter, or if you'll be able to meet the monthly payments on your SBA loan? An Excel add-on called BottomLine can help answer such urgent business questions by forecasting cash flow for up to a year.

BottomLine 1.1 runs inside Microsoft Excel 4.0 and can read accounts receivable and accounts payable information from text files, FlexWare accounting databases, and, of course, Excel files. (An upcoming version, slated to ship soon after Excel 5.0 ships, will also read Great Plains and dBase/FoxPro files.) BottomLine prompts you to enter estimates such as when you expect to post receivables and how much bad debt you'll have to write off, and it then projects best-case, most-likely, and worst-case cash-flow scenarios. BottomLine can produce about 25 different reports and charts that highlight its projections. BottomLine lists for $186 from end-if Software, 916/671-6700.—D.L.

4D Broadens Connectivity

ACI US IS EXPANDING THE OPTIONS available for 4th Dimension users who need to share data with mini-computer databases. 4D Passport and 4D Multi Passport, which replace ACI US's earlier connectivity products, provide tools for developing and deploying links between 4D databases and SQL platforms, including Oracle, Sybase, and DAL-compliant databases.

4D Passport provides tools for creating and managing reusable libraries of code and for documenting programs. 4D Multi Passport lets several developers collaborate on creating a database. It manages object locking and revision control automatically, so programmers don't have to go through checkout and check-in procedures, and it includes a 4D compiler.

4D Passport lists for $6000; 4D Multi Passport lists for $15,000 for three users; users can be added at additional cost. Both packages come with one SQL connection for either Oracle, Sybase, or DAL, and applications created with either version can be distributed to end users with no licensing cost. Both products are available. ACI US, 408/252-4444.—D.L.
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"Best Display Products" (Computex/Byte, Taiwan).

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So how did we get so big so fast? Simply by giving you more for less. For more information, call your nearest CTX office.
Secrets of the StyleWriter

APPLE'S STYLEWRITER FAMILY OF INK-JET printers has ably addressed the needs of students, small-business owners, and home-office workers for several years now. Built around compact printing mechanisms made by Canon, the StyleWriter II and the new Color StyleWriter Pro each provides a happy marriage of excellent output quality and economical operation. The StyleWriter II prints 360 dots per inch and sells for approximately $289; the Color StyleWriter Pro has the same resolution and sells for around $629.

The StyleWriters' small size is a big bonus for cramped home offices or dorm rooms, and weighing only 7 pounds and fitting easily in a briefcase, the StyleWriter II even makes a good portable printer. (It doesn't run on batteries, but it is faster and delivers better print quality than the Portable StyleWriter.)

One reason a StyleWriter is cheap and petite is its ink-jet printing mechanism, which is simpler and smaller than laser printer engines. But ink-jet printing brings its own liabilities: ink-jet printers are more finicky about paper than their laser counterparts, and print quality can vary with humidity and temperature.

Another reason StyleWriters are inexpensive is that they're QuickDraw printers, using your Mac's processor and its QuickDraw graphics architecture to image pages. (Most laser printers are PostScript-based and contain their own processor.) This slows performance and interferes with compatibility with some PostScript applications.

In short, living with a StyleWriter means making some compromises in output quality, performance, and compatibility. You can't escape these trade-offs, but you can do a lot to minimize their impact.

Choosing and Using Paper

Ink-jet printing is a messy business. In a StyleWriter II, streams of water-based liquid ink gush from tiny nozzles onto the paper, and paper quality is the factor that most affects output quality. Cheap photocopyer bond works well for laser printers, but for ink-jet printing, its coarse fibers soak up the ink before it dries, creating mottled-looking output (see "StyleWriter Output").

You can get better results by using a smooth-surfaced, high-quality laser bond such as Hammermill's Laser Print (800/242-2148). Better still, use paper that's designed for ink-jet printing, such as InkJet Ultra and InkJet Cotton (available from PaperDirect, 800/272-7377). Most computer- and office-supply houses sell similar stocks.

Because of its textured surface and high cotton content, high-quality water-based marked bond—the kind of paper often used for corporate letterhead—can deliver disappointing results with StyleWriters. One workaround is to print a business letter on plain stock and then photocopy it onto your letterhead.

When paper is manufactured it is sandwiched between a wire mesh and a felt belt, which gives each side different characteristics. The felt-belt side is smoother than the wire-mesh side and generally yields sharper ink-jet output. But how to tell which side is which? Most manufacturers indicate on the wrapper which side to use for printing. If there is no indication, print some tests and keep track of which side is up—you'll see that one side has a slightly different look.

Thinking about Ink

A StyleWriter II's disposable print head contains about an ounce of ink. Because the ink's pigments are water soluble, StyleWriter output can smear easily before it dries—or after it dries, if it gets wet again. Your pages may not be exposed to raindrops very often, but your envelopes might, so to protect the address on an envelope, cover it with a piece of transparent tape. If you are printing something that will be exposed to moisture, you can improve durability by spraying it with clear artist's fixative, such as Krylon Crystal Clear.

Apple says a StyleWriter II ink cartridge is good for about 500 double-spaced text pages. When the ink is spent, you throw away the cartridge and buy a new one. Or do you? The cartridge's components are good for more than just a few hundred pages, and if you can squeeze more ink into the cartridge, you can also squeeze more pages out of it.

In the StyleWriter's early days, some people used syringes to inject spent cartridges with fountain-pen ink. Things are a bit more civilized now, and several companies sell refill kits. I tested the JetInk kit ($15.99; Bottom Line Distribution, 512/892-4070), which comes with two refills (by comparison, one StyleWriter II ink cartridge sells for about $23).

Refilling is easy, but be careful: on my
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Circle 132 on reader service card
Because the StyleWriter uses a liquid ink, it relies on good quality paper more than does a laser printer with its dry toner.

### New Sales by District (1993 vs. 1994)

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- **Good** StyleWriter II output doesn’t look half bad, even on porous, low-quality paper.
- **Better** The StyleWriter II produces better output on paper with a harder finish.
- **Best** Laser printers use a finely ground plastic instead of ink, so there are no wrinkles or smearing.

First try I trashed a favorite T-shirt. The first few pages you print with a refilled cartridge will be disappointing, but things improve after a few cartridge cleanings—click on the Print dialog box’s Options button and then check the Clean Ink Cartridge Before Printing box. I couldn’t distinguish between output created with a fresh cartridge and a refilled one.

But is it worth the trouble? It does cost less, and if you’re on a tight budget, the answer is probably yes. But don’t think you’re doing the environment any favors; a refill kit contains about as much cardboard and plastic waste as a new cartridge does. (Refilling the larger cartridge used by laser printers, on the other hand, does cut down on waste.)

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Circle 89 on reader service card
The Color StyleWriter Pro is Apple's second ink-jet color printer but its first good one. The Color StyleWriter Pro uses a 360-dpi Canon mechanism with a driver that provides network sharing and excellent color-rendering features.

Here are a few tips to get the most from it:

- A bug in the Color StyleWriter Pro driver affects Macs with more than 32MB of free memory. To work around this, run enough programs that you are left with less than 32MB of RAM free, or use the Memory control panel to create a RAM disk that takes up the right amount of memory. Apple plans to fix this bug in a future release of the driver, but no ship date has been announced.

- To get Postscript output from a Color StyleWriter Pro, use StyleScript ($149; GDT Softworks, 604/291-9121). StyleScript is an actual Adobe PostScript interpreter that GDT has tweaked to work specifically with the Color StyleWriter Pro.

- The Color StyleWriter Pro has an array of indicator lights that illuminate or flash in various patterns when a problem exists. Trouble is, the printer's manual doesn't tell you what each pattern means. I've posted this information in Macworld's forums on eWorld and America Online.

- The ink cartridge is broken-in, too, when paper dust and fibers clog the ink nozzles. Clean Ink Cartridge Before Printing also prevents clogging. During the cleaning, the StyleWriter II wipes the ink nozzle tips, caps the ink cartridge with a rubber cover, and then pumps a small amount of fresh ink into the nozzles. The entire job takes about 13 seconds.

- One final ink tip. Remember my T-shirt? Before transporting a StyleWriter, always remove the ink cartridge and put it in a zip-top plastic bag.

**Driver Details**

All printers require driver software—files that live in the System Folder's Extensions folder and tell the Mac how to talk to specific printers. It's always a good idea to keep an eye on the latest developments in your printer's driver.
Color is color, unless you're breaking the rules.

Then you need Phaser™ Color. To give fresh ideas their best shot, print your comps on a Phaser 300i. It's that simple. It prints rich, vivid color on any paper you've spec'd for the job, text or cover. Load it for full-bleed tab or postcards. Then print both sides. It prints a page a minute on the paper of your choice for about 30¢, and processes images at RISC-speed. It serves PCs, Macs, workstations and networks simultaneously. And it's from Tektronix, a Fortune 500 leader, where quality in workgroup color printers starts at only $1,695, and breaking barriers is a general rule.
idea to use the latest version of a printer driver. At this writing, the latest driver for the StyleWriter II is 1.2; for the original StyleWriter, it's 7.2.3 (the version number appears in the upper-right corner of the Print dialog box). Both drivers are included with new Macs, and are installed automatically when you use the Easy Install option in System 7's installation utility.

These StyleWriter drivers provide an amalgam of features that Apple calls GrayShare. The gray half of GrayShare refers to the drivers' ability to print gray-scale images (such as scans or illustrations). Before printing the final version of a document containing a gray-scale image, be sure the Print dialog box's Gray-scale option is selected. (If you're just proofing the document, it will print faster if you select Black & White.)

The share half of GrayShare means that you can make the printer available to other machines on a network. If you're on a LocalTalk network, connect the StyleWriter to your Mac's modem port, since the printer port is used for LocalTalk connections. If you are using Etherernet, you can connect the StyleWriter to the modem or printer port. You then use the Chooser's Setup button to turn printer sharing on (see "Share That StyleWriter").

GrayShare works much like System 7's file sharing. Just as file sharing turns your Mac into a file server, printer sharing turns it into a print server. And just as with file sharing, when someone uses the StyleWriter connected to your Mac, it's your Mac that has to process the file, so you'll notice a big slowdown. That's the price you pay for sharing.

Its light-duty, 2-pages-per-minute mechanism doesn't exactly make a StyleWriter II an ideal workgroup printer. But printer sharing is useful in very small offices and classrooms. In the classroom, you might want to use GrayShare's password-protection feature to...
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[Additional Information]

AT WORK: WORKING SMART

track or control who uses the printer. Just specify a password in the Chooser's Setup dialog box or check the Keep Log of Printer Usage box.

GrayShare relies on a system extension named Printer Share. With Apple's At Ease program and document-launching utility installed, you may have trouble sharing a StyleWriter II; be sure you're using Printer Share version 1.1 or later.

PostScript for StyleWriters

The StyleWriter driver does a great job with most documents, but there's one thing that is beyond its reach: PostScript. To print an illustration created in a PostScript-oriented program such as Adobe Illustrator, and the PostScript- ignorant StyleWriter driver, in its zeal to print something, prints the 72-dpi QuickDraw representation of the illustration.

You can add PostScript support to a StyleWriter with T-Script ($145; Tele-Typesetting Company, 617/734-9700), an application that captures the printing commands of your PostScript application and translates them into QuickDraw for your StyleWriter (or other non-PostScript machines). Thus, the StyleWriter becomes a bargain PostScript printer—and a proofing device for documents destined for a laser printer or imagesetter.

T-Script can also act as a print server for other Macs on a network. You can use another Mac's Chooser to select the T-Script driver and then print as though you were printing to a LaserWriter. T-Script receives the PostScript instructions over the network and then processes the job.

Is T-Script too good to be true? Not quite: because T-Script makes your Mac crunch the PostScript image (and PostScript requires a lot of crunching), its performance depends on your Mac. I was pleasantly surprised by T-Script's speed on my Quadra 840AV. On a Power Mac, T-Script could yield processing performance comparable to that of a laser printer—T-Script 4.0 runs in native Power Mac mode. However, on slower 68000-family machines, you might want to plan for a coffee (or lunch) break, at least for printing complex images. But hey, what do you expect? You're getting PostScript output from a printer that costs about 5 percent of what Apple's original LaserWriter went for.

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<th>If mailing to company address: If mailing to your home address, leave the next two lines blank.</th>
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- **Check enclosed (make payable to MACWORLD Exposition)**
  Amount $ 

- **Master Card**
  **Visa**
  **American Express**
  Amount $ 

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<th>Expired Date (include all numbers)</th>
<th>Card Holder Signature (Signature necessary to be valid)</th>
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If card holder is other than registrant, please print card holder’s name below:

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<th>Last Name</th>
<th>Street Address</th>
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Cash only at the door. After December 1, you must register at the show.

Please check the appropriate information:

**YOUR INDUSTRY**

- **Construction/Architecture**
- **Design/Art/Architecture**
- **Communications/Advertising**
- **Consulting**
- **Education/Training**
- **Engineer/Scientist/R&D**
- **Government/Military**
- **Health/Medical Services**
- **Law**
- **Law Enforcement**
- **Manufacturers (Computer Industry)**
- **Manufacturers (Non-computer Industry)**
- **Media/Photography**
- **Marketing/Sales/PR/Communications**
- **Medical/Healthcare**
- **Music/Entertainment**
- **Network Computing**
- **Office Automation**
- **Other**
- **Photography/Video**

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<td>Director</td>
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<td>Vice President</td>
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<td>General Manager</td>
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**SITE OF YOUR ORGANIZATION**

- **National**
- **International**
- **Regional**
- **Local**

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<td>Under 50</td>
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**WHICH PERSONAL COMPUTER(S) DO YOU OWN/OFFICE?**

- **Macintosh SE/30**
- **Macintosh Classic Series/LC Series**
- **Macintosh Performa Series**
- **Macintosh Centris Series**
- **Macintosh Quadra Series**
- **Macintosh Workgroup Series**
- **PowerMac**
- **IBM PC or compatible**
- **None**

**DO YOU RECOMMEND, BUY, OR APPROVE MICROCOMPUTER SOFTWARE AND/OR PERIPHERALS?**

- **Yes**
- **No**

**IF YES, PLEASE INDICATE FOR HOW MANY COMPUTERS**

- **1-10**
- **11-25**
- **26-50**
- **51-100**
- **101-500**
- **501+**

**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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ATTENDING MADE EASY

MACWORLD Expo/San Francisco 1995. Moscone Convention Center, 747 Howard Street, San Francisco, CA. January 4-7, 10:00 a.m. - 6:00 p.m.

U.S. Attendees.

Badges will be mailed on or about December 16. Be sure to check box indicating where badge should be sent.

International Attendees.

International Badges (including Canadian) will be held for pick-up at the International Pre-registration counter at Moscone Center. Badge Pickup hours are: January 3, 11:00 a.m. - 4:00 p.m.; January 4-7, 9:00 a.m. - 6:00 p.m. For Federal Express service, check the appropriate box on the pre-registration form and add $45 to your pre-registration fee. Fill in your exact street address (no P.O. boxes) and include your telephone number and country code. We will Federal Express your badge directly to you.

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Car Rental Discounts From Alamo.

Alamo Rent a Car has been appointed the official car rental company for MACWORLD Expo/San Francisco and special discounted rates have been extended to attendees. These rates are available one week before and after the meeting dates and include unlimited free mileage. To make reservations call Alamo at 1-800-732-3232 and request group I.D. #382751 and rate code GR. Advance reservations are required.

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.

Services for the Physically Challenged.

We're committed to ensuring that our physically challenged attendees receive all the services they need to make their visit enjoyable. Call us at 800-945-3313 for details.

Pre-recorded Information.

For pre-recorded information about MACWORLD Expo/San Francisco, call the MACWORLD Expo Information Hotline at 617-361-3941. 24-hours a day, seven days a week.

Early Bird Registration.

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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Tips, Tricks, and Shortcuts

IF YOU HAVE MORE THAN ONE HARD drive (or a hard drive partitioned into multiple volumes), you have no doubt noticed that an item you save or copy to the desktop is actually stored on the start-up drive (or volume). If you drag this item from the desktop to a folder not on the start-up drive, the Finder does not move the item to the folder, it copies the item there. You invariably end up dragging the original item from the desktop to the Trash—not a big deal but a nuisance nevertheless. Martin Koistinen of Houston, Texas, points out that it takes only a couple of mouse-clicks in a Save dialog box to save a file on any disk or volume you want and have the saved item appear on the desktop. Yes, when you go to the desktop in a Save dialog box (by clicking the Desktop button, for example), System 7 targets the start-up volume for the pending save. But you can target a different volume while keeping the desktop as the destination: first click (don't double-click) the desired volume to select it, and then click the box in which you type the name of the document you're saving. A glance at the upper-right corner of the Save dialog box confirms the target volume.

Koistinen has another maneuver for putting items on the desktop while having them stored on a non-start-up volume. He uses an alias of the non-start-up volume's Desktop Folder. Anything he puts into the alias shows up on the desktop and is stored on the desired non-start-up volume. This maneuver comes in handy for copying items from a CD-ROM or a file server to a non-start-up disk's desktop. Also, opening a Desktop Folder alias located within any folder provides faster access in a Save dialog box than clicking the Desktop button and then clicking a non-start-up volume's name.

Making the Desktop Folder alias is the tricky part of this maneuver, because a volume's Desktop Folder is normally invisible. It is visible on another Mac that shares the volume with System 7's file sharing. So Koistinen connects his Mac with network cables to a borrowed PowerBook and starts File Sharing in his Mac's Sharing Setup control panel. With the PowerBook's Chooser he connects to his Mac using its own name and password, allowing him to access all volumes on his Mac from the PowerBook. On the PowerBook, he can see and make aliases of the Desktop Folder icons of his Mac's shared volumes. Back on his Mac, he still cannot see any Desktop Folders, but he can see the aliases he made using the PowerBook. He recommends locking Desktop Folder aliases with the Finder's Get Info command, since he has seen an unlocked Desktop Folder alias inherit the invisibility of its original item. Warning: Clicking the Find Original button in a Desktop Folder alias's Get Info window causes a system crash.

Persistent Playthrough

Q: My Power Mac 6100/60 plays an audio CD through the Mac's internal speaker if I choose Sound In from the Sound control panel's pop-up menu, click the Options button, set the Input Source option to Internal CD, and check the Playthrough check box. When I restart or shut down the computer, the Input Source reverts to Microphone and the Playthrough option gets turned off. Is there a way to retain my settings?

Shamish P. Patel
Renton, Washington

A: Installing Apple's System Update 3.0 software updates the PowerPC Enabler to version 1.0.1, which makes the Sound control panel retain an Input Source setting of Internal CD through restarts and shut-downs. An Input Source setting of Microphone still persists, and a setting of AV Connector still reverts to Microphone at the next start-up or restart.

If the Sound control panel doesn't retain the Internal CD setting after you install System Update 3.0, then the Sound Preferences file is probably corrupted. To replace it, drag it from the Preferences folder (inside the System Folder) to the Trash, restart, and set the Sound In and other Sound options again.

Macs with DOS Breath

Q: I have a Power Mac 6100 with MacTools 3.0 and SoftWindows. I understand that MacTools will take care of Mac viruses, but what about DOS and Windows viruses? I have been told that continues...
SIGNATURE SNOWFLAKES

You can make unique snowflake designs from signatures. You need a scanner to get your signature into the Mac as a graphic image, and to manipulate the graphic you need a drawing program (other than Adobe Illustrator, which can’t manipulate bitmapped graphics). If you don’t have a scanner but do have a fax modem, you can send the modem your signature as a graphic image from an ordinary fax machine. Alan J. Engard of Costa Mesa, California (where it never snows), created the snowflakes you see here using the following snow-making procedure:

1. Scan or fax just a first or last name (to keep the design compact). Crop the scanned or faxed image to remove unnecessary white space, and save the cropped signature as a PICT file. Open the PICT file with a drawing program, select the signature, and make its fill transparent.

2. Duplicate the signature, flip the duplicate vertically, and align its baseline to the baseline of the original signature.

3. Group the two signatures and make three copies of the group. Flip one copy horizontally, and rotate the other two copies 90 degrees in opposite directions. Move all four signatures together.

4. Experiment with various amounts of overlap in the center. Also, see how it looks having the signature end at the center as opposed to beginning at the center. You’ll have almost as many different designs as real snowflakes!

because SoftWindows is software, I don’t need to worry about any viruses in DOS or Windows files; that MacTools will take care of them before they reach SoftWindows. I have also been told I need a separate antivirus utility for DOS and Windows. Which is correct?  
Richard Fink
Portland, Oregon

SoftWindows creates true DOS files that can become infected with DOS viruses. Only DOS antivirus software can protect against DOS viruses. If you use SoftWindows you probably work in an environment with DOS and Windows computers that have antivirus software; you can and should use the same software with SoftWindows. You don’t have to worry, though, about your Mac files catching DOS viruses before you install DOS antivirus software. Viruses are specific to an operating system, so Mac and DOS files can’t infect each other.

Macs on the Side

Q: Can I put my Centris 650 on its side without adversely affecting my floppy, hard, and CD-ROM drives?
Jon Masami Kuruda
Los Alamitos, California

A: As long as you don’t block any cooling vents or try to use a tray-loading CD-ROM drive vertically, you can probably get away with vertical operation of a Centris 650 or any other Mac with the same case—a IIvx, Ivi, Performa 600, Quadra 650, or Power Mac 7100. Having designed and tested these models only for horizontal use, Apple frowns on—but does not forbid—the vertical position. Certainly floppy disks, hard drives, and caddy-loading CD-ROM drives all work properly on their sides. (All Apple CD-ROM drives sold before March 1994 use caddies. The AppleCD 300i Plus internal drive used in Power Maccs and some other Macs sold since then does not use a caddy, and you should not use this drive on its side.)

Warning: Do not operate your Mac in a position that disrupts the airflow through the case or you may damage the computer’s internal components. Also, Apple hints that the Mac models listed above may generate more radio and TV interference when operated on their sides. This interference is annoying but not harmful.

Power Mac Virtual Memory

TIP: Most native Power Mac software requires less RAM when virtual memory is turned on. For example, turn-
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In fact, we'll do it for you. Introducing Open Sesame!, the world's first intelligent software assistant for the Macintosh. Open Sesame! observes how you work, learns your repetitive patterns, and then offers to do them for you. Automatically.

With a single click, Open Sesame! will open and close related sets of folders, documents and applications, create and manage multiple Apple Menu and Desktop items folders, and perform routine maintenance, like rebuilding your desktop...automatically. So you can do more with fewer clicks.

For example, suppose that every time you start up your Macintosh you immediately open your mail program. Open Sesame! will observe this and offer to do it for you. It will even send more efficient ways for you to use System 7.0, like making aliases and stationery automatically.

Here's what the critics say: "One that knocks my socks off is called Open Sesame!...the simple fact is that Open Sesame! works smarter for me. It might just herald a new wave in mac smartware. ... The more you use it the better it gets." The Mac Manager, MacWEEK

"Macintosh users who like the flexibility of System 7 but tire of "tweaking" their desktop and Apple menu items will appreciate Charles River Analytics Inc.'s Open Sesame!" INFOWORLD

Open Sesame! is available at these quality resellers: MacWarehouse 800-285-6227, EGCHHEAD 800-EGCHHEAD, The Mac Zone 800-248-0800, ComputerWare 800-326-0092.

To order direct, call 1-800-913-3535.

For more information, call 617-491-3474 or fax 617-885-0780.

**Open Sesame!**

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**Color in Directory Dialog Boxes**

TIP Apple’s System Update 3.0 (which is built into System 7.5) adds distinctive icons to directory dialog boxes, as shown in “Icons of Distinction.” These icons appear in color in applications that contain a dbt resource for each DLOG resource. With ResEdit you can easily add missing dbt resources to an application that has only black-and-white icons in its directory dialog boxes. Begin by making a copy of the application you want to modify (for example, by pressing the option key while dragging the application's icon to the desktop). Drag the original application to a folder for safekeeping and put the copy where the original was.

In ResEdit, open the copy of the application and then its DLOG resources. You must determine which DLOG resources are for directory dialog boxes. The resources may have helpful names, but most likely you will have to open each DLOG resource and see if it defines a directory dialog box (a disk-related dialog box, such as Open or Save). Write down the resource ID number of each DLOG resource you find for a directory dialog box, then close the DLOG resource windows.

Next use ResEdit’s Create New Resource command to create a dbt resource for each ID number you wrote down. When you create a new resource, ResEdit displays a window for it and assigns it an arbitrary ID number. Close the resource window without making any changes in it. Then use the Get Resource Info command to change the new dbt resource’s ID number to one of the numbers you wrote down (and have not already assigned to another new dbt resource).

After creating dbt resources to match all directory-dialog DLOG resources, save and close the application in ResEdit. This modified application will now display color (and gray-scale) icons in its Open and Save dialog boxes.

John Feinberg
Middletown, New York

---

**TYPE IN A CLOUD**

Here’s a quick way to double-outline type with Adobe Illustrator, contributed by Carla Michellini of New York City.

1. Set the type, kern as desired, and choose Create Outlines from the Type menu.
2. Copy the type outlines and then lock the original type outlines with the Lock command. Choose Paste In Back from the Edit menu; use the Paint Style palette to give this pasted copy a heavy stroke (in this example, a 10-point white stroke). To get rounded edges, select the middle setting for the Joins option in the Paint Style palette.

3. Copy the modified type outlines and lock them. Choose the Paste In Back command again, and give this pasted copy a stroke that’s a contrasting color and a couple of points heavier than the white stroke (for example, a 12-point black stroke).

---

**Icons of Distinction**

After you install System Update 3.0, the dialog boxes you get with Open, Save, and other disk-related commands show the same distinctive icons as the Finder. These icons even appear in color in applications that have the right resources (which you can easily add with ResEdit).

---

In the cockpit of every Delta Air Lines jet you'll find something absolutely critical to safe, legal, and efficient air travel: a FrameMaker document. It's called a Minimum Equipment list, and it's also available on-line, for access via radio from dispatchers on the ground. It's one of many operational, technical, and administrative manuals that Delta writes and publishes in FrameMaker.

Because FrameMaker gives Delta the functionality and flexibility they need to create, update, and consolidate their extensive documentation. Particularly attractive were features like automatic indexing, superior graphics handling, multiplatform capabilities for file compatibility across PCs, Macintoshes, and UNIX systems. And of course, on-line document distribution, complete with automatic hypertext links, through FrameViewer. So don't just settle for any old publisher — fly first class with FrameMaker 4. Call 1-800-U4-FRAME Ext. 022 today for our comprehensive Guide To Document Publishing. And watch your publishing projects really take off with FrameMaker 4.
When all else fails,

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.
"All other brands of UPS die regularly in this lightning prone environment. My APC won't die!" said Paul Sisilli, Systems Analyst, City of Port St. Lucie. "With other brands, users don't find out until it is too late. The power interruptions here are very hard to live with. Typically they last just beyond their warranty period. My Back-UPS is going on three years...no other brand is as reliable."

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/系统的 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.

Discovering how essential Back-UPS protection is can be hard...if you wait for the next storm to roll through. But discovering how affordable it has become is easy...

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- Site diagnostics automatically spot missing ground and reversed polarity, two common miswirings which usually require an electrician's visit to diagnose.
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<tr>
<td>200</td>
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<td>280</td>
<td>Desktop systems, LAN nodes, POS</td>
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<td>600</td>
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<td>$399</td>
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<td>900</td>
<td>Multiple systems, longer runtime applications</td>
<td>$599</td>
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<tr>
<td>1250</td>
<td>Multiple systems, LAN hubs, small mains, telecom equipment</td>
<td>$799</td>
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"One lasted a few days, a second one went up in smoke after 48 hours, a third lasted less than 24 hours! I 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!"

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! I 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!"

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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/Systems 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. Discovering how essential Back-UPS protection is can be hard...if you wait for the next storm to roll through. But discovering how affordable it has become is easy...

Call today and find out (the easy way) why more than 2,000,000 satisfied users bank on Back-UPS from APC. With more awards than all other brands combined, field-proven reliability, and a two year warranty, Back-UPS are power protection you can purchase with confidence.

**AWARD-WINNING FEATURES**

- Instantaneous backup power, with blackout and brownouts
- Unmatched lightning (tested to UL1449) and surge protection for maximum hardware safety
- Network-grade line conditioning and EMI/RFI filters prevent glitches
- LAN Interface (on Back-UPS 400 and up) provides automatic shutdown to all major OS: Windows, NT, NetWare, LAN Server, LAN Manager, LANtastic, Unix, OS/2, Vines, AppleShare/Systems and more.
- Site diagnostics automatically spot missing ground and reversed polarity, two common miswirings which usually require an electrician's visit to diagnose.
- Option switches allow you to customize transfer voltage and alarm settings.
- Test Switch for ongoing peace of mind.
- 2 year warranty and full safety approvals including ISO9001.
- $25,000 Lifetime Equipment Protection
- Hot Swappable, User Replaceable Batteries reduce service time, costs by allowing safe removal and replacement of exhausted batteries, while your system stays running.

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**Attention Resellers, Win $10,000 cash in APC's Back-UPS Workstation Success Story Promo!! Call for an entry form today!**

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!"

"One lasted a few days, a second one went up in smoke after 48 hours, a third lasted less than 24 hours! I 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!"

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! I 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!"
Router Roundup

In today's heterogeneous world, linking remote sites to each other and helping telecommuters talk to their corporate LANs means carefully choosing remote-access routing equipment. Four companies offer you more to pick from by adding communications features to their routers without adding a lot to the prices.

Cisco Systems' line of high-end remote-access routers called Access Servers let up to 16 remote users dial in to a LAN at high speeds. The Access Servers also let Ethernet and Token Ring users dial out to other offices or the Internet over leased or switched telephone circuits. Behind it all is a powerful new microprocessor that pushes the performance of each asynchronous communications port on the unit to 115.2 Kbps—the top speed of V.34 modems with 4:1 compression. The Access Server supports ARA 2.0, PPP, Novell's IPX, and TCP/IP. The Access Server family, scheduled to ship this fall, is an overhaul of Cisco's 500-CS Communications Server. Priced from $2995 to $5995, the routers come with either 8 or 16 remote-access ports and with 2 WAN ports that operate at speeds up to T1.

Other vendors offer several lower-capacity routers that are also packed with features and priced affordably. Compatible Systems Corporation is shipping its MicroRouter 1000R ($1695), a multiprotocol device that routes AppleTalk, TCP/IP, IPX, and DECnet traffic over PPP. The router has one Ethernet port and one WAN port that you can use for asynchronous (dial-up) operation at up to 115.2 Kbps or configure for synchronous operation at a data rate of 128 Kbps. A new version of Engage Communications' ExpressRouter ($1795) supports 56-Kbps frame relay and other data traffic, including ISDN at up to T1 speed. Scheduled to ship this fall, the ExpressRouter supports AppleTalk, IPX, TCP/IP, and PPP and accommodates up to three WAN connections.

International Transwire is shipping TransTalk MP, the company's first multiprotocol router. The two-port unit ($1799) handles DECnet and TCP/IP, as well as AppleTalk. The company expects to add support for PPP this fall.

Cisco Systems, 408/553-4000; Compatible Systems, 303/444-9532; Engage Communications, 408/688-1021; International Transwire, 415/903-2300.

—Martha Strizich

SNMP Catches On

On October 1, Saber Software entered the Macintosh market with its purchase of three TechWorks products. It joins a small but growing list of companies selling Macintosh network-management software that uses the Simple Network Management Protocol.

Saber is bundling GraceLAN Network Manager (trouble-shooting software), GraceLAN SNMP (an add-on module), and Update Manager (a software-distribution tool) into one product: Saber LAN Workstation for Macintosh. The SNMP module gathers information over AppleTalk and TCP/IP networks from devices that support SNMP MIB 2, the AppleTalk MIB, and the Macintosh MIB. Saber LAN Workstation costs $199 for the first node and $49 for each additional node. Saber also sells network-management software for DOS, Windows, and NetWare.

Sonic Systems' recently announced LANscape SNMP console software ($799, expected to ship in October) manages MIB 2, AppleTalk MIB, and Repeater 802.3K (hub) MIB devices over AppleTalk or TCP/IP. Saber Software, 214/361-8086. Sonic Systems, 408/736-1900.—Cameron Crotty and E.D.
Simplifying ISDN for Prepress

THE SUPERHIGHWAY PRODUCT LINE from 4-Sight enables communication between ISDN NuBus cards from different vendors. It also speeds up and simplifies file transfers over both ISDN and switched-56 networks. Targeted at the prepress industry, Superhighway Broadcast provides access to multiple ISDN and modem connections. It features a drag-and-drop interface and can send data on eight ISDN channels simultaneously to achieve a transfer rate up to 3MB per minute without compression. Software (for one server and ten users) packaged with a NuBus card costs $3995.

Superhighway ISDN Manager has a file-transfer utility that supports rates of up to 1MB per minute. It can work with other communication software to automatically redirect traffic over an ISDN link. Software packaged with a NuBus card costs $2495. 4-Sight L.C. (formerly CommForce), 515/221-2100.-E.D.

Mac Clients Multiply

WITH THE GROWTH OF CROSS-PLATFORM computer communities, more non-Mac-based network-management systems are reaching out to their Mac brethren by offering them client software.

On the PC side, Symantec recently shipped a Mac client for its Norton Administrator for Networks 1.5, which runs its server software on a Windows PC. The Mac client can inventory Macintosh hardware, software, and System Folder contents. It also can distribute software electronically to Macs. Norton Administrator for Networks 1.5 costs between $44 and $65 per node.

Over in the Unix camp, a Mac client is now available for Remedy Corporation's Action Request System. This Unix-based help-desk product tracks trouble reports from users and accumulates problems and solutions in a database that technicians can search by symptom. Software for one server and three support-personnel workstations costs $6500; an unlimited number of end users can install the system's client to submit problems or query the database. MacTCP must be installed on each client Mac.

For centralized management of TCP/IP services on a cross-platform NetWare network, Firefox has added a Mac client to its Novix software line, which runs on an Intel-based NetWare server. Prices for Novix for Macintosh 1.0, due to ship in the fourth quarter of 1994, start at $795. Firefox, 408/321-8344; Remedy, 415/903-5200; Symantec, 503/334-6054.—E.D.

BBS’s Improve Internet Access

UPGRADES TO THREE BULLETIN board-management programs add more-sophisticated Internet connectivity options, among other improvements.

ResNova, adding HyperText Markup Language (HTML) support to its NovaLink software so users can browse the Internet's World Wide Web with an interface similar to Mosaic's. The upgrade, expected to ship by year end, doesn't require a direct Internet connection. Pricing wasn't set at press time.

Spider Island's TeleFinder bulletin board software now has a Unix-to-Unix Copy Program (UUCP) gateway that translates TeleFinder messages to Internet format, so users can exchange mail over the Internet. NetConnect TCP software turns a TeleFinder server into a TCP/IP host, allowing users to connect directly to the Internet or other TCP/IP-based networks. NetConnect TCP server software costs $295. The client comes bundled with TeleFinder Group Host Edition 3.5, which costs $425 and is expected to ship in October.

SoftArc has released an upgrade that beefs up its FirstClass bulletin board's support for TCP/IP. The enhanced FirstClass server ($995) can accommodate users in AppleTalk, IPX, terminal-emulation, and TCP/IP environments. The client software is free.

ResNova, 714/379-9000; Spider Island, 714/609-9260; SoftArc, 905/415-7000.—MARTHA STRIEICH

The Wireless Ethernet Wave

DIGITAL OCEAN'S SECOND WAVE OF network products give Macintoshes wireless access to Ethernet networks. The company's first-generation Grouper products used LocalTalk. Scheduled to ship in November, the Starfish I wireless access point ($1850) and its companion Manta wireless adapter ($799) both use spread-spectrum radio-frequency wireless technology.

Designed to mount on the wall of a wiring closet, the Starfish I connects to an Ethernet network running AppleTalk via an RJ-45 or AUI port. It provides Ethernet access for up to 16 Macs or peripherals equipped with one of the company's Manta (Ethernet) or Grouper (LocalTalk) adapters, across distances up to 800 feet. The Manta connects to an AUI port. To communicate with the Starfish I, a Grouper requires a firmware upgrade, available free. Digital Ocean, 913/888-3380.—NANCY E. DUNN

IN BRIEF

- Hubbub at Apple Almost every company that sells network hardware offers a 10BaseT hub, so why not Apple Computer? The Apple Ethernet 10/100 Workgroup ($149) fills that gap in Apple's product line. The five-port hub (one AU1 and four RJ-45 connectors) is scheduled to ship October 15. 408/862-3385.
- Chatter Reduction LessTalk, a system extension from Information Presentation Technologies, reduces AppleTalk chatter by allowing a user to configure the time interval between a workstation's queries about the status of mounted volumes. (AppleTalk's default setting is every 10 seconds, which adds up to a lot of traffic, especially on big networks.) It costs $995 for 100 users. 805/541-3000.
- Power Backup Cheyenne's Power Mac version of its network-backup software, ARCserve for Macintosh 3.1, adds support for changers and performs virus prescans. It's scheduled to ship by the end of 1994 and costs $245 for 5 users and $495 for 20 users. 516/484-5110.

MACWORLD December 1994 159
After This, You’ll Think Of Remote Access Servers In One Of Two Ways.

State Of The Art.

DaynaLINK 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 Securikey security software lets you control access to available services.

DaynaLINK’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.

DaynaLINK, MobiOS, SecuriKey and No Boundaries, No Limits are trademarks of Dayna Communications, Inc. All other product names are the trademarks of their respective holders. ©1994 Dayna Communications, Inc., Sorenson Research Park, 819 West Levey Drive, Salt Lake City, UT 84123
Introducing DaynaLINK:
The First PCMCIA-Based Mobile Access Server.

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

Circle 161 on reader service card
WE ADMIT THERE'S ONE THING EVEN EASIER THAN SETTING UP A ONEWORLD FAX SERVER.

USING IT.

Basically, everything about the OneWorld Fax server is as easy as 1-2-3. You can send a fax from any Macintosh as easily as you can print. To a hundred people as easily as to one. And check the fax status right from your desk. After all, it's got the same GlobalFax client software found in our award-winning PowerPort and TelePort modems.

Setting up OneWorld Fax is just as easy. It's completely plug-and-play, because all the hardware (even a 68302 processor), software, modems, and network connections are integrated. And unlike typical fax servers, you won't even need an additional Mac.

Managing the OneWorld Fax server is (surprise, surprise) easy, too. Its OneWorld Manager administration software lets you customize the server from any Mac on the network. And gives you a detailed log to track usage. OneWorld Fax lets you grow, too. Making it easy (there it is again) to add new communications capabilities by upgrading the software, exchanging modems, and adding memory.

So what, you may ask, will all this convenience wind up costing me?

Truth is, it can actually save you money. To find out how much, call us at 1-800-736-4821, ext. 2448, and we'll send you a free demonstration disk with a customizable fax-savings analysis. Making OneWorld Fax every bit as easy to justify as it is to install and use.
The Wireless Office

THE POWERBOOK LETS YOU COMPUTE nearly anywhere without wires—until you need to print or share files. A premises-wireless system replaces network wiring with infrared beams or radio waves. Freed from the network cable, you can move about with your PowerBook and still access all network services.

Infrared Systems

The Cooperative Adapter from Photonics Corporation (408/955-7930, 800/628-3033) works with infrared beams. This $349 transceiver for a PowerBook is small and light; it fits in most shirt pockets and all PowerBook carrying cases. The two-part cable attaches to the printer port for the network and to the ADB port with a pass-through connector for power. (See Reviews in this issue for more on the Cooperative Adapter.)

The Cooperative Adapter requires no software; you simply plug it in and use it as a LocalTalk connector. To connect to a wired LocalTalk network, set up at least one adapter with a Cooperative Access Point Base ($129 including an AC adapter) as a freestanding LocalTalk node; it needs its own LocalTalk interface adapter (typically a PhoneNet adapter). The Access Point Base also provides power from three AA batteries for a Duo without an ADB port. The Cooperative Adapter runs at full LocalTalk speed and shuts down if your PowerBook goes to sleep.

Normally, you set up the Cooperative’s infrared beam to bounce off the ceiling; the beam is strong enough to cover a 25-by-25-foot area in a single room if the ceiling is no higher than 10 feet. A higher or dark-colored ceiling reduces the coverage area. Bright daylight can swamp the infrared; you cannot use the system in a room with large windows or a skylight, and you can’t use it outdoors except at night. Unlike radio systems, the Cooperative Adapter does not fasten onto the PowerBook. When you pick up and go, you may as well disconnect the Cooperative, since it works only within one room. You can extend the coverage over a large room or to additional rooms by connecting multiple Cooperative Access Point Bases with LocalTalk cabling. You can roam at will within the covered area. Photonics makes a $595 PCMCIA version of its infrared transceiver for DOS/Windows laptops; it does not currently support 500-series PowerBooks.

Radio Systems

The Grouper 100LT from Digital Ocean (913/888-3380, 800/345-3474) can operate through walls because it uses radio (915MHz). No license is necessary. With in a typical building with walls, it will work for a few hundred feet in any direction; you can usually go up or down several stories. (Digital Ocean says the range is 800 feet, if unobstructed.) Large metal objects—file cabinets, pipes, safes—can interfere with the signals, but generally you shouldn’t have much trouble finding an operating location. The Grouper works fine outdoors as long as you stay close enough to the Grouper you are communicating with, so you can easily work on a patio or in a parking lot.

The S699 Grouper 100LT has its own NiCad battery and comes with a heavy, 28-ounce, AC adapter/charger (the 100LT uses five times the power of the Cooperative). The battery runs for about four hours, longer than a PowerBook’s internal battery.

The wedge-shaped Grouper 100LT fastens to the bottom of PowerBook models 140 through 180 with two screws that fit into plastic inserts placed in the PowerBook’s screw holes. Some carrying straps for the PowerBook use the same screw holes and are not compatible with the Grouper 100LT. An antenna unit clips onto the wedge; unfortunately, the electrical connection is a separate cable. Yet another cable connects to the printer port. The Grouper works with other PowerBook models, but does not fasten on, so you are pretty much limited to stationary operation.

The Grouper comes with three pieces of software to manage its operations. The software choices are moderately complicated: you have to set operating mode (as a remote unit, a hub, or autoswitching between the two), select the “school”—the Groupers you work with—and deal with battery management. You have to spend some time with the manual to continue.
Introducing the NoteBook Traveler® Leather Carrier.

Never have so many compartments, pockets, pouches, dividers, holders & folders looked so good.

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While others use a combination of leather and vinyl on the outside, Kensington uses only 100% full-grain premium quality leather.
The look is rich and luxurious.
While other cases may feel stiff and unnatural, our case feels smooth and soft.
Stitching and detailing are subtle. Seams are carefully hidden. And the color is a classic matte black.
Open it up and you’ll find two large padded compartments, numerous inner pockets, pouches, dividers, accordion-style file storage, two disk holders, a business card holder, and more.
And the NoteBook Traveler Leather Carrier is as rugged on the inside as it is elegant on the outside. No other case even comes close in terms of materials, workmanship and overall quality.
It’s a quality we stand behind with the unique Kensington Satisfaction Guarantee. That means our case has a lifetime warranty. And it means you have a no-risk 60-day trial.
The NoteBook Traveler Leather Carrier is one of six computer cases Kensington offers. So whether you’re traveling for a day or a month, one of our cases will be just right for you.
For more information, call 800-535-4242. Outside the US and Canada, 415-572-2700. For information by fax, call either number and enter 82, then request document 600.
understand all the choices and learn the icons (check out the dead-fish icon). The Grouper performs at about half to two-thirds the speed of wired LocalTalk or the Cooperative, a definite drawback. You can extend the coverage area with multiple base stations, but you cannot roam freely because you must specify which base station you're connected to. The Grouper's transmitter may produce clicking sounds in nearby audio equipment (not in the Mac's built-in speakers, however).

Metricom (408/399-8200, 800/556-6123) sells its $495 Ricochet modems principally for connection to its regional wireless network, a topic I'll discuss next month. The Ricochet modems—about the size of a cordless phone—can also be used for peer-to-peer communication without connecting to Metricom's network. They connect to a computer as modems rather than as a network node; one computer must be running Apple Remote Access (ARA) server software (about $150), and the other connects as a client ($35; included in System 7.5). On the client machine, you enter the server's address rather than a telephone number. Metricom says that a pair of Ricochets can exchange information at the speed of 9600- and 14,400-bps modems. The Ricochets operate in the same frequency band as the Groupers; the Ricochets achieve longer range (Metricom says 1000 to 1500 feet) with slower speed.

Coming Events

The Grouper 100LT represents Digital Ocean's first try at a network radio connection. It will soon be replaced by two smaller 915MHz models—each about the size of a portable CD player—that can attach to the lid of any PowerBook. A $699 LocalTalk model—the Grouper 200LT—has the same performance and features as the Grouper 100LT and connects to the printer port; the $799 Manta 500 EN operates at about one-third the speed of wired Ethernet and connects to the AAUI Ethernet port of a 500-series PowerBook. These new models should overcome some of the 100LT's problems.

The Manta requires the Starfish, Digital Ocean's $1850 base station, to connect to a wired Ethernet network. Besides supporting all Groupers and Mantas, the Starfish will support roaming if you can afford multiple Starfish; roaming software costs an additional $499.

Dayna Communications (801/269-7200) has introduced DaynaComm wireless-network adapters following the forthcoming IEEE 802.11 wireless standard—about one-quarter the speed of wired Ethernet in the 2.4GHz band. Dayna says its units will be upgradeable to the finished standard. The $699 DaynaComm Serial Roamer is the size of a fold-up cellular phone and attaches to any PowerBook lid and the serial port. The Roamer uses a cellular phone battery and has a range of about 150 feet, compared with 250 feet or more for the Digital Ocean products. The PCMCIA version, also $699, plugs into a 500-series PowerBook through a PCMCIA adapter. On the wired-network side you'll need the $1499 DaynaComm Network Access Point (more than one for roaming).

Both Digital Ocean and Dayna will offer Newton versions of their products by late this year or early 1995.

Network Security

The radio-based wireless systems pose a potential security problem. Digital Ocean will offer optional DES encryption hardware for its systems. Although the limited coverage of infrared makes it more secure, eavesdropping is certainly possible, so some network security measures may be necessary. All the network-security tools for wired networks work with these wireless networks as well.

Wireless versus Wired

Wireless networking offers tremendous freedom, but that freedom comes at a considerable price. If walk-around mobility isn't absolutely essential, then I think you will be better off installing network ports around your offices, even outdoors if needed. LocalTalk ports are cheap (unless you can't lay down the wire easily); even Ethernet ports and adapters cost less than the cheapest wireless systems (see last month's column). And wired Ethernet is much faster and more reliable than any wireless network. Nevertheless, there are many situations where wireless networking makes sense:

- When the cost of wiring is prohibitive because of concrete or other barriers. Historic buildings that cannot be modified.
- Temporary networks, such as for a team of auditors who travel from site to site, or for a factory floor during equipment installation or testing.
- Warehouses where a PowerBook with a radio adapter can be carried around on a forklift truck.
- Reception areas where a PowerBook can get to a person more easily than the person can get to a desk (such as in a hospital, where it may be difficult to bring a patient to an admission desk).

If you can live with the limited coverage, the Photonics Cooperative infrared system is much cheaper and easier to use than the radio systems, although in most locations, installing LocalTalk cable is much cheaper yet. If you need room-to-room mobility, you'll have to choose one of the expensive radio systems.

Next month: wide-area wireless that covers a city or region.

CARY LU is a Macworld contributing editor who covers mobile- and remote-computing issues in this monthly column.
What's one without the other?

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High-quality mobile printing.

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Employee volunteer programs benefit everyone involved. Volunteers, like Oracle’s Lei Tung, know they make a meaningful difference in someone’s life. Employee volunteers feel good about themselves and their company, which makes for improved morale and can give productivity a real boost. You can do for your employees and your community what Oracle is doing for theirs. The Points of Light Foundation can help show you how. To find out more call 1-800-888-7700.
I’m dreaming of a gray Christmas. I love those gifts that match my Mac! If it’s housed in plastic — then it’s fantastic — and I’ll plug it in the back. I’m dreaming of a new scanner, printer, and multi-sync display. May your Mac still work New Year’s Day — and may all your Christmas gifts be gray.

YES, KIDS, IT’S OUR FAVORITE TIME of year: our waistlines get larger, our wallets get thinner, and our SCSI chains get longer. There’s been an explosion of interesting, funny, worthwhile accessories for gift-giving this year — it won’t be just another mouse pad for your friends. For the fifth consecutive year, The Desktop Critic’s holiday roundup rules are simple: nothing over $100, and nothing buggy, cheesy, or predictable.

Personalized Mouse Pad
I know what you’re thinking. After that big puffed-up no-mouse-pads speech, I’ve got a lot of nerve to lead off with a mouse pad. But listen, this one’s different.

The gimmick here is that you send in a photograph, and they make it into a mouse pad ($19.95; VIP Communications, 602/544-4753); they accept PostScript files, too; takes 4 to 6 weeks, or 2 to 3 weeks for a rush charge. If you’re wincing, envisioning some piece of clear plastic pathetically Scotch-taped over your Instamatic shot, you can relax: it’s a much classier deal. Somehow they actually incorporate the image of your photograph onto the clothly surface of the pad itself. It’s not a layer you can peel off; it’s bright, clear, resized to fit the 8-by-9½-inch pad, and as twisty and flexible as the foam rubber itself.

This is a truly ingenious gift. It costs about as much as a piece of shareware, but it’s unusual and practical, and your recipient will be forced to think of you for eight hours a day. There are probably some really neat psychological implications in rolling and scraping across somebody’s face (your spouse? your boss? your in-law?) every day — but I’ll leave that to your imagination.

After Dark: The Simpsons Collection
Guy in my grocery last week: “I think Krusty the Clown symbolizes man’s inhumanity to man.” My mom: “I’ve heard it glamorizes juvenile delinquency.” My niece: “Why is Marge’s hair blue?”

Yep, everybody’s talking about TV’s “The Simpsons”; if you’ve never seen this satirical, masterfully scripted spoof of American culture, then it’s hopeless for me to try to explain it. Suffice it to say that The Simpsons ScreenSaver will be a big hit with any Simpsons fan and an utter mystery to everybody else ($49.99; Berkeley Systems, 510/540-5535; After Dark control panel included).

A few of the 15 Simpsons modules are inventively infected with the spirit of the actual Simpsons characters. There’s Chalkboard, in which a different one of Bart’s opening-credits schoolroom punishments is scrambled across your screen each time (“I will not Xerox my butt . . . I will not Xerox my butt!); Itchy and Scratchy, in which your desktop icons are used as tools of mutilation and death by America’s least favorite cartoon-within-a-cartoon characters; and the savagely politically incorrect Grampa’s Wisdom in which the shriveled Grampa does nothing but mutter, Talking Moose-like, periodic utterances like “I’m hungry!” and “Who’s got my pills?”

Some of the other modules feature likenesses of the Simpsons but aren’t witty in the least. Nonetheless, considering that $48.99 of the program’s $49.99 list price probably pays for the licensing of the music, voices, and characters, it’s a good deal — and a good deal of fun for Simpsons nuts everywhere.

CD-ROM Caddies
I read a startling statistic: nearly half of all CD-ROM owners never buy another disc beyond the handful that came with their CD-ROM drive. I think I know the reason for this seemingly incredible fact: it’s the hassle of using a CD-ROM drive’s removable tray.

Last year, Apple, at least, had the merciful insight to retire this flimsy, infernal nuisance. (The ejectable caddy was replaced, in newer drives, by a tray that slides out but remains attached to the drive.) Tough, I guess, for the millions of us who are stuck with the original design.

Therefore, buy, say I, a five-pack of CD-ROM caddies (from an Apple dealer; around $50). The lucky recipients will be able to leave their favorite discs nestled permanently in their caddies — one for Myst, one for Encarta, and so on — and just swap the whole enchilada in and out of the drive. This suggestion qualifies for the Perfect Holiday Gift Merit Badge: it’s something that will substantially improve the quality of your friends’ lives but that they’d never have bought for themselves.

CD3
So what, I can already hear you clamoring, is the ideal gift for the other half of the Mac population — those who do buy additional CD-ROMs?

For them, may I suggest the fascinating CD3, a hard, plastic, CD-ROM storage kit ($29.95; CD3 Inc., 512/860-0191). My various friends have described this unique cylindrical cabinet as looking like (1) a headless dachshund, (2) a black post-office box, or (3) a piece of plastic病房. Whatever you call it, it’s a great gift for the Mac user who has a lot of CDs and no place to put them.
THE DESKTOP CRITIC

If you, like thousands of others, have found that Method 2 works more often, consider the SCSI Sentry ($99; APS Technologies, 816/483-6100). This thing looks for all the world like a regular terminator plug. It's much smarter, however, automatically turning termination on or off as befits the quirksiness of your particular chain. It apparently does a bunch of other stuff, too: APS literature says it can "regulate power with the monolithic digital IC solution" (really? how interesting) and that it "helps you diagnose problematic transmissions and instantly identify a frozen bus."

Well, shoot. Even I can identify a frozen bus—you see 'em in Manhattan every winter. But now you can ignore some rules in the scuzzy world of SCSI.

Label Once Disk Labels

When I want to relabel a floppy disk, I generally just slap another label sticker over the existing one. Trouble is, after a few years of this, some of my disks have so many overlaid labels they look like little bars of ivory—and they won't fit into the disk drive.

It's hard not to love Label Once disk labels ($12.95 for 50, $8.95 for refills; Multicom, 915/676-0844; sold through CompUSA, Staples, APS, and similar outlets). You put one label on each disk—the only adjustment I'm finding hard to make—and write on it with a permanent magic marker (one's included). When the disk's contents change, you can erase your original writing, using either a standard art-ink eraser (one's included) or rubbing alcohol—and then perform your rite of writing right onto the newly blank label. The scheme works beautifully.

(P.S. I know you're not reading VHSWorld, but listen—your lucky giftee might also appreciate a set of Label Once videocassette stickers, too.)

Stealth Stylus II

Who can account for the Newton's failure to dominate the galaxy in its first year on the market? I can. It's because of the chintzy plastic stylus/pen thing you use to write on the hand-held computer's little screen. I'm sure the Newton would have been a smash hit had it come with a more stylish stylus.

That drawback's been withdrawn. The Stealth Stylus II ($17.95; WriteWare, 408/262-6660) looks exactly like a garden-variety ballpoint pen—and, in fact, it is one. But if you click the end cap a second time, the ballpoint retracts and is replaced by a plastic Newton stylus tip! This Jekyll-and-Hyde split personality will make any gadget freak salivate, and it eliminates the debatable inconvenience of carrying around two different pens.

For your further phony-pen pleasure, WriteWare also makes black plastic Newton-ready replacement "cartridges," called S.N.A.P.'s (Stylus Not A Pen), for the expensive pens your Newton-owning friends may already have:

Christmas Lights 1.0

Oh, how cute! That's all anybody can say about this adorable $19.95 software gem (Articus Software Corporation, 203/348-6100). It strings up tiny blinking Christmas lights and tree ornaments around the edges of your screen, with your choice of 27 other decorations (holly, hung-up stocking, menorahs) as lightbulbs. If you wish, sweet orchestral carols play from your Mac speaker. All of this merrymaking goes on in the background while you struggle through your year-end finances in Excel.

One Share of Apple Stock

Who could stifle a gasp of joy upon pushing aside the wrapping paper to reveal a crisp, new, official stock certificate (from your friendly local broker or Charles Schwab-type discount brokerage, about $35? It's one thing to own the computer; it's quite another to own the company. Now your voice can be heard! Vote Spindler out of office...or reelect him! Demand satisfaction on that broken ImageWriter! Glamor for better icons on the eWorld start-up screen!

OK, owning one share of Apple is a little like owning one grain of sand on the French Riviera— you do indeed have a voice in Apple Computer's affairs, but it's the voice of a gnat on Neptune. Still, imagine the rush your friends will get from knowing they're in the fast lane, and they can whip open the newspaper every morning to see how their portfolio is doing, and they'll get mailed Apple's annual report, which has a lot of impressive-looking numbers in it and a lot of Mac photos.

And even if that Appleshare doesn't appreciate, you and your friends will clearly appreciate each other, and that, after all, is the purpose of this ho-ho-ho whole thing.

Happy hollydays, all. m

Contributing editor DAVID POGUE is coauthor of a sterling stocking stuffer: the Macworld Macintosh Secrets 1995 Desk Calendar (Andrews and McMeel), which imparts a tasty trick or tip for every day of the coming year.

Homer Run If you install The Simpsons Screen Saver, even your desktop is fair game for Homer. modernist waffle iron, and (3) a 7-inch slice of a large German salami. (Of course, these descriptions may reveal more about my friends than about the CD3.)

Still, the idea is irresistible. You open the CD1 like a lunch box. Into the thinly spaced slots within, you painstakingly lower your 45 favorite discs. Then, into the equally thinly spaced numbered blanks on the CD3's lid, you painstakingly write the name of each disc.

The payoff comes the next day, and for the rest of your life: every time you want a particular CD, you simply slide a pointer along the outside of the unit until it points to the title you want. Open the lid, and—hey presto!—there's your disc, hanging neatly from the open lid (having been plucked by its safe-to-handle outer rim). Slip your finger through the hole, slide the disc into your CD-ROM player's cavity (enough said), and off you go for some compact fun. As you play, you'll know that your entire collection is safe from dust and marauding toddlers, and that the CD3's carrying handle portends portability for parties to come.

SCSI Sentry

As you probably know, there are two schools of thought when it comes to attaching multiple SCSI appliances (scanner, SyQuest drive, CD-ROM drive, and so on) to your Mac.

Method 1: To connect a single SCSI device, a desktop Mac requires a terminator plug; a PowerBook requires two terminators, and a Duo needs none. Each external device must have a unique ID number, usually set with DIP switches on the body of the unit, between 0 and 7 (but excluding 0, which is the internal hard drive, and 7, which is the Mac, and possibly 1, which is used for a built-in CD-ROM drive). The combined calling must not be longer than 19 feet. If you have a Mac IIfx, Quadra, AV model, or Plus, special exceptions apply to your machine; see your manual.

Method 2: Junk the rules and do what works.

170 December 1994 MACWORLD
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Confessions of a Mosaic Addict

Surfing the World Wide Web

There is a window in my office. Sometimes when I look out the window, the sun is shining. Other times it is dark. For a while the days were long, and now they are getting shorter again. But I don't think too much about days or nights, or anything else outside my window for that matter. I am too busy staring at a 13-inch Apple color monitor that is attached to a PowerBook 180, which is hooked to a modem that is connected to an Internet dial-up server. I am running Mosaic, hanging ten on the data wave, and nothing else seems to matter.

Elsewhere in this issue you can read the facts about Mosaic itself—what it is, how to get it, how to use it (see “Taming the Internet”). I thought about writing the article myself, but really, I'm too busy. Too busy net surfing with Mosaic.

At this moment on my screen is a picture of a half-empty coffeepot in the Trojan Room, a university lounge in Cambridge, England. Someone has rigged a video camera to catch live images of the coffeepot, and all over the world people like me can see how the pot is doing. I monitor this on a daily basis, sometimes three and four times a day. Sometimes the woman whom I have taken as a bride asks me what possible fascination a person could have with the state of a coffeepot in Cambridge, England. She doesn't get it.

"Don't you understand," I tell her, "that Mosaic transports me anywhere in the world? A coffeepot may not be interesting, but the fact that I can go and see the coffeepot and view millions of other things at locations in Japan, Norway, and Champaign, Illinois, is very interesting. There's a lot of information in the world—with Mosaic you just swoop down in front of it, like Superman going through a window, and the info is yours.

"Do you want to hear sound bites from Grateful Dead records? Do you need a clue to solve Myst? Are you curious about the airtimes of 'Babylon 5' episodes in Singapore? Need to download the Pretty Good Privacy encryption program? Want to know where Ted Kennedy stands on the crime bill? To subscribe to *Vibe* magazine? Fool! Just link and you're there!"

"I don't want to do any of those things," she says, and leaves the room. I lock the door behind her. She is the Antimosaic and is hereafter banished from my sanctum.

Hot Stuff
The Trojan Room coffeepot, of course, is on my Hot List, the Mosaic menu item that saves the addresses (which are called URL's) of places worth revisiting. I have a very long Hot List—the drop-down menu is too long for the screen. Sometimes friends send me their Hot Lists, and then I have dozens of new places to virtually visit. These lists are as good as letters, really—they provide a snapshot of what my friends are thinking. Oh, I think, seeing one Hot List—this friend has taken an interest in intellectual-property law and has finally gotten into industrial music. You can tell how cool a person is by his or her Hot List. It's the modern equivalent of "Who's your favorite Beatle?"

Maintaining an up-to-date Hot List means monitoring what fascinating new Mosaic sites come onto the World Wide Web (WWW), and it is pretty much a full-time job. The high point of my existence these days comes when the NCSA (National Center for Supercomputing Applications) releases its weekly summary of "What's New with NCSA Mosaic." Last week I learned about the Elvis Presley Home Page ("where The King lives on in cyberspace"), which offers sound clips from The King's music, as well as a tour of Graceland. (I put the Presley site on my Hot List.) And I found a queen, too: from the home page of the Illinois State Fair, I linked to a description of the fair's reigning monarch, Amy Maguire, whose interests include reading, jigsaw puzzles, and dance.

Then I bounced over to a site called Jesuits and the Sciences, where I learned that "Saint Ignatius Loyola considered the acquisition of knowledge and the performance of mundane labor as spiritually profitable tasks, and this fostered in the Society an action-oriented, utilitarian mentality sympathetic to scientific study." Nicely stated. There were some artworks available, but I figured it might take a long time to download them, so I went back to the What's New page and saw that a new WWW site at the Federal Institute of Technology at the University of Lausanne offered text and radio broadcasts of "general information about what's..."
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2. How many stars did Macworld’s review give the Power Macintosh 6100?

3. How many Power Macintosh logos (large and small) appear in the articles of this issue of Macworld?

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The Iconoclast

going on in the universities of western Switzerland." Unfortunately, all of this was in French, a language I don't understand. Still, it was fun going to Switzerland. Sort of the vacation I never took this summer because I was too busy with Mosaic.

Suddenly I had a craving for nature. So I linked over to the Missouri Botanical Garden for a tour. Had I been interested, I could have linked to other biological Web sites or perused a database of more than 600,000 taxonomic entries. But instead, I linked my way to the home page of a musical group called Violet Arena, whose music was described as "ethereal, dreamy, organic, moody, ambient, melodic, contemplative soundscapes for the surreal music listener." I pressed a button, and my computer received a short music clip that seemed more ambient than melodic. But I was happy to hear it.

This is what my days are like in the thrill of Mosaic. Using only my mouse, I get survivors' accounts of the Holocaust, photographs from Jupiter, the philosophy of Hugh Hefner, artwork of a sixth-grade class in Saint Paul, quotes from former MTV see-jay Adam Curry, press releases from the White House. There is a baseball strike, and once this would have made me sad. But now the main damping effect is that when I go to the home page for Major League Baseball I see the message, "Yesterday's MLB highlights are not available," and therefore I cannot access the video clips of yesterday's home runs. So instead I go on to the next site. And the next one. The info surf is up, perpetually. Gotta ride it.

Gimmie Bandwidth

I don't want to imply that Mosaic does not have drawbacks. First of all, setting it up is a process that hackers delicately call nontrivial. You begin by downloading the program. There are several versions, as well as some alpha versions of upcoming releases, and every one of them is buggy. Then there is a list of companion programs that have to accompany Mosaic so you can process text files, graphics, sounds, and animations. Each one seems to require some tinkering. Even when everything is installed properly, you often wind up in crash city. Maybe soon the various companies concocting commercial versions of Mosaic will produce bulletproof code. Until then, using Mosaic is like cooking a souffle—if the factors aren't just right (and they're often not), everything falls flat.

But the real problem, and the utter bane of my existence, is lack of bandwidth. Everyone who uses Mosaic on a
dial-up connection will tell you this—it's too slow. Like drinking margaritas through an eyedropper. The irony is unbearable and a little embarrassing. On one hand we are the mighty sojourners of the net, jumping from site to site around the world as if we had parachuted into 1994 from an episode of "Star Trek." On the other hand, we spend an inordinate amount of time watching the little ball move around on the S shape on the Mosaic logo—the signal that information is moving, however slowly, into our computers. At one time I would have considered a modem moving 14,400 bits of information a second as more than adequate. Now it is simply a joke. Sooner or later I will have to spring for an expensive acronym like ISDN or a T1 connection. Don't ask me what those letters and numbers mean; all I know is that they cost a lot and will enable me to do Mosaic faster.

Still, I know how much time I spend with Mosaic now—what would happen if I got a T1 connection? Is it possible I would spend all my time hooked to the net? It is an interesting thought, but I am too busy to consider it. I have a new list of URL's to check out.

In fact, it is getting harder to keep up. It seems that every company imaginable is getting its own Web site. Even individuals are taking the plunge. The latest status symbol is putting up one's personal home page—a private URL is more desirable than a Beverly Hills area code-complete with digitized portrait, hypertext résumé, your vacation photos, and of course the proper links to your favorite Web sites and the home pages of all your friends. Mosaic, I think, will one day be everyone's personal interface with the world. Soon we will have Secure Mosaic and be able to use our credit cards to buy things directly from Mosaic sites. Already, you can order a pizza via Mosaic, from the Pizza Hut Web site.

There is a banging on the door. It is the Antimosaic, demanding that I abandon my activity and watch my child grow up. I don't let her in, and she starts screaming at me from the other side of the door. "Get a life!" she shouts, and then it is quiet.

Life? The word sounds strange to me. For a second I am really not sure what that is. Then I remember. Life is what happens while you're waiting for the graphics to open.
Any computer information service that has a place for everyone from a skateboarder in Wichita to a bond trader in Hong Kong certainly has a place for you.

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LIKE OTHER ELECTRICAL DEVICES, computer monitors generate both electrical fields and magnetic fields in the very-low-frequency (10kHz to 300Hz) and the extremely-low-frequency (below 300Hz) ranges. Less than five years ago, monitor manufacturers didn't give much thought to these electromagnetic emissions. Neither did most consumers. But in the wake of published reports that exposure to electric power lines might be a health risk, Macworld had questions: What are the emission levels from monitors? Are these emissions harmful, as some people contend?

In the July 1990 issue we published the results of Paul Brodeur's investigation for Macworld in "The Magnetic-Field Menace," which cited several studies that suggested that extremely-low-frequency (ELF) magnetic fields might be a health risk. In the same issue, Macworld contributing editor Robert Eckhardt's feature on color monitors listed the results of Macworld Lab measurements of the magnetic fields of 17 popular Macintosh monitors, information that had never before been published.

Nearly five years later, the scientific debate over low-level electromagnetic emissions remains unsettled. Nevertheless, the monitor industry has moved rapidly to reduce emissions. In the absence of scientifically established standards, most manufacturers support the Swedish guidelines known as MPR-II (set forth in 1990 by the Swedish Board for Measurement and Testing, which is known as MPR). A smaller number of manufacturers conform to stricter guidelines known as TCO (for the Swedish office workers' union that developed them).

When Macworld Lab tested color monitors in 1990 and 1991, for example, it measured the intensity of ELF magnetic fields from a low of 2 milligauss (or 200 nanoteslas) to a high of 100 milligauss (10,000 nT). Today, however, many monitors have sharply lower emissions, thanks to the MPR-II guidelines, which limit ELF fields to 2.5 milligauss (250 nT) when measured at 50 centimeters (just under 20 inches) from the monitor. The tougher TCO guidelines also limit ELF fields to 2.5 milligauss but at closer range—30 centimeters (just under a foot) from the monitor.

Reducing Your Exposure
One way to lower your exposure to monitor emissions is to buy a display that is compliant with MPR-II or TCO. If a new monitor is in your future or if you bought one recently, be aware of a few issues involving MPR-II testing requirements. Generally speaking, the higher the resolution and the brightness, the stronger the electromagnetic fields. Manufacturers test monitors at only one resolution and at midpoint brightness. So if you use a multiresolution monitor at its top resolution and with the brightness cranked all the way up, it's possible that you may be exposed to higher emissions than the MPR-II guidelines allow.

According to Apple, its 15-, 17-, and 20-inch Multiple Scan Displays, 14-inch AudioVision Display, and 14-inch Apple Color Plus Display all fully meet the MPR-II guidelines for low emissions. Other monitor manufacturers, including E-Machines, Mirror, Mitsubishi, Nanao, NEC, Nokia, Radius, RasterOps, and Sigma, also offer at least one MPR-II-compliant display.

Outside the United States, many companies make monitors that meet the TCO guidelines. Stateside, only two companies make such monitors for Macs: Nanao (310/325-5202) and Nokia (415/331-0322). Nanao's 17-inch and 20-inch T2 and its 21-inch F780iW list for from $1999 to $3999. The company says it expects its full line of monitors to meet TCO guidelines sometime next year. Nokia's 15-inch MultiGraph 449E, 17-inch 447X, and 21-inch 445X are available with a TCO option and retail for from $750 to $2775. (Nokia ships the monitors with a single-resolution Mac cable; a multiple-resolution adapter is available free on request.)

Reducing your exposure to ELF emissions doesn't require buying a new monitor, however. With distance, electromagnetic emissions drop sharply; the fields from the front of virtually any display should be negligible at 28 inches. For a cheap fix, just make sure you sit at least an arm's length from your computer when working.

The left and back sides of a monitor generate the strongest emissions, so you should steer clear of those areas if you are especially concerned about emissions. If you can't keep as far from them as you'd like because of the location of a coworker's computer, or if you have an old monitor that you can't replace, consider retrofitting the monitor to reduce its emissions.

NoRad's (310/605-0808) ELF ProTech (S65 to S131, depending on monitor size) is a set of special metal bands that fit around the top and sides of a monitor. The product works by deflecting magnetic fields from the monitor toward the bands. Macworld Lab tested ELF ProTech a couple of years ago and

Buyer beware is an aphorism that won't disappear; it's a short and sweet warning against purchasing a monitor without being cautious of its electromagnetic emissions.
found a reduction in ELF magnetic-field emissions of between 17 and 69 percent, depending on the measuring points ("Seeking ELF Relief," Macworld, October 1991).

At the same time, Macworld Lab tested Get Safe’s (515/472-5551) E.L.F. Armor ($89.95), a steel-alloy tube that goes over the yoke of a display’s cathode-ray tube. Monitors fitted with the device showed significantly reduced magnetic-field emissions, according to Microwe measurements. Note that E.L.F. Armor requires installation by a qualified technician.

Beware of companies that claim or imply that computer-glare shields or screens can block electromagnetic emissions. Such screens may be able to block much of the electric fields generated by computer displays, but they do not block magnetic fields, which have been linked to health concerns.

Unanswered Questions
As I reported back in February 1993, there’s still no scientific consensus that exposure to electromagnetic fields constitutes a genuine health hazard. Some scientists strongly believe there is no credible evidence that these fields are in any way harmful.

Others disagree. A 1992 Finnish study by the Institute of Occupational Health in Helsinki found a link between miscarriages and exposure to magnetic fields generated by video display terminals (VDTs). According to Louis Slesin in an editorial for the July/August 1993 issue of VDT News, “If a VDT does present a miscarriage risk, then it has to be caused by some aspect of VDT work. Possible risk factors include magnetic fields, stress, and harmful posture. Even though magnetic fields are easy to quantify, and therefore easy to study, the Finns were the first to test the obvious hypothesis, and their results show that electromagnetic fields may indeed be the culprit.”

Other potential concerns are cancer and Alzheimer’s disease. A 1992 study by scientists at the Karolina Institute in Stockholm found a dose-response relationship between childhood leukemia and exposure to weak magnetic fields from power lines. As a result of that study, the Swedish government has said it will act on the assumption that a link exists, for example, when planning where to locate transmission lines. More recently, VDT News reported that Dr. Eugene Sobel of the University of Southern California has found a link between workplace exposure to electromagnetic fields and Alzheimer’s disease. (The study did not include computer users.)

VDT News and Microwave News are valuable resources for keeping current on this topic. Both of these thoughtful and comprehensive newsletters are edited and published by Louis Slesin in New York. Annual subscriptions are $150 and $285, respectively; call 212/517-2802 for details.

What You Can Do
It’s terrific that manufacturers have responded to this health issue by making low-emission monitors available. As a result, consumers using modern computer equipment are now exposed to considerably lower emissions than they were a few years ago.

But computer monitors are not the only source of electromagnetic emissions. At work, office wiring is the primary source of exposure; at home, all kinds of electrical appliances—electric blankets, heaters, electric razors, and so on—emit these fields. And emerging technology such as cellular telephones and wireless networks will add to the overall exposure level for many people.

Because it appears that if any health risk exists it is quite small, some people argue against continued research. But even a small risk can affect large numbers of people, since virtually the entire population is exposed to electromagnetic emissions. Under the circumstances, we need more research in this area, not less.

If you agree, please lobby Congress, the president, and the appropriate companies for support. Apple, Compaq, and IBM, for example, are funding research into the biological effects of magnetic fields. The computer threesome established the Center for VDT and Health Research at Johns Hopkins University in 1992 to fund independent research into computer use and health. Despite the need, there’s been little additional industry support for the center. And that’s a shame, because there are too many unanswered questions about electromagnetic emissions and health.

"If electromagnetic exposures came only from VDTs, that would be one thing, but we are just beginning to address building wiring and other electromagnetic-field sources in offices," says Louis Slesin. "And of course, we are in the midst of the wireless revolution. This is the stuff of the twenty-first century. Sooner or later we must answer the question, What is it all doing to us?"
THE BEST PRODUCTS FEATURED IN MACWORLD

Edited by Elizabeth Maffly

Macworld Editors’ Choice is a complete listing of the hardware and software products selected as the best of their type in Macworld’s comparative articles. A &next to a product indicates that we chose more than one product in that category. A &next to a product listing indicates that a native Power Mac version is available.

Hardware

MONITORS

BLACK-AND-WHITE MONITORS, May 93
Portrait monitor: 15-inch Gray Scale Portrait Display; Mirror Technologies, 612/633-4450; $395, with video-display board $549.

Two-page monitor: LView MultiMode; Sigma Designs, 510/770-0100; $1099, with video-display board $1398. MD 202 Two Page Display, Mobius Technologies, 510/654-0556; $659, 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. Nanao FlexScan F340+V; Nanao USA, 800/800-5202; $799.

15-inch display: NEC Multisync 4GC; NEC Technologies, 708/860-9500; estimated street price $755.

THREE-PAGE COLOR MONITORS, Nov 94
PressView 21 Display System; SuperMac Technology, 408/541-6100; $3999.

NETWORK HARDWARE

HIGH-SPEED FAX MODEMS, Oct 93
Teleport Gold and Silver with Global Fax; Global Village Communication, 415/393-8200; Gold $499, Silver $429.

REMOTE-ACCESS SERVERS, Oct 94

PRINTERS

COLOR PRINTERS, Aug 94
Low-end ink-jet: DeskWriter 560C; Hewlett-Packard, 800/752-0900; $719.

Solid ink-jet: Phaser 300; Tektronix, 503/682-7377; $999.

Thermal-wax transfer and color laser: Phaser 220; Tektronix, 503/682-7377, $5995.

DYE-SUBLIMATION PRINTERS, Jul 94
Prepress proofing—table size/fastest: Phaser 440; Tektronix, 503/682-7377; $14,995.

Prepress proofing—table size/most complete: Rainbow, 3M, 612/733-1110; estimated street price of $20,000.

Prepress proofing—letter size: ProofPositive Full Page; SuperMac Technology, 408/541-6100; $799.

General publishing and business: Phaser 1100; Tektronix, 503/682-7377; $9995.

PERSONAL PRINTERS, Sep 94
InkJet DeskWriter 500; Hewlett-Packard, 800/752-0900; $365.

Laser—$1000 to $1600: microLaser Pro 600; Texas Instruments, 214/995-6611; $1599.

WORKGROUP PRINTERS, Feb 94
High-speed: Hewlett-Packard 45 MX; Hewlett-Packard, 800/752-0900; $5499.

Best buy: Apple LaserWriter Pro 600; Apple Computer, 408/996-1010; $2529.

QUADRA II SCANNER: Hewlett-Packard, 800/752-0900; $2329.

SCANNERS/IMAGE CAPTURE

ELECTRONIC CAMERAS, Sep 94
Apple QuickTake 100; Apple Computer, 408/996-1010; $719.

LOW-COST COLOR SCANNERS, Nov 93
$1300 to $1600: La Cie Silverscanner IIc; La Cie, 503/520-9000; $1599.

Hewlett-Packard ScanJet llc; Hewlett-Packard, 800/752-0900; $1599.

Under $1300: Mirror 800 Plus Color Scanner; Mirror Technologies, 612/633-4550; $1299.

OCR, Nov 93
OmniPage Professional; Caere Corp., 408/395-7000; $995.

SYSTEMS/STORAGE

DOUBLE-SPEED CD-ROM DRIVES, Jul 93
Sheer speed: Pioneer DRV-604X; Pioneer, 800/444-6794; $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. Vista 3.5GB; Relax Technology, 510/471-6112; $3499.

SCSI-2 adapters: QuickSCSI; PLI, 800/288-8754; $499.

MACINTOSH UPGRADES, Jun 93
SE accelerator (25MHz): Quick30; Novy Systems, 904/427-2258; $449 (without FPU).

SE/30 accelerator (50MHz or 33MHz): Universal PowerCache; DayStar Digital, 408/967-2077; 50MHz $999 (with FPU), 33MHz $1499 (without FPU).

LC and LC II upgrades: Machintosh LC III Logic Board Upgrade; Apple Computer, 408/996-1010; $599.

Mac II accelerators: Radius Prophet II, Radius Rocket 25; Radius Rocket 33; Radius, 408/435-1010; 25i $1199, 33 $2499.

Universal PowerCache series; DayStar Digital, 408/967-2077; $449 to $999.

Quadra static-RAM cache card: FastCache Quadra; DayStar Digital, 408/967-2077; $299 for Quadra 700 and 900, $449 for Quadra 800 and 950.

1.3GB OPTICAL STORAGE, Dec 94
Best low-cost solution: 1.3GB Mo; Club Mac, 714/768-8130; $2099.

Best overall performance: Genesis 1300; Microtech, 203/468-6223; $2899.

PC COPROCESSING, Oct 94
OrangePC Model 210; Orange Micro, 714/779-2772; $1283.

VIDEO/DISPLAY

24-BIT VIDEO CARDS, Apr 94
Inexpensive acceleration: PrecisionColorPro 24XP; Radius, 408/435-1010; $599.

Full-featured acceleration: Thunder II GX*1360; SuperMac Technology, 408/541-6100; $4499.

HIGH-END VIDEO EDITING, Jun 94
Presentation video: MoviePal2 Pro Suite; RasterOps, 801/785-9570; $4199. VideoVision Studio; Radius, 408/343-1010; $4499.

Corporate video (offline): Media Composer 400; Avid Technology, 508/640-6789; $14,995.

Corporate video (online): VideoCube; ImMix, 916/272-9800; $40,500.

PHOTOSHOP ACCELERATORS, Apr 94
Photoblast; Radius, 408/434-1010; $999.

continues
Software

ACCOUNTING/FINANCE

GROWING A SMALL BUSINESS, Nov 93
Small-business system: M.Y.O.B.; Best Ware, 201/586-2200; $199.
Home office/personal finance: MacMoney, Survivor Software, 310/410-9527; $119.95.

BUSINESS TOOLS

STATISTICS, Oct 93
Exploratory data analysis: DataDesk 4.1; Data Description, 607/257-1000; $959.
Comprehensive package: SYSTAT 5.2.1; SYSTAT, 708/864-5670; $895.

CD-ROM

TOP 10 CD-ROMS, Mar 94
Overall: Seven Days in August; Time Warner Interactive Group, 818/955-9999; $79.99.

COMMUNICATIONS/NETWORKS

COMMUNICATIONS SOFTWARE, Aug 94
Basic connectivity: ZTerm; David P. Akerson (no phone number available); $30.
Terminal emulation: Consoft for Macintosh; Digital Communications Associates, 404/442-4000; $195.
Internet exploration: VersaTerm; Synergy Software, 215/779-0522; $125.

DOS WINDOWS EMULATION, Oct 94
Timbuk Pro 1.0.3 for Macintosh, Timbuktu 1.1 for Windows; Farallon Computing, $10/814-5000; $199 each.

HIGH-SPEED FAX MODEM SOFTWARE, Oct 93
Faxiff; Telefonix, 816/886-9800; $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; $795.

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 MODELING, Dec 94
Stand-alone modelers: Form Z; autodeskys, 614/488-9777; $1495.
Integrated-modeling packages: Strata StudioPro; Strata, 801/628-5218; $1495.

Entry-level modeler: Infini-D; Specular International, 413/253-3100; $695.

CLIP ART'S GREATEST HITS, Jan 94
Overall collection: ClickArt Studio Series, T/Maker Company, 415/962-0195; $99.95 per volume.
Electronic Clipper subscription service: Dynamic Graphics, 800/255-8800; $67.95 per month.

Metro ImageBase Electronic Clip Art; Metro ImageBase, 800/525-1552; $74.95 per volume, CD-ROM $149.95.

Images with Impact series: 3G Graphics, 800/456-0234; $99.95 to $129.95 per volume, CD-ROM volumes $50 each.

DRAW PROGRAMS (LOW-COST), Sep 93
Budget draw: Expert Draw; Expert Software, 305/567-9990; $49.95.
Budget draw/paint: UltraPaint; Deneba Software, 305/596-5604; $79.
Beginners' program: Aldus SuperPaint; Aldus Corp., 619/559-0144; $149.95.

Canvas; Deneba Software, 305/596-5644; $399.

FONT BUYER'S GUIDE, Mar 94
Text-face collection: True On Call CD-ROM; Adobe Systems, 415/661-4400; 800/682-3623; $99 (includes the ability to link two families from preselected packages) plus $25 to unlock individual faces or $69 to $179 for unlocking families.
Display/decorative-face collection: Fontek; Letraset, 201/845-6100; $39.95 per face.

Bargain collection: Monotype ValuePack; Monotype, 312/855-1440; $89 for 57 fonts.

IMAGE DATABASES, Oct 93
AdaTech Fetch 1.0; Aldus Corp., 206/628-5739; $295.
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, 305/567-9990; $49.95.

Overall program: Fractal Design Painter; Fractal Design Corp., 617/685-8800; $399.

Image-editing program: Adobe Photoshop 2.5; Adobe Systems, 415/961-4400; $895.

INTEGRATED SOFTWARE

INTEGRATED SOFTWARE, Feb 94
ClarisWorks; Claris Corporation, 408/727-8227; $299.

ONLINE SERVICES

ONLINE SERVICES, Aug 94
E-mail: America Online; America Online, 703/893-6288; basic monthly fee $9.95.
Reference: CompuServe; CompuServe Information Service, 614/457-8802; basic monthly fee $8.95.

ORGANIZATION/PRODUCTIVITY

CALENDARS, Jul 93
Alarm system: First Things First; Visionary Software, 503/246-6200; $79.95.
Smart Alarms Plus; IAM Software, 203/630-0005; $75.
All-around scheduler: Now Up-To-Date; Now Software, 503/274-2800; $99.
Meeting scheduler: Meeting Maker; On Technology, 617/373-1400; five-pack $499.

GRAPHING SOFTWARE, Aug 94
DeltaGraph Pro 3.0.4; DeltaPoint, 408/648-4000; $195.

SALES-AUTOMATION SOFTWARE, Oct 93
Contact Ease; WestWare, 619/274-5053; one user $395, five users $1495.
CBS; Colleague Business Software, 512/345-9964; $495.

TEXT-RETRIEVAL SOFTWARE, Dec 93
Small system: On Location; On Technology, 617/374-1400; $125.
Multiluser system: Personal Librarian; Personal Library Software, 301/990-1155; $995.

PRESENTATION TOOLS

PRESENTATION SOFTWARE, Jul 94
PERSUASION 3.0; Aldus Corp., 206/622-5500; $495.

UTILITIES

BRAVE NEW DOCUMENTS, Jan 94
Application-independent document distribution: Common Ground; No Hands Software, 800/598-3821; $189.95.
Book-length documents: FrameReader; Frame Technology, 800/843-7263; $84.95.

PRINTING, Sep 93
PC-printer cable packages: PowerPrint; CDT Softworks, 604/291-9121; $149.

VIRUS KILLERS, Jul 94
Commercial software: Virex; DataWatch, 919/549-0711; $99.95.
Free software: Disinfectant; free from online services.

VIRTUAL MEMORY SOFTWARE

VIRTUAL MEMORY, Jun 94
Virtual memory software: Virtual 3.0; Connectix Corp., 415/571-5100; $99.
Memory-boosting software: RAM Doubler 1.0.1; Connectix Corp., 415/571-5100; $99.
Signature Software

Personal Font™

The Original Cursive Handwriting Font

Version 1.1

Patent Pending

Font Technology Breakthrough!

Now you can add your own handwriting to the Font Menu! Signature Software's Personal Font is a custom font which can reproduce your handwriting - including the exact way that you shape and connect your letters. This unique patent pending technology will actually vary the shapes of your letters depending on the characters around them. No other font can do this!

PERSONALIZE YOUR CORRESPONDENCE

With Personal Font you can join the personal impact of your own handwriting with the convenience and power of your personal computer. Imagine running your spell checker on your handwriting! Use your word processor's cut and paste features to polish up your handwritten letters. Add a friendly handwritten P.S. note to your business correspondence. Or even sign your fax modem messages.

CREATE YOUR FONT TODAY!

For your own Personal Font, simply write the 26 words as well as the capital letters, numbers and punctuation found on the back of this page. From that sampling, Signature Software font designers will individually convert your handwriting into a custom font which duplicates the unique way you create each word - not just each letter. Your font will include your signature and will even have a name which you specify.

HANDWRITING FROM THE KEYBOARD

Personal Font captures your handwriting at its best. Your font has the same style and character as your own handwriting - without the inconsistencies and inkblots! With your own Personal Font in the font Menu you'll find yourself creating handwritten notes without hesitation - straight from your keyboard!

Since each order is custom, please allow two to four weeks processing time. If you're in a hurry, for an extra $25 Signature Software will ship your order within five working days.

Actual Handwriting vs. Personal Fonts:

- Peter's actual Handwriting
- Peter's Personal Font
  Peter Matthews - Toronto, ONT
- Colleen's actual Handwriting
- Colleen's Personal Font
  Colleen Johnson - Westport, OR

Your Personal Font can be installed and used as simply as an "ordinary" font. It appears in your menu and functions just like any other typeface in your computer.

System Requirements:

- Mac - System 6.05 or higher
- PC - Windows 3.1
- Postscript printers or interpreters. On non-Postscript printers, characters will be disconnected, just as they appear on the screen. Similar to this:

489 N. 8th St. Suite 201
Hood River, OR 97031
1-800-925-8840
1-503-386-3921

There's NO OTHER FONT LIKE YOUR PERSONAL FONT, AND HERE'S HOW TO ORDER!

ORDER YOUR FONT!

Send your completed form to:
Signature Software, Inc.
489 N. 8th St. Suite 201
Hood River, OR 97031
1-800-925-8840
1-503-386-3921

Because each order is custom please allow 2 to 4 weeks. Add $25 for 5 day processing (44 hour processing is available). *Special handling for Personal Font includes personalized disk, personal test document and copy of original form.

NAME

COMPANY

ADDRESS

CITY STATE ZIP COUNTRY

CARD NUMBER

CARD EXPIRATION PHONE

CARDHOLDER'S SIGNATURE

- Yes! RUSH me my Personal Font in 5 working days for $25 extra
- Yes! Include SUPERscripts with my Personal Font order for the special bundle price of $139

Shipping and Special Handling

United States

<table>
<thead>
<tr>
<th>Regular 57¢</th>
<th>Regular 115¢</th>
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<td>Overnight 48 State 15¢</td>
<td>Overnight 40¢</td>
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| Overnight AK HI PR 185¢ | (select one)

International

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<td>Overnight 40¢</td>
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<td>Overnight AK HI PR 185¢</td>
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For more info circle reader service number 300

For those times when you write or send a letter and want to create a letter from Signature Software, come to the scene.

"I recommend these fonts for each and every person who has shared (or read) the words, typing as "personally" - MacWorld

Also Available: SUPERScripts Cursive Font Pack
Five Fantastic Handwriting Fonts
Lisa
William
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Special Cursive Handwriting Font Bundle
Receive both Personal Font and SUPERScripts for the special low price of $139.95

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Signature Software
Personal Font

Name: ___________________________ Phone #: _______________________

Signature Software
The Original Custom Cursive Handwriting Font

SAMPLE FORM INSTRUCTIONS

1. Write your signature within the Signature box. For best results, try to ensure that the signature fits within the box.
2. Write the words shown within each box using the broken lines as a base. Begin each word on the left side of the boxes. Characters can be connected or disconnected or a combination of both.
3. Write naturally and consistently. Practice first on a separate sheet of paper. Remember, what you write here will become the final font.
4. For best results use a rolleball or fiber tip pen. Do not use ballpoint pens or pencils!
5. Use the grid lines in the boxes as an aid to maintain consistent height and slant. Be sure capital letters are proportional to lower case letters.
6. Write your capitals normally. Consider the appearance of capitals when at the beginning of words AND when words are all capitalized. Don't forget the punctuation!
7. Name your font and complete the ordering information on the front of this form. Indicate PC or MAC on card!

NOTE: Strike out mistakes and write corrections nearby. Signature Software can even make changes after you receive your font!

NAME YOUR FONT!
The name must be seven alphabetical characters or less.

adjoint
bowman
cyclops
doubt
egyptype
forgiven
grocery
hydrodyke
ionize
jewfishes
kagvels
lysozyme
mojxe
novque
oxyzobe
polygyne
quote
rybema
skyque
toyjoke
unfaxed
vogue
waywhips
xylosse
yachtque
zigzag

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HARDWARE AND SOFTWARE REVIEWS AT A GLANCE

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 review indicates quality; our reviewers assign five stars to outstanding products and one star to poor ones. The O 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.

If a product has been upgraded since our last review, the most recent version number supplied by the vendor appears in parentheses after the reviewed version number. To read a full review of any product in the listing, please consult the issue listed at the end of each synopsis.

Vendors: Please write to Macworld Star Ratings, 501 Second St., San Francisco, CA 94107 to inform us of changes in the version number or list price of your product, or of changes to your phone number.

Software

BUSINESS TOOLS

★★★★★ 4D First 1.0 (1.0.1), ACI US, 408/252-4444, $295. This entry-level relational database has 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-featured 4D. May 94
★★★★★ AccuZip 1.8.7, Software Publishers, 800/233-0555, $589. Bulk-mail software has informative progress indicators, low rates, and flexible parsing during import, but the interface is incomprehensible. Sep 94
★★★★★ BaseMap 1.0.1, GeoPoint, 415/957-1560, $149. For simple maps displaying single 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 Mailer CASS 1.00d, Sator! Software, 206/443-0765, $150. Unattended operation is possible with this bulk-mail software, but batch processing is slow and the program has coding problems. Sep 94
★★★★★ ClarisImpact 1.0 (1.0.3), Claris Corp., 408/727-8227, $399. Business graphing, project management, object-oriented drawing, word processing, and presentation functions merge in this business graphics software. The outstanding integration offers versatility that dedicated programs are pressed to match. Jun 94
★★★★★ Cricket Graph III 1.5 (1.5.2), 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, $255. Compact business-simulation software is fast enough for complex projects and can pay for itself in disaster avoidance. May 94
★★★★★ Decision Analysis 2.5, TreeAge, 800/254-1911, $379. Decision-assistance software handles complex business cases by constructing tree diagrams of probabilities and payoffs. It offers a type of modeling that is more realistic and easier to modify than other options. Nov 94
★★★★★ DeltaGraph Pro 3 (3.5), DeltaPoint, 408/648-4000, $195. At its new lower price, this charting program is the best introductory-for-feature-value package in Macintosh charting. There's even a new Chart Advisor function that suggests the appropriate display for your data. Apr 94
★★★★★ Extend-BPR 3.0, Imagine That, 408/365-0305, $990. Business-modeling software includes superior templates for business-process reengineering, but some programming experience is helpful. Oct 94
★★★★★ FastTrack Schedule 2.1, AEC Software, 703/450-1980, $275. Simple project-management software is ideal for managers who need to put together a schedule quickly and easily, but if you require more power, you'll need a more comprehensive program. Sep 94
★★★★★ Helix Express 2.01 (2.0.4), Helix Technologies, 708/465-0242, $589. Icon-based relational-database software's improved performance makes it a serious competitor for all-Mac networks. Especially notable is its much faster speed; multiuser operation is down right snappy. Jul 94
★★★★★ Map II.5, ThinkSpace, 519/859-5047, $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
★★★★★ MicMac 2.0v1, Nirvana Research, 408/459-0663, $50. The concept of Mac as a general-purpose modeler is undeniably attractive, and Nirvana Research has pulled it off well. It takes lots of hard drive space to save recordings, though. Nov 94
★★★★★ Microsoft FoxPro for Macintosh 2.5 (2.6), Microsoft Corp., 206/882-8000, $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, it offers excellent performance. Apr 94
★★★★★ Office Tracker 1.1, Milum Corp., 512/327-2255, $195 to $395. The efficient user interface of this software sign-off board makes it easy to learn and use, but it has some minor flaws. Dec 93
★★★★★ Pablo 2.0.1 (2.0.3), Andeye Computing, 613/548-4355, $695. This effective end-user data-reporting tool puts a considerable workload on the corporate information department, but it sidesteps the hassles of SQL data access and produces great reports with minimal effort. Jul 94
★★★★★ Street Atlas USA 2.0, Delorme Mapping, 207/865-1234, $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
★★★★★ TeamFlow 3.1, CFM, 617/275-2528, $295. Total Quality Management flowchart software is a valuable business tool. It report printing and customizability are limited, however. Nov 94
★★★★★ TopDown 4.0 (4.1), Kaetron Software Corp., 713/298-1500, $345. Flowcharting program's support for custom symbols and automatic drawing aids, along with its ability to let you easily create and navigate lower-level charts, make it a productive tool. Jul 94
★★★★★ 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
★★★★★ ZipZapp 1.0, True Basic, 603/298-8517, $39.95. You can use this data-referencing 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
★★★★★ ZM 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, $259.95. 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. Compendium communications product has a strong feature set but complex script editing. You must manually enter phone numbers each time you use it. Apr 94
★★ Delrina FaxPro for Macintosh 1.0 (1.5.1), Delrina Corp., 408/383-2345, $129. Fast, efficient fax software has an excellent address book but also has some interface quirks and minor bugs. Feb 94
★★★★★ DOS Mounter Plus 4.0, Dayna Communications, 801/269-7200, $100. File-transfer and translation utility works with floppy removable drives, and network volumes and supports wild cards in DOS extensions. Apr 94
★★★★★ EtherPeek 2.0 (2.0.4), LocalPeek continues
Star Ratings

2.0.3 (2.0.4), TokenPeak 1.0 (2.0.3), AG Group, $510/937-7900, $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, DataViz, 203/268-0030, $149. If your PC Net is 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., 510/644-2223, $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 PowerPoint utility looks at what's hooked up to your computer and adjusts accordingly—for example, printing only when a printer Is available. Dec 93

PowerShare Collaboration Servers, Apple Computer, 415/872-0510, $599. Before this collaboration software will be ready for prime time, Apple needs to overhaul the complex Admin application, and serious diagnostic aids, provide comprehensive documentation, and offer knowledgeable technical support at a price less that of the program itself. Aug 94

Silver Cloud 1.2 (1.2.1), AG Group, $510/937-7900, $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 simpler. Feb 94

Sitcom 1.0 (1.0.1), Aladdin Systems, 408/761-6200, $520. 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. Apr 94

Snap Mail 1.0, Casady & Greene, 408/848-9228, $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, Insight Solutions, 415/694-7600, $499. While the speed of the Windows PC emulator is greatly improved, buying an add-on PC card for your Mac is more efficient. Mar 94

SoftWindows 1.0, Insight Solutions, 415/694-7600, $499. You can run Windows software on a PowerMac with this emulation software, but although it's a viable solution, you pay the price in terms of performance, compatibility, and actual cost. Aug 94

Timbuktu Pro 1.0 (1.05), Farallon Computing, 510/814-5000, $199 to $1999. Terminal emulation 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 II 2.0 (2.1), Neon Software, 510/283-9771, $495. Without printing alarms, triggers, or true protocol support, this AppleTalk traffic-monitor misses the mark. Jun 94

VersaTerm 5.0 (5.04), Synergy Software, 510/799-0523, $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. Jan 94

White Knight 12.0, The FreeSoft Company, 412/846-2700, $139. While this telecom software can be bewildering, it works impressively well. If you're willing to read the manual from cover to cover, the program may become your favorite telecom tool. Nov 94

AboutFace 1.1.1 (1.1.2), Big Rock Software, 216/288-2860, $69.95. Type-specimen generator has many serious deficiencies that need to be addressed. Jan 94

CheckPost 1.3, Working Software, 408/423-5969, $249. Interface aside, this imageretter­simulation software is generally disappointing. It can't automatically scale pages, it prints on a single sheet, and its error reporting is limited. Nov 94

ClickBook 1.1, BookMaker Corp., 415-354-8161, $69.95. If you need to create inexpensive booklets quickly and without hassle, this print utility that helps you format documents in double-sided booklet form is an excellent tool. Nov 94

FontChameleon 1.0.1, Ares Software Corp., 415/578-9090, $295. Font utility builds serif and sans serif fonts from a master outline file, plus the ability to customize fonts. Sep 94

FontMaker 1.0, Monotype Typography, 312/855-1440, $799. 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., 214/660-2060, $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. Apr 94

FrameMaker 4.0 (4.04), Frame Technology Corp., 408/433-3311, $895. For such projects as books and instruction manuals, this desktop publishing program is one of the best tools available. It's fast, well mannered, and a real time-saver. Mar 94

LaserCheck 1.0, Systems of Merritt, 205/660-1240, $199. Imageretter-simulation software has a capable engine, but it's not a complete color management system. Inferior tech support and poor documentation were only part of the problem. Apr 94

Print Shop Deluxe 1.0 (1.1), Broderbund Software, 415/882-4400, $949. Even the most ham-fisted can create greeting cards, signs, banners, letterhead stationery, and calendars with these desktop publishing templates and graphics. Apr 94

ReadySetGo 6.0.2, Manhattan Graphics Corp., 914/725-2048, $395. There's no stronger reason not to use this desktop publishing software if its tools meet your needs, but there's no compelling reason to choose it, either. Its low price is nice, but not enough. Oct 94

Tableworks Plus 1.05, 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

Creative Writer 1.0, Microsoft Corp., 206/882-8080, $549.50. Graphics/page-layout/word­processor hybrid offers some terrific type effects, zany sounds, and bright graphics. While it doesn't teach kids to be better writers, it does encourage them to develop ideas and provides a fun vehicle to express those ideas creatively. Sep 94

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

Grolier Multimedia Encyclopedia, Grolier Electronic Publishing, 203/797-3530, $399. CD-ROM encyclopedia has excellent search capabilities, weighs much less than a shelf of books, and is loaded with fun. Its timeliness and some technical snafus were slight problems. Jul 94

How Computers Work, Time Warner Interactive Group, 812/955-9999, $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 many multimedia functions through easy­to-use dialog boxes, but the interface doesn't always follow Apple guidelines. Dec 93

MacGrade 1.5.5 (2.2.7), CallEd Software, 800/795-0641, $85 to $245. 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, Fairchild Language Technologies, 703/432-6166, $399.50. Foreign-language instruction on CD-ROM is a valuable educational tool and fun to use. Jan 94

Small Blue Planet 2.1.1, Now What Software, 415/685-3432, $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

Crystal Crazy, Casady & Greene, 408/848-9228, $49.95. Ultraglossy, superlative version of the classic Crystal Quest is a challenging and fun without being overly difficult. Each level retains some old elements, and adds some new ones to keep you on your toes. Jun 94

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 latest combat flight simulator. Dec 93

Firefall Arcade 1.0 (1.0.2), Inline Software, 617/935-1515, $49.95. If you loved the classic video game Centipede, or are just looking for a fun shoot-em-up, this arcade-style game will satisfy. Jun 94

Hell Cab 1.0.1, Time Warner Interactive Group, 812/955-9999, $35.97. Take a diabolical New York cabbie with a penchant for time travel, toss in the Empire State Building, 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 it succeeds. Jan 94

Myst 1.0 (1.0.1), Broderbund Software, 415/382-4400, $59.95. The smooth pacing of actions and sounds in this beautiful CD-ROM game will make you gape and go "wow." Sep 94

Publishing Template and Graphics, 415/896-2700, $249.95. 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

SiCafe 2.0 (2.0), Silicon Graphics, 510/525-9700, $549.50. 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 lovely. Jun 94
FINANCE/ACCOUNTING

Andrew Tobias's TaxCut 1993, MECA Software, 208/255-1441, $79.95. The free-form approach and flexible Help menu of this tax-preparation software make filling out your tax return a smooth, almost relaxing process. Apr 94

ExpensPlus 1.0.1 (1.0.2), State of the Art, 714/753-1222, $139.95. Software uses a Newton MessagePad to record expenses, then sends data to a Mac to create expense reports. While it's a real time-saver, you'll need AppleScript expertise to modify the reports. Apr 94

Financial Competence 1.5, Competence Software, 603/435-5098, $99. Business economics tutorial explains how financial statements are compiled and how they relate to each other, but you could learn the same things from a book. Jul 94

MacinTax 1993, Intuit, 602/295-3110, $69.95. Tax-preparation software provides a reasonably detailed manual and a reliable, structured interface for building your tax return. Its inability to accept figures containing amounts in cents or round off to whole dollar amounts will frustrate some users. Apr 94

MacinTax Tax Planner, Intuit, 602/295-3110, $29.95. Software allows you to construct a five-year forecast of your tax liability, projecting tax figures through 1997 in a concise summary format. If you have a tax preparation program, you can do the same thing by creating alternative tax returns. Apr 94

MacinTax Tax Savings Guide, Intuit, 602/295-3110, $19.95. Simple, straightforward collection of tax tips and suggestions is designed to help you better understand your tax return and reduce your tax liability. Although strong in content, it doesn't allow you to copy and paste, export as a text file, or even print. Apr 94

MacMoney 4.01, Survivor Software, 310/410-9527, $89.95. Personal-finance software has new and improved features that will please longtime users, but it hasn't kept up with the leaders in the field and won't win many new converts. Jul 94

Managing Your Money 6.0, MECA Software, 203/255-1441, $79.95. Personal-finance program does a good job if somewhat roundabout job of keeping track of your total financial picture. Although it isn't as easy to use as the competition, it excels in tax, investment, and financial planning. Jun 94

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 tile patterns, 220 fonts, and the Acrobat Distiller and Exchange utilities. Sep 94

Aldus FreeHand 4.0 (4.0a), Aldus Corp., 206/622-5500, $595. The 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), Deneba 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 allows you to combine and composite multiple RGB images stored in PICT, TIFF, and Photoshop 2.5 formats. While it's functional and indisputably easy to use, its oversights, including slow screen redraw with a Interrupt option, are nearly as numerous as its benefits. Jul 94

Dabbler 1.0, Fractal Design Corp., 408/688-5300, $99. Art-education and paint software provides an excellent paint set with an appealing if slightly quirky interface. at a great price. Nov 94

DeBabelizer Lite 1.0 (1.1), Equilibrium Technologies, 415/332-4434, $129. Terrific graphics utility converts graphics files from one format to another. It offers a choice selection of capabilities at a nice, slim price. Aug 94

DesignWorkshop 1.0 (1.1), Artifice, 503/345-7421, $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 modelling, rendering, and animation features, with a straightforward interface. Feb 94

IntelliDraw 2.0, Aldus Consumer Division, 619/558-6000, $129. Wonderful general-purpose graphics package works well, does a great job of automating drawing tasks, and is straightforward. Despite its breadth of features, it always feels approachable. Sep 94

Kali'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 and the artwork you can create. May 94

Koyn Fractal Studio 2.0 (2.1), Koyn Software, 314/876-9125, $119.95. Software lets you generate beautiful fractals of your own design. It's a reasonable choice if you are interested in fractal or self-similar naturalistic forms, but it's not an all-fractals-for-all-people package. Aug 94

LogoMotion 1.0, Specular International, 413/253-3100, $149. Easy-to-use 3-D package is eminently affordable. It's a terrific program, both for creating flying logos and as an entry-level 3-D package for nonprofessionals. Nov 94

MacroModel, Macromedia, 415/252-2000, $1495. This 3-D modelling software is a solid resource to have along when you venture out into 3-D space. The interface is elegantly simple, making the Mac's inner space a more pleasant place to work. May 94

MetaFlow!, The VALIS Group, 415/425-5404, $595. Graphics utility yields interesting visual effects with a minimum of fuss. It imparts elasticity to 2-D images, letting you push and pull collections of pixels while retaining the visual integrity of the image. Aug 94

MiniCad 5, Graphisoft, 410/290-5114, $795. Excellent CAD software for the Power Mac offers major performance for its price. It's admirably easy to learn. Nov 94

Paint Alchemy 1.0, Xao Tools, 415/487-7000, $599. For the price, these plug-in graphics effects are a tremendous value that both casual users and professional artists can use to design a little chaos into their work. May 94

PhotoMatic 1.01, DayStar Digital, 404/967-2077, $199. AppleScript-based utility lets you automate tasks in Adobe Photoshop 2.5 or later. Although it's limited, it can relieve you of some mundane chores. Nov 94

Pointillist, Pictor GraFX, 310/865-0495, $399.95. Carefully wacky stegosaurus software creates images that look, at first glance, like random dots, but as you focus, a 3-D image appears. 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, misleading features, and sluggish performance are problems that need to be rectified. Jul 94

ScanPrep Pro 1.2, ImageXpress, 404/564-9124, $695. Adobe Photoshop add-on automates the scanning and image-processing process and produces good results, although the program is somewhat unwieldy. Nov 94

Scenery Animator 1.0.4 (1.1), Natural Graphics, 916/624-1436, $149. Landscape rendering and animation software uses U.S. Geographical Survey data to create remarkably realistic 3-D representations of terrain. Aug 94

Showplace 2.0 (2.1), Pixar, 510/236-4000, $495. Adequate, entry-level, 3-D modeler is suitable for illustration. 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 (3.1), Strata, 801/629-5218, $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

TerraCero 1.0, Xao Tools, 415/487-7000, $199. Turning a random group of pixels into a geometric pattern may not be everyone's consuming passion, but this plug-in graphic-effects module has definite appeal for a select niche of designers. Nov 94

Typetext 2.0 (2.1), Pixar, 510/236-4000, $299. An approachable interface, animation support, and outstanding Renderman rendering technology make this 3-D type-renderer a popular choice. This version improves on the original, but still lacks canned positioning effects. Jun 94

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 it 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, 617/776-3427, $250. If you're taking the MCAT, you'd be nuts not to buy this interactive science review. With proper use, its 9MB of files are certain to improve your score. Apr 94

CSC ChemOffice 2.0, Cambridge Software continues...
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entific Computing, 617/491-6862, $995. Comprehensive chemistry software is the Atac equivalent of software that seven years ago would have cost $200,000 and required an equally costly minicomputer. Feb 94  

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  

KaleidaGraph 1.1, P5I International, 410/821-5980, $495. Scientific software reads scanned chemical-structure drawings and interprets them, giving both a diagram for checking interpretation accuracy and a formal string representation of the structure. Nov 94  

LabView for Mac 3.0, National Instruments, 512/338-9119, $1995. For large-scale, demanding projects in data acquisition and analysis, this scientific software is an unchallenged standard. Jul 94  

Maple V 3.0, Waterloo Maple Software, 519/747-2373, $795. If you prefer to do your own programming and function creation, you’ll benefit from this symbolic mathematics software’s efficient use of your Mac’s resources. This version helps most of the points on your symbolic-math wish list. Oct 94  

MATLAB 4.1, The Math Works, 508/653-1415, $1695. Relatively expensive numerical math software has added nearly 100 new graphics commands, improved its treatment of sparse matrices, and added commands for sound processing. Its toolboxes make it a first-rate choice for many applied-science specialties. Nov 94  

OC Tools 1.0, Abacus Concepts, 510/540-1499, $245. Quality-control tool kit for StatView appears to introduce a slight slowdown in program response, but is generally well designed. 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, Scientific Vision, 301/593-0317, $135. If you have piles of data and don’t need animated bar-charts in 24-bit color, this spreadsheet plotting software should be in your analysis tool kit. Jun 94  

SpyglassPlot 1.0, Spyglass, 217/355-6000, $295. This scientific-plotting software is 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  

Turing World’s 3.0, CSl Publications, 312/568-1550, $199.55. 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. Jan 94  

ORGANIZATION/PRODUCTIVITY  

Arrange 1.1 (2.0), Common Knowledge, 415/235-9900, $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  

DateBook & TouchBase Pro Bundle 4.0, Aldus Consumer Division, 619/558-6000, $89.99. Personal information manager package is now easier to use and offers many new features. The excellent linking between contacts and calendar is the most significant feature. Sep 94  

DateView 1.0.1 (1.0.2), 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. In Touch, Aug 94  

Dynode for Macintosh 3.5, Portfolio Software, 802/434-6400, $69.95. Although this program doesn’t currently link to a calendar program, it is an excellent contact manager. This upgrade has a few new features, improved performance, and an easier-to-use interface. Sep 94  

First Things First Proactive 1.1, Visionary Software, 503/246-6200, $149. Capable scheduling program has some convenient features. It’s worth a look if you don’t have to share information with a contact manager. Nov 94  

Full Contact 2.01 (2.0.2), FIT Software, 408/562-5990, $169. Personal information manager can handle with speed and style tasks that would choke other products, but frequently, using it feels like a full-time job. Aug 94  

In Control 3.0.4, Attain Corp., 617/776-1110, $85. Excellent to-do-list manager and outline, coupled with a good calendar is 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 but could add some features, such as file reconciliation. Mar 94  

Rae Assist 1.0.2 (1.5), Rae Technology, 408/725-2850, $599. 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 multi-day events and label grouping. Aug 94  

PRESENTATION TOOLS  

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  

Authorware Professional 2.0.1, Macromedia, 415/252-2000, $4995. Multimedia authoring and -presentation software lets you develop complex presentations with amazing speed. Although expensive, it’s wonderfully done. 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. Oct 94  

Deck II 2.1, OSC, 415/252-0460, $399. AV Macs turn into digital-audio workstations with this software that enables you to record, mix, modify, and play back CD-quality sound. It doesn’t include equalization features. Jun 94  

Elastic Reality 1.0 (1.2), Elastic Reality, 608/237-6585, $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  

FlipBook 1.0, S. H. Pierce, 617/338-2222, $59. Animation printing utility lets users make flip-books (consisting of a series of printed images that, through application of an extremely technical thumbnail-and-forelorder method. appear to move) out of QuickTime movies. RCS animators, and programs make leap into multimedia easier and more rewarding. Sep 94  

HyperCard 2.2, Apple Computer, 408/996-1010, $249. Authoring tool strikes a good balance between power and ease of use, and its price is reasonable. It may not satisfy all your wishes, but it should keep you happily building stacks 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, 619/454-6836, $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 2.0.2, Interactive Solutions, 415/377-0136, $295. With diligence you can get decent results with this all-in-one QuickTime-based multimedia package. But other entry-level programs make leaping into multimedia easier and more rewarding. Sep 94  

The Multimedia Workshop 1.0, Davidson & Associates, 310/793-0600, $79.95. Children or adults can use this media-integration tool without big investments of either time or money. It’s full of compromises, though, such as the inability to layer narration over music. Nov 94  

Passport Producer Pro 1.0 (1.1.2), Passport Designs, 415/726-0280, $995. Superb, 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, $339. Users have plenty of new features to cheer about, including improved tool palettes, extensive charting options, and hypertext functions with this presentation graphics program’s upgrade. High memory and disk-space requirements are drawbacks, however. Sep 94  

QuickFlix 1.0 (1.1.1), VideoFusion, 419/891-1090, $149. Approachable QuickTime movemaking software lacks the high-end features of other programs but costs a whole lot less. Feb 94  

PROGRAMMING  

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. If you’re an image processing professional, you should consider adding it to your tool kit. Oct 94  

Object Master for Think C and C++, ACI US, 408/252-4444, $255. Object-oriented development environment is full of goodies and will pay for itself in about a week due to increased programmer productivity.  

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Star Ratings

**Apple Personal Diagnostics, Apple Computer**, 408/996-1010, $129. In trying to make a hardware tool for the rest of us, Apple has come up short. This hardware-diagnostic utility has an uneven manual, some less than thorough tests, and a surprisingly unsatisfying interface. Nov 94

**AppleSearch 1.0, Apple Computer**, 408/996-1010, $179.9. 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.**, 203/448-6100, $69.95. Control panel and application automatically catalog the disks you mount on the desktop. It has a few problems, including limited search expressions, 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, $59.95.** Mapping software tells you how to get to where you're going better than any other map or atlas our reviewer has seen. Although screen redraw is slow, it's worth it for the written directions and maps the program has to offer. Jul 94

**CD AllCache 2.0, CharisMac Engineering, 916/885-6090, $195.** CD-ROM caching software 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 1.0.1 (1.1), PWB, 415/474-8055, $579.** Software accelerator can halve the time it takes to open files and search on a CD-ROM. The product supports a wide variety of formats and CD-ROM drives, but users should be aware that playback of QuickTime movies is uneven. May 94

**Conflict Catcher II 2.1.1, Casady & Greene, 408/484-9228, $79.95.** Customizable, fast, and safe extension-management utility goes well beyond the bases. 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

**CryptoMatic 1.01, Kent Marsh, 713/522-5625, $99.** Security software offers fast Finder-level encryption and decryption with effective file removal. Although its simplest encryption algorithm isn't quite hack-proof, it's worth considering. Feb 94

**DiskDoubler 4.0, Symantec Corp., 503/334-6054, $79.95.** In pure efficiency terms, this file-naming utility comes with terrific tools for building new icons, including an outstanding thumbnail feature that builds custom icons from graphics files. Aug 94

**Drive? 3.0, Casa Blanca Works, 415/461-2227, $79.95.** Highly recommended hard-drive formatting utility easily formats and partitions most drives and provides all the options you need. And within its limitations, its Mount Cache utility provides a real performance boost. Nov 94

**DupLocator 1.03, Midnight Software, 303/933-1013, $99.** For new Macintosh users who don't have a general file utility, this software locates duplicate files, as well as performs basic file commands such as moving and renaming files, may be useful. Jan 94

**Icon-Mania 1.0 (1.01), Dubl-Click Software, 503/317-0355, $69.95.** Delightful icon-editing utility comes with terrific tools for building new icons, including an outstanding thumbnail feature that builds custom icons from graphics files. Aug 94

**Icon-It Pro 3.0.6, Olduvai Corp., 305/670-1112, $129.** Utility allows you to attach custom tool bars to almost any application, including the Finder. The interface is quirky, but you get used to it. Dec 94

**Iconic Collection, Screen Saver, 805/334-6054, $59.99.** Colorful, inexpensive utility lets you bring order to disorganized disk collections. Aug 94

**IconTop 4.5 (4.5.1), PrairieSoft, 515/225-3720, $99.95.** Organizing a cramped hard drive is a more manageable task with this simple but powerful file-management utility that lets you copy, move, rename, delete, and find files—without using the Finder. Jul 94

**Iconic Collection, Screen Saver, Berkeley Systems, 510/540-5535, $49.99.** Mickey, Goofy, Peter Pan, Ariel, and other Disney favorites cavort around your screen with this screen saver that includes 16 different modules. Mar 94

**JetDrive 3.0, Casa Blanca Works, 415/461-2227, $79.95.** Highly recommended hard-drive formatting utility easily formats and partitions most drives and provides all the options you need. And within its limitations, its Mount Cache utility provides a real performance boost. Nov 94

**Maxima 3.0, Connectix, 415/571-5100, $99.** If you have more than 8MB of RAM, you can use some of it as a RAM disk, speeding up disk-based operations, with this inexpensive utility. Nov 94

**MiniDisk PB 1.0 (3.0), Symantec/First Generation Systems, 503/334-6054, $59.99.** PowerBook security software balances robust security with simplicity and ease of use. We keep it out all but the most determined. Jan 94

**Mickey Mouse Reader, Disney, 916/882-4420, $579.95. CD-ROM accelerator and safe extension-management utility goes well beyond its competition. It includes disk-and-file maintenance, disk repair, virus protection, and backup. Mar 94

**Minibeam 1.0 (1.0), DigitalAudio, 415/232-6900, $149.** Recovering damaged files with a snap this utility package that fills more disk problems than its competition, it includes disk-and-file maintenance, disk repair, virus protection, and backup. Nov 94

**Minibeam 1.0 (1.0), DigitalAudio, 415/232-6900, $149.** Recovering damaged files takes a snap this utility package that fills more disk problems than its competition, it includes disk-and-file maintenance, disk repair, virus protection, and backup. Nov 94

**Mr. File 2.0, Softworks, 408/978-9167, $99.95.** The well-designed background capabilities of this Finder utility make it a handy tool for copying, finding, moving, launching, and renaming files, although it has a few interface quirks. Dec 94

**Now Compress 1.0 (1.0.1), Now Software, 503/274-2899, $59.99.** Compression utility is easy to use and complete, and it compresses as well as or better than other options. Dec 94

**OptiMem 1.4.1 (1.5.6), Jump Development Group, 412/681-2692, $129.** Systemwide memory management monitors RAM use and allocates RAM where it’s needed. Works best with software that handles minimum-memory situations effectively. Mar 94

**PowerAgent 1.1, Snowflake Software Corp., 305/858-8416, $159.** You can revolutionize your Macintosh work with this agent program that manages scripts. It provides excellent support for FileMaker Pro, but unfortunately in many other mainstream applications scripting is difficult to implement. Nov 94

**PowerMerge 2.0, Leader Technologies, 714/757-1787, $129.** Powerful file-management tool helps you keep individual files, folders, or entire volumes organized and up-to-date. This version lets you compare and launch documents, rename files, trash superfluous files, and lots more. Aug 94

**Power To Go 2.0, Claris Corp., 408/727-B277, $39.** PowerBook utility collection has a few unique slants—including a floating palette that can display battery life estimates—that keep it above the also-rans. It does lack features of similar products. Dec 93

**ProFiles 1.0, Dayna Communications, 801/269-7200, $129.** Unusual utility lets you group related files and folders for quick access and actions such as making aliases, copying, turning sharing on and off, and more. The recommended RAM allocation of 1MB may be a problem for computers with limited memory. Aug 94

**QuickKeys 3.0, CE Software, 515/221-1801, $139.** The simple, unimposing interface of this macro-building utility allows you to build a set of useful shortcuts quickly. Mar 94

**RAM Doubler 1.0.1 (1.1), Connectix Corp., 415/571-5100, $99.** Inexpensive system extension doubling available RAM for many Mac users. There are a number of requirements, however, including System 7, 4MB of physical RAM, and a 68030 board. May 94

**Redux Deluxe 2.0.2 (2.5.1), Inline Software, 617/935-1515, $79.95.** Easy to learn and relatively simple to use, this backup program has some powerful features, such as scripting, but it doesn’t have a compression option. Jan 94

**SAM 3.5.8 (4.0), Symantec Corp., 503/334-6054, $99.99.** Efficient, thorough virus-protection software slows down system startup and application launching, but this program is a worthwhile investment for anyone who exchanges or downloads files. Mar 94

**SCSI Director Pro 3.0.6, Transoft Corp., 805/653-5200, $99.** Utility provides simple, one-button hard disk formatting, but when it comes to doing some of the fancy tricks described on the program’s box, the going gets rough and technical support costs $190 per minute. Sep 94

**Stop & Go 4.0, Engramp International, 415/455-1100, $69.99.** File-protection/relaunch utility uses a portion of your hard disk to save a snapshot of the data in your Mac’s RAM. It’s fast, and it relaunches files, applications, and extensions in a single, unified process, but it’s unduly complicated. Oct 94

**Tempo II Plus 3.0.9 (3.0.9a), Affinity Microsystems, 303/442-4840, $179.95.** Very capable macro-creating utility may be daunting for novices but offers plenty of power for advanced users. Mar 94

**Stop**
You want to double productivity.

That's why we put MagicScan™ in every UC1260 scanner we make.

High resolution color scanning doesn't have to be a complicated process. Not with the UMAX 1200 dpi UC1260 color flatbed scanner on your side.

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The secret? MagicScan. UMAX's intuitive plug-in scanning software enables the UC1260 to provide FASTER, easier and more versatile image manipulation than any other scanner manufacturer.

MagicScan offers a wide range of useful controls including MULTIPLE/BATCH SCANNING, allowing you to scan several images at once; a DESCREEN function that automatically removes screen patterns from halftone images; an AUTO ADJUSTMENT checkbox that lets you immediately preview any image changes through the highlight, shadow and gamma correction settings; and an INVERT BUTTON, which instantly creates a brilliant positive from a negative original—and vice versa. It's the ultimate user interface.

To add even greater PRODUCTIVITY, the UC1260 offers a maximum resolution of 9600 dpi for smoother line art if you ever need it, a built-in SCSI II interface, Macintosh™ and Windows® compatibility. And you can get the full version of PhotoShop™ and Kai's Power Tools™ with our Pro version and PhotoShop™ LE and OmniPage™ Direct™ with our LE version.

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New ClarisWorks 3.0 software for Macintosh
When you’re the best-selling software for Macintosh, you not only feel grateful, you feel downright generous. But ClarisWorks® 3.0 won’t offer you a goofy gift you’ll never touch, instead you’ll get a personal organizer that’s as indispensable as ClarisWorks itself.

Why is ClarisWorks such a hit with more than two and a half million Macintosh users? Because it perfectly integrates all the functionality of six software applications into one—with a streamlined feature set and responsiveness that gets the job done fast. For example, you can instantly add graphics, charts or a spreadsheet to your text with just a couple of mouse clicks—unlike other “works” and “office” products that seem to take forever to finish the task.

With ClarisWorks you can dash off correspondence, memos and reports. Create and give stunning presentations and slide shows straight from your desktop. Work on budgets and proposals. Develop outlines, review customer lists, create mailing labels and much more.

If you’re in a hurry, let new Claris Assistants step in to do the hard work for you. Assistants guide you through complex tasks like creating tables, and give expert advice on design for newsletters, presentations and more. You’ll also find 150 push-button “Shortcuts” that reduce multistep tasks to a single mouse click.

Even without free Claris Organizer, ClarisWorks 3.0 is still an exceptional value for every Macintosh user. And if you already own ClarisWorks, you can upgrade to version 3.0 for a special price. So see your Claris dealer today, or pick up your phone to order now!

Don’t let another year pass without ClarisWorks on your Mac—and a free gift you can really sink your teeth into.

Free with your order!
Buy ClarisWorks 3.0 before January 31, 1995 and get seven fonts, 75 clip art images, and Claris Organizer (a $99 value that integrates calendars, contacts, to-do’s and notes) absolutely free!

1800 293 0617 ext. 436
Star Ratings

TimesTwo 2.0, Golden Triangle Computers, 619/587-0110, $149. This driver-level compression utility is transparent and robust. It caused no problems through a two-month course of testing, on a system with myriad utilities and system software tools. Mar 94

Toner Tuner 1.0.3 (1.06), Working Software, 408/423-5696, $24.95. Inexpensive, incredibly useful extension adds a sliding bar to print dialog boxes allowing you to adjust the amount of toner applied to each print job. Dec 93

ultraShield 1.252 (2.0), ures2 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. Jun 94

Virex 5.0 (5.03), Datawatch Corp., 919/549-0711, $99.95. The extremely fast, trouble-freeformance of this software makes the task of guarding against computer viruses almost painless. Its speed puts it ahead of the pack. May 94

Working Markermaker 1.0.2 (1.06), Working Software, 408/423-5696, $49.95. Simple, useful system extension allows you to print or fax "markermarks" in the background of virtually any document. Although it has imperfections, 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. 333, $129.95. Musikmanship program teaches pitch and interval recognition, sight singing, and intonation. Although the interface is nonstandard, it's logical and easy to learn. May 94

Finalo 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 93

Macintoshers 1.0.1 (1.2), 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 zygotes, although it doesn't include any reference to alternative therapies. Sep 94

Mayo Clinic: The Total Heart 1.0, IVI Publishing, 612/686-0779, $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 $249. Music-notation program is geared for hobbiests and students. If your needs aren't complex, it may fit the bill, at a great price. Oct 94

SAM-CD, Scientific American Medicine, 212/754-0550, $395. Despite a few shortcomings, this medical reference work—a series of electronic books 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

OmniPage Professional 5.0, Caere Corp., 408/395-7000, $695. In a historic first for OCR, this Power Mac software has an accuracy of 100 percent on good text samples. It does still make occasional baffling minor errors on real-world documents. Nov 94

The Oxford English Dictionary, Oxford University Press, Electronic Publishing, 212/679-7300 ext. 7370, $859. CD-ROM dictionary contains 20 print volumes, including half a million words, but the flaws, omissions, unlikelihood, and unforgivably poor design are unbearable. Apr 94

Random House Unabridged Dictionary, Random House Electronic Publishing, 212/572-2600, $179. 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 dictionaries on CD-ROM. May 94

TextBridge 2.0, Xerox Imaging Systems, 508/977-2000, $599. Optical character recognition software is impressive on good-quality scanned text, but can be trained and automated. You won't find that anywhere else at this price. Sep 94

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 dinky 600K partition) and graceful interface will continue to win it fans. This version adds elegant table capabilities and several PowerBook-friendly features. Jun 94

Hardware

INPUT DEVICES

Drawing Slate, CalComp Digitizer Division, 714/821-2000, $395. Digitizing tablet is a good, compact, low-cost implementation of pressure sensitivity, although the battery-operated stylus is a bit heavy. Jun 94

Ear Phone Streamline AV, Jabra Corp., 619/622-0764, $169. As a hands-free telephony tool—and as a replacement for the Apple PlainTalk microphone—this telephone/speech-recognition carcass is a winner. Its biggest drawback is that you can't hear other Mac sounds when it's plugged in. Jul 94

Mac Keyboard Deluxe, MicroSpeed, 510/490-1453, $125. If you're in the market for a new or replacement keyboard, this one, which is both smaller and lighter than Apple's Extended Keyboard, is worth considering. It has four ADB ports. Nov 94

PenDirect ADB, FTC Data Systems, 714/995-9000, $59. 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 device is interesting, it's not for everyone. Feb 94

Wacom UD-1121R, 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

AC5100, Actel 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 lack noticeable bass. Dec 93

AC5150, Actel Lansing Consumer Products, 717/296-2818, $150. Subwoofer rounds out the sharp tones of the AC5100, 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 comfortably high volumes, but the bare-wire-and-terminal connections aren't user-friendly. Dec 93

Apple Newton MessagePad, Apple Computer, 408/996-1010, $599. Although Apple released this personal digital assistant too early and marketing hype led to mistaken expectations, this is a very intelligent piece of work. 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, Lyrinx, 213/952-3000, $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, $449. 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, $207.05. 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

PowerPlate, Technogén, 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 PowerBook 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. Mar 94

continues
**BUYERS' TOOLS**

**Star Ratings**

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Manufacturer</th>
<th>Features</th>
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</thead>
<tbody>
<tr>
<td>RCD-202, Pinnacle Micro</td>
<td>714/727-3300, $249.5. Writable CD-ROM drive is good for archiving data simply and inexpensively, but it's incompatible with many hard drives.</td>
<td>Mar 94</td>
</tr>
<tr>
<td>SCSi Sentry, APS Technologies</td>
<td>816/483-6100, $599. Although the price of this terminator may seem steep, this device may well be the cure for SCsi woes. Our reviewer heartily recommends it.</td>
<td>Sep 94</td>
</tr>
<tr>
<td>ThinPack, VST Power Systems</td>
<td>508/287-4600, $1,199.5. External battery pack for PowerBooks is compact, with a lightweight design. It comes with handy power-management utilities.</td>
<td>Mar 94</td>
</tr>
</tbody>
</table>
| TurboDialer, Advanced Software | 408/536-8880, $639. This 26,800-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 terrifi-

**MODEMS/NETWORK HARDWARE**

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Manufacturer</th>
<th>Features</th>
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</thead>
<tbody>
<tr>
<td>AsanteHub 1012, Asante Technologies</td>
<td>408/435-8388, $1,299. This 12-port, 10BaseT Ethernet hub works right out of the box and is a premium device at a bargain price.</td>
<td>Dec 93</td>
</tr>
<tr>
<td>Cypress PhonePro 1.2 (1.4), Cypress Research Corp.</td>
<td>408/752-2700, $319 and $950. By improving its integration with FaxPro and with PowerTalk and PowerShare, this powerful telephony software has greatly extended its business scope.</td>
<td>May 94</td>
</tr>
<tr>
<td>DaynaPort Pocket SCsi/Link, Dayna Communications</td>
<td>801/269-7200, $299 and $569. Inexpensive, lightweight SCsi-to-Ethernet connection works with both desktop Macs and PowerBooks and can use the Mac's ADR port as a power source.</td>
<td>Nov 94</td>
</tr>
<tr>
<td>EtherWave, Farallon Computing</td>
<td>510/814-5000, $129. If you need to expand your network at a reasonable price with minimal fuss, get this EtherWave transceiver. Instead of providing only one 10BaseT twisted-pair jack, it includes a second jack that allows you to daisy-chain to another device through an additional 10BaseT line.</td>
<td>May 94</td>
</tr>
<tr>
<td>Expert Pad Pl-7000, Sharp Electronics</td>
<td>818/878-7600, $349 to $399. All-in-one SCsi-to-Ethernet connector is lightweight and works with desktop Macs and PowerBooks.</td>
<td>Nov 94</td>
</tr>
<tr>
<td>PowerPort Mercury/PB 500 Series, Global Village Communication</td>
<td>415/390-8200, $599. Top-notch fax modem is capable of exemplary fax and data communications performance.</td>
<td>Nov 94</td>
</tr>
<tr>
<td>Spectra-Com P192mx, Xircom</td>
<td>408/270-8070, $199.5. 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.</td>
<td>Oct 94</td>
</tr>
</tbody>
</table>
| SuperFaxModem 288, Super Corp. | 503/867-2410, $329.5. This 28,800-bps fax mo-

dem is a very good performer, as good as or better than 14,400-bps modems, and the price of admission isn't terrifi-

**PRINTERS**

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Manufacturer</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apple Portable StyleWriter, Apple Computer</td>
<td>408/996-1010, $439. Sleek, portable inkjet printer weighs 47 pounds and is a pleasure to use. It uses standard StyleWriter cartridges.</td>
<td>Oct 94</td>
</tr>
<tr>
<td>Brother HI-400, Brother International</td>
<td>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.</td>
<td>May 94</td>
</tr>
<tr>
<td>Color StyleWriter Pro, Apple Computer</td>
<td>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.</td>
<td>Sep 94</td>
</tr>
<tr>
<td>DeskWriter 310, Hewlett-Packard</td>
<td>800/752-0900, $379 to $455. Versatile, low-cost inkjet printer is a 4.3-pound, battery-powered portable. With its 60-page sheet feeder, it's also a great desktop printer, and with a $49 color print cartridge, it offers inexpensive three-color printing.</td>
<td>Mar 94</td>
</tr>
<tr>
<td>HP LaserJet 4ML, Hewlett-Packard</td>
<td>800/752-0900, $1279. Primarily for those who use a PC or work in a small, mixed-platform environment, this energy-efficient laser printer offers automatic page and language switching, and in a good buy. Its advanced PC features may not be worthwhile for those who use Macs only.</td>
<td>May 94</td>
</tr>
<tr>
<td>LaserWriter Select 360, Apple Computer</td>
<td>408/996-1010, $1599. Low-cost, high-performance, 10-ppm printer is 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.</td>
<td>Apr 94</td>
</tr>
<tr>
<td>MobileWriterPS, Mannesmann Tally Corp.</td>
<td>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.</td>
<td>Dec 93</td>
</tr>
<tr>
<td>Notebook Printer II, Citizen America</td>
<td>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 at all an issue, however, other options may be preferable.</td>
<td>Jun 94</td>
</tr>
<tr>
<td>Personal LaserWriter 320, Apple Computer</td>
<td>408/996-1010, $959. 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.</td>
<td>Sep 94</td>
</tr>
<tr>
<td>PowerPrint 2.5, CDT Softworks</td>
<td>604/291-9121, $1499. Ingenious hardware-software combo lets you print from your Mac to almost any PC printer. It supports over 1000 printers, ranging from aging dot-matrix models to the newer color inkjet and laser printers.</td>
<td>Sep 94</td>
</tr>
<tr>
<td>P-Touch, Brother International Corp.</td>
<td>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.</td>
<td>Sep 94</td>
</tr>
<tr>
<td>QMS ColorScript Laser 1000, QMS</td>
<td>205/633-4300, $799. 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.</td>
<td>Jul 94</td>
</tr>
<tr>
<td>Silentwriter 640, NEC Technologies</td>
<td>508/264-8000, $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.</td>
<td>Jun 94</td>
</tr>
<tr>
<td>Smart Label Printer Pro, Seiko Instruments</td>
<td>408/922-5000, $299.5. 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.</td>
<td>May 94</td>
</tr>
</tbody>
</table>

**SCANNERS**

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Manufacturer</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coolscan LS-10e, Nikon Electronic Imaging</td>
<td>516/547-4200, $2600. Compact desktop scanner for digitizing images from 35mm transparencies is slow, but delivers images good enough for newsprint publications and some catalogs.</td>
<td>Dec 93</td>
</tr>
<tr>
<td>IX-4015 Color Image Scanner, Canon Computer Systems</td>
<td>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.</td>
<td>Jul 94</td>
</tr>
<tr>
<td>LightningScan Portable, Thunderware</td>
<td>510/254-6581, $459. Thunderbird owners will find this hand scanner's modem- and serial-port connection, lightweight interface, and total portability well worth the cost, although the scanner is incompatible with some desktop Macs.</td>
<td>Dec 93</td>
</tr>
<tr>
<td>Mirror 800 Plus Color Scanner, Mirror Technologies</td>
<td>612/830-1549, $999. Add the NuBus JPEG board (300) and easy-to-use 35mm transparency scanning module ($599) and you get a nifty—if slow—desktop scanning package for a reasonable price.</td>
<td>Jan 94</td>
</tr>
<tr>
<td>ScanMaker 35t, Microtek</td>
<td>310/297-5000, $1999. Speedy 35mm film scanner accommodates loose film and delivers a good image, but the included software is weak.</td>
<td>Dec 93</td>
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**SYSTEMS/STORAGE**

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<th>Product Name</th>
<th>Manufacturer</th>
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<tr>
<td>Alacrity PM 6100, KS Labs</td>
<td>614/374-5665, $165. Installing a clock booster is the quickest, easiest, and cheapest way to extract more power from Apple's entry-level Power Mac.</td>
<td>Oct 94</td>
</tr>
<tr>
<td>Comer SLY RAID System, Conley Corp.</td>
<td>212/682-0162, $25,335. 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.</td>
<td>Sep 94</td>
</tr>
<tr>
<td>EtherDock, E-Machines</td>
<td>408/541-6100, $699. Heavy-duty Duo docking option is equipped with a full set of 11 ports, including an Ethernet port. The locking mechanism is alarmingly wobbly—although reliable enough to ensure a good connection.</td>
<td>May 94</td>
</tr>
<tr>
<td>Expert Pad PI-7000, Sharp Electronics</td>
<td>516/547-4200, $2600. Compact desktop scanner for digitizing images from 35mm transparencies is slow, but delivers images good enough for newsprint publications and some catalogs.</td>
<td>Dec 93</td>
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</tbody>
</table>
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 end up paying 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**
   Even “ordinary” returns require anywhere from six to a dozen forms to complete. It’s easy to miss one or end up rushing all over town to find the one you need.

4. **The Misinterpreted Instruction**
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5. **The Overlooked Deduction**
   You’d have to be a professional tax preparer to know all the deductions you’re entitled to. If you miss just one, it could cost you hundreds of dollars.

6. **The Exceeded Guideline**
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Star Ratings

Corp., 800/237-4277, $899. Personal digital assistant features the advantages of the Newton, in a better-industrial design and at a comparative price. If the 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 975, Apple Computer, 408/996-1010, $1699. For students and small-business professionals who want high power and the convenience of having everything integrated into one case, this 33MHz 68040 system is an ideal choice. Jun 94

★★★★ Newton MessagePad 110, Apple Computer, 408/996-1010, $599. This is the personal digital assistant that Apple should have shipped in August 1993, with improved handwriting recognition, including deferred and letter-by-letter recognition. It also has more memory, longer battery life, and a more efficient design. Aug 94

★★★ NuTek Duet, NuTek USA Corp., 408/973-8799, $2996. Mac workalike is both a PC and a Mac in a single box, but because of many incompatibilities and problems, the Duet is not a computer anyone should consider using for serious work. Feb 94

★★★★ OrangePC Model 200 Series, Orange Micro, 714/779-2722, $1139 to $3237. If your goal is to get a Mac that runs Windows as fast as a PC, you can't get there from here. If your goal is to get business-level performance for day-in, day-out use, these PC coprocessor cards are probably your best choice. Aug 94

★★★★ PLI Infinity 270 Turbo, PLI, 510/657-2211, $651. This 270MB SyQuest drive is fast, reliable, and a very good product. The cost of the medium is competitive with that of optical drives. Sep 94

★★★★ PowerBook 140 F/25 Upgrade, Digital Eclipse Software, 510/547-6101, $399. By changing the oscillator and adding an FPU, Digital Eclipse changes PowerBook 140s into 170s, minus the active matrix screen. While the upgrade seems expensive, it's the only way to extend the viability of a 140. Dec 93

★★★ PowerBook 540c, Apple Computer, 408/996-1010, $4389. The prestige PowerBook du jour, this sleek, curvy and futuristic-looking notebook makes a good computer for both on-the-road and in-the-office use. Its nonstandard battery, memory, and Ethernet ports are not ideal features, however. Oct 94

★★★★ PowerBook Duo 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 close to the power of a Quadra 650 in a subnotebook. Oct 94

★★★★ PowerBook Duo Dock II, Apple Computer, 408/996-1010, $699. Apple has added Ethernet to this full-featured docking station, but installing NuBus cards is still awkwardly difficult. If you don't need NuBus expansion, consider other options. Oct 94

★★★★ PowerMacintosh 6100/60, Apple Computer, 408/996-1010, base model $1819. Given its price and performance, this Power Macintosh is hard to resist. When developers offer in PowerPC format the software that most business users run daily, this should be a system that will give you power to spare. Jun 94

★★★★ PowerMacintosh 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

★★★★ PowerMacintosh 8100/80, Apple Computer, 408/996-1010, $4249. While this system doesn't offer the excellent price/performance ratio of the other available Power Macs, you should consider it if you're a high-end user moving your work over to RISC-based computing. Aug 94

★★★★ PowerMacintosh Upgrade Card, Apple Computer, 408/996-1010, $699. Current 33MHz 040 machines will get the best bang for the buck with this card, which is a less expensive upgrade path than a standard motherboard replacement. However, other Macs won't realize as much of a performance gain. Oct 94

★★★★ Quadra 605, Apple Computer, 408/996-1010, 4/80 $979. Never before has Apple offered so much performance for so little money. The performance and price of this 040-based machine match those of a standard entry-level 486SX-based Windows PC. Mar 94

★★★★ Quadra 630, Apple Computer, 408/996-1010, $1279. Fast, inexpensive, expandable 33MHz continues

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68040 machine may be the last 680X0-based desktop Macintosh, but it's one of the best entry-level Macs ever. Nov 94

Quadra 840AV, Apple Computer, 408/996-1010, $230/5069. 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 some hardware and software incompatibilities. Dec 93

SCSI MicroDock, Newer Technology, 316/685-4904, $175. Tiny Duo docking station is just under 4½ ounces and barely 5 inches long. It adds only an ADB port and a SCSI port—but both are useful. May 94

SledgeHammer2000FMF, FWB, 415/474-8055, $3179. 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, $7499. Turbo 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

Apple Macintosh Display Card 24AC, Apple Computer, 408/996-1010, $1579. 24-bit accelerated graphics card offers a satisfactory price/performance ratio, although it can't switch resolutions from the keyboard. Oct 94

Apple QuickTake 100 for Macintosh, Apple Computer, 408/996-1010, $749. If you're in the market for a medium-quality, digital color camera that costs less than $1000, this is the best deal around. But if you're not in a hurry, you may want to wait until some of the camera's more obvious problems, such as its fixed-focus lens and lack of a zoom option, are ironed out. Jul 94

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

Intellilcolor Display/20, Radius, 408/434-1010, $2399. Although with its exceptional brightness and clarity this monitor would be a fine addition to any designer's desk, the included Intellilcolor 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, $5299. L-TV is a crisp, clean image, but mild flickering and conspicuous shimmers were persistent. Aug 94

L-TV Pro NuBus, Focus Enhancements, 617/938-8088, $3999. NuBus card converts your Mac's RGB video signal to NTSC so you can use your Mac with a TV or VCR. It supports a wide range of Macs, but the Image has some flicker and distortion, 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

SuperMac Spectrum Power•1152, 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, 612/832-5622, $699. Inexpensive 24-bit accelerated graphics card has zoom and pan options, but is relatively slow. Oct 94

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, $2499. At less than half the cost of a typical active matrix LCD panel, this passive matrix projection panel offers an economical alternative for presenters who don't need multimedia capability. Jul 94

LTV Portable, Focus Enhancements, 617/938-8088, $5399.99. 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 snuggly into a POS 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 Power•1152, 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, 612/832-5622, $699. Inexpensive 24-bit accelerated graphics card has zoom and pan options, but is relatively slow. Oct 94

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Selected and edited by Charles Barrett

The following listings include both time-sensitive promotions and open-ended offers being sponsored by Macintosh vendors and their resellers. Each listing indicates which products have been awarded a star rating in Macworld's Reviews (products rated ★★ or 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.

BUNDLES

Brother HL-600 Laser Printers + ClickBook
Brother International is including BookMaker's $69.95 (SRP) ClickBook print utility (Nov 94 ★★★★ for version 1.1) with its straight-paper-path, 300-dpi HL-600 series printers. ClickBook transforms Windows or Macintosh application-generated documents into one of 20 predefined booklet formats. Papers designed specifically for ClickBook and an assortment of fonts are also included. Estimated street prices: HL-630 $399; HL-645 $499; HL-655 $599. For more information, call Brother at 800/276-7744, 714/859-9706 in California.

DataLife Disks + Ejector Pack Verbatim Corporation is offering a free storage ejector pack, which holds two 3½-inch floppy disks (or one rewritable optical disk), plus a bonus disk to customers who purchase specially marked ten-packs of DataLife disks.

Power Macintosh 8100/80 + QuarkXPress 3.3
Apple Computer is offering a limited-edition version of its Power Macintosh 8100/80 (Aug 94 ★★★★) specially priced at $5629, including an internal CD-ROM drive, 16MB of RAM, a 1GB hard drive, and Quark's $895 (SRP) QuarkXPress desktop publishing system (Nov 94 ★★★☆ for version 3.2; 1993 World-Class). Call 800/538-9669 for nearest authorized reseller. Offer expires 1/3/95.

Pro AudioSpectrum 16 + Trax + Sound Edit Pro + Headphones Tiger Software is offering a bundle that consists of Media Vision's $179.90 (SRP) 16-bit sound system: Passport Design's $85.50 (SRP) Trax software for MIDI recording, editing, and playback; Macromedia's $133.20 (SRP) Sound Edit Pro; and a pair of $24.90 (SRP) Labtec headphones. Available for $49.90 (specific LC or Macintosh version) by calling 800/666-2562 (ask for N27-260). Offer not to expire before 11/30/94.

StuffIt Deluxe 3.5 + Conflict Catcher II or

- StuffIt Deluxe 3.5 + QuickKeys 3.0 MacWarehouse is offering Aldus Systems' $129 (SRP) StuffIt Deluxe compression, encryption, and archiving program (Aug 93 ★★★★ for version 3.0) bundled with either Casady & Greene's $79.95 (SRP) Conflict Catcher II INTM-manager utility (Mar 93 ★★★★ for version 1.0) or CE Software's $169 (SRP) QuickKeys keyboard-shortcut utility (Mar 94 ★★★☆). Call MacWarehouse at 800/205-6227 to order either StuffIt Deluxe/Conflict Catcher (MACS 0021) for $99.95 or StuffIt Deluxe/QuickKeys (AMS 0209) for $99.95. Both bundles come in promotional packaging. Offer expires 12/31/94.

SummaSketch FX Tablets + Fractal Design Painter 2.0 Fractal Design Corporation's $199 (SRP) natural-media paint and image-editing software including free upgrade to version 3.0 is being bundled with both of SummaGraphics Corporation's cordless, pressure-sensitive digitizer tablets. The 18-by-12-inch tablet bundle is available for $1099, and the 12-by-12-inch one for $749—savings of $449 and $299, respectively. For more information, call 800/444-3245. Offer not to expire before 12/31/94.

SyQuest 270MB Drives + Fastback Express SyQuest Technology is including a free copy of Symantec's $149 (SRP) Fastback Express backup software on the SQ3270 cartridges that are provided with its family of 3½-inch, 270MB removable hard cartridge drives (Apple's PC Exchange 7.5, required). Street prices start at approximately $500 for a drive and one cartridge. CompUSA (800/451-7683) is the first reseller to offer this bundle.

SIDEGRADES/UPGRADES

Impact RGB and Vandal Accelerators Extreme Systems is offering owners of Applied Engineering's Trans-Warp LC '030 33MHz, Total System Integration's Enterprise LC, or Harris Labs' Performer LC cards a $50 trade-in credit toward the purchase of the Impact RGB, a 24-bit-video and CPU accelerator for the LC. The same offer applies to owners who trade in their 33MHz or faster TransWarp SE '030, Gemini Ultra, or Noyes System's QuickLo SE toward the purchase of a Vandal SE accelerator. Call 800/995-2334 for more information. Offer expires 1/3/95.

MacTools 3.0 Central Point Software is offering this $149 (SRP) hard disk utility (Mar 94 ★★★☆) for $49.95 to users of any Symantec Mac product. Call 800/937-9842.

Microsoft Excel 5.0 + PowerPoint 4.0 + Word 6.0 Microsoft Corporation is offering a $30 mail-in rebate to users of each of these applications who upgrade to the latest version. Complete details on how to receive a rebate directly from Microsoft are included in each product package. Call 800/622-4445 for rebate information. Offer expires 12/31/94.

Org Plus for Macintosh 1.0 Banner Blue Software is offering this $195 (SRP) organization-charting program to users of competitive business graphics products for $69. Available through MacWarehouse (800/255-6227) and Rocky Mountain Computer Outfitters (800/881-3090).

SPECIAL DISCOUNTS/REBATES/OFFERS

Adobe Typefaces Adobe Systems is offering a 14-Multiple Master typefaces, new Adobe Originals display faces, and 23 newly released type packages for $69 each. Adobe is also discounting over 400 packages by up to 40 percent. This offer applies only to orders placed through Adobe's Font & Function type catalog, which you can obtain by calling 800/445-8787. Offer expires 12/31/94.

FileMaker Pro 2.1 Claris Corporation is offering this $399 (SRP) flat-file database (Jan 94 ★★★★ for version 2.0) for $99 ($149 in Canada). Call 800/325-2747 for more information. Offer expires 12/31/94.

LS-10 Coolscan Film Scanner Nikon Electronic Imaging is offering a $75 cash rebate that applies to every Coolscan model (Dec 93 ★★★★ for LS-10e) purchased after 9/1/94. Rebate coupons are available at the point of sale, or can be requested by calling 800/526-4566. Offer expires 12/31/94.

MailLink E-mail Gateways StartNine Technologies is offering a special introductory price of $49 ($65 after 3/31/94) for a single-user license of MailLink MS for PowerTalk, which permits users to access their Microsoft Mail for AppleTalk Networks mailbox from within PowerTalk. MailLink Internet for PowerTalk 1.5, which links System 7.5's universal mailbox with Internet mail, is also available for $49 ($65 after 3/31/95). Version 2.0 of MailLink Directory Services, which allows access to the directories of a wide variety of E-mail systems, is being introduced for $1995 ($2995 after 12/31/94). For product and ordering information, call 510/469-4849. Offers expire 12/31/94 and 3/31/95.

UnderWare 1.0.1 Bill Jugglers is offering a $10 mail-in rebate on this screen-saver entertainment utility (Jun 94 ★★★☆). UnderWare has over 75 original background patterns, and many of the characters in its 26 modules can interact with objects already on the screen. Details on how to get your rebate is included in each product package. Offer expires 12/31/94.

Workgroup Server + FileMaker Pro Server or 4D Server Apple Computer is offering a $750 rebate on any Workgroup Server 6150, 8150, or 9150 (with base model estimated prices of $4219, $5319, and $7419, respectively) with the "same time, same invoice" purchase of Claris's $1499 (SRP) FileMaker Pro Server. A similar rebate arrangement is also available (with rebates varying from $650 to $1000, depending on software configuration) when you purchase either an 8150 or 9150 server with ACI US's 4D Server database and application-development software, which starts at $1195 (SRP) for two-user configuration. For Apple Computer reseller information, call 800/538-9606. Offers expire 12/31/94.

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- **238** Megahertz
- **229** ProDirect
- **264-266** Quality Computers
- **227** The Mac Zone
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There's no cost or obligation. We even pay the postage! Simply fill in the questionnaire, then circle the numbers on the card below for the products that interest you. Numbers for advertised products can be found in the ad and in both the Product Index and Ad Index. Fold card and mail. No staples please.

Please answer these questions so that we may better serve you.

A. Including yourself, approximately how many people are employed at your entire work-site (i.e., employees in your office, building, or cluster of buildings)?
   [ ] 1000+
   [ ] 999 - 25
   [ ] Under 25

B. Which of the following computers are installed at this entire work-site?
   [ ] Apple Workgroup Servers
   [ ] Mac Quadra-series
   [ ] Mac Centris-series/Power Mac
   [ ] Mac Powerlook-series/Duo-series
   [ ] Macintosh Portable
   [ ] Classic/Series/SSE/128K Portable
   [ ] Performa
   [ ] LC
   [ ] LC II
   [ ] LC II/Performa

C. What is the total number of Macs installed at this entire work-site?
   [ ] Under 25
   [ ] 25 - 50
   [ ] 50 - 100
   [ ] 100 - 200
   [ ] 200 - 500
   [ ] 500 -
   [ ] 1000 -
   [ ] 2000+

D. For how many Macintosh computers within this entire work-site do you have purchase involvement for products and/or services?
   [ ] None
   [ ] 1 - 5
   [ ] 6 - 10
   [ ] 11 - 20
   [ ] 21 - 50
   [ ] 51 - 100
   [ ] 101 - 200
   [ ] 201 - 500
   [ ] 500+

E. In which ways are you involved in purchase decisions for Macintosh products at this entire work-site?
   [ ] Evaluate, recommend, or approve brands/models
   [ ] Evaluate, recommend, or approve purchase source
   [ ] Authorize purchases
   [ ] Evaluate, determine need for product/feature

F. Over the next 12 months, how much will entire work-site spend on Macintosh products and/or services?
   [ ] Under $10,000
   [ ] $10,000 - $19,999
   [ ] $20,000 - $49,999
   [ ] $50,000 - $99,999
   [ ] $100,000 - $249,999
   [ ] $250,000 - $499,999
   [ ] $500,000 - $999,999
   [ ] $1 million or more

G. Considering the entire work-site, which of the following Macintosh hardware and software products are currently installed?
   (Check all that apply.)
   [ ] Business software (Word processing, spreadsheet, database, etc.)
   [ ] Graphics/publishing software
   [ ] Monitors/Displays
   [ ] Printers/scanners
   [ ] Networking/communications software
   [ ] Multimedia/Audio hardware and/or software
   [ ] Mobile computing products (PowerBooks, peripherals, software, etc.)

H. What is your primary job function?
   (Check one.)
   [ ] Computer Hardware/BIOS
   [ ] MIS/IT/Network Management
   [ ] Engineering
   [ ] R&D/Scientific
   [ ] Corporate/General Management
   [ ] Accounting/Finance
   [ ] Marketing/Sales/PR/Communications
   [ ] Art/Design/Graphic Services

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<table>
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<th>Model</th>
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<td>1080MB External</td>
<td>$949.99</td>
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**UMAX**

**UC630LE 600dpi Color Scanner**
- Includes Adobe Photoshop 2.5 LE and OmniPage Direct
- Scan up to 8.5" x 11.7" 24-bit and 8-bit color, 256 gray levels
- TWAIN standard and SCSI-2 interface
- Shown with optional transparency adapter

**UC1260 1200dpi Color Scanner**
- Includes Adobe Photoshop 3.0 Full Version and Kai's PowerTools
- Scan up to 8.5" x 11.7" 24-bit and 8-bit color, 256 gray levels
- Downloadable gamma curves
- TWAIN compliant
- Built-in SCSI interface

**RELI SYS**

**RELI 2412 Mac/TE Color Scanner w/ Transparency Adapter**
- The RELI 2412 Mac/TE is an excellent choice for the desktop professional.
- It is a single pass design, capable of scanning at 24-bit 8 1/2" x 11" at a resolution of 2400 x 3600 dpi. It has a maximum resolution of 7400 dpi. This translates into 360,000 pixels per square inch, which benefits anyone scanning color images and transparencies. Bundled with Adobe Photoshop LE image processing, Kai's PowerTools LE, and OmniPage Direct OCR software, the RELI 2412 has everything you need in an entry level color scanner with three times the performance of the competition at a lower cost. Has SCSI-2 interface.

**RELI 4816 Mac/TE Professional Color Scanner with Transparency Option**
- An excellent choice for desktop publishers and graphic artists. It is a single pass design, capable of scanning at 24-bit, 8 1/2" x 14" at a resolution of 4800 dpi. The RELI 4816 Mac/TE's maximum optical resolution translates into 640,000 pixels per square inch, which benefits anyone scanning color images and transparencies. Bundled with Adobe Photoshop LE, Kai's PowerTools LE and OmniPage Direct OCR software, the RELI 4816 Mac/TE is the best value in color scanners.

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The SyncMaster 4Ne offers Macintosh and PC users a low radiation 15" monitor that provides superior image quality with reduced distortion—thanks to its flat square screen. With a .28mm dot pitch, it offers a very high resolution: 1024 x 768. This SyncMaster carries the EPA Energy Star logo, which attests to its compliance with lower power consumption standards. In addition, it features a power saving mode that complies with VESA guidelines. The SyncMaster 4Ne delivers the sharp, high quality images required for Macintosh and PC applications, including presentation graphics, desktop publishing and multimedia. It offers an unlimited palette of colors, so charts, graphics and illustrations come to life. The SyncMaster is also backed by a two-year warranty.

SyncMaster™ 17GL
17" Color Monitor

- 1280 x 1024 (max. res.) at 60Hz refresh rates
- .28 mm dot pitch
- INVAR shadow mask
- Tilt-swivel base

Includes Mac Adapter

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- 1600 x 1200 (max. res.) at 60Hz refresh rates
- .26 mm dot pitch
- INVAR shadow mask/New Anti-Reflective coating
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Includes Mac Adapter

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SyncMaster™ 15GL
15" Color Monitor

- 1024 x 768 at 76Hz refresh rates
- .28 mm dot pitch
- Digital (one touch) picture controls
- Tilt-swivel base

Includes Mac Adapter

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SyncMaster™ 14GL
14" Color Monitor

- 1024 x 768 at 76Hz refresh rates
- .28 mm dot pitch
- Digital (one touch) picture controls
- Tilt-swivel base

Includes Mac Adapter

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For the most exacting visual applications, Samsung offers the top-of-the-line SyncMaster 17GLs. This 17" flat-square monitor offers ultra-precise, sharp images—even in the corners—thanks to its .26mm dot pitch and extremely high resolution. The SyncMaster 17GLs carries the EPA Energy Star logo, which attests to its compliance with low power consumption standards. Outstanding features of this display include an On-Screen Display that makes it easy to carry out precise adjustments and a power-saving mode that complies with VESA guidelines. It has up-front digital controls for easy image adjustments, as well as a special AR coating to limit glare while maximizing focus. The 17GLs is covered by a two-year warranty.

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BY ENVIROGEN
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<thead>
<tr>
<th>Brand</th>
<th>Capacity</th>
<th>Size</th>
<th>Access</th>
<th>Internal</th>
<th>External</th>
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### OPTICAL DRIVES

**128MB External $599**

**1 Year Warranty**

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### TAPE BACKUP

**Systems Jukebox Upto 140Gig**

**2 Year Warranty**

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<td>$2255</td>
<td>$2355</td>
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### RAID SYSTEMS

Guaranteed Fastest

- 4.0 Gig Barracuda 2 RAID
- 6.0 Gig Fast and Wide Upto 14 MB/Sec

**$4295**

### CD ROMS

**$5849**

<table>
<thead>
<tr>
<th>Model</th>
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<td>Toshiba 3501 4 Speed</td>
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**Media**

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<tr>
<td>1.3GIG</td>
<td>Optical</td>
<td>$105</td>
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Circle 121 on reader service card
The Quantum Dayonta Series is high capacity 2.5-inch hard disk drives that provide unrivaled mass storage solutions for the Apple Powerbook. The drives have enhanced performance features like SmartWrite firmware and a unique locking mechanism, called ShockLock, that provides maximum protection against non-constant shock.

### Quantum Dayonta Series

#### 2.5" Portable Drives

- **Value/Entry Level**
  - 3.5" Low Profile
  - 170MB: 14ms, $179
  - 270MB: 12ms, $195
  - 340MB: 12ms, $225
  - 540MB: 12ms, $279

- **Value/Performance**
  - 3.5" Low Profile
  - 730MB: 11ms, $379

- **High Performance/ capacity**
  - 5.25" High Profile
  - 1080MB: 9.5ms, $629
  - 1400MB: 9.5ms, $819
  - 2160MB: 9.5ms, $1139

Quantum LS, Lightning, and Empire Series carry a 30-Day Money Back Guarantee and a One Year Warranty. Quantum Dayonta Series carry a One Year Warranty.

---

**NEC MultiSpin 2V** (available in gray) 320MB access time, 3000RPM, $149

**NEC MultiSpin 3XP** 740MB access time, 5000RPM, $189

**NEC MultiSpin 4X** 2200MB access time, 4200RPM, $199

**ClubMac Dual-Speed** 2200MB access time, 4200RPM, $199

**ClubMac Quad-Speed** 7200MB access time, 4200RPM, $439

The ClubMac Quad-Speed Bundle carry a Two Year Warranty.

---

**SyQuest REMOVABLE TECHNOLOGY**

- **Genuine Syquest Cartridges**
  - McDrk Qty 1 $10, Qty 10 $90
  - 44MB $57 each, Qty 10 $55 each
  - 88MB $63 each, Qty 10 $63 each
  - 200MB $77 each, Qty 10 $77 each
  - 10MB $55 each, Qty 10 $53 each
  - 270MB $63 each, Qty 10 $61 each

Syquest Cartridges carry a FREE Year Warranty.

---

**ClubMac Optical Drives**

- **ClubMac 230MB Optical Drive**
  - 3.5" 230MB Olympus Optical Drive: $895
  - Includes free formatted optical disk, 30-Day Money Back Guarantee and a Two Year Warranty.

**ClubMac 200MB Removable Drive**

- **ClubMac Quad-Speed**
  - 5.25" ClubMac 44MB: $179
  - 5.25" ClubMac 88MB: $328
  - 5.25" ClubMac 200MB: $448
  - 3.5" ClubMac 105MB: $259
  - 3.5" ClubMac 270MB: $449

All drives include CD10 driver formatting software, ONE FREE Copy, necessary drivers for 3Floppy system and documentation. All ClubMac drives include a 30-Day Money Back Guarantee and a Two Year Warranty.

---

**ClubMac Tape Backup Drives**

- **Exabyte 2580 Tape Drive**
  - 31 MB/tape data transfer rate (compressed)
  - Capacity up to 2.0GB compressed
  - Includes backup software
  - 20,000 hour MTBF
  - $299

**ClubMac CD Bundle**

- **ClubMac 44MB Removable**
  - 219

**LPS Series**

- **3.5" Hall Height**
  - 3.5GB

- **4.3GB**

- **2.4GB**

**EMPIRE Series**

- **3.5" Low Profile**
  - 1.7GB

- **3.4GB**

- **4.3GB**

---

**CD-ROMS**

- **ClubMac 2X CD-ROM**
  - 320X/60x data transfer rate
  - 8x data buffer
  - Includes CD-Packet Writer software
  - 50,000 hours MTBF
  - ONE Year Warranty

**ClubMac CD Bundle**

- **Optical MEDIA**
  - 3.5" 230MB: $39
  - 3.5" 255MB: $79
  - 5.25" 562MB: $79
  - 5.25" 1.35GB: $99

**ClubMac CD Backup Drives**

- **Exabyte EX-2600**
  - 1.3GB data transfer rate (compressed)
  - Capacity up to 2.0GB compressed
  - Includes backup software
  - 20,000 hour MTBF
  - $299

---

**NEC MultiSpin 4Xe CD-ROM**

- **NEC MultiSpin 4Xe CD-ROM**
  - Designed for high-performance CD-ROM applications, multi-user development and networking.
  - Includes CD-Packet Writer software
  - 50,000 hour MTBF
  - ONE Year Warranty

**ClubMac Optical**

- **3.5" 230MB Olympus:** $895

**MaxOptix**

- **Tahiti III:** 5.25" CD-ROM Drive: $299

**DASS**, **DDS**, **QIC**

- **200mB:** $120
  - $25

**NEC MultiSpin 4Xe**

- **NEC MultiSpin 4Xe (available in gray):** 230MB access time, 3000RPM, $149

---

**212 December 1994 MacWorld**
NEC SilentWriter Model 640
- 6 ppm printing resolution
- Adobe PostScript level 2 interpreter, TrueType fonts
- 600 dpi print resolution
- 1MB RAM standard
- AppleTalk interface
- Limited 3-Year-Upgrade Warranty

HP DeskWriter 320 Printer
- Perfect companion for the PowerBook
- 600 x 300 dpi with HP's exclusive KST technology for crisp, black output
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NEC's Enterprise Series... The Next Generation in Monitors
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- 15" MultiSync XE15 640 x 480 to 1024 x 768
- 17" MultiSync XE17 640 x 480 to 1024 x 768
- 21" MultiSync XE21 640 x 480 to 1152 x 870

PowerPC Products
- 66 MHz PowerSeries 601
- 80 MHz PowerSeries 601
- FastPage PowerPage + 1MB Cache
- 66 MHz PowerPage + 1MB Cache Bundle
- 66 MHz PowerPage + 1MB Cache Bundle
- 80 MHz PowerPage + 1MB Cache Bundle

Monitors
- NEC 17" MultiSync XE17
- Printers
- NEC SilentWriter Model 640
- E-Machines T16 II
- DigitalVision Deluxe
- VideoVision Studio
- Multimedia Solutions
- Scanners
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**Sony #01156**

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- 40433 Hot Line 6
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**SoftKey**

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- 99137 Solomon V2
- 99137 Medium Talker 5

**Spectrum Holobyte**

- 00539 Fusion MC
- 00539 WordWright 3
- 00539 LogiCom

**Specular International**

- College
- 10213 WordWright 3
- 10213 Mag writer

**Syntexture**

- 14531 ACT V2.0
- 14531 AutoDesk V3.0 or any previous
- 10405 DeskPress V3.9
- 10405 TallyStar V2.0

**WordPerfect**

- 06735 Grammar V 5.1
- 06735 WriterPerfect V 5.0
- 06735 WriteRight V 5.0

**WriteRight**

- 06735 WriteRight V 5.0
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- 06735 WriteRight V 5.0

**World of Warcraft**

- 08175 World of Warcraft V 4.5
- 08175 World of Warcraft V 4.5
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**WordPerfect V3.5**

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<td>Advanced 3-1/2&quot; drive technology for fast data access</td>
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<td>Apple Computer, Inc.</td>
<td>#95346</td>
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<td>For the Best Deals Around!</td>
<td>1-800-619-9091</td>
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APS Technologies 6131 Deramus
Kansas City, MO 64120

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For your Mac or Power Mac

<table>
<thead>
<tr>
<th>Model</th>
<th>Capacity</th>
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<td>5506MB</td>
<td>3699.95</td>
<td>3899.95</td>
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- Provides Ideal Termination Power
- Dynamically Reduces SCSI Retries
- Regulars SCSI Line Voltage
- Solves Bus Impedance Issues
- LED Activity Indicators Diagnostic Tool
- Easy Installation: Takes Seconds

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MW... When all was said and done, SCSI Sentry did it all. All the problems and the performance issues of this drive were the result of our SCSI setup. Even if your SCSI setup is working, I heartily recommend SCSI Sentry as an extra layer of protection.

Just $79.95

Model | Capacity | Internal | SR2000 |
<table>
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<tr>
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<tbody>
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<td>APS D 2.0</td>
<td>2047MB</td>
<td>1199.95</td>
<td>1299.95</td>
</tr>
</tbody>
</table>

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Endorsement

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**SYQUEST**

<table>
<thead>
<tr>
<th>Model</th>
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<td>44MB</td>
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<td>APS SQ 5110c</td>
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<td>$429.95</td>
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<td>APS SQ 3270†</td>
<td>270MB</td>
<td>$499.95</td>
</tr>
</tbody>
</table>

† Does not format 44/88MB cartridges
‡ Does not format 44/88MB cartridges

All SyQuest Drive Include 1 FREE Cartridge

**SYQUEST MEDIA**

<table>
<thead>
<tr>
<th>Model</th>
<th>Capacity</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>SQ-400 (44MB)</td>
<td>5-19 20+</td>
<td></td>
</tr>
<tr>
<td>SQ-44 (44MB)</td>
<td>49'</td>
<td></td>
</tr>
<tr>
<td>SQ-800 (88MB)</td>
<td>79'</td>
<td></td>
</tr>
<tr>
<td>SQ-2000 (200MB)</td>
<td>89'</td>
<td></td>
</tr>
<tr>
<td>SQ-310 (105MB)</td>
<td>59'</td>
<td></td>
</tr>
<tr>
<td>SQ-327 (270MB)</td>
<td>69'</td>
<td></td>
</tr>
</tbody>
</table>

Frees interface for unformatted media

**SYGUARD**

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
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<tbody>
<tr>
<td>APS SYGUARD Single Unit</td>
<td>$8.99</td>
</tr>
<tr>
<td>APS SYGUARD 3-Pack</td>
<td>$24.99</td>
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**CD ROM**

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
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<tbody>
<tr>
<td>APS T4101</td>
<td>$299.95</td>
</tr>
<tr>
<td>APS T3401</td>
<td>$399.95</td>
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**MAGNETO OPTICAL**

<table>
<thead>
<tr>
<th>Model</th>
<th>Capacity</th>
<th>Internal</th>
<th>Price</th>
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<tbody>
<tr>
<td>APS 198MB MO†</td>
<td>1-4</td>
<td>$629.95</td>
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<tr>
<td>APS 230MB MO†</td>
<td>1-4</td>
<td>$799.95</td>
<td></td>
</tr>
<tr>
<td>APS 3.3Gb MO†</td>
<td>1-4</td>
<td>$799.95</td>
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</table>

† Includes Includes 1 FREE Cartridge

<table>
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<tr>
<th>Media</th>
<th>Capacity</th>
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<tbody>
<tr>
<td>Solid state 1-4</td>
<td>4-19 20+</td>
<td></td>
</tr>
<tr>
<td>120GM cartridge</td>
<td>33</td>
<td>$195.95</td>
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<tr>
<td>250MB cartridge</td>
<td>46</td>
<td>$45.95</td>
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<tr>
<td>3.3Gb cartridge</td>
<td>101</td>
<td>$349.95</td>
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**POWERBOOK STUFF**

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
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<tbody>
<tr>
<td>APS SCsi DOC w/ PowerMerg Lite</td>
<td>$39.95</td>
</tr>
<tr>
<td>APS SCsi BOY Rugged Palm-Sized 25-30 PowerBook SCsi Adapters</td>
<td>$19.95</td>
</tr>
</tbody>
</table>

**DAT**

<table>
<thead>
<tr>
<th>Model</th>
<th>Capacity</th>
<th>Internal</th>
<th>Price</th>
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</thead>
<tbody>
<tr>
<td>APS DAT</td>
<td>1.86 on 100 tape</td>
<td>$749.95</td>
<td></td>
</tr>
<tr>
<td>APS HyperDAT† S100 on 120 tape</td>
<td>$499.95</td>
<td></td>
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</tbody>
</table>

† Actual data compression and tape capacity vary greatly depending on the type of data recorded, other system parameters and environment.

**DAT Tapes**

<table>
<thead>
<tr>
<th>Model</th>
<th>Capacity</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Macell DAT Tapes</td>
<td>1-4</td>
<td>14 20+</td>
</tr>
<tr>
<td>40-Meter</td>
<td>13®</td>
<td>15 20+</td>
</tr>
<tr>
<td>50-Meter</td>
<td>11®</td>
<td>17 20+</td>
</tr>
<tr>
<td>90-Meter (DDS-D2)</td>
<td>22®</td>
<td>21 20+</td>
</tr>
<tr>
<td>3M DAT Tapes</td>
<td>1-4</td>
<td>14 20+</td>
</tr>
<tr>
<td>60-Meter</td>
<td>10®</td>
<td>19 20+</td>
</tr>
<tr>
<td>50-Meter</td>
<td>11®</td>
<td>17 20+</td>
</tr>
</tbody>
</table>

†† All DAT Drives Include Retrospect by Shintec & 1 FREE DAT Tape

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* Recommended DAT capacities will vary depending on tape length, type of data, and method of data compression.

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THE SPIN 1021: "THE FASTEST DRIVE IN THIS CATEGORY (1 GB-1.6 GB) ... A KILLER."
THE SPIN 2149: "THE SECOND FASTEST DRIVE (1.7 GB-2.8 GB CATEGORY) ... AND COSTS LESS."

SPIN HARD DRIVES (Includes SurfGuard Backup Software)

<table>
<thead>
<tr>
<th>Capacity (Model)</th>
<th>Access</th>
<th>Internal</th>
<th>Tornado</th>
</tr>
</thead>
<tbody>
<tr>
<td>270 MB (LP270S)</td>
<td>9.5</td>
<td>$799</td>
<td>$899</td>
</tr>
<tr>
<td>340 MB (LP340S)</td>
<td>9.5</td>
<td>$799</td>
<td>$899</td>
</tr>
<tr>
<td>450 MB (LP545S)</td>
<td>9.5</td>
<td>$799</td>
<td>$899</td>
</tr>
<tr>
<td>1.06 GB (Emp 1080)</td>
<td>9.5</td>
<td>$799</td>
<td>$899</td>
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</table>

DIGITAL DRIVES

<table>
<thead>
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<th>Capacity (Model)</th>
<th>Access</th>
<th>Internal</th>
<th>Tornado</th>
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</thead>
<tbody>
<tr>
<td>1.0 GB (DSP-3107)</td>
<td>9.5</td>
<td>$699</td>
<td>$799</td>
</tr>
<tr>
<td>2.1 GB (DSP-3210)</td>
<td>9.5</td>
<td>$1549</td>
<td>$1649</td>
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MICROPOLIS DRIVES

<table>
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<th>Capacity (Model)</th>
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<th>Tornado</th>
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</thead>
<tbody>
<tr>
<td>1.05 GB (M4110)</td>
<td>8.5</td>
<td>$699</td>
<td>$799</td>
</tr>
<tr>
<td>1.05 GB (M4110AV)</td>
<td>8.5</td>
<td>$759</td>
<td>$859</td>
</tr>
<tr>
<td>1.7 GB (M2217AV)</td>
<td>8.5</td>
<td>$999</td>
<td>$1099</td>
</tr>
</tbody>
</table>

THE SPIN 2149
1.0 GB $799 (Int.) $899 (Ext.)
Spin 2149 2.1 GB $1549 (Int.) $1649 (Ext.)
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<table>
<thead>
<tr>
<th>Capacity (Model)</th>
<th>Access</th>
<th>Internal</th>
<th>Tornado</th>
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<tbody>
<tr>
<td><strong>SEA GATE DRIVES</strong></td>
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<tr>
<td>2.0 GB (ST12550N)</td>
<td>8</td>
<td>$1679</td>
<td>$1779</td>
</tr>
<tr>
<td><strong>POWERBOOK</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>127 MB (Quantum GLS 127)</td>
<td>17</td>
<td>$239</td>
<td>–</td>
</tr>
<tr>
<td>340 MB (Toshiba M3236)</td>
<td>12</td>
<td>$499</td>
<td>–</td>
</tr>
<tr>
<td><strong>AND WHILE THEY LAST...</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quantum (Powerbook)</td>
<td>2.5” 80 MB (GLS 80)</td>
<td>$99</td>
<td></td>
</tr>
<tr>
<td>Toshiba (External)</td>
<td>2x CD-ROM Drive (XM3401B)</td>
<td>$399</td>
<td></td>
</tr>
<tr>
<td>NEC (External)</td>
<td>2x CD-ROM Drive (CDR84)</td>
<td>$349</td>
<td></td>
</tr>
</tbody>
</table>

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**FREE WITH HARD DRIVES OVER 1.0 GB!**

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<table>
<thead>
<tr>
<th>Product</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEC</td>
<td>3V.1 D.AM. Fax, 15L.12 Fax, 1L.9 Fax, 1L.8 Fax</td>
<td>$407.99</td>
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<tr>
<td>SONY</td>
<td>1.5L.12 Fax, 1L.9 Fax, 1L.8 Fax, 2L.12 Fax</td>
<td>$415.39</td>
</tr>
<tr>
<td>MAGNAVOX</td>
<td>02.12 Fax, 3L.9 Fax</td>
<td>$600.00</td>
</tr>
</tbody>
</table>

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- **Sony Carrying Case**
- **A-1 Deluxe PowerBook Bundle**: Extra Intelligent Battery, Symantec GhostWorks, CPU, A-1 Accessory Kit, Norton Utilities

**PowerBook 520 Executive Package**...

- **PowerBook 520** (EMI RAM, 240MB Hard Drive, 25MHz LC040, 14.4 BPS/Fax Modem)
- **Citizen Color/UIIA Portable Printer**
- **Sony Carrying Case**
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- RadiosView Video Studio 1200dpi Scanners
- Sony Bx/Fast Back
- Sony Video Monitor
- Optics 2 GIG-Disk Drive
- Adobe Premiere Package & Videofusion
- Yamaha Speakers & Apple Adjustable Keyboard
- Power Macintosh 810/810i with 50MHz, 1 GB Hard Drive, 16-20 Sound, 4-8B Color)
- Apple Adjustable Keyboard

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e-World 1-800-258-0882

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City

State

Zip

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1. Macworld Pub. No. 07418647
2. Date of filing: October 1, 1994
3. Published monthly
3A. No. of issues published annually: 12
3B. Annual subscription price: $30.00
4. Known office of publication: 501 Second St., San Francisco, CA 94107
5. Complete mailing address of the headquarters of general business offices of the publisher: Macworld, 501 Second St., San Francisco, CA 94107
6. The names and address of the publisher, editor, and managing editor are: Publisher: James E. Martin, Macworld, 501 Second St., San Francisco, CA 94107; Editor: Adrian Mello, Macworld, 501 Second St., San Francisco, CA 94107; Managing Editor: Charles Barrett, Macworld, 501 Second St., San Francisco, CA 94107
7. The owner is: IDG COMMUNICATIONS, INC., Patrick McGovern, 5 Speen St., Framingham, MA 01701. The names and addresses of stockholders owning 1% or more of the total amount of stock are listed below.
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9. Extent and nature of circulation: Average no. copies each issue during preceding 12 months: A. Total no. copies (net press run), 724,032; B. Paid and/or requested circulation 1. Sales through dealers and carriers, street vendors and counter sales, 106,671; 2. Mail subscription; (paid and/or requested), 474,014; C. Total paid and/or requested circulation (sum of 10B1 and 10B2), 580,685; D. Free distribution by mail carrier or other means, samples, complimentary, and other free copies, 38,813; E. Total distribution (sum of C and D), 619,498
F. Copies not distributed: 1. Office use, left over, unaccounted for, spoiled after printing, 2,406; 2. Return from news agents, 104,579; G. Total (sum of E, F1 and F2 -should equal net press run shown in A) 743,300
10. Extent and nature of circulation: Average no. copies each issue during preceding 12 months: A. Total no. copies (net press run), 724,032; B. Paid and/or requested circulation 1. Sales through dealers and carriers, street vendors and counter sales, 106,671; 2. Mail subscription; (paid and/or requested), 474,014; C. Total paid and/or requested circulation (sum of 10B1 and 10B2), 580,685; D. Free distribution by mail carrier or other means, samples, complimentary, and other free copies, 38,813; E. Total distribution (sum of C and D), 619,498
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Actual no. copies of single issue published nearest to filing date: A. Total no. copies (net press run), 743,300; B. Paid and/or requested circulation: 1. Sales through dealers and carriers, street vendors and counter sales, 109,471; 2. Mail subscription (paid and/or requested), 506,546; C. Total paid and/or requested circulation (sum of 10B1 and 10B2), 616,017; D. Free distribution by mail carrier or other means, samples, complimentary, and other free copies, 20,369; E. Total distribution (sum of C and D), 636,386; F. Copies not distributed: 1. Office use, left over, unaccounted for, spoiled after printing, 2,335; 2. Return from news agents, 104,579; G. Total (sum of E, F1 and F2 -should equal net press run shown in A) 743,300.
11. I certify that the statements made by me above are correct and complete. Adrian Mello, Editor.
## Hard Drives

### Quantum LPS Series

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Size</th>
<th>Access</th>
<th>RPM</th>
<th>Cache</th>
<th>Int. Ext.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.2 GB</td>
<td>3.5&quot;</td>
<td>9-10 ms</td>
<td>10K</td>
<td>512K</td>
<td>3 Yr.</td>
</tr>
<tr>
<td>1.7 GB</td>
<td>3.5&quot;</td>
<td>9-10 ms</td>
<td>10K</td>
<td>512K</td>
<td>3 Yr.</td>
</tr>
<tr>
<td>2.1 GB</td>
<td>3.5&quot;</td>
<td>9-10 ms</td>
<td>10K</td>
<td>512K</td>
<td>3 Yr.</td>
</tr>
<tr>
<td>2.4 GB</td>
<td>3.5&quot;</td>
<td>9-10 ms</td>
<td>10K</td>
<td>512K</td>
<td>3 Yr.</td>
</tr>
<tr>
<td>3.6 GB</td>
<td>3.5&quot;</td>
<td>9-10 ms</td>
<td>10K</td>
<td>512K</td>
<td>3 Yr.</td>
</tr>
</tbody>
</table>

LPS drives include a 2 year warranty and are SCSI 1 & 2 compatible.

### Go Power Books Drive

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Size</th>
<th>Access</th>
<th>RPM</th>
<th>Cache</th>
<th>Int. Ext.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1 GB</td>
<td>3.5&quot;</td>
<td>9-10 ms</td>
<td>10K</td>
<td>512K</td>
<td>3 Yr.</td>
</tr>
<tr>
<td>2.4 GB</td>
<td>3.5&quot;</td>
<td>9-10 ms</td>
<td>10K</td>
<td>512K</td>
<td>3 Yr.</td>
</tr>
<tr>
<td>3.6 GB</td>
<td>3.5&quot;</td>
<td>9-10 ms</td>
<td>10K</td>
<td>512K</td>
<td>3 Yr.</td>
</tr>
</tbody>
</table>

### Empire Pro Series

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Size</th>
<th>Access</th>
<th>RPM</th>
<th>Cache</th>
<th>Int. Ext.</th>
</tr>
</thead>
<tbody>
<tr>
<td>540 MB</td>
<td>3.5&quot;</td>
<td>9.5 ms</td>
<td>5400</td>
<td>512K</td>
<td>3 Yr.</td>
</tr>
<tr>
<td>700 MB</td>
<td>3.5&quot;</td>
<td>9.5 ms</td>
<td>5400</td>
<td>512K</td>
<td>3 Yr.</td>
</tr>
<tr>
<td>910 MB</td>
<td>3.5&quot;</td>
<td>9.5 ms</td>
<td>5400</td>
<td>512K</td>
<td>3 Yr.</td>
</tr>
<tr>
<td>1100 MB</td>
<td>3.5&quot;</td>
<td>9.5 ms</td>
<td>5400</td>
<td>512K</td>
<td>3 Yr.</td>
</tr>
</tbody>
</table>

Empire and Pro drives include a 5 year warranty.

## Removable Storage

### NEC Syquest

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Model Access</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>44 MB</td>
<td>SQ55 40ms 3200B 8K</td>
<td>$195 325</td>
</tr>
<tr>
<td>105 MB</td>
<td>SQ103 14.3ms 6000-64K</td>
<td>$255 315</td>
</tr>
<tr>
<td>200 MB</td>
<td>SQ200 18 ms 3200-64K</td>
<td>$445 505</td>
</tr>
<tr>
<td>270 MB</td>
<td>SQ270 13.5 ms 3200 128 455 515</td>
<td></td>
</tr>
</tbody>
</table>

All Syquest drives include a 2 year warranty.

## Media

### CD Rom Drives

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Model Access</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.3 GB</td>
<td>C1716D 23.5ms 2400</td>
<td>$1230 1295</td>
</tr>
<tr>
<td>1.5 GB</td>
<td>C2217D 23.5ms 2400</td>
<td>$1285 1345</td>
</tr>
<tr>
<td>1.7 GB</td>
<td>C2217D 23.5ms 2400</td>
<td>$1330 1390</td>
</tr>
<tr>
<td>1.8 GB</td>
<td>C2217D 23.5ms 2400</td>
<td>$1380 1440</td>
</tr>
</tbody>
</table>

## Scsi-2 Accelerators

### Silicon Express Fast Scsi-2 Cards

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Model Access</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>345 MB</td>
<td>D3713 3.5&quot; 12 ms</td>
<td>$185 225</td>
</tr>
<tr>
<td>540 MB</td>
<td>D3717 3.5&quot; 12 ms</td>
<td>$300 320</td>
</tr>
</tbody>
</table>

### IDE Hard Drives

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Model Access</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>540 MB</td>
<td>D3717 3.5&quot; 12 ms</td>
<td>$185 225</td>
</tr>
<tr>
<td>720 MB</td>
<td>D3717 3.5&quot; 12 ms</td>
<td>$260 290</td>
</tr>
</tbody>
</table>

### Cabinets

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>MicroCab</td>
<td>$75</td>
</tr>
<tr>
<td>Full Height</td>
<td>$85</td>
</tr>
<tr>
<td>MultiBay Cables</td>
<td>$250 250</td>
</tr>
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</table>

### Zero Footprint

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Model Access</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.2 GB</td>
<td>C217 3.5&quot; 10 ms</td>
<td>$560 700</td>
</tr>
<tr>
<td>1.7 GB</td>
<td>C217 3.5&quot; 10 ms</td>
<td>$959 1159</td>
</tr>
</tbody>
</table>

### Seagate

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Model Access</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>260 MB</td>
<td>D3290A 3.5&quot; 15 ms</td>
<td>$180 220</td>
</tr>
<tr>
<td>420 MB</td>
<td>D3491A 3.5&quot; 15 ms</td>
<td>$285 325</td>
</tr>
</tbody>
</table>

## Micropolis

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Model Access</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.5 GB</td>
<td>M2110A 10 ms</td>
<td>$675 735</td>
</tr>
<tr>
<td>3.5 GB</td>
<td>M2110A 10 ms</td>
<td>$945 1005</td>
</tr>
<tr>
<td>3.5 GB</td>
<td>M2110A 10 ms</td>
<td>$1925 2025</td>
</tr>
</tbody>
</table>

### Tape Backup Drives

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Model Access</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.2 GB</td>
<td>8205 265K/sec</td>
<td>$1485 1535</td>
</tr>
<tr>
<td>2-10 GB</td>
<td>8205 265K/sec</td>
<td>$2175 2275</td>
</tr>
<tr>
<td>20-50 GB</td>
<td>8205 265K/sec</td>
<td>$2975 3075</td>
</tr>
</tbody>
</table>

## Printers

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>PS510</td>
<td>$1399</td>
</tr>
<tr>
<td>PS650</td>
<td>$3825</td>
</tr>
<tr>
<td>PS725</td>
<td>$1220</td>
</tr>
<tr>
<td>PS1725</td>
<td>$1220</td>
</tr>
<tr>
<td>PS310</td>
<td>$935</td>
</tr>
<tr>
<td>PS240</td>
<td>$3825</td>
</tr>
<tr>
<td>PS275</td>
<td>$3825</td>
</tr>
</tbody>
</table>

## Memory Products

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Model Access</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 MB</td>
<td>60/70ns</td>
<td>$270 280</td>
</tr>
<tr>
<td>8 MB</td>
<td>60/70ns</td>
<td>$380 390</td>
</tr>
<tr>
<td>16 MB</td>
<td>70ms</td>
<td>$780 800</td>
</tr>
<tr>
<td>32 MB</td>
<td>70ms</td>
<td>$1945 1965</td>
</tr>
</tbody>
</table>

### Specials!!!

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Model Access</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEC 540 GB</td>
<td>Only $259 269</td>
<td></td>
</tr>
<tr>
<td>Seagate 2.4 GB Barracuda II</td>
<td>Only $198</td>
<td></td>
</tr>
</tbody>
</table>
**Radius**

Ask us about Radius’ money back guarantee on video cards

<table>
<thead>
<tr>
<th>Product</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>88c MB External Drive</td>
<td>329</td>
</tr>
<tr>
<td>200 MB External Drive</td>
<td>499</td>
</tr>
<tr>
<td>270 MB External Drive</td>
<td>449</td>
</tr>
<tr>
<td>44/88 MB Cartridge</td>
<td>57/69</td>
</tr>
<tr>
<td>270/200 MB Cartridge</td>
<td>65/85</td>
</tr>
</tbody>
</table>

2 Year warranty

---

**Scanners**

<table>
<thead>
<tr>
<th>Brand</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALF</td>
<td>769</td>
</tr>
<tr>
<td>Apple Color One Scanner</td>
<td>879</td>
</tr>
<tr>
<td>Microtek</td>
<td>1028</td>
</tr>
<tr>
<td>Scanner 3s2r</td>
<td>745</td>
</tr>
<tr>
<td>Scanner lxe</td>
<td>874</td>
</tr>
<tr>
<td>3ST Slide Scanner</td>
<td>953</td>
</tr>
</tbody>
</table>

---

**Laser Printers**

<table>
<thead>
<tr>
<th>Brand</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apple Laserwriter 360</td>
<td>1415</td>
</tr>
<tr>
<td>Hewlett Packard Deskwriter 310</td>
<td>299</td>
</tr>
<tr>
<td>Deskwriter 520</td>
<td>289</td>
</tr>
<tr>
<td>Deskwriter 560c</td>
<td>569</td>
</tr>
<tr>
<td>Laserjet 4Ml w/toner</td>
<td>1029</td>
</tr>
<tr>
<td>Laserjet 4MP w/toner</td>
<td>1395</td>
</tr>
</tbody>
</table>

---

**Monitors**

<table>
<thead>
<tr>
<th>Brand</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEC Multisync 3FGE 15&quot;</td>
<td>579</td>
</tr>
<tr>
<td>NEC Multisync 17&quot;</td>
<td>999</td>
</tr>
<tr>
<td>NEC Multisync 21&quot;</td>
<td>1999</td>
</tr>
<tr>
<td>Radius IntelliColor 20&quot;</td>
<td>817</td>
</tr>
<tr>
<td>Precision Color 17&quot;</td>
<td>959</td>
</tr>
<tr>
<td>Precision 21&quot;</td>
<td>1968</td>
</tr>
<tr>
<td>Two Page Display 20gs</td>
<td>789</td>
</tr>
<tr>
<td>Two Page Display 21gs</td>
<td>949</td>
</tr>
</tbody>
</table>

---

**Jet Pac**

The most economical refill for inkjet printers. Over 50% savings.

<table>
<thead>
<tr>
<th>Product</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>2P Black/Color</td>
<td>15/99</td>
</tr>
<tr>
<td>2P Black High Capacity Black</td>
<td>19/99</td>
</tr>
<tr>
<td>500c/550c/560c/310</td>
<td></td>
</tr>
<tr>
<td>AppleColorPrinter 3FGE 2P Black</td>
<td>22/95</td>
</tr>
<tr>
<td>Cyan/Yellow/Magenta</td>
<td>29/95</td>
</tr>
</tbody>
</table>

---

**Dell Printers**

<table>
<thead>
<tr>
<th>Brand</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>270 Optical</td>
<td>959</td>
</tr>
<tr>
<td>Micronet</td>
<td>CALL</td>
</tr>
</tbody>
</table>

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**Hard Drives**

<table>
<thead>
<tr>
<th>Brand</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Olympus</td>
<td>999</td>
</tr>
<tr>
<td>Delts 1300 Optical</td>
<td>2799</td>
</tr>
<tr>
<td>PLU</td>
<td>589</td>
</tr>
<tr>
<td>Toshiba</td>
<td>CALL</td>
</tr>
</tbody>
</table>

---

**Accelerators/Video**

<table>
<thead>
<tr>
<th>Brand</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radius Precision Color Pro 24x</td>
<td>1245</td>
</tr>
<tr>
<td>VideoVision Studio</td>
<td>3349</td>
</tr>
<tr>
<td>Precision Color Pro 24x</td>
<td>429</td>
</tr>
</tbody>
</table>

---

**Restocking Fee**

Original shipping is non-refundable. Returns may be subject to 8% sales tax.
## HP Scanjet IIc

**Price:** $899

![HP HEWLETT PACKARD logo](image)

**Ask about our Memory Buy Back program!**

### DiEMO

- **DiEMOCache**
- **DiEMOCache w/FPU**
- **DiEMOCache 50MHz**
- **DiEMOCache 50MHz w/FPU**

## Apple

- **Ask about our Leasing Program!**
- **PowerPC 6100**
- **PowerPC 7100**
- **PowerPC 8100**
- **Blackbird 540c 4/320 118 per mo.**
- **Quadra 630 4/250 32 per mo.**
- **Quadra 630 4/250 w/CD 47 per mo.**
- **Powerbook 150**

### Software

- **Fontographer 4.0**
- **MacLink Plus Translators 7/92**
- **MacTools 3.0 PPC**
- **Norton Essentials 8.1**
- **Quick Keys 3.0.1**
- **ResTox 5.0**
- **Graphics/Word Processing**
- **Adobe Illustrator 5.5**
- **Adobe Photoshop 3.0**
- **Adobe Premiere 4.0**
- **Adobe Freehand 4.0**
- **Acrobat 3.0**
- **Acrobat X.2**
- **Kais PowerTools 2.1**
- **MS Works 3.0**
- **QuarkXPress 3.31**
- **QuarkXPress PPC**
- **Word Perfect 3.0**

### Utilities Software

- **Adobe Superl !**
- **DOS AutoMail 2.0**
- **Central Point MacTools 3.0**
- **Disk Dumper 4.0**
- **DiS Moun ter 4.0**
- **Fast Back Plus 3.0**
- **Folder Bolt 1.02**
- **Fileguard 2.7**

### Memory

- **1MB 30pin 120ns**
- **2MB 30pin 80ns**
- **4MB 72pin 60/70/80ns from 144**
- **8MB 72pin 60/70/80ns from 265**
- **16MB 72pin 32/64MB 72pin 60ns from 1050/2795**

**Powerbook RAM Call LC/Quadra VPR from 22/19**

### Magic

- **Magic Fax Modems**
- **Magic 28.8 V. Fast Class**
- **Magic 14.4 Data/FaxModem**
- **Magic 14.4 With Voice Mail**
- **Magic Powerbook Int. Modems**
- **Magic Powerbook Int. Modems 24/96 Data/FaxModem**
- **High Speed Modem Cable**

### Magic Backup

- **2GB Compressed**
- **2GB DAT**
- **4GB Compressed DAT**

### Magic RAID

- **Magic RAID System. Recommended for Mac professionals. Our Magic RAID systems offer SCSI 1 & 2 compatibility and high data throughput.**
- **Magic RAID**
- **Maximize your 8100 Power Mac**

### Magic Optical Drives

- **Magic Optical Drives**
- **120 Optical Drive**
- **230 Optical Drive Turbo**
- **1.3GB Optical Drive Turbo**

### Magic From MacProducts USA

**A Division of Bottom Line Distribution**

### Magic Hard Drives

- **IBM Drives**
- **Alleycat 2GB**
- **Spyfire 1GB**
- **520MB**
- **720MB**

**Call us about custom configurations**

### Magic RAID Upgrades for Quadra 900, Quadra 950 & Power Mac

- **1.0GB RAID**
- **2.0GB RAID**
- **1.3GB Optical Drive Turbo**

**Ask For Your Free Catalog**

### Memory

**Lifetime warranty!**

- **Delrina Fax Pro**
- **Fax STF**
- **Microphone 5.0**

### CDs

- **Flying Nightmares Power PC...47**
- **Hilarious...25**
- **Journey to the Yangtze...37**

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### Magic Hard Drives

- **LPS Drives**
- **Q170 Raw**
- **Q340 Raw**
- **Q540 Raw**
- **Empire Drives**
- **Q0540 Empire**
- **Q1080 Empire**

**Call us about custom configurations**

### Magic RAID

- **Magic RAID System. Recommended for Mac professionals. Our Magic RAID systems offer SCSI 1 & 2 compatibility and high data throughput.**

### Magic Optical Drives

- **Magic Optical Drives**
- **120 Optical Drive**
- **230 Optical Drive Turbo**

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**Ask about our Memory Buy Back program!**

### Keyboards/Accessories

- **DGR Extended Keyboard**
- **Kensington Turbo Mouse**
- **Apple Design Keyboard**

### Software

- **Utilities Software**
- **Adobe Super 1!**
- **DOS AutoMail 2.0**
- **Central Point MacTools 3.0**
- **Disk Dumper 4.0**
- **DiS Moun ter 4.0**
- **Fast Back Plus 3.0**
- **Folder Bolt 1.02**
- **Fileguard 2.7**

### NET 30 TERMS

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**Circle 63 on reader service card**

**MACWORLD December 1994 231**
MacProducts USA sets the new Magneto-Optical standard.

**Magic 230MB $825**
3.5 inch storage solution. Reads and writes at full speed 128MB & 230MB media.
2 year warranty.
128 MB Cartridges $24
230 MB Cartridges $44

**Magic 1.3GB Turbo $1999**
5.25 inch storage solution.
1.3 GB Cartridges $89

<table>
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<th>High Performance SCSI Products from Magic</th>
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<td><strong>RamDrive</strong></td>
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<tr>
<td>Less than .2 ms access time with storage sizes up to 1.5Gb 768MB $399 1.5Gb $599</td>
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**Railgun Pro II LC**
Up to 64 MB of RAM, super fast 24 bit video and a 50 Mhz 68030 with FPU.
16" Video 24 bit $899
21" Video 24 bit $999
Accelerator (no video) $399

<table>
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<th><strong>SCSI Bus Extension</strong></th>
<th><strong>AV Raider</strong></th>
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<td>Allows 21 additional SCSI 1 &amp; 2 devices. Seven SCSI extenders allow 147 devices on the SCSI bus. Extender $299</td>
<td>Hardware controlled RAID system at an affordable price. Faster than software RAID System. AV Raider $599</td>
<td>Take your Power Mac to the limit with our easily installed accelerators. 80Mhz 6100 $89 80Mhz 7100 $89 100Mhz 8100 $99</td>
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MacProducts USA
A division of Bottom Line Distribution

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Internet: sales@max.dgr.com

Circle 65 on reader service card
A multifunctional drive is a custom-made combination of hard drive, CD-ROM drive, CD-R drive, tape drive, and Syquest drive mounted in the same enclosure. Multipurpose drives require less space, eliminate compatibility problems and cost less than separate components.

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- Extended keyboard
- SuperMac 20, 24-bit color monitor
- SuperMac 24, 152x112 video card
- Image processing multifunctional drive
- 650MB optical and Syquest 88C in one enclosure

$8399

PowerPC 6100 Imaging Station
- PowerPC 6100/60 w/ 60MHz PPC 601 CPU
- 40MB RAM, 540MB HD
- Extended keyboard
- SuperMac 20, 24-bit color monitor
- SuperMac 24, 152x112 video card
- External Syquest 200MB with cartridge
- Apple 2.0B tape backup system
- TI Pro 600, 9 p.m., 600 dpi laser printer
- AVision 680AV-6400 x 6400 dpi scanner w/PS LE

$8999

PowerPC 7100 Value Station
- PowerPC 7100/65 w/ 66MHz PPC 601 CPU
- 72MB RAM, 340MB hard drive
- Dual spool CD-ROM drive
- SuperMac 20, 24-bit color monitor
- SuperMac 24, 1152x870 video card
- Image processing multifunctional drive
- 650MB optical and Syquest 88C in one enclosure

$7149

Quadra 840AV DTP Station
- Quadra 840AV/133MHz, 680CPU processor
- 1MB RAM, 540MB hard drive
- Extended keyboard
- 17" hi-res 24-bit color monitor
- SuperMac 24, 1152x870 video card
- Syquest 88C/128MB, 2.1GB
- AVision 850AV-4800 x 4800 dpi scanner w/PS LE
- TI Pro 600, 9 p.m., 600 dpi laser printer

$55

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- 8.5" x 14", scanning area
- $600 x 600 dpi
- 24-bit color, grayscale, halftone and line art mode
- Built-in gamma correction control

$125

Multipurpose Drives

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E-Machines 20
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- Shadow Mask Tube
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20 INCH

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RocketShare $299
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PhotoBooster $299
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SuperMac Display Calibrator $199

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with Color Calibrator

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Thunder II GX 1360 $CALL
"The Thunder II GX 1360 simply can’t be beat" MacUser

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Precision Color 24X $799
Precision Color Pro 24XK $699
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Circle 20 on reader service card
**WACOM Digitizers**

12" x 18" Tilt with 2 Handed Input Calligraphy/Cordless Pen

$659

Wacom #UD1210RM

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<th>Size</th>
<th>Price</th>
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<tr>
<td>12&quot;x12&quot;</td>
<td>$499</td>
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<td>ARTZ 6x8</td>
<td>$299</td>
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<tr>
<td>ARTZ/Painter 2.0 Bundle</td>
<td>$479</td>
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<tr>
<td>4&quot;x5&quot; - Compatible with Mac or PC</td>
<td>$149</td>
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**PhotoShop 3.0** $199

Photoshop 3.0 with purchase of Scanner or Wacom Tablet includes FREE KAI's Power Tools

**UMAX Scanners**

Vista V56 - 600dpi One-Pass Scanner $699
UMAX 630 - 600dpi $509
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**FUJIX FV-7** $995

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- $1,059 with TouchScreen & Software

**20" Color Display** Igegami CF-20

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RasterOps PaintBoard 24XLI $499

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- Personal ROMMaker $5695
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- Lifetime technical support.
- 24 Hour turnaround, 1 year replacement policy.
- Friendly, helpful staff. We appreciate your business!

### Quantum

**#1 HARD DRIVE FOR MAC**

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Speed</th>
<th>RPM</th>
<th>Buffer</th>
<th>Warranty</th>
<th>Model</th>
<th>Internal</th>
<th>External</th>
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<tr>
<td>170MB</td>
<td>17ms</td>
<td>3600</td>
<td>32K</td>
<td>2yr</td>
<td>ELS170S</td>
<td>$169</td>
<td>$229</td>
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<tr>
<td>270MB</td>
<td>12ms</td>
<td>4500</td>
<td>128K</td>
<td>2yr</td>
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<td>340MB</td>
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<td>1080MB</td>
<td>9.5ms</td>
<td>5400</td>
<td>512K</td>
<td>5yr</td>
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<td>1440MB</td>
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<td>2160MB</td>
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<td>512K</td>
<td>5yr</td>
<td>EMP2160S</td>
<td>$1039</td>
<td>$1099</td>
</tr>
</tbody>
</table>

MegaHaus is your #1 source for Quantum drives.
- Low price guarantee on all Quantum Drives!
- Same day shipping on most orders!

### SyQuest

**Genuine Syquest Media**

<table>
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<tr>
<th>Capacity</th>
<th>Speed</th>
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<th>Buffer</th>
<th>Warranty</th>
<th>Internal</th>
<th>External</th>
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<tr>
<td>44MB</td>
<td>20ms</td>
<td>SQS44</td>
<td>32K</td>
<td>1yr</td>
<td>$309</td>
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<td>105MB</td>
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<td>SQS270</td>
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<td>1yr</td>
<td>$529</td>
<td>$589</td>
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</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 easel.
- 5 year warranty on all cartridges!

### CD ROM DRIVES

<table>
<thead>
<tr>
<th>Speed</th>
<th>Capacity</th>
<th>Model</th>
<th>Buffer</th>
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<td>350K/sec</td>
<td>250MB</td>
<td>S105</td>
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<td>330K/sec</td>
<td>250MB</td>
<td>S105</td>
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<td>330K/sec</td>
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<td>500MB</td>
<td>S105</td>
<td>1yr</td>
<td>$169</td>
<td>$239</td>
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</tbody>
</table>

- Includes driver software with music play, 25 Photo CD processing coupon, and cables. Multi Drive CD Towers in stock!

### TAPE DRIVES

<table>
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<tr>
<th>Capacity</th>
<th>Type</th>
<th>Brand</th>
<th>Internal</th>
<th>External</th>
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<td>QIC 150</td>
<td>Archive</td>
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<td>640MB</td>
<td>QIC 240</td>
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<td>750MB</td>
<td>QIC 350</td>
<td>Archive</td>
<td>$319</td>
<td>$389</td>
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- Includes Retrospect 2.1, 1 tape, and cables. OPTIMA DeskTape Software mounts DAT on desktop $289.
### PRODUCT INDEX

#### BUSINESS TOOLS

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<th>Model</th>
<th>Description</th>
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<tbody>
<tr>
<td>ADB-200</td>
<td>Reads ADB, Mag Stripe, and Barcode data</td>
<td>$369</td>
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</table>

*UnScan-It! is a powerful software tool that makes it easy to create and read barcodes on your Mac.*

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<th>Description</th>
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<td>MacAuthorize</td>
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<table>
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<th>Product</th>
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<td>Apple Color Onew Scanner</td>
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<td>Apple One Scanner</td>
<td>$623</td>
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*Apple Color Onew Scanner is a powerful tool for scanning barcodes.*

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<td>3199/2599</td>
<td>24MB/1GB/CD 3199/2599</td>
</tr>
<tr>
<td>Call for the lowest price on PowerBooks 1458, 160, 165c, 180, 180c, 190c, 190c/600</td>
<td>456</td>
<td>Transparency Adapter 456</td>
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<tr>
<td>UC30/630 PRO</td>
<td>599/699</td>
<td>958/699/367</td>
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<tr>
<td>UC840 1000D W/Photoshop</td>
<td>875</td>
<td>1000D W/Photoshop 875</td>
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<td>UC1260 1600D W/Photoshop</td>
<td>1079</td>
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<td>965</td>
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<td>PowerLook/transparency</td>
<td>955</td>
<td>955/955/367</td>
</tr>
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</table>

**All** Prices are subject to restocking fee, must be in original package, condition & needs an AMA.

**All Prices are subject to change without notice.**

---

**CIRCLE 420 ON READER SERVICE CARD**

**MACWORLD December 1994 243**
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<table>
<thead>
<tr>
<th>Phone</th>
<th>Fax</th>
</tr>
</thead>
<tbody>
<tr>
<td>(818) 719-9200</td>
<td>(818) 719-9115</td>
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**POWER MAC**

<table>
<thead>
<tr>
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<td>600/1200 250</td>
<td>$329.00</td>
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<tr>
<td>600/1600 250</td>
<td>$389.00</td>
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<tr>
<td>600/2000 250</td>
<td>$449.00</td>
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<td>600/2500 250</td>
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**PRINTERS**

<table>
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<tr>
<td>HP LaserJet 4+</td>
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<td>HP LaserJet 5+</td>
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<td>HP LaserJet 6+</td>
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**MONITORS**

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<tr>
<td>Sony G5</td>
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<tr>
<td>Sony G6</td>
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</tr>
<tr>
<td>Sony G7</td>
<td>$350.00</td>
</tr>
</tbody>
</table>

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**PowerMac 6100/60 8mb ram** $1570  
**PowerMac 7100/80 8mb ram** $1910  
**Quadra 700 4mb ram/500HD** $840  
**PowerBook 150 4/80** $1375  
**PowerBook 150 4/80** $1375  
**PowerBook 150 4/80** $1575  
**PowerBook 150 4/80** $1575  
**PowerBook 150 4/80** $1575  

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**ViewSonic 21" Color Display** $1499  
**Norcent 21" Color Display** $1999  
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**Adobe Photoshop 3.0 Software** $599  
**Adobe Photoshop 3.0 Software** $599  
**Adobe Photoshop 3.0 Software** $599  
**Adobe Photoshop 3.0 Software** $599  
**Adobe Photoshop 3.0 Software** $599  

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- PowerMax 6100/60 with fax/modem...
- PowerMax 7100/80 with fax/modem...
- PowerMax 6100/60 with fax/modem...
- PowerMax 7100/80 with fax/modem...
- PowerMax 6100/60 with fax/modem...
- PowerMax 7100/80 with fax/modem...
- PowerMax 6100/60 with fax/modem...
- PowerMax 7100/80 with fax/modem...

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- Help Buyers Find the Products They Need Fast
**LATEST S A L E INTERNATIONAL**

**USED SYSTEM SPECIALS**

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Price</th>
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<tbody>
<tr>
<td>MAC LC II 4/80</td>
<td>BASIC COLOR MONITOR STAND. II KEYBOARD</td>
<td>$599.00</td>
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<tr>
<td>DUO 210 4/80</td>
<td>WITH DUO DOCK</td>
<td>$875.00</td>
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<td>MAC IISI 3/40</td>
<td>12&quot; RGB MONITOR STAND. II KEYBOARD</td>
<td>$675.00</td>
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<tr>
<td>MAC LC575 5/160 W/CD</td>
<td>STAND. II KEYBOARD</td>
<td>$1,299.00</td>
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**SUPER DEALS ON USED CPU'S**

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<thead>
<tr>
<th>Model</th>
<th>CPU</th>
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<tr>
<td>PB 100</td>
<td>2/20</td>
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<td>PB 140</td>
<td>4/40</td>
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<td>PB 145B</td>
<td>4/80</td>
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<td>PB 165C</td>
<td>4/120</td>
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<td>PB 170</td>
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<td>PB 180</td>
<td>4/120</td>
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<td>PB 180C</td>
<td>4/80</td>
<td>$1,999.00</td>
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<td>Duo 210</td>
<td>4/80</td>
<td>$599.00</td>
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<tr>
<td>Duo 230</td>
<td>4/80</td>
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<td>Duo 230</td>
<td>4/80</td>
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<td>Mac LC 520</td>
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<td>Quadra 800</td>
<td>8/500</td>
<td>$1,749.00</td>
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<td>Mac Classic II</td>
<td>2/40</td>
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**SUPER PERIPHERALS**

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<tr>
<th>Model</th>
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<tr>
<td><strong>Personal Laser LS</strong></td>
<td>$279.00</td>
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<tr>
<td>ImageWriter II</td>
<td>$199.00</td>
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<tr>
<td>Apple OneScanner</td>
<td>$249.00</td>
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<tr>
<td>Apple Color OneScanner</td>
<td>$499.00</td>
</tr>
<tr>
<td>PowerBook DuoDock</td>
<td>$299.00</td>
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<tr>
<td>PB &amp; Duo Express Modems</td>
<td>$99.00</td>
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<tr>
<td>PowerBook Carrying Cases</td>
<td>$39.00</td>
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<tr>
<td>Apple GeoPort Adapter</td>
<td>$49.00</td>
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<tr>
<td>Apple CD150/CD300 Ext.</td>
<td>$149.00/$249.00</td>
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<td>StyleWriter AC Adapters</td>
<td>$39.00</td>
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<td>Duo &amp; PwrBk Access. Close-Out Prices</td>
<td>$229.00</td>
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<tr>
<td>Laser NTR Logic Bd. Upgrade</td>
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</tr>
<tr>
<td>Apple LocalTalk Din 8 Connect.</td>
<td>$14.00</td>
</tr>
</tbody>
</table>

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**NEW LaserWriter LS-$399.00**

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
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<tbody>
<tr>
<td>New Mac LC 520 4/80</td>
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<td>New Mac IIXX 5/80 W/CD</td>
<td>$999.00</td>
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<td>New LaserWriter II Engine</td>
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<td>New Apple Color Plus Display</td>
<td>$299.00</td>
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<tr>
<td>Mac Plus</td>
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<tr>
<td>Mac SE (800K)</td>
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<td>Mac SE/30</td>
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<td>Mac Classic</td>
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<tr>
<td>Mac LC</td>
<td>4/40</td>
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<td>Mac LC III</td>
<td>4/80</td>
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<tr>
<td><strong>Mac IIX</strong></td>
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<td><strong>Mac IIXx 5/80 W/CD</strong></td>
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<td>Mac IISi</td>
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<td>Mac IIXc</td>
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**Factory Refurbished**

**NEW LaserWriter Select 310-$449.00**

<table>
<thead>
<tr>
<th>Model</th>
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<tbody>
<tr>
<td>New Apple 21&quot; Color Monitor</td>
<td>$1,399.00</td>
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<td>New Apple One Scanner</td>
<td>$399.00</td>
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<td>New Ext. Hard Drive Enclosures</td>
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<td>New Extended Keyboards</td>
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<td>Mac IIEi</td>
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<tr>
<td>Mac IIFX</td>
<td>4/0</td>
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<td>Apple Hi-Res Mono Monitor</td>
<td>$129.00</td>
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<td>Apple Basic Color Display</td>
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<td>Apple 12&quot; RGB Display</td>
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<td>Apple Color Plus Display</td>
<td>$229.00</td>
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<td>Apple 13&quot; RGB Display</td>
<td>$299.00</td>
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<td>Apple Portrait Display</td>
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<td>Apple Two Page Display</td>
<td>$479.00</td>
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<tr>
<td><strong>Epson Color Scanner</strong></td>
<td>$299.00</td>
</tr>
</tbody>
</table>

Prices represent a Cash Discount - off List Price.
Returns at discretion of Mgmt./15% Restocking Fee.

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### Power Macintosh CPUs

- Power MAC 6100/66 8/250 166 MHz, $1679
- Power MAC 6100 8/250 166 MHz, $1899
- Power MAC 6100 16/500/CD 326 MHz, $2519
- PM 6100A 8/250/CD 33 MHz, $2149
- PM 7100/66 8/250 166 MHz, $2558
- PM 7100 8/500/CD 326 MHz, $2785
- PM 7100 32/1GB 326 MHz, $4149
- PM 7100AV 16/500/CD 326 MHz, $3459
- PM 8100/80 8/500 166 MHz, $3695
- PM 8100 16/250/CD 133 MHz, $4299
- PM 8100AV 16/500/CD 326 MHz, $4659
- PM 8100 40/16GD 133 MHz, $6309

### PowerBooks Duo

- Q 650 8/250/CD 166 MHz, $989
- Q 660 8/250/CD 166 MHz, $1239
- Q 630 8/250/CD 133 MHz, $1197
- Q 650 8/250/CD 133 MHz, $1229
- Q 800/8/1GB 133 MHz, $269

### PowerBooks

- DUO 250 4/200 133 MHz, $989
- DUO 280 4/240 133 MHz, $989
- DUO 320 4/320/MODEM 64K, $1395
- DUO 400 4/512/MODEM 128K, $1395
- DUO 550 4/512/MODEM 128K, $1399
- DUO 650 4/720/MODEM 128K, $1399
- DUO 650 12/512/30M/CD 133 MHz, $1399
- DUO 750 12/512/30M/CD 133 MHz, $1399
- DUO 750 16/720/60M/CD 133 MHz, $1399
- DUO 850 16/1280/120M/CD 133 MHz, $1399
- DUO 950 16/1280/120M/CD 133 MHz, $1399
- DUO 950 32/512/30M/CD 133 MHz, $1399
- DUO 16/1280/120M/CD 133 MHz, $1399
- DUO 18/1280/120M/CD 133 MHz, $1399

### Mac CPUs

- PM 6100AV 8/250/CD 133 MHz, $1389
- PM 6100AV 16/500/CD 133 MHz, $1395

### Monitors

- Apple 14 Color Plus 8/250/CD, $269

### Printers & Others

- StyleWriter II REF $379
- Personal LaserWriter $529
- LaserWriter Select 300 (10PPM) $1448
- LaserWriter 360 Fax Modem $298
- LaserWriter Pro 630 REF. $1559
- HP DeskWriter 540 NEW! $989
- HP DeskWriter 500c $589
- HP DeskWriter 310 w/CSF $389
- HP LaserJet 4 ML $989
- HP LaserJet 4 M Plus $1989
- Global Village PP Gold $279
- Global Village PP mercury $359
- Geoport Adapter $129
- APPLE COMPATIBLE EXT. KB $79

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- 660AV, 8500: $1995
- 950, 8400: $1995
- 605, 8150: $1050
- 650, 8500: $500
- 620, 8230: $1300

**Apple Monitor**
- 14" Hi-Res, 15" AV: $895 / 1150
- 16" AV: $795 / 1000
- 20" AV: $995 / 1200

**Apple Printer**
- Laser 4M/4M+: 1595/1895
- Laser 4M/4MP: 995/1295
- Laser SIMX: 4240
- Deskwriter 310 W/Color: 339
- Deskwriter 560C: 925
- DeskJet 1200 PS: 2150
- GCC Select Press 1200: 5600

**Power Books**
- 320/330: 550/650
- 330/340: 495/595
- 350/360: 140/430

**Printers & H.P.'s**
- Laser 4M/4MP: 1595/1895
- Laser 4M/4MP: 995/1295
- Laser SIMX: 4240
- Deskwriter 310 W/Color: 339
- Deskwriter 1200 PS: 2150
- GCC Select Press 1200: 5600

**Scanners**
- AGFA Studio Scan II: 915
- AGFA ProColor Premier: 2195
- Unix UC1200: 1152
- Unix Color Look: 2879
- Microtek 3ST: 966
- Nikon Color Scan: 1895

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- Xantec Laser 8200: CALL

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- Radius VideoVision 8400: 6550
- SuperMac Digital Video: 4500
- Philips CD-ROM: 2195

**Kodak**
- PowerPC 7100: 1595
- PowerPC 8100: 2395
- PowerPC 8100AV: 1995

**Apple Logic Board**
- PowerPC 7100: 1595
- PowerPC 8100: 2395
- PowerPC 8100AV: 1995

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**系统和外设**

**Power Mac U pgrade**

**UPGRADE CARD 682**

<table>
<thead>
<tr>
<th>Model</th>
<th>Memory (MB)</th>
<th>Price (USD)</th>
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<tbody>
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<td>8000/600</td>
<td>128</td>
<td>$995</td>
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<tr>
<td>7100/66AV</td>
<td>128</td>
<td>$1695</td>
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<tr>
<td>8100/80AV</td>
<td>128</td>
<td>$1695</td>
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**Apple Monitor**

<table>
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<th>Model</th>
<th>Resolution</th>
<th>Price (USD)</th>
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<tr>
<td>14&quot; Hi-Res</td>
<td>15&quot; AV</td>
<td>$895 / 1150</td>
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<tr>
<td>16&quot; AV</td>
<td></td>
<td>$795 / 1000</td>
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<td>20&quot; AV</td>
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<td>$995 / 1200</td>
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**Apple Printer**

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<th>Model</th>
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<th>Price (USD)</th>
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<tbody>
<tr>
<td>Laser 4M/4M+</td>
<td>Deskwriter 310 W/Color</td>
<td>1595</td>
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<tr>
<td>Laser 4M/4MP</td>
<td>Deskwriter 560C</td>
<td>995</td>
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<td>Laser SIMX</td>
<td>DeskJet 1200 PS</td>
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**Power Books**

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<td>320/330</td>
<td>550/650</td>
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<tr>
<td>330/340</td>
<td>495/595</td>
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<td>350/360</td>
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**Printers & H.P.'s**

<table>
<thead>
<tr>
<th>Model</th>
<th>Price (USD)</th>
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<tbody>
<tr>
<td>Laser 4M/4MP</td>
<td>Deskwriter 310 W/Color</td>
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<tr>
<td>Laser 4M/4MP</td>
<td>Deskwriter 560C</td>
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<tr>
<td>Laser SIMX</td>
<td>DeskJet 1200 PS</td>
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**Scanners**

<table>
<thead>
<tr>
<th>Model</th>
<th>Price (USD)</th>
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<tbody>
<tr>
<td>AGFA Studio Scan II</td>
<td>915</td>
</tr>
<tr>
<td>AGFA ProColor Premier</td>
<td>2195</td>
</tr>
<tr>
<td>Unix UC1200</td>
<td>1152</td>
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<tr>
<td>Unix Color Look</td>
<td>2879</td>
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<tr>
<td>Microtek 3ST</td>
<td>966</td>
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<tr>
<td>Nikon Color Scan</td>
<td>1895</td>
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**Printers & Scanner**

<table>
<thead>
<tr>
<th>Model</th>
<th>Price (USD)</th>
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<tr>
<td>Xantec Laser 8200</td>
<td>CALL</td>
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**Audio Video**

<table>
<thead>
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<th>Model</th>
<th>Price (USD)</th>
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<tr>
<td>Radius VideoVision 8400</td>
<td>6550</td>
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<td>SuperMac Digital Video</td>
<td>4500</td>
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<td>Philips CD-ROM</td>
<td>2195</td>
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**Kodak**

<table>
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<th>Model</th>
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<tr>
<td>PowerPC 7100</td>
<td>1595</td>
</tr>
<tr>
<td>PowerPC 8100</td>
<td>2395</td>
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<tr>
<td>PowerPC 8100AV</td>
<td>1995</td>
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**Apple Logic Board**

<table>
<thead>
<tr>
<th>Model</th>
<th>Price (USD)</th>
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<tbody>
<tr>
<td>PowerPC 7100</td>
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<tr>
<td>PowerPC 8100</td>
<td>2395</td>
</tr>
<tr>
<td>PowerPC 8100AV</td>
<td>1995</td>
</tr>
</tbody>
</table>

**Exchange any old MAC to NEW POWER MAC**

Call for APPLE 3rd party products

*系统和外设*
MEMORY

WE BUY USED MEMORY

WE WILL BE AT MACWORLD TORONTO, BOOTHS 177 &
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NO HIDDEN CHARGES!
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256K $128
512K $228
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2MB $698
4MB $998
8MB $1,798
16MB $3,398

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FAX: 703-322-6620

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ACCELERATORS/FPUs

DOUBLE THE 040 SPEED!

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40MHz 68040 Centris 610 $249/$399
50MHz 68040 Quadra 605/610 $399
Motor Speedster 25MHz $349/$499
33MHz w/128K cache $489/$599
25MHz 030 Mac SE $179/$217
25MHz 030/FP/16K cache LC $99
25MHz 030/FP/16K cache LCII $109
33MHz 030 Mac II, IIx $189/$238
26K Cache Card PowerMac $239
68040-25 FPJ Q605,610, LC475 $249
68040 33 FPJ QLCPS575/630 $99
(With 80386/40 Indx-It) $99
68822 FPJ LC I-III, Duo, etc. $39-$49
68851 PMAU w/Model2 Mac II $99

No EPP/FPJ

CIRCLE 420 ON READER SERVICE CARD

ACCELERTORS/FPUS

DOUBLE THE 040 SPEED!

QUADRA 605/610 & CENTRIS 610

40MHz 68040 Centris 610 $249/$399
50MHz 68040 Quadra 605/610 $399
Motor Speedster 25MHz $349/$499
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25MHz 030/FP/16K cache LC $99
25MHz 030/FP/16K cache LCII $109
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68040 33 FPJ QLCPS575/630 $99
(With 80386/40 Indx-It) $99
68822 FPJ LC I-III, Duo, etc. $39-$49
68851 PMAU w/Model2 Mac II $99

No EPP/FPJ

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UPGRADES & MEMORY

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FAX (310) 394-7744

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CIRCLE 412 ON READER SERVICE CARD

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PowerBook 145 4/80...
Power Book 170...

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CIRCLE 413 ON READER SERVICE CARD

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1/2 the cost of similar printers!

$149 While they last!

E-MACHINES DoubleColor SX
ACCELERATED 8-BIT VIDEO CARD FOR MACS
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IMAGEWRITER II $169
IMAGEWRITER II $278
IMAGEWRITER LQ $448
STYLEWRITER II $239
LASERWRITER INT 1 $749
LASERWRITER INT II $899
PERSONAL LASERWRITER 350 $349
PERSONAL LASERWRITER NT $649
PERSONAL LASERWRITER NT $499
PERSONAL LASERWRITER NTB $799
(ALL TONER SOLD SEPARATELY)

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MAC PLUS SYSTEM $259
SE 1/20 SYSTEM $349
CLASSIC 4/40 SYSTEM $549
CLASSIC II 4/80 SYSTEM $749
IIsi CPU 5/80 $599
IIsi CPU 0/0 $699
IIsi CPU 0/40 $699
LC II CPU 4/80 $799
LC II CPU 0/0 $799
POWERBOOK 145 4/80 $899
Duo 230 4/80 $899
Duo Dock $499

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QUADRUPLE YOUR REDRAW RATE!

MONITORS

APPLE 12" MONITOR $189
APPLE BASIC COLOR $169
APPLE 12" RGB $299
APPLE 14" PERFORMANCE PLUS (NEW) $399
APPLE 14" TINTRON (NEW) $399
APPLE 16" TINTRON $899

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Clearance Sale!

APPLE CD-I $49
SE Power Supply $89
LC Power Supply & Case $89
Apple Monitor Board $129
Apple Monitor Board $129
LaserWriter Plus ROM upgrade $59
PowerBook 140/170 Battery $49
AEM Mouse $49
40 Mb Hard Disk for Mac Portable $442
540Mb/Quadra Power Supply $149
USB B/Personal Monitor $149
540 Mb 5.25" Internal Mac Bi-Linear $49
NuBus Black & White Video $10
LC Ethernet Board $49
CIST & Vieux AUX (Plus & SE) $59
Mac Plus Keyboard $59
PowerBook 240 Round Internal Mouse $99
40 Mb External Hard Drive $99
Apple Design Power Mouses $129
Classic Logic $129
Mouse Mac Plus $149
Plus Power Supply $119
Radius PowerMou (6-Book Video Interface) $199

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AFFORDABLE UPGRADES

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Quad 650 $399
Quad 680AV $399
Quad 600 $399
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Power PC 7100 $999
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FAX: (310) 394-7323

CIRCLE 460 ON READER SERVICE CARD
## Xtra REASONS TO BUY FROM MAC Xtra...

### MEMORY UPGRADES

<table>
<thead>
<tr>
<th>Memory Type</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1X8X80</td>
<td>$37</td>
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<tr>
<td>2X8X80</td>
<td>$75</td>
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<tr>
<td>4X8X80</td>
<td>$133</td>
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<tr>
<td>16X8X80 II/II</td>
<td>$155</td>
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<tr>
<td>16X8X80 (Low Profile)</td>
<td>$919</td>
</tr>
<tr>
<td>1X8X80FX</td>
<td>$42</td>
</tr>
<tr>
<td>4X8X80FX</td>
<td>$155</td>
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<tr>
<td>4X8X80FX</td>
<td>$629</td>
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<tr>
<td>4MB 72Pin (70NS/60NS)</td>
<td>$145/$149</td>
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<tr>
<td>8MB 72Pin (70NS/60NS)</td>
<td>$289/$297</td>
</tr>
<tr>
<td>16MB 72Pin (60NS)</td>
<td>$535</td>
</tr>
<tr>
<td>32MB 72Pin (60NS)</td>
<td>$1115</td>
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</table>

### POWERBOOK UPGRADES

<table>
<thead>
<tr>
<th>Powerbook Upgrade</th>
<th>Price</th>
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</thead>
<tbody>
<tr>
<td>PB 520-540C 4MB/8MB</td>
<td>$197/$399</td>
</tr>
<tr>
<td>PB 520-540C 16MB/62MB</td>
<td>$795/$1565</td>
</tr>
<tr>
<td>PB 140-170 4MB/6MB</td>
<td>$139/$209</td>
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<tr>
<td>PB 160-180 4MB/6MB</td>
<td>$135/$205</td>
</tr>
<tr>
<td>PB 180-180 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>$293/$335</td>
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<tr>
<td>PBDUO 4MB/8MB</td>
<td>$175/$335</td>
</tr>
<tr>
<td>PBDUO 12MB/14MB</td>
<td>$535/$592</td>
</tr>
<tr>
<td>PBDUO 20MB/28MB</td>
<td>$930/$1429</td>
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### MODEMS

<table>
<thead>
<tr>
<th>Modem Type</th>
<th>Price</th>
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<tbody>
<tr>
<td>Zoom VFX 14.4 v.32bis SIR Fax</td>
<td>$169</td>
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<tr>
<td>Zoom FXV 2400/9600 S/R Fax</td>
<td>$116</td>
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<tr>
<td>Accura 144/FAX 14.4 Mac</td>
<td>$164</td>
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<tr>
<td>Optima 288 V.FC+FAX Mac</td>
<td>$449</td>
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<tr>
<td>Accura 144+FAX 14.4 Mac</td>
<td>$164</td>
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<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>
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<tr>
<td>Optom 288 V.FC+FAX Mac</td>
<td>$449</td>
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### NETWORKING

<table>
<thead>
<tr>
<th>Networking Type</th>
<th>Price</th>
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<tbody>
<tr>
<td>DaynaPort Pocket SCSI/Link-T</td>
<td>$231</td>
</tr>
<tr>
<td>DaynaPort SCSI/Link</td>
<td>$247</td>
</tr>
<tr>
<td>DaynaPort SCSI/LinkPowerbook-T</td>
<td>$266</td>
</tr>
<tr>
<td>DaynaPort TX (Friendly Net Adptr)</td>
<td>$54</td>
</tr>
<tr>
<td>DaynaPort E/LT Hub</td>
<td>$104</td>
</tr>
<tr>
<td>DaynaPort E/LT-C Mac LC Card</td>
<td>$193</td>
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<tr>
<td>DaynaPort E/SE-T Mac SE Card</td>
<td>$143</td>
</tr>
<tr>
<td>DaynaPort E/SE-T Mac ISI/SE/60</td>
<td>$143</td>
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<tr>
<td>DaynaStar Mini Hub 5 10BaseT</td>
<td>$140</td>
</tr>
<tr>
<td>DaynaStar Mini Hub 10BaseT</td>
<td>$193</td>
</tr>
<tr>
<td>Etherwave Nubus Card</td>
<td>$99</td>
</tr>
<tr>
<td>Etherwave Logic Card</td>
<td>$99</td>
</tr>
<tr>
<td>Etherwave Mac Powerbook Adapter</td>
<td>$276</td>
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<tr>
<td>Etherwave Printer Adapter</td>
<td>$278</td>
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<tr>
<td>EtherMac LC-C</td>
<td>$170</td>
</tr>
<tr>
<td>EtherMac LC-10T</td>
<td>$34</td>
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<tr>
<td>PhoneNet Connector</td>
<td>$28</td>
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### ACCELERATORS

<table>
<thead>
<tr>
<th>Accelerator Type</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daystar Turbo 040 33Mhz W/Cache</td>
<td>$795</td>
</tr>
<tr>
<td>Daystar Turbo 040 40Mhz W/Cache</td>
<td>$999</td>
</tr>
<tr>
<td>Daystar Turbo 040 128kCache</td>
<td>$193</td>
</tr>
<tr>
<td>Daystar 030 33/53 w/FPU</td>
<td>$275/$357</td>
</tr>
<tr>
<td>Daystar PowerPRO Cards</td>
<td>CALL</td>
</tr>
</tbody>
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### PRINTERS

<table>
<thead>
<tr>
<th>Printer Type</th>
<th>Price</th>
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<tbody>
<tr>
<td>SuperMac Pro</td>
<td>$800</td>
</tr>
<tr>
<td>Hewlett Packard DeskWriter C560C</td>
<td>$408</td>
</tr>
<tr>
<td>DeskWriter 310/520 (Mono)</td>
<td>$397/382</td>
</tr>
<tr>
<td>Call for HP Printer Supplies</td>
<td>CALL</td>
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### DRIVES

<table>
<thead>
<tr>
<th>Drive Type</th>
<th>Price</th>
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<tr>
<td>Xtra Drives</td>
<td>$289/$409</td>
</tr>
<tr>
<td>SyQuest 200MB w/Cart.</td>
<td>$239</td>
</tr>
<tr>
<td>SyQuest 105/270MB w/Cart</td>
<td>$429/$559</td>
</tr>
<tr>
<td>120MB Optical 30ms w/5 Disks</td>
<td>$995</td>
</tr>
<tr>
<td>CD-ROM Photo CD 2x</td>
<td>$259</td>
</tr>
<tr>
<td>8GB DDS2/32</td>
<td>$1209</td>
</tr>
<tr>
<td>MicroNet</td>
<td>$264/$288</td>
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<tr>
<td>Int'Ext 270MB Fast SCSI-2</td>
<td>$302/337</td>
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<tr>
<td>Int'Ext 340MB Fast SCSI-2</td>
<td>$347/392</td>
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<tr>
<td>Int'Ext 1GB Fast SCSI-3</td>
<td>$540/591</td>
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<tr>
<td>External 2.7GB Fast SCSI-2</td>
<td>$2,932</td>
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<tr>
<td>Int'Ext 128MB Optical Drive, 2MB/1,644</td>
<td>$2,932</td>
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### ACCESSORIES

<table>
<thead>
<tr>
<th>Accessory Type</th>
<th>Price</th>
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<tbody>
<tr>
<td>DiskMule 255</td>
<td>$255</td>
</tr>
<tr>
<td>FPU L/C/LCII</td>
<td>$49/48</td>
</tr>
<tr>
<td>FPU Classic II</td>
<td>$55</td>
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<tr>
<td>FPU Color Classic</td>
<td>$48</td>
</tr>
<tr>
<td>FPU Duo Dock/Performance 600</td>
<td>$599</td>
</tr>
<tr>
<td>FPU/CPUL 040 25Mhz</td>
<td>$299</td>
</tr>
<tr>
<td>VRAM 256K / 512K</td>
<td>$20/30</td>
</tr>
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### SYQUEST MEDIA

<table>
<thead>
<tr>
<th>Media Type</th>
<th>Price</th>
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<tbody>
<tr>
<td>44MB 1-4/5/9-10/10 +</td>
<td>$59/$58/$57</td>
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<tr>
<td>44MB Pre-Formatted</td>
<td>$65</td>
</tr>
<tr>
<td>88MB 1-4/9-10 +</td>
<td>$69/$68/$67</td>
</tr>
<tr>
<td>270MB 1-9/10 +</td>
<td>$535/$592</td>
</tr>
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</tr>
<tr>
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<td>$193</td>
</tr>
<tr>
<td>Daystar 030 33/53 w/FPU</td>
<td>$275/$357</td>
</tr>
<tr>
<td>Daystar PowerPRO Cards</td>
<td>CALL</td>
</tr>
</tbody>
</table>

### VIDEO CARDS

<table>
<thead>
<tr>
<th>Video Card Type</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radius</td>
<td>Precision Color 17 MultiSync</td>
</tr>
<tr>
<td>Precision Color 20 MultiSync</td>
<td>$1,417</td>
</tr>
<tr>
<td>Precision Color 21</td>
<td>$2,110</td>
</tr>
<tr>
<td>Full Page Display 15&quot; Mono</td>
<td>$685</td>
</tr>
<tr>
<td>NEC</td>
<td>5FGE 17&quot; MultiSync</td>
</tr>
<tr>
<td>5FGE 15&quot; MultiSync</td>
<td>$594</td>
</tr>
<tr>
<td>5FGE 15&quot; MultiSync</td>
<td>$594</td>
</tr>
<tr>
<td>SuperMac</td>
<td>SuperMatch 1717&quot;</td>
</tr>
<tr>
<td>SuperMatch 17XL 17&quot;</td>
<td>$1,063</td>
</tr>
<tr>
<td>SuperMatch High Res 20&quot;</td>
<td>$2,753</td>
</tr>
<tr>
<td>SuperMatch 21xT XL 21&quot;</td>
<td>$2,657</td>
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</table>

### MONITORS

<table>
<thead>
<tr>
<th>Monitor Type</th>
<th>Price</th>
</tr>
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<tr>
<td>Radius</td>
<td>Precision Color 17&quot; MultiSync</td>
</tr>
<tr>
<td>Precision Color 20&quot; MultiSync</td>
<td>$1,417</td>
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<tr>
<td>Precision Color 21&quot;</td>
<td>$2,110</td>
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<tr>
<td>Full Page Display 15&quot; Mono</td>
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<tr>
<td>NEC</td>
<td>5FGE 17&quot; MultiSync</td>
</tr>
<tr>
<td>5FGE 15&quot; MultiSync</td>
<td>$594</td>
</tr>
<tr>
<td>5FGE 15&quot; MultiSync</td>
<td>$594</td>
</tr>
<tr>
<td>SuperMac</td>
<td>SuperMatch 1717&quot;</td>
</tr>
<tr>
<td>SuperMatch 17XL 17&quot;</td>
<td>$1,063</td>
</tr>
<tr>
<td>SuperMatch High Res 20&quot;</td>
<td>$2,753</td>
</tr>
<tr>
<td>SuperMatch 21xT XL 21&quot;</td>
<td>$2,657</td>
</tr>
</tbody>
</table>

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Fax your order 24 Hours a day! (206) 455-3448

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- Returns subject to approval & restocking fee
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CIRCLE #61 ON READER SERVICE CARD
**POWERPC MEMORY $145**

**POWERPC, CENTRIS, QUADRA, LC III**

- 4MB-70ns / 4MB-60ns ........................................ 145 / 146
- 8MB-70ns / 8MB-60ns ........................................ 294 / 298
- 16MB-60ns non-composite ..................................... 529
- 32MB-60ns .......................................................... 1089

**STANDARD 30 PIN MEMORY**

- 1x860 ............................................................. 937
- 1x870 ............................................................. 947
- 1x8100 ............................................................ 1355
- 2x860 ............................................................. 773
- 2x870 ............................................................. 858
- 4x860 ............................................................. 1134
- 4x870 ............................................................. 1137

**PRINTED MEMORY**

- LaserWriter 810 4MB / 8MB .................................... 525 / 529
- HP 4, 4MB / 8MB ................................................ 579 / 539
- TI FSI7-35 1MB ..................................................... 98

---

**POWERBOOK MEMORY**

- PBI-40-170-4/6 .................................................. 1129 / 1169
- PBI-60-180-4/6/10 .............................................. 1289 / 1299
- PB165-180C-4/6/8/10 ....................................... 129 / 1299
- PB160C-180C-4/6/8/10 ..................................... 1329 / 1349
- DUO 210 - 290C 4/6/8/12 .................................. 175 / 1339
- DUO 210 - 260C 14/20/28 .................................. 1399 / 1199
- PB 520 - 540C 4/8 /16/32 .................................... 198 / 1359 / 1197

---

**POWERBOOK ACCESSORIES**

- Battery Charger & Conditioner ................................ 69
- Long Life Battery 140-180c .................................. 39
- AutomobileAdapter 100-180 / DUO .......................... 69
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Dumb Macintosh Things

From anal to banal, Guy tells it like it is

Apple challenged the personal computer business in 1984 by introducing a new computer called Macintosh. It challenged then-current standards of hardware and user-interface design.

To be a challenger once, you only have to challenge existing conventions. To be a challenger twice, you have to challenge your own conventions. Allow me to start with my list of the ten dumbest things about Macintosh.

1. Too many models. I defy anyone at Apple to explain who should buy which model. The best algorithm I've found is to go to a superstore and buy the one that's on sale and never read a newspaper ad or computer magazine again. If any reader has figured out how to help determine the model they should buy, please contact me; I have a lot of E-mail I'd like to forward to you.

2. Depending on Microsoft for Macintosh applications. What would you say if your country's weapons were manufactured by its enemies? Yet in the war against the Intel/Microsoft megalith, Apple depends on Microsoft for key applications. To add inaneness to injury, Apple promotes Microsoft's products.

3. INITs and cdevs conflict? In what order should they be loaded? Which are necessary and which aren't? Managing INITs and cdevs is pure witchcraft, and I don't like riding a broom. I run a minimalist system, and I load 32 of these puppies. Half of them should be part of the system software. If you needed 32 different patches for your television, you'd have trouble getting it working, too.

4. The cover dates of Macintosh magazines. They bear no sensible relation to when you get each issue. This is the December issue of Macworld. When did you get it—sometime in June? I'm writing this column in January of 1993. I propose a cover-date amnesty between MacUser and Macworld, so we can all reset our calendars to real time.

5. Setting up a Macintosh for file sharing. Here's a quick test: what four pieces of software do you use to set up file sharing? The answer is Users & Groups, Sharing Setup, Chooser, and Network. It may be an order of magnitude easier to add a Macintosh to a network than any other computer, but like I said, we have to challenge our own conventions. A good test is, can you explain how to set up file sharing to your mother or father over the phone?

6. Macworld Expo exhibitors that use models, actors, and actresses, or that throw hats or T-shirts into the audience as a prize for yelling "NerdPerfect."

7. The bomb-box Resume button. When your Mac crashes (never happens to you, right?), you sometimes get this great dialog box with two buttons in it: Restart and Resume. Have you ever, ever had the Resume button work? The very best thing that happens is the machine starts buzzing and flashing in ways that DOS-based computers never dreamed of.

8. The danger of reinstalling a System over an old System. You're pretty much guaranteed a crashed system disk unless you remove your old system and install from scratch. Does the Installer tell you this? Does Apple tell you this? Does Apple know this?

9. Running Windows and MS-DOS applications on a Macintosh. There's a coprocessor card. There's emulation software. Soon there will be a chip. Does anyone care? Someone who wants a Macintosh wants a Macintosh. Someone who wants an IBM PC isn't going to lower himself or herself and buy an overpriced "cutie graphics toy."

10. A few miscellaneous items: mysteriously named enablers in your System Folder for Macintoshes you've only read about; the slowest file copying this side of the Franciscan monks; and dragging a disk into the Trash to eject it. In the real world, when I want something out of a machine, I throw it in the trash. Don't you?

There you have it: ten dumb things about Macintosh that should be fixed. I may have gotten under the skin of a few people, but like the oyster and the cultured pearl, a great computer needs a little irritation to develop.
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The editors of *MacUser* think Turbo Mouse® is the best. They gave it the coveted Five Mice award. The readers of *Macworld* think Turbo Mouse is the best. This year they voted it “Best Input Device” for a record-setting sixth time. In fact, Turbo Mouse has won more awards than any Macintosh input device in history. And when you take a close look, it's easy to see why.

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You can even program Turbo Mouse to send complex keyboard commands—like printing an envelope, inserting a picture, sending a fax. And you can do it all with just one click.

What's more, Turbo Mouse automatically remembers which application you're in. So you can create different command combinations for each of your favorite programs.

And don't forget what started it all. With all the talk about software, it's easy to forget our award-winning hardware.
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