COMPUTER GRAPHICS

3-D RENDERING ON THE MAC
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80MB TO 150MB HARD DRIVES
Lab Test: 85 Products

E-MAIL PROGRAMS: WHICH IS BEST?
QuickMail vs. InBox
vs. Microsoft Mail

6 COMMUNICATIONS PROGRAMS:
Macknowledge
MicroPhone II, Smartcom II,
VersaTerm-Pro,
White Knight, Zterm

PRINTING WITHOUT POSTSCRIPT
10 Affordable QuickDraw Printers
Consistently, people who work with numbers have some noticeable traits. They’re intelligent, organized and thorough—buttoned up, if you will.

Which explains why Microsoft Excel has been the spreadsheet standard for Macintosh ever since it was introduced in 1985. Today, 90% of Macintosh spreadsheet users do their calculating, manipulating, analyzing and presenting with it.

And while Microsoft Excel has always been easy to learn and use, it can now perform all the complex functions you perform, but with labor-saving benefits.

You can easily build complex models, and conveniently link multiple sheets with a simple point and click.

So the left hand knows what the right is doing, we’ve added a feature that will tie your data into Microsoft Word documents. Then update that same data automatically, when

With Microsoft Excel you can create impressive documents, choosing from 256 fonts and colors, variable row height and shading.

### Profitability by division

#### WxC 2000

<table>
<thead>
<tr>
<th></th>
<th>JUL</th>
<th>AUG</th>
<th>SEP</th>
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<td>92%</td>
<td>108%</td>
<td>113%</td>
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|                |      |      |      |      |      |      |
| **Cost of Goods Sold** |      |      |      |      |      |      |
| Actual         | $1,848 | $3,198 | $3,475 | $2,262 | $2,860 | $7,663 |
| Forecast       | $1,549 | $2,288 | $2,312 | $1,608 | $2,840 | $3,969 |
| Variance       | $299  | $910  | $1,164 | $654   | $220  | ($3,969) |
| %              | 119%  | 140%  | 150%  | 141%   | 108%  | 0%    |

|                |      |      |      |      |      |      |
| **Gross Profit** |      |      |      |      |      |      |
| Actual         | $6,552 | $9,102 | $10,425 | $6,438 | $10,140 | $21,300 |
| Forecast       |       |       |       |       |       |       |

#### WxC 1000

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<td>110%</td>
<td>134%</td>
<td>118%</td>
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</table>
it's been changed in Microsoft Excel.

To insure data integrity, we've even built in alerts that will warn you of such grievous errors as circular references. In fact, Microsoft Excel is so bright, it will actually review your worksheet and flag any formulas that don't fit an established pattern.

Furthermore, the search and replace function can make corrections on a global scale. And customized number formatting lets you bend the rules, allowing you to create everything from a 3-digit account code to a 17-digit part number.

Now, we've left a lot out in this short discourse, but Microsoft Excel hasn't. So be sure to ask your dealer for a complete explanation of its capabilities. And you'll see how Microsoft Excel will make your job easier and better.

Or, if you look at it a different way, you'll become a more effective manipulator. And a more efficient calculator.

Microsoft
Making it all make sense.

Then you can Paste Link those worksheets and charts into your Microsoft Word documents and update them automatically.

WinMark Copiers

MEMO:

TO: Shannon Pitts
FR: Peter Cohen
DT: November 13th, 1989
RE: Presentation to the Board

In preparation for the annual meeting, I've created a 20-minute slide presentation on our successful entry into the small printer market.

The presentation will explain to the shareholders that, on a basis of sound marketing strategy, reinforced with our knowledge of the printer business at other levels, we have been able to grow from a 2 percent share of market, to 9 percent in 18 short months.

To the right is an excerpt of the presentation which illustrates our growth. Anticipated concerns will probably center around quality of service and the ability to meet market demand over the next year.

We should be able to squelch any fears by explaining that our small printers have a very low (4%) field repair call requirement at present.

And our assembly resources here in the U.S. and Asia are operating at 87% capacity.
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By Charles Seiter  The new crop of QuickDraw printers offers an unbeatable combination for the budget-minded: high resolution and low prices.

What's new in the midrange hard disk market? Lower prices and higher quality (see page 146).
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The Original AnthroCart. Mobile. Compact. Incredibly strong. So many ways to solve your space and equipment problems!

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It even lets you dial in to your network from a remote site to access files, use TOPS®, AppleShare®, E-mail®, printers or any other network resource. And it lets any Mac on your network access a remote network thousands of miles away, creating a powerful, high-speed wide-area internetwork. The Hayes-compatible NetModem V.32 comes with Internet Manager software that lets you create network zones, control traffic, restrict access between zones - even check the location and status of every device in the system. The NetModem V.32 is setting a whole new standard. For more information, call Shiva at 1-800-458-3550.

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by Shiva

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Getting ready for the Volvo Challenge, the single-handed racers around the world are focusing on their boats. The American builder of Wednesday's Dream, Jason Richardson of W.F. Richardson, will give his 66-foot 3.5 m/38-foot 5-inch single-handed boat an extreme upgrade. He will sail around Cape Horn again in 1996 with this single-handed racing boat, or Sundays Victory. The boat's hull has one of the most advanced carbon composite hulls ever built, which means it is lighter and stronger than any other boat. The deck is low to the water and has an easy-to-use sail foil. The design is perfect for a single-handed sailor.
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Radius and Pantone, Inc. have created a new electronic color standard for Macintosh. It's the breakthrough graphic designers and publishers have been waiting for.

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The key to color accuracy in Radius Color Systems is the Radius PrecisionColor Calibrator™.

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Radius Color Systems are powered by the Radius QuickColor™ Graphics Engine. A 6 MIPS RISC processor that drives Macintosh QuickDraw routines like window movement, text scrolling, fills and image displays, up to 600% faster.

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No matter which Radius Color System you choose, you'll work with the only complete system that provides the performance of a professional workstation and unprecedented color accuracy.

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Whether for mail, teleconferencing, on-line research or bulletin boards, MicroPhone II 3.0 is helping everyone put on a happy face.

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Circle 48 on reader service card
Only SuperMac™ can dramatically enhance the look and feel of your Macintosh. We do just that with the newest, most impressive member of our family — our 21-inch Color Two Page Display.

We redefine the concept of a two page display with the first 1152 x 870 color display that's Apple™ standard WYSIWYG. And we apply our vast color graphics expertise to our gray scale and monochrome displays, too. With our Platinum Two Page Display™ and our 19" Platinum Display™, we perfectly mirror the subtle details of the actual printed page: Paper whites. Crisp grays. And razor sharp focus, even at the edges.

SuperMac's Two Page Displays are the latest members of an influential family of sophisticated graphics systems. Each complete with a high-contrast anti-glare panel and a fast 75Hz flicker-free refresh rate. Each perfect for any size system or budget. From our 19- and 16-inch color Trinitrons™ to our high performance 19" Color and Platinum Displays.
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Choose from our Spectrum/8™ PDQ for fast 8-bit performance, or our Spectrum/24™ PDQ for a blazing 16.7 million colors—as many as your eye can distinguish. Or select any one of our extensive family of high performance, 24- and 8-bit graphics systems: displays, boards, and software. Including our ColorCard/24™ with optional acceleration for 13" displays.

So insist on the superior quality you've come to expect from SuperMac. The best look. The best feel. The best performance. And the best value. Ask your dealer for a SuperMac graphics system.

SuperMac 24- and 8-bit graphics family includes the new accelerated Spectrum/8 PDQ and Spectrum/24 PDQ for large screens; the economical ColorCard/8 and Graphics Accelerator™. Other family members include the Spectrum/8 Series III, accelerated Spectrum/24 Series III, ColorCard/8™, Monochrome Card™ and other specialty cards.

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PostScript laser printers used to be expensive, large and shared by the entire office.

Until now.
microLaser™ from Texas Instruments: the affordable PostScript printer you can call your own.

Finally, for less than $3,150*, you can have a true Adobe® PostScript laser printer right at your own desk. TI introduces its new microLaser — the perfect partner for your Macintosh®.

Small size. Lots of value.
When you place this printer next to your Mac, you’ll be impressed by its small size and compact design. At only 13.4 inches wide and 14.2 inches deep, microLaser may be the small kid on the block, but it packs plenty of punch. This six-page-per-minute printer takes full advantage of virtually all of the software that runs on your Macintosh. That’s because it uses the Adobe PostScript language, offers 35 PostScript typefaces, 1.5 Mb of memory and an AppleTalk® interface.

If you also use MS-DOS® Computers, you can switch between the PostScript language and standard HP LaserJet® Series II emulation easily without turning off the printer.

True Adobe PostScript.
Because microLaser features the PostScript language, you can print fonts in a variety of typestyles, sizes, and orientations by scaling and rotating them to meet your exact specifications.

The PostScript language also gives you more graphics power so you can print precise lines and smooth curves. Integrating text and graphics is easy, and the microLaser can print even your most sophisticated page layouts and illustrations.

What’s more, the PostScript language is the industry standard for higher resolution output devices. So you can proof your documents on the microLaser, then print on any typesetter with PostScript capability without recreating the document.

Capabilities that grow as your needs grow.
One of the best things about microLaser is that you only buy what you need. Memory is upgradeable in 1 Mb increments up to a total of 4.5 Mb, and you can upgrade it yourself, without tools or technicians. All you have to do to get additional fonts is download through software or plug optional microCartridges into two credit-card size slots.

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Part of what makes microLaser a truly personal, desktop laser printer that takes up so little room is its paper drawer, which slides inside. Because microLaser holds 250 sheets standard (it holds 500 when you add an optional paper drawer), you spend less time refilling paper and more time creating superb-looking documents.

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*TI suggested retail price of microLaser FS with an AppleTalk interface.

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Over a Dozen New Features & Usability Enhancements  Or how
about over a dozen new features and usability enhancements, like menu
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powerful new format accelerators, direct input of font size, pre-designed
mailing label templates for popular label sizes, and more.

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about just one really important reason: When you ask industry critics
which word processor they use day-to-day, the answer is always the same:
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Reviews

"WriteNow is the definitive Macintosh word processor. It’s easy to use, powerful, and
comfortable... Highly recommended."
—John Dvorak, Industry Columnist

"WriteNow might be The Best Program I’ve
Ever Used. On any computer—it’s the fastest
Macintosh word processor I’ve ever seen.
"—Jim Seymour, MacUser Magazine

Even if WriteNow is your first Mac application, you’ll be up and running in no time.
We rate ease of learning excellent.
—InfoWorld Magazine

Awards

1989 Editors’ Choice Award,
‘Best New Word Processor’—MacUser

1989 Readers’ Choice Award,
‘Best Word Processor’—Macazine

*1 Rated Word Processor in Macintosh
‘PC Week Poll of Corporate Satisfaction.’
—PC Week Magazine

Comparison of Leading Word Processors

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For more information...

Registered users will receive WriteNow 2.2 upgrade information in the mail. Nonregistered
users should call or write for details.

T/Maker Company
1390 Villa Street
Mountain View, CA 94041

Tel: (415) 962-0195 Fax: (415) 962-0201

Circle 332 on reader service card
Time for Tempo

Affinity is designing some extensions for its macro builder, Tempo II, and will probably call the completed package Tempo+ Tools. The additions include Tempo+ Menu, an INIT that creates a special menu for local and universal Tempo macros, and Tempo+ Viewer, an application that lists all the steps of a macro to simplify debugging macros and setting up branches (an editor will be released eventually). The new package also has improved support for externals, and it comes with 22 externals that perform such functions as reading the name of a window and using it to branch to another macro, or triggering an action based on a bitmap such as an icon. The new package lists for $29.95 and is available to registered Tempo owners only. For more information, contact Affinity at 303/442-4840.

Programmers' Triptych

Paracomp and Aladdin Systems have both recently announced programming utilities, and Symantec has a new version of Think Pascal. Paracomp's $495 C Math Solvers is a collection of Think C 3.0-compatible math routines adapted from FORTRAN libraries on other computers. An MPW C version is also under development. Aladdin's $99.95 Programmer's Assistants is a collection of six desk accessories that perform specific tasks, such as calculating 68000 instruction cycles and displaying the values of windows and system variables. Think Pascal version 3.0 is a fully object-oriented implementation of Pascal, with a special class-browser and tools to simplify the transition from procedural programming to object-oriented programming. Think Pascal 3.0 lists for $249. For more information, contact Paracomp at 415/543-3848; Aladdin Systems at 408/685-9175; and Symantec at 408/253-9600.

Lotus, Novell Announce Merger

In a surprise announcement, Lotus Development Corporation of Cambridge, Massachusetts, has agreed to acquire Provo, Utah-based Novell. Under the terms of the agreement, Novell—the developer of Netware—will become a wholly owned subsidiary of Lotus. The two companies will combine their boards of directors. Jim Manzi will continue as chairman, president, and CEO of Lotus; Ray Noorda will become vice chairman of Lotus and continue as Novell's CEO. The deal, expected to become final in July, will make Lotus the world's largest personal-computer software vendor, surpassing Microsoft.

Reams on ROMs

The latest addition to the CD ROM market is Grolier's 1990 version of the New Grolier Electronic Encyclopedia. The new version contains the entire 1990 edition of Grolier's Academic American Encyclopedia with color images. Also on compact disc is Highlighted Data's CD ROM edition of Webster's Ninth New Collegiate Dictionary. The dictionary includes illustrations and digitized pronunciations of each word. The list price for the New Grolier Electronic Encyclopedia is $395. For more information, contact Grolier at 800/356-5590. The list price for the CD ROM version of Webster's Ninth New Collegiate Dictionary is $199.95. For more information, contact Highlighted Data at 703/533-1939.

Rodime Ships 330MB and 650MB Hard Disks

Rodime Systems has begun shipping two new high-capacity hard drives: the Cobra 330e and Cobra 650e. The Cobra 330e lists for $3999 and has an average access time of 14.5ms. The Cobra 650e lists for $5899 and has an average access time of 16.6ms. For more information, call Rodime at 407/994-5585.

Farallon Opens More Windows

Timbuktu, a utility that lets users reach across a network and observe or control another Macintosh, is adding the ability to observe or control more than one Mac at a time. In version 3.1, each remote machine's desktop appears to the guest in a separate, resizable, movable window. Farallon says the new version transfers files seven times faster than version 3.0. Farallon is also shipping its Remote/WakeUp cable, which will allow a user to call in via modem and boot any ADB Mac. For more information, call 415/596-9100.

Casady & Greene on the Scene

Casady & Greene is preparing a truckload of new products, including a general utilities package. QuickTools is a collection of five utilities including Sunset, a screen saver; Dialog Power, similar to CE Software's Dialog Keys; a screen grabber called Snipper; PowerStrip, for launching files and applications; and Functionality, which makes the function keys on the Apple Extended Keyboard function. QuickDex is
getting scroll bars and multiple-keyword search capability, and its companion PrintDex is getting a major overhaul including sorting, text parsing, three-level-deep selecting, simplified importing, and greatly improved print formatting. Also coming: two new games (one by Patrick Buckland, the author of Crystal Quest) and lots of new fonts, including two music fonts and a few Cyrillic fonts. Fonts will come with both Type 1 and Type 3 in the box. For more information, call Casady & Greene at 408/624-8716.

Fastback Is Back
Fastback II 2.1 sports a typical backup rate that is up to three times faster than version 2.0, according to its maker, Fifth Generation Systems. The new version also uses half as many disks for a backup. Users can select files to back up by their size, date, and even the color of their icons. In addition, Fifth Generation is entering the hardware business with the FB120, an MCD II-format cartridge tape backup system that the company says can store over 200MB at a data-transfer rate of more than 3MB per minute. Fastback II 2.1 lists for $189. For more information, contact Fifth Generation Systems at 800/873-4384.

Compute While You Sleep
Simple Software has introduced NightLife 1.2, an application that can launch and operate other programs while the user is away from the computer. NightLife, available in the latest version for $79.95, can open an application at a preset time and initiate macros made by applications or macro generators including MacroMaker, QuicKeys, or Tempo II. For more information, contact Simple Software at 415/381-2650.

Apple, KPMG Peat Marwick Form Strategic Alliance
Apple and KPMG Peat Marwick have formed a strategic alliance to assist companies implementing executive information systems and decision support systems (EIS/DSS) on Macs. Called Exis (Executive Integration Services), the venture will provide consulting and systems integration services, including project management, systems planning and analysis, system configuration, training, and support. Exis will operate as a business unit of KPMG, Peat Marwick's Management Consulting Practice. For more information, contact KPMG Peat Marwick/Exis at 415/354-1412.

The Expandable SAM
Version 2.0 of Symantec Anti-Virus for Macintosh (SAM) can be modified by end users to add protection against new viruses. Symantec will maintain an automated telephone hot line to provide codes that users can simply type into a dialog box, much like adding words to a spelling checker. Security features have also been expanded so that network administrators can disable the Learn button and lock SAM's configuration. SAM 2.0 can keep a list of all alerts and can scan Syquest platters at insertion. List price remains $99.95. For more information, contact Symantec at 408/253-9600.

Claris Upgrades CAD
The new Claris CAD pushes mind-machine symbiosis several brainwaves into the future with Graphic Guide, a system that makes intelligent guesses about a user's next action, based on mouse speed, direction, and position. Version 2.0 of the 2-D package has about 100 new features, including enhanced dimensioning capability, selection filters, and object-attribute exporting for project management and cost estimates, and will list for $899. For more information, call Claris at 408/987-7000.

The Talking Mailbox
Microsoft Mail is sporting a new talking envelope. Using a $49 version of the MacRecorder that Farallon stripped down for digitizing speech, MS Mail users can affix messages with spoken comments. The interface lets users play back and change messages before sending them, and reply to or forward voice messages like text messages. Microsoft is at 206/882-8080.

Strata Takes Flight
Strata has released StrataFlight, a $189 add-on utility for Strata's 3-D rendering program, StrataVision. StrataFlight can animate 32-bit color images composed in StrataVision. Key images created with StrataVision's 3-D camera can be animated using StrataFlight's tweening function to fill in the intervening frames. The animations can then be exported into Macromind Director. For more information, contact Strata at 801/628-5218.

Scitex Visionary Expanded
Scitex's Mac software used for preparing QuarkXPress files for Scitex photo editing and color correction has been upgraded to match the features of version 3.0 of QuarkXPress, adding support for text rotation, bleeds, and the use of multiple templates in a document, as well as support for Quark's new library feature. Visionary 3.0 also adds such Scitex features as degrade creation, black trapping and mask substitution, and scanning instructions. For more information, contact Scitex at 617/275-5150.

Apple Files against Mac Clone
In the latest skirmish of its anticleone wars, Apple says it has filed a complaint against five Akkord Technology employees. Akkord makes a Macintosh clone. The criminal complaint, which has resulted in police raids on the Taiwanese premises of Akkord and Elive Computer Corporation, alleges that the five employees illegally copied the code contained in Apple ROM chips. At press time, the Taiwanese police were considering indictments, according to Apple. ☑️
We bet you're already figuring how you can justify this one — even at $78,000! Fact is, most Mac users are desperate for anything that can enhance the performance of their systems.

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My Turn
AN OBSERVER ATTEMPTS TO SHED LIGHT ON RECENT EVENTS AT APPLE

BY JERRY BORRELL

It all started with sporadic reports in the newspapers about an expected decline in earnings at Apple. Then John Sculley missed a round of meetings with financial analysts. Rumors began to circulate that a low-cost Macintosh was nowhere on the horizon. News followed about massive layoffs at the company's head-quarters. Next came a spate of front-page stories about Allan Loren, who was leaving Apple. At the same time Michael Spindler (formerly president of Apple Europe) was promoted to chief operating officer. The Wall Street Journal followed up with a report that Jean-Louis Gassée had resigned from Apple. It was widely discussed that John Sculley intended to head up the group formerly directed by Gassée. Sculley began to receive some of the worst press in Apple's history. This is but the latest chapter in the ongoing saga of the all-too-public growth pains of a small company that is getting big.

What Started All of This?
Good question, since Apple is selling more Macintosh computers than it ever has. Part of the problem is that someone estimated, and someone else accepted the estimates, that Apple was going to sell about 40 percent more computers in the fall and winter of 1989 than it actually sold. And based upon those estimates, money was spent and projects were initiated. Estimates that flew in the face of facts, such as the real limits on the number of Macs that could be made in the company's manufacturing plants.

Part of the problem was that the number of employees at Apple had crept up to nearly 15,000. Part of the problem was Allan Loren's inability to wrest control of, and give direction to, Apple's marketing and sales groups. Part of the problem was caused by those plans that Loren was able to implement. Test-drive a Mac, a campaign Apple advertised beginning in November of 1989, produced results as lackluster this time as it had the first time it was tried a couple of years ago. Worse, Apple heavily promoted a campaign of rebates that provided consumers with cash for machines they probably would have bought without any inducement.

Part of the problem was caused by John Sculley's personnel choices—like his choice of Loren (not to mention the crowd of executives that preceded him), a career insurance executive, to head up a computer company's product marketing. Part of the problem was caused by Sculley's reported inability to allow his executives to run their own departments—a notorious tendency to reduce his direct reports to supernumerary status by going around them to get their staffs to make decisions that he liked. Part of the problem was that John Sculley preannounced the low-cost Macintosh by at least a year and a half. For the first time in his tenure Sculley had seriously miscalculated his actions, which caused many to repeat a popular saying at Apple, "Apple leaks from the top." And a large part of the problem was caused by the fact that the press loves a goat, and so it heaped negative attention on Sculley for sins not all of his own making.

Missing: The Low-Cost Mac
The surprising truth is that there are several versions of low-cost Macs on the drawing boards or in prototype stages at Apple. The not-so-surprising truth is that Apple, during the process of designing both color and monochrome versions of low-cost machines, is learning a lot about what can and cannot be done.

At the same time, technology is changing—faster microprocessors are always just over the horizon—waiting on a successful yield rate from a silicon manufacturer. Disk drive technology is fluid. You have self-appointed critics (like me) out there in the press asking Apple to pull off technical miracles, such as adding small erasable optical drives to their machines. Apple's increasing level of sophistication in integrated circuit and subsystem design (the chips that are stuffed onto a printed circuit board) dictates (continues)
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COMMENTARY

that the company think out its designs rather than slapping integrated circuits onto a card to get another machine out the door.

Then there is the shifting nature of system software—which has its own impact on the functional requirements for new CPUs the company will produce. Finally, the company's design mandate requires it to produce aesthetically pleasing machines. To do that, Apple runs sophisticated models on its Cray computer, mills molds out of solid steel, and does tests of how materials will look when they are produced by the mold. In short, as one company executive reported in an obvious jab at Sculley, "We're not producing soda pop here."

Add to this the pressure for Sculley to deliver on his promise of a low-cost machine. In fact, being in the position of having to announce the most expensive machine Apple has ever produced, the Mac IIx, Sculley must have felt as if the company's leaders on the technology side were letting him down.

French Psycho, Meet New York Push

All of which set up an increasing friction between John Sculley and Jean-Louis Gassée. Proud, egocentric, charismatic Frenchman (who had cultivated many friends in the press) meets high-strung, brilliant, cold marketing wizard (whose press coverage is strewn with photos of multimillion-dollar mansions and Malcolm Forbes junkets). Use pressure, confine in tight space, mix thoroughly, and have the ghost of Steve Jobs wandering the halls at night.

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LETTERS

Batteries Get You Everywhere

I must take Steven Levy to task over his obvious disdain for things battery-powered. [The Iconoclast, March 1990].

Somewhere out there beyond our sheltered shores, yeah, even beyond the great Mojave Desert, is something called The Rest Of The World, where things do not operate at 110V AC. They don't even have standardized wall sockets, for goodness' sake. And you can forget about those handy-dandy converters. If they can blow a hair dryer, I shudder to think what they might do to an unsuspecting computer.

Those of us who must travel and write at the same time have waited patiently for a Macintosh product to fit the bill. Yes, it needs to be lighter, and definitely more affordable. But, as Levy points out, Mac devotees really don't have much choice at the moment.

So please, keep the batteries (but you can make them lighter).

Christina Macias
San Juan Capistrano, California

Post-Portable Depression

Steven Levy's column about the Mac Portable is the only real review I have seen. I couldn't agree with his judgments more. I'm an escaped physicist who studies buildings, so I do a fair amount of field research. All I've ever wanted in a laptop is something that was easy to pack and carry and would run a word processor, a spreadsheet, a drawing program, and a scientific graphics program. I began saving my money so that when Apple did come out with a lightweight I could buy one.

I eventually bought Toshiba's to tide me over, nice little machines that cost less than $2000. But Levy is right. I hate MS-DOS. When the Dynamac and the Colby started shipping I kicked the tires, but they were large and heavy and I could buy a couple of Toshibas for the same price.

When the Mac Portable came out, I was delighted it could run the software but depressed to find that it weighed nearly the same as my SE, was the size of a large typewriter, and was the price of three Toshibas.

My depression lasted until I saw Tandy's new little laptop, the Tandy 1100. I bought one of these machines for just over $1000. It's just small enough to take with me and easy enough for me to use all the time. So if you are as disappointed as I was with Apple's portable, go have a look at this cheap and simple laptop. I had enough money left over in my Mac Portable savings account to pay cash for a new car. I'm not depressed anymore, and I owe it all to Apple.

Terry Brennan
Oriskany, New York

Corrections

The following information should have appeared in the table "SIMM Sellers" on page 134 ("Is Your Mac Obsolete?" February 1990): The MacZone (800/248-0800) sells 256K and 1MB SIMMs. Genesystems makes the scientific graphics program Plasmid Artist (New Products, February 1990).

Genigraphics Corporation should have been credited for its help in the design and production of visuals for "Here's the Pitch" (March 1990). C-Cube Microsystems (408/944-6300), maker of color compression hardware and software, was incorrectly referred to as C in State of the Mac (April 1990).

The caption for the photo on page 95 of Macworld News April 1990 should have read "Mark Tuttle (left) and David Sherertz of Lexical Technology."

The phone numbers for Broderbund, maker of The Playroom (New Products, April 1990) are 800/521-6263 and 415/492-3300. The product retails for $49.95.

Howtek's Pixelmaster printer does not support color transparencies ("Hot Wax & Cold Ink," February 1990). Although the Pixelmaster can print on transparent material, the opaque quality of the ink results in black-and-white output.
tracts from otherwise valid criticism.

Levy states that the Macintosh Portable, in giving the user critical feedback, “worries like a Jewish mother.” Levy can aim his venom at whatever computer he desires, but he cannot be allowed to libel a religion or its followers. *Macworld*’s Jewish readers deserve a prompt and public apology and retraction for this irresponsible breach of journalistic ethics.

Ross Scott Rubin
Flushing, New York

My Jewish mother forgives me—can you?—Steven Levy.

**Fonts of Wisdom**

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We hope that you will help us spread the word on bitmapped fonts: they’re ugly and, as a law-abiding American citizen, you don’t have to use them (if it’s not an amendment, well, by God, it should be).

Carol White
Andrew Daltons
Melinda Parker
Tebachapi, California

**Type-Righter**

I learned to type in high school over 30 years ago, and that means I put two spaces after a period at the end of a sentence. I will continue to do it, come hell or high water, because it accomplishes what I want: it distinguishes the end of a sentence from the word space that follows an abbreviation. All word processors ever made (at least all that I know of) can handle that and don’t do stupid things like leaving a ragged edge if the line breaks there. I have set type on machines with no more RAM than is now found in the average wristwatch, and they didn’t have any trouble with it (and they did better hyphenation too). Now we have to contend with programs like ReallySetGo and QuarkXPress that display the attitude “we don’t do it that way in typesetting.” Baloney.

It used to be that typesetting was for books, and the two had very little in common. For decades even the keyboard layouts were different. It’s not that way anymore. Acronyms and abbreviations are everywhere you look, in any kind of copy. There is no excuse for perpetuating this snotty myth any longer. These people should be ashamed of putting their customers through needless gyrations to get the glitches out of their finished work, glitches that the programs put there intentionally.

Eric Bear-Albrecht
Taos, New Mexico

Features Don’t Follow Function

If you are doing a disservice to readers by overemphasizing features versus (continues)
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functionality. In the beginning, there was this wonderful concept that users would purchase software that did one thing very well. Because of the Macintosh interface, all programs would share information. What wonderful functionality. Unfortunately, your reviewers favor the all-in-one mediocre software.

A case in point is your review of desktop presentation packages ["Here's the Pitch," March 1990]. David Pogue makes the statement "PowerPoint, the granddaddy of them all, somehow continues to do well in the marketplace, despite the fact that it's nowhere near as capable as its rivals." Define capable. I'm sure Pogue defines it as features. The majority of users, based upon their purchase of PowerPoint, define it as functional.

PowerPoint is by far the most functional of those reviewed. I've tried them all.

Steven Doctor
Rochester, New York

Heap o' Help for Crashes

I used to experience annoying "Unexpectedly quit" messages even after installing 8MB of RAM [see State of the Mac, February 1990]. The problem seemed to occur particularly when I was using PageMaker, with or without MultiFinder.

Then I discovered a little utility called HeapFixer from CE Software included with the QuickKeys program. The accompanying Read Me file is very informative and suggests that the user look at the amount of RAM the System file is occupying. If there is less than about 20 percent free space, look out for a crash. After some experimentation, I used HeapFixer to set the system heap at 1200K larger than normal (about 1600K).

Anyone with plenty of RAM who is experiencing system crashes or unexpected quits should look at About Finder to see how much of the system heap is in use. If the "thermometer" is nearly all black, consider HeapFixer. I haven't had a crash or an unexpected quit in two months, in spite of the fact that I work with MultiFinder open at all times.

Matt Cole
Lakewood, Colorado

MYMmania II

After reading Andrew Tobias's letter [Letters, March 1990], I'd like to reassure him that Levy's column [The Iconoclast, January 1990] is not the last word on MECA's Managing Your Money (MYM). I have a few of my own to add.

Reading Levy's column actually encouraged me to purchase MYM. I'm one of those sick people who wants a program that really nails down every last penny and then gives me the powerful tools included in Tobias's program. I am also the kind of computer enthusiast who doesn't mind a program with a few non-Mac foibles and idiosyncrasies as long as it does what I want.

But MYM was so frustrating to work with that I finally gave up on it completely. I can't count the number of times I reached for the Undo function, never to find it active. Changing a category under which an account is...
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listed is impossible once you have recorded a transaction for it. And changing many things in the program entailed a trip through multiple screens (you couldn’t call them windows because most of them are dialog boxes) that look confusingly similar.

It was especially infuriating to have to give up because using MYM for a moderately complex financial situation means a considerable investment in time to get everything set up. If this program was written by “Mac true-believers” as Tobias says, I would suggest they don’t give up their day jobs.

Dan Richsta
Brockport, New York

FileMaker Graphics

Your article “Forming Opinions” [February 1990] is correct when it states that FileMaker II has crude graphics capabilities. However, you overlooked the fact that PICT graphics can be imported into FileMaker and then printed with high resolution. I use the wide array of drawing tools in Canvas 2.1 to draft forms from scratch, or redraw images scanned with a Hewlett-Packard ScanJet Plus. The finished graphic is then copied into the Clipboard and pasted directly into FileMaker. Graphics, such as the company logo, can be imported and arranged separately. Once the parts of the form are positioned, fields are overlaid. Using an additional layout allows fields to be rearranged so they are visible on the small screen of a Mac Plus or SE (handy for data entry). Additional fields or layouts can be used for tracking copies of the form (records) after they are issued. The combination of a high-resolution background and fields with database capabilities can be achieved easily with FileMaker.

Ian McGregor
Saskatoon, Saskatchewan, Canada

Seeing Static

The static field of my SE used to create a heap of problems for me [see “Warning: Computing Can Be Hazardous to Your Health,” January 1990] including allergic eye sores caused by dust clinging to my face, asthma, and unfamiliar fatigue. In addition, after some hours on my Mac, my hair was literally standing on end. Anti-glare filters, such as those manufactured by Polaroid, seemed to add to these troubles. With Polaroid filter, I could actually feel the static particles spraying my face.

NoRad’s antistatic radiation filter has done away with all of these problems, which is why I strongly recommend it. However, it has one serious flaw: the grounding cable can’t be securely fastened to the screws in the back; it has to be tucked loosely into the gap between screw and chassis.

Alexander Schamburg-Lippe
Schloss, West Germany

You can ground the NoRad screen to the chassis provided you have a Torx T15 or 1/4-inch flathead screwdriver. Unscrew one of the case screws part way, slip the U-shaped lug around it, then tighten the screw. The contact between the chassis and the screw grounds the (continues)
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screen. In fairness, several manufacturers provide grounding cards that plug directly into a threepronged outlet. They have only the ground lead, so there is no danger of electrocution.—Ed.

Simple SIMM-On

Your article on upgrades ["Is Your Mac Obsolete?" February 1990] contains misinformation about installing SIMM chips into Macintosh SEs. "Memory Configurations" (page 129) states that a resistor must be cut on the main logic board in order for the SE to recognize the new memory. The SE has a jumper block that can be switched or removed (depending on the memory configuration) to allow the computer to recognize the increased memory. This jumper block has been present in the SE since at least November 1988.

Rebecca R. Van Dalen
Portola Valley, California

An MB is an MB

I'm still trying to figure out one paragraph from "Is Your Mac Obsolete?" February 1990, page 130:

"If you have been reading carefully, you may be wondering why it takes eight 256K SIMMs to get 1MB of memory. One 256K bit chip can store 256,000 bits of information, but only 1 bit is accessible at a time... Eight 256K bit chips on one SIMM provide only half of that 16—8 bits (1 byte) of memory."

Eight 256K SIMMs for one megabyte? I've always thought that it takes four: (4 \times 256 = 1024). Also, whether the CPU takes its data 8, 16, or 32 bits at a time, a byte will always be 8 bits, and a megabyte will always be 1024 bytes. This implies that 1MB on a Mac II-family machine is less than 1MB on a Plus or SE, since the 68020 and 68030 CPUs get their data 32 bits at a time.

Jeff Morrow
Ann Arbor, Michigan

The paragraph (which was incorrectly edited) should have read as follows. Each 256K SIMM contains eight 256Kbit chips, and it takes four 256K SIMMs to get 1MB of memory. One 256Kbit chip can store 256,000 bits of information, but only 1 bit is accessible at a time. Since a byte equals 8 bits, eight 256Kbit chips (on the SIMM) are necessary for 256K of memory. Similarly, eight 11bit chips on a SIMM provide 1MB of memory. The CPU in the Mac Plus and SE needs to access 16 bits (2 bytes) at a time. Since one SIMM provides only 8 bits (1 byte), you must buy SIMMs two at a time for a Plus or SE. The CPU in a Mac SE/30, II, IIx, or IIXc, on the other hand, accesses 32 bits (4 bytes) at a time. As a result, you must buy SIMMs four at a time for those Macs.—Ed.

Skeletal Screw-Up

I read with great interest Dr. Tessler's article about the expanding role of the Mac in the medical field ["The Medical Desktop," March 1990]. Not only was the text informative, the graphics included were well chosen and illustrated key points. However, I thought I should point out that the cervical spine film on pages 139 and 142 is upside down. Of course, I suppose we could say the subject was standing on his head when the radiograph was taken, but considering the arthritis in the lower segments, that (continues)

Skeletal Screw-Up

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would be a dubious explanation at best.
Keith H. Sherry, M.D.
Mishawaka, Indiana

Thanks for pointing out the mix-up. We published the image just as we received it, inverted, and we regret not catching the error. — Ed.

How Many Minitels?

As an active member of the Paris Macintosh community, I get a lot out of reading Macworld each month. In your February column [Commentary], I was surprised to read about the supposedly 20 million Minitels that have been distributed here. The number is actually verging on 5 million, and a significant number of these aren't really used, even for as simple a function as the Electronic Phone Directory. Nevertheless, only a public service could afford to invest so much (nearly $2 billion initially) with no guaranteed return, enabling France to pass rapidly from a country with an underdeveloped phone system to one with over 12,000 online services used at the rate of 6 million hours per month.

Lionel Limbroscos
Paris, France

Ethemet + LocalTalk = ?

I really enjoyed the article on ISDN. I wanted to clarify one item, however. In the second paragraph you stated that EtherTalk was "Ethernet implemented over LocalTalk." This is not true. It is a confusing issue, but generally both Ethernet and LocalTalk are used to describe hardware standards (the physical medium), while AppleTalk and EtherTalk define protocol standards. EtherTalk is simply AppleTalk protocols running over Ethernet cabling. By definition, however, you cannot run Ethernet over LocalTalk, since they're both hardware standards.

Mark S. Burnham
Walnut Creek, California

It Can Print Envelopes

Reviewer Ron Risley should be happy to know that his one real reservation about the Fujitsu RX7100PS PostScript page printer [Review, April 1990]—its inability to print envelopes—has been more than resolved. Actually, printing envelopes is one of the printer's greatest selling points.

The RX7100PS and the PS+ are now bundled with two software enhancements that make envelope printing and letter writing a breeze: Working Software's desk accessory QuickLetter and Fujitsu's proprietary Select-A-Bin menu-driven utility for automatic switching of dual paper bins. Both printers also come with screen fonts on disk.

Sallie Siegel
Fujitsu America
San Jose, California

Letters should be mailed to Letters, Macworld, 501 Second St., San Francisco, CA 94107, or sent electronically to CompuServe (70370,702) or MCI Mail (294-8078). Include a return address. We regret that, due to the high volume of mail received, we're unable to respond personally to each letter. We reserve the right to edit all letters. All published letters become the property of Macworld.
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Softstream Int'l., Inc. ... 30 day MBG . 23.

4071 MacMan . 23.

4072 The Solitaire DA .......... 23.
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1842 Chessmaster 2000 (CP) .... 28.
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3464 Tetris 1.1 (for Mac II & SE) ...... 19.
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3462 PT-109 .............. 25.
3460 CATO .............. 25.
3459 Falcon 2.2 .............. 30.

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2329 SAT Score Improvement 1.0 (CP) ... 57.

**SubLogic ... 60 day MBG**
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**Think Educational ... 60 day MBG**
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True BASIC, Inc. ............... 27.
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6110 Algebraic Proposer 2.0 .... 45.
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**Wayzata Tech. ... 60 day MBG**
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  - 1673 CompuServe Navigator 2.1 ... 39.
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  - 5834 Connect 1.5 for the Macintosh ... 63.

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  - 6758 DoveFax Desktop ... 279.
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  - 6751 TurboNet ST (12-Pak) ... 279.
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Candy Flagg
Port Angeles, WA

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<tr>
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<th>Price</th>
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<tbody>
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<td>1 Meg SIMMs ... 2 year warranty</td>
<td>$49.99</td>
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<tr>
<td>Low profile 60 nanosecond SIMMs</td>
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<td><strong>Apple Computer</strong></td>
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<tr>
<td>Mac Portable 1 Meg Exp. Kit</td>
<td>$549.99</td>
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<tr>
<td><strong>Cutting Edge ... 30 day MBG</strong></td>
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<td>800K External Disk Drive</td>
<td>$149.99</td>
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<td><strong>Apple Computer</strong></td>
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<td><strong>Dove Computer ... 60 day MBG</strong></td>
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<td>Dove Tool Kit</td>
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<td><strong>SuperMacTech. ... 30 day MBG</strong></td>
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<td>SuperMac drives include SuperSpool, SuperLaserSpool, DiskIt and Manager</td>
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<tr>
<td>3.5&quot;* SD/DD Disks 3 Pak (30)</td>
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<td>3.5&quot;* HD Disks 1.44 Meg (10)</td>
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<tr>
<td>3.5&quot;* HD Disks 3 Pak (30)</td>
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<td>CD2000 40 MB Data Cartridge</td>
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<td>MAXELL ... 60 day MBG</td>
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<tr>
<td>LaserWriter Plus Toner Cartridge</td>
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Circle 357 on reader service card
ART BEAT

by Cathy E. Abes
and Jerry Borrell

The tools and the talent behind
Macworld's graphics and the
techniques that make them
possible

Artists: For this month's
cover illustration, Drew
Huffman of Paracom created a
model from Macworld art
director Joanne
Hoffman's sketch; Huffman
and Eliot Smyrl of Pixar
then rendered the image.

Tools: Sun 3150 workstation;
Mac Ilx with 40MB hard
drive; RasterOps 24-bit
board; 13-inch Apple color
monitor; Paracom's Swivel
3D; and Pixar's Photorealistic
RenderMan.

How It Was Done: To get
the most sophisticated image
possible, we had to provide
Pixar the underlying geom-
etry for the image in a for-
amat acceptable to Pixar's
RIB (RenderMan Interface
Bitstream) software.

Huffman used an unre-
leased version of Swivel 3D
(2.0) to create first wire-
frame, and then shaded,
models of a Macintosh, a
24-bit graphics board, and
two additional surfaces that
Pixar rendered as the floor
and the star field in the
final output. Using Swivel 3D
Huffman built objects (such
as the components on the
circuit board) and set the
camera position (viewing
angle). He pulled the Mac
from a file of Paracom's to-
be-released 3-D clip art.

Generating a
reasonable facsimile of a Raster-
Ops 24-bit board took
Huffman about five hours.

Tweaking the model, vary-
ing the geometry, resizing,
and changing the viewing
angle and perspective took
about eight hours. He
worked on a Mac Ilx with
a RasterOps 264 board set
for 8-bit operation.

The original DXR file
was a whopping 4.5 mega-
bytes, containing over
100,000 polygons—too
large to be practical for ren-
(continues)

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dering. Huffman and Smyrl
reduced the size of the file
to 2.7MB by rebuilding the
pins (metallic leads) on the
integrated circuits as united
files. Then Huffman and
Smyrl broke the image into
smaller objects (computer,
circuit board, and so forth)
in order to simplify the ren-
dering process. Software
routines called shaders
were used to calculate each
object’s surface properties
and produce specular high-
lights and wood flooring.
Smyrl even wrote a shader
that applied the bands of
color on the resistors.

Smyrl spent about 75
hours over a three-week pe-
oriod on the project. The
wooden floor and ball are
borrowed from the Pixar
film Luxo Jr. The snowman
on the Mac is from Pixar’s
film KnickKnack. Smyrl
worked on a Sun 3150
workstation that has a Pixar-
designed graphics-accelera-
tor board connected on the
Sun bus. The star field in
the background is from
Pixar’s proprietary star-field
generator, a program that
makes astronomically cor-
correct star backgrounds.
You may be able to detect the
constellation Orion in the
background.

The entire project
could have been done on a
Mac, but time constraints
made it necessary to use the
Sun system, which cut the
rendering time in half. The
motion blur, for example,
presented special prob-
lems. Smyrl had to use a
digital composition tech-
technique to give individual
motion-blur streaks the
appearance of a ball bounc-
ing across the floor.

To maintain the resolu-
tion of the data file, Pixar
submitted the entire file on
magnetic tape to Walker
Graphics in San Francisco.
Walker produced both
match print and CMYK
separations from the tape,
and performed some color
corrections on the high-
lighting of the ball.

State of the art is pos-
sible, but rather painful on
the Macs of today. The Mac
IIfx release came too late to
help, but we look for-
ward to improvements in
Mac computer graphics that
the IIfx will provide. Our
thanks to Ed Catmull,
founder and chairman of
the board of Pixar; to Bill
Woodward, president of
Paracomp; and to all the
folks at both companies
who spent weeks working
on the cover.—J.B.

Artists: For our rendering
feature on page 136, Mac-
world asked five vendors to
put their software to the
test by rendering a complex
model of a Chinese mask.
Here’s how Jay Roth, presi-
dent of Electric Image, and
Koji Sonoda of SystemSoft
created their images.

Tools: Roth used a Mac IIcx
with his company’s Electric
Image software, AutoCAD,
Studio8, and Adobe Photo-
shop. On a network of
several Macs, Sonoda
used PixelPaint and
SystemSoft’s modeler and
renderer, code-named
Shade, which is not yet re-
leased in the United States.

This wire-frame image shows how the
data looked before it was rendered.
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The model as rendered by ElectricImage.

How It Was Done: The original image was scanned by Cyberware Laboratories of Monterey, California, with a Rapid 3-D Digitizer. The Cyberware works by throwing a laser grid composed of more than 200,000 data points over an object, so a lot of extraneous data had to be deleted from the model before rendering. Production designer Jon Farhat did some of the cleanup work in AutoCAD before the image was sent to the vendors. ElectricImage: Roth cleaned up and fleshed out the model in AutoCAD, then added the shelf, wall, and mirror. He imported wood-grain-texture images (in PICT format) from Studio/8 and applied them to the shelf and stand. To create a template on which to paint the mask pattern, Roth rendered the mask in a straight-on view using a 100mm simulated lens to flatten it out. He imported the resulting image into Photoshop, where he painted the pattern on top of the mask. Roth then brought the pattern back into ElectricImage as a texture map, which he applied to the model. After positioning all the objects, he lit the scene with one spotlight and lit the reflection with two spotlights and a fill light. The entire project took about six hours, much of it devoted to cleaning up the model. The rendering (of six or seven thousand polygons) took about ten minutes on a Flex.

SystemSoft: Because of the poor quality of the model, Sonoda re-created the mask geometry. First he created a template by using Capture to convert a wire-frame image of the DXF file into a PICT file. He imported the PICT file into Shade and used the program's modeler to reconstruct the mask on top of his template. Sonoda applied randomly generated patterns from Shade to the wall and to the shelf. He scanned in a Chinese character and used PixelPaint to fine-tune the image. The mask pattern was also created in PixelPaint, saved as a PICT file, and imported into Shade.

According to Toshiya Tokieda, author of Shade, ray tracing the soft shadow and soft reflection on the shelf and wall required considerable computational time. As a result, the rendering process—distributed over a network of Macs—took about 24 hours. Rendering time could be cut drastically by leaving out the soft shadow and soft reflection features, Tokieda said.—C.E.A.
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You are looking at the new StudioSet™ 2000 from AGFA Compugraphic. It’s smaller than a two-drawer filing cabinet, and comes with its own set of wheels, so you can put it just about anywhere.

With a StudioSet in your design firm, ad agency, or printshop, you can produce in-house the high-resolution PostScript files you send out for today. The StudioSet is a true Adobe PostScript imagesetter, not a clone, which means your files are imaged right the first time. It comes with 35 PostScript fonts, and offers a choice of 600, 1200, 1600 or 2400 dots-per-inch resolution. It also lets you output spot color and electronic art files up to a 100-line screen.

And you can do it yourself. We’ve simplified the controls and operating instructions, eliminating the need for a dedicated operator. If you can operate a Macintosh®, you can operate a StudioSet. Plus, if you do have a question, you can call our PostScript Technical Assistance Center for answers.

Combined with a Macintosh and an AGFA Focus scanner, a StudioSet 2000 is an affordable way to add a professional PostScript publishing system to your office or studio. Which is another way of saying that our little imagesetter can make a small shop look like a big one.

For more information, or to schedule a demo, call 1-800-227-2780 (in Canada 1-800-387-9533), ext. 2000.
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Now Software
The End of Literature
MULTIMEDIA IS TELEVISION'S INSIDIOUS OFFSPRING

BY STEVEN LEVY

Multimedia has become a certified buzzword in computerdom, so much so that the only people whose heads don’t drop to the table when that word is intoned are those who have something to sell. At the heart of the instant boredom concerning this presumably exciting concept is overhype. The promise of multimedia is just a little too far ahead of what Macintoshes (and other PCs, including those of IBM, a company also touting multimedia as the platform of the future) can presently deliver. And besides, in the mantralike repetition of the word, its definition has fuzzed to the point of near-meaninglessness. What is multimedia, anyway? Should we care?

We should care very much. Because despite its vague beginnings, multimedia is just as potent as its myriad promoters say it is. The forces of history almost dictate that it will succeed, and in the not-distant future, multimedia will be so easy to produce that it will be pandemic as a means of communication.

But no one, at least to my knowledge, has anticipated the potentially disastrous effects of multimedia’s success. So please say you read it here first: multimedia will hasten the end of literacy. Despite the fact that its promoters are almost universally well intentioned, multimedia’s lasting legacy will be the debasement of the remaining forms of communication in this country that have not already been debased by the perpetually widening gyre of television.

Tale of the Tube
First of all, let’s consider the nature of multimedia. Once you strip it bare of its considerable pretensions, multimedia is essentially one thing: computer applications that aspire to being television. Once you add video-quality images, high-resolution animation, and high-fidelity sound to computer files, you’ve got your MTV. That’s why some folks are calling this Desktop MTV. (Wimps call it Desktop Media—same difference.) Presumably, these multimedia capabilities aid the user in communicating and learning.

But this is a different form of communication we’re talking about, something that, according to Business Week magazine, “could change the way people work, learn, and play.” How is multimedia different? With colors and pictures and noises and motion, it’s oriented not to the mind, but to the senses and the gut—like television. Multimedia disregards the previous communications paradigm: the person as reporter, blending logic, language, and perhaps illustrative charts in order to inform or compel. The new paradigm sees the user as a television director, most often one who works in the advertising business.

The result is a debasement of content, because the language of television, as convincingly argued by New York University professor Neil Postman in his book Amusing Ourselves to Death (Penguin, 1985), is inherently incapable of promoting complex disc...
THE ICONOCLAST

If you’ve seen 16 shades, then 64 shades, and maybe even 128 shades of gray and thought that was good, now it’s time to get excited! The new Canon IX-3OF™ scanner can accurately scan up to 256 different shades of gray to capture the fine subtleties in your photos and other continuous tone images.

And it’s so easy to use. With the convenient flat-bed document tray you can scan books, magazines, or photos. Add the optional automatic document feeder and you can effortlessly feed up to 20 letter or legal size documents.

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Introducing Symantec AntiVirus for Macintosh (SAM™), Version 2.0.

The original version of SAM just locked up the 1989 Eddy as “The Best AntiViral Program” you can buy. Now with added protection and security, new SAM 2.0 is even more effective. And more essential. Because, when your business is at stake, no amount of protection is too much.

SAM finds and destroys all known viruses and clones. It also protects you from new, unnamed viruses by constantly scanning for suspicious virus-like activity. And only SAM 2.0 protects you with instant virus updates from our exclusive 24-hour Virus Newsline.

To keep viruses from ever becoming a problem, SAM keeps them out. SAM prevents any infected application from launching and spreading a virus, and detects “Trojan Horse” attempts to damage a disk. It checks every floppy or removable you insert, and just touch a hot-key to check files downloaded from networks or by modem.

Total protection. It makes SAM the best-selling, highest rated antiviral program ever created for the Mac.

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So whether you're using large type like our headline, or smaller sizes like this, Adobe Type Manager keeps your words looking great every time.

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And do it before you start another headline.
“helocar,” and proceed to convince their bosses to give the project a thumbs-up. What bothers me about the ads is that by using multimedia to illustrate the concept—making a kinetic report chock-full of exploding charts and flying vehicles—the main effort is spent on doing the hard work of figuring out whether or not the thing will literally fly, but in creating the sexy images that will get their bosses all heated up about the concept. What makes the workers successful is not the idea, but the flashy presentation. Who cares whether the helocar makes financial sense? Look at it fly!

Essentially, the ad campaign views workers, even engineers, as marketers whose job it is to sell ideas to their superiors. That may be a valid interpretation of part of an engineer’s job, but placing the heavy artillery of Madison Avenue in the hands of an engineer will likely do much more harm to the process than good. Those tools are effective precisely because of their ability to bypass logic and access emotion. The victory goes to the engineer who can make the best commercial—not the best vehicle.

This process almost guarantees that choices will be made on irrelevant criteria. To quote Neil Postman again, “The commercial disclaims exposition, for that takes time and invites argument. It is a very bad commercial indeed that engages the viewer in wondering about the validity of the point being made. . . . Moreover, commercials have the advantage of vivid visual symbols through which we may easily learn the lessons being taught. Among those lessons are that short and simple messages are preferable to long and complex ones; that drama is to be preferred over exposition; that being sold solutions is better than being confronted with questions about problems.”

This is what we want to introduce as the standard means of communicating? Obviously, yes. Catherine Nunes, in charge of multimedia in Apple’s publishing, presentation, and audiovisual markets, told me that it was “very likely” that the writing tools of the future would be able to process sound and video images as well as words.

Lowering Higher Ed

If multimedia in business isn’t bad enough, consider the potential effects of multimedia in education. Here again, this platform is being touted as a beneficial revolution. No one has bothered to ask, “What are we revolting against?” The answer, of course, is reading and writing. Implicit in all the hype about multimedia is the premise that language alone just doesn’t cut it. Those still nourished by this antiquarian activity may argue that the ability to express oneself in words, and to understand the words of others, is essential to the process of thinking. But multimedialaughs at that objection—because multimedia, like its progenitor, television, is designed to entertain, at the cost of thinking.

Let’s look at a multimedia project geared to the education market: the ABC-TV products that utilize television news footage of important events, such as presidential elections or the Middle East crisis. Presumably the products’ purpose is to amplify the feelings of the written word. As Doug Doyle, Apple’s manager of multimedia solutions for higher education, puts it, “Traditionally, we thought that information resides in the library—in books. But that’s not true anymore.” Multimedia is a way to capture that information and, as Doyle says, “add value” to it by including it in the learning process.

That seems to make some sense, but is the gain sufficient to overcome the danger that the images will overwhelm everything else? Take the ABC product dealing with the Middle East. Presumably, by interacting with a multilinked set of video clips loaded with key images and sound bites from the Holy Land, the student gets a deeper understanding of the situation. Actually, since the language of television is the main form of communication here, and the student is encouraged to browse the material by accessing a subject here and a subject there, a lack of context is almost guaranteed. Some of the clips are quite dramatic but lack a full explanation of the circumstances under which they were taped.

In order to get full use of the system, each student needs to spend unhurried time with a Macintosh, a (continues)
As you can see, with the Personal LaserPrinter" II (PLP" II) from GCC Technologies," you get output that is absolutely stunning.

Crisp, clean, professional, and razor-sharp.

If you think PLP II's output is stunning, you'll think the same of its price: an incredibly low $1,399. It's the lowest-priced laser printer ever for the Macintosh.

And the most impressive. MacUser magazine was impressed: PLP II was this year's Editors' Choice Award Winner.

**High-Quality Outline Fonts.**

The beauty of PLP II is that it can do the same things many expensive laser printers can do. For only a fraction of the price.

Because PLP II includes 22 Bitstream® outline fonts, its output can be shaped, scaled and rotated, as well as enlarged or reduced to any size—all at a full 300 dots per inch (dpi), and at 4 pages per minute.

Which means you have unlimited flexibility in printing all kinds of applications such as text from Microsoft Word, newsletters from Aldus® PageMaker, and illustrations and scanned photos from Canvas® and SuperPaint®.

**Other Beautiful Features.**

Another reason the MacUser editors couldn't take their eyes off PLP II was its user-friendly front-panel LCD display. Who could blame them? With the simple push of a button, you can set your SCSI ID. Check your percentage of consumables used. Adjust your print density. And more. But what the MacUser editors especially liked was PLP II's "sleep mode," which automatically silences the printer when not in use.

When it's time to print, PLP II supports a variety of paper weights, including envelopes and transparencies. And with GCC's new desk accessory QuickEnvelope® printing envelopes is a snap.

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For those who want beautiful output with a whole lot of power, there's our new PLP IIS. (The "S" stands for speed.)

With the PLP IIS, you get all the breakthrough technology of the PLP II, only now, you get it at a swift 8 pages per minute.

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The new, powerful PLP IIS and the award-winning PLP II. For the Macintosh® user who wants the beauty of great output at a great price. And what could be more beautiful than that?
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Dressing for an evening out can be the most fun and challenging thing a woman does all week. Most of us have been practicing this art since we were children and played dress-up in our mother’s clothes. We’ve learned that not only is enough versatility to wear a skirt for virtually any occasion, including dancing in a club or dining in a fancy restaurant. By adding your favorite blouse, sweater, or jacket, you can create a look that’s comfortable for you and is fashionable.

Make the outfit unique by adding an unusual scarf or a trendy pair of shoes or boots. By blending your favorite all-time styles with what’s hot in the world of fashion, you’re sure to be a hit.

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Everything that goes into UltraDrive has been meticulously designed and exhaustingly tested. The result: only the very finest components are used. Like the best hard drive mechanisms from Quantum, Seagate®, and Hitachi.

UltraDrive is an engineering marvel inside and out. It features an easy-to-use push-button SCSI selector switch, a security loop to protect against theft, double-shielded cables, a universal power supply and a low-noise cooling fan. Plus a custom-designed wire harness, which protects sensitive wires from exposure to the power supply.

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Every UltraDrive comes with an impressive array of value-added software.

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- Two sturdy 50-pin SCSI connectors. External terminator for simple configuration, and double shielded Mac-to-SCSI cable to prevent electronic interference (both included).
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All UltraDrive and UltraDrive S hard disks carry a full two-year warranty on parts and labor. We also offer repair service here at GCC and at hundreds of GCC dealers nationwide.

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**QuickSpool II** is a second generation spooler for serial printers like the ImageWriter II. Reduce your waiting time during printing by as much as 75%. A $59 value.

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video monitor, and a laser disc player. (Apparently one advantage of multimedia over book learning is that the former generates significantly higher revenues.) Once installed before a machine, students are encouraged to create their own reports on the system. Drawing on the culture of TV babies, these reports are not driven by language or reasoning, but by the accumulation of vivid images. The students are literally asked to perform the function of a television news producer, splicing clips together for maximum impact. And clever students will soon learn, as clever television producers understand all too well, the facts of dealing in a visual medium: one dramatic image, even if misleading, communicates more effectively than an interesting idea without a compelling picture accompanying it. It's history by sound bite. Doug Doyle of Apple insists that responsible teachers will prevent this from happening, but in light of our national experience with television—which has trivialized literature to sitcoms and transformed our politicians into pitchmen—this seems rather optimistic.

**If Books Could Talk**

Recently I spent a session with Marc Canter and John Scull, the two key executives of MacroMind. They guided me through an impressive tour of their newest version of Director, a program designed to enliven information, multimedia style. Canter was frank in admitting that, given the present state of computer power, the only way Director and other powerful multimedia tools can be implemented is in expensive machines with relatively hard-to-use applications. Even so, those who do this type of work anyway—art directors and advertising people and television graphics folks—will currently find a Macintosh to be a cost-effective tool. I see no problem at all with lowering the cost of tools to people already involved in this form of show business, and MacroMind is doing honorable work in this regard. Likewise, I think that multimedia capabilities have real value when used in areas such as scientific visualization.

But Canter and Scull were both gushing about the not-too-distant day when our Macintoshes will be more powerful, and their software will be as simple to use as a Nintendo machine. At that time, they guess reasonably, multimedia will be as accessible to ordinary users as, say, word processing is to people today. That will be the day when multimedia will be utilized in many instances where previously, logical communication sufficed quite nicely—except for the fact that one had to be literate to participate. Marc Canter believes that ultimately, multimedia will make significant inroads in replacing the beleaguered holdouts of communication, those dinosaurs that refuse to yield to pictures and sound ... you know, books.

Earlier, Canter and I had been talking about my current book project. As with the previous ones, I proceeded with my research on the assumption that any images I collect in addition to the reams of written and spoken material I gather will be conveyed only by my language. The finished project will be a bound stack of pages consisting of words, accessed a page at a time, in order. Canter is convinced this process will be improved upon. "Steve," he said, bursting with enthusiasm, "I really believe that ten years from now you won't be writing a book in that way. In ten years, books won't be written only in text—they'll be done with sound and video and images, and people will access it by links, not start to finish."

Multimedia fulfilled: a world where sensory input is king. Where writing is replaced by "authoring." Where the techniques of sneaker ads "add value" to charts and spreadsheets, and a thousand words die with every picture. Words we could have used. Words that bind a writer and a reader, words that bear rereading, words that carefully unreeled detonate fireworks inside the mind and change lives. Canter couldn't have meant this, could he? Yet, he said it—within a decade, books are going multimedia.

"What you don't understand, Marc," I said to him, "is that you're describing my nightmare." □

Steven Levy is a Macworld columnist and the author of *The Unicorn's Secret: Murder in the Age of Aquarius* (NAL, 1989).
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Information, Please
HELPFUL TOOLS AND RESOURCES FOR MAC USERS

BY DEBORAH BRANSCUM

There's a world of information about the Macintosh, but it's not always easy to unearth. Here's a brief and opinionated survey of products and services that can simplify your search.

Indexes. Our annual index (usually in the January issue) is fine for many readers, but you may prefer to have an index on a disk. No problem—two small companies offer floppy-disk guides to *Macworld* and two other Mac magazines.

Niles & Associates of Berkeley, California, began indexing *Macworld*, *MacUser*, and *MacWeek* in February 1989. The company also publishes *EndNote*, a reference database and bibliography maker. For $120, subscribers to MacInfo receive the initial disk (covering February 1989 to date), 12 monthly updates, and a run-time version of *EndNote*. I like MacInfo a lot, despite its shortcomings (see “Indexing Plus”). (Developers, students and educators, and user groups can purchase the product for $99.) Niles can be reached at 415/655-6666.


Databases. Through CompuServe you can access the Dialog service, which offers at least five databases of interest to computer users. (Dialog may also be available through your public library.) The databases include the Microcomputer Index and the Microcomputer Software & Hardware Guide and are intended for the well-heeded: these babies will cost you $60 an hour and more to access. For more details, talk to Dialog at 415/858-5810 or 800/354-2561.

Books. For one-stop shopping, it's hard to beat *MacBooks*, a mail-order bookstore in Palo Alto, California, that says it keeps track of the more than 360 Macintosh books currently in print. Because customers can't browse, *MacBooks* publishes a $2 HyperCard catalog with a complete list of the books and brief reviews. Regular new-book bulletins also keep clients informed. "We do try to take a stand on books, since we are mail order and people can't browse," says president David Angell.

You can access the book bulletins and catalog from the *MacBooks* forum on Connect, or call the company directly at 415-494-2154.

Angell warns that no one book can answer all your questions, but he's happy to suggest some recent titles. For beginners he recommends *The Big Mac Book* ($27.95, Que, 1989), "because it's hands on and geared toward (continues)
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Conspicuous Consumer

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December 11

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Since 1985 La Cie has offered you more. It's your choice.

<table>
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<tr>
<th>Drive Mfg.</th>
<th>Size MB</th>
<th>Seek Time (ms)</th>
<th>ZFP Price</th>
<th>Cirrus Price</th>
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“La Cie gives hard disks a Silverlining.”
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Cranky about Crate

Last October I received a letter from
Steven Payne of Washington, D.C.,
who was in the midst of an odyssey
that would tax the patience of a saint.
So perhaps it's appropriate that he's a
Roman Catholic priest and editor of
Spiritual Life magazine. Payne bought
a 60MB external Crate Technology
disk drive from a dealer
in September 1988 to use with his Mac
for desktop publishing.

Problems with the disk prompted
Payne to call the dealer and
Crate for advice. When telephone
troubleshooting didn't work, he re-
turned the disk drive on August 15,
1989, to the dealer at Crate's sugges-
tion. He, in turn, sent it to Hamilton
Avnet, the large disk drive distribu-
tor from which the dealer had purchased
the drive originally. Hamilton Avnet
sent the drive to Seagate for actual
repair. And there the drive sat. And
sat. And sat.

Father Payne called his dealer. He
called the manufacturer, Crate Tech-
nology. He called Hamilton Avnet. He
called me. Eventually Hamilton Avnet
returned the drive—broken. Another
round ensued, and in late February
Father Payne wrote to me that a
working replacement unit had finally
arrived. A mere six months later, a new
drive replaced the old.

But a mystery remains. Why didn't
Crate help Father Payne get his drive
repaired? The drive came with two
warranty statements. One statement
(continues)
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“Aldus Magazine is no ordinary publication,” says Campbell. “Its design and production are a lab for over 200,000 Aldus® customers. We use our software to redesign each issue, and with the amount of data we handle, Bernoulli really simplifies the process.”

Bernoulli is a complete primary storage solution for desktop publishing. Its removable 44MB disks provide endless storage capacity, without the worry of filling up a hard disk. And Bernoulli works the way you work, giving you total flexibility in data storage and transfer. It allows you to keep both your files and application on one 44MB disk. So transferring large projects to service bureaus is as simple as sending the disk over, eliminating software compatibility problems and saving the time of using a modem. And since Bernoulli disks can withstand 1000Gs of shock, they’re rugged enough to mail anywhere.

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According to Campbell, Bernoulli solves another growing concern of desktop publishing users. “Desktop publishers are entering a new generation, pushing the software to create larger, more complex documents than ever before. Bernoulli gives those users the convenience, transportability, and storage capacity they require.”

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said "AppleCrate [as the company was then known] will repair or replace, at its option, any AppleCrate disk drive that becomes inoperable or fails to perform to published specifications for a period of two years from the date first shipped." The other statement said "Warranty of any disk drive installed in the AppleCrate is specified by the warranty of the manufacturer of the specific drive used." Crate president Chris Lemoine argued that it was the dealer's responsibility to get the drive fixed, not Crate's. The warranty's words, apparently, were meaningless.

I talked to Lemoine recently to get his side of the story. I wanted to understand Crate's perspective, particularly in light of other complaints I've received about poor service from Crate.

Lemoine said Crate sells housing and software to Hamilton Avnet and not drive mechanisms, which caused the misunderstanding. Crate now offers a two-year limited warranty on the case and a one-year warranty on the drive when Crate adds the drive mechanism.

Lemoine blamed the problem on the dealer, who reportedly had given up his small company and moved by the time Father Payne's drive needed repair. "Typically, if a person buys a product from a retailer, the retailer has inventory that can buffer a person from the process. In this particular case, the consumer had no buffer," said Lemoine. "The retailer made his $300 and then walked away from it."

A warranty should be more than a piece of paper. In my opinion, Crate should have stepped in and repaired or replaced Father Payne's drive because that's what the first warranty said Crate would do. Father Payne shouldn't be held responsible for Crate's inconsistent warranty policies. But I have some sympathy for the situation of companies like Crate. "How does a manufacturer protect himself from products sold by incompetent people?" asked Lemoine. One answer is authorized dealers, and Crate is looking at that possibility.

Father Payne did finally get a new drive, but only after many months and many letters to three different companies. Did Crate learn anything from its customer? Probably not. "Maybe Crate should have solved the problem, but I thought giving the man [Father Payne] a drive would only condone his behavior," said Lemoine.

What about Father Payne? "I guess I've learned not to deal with Crate and Hamilton Avnet in the future, at least not unless I get everything spelled out in writing from the start," he writes. "They seem to view consumers as if we were adversaries out to bilk them. I'll also avoid any similar arrangements where I'm dealing with a manufacturer through both a dealer and distributor. I often felt like the victim of an elaborate shell game, trying to guess which party was going to admit responsibility for the warranty. But finally, I've learned that persistence pays off... Almost every positive development over these past six months was at my prodding."

Jasmine Update

Jasmine is accepting and shipping new product orders (with Fujitsu mechanisms), and using half the income for back orders and repairs, according to Jasmine president William Bayer. When Jasmine filed for Chapter 11 in mid-March, there were 1500 to 1600 product back orders.

Bayer said the company's goal is to

CONTINUES

Display Disabilities

MicroRX is a HyperCard-based expert system for Macintosh SE repairs. In the section on displays, clicking on the icon that represents your Mac's problem (above) brings up a description of the ailment and suggested action.
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The chart explains exactly what you need to achieve the desired level of performance.

<table>
<thead>
<tr>
<th>To upgrade a 4-socket Mac Plus or SE to this amount of memory</th>
<th>Do this: (install in multiples of two only)</th>
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<tbody>
<tr>
<td>2 MB Remove all four existing 256K SIMMs, install two 1M SIMMs, leave two sockets for future expansion.</td>
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<tr>
<td>2 1/2 MB Remove only two 256K SIMMs, install two 1M SIMMs.</td>
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<tr>
<td>4 MB Replace all four 256K SIMMs with four 1M SIMMs.</td>
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To upgrade an 8-socket Mac II, IIX, IIXx, or SE to this amount of memory

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<th>To upgrade an 8-socket Mac II, IIX, IIXx, or SE to this amount of memory</th>
<th>Do this: (install in multiples of four only)</th>
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</thead>
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<tr>
<td>4 MB Remove all four existing 256K SIMMs, install four 1M SIMMs, leave remaining sockets for future expansion.</td>
<td></td>
</tr>
<tr>
<td>5 MB Keep existing 256K SIMMs, install four 1M SIMMs in remaining sockets.</td>
<td></td>
</tr>
<tr>
<td>8 MB Remove all four 256K SIMMs install eight 1M SIMMs.</td>
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</table>

To open your Mac Plus or SE, you'll need a specially designed tool — it's available from us as part of a handy tool kit for just $15.

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MacWAREHOUSE

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Call toll-free Twenty-four hours a day, seven days a week.
Inquiries 1-201-367-0440
Fax 1-201-905-9279

MACWAREHOUSE 30 DAY MONEY BACK GUARANTEE
If, for any reason, you are dissatisfied with your MacWarehouse Memory Kit, you may return it for a full refund within thirty days of purchase. All you have to do is call us for a return authorization number and return the product, postage paid, in its original condition, with the original packaging and documentation.

ONE YEAR WARRANTY. MacWarehouse also guarantees its Memory Kits against manufacturer defects for one year from the date of purchase. We will repair the item or replace it at our discretion.
Turn your Mac into a System 7 Powerhouse for only $449!

In a matter of weeks, Apple will release SYSTEM 7 and make it available to all existing Mac users! And there's a large pool of SYSTEM 7 software ready to run RIGHT NOW! Soon, the multi-tasking capabilities of SYSTEM 7 will allow your Mac to run new and much more powerful applications. But this new intelligent software will make the Mac more “power-hungry” than ever. And to fully utilize SYSTEM 7 you'll need a 68030 processor which gives access to virtual memory — allowing the computer to use your hard disk as extended RAM.

PRICE BREAKTHROUGH!
Thanks to some ingenious new technology, we’re able to offer the Dove Marathon 030 upgrade, including the necessary 68030 processor for the astonishing price of $449.

You'll be amazed at the increase in speed of your present applications with the Marathon 030 Upgrade. You'll race through graphics and database processing at speeds equivalent to computers costing thousands more. And as soon as SYSTEM 7 is available — you'll be ready to run the new applications.

WHAT DO I NEED?
The upgrade is easy to install in not much more than half an hour and comes with complete step-by-step instructions. You may need a simple tool kit to open your Mac — price $15.

To run SYSTEM 7 you must have at least 2 megabytes of RAM, and an enhanced (128K bytes) ROM. The Mac Plus, SE, SE/30 and the Mac II series all have the enhanced ROM, so the only other expense is an extra megabyte of RAM if your computer only has 1MB. Since you have to install 1MB memory chips in pairs, this could cost about $200.

PLUS, AN INCREDIBLE $250 VALUE!
To keep your newly upgraded system on track, we've bundled two state-of-the-art maintenance utilities with this offer. SAM 2.0 - Symantec Antivirus for Macintosh operates to identify and eradicate viral infections. SUM II - Symantec Utilities for Macintosh is used for more urgent disaster relief such as crashed disk and deleted file recovery, back-up and security.

CALL NOW!
Don't miss the chance to supercharge your Mac to SYSTEM 7 capability now. Our helpful staff of Mac fanatics is standing by to take your call. We'll help you select just what you need and get you off and running on the new system!

1-800-255-6227
24 hours a day, 7 days a week.
Inquiries: 1-201-367-0440
Fax: 1-201-905-9279
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Buy a Hard Drive Now And Save Up To $350

“The best deal in hard drives just got better!”

Between now and May 31st MacWarehouse is offering savings on every hard drive we sell. So, if you're thinking of buying a new hard drive, your timing couldn't be better. Check out our sale prices and your savings, compared to our December 1989 prices, in the chart.

We offer drives by leading manufacturers like Cutting Edge, C.M.S., Quantum, Dolphin, PLI, Infinity Turbo and others — all at unheard of low prices.

Let our helpful sales staff take the hassle out of buying a drive. They'll tell you which drive each manufacturer uses. They'll also tell you about access speed, reliability, software and the manufacturer's warranty.

MONEY BACK GUARANTEE

They'll tell you which drives come with the MacWarehouse 30-day money back guarantee. Try one at home. And if, for any reason, you're not 100% satisfied, just return it to us within thirty days and we'll refund your money.

Then there's the MacWarehouse Loaner Drive Program. Buy from MacWarehouse and if you ever have a problem, you won't be without a drive for more than a few hours.

READY TO USE

A hard drive from MacWarehouse couldn't be easier to use. We'll tell you which ones come pre-formatted — ready to use right out of the box. You just plug it in, turn on your Mac and go! If you do need any help, the MacWarehouse Technical Support staff is standing by our toll-free lines to assist you.

LIMITED TIME OFFER

MacWarehouse sale prices, based on capacity, are shown in the chart. Also shown are the savings from pre-holiday prices. (This is a limited time offer, valid through May 31, 1990.) Overnight delivery is just $3, anywhere in the Continental United States. So call us now and tomorrow morning you'll be up and running with the best hard drive deal in the business!

Call toll-free Twenty-four hours a day, seven days a week. Inquiries 1-201-367-0440 Fax 1-201-905-9279 © Micro Warehouse Inc.

MacWarehouse 30-Day Money Back Guarantee

Many of our drives come with the MacWarehouse 30-Day Money Back Guarantee. If, for any reason, you're not completely satisfied, call us within thirty days of receipt for a return authorization number and full refund of the purchase price.

MACWAREHOUSE 1-800-255-6227
White Knight 11.0 (Freesoft)
White Knight is Scott Watson's successor to the legendary Red Ryder telecommunications program. It's more than just a new version - the added new features list alone is more than 20 pages long! The 270-page manual has plenty of step by step tips to help beginners communicate like the pros in no time. While Knight comes bundled with Okyto, a revolutionary Mac-to-Mac file transfer program. A free subscription to the Celline network is also provided (communications) $85.

Ergotron
MacThumb .......... 68.
MacThumb II-RGB .... 76.
Goldstein & Blair
The Macintosh Bible .. 20.
ICD
Graflex ............. 84.
I/O Designs
ImageWriter II Carrying Case ... 49.
MacThumb II Carrying Case ... 59.
MacThumb Plus Carrying Case ... 64.
MacThumb SE Carrying Case ... 75.
Monitorwriter Apple RGB Case ... 79.
The Ultimate SE Carrying Case ... 79.

UnMouse (MicroTouch)
The UnMouse does everything a mouse can - only faster, easier, and in less space. To move the cursor, simply slide your finger over the glass surface. To make a selection, merely press down. The UnMouse also serves as an extended keyboard. Tap the large red button and you have a Power Keypad with 16 keys instantly available to execute macros (80 in advanced mode). With its one million touch points the UnMouse also performs as a small graphics tablet. Requires a Mac with ADB port. (Input) $189.

Hanging Targus Carrying Case made of silicone treated nylon to give you waterproof durability and an impact absorbing high-density foam layer with a soft protective lining for complete protection. Cushioned shoulder pad and handles provide extra comfort and convenience. Plus there's room for everything from your Mac, a hard disk drive, and an extended keyboard to pockets for your mouse, floppies, cables, and pens. Full Macintosh line available in black. Some styles available in blue, burgundy, and platinum. (accessories) $69.

ACCOUNTING & PERSONAL FINANCES
Aatrix
Checkwriter II ........ 37.
Payroll 3.5 ........ 109.

MapMaker 4.0
(Scientific Computing, Inc.)
Now includes dozens of powerful new features such as built-in drawing tools, on-screen distance measurements, graphics tablet support, and much more. Creates publication quality color maps of the U.S. by states and counties, and the world by country. Enter six different datasets, including data, and use the included U.S. census statistics. Quickly displays hidden relationships in geographic data with striking presentation graphics, Mac SE/II, Plus, SE and II (graphics) $295.
Imagine yourself on the flight deck of the British Airways Supersonic Concorde — en route to the MacUser U.K. show in London. New York to London in just over three hours! Superb comfort at twice the speed of sound. At 60,000 feet, the sky is dark blue and you can see the curvature of the earth. The ultimate flying experience.

You can win a fabulous four day, all expense paid trip by Concorde to the MacUser U.K. Show, November 7-10, 1990, in the MacWarehouse Concorde to London Contest. You'll meet some of the staff of MacWarehouse U.K. and find out how the Mac is making out in Europe.

Your name is automatically entered into the drawing when you order from MacWarehouse. (Or just mail the entry coupon.)

And don't forget, nobody beats MacWarehouse for great prices, free technical support and our Midnight Express Service. Order until twelve midnight for overnight delivery. The price is still just $3. Nobody does it faster than MacWarehouse — nobody!

FREE CATALOG!
We carry more than 1200 Macintosh products, including all the latest releases and new versions. We pride ourselves on getting new products first. If you can't find what you need, call us for a free copy of our latest catalog!

Dreams (Innovative Data Design)
IDD, creator of MacDraft, offers a powerful precision drawing tool for professional scaled drawings, illustrations, presentations and general-purpose graphics. Dreams offers zoom, rotation, layers, dimen-
sioning, symbol libraries and a vast array of drawing tools, as well as many advanced illustration features. You can merge shapes together, cut objects using other objects as templates…even glue lines and waves together to form unique shapes to be filled with colors or patterns. (Graphics) $325.

Stuff Deluxe (Klaedle Systems, Inc.)
Stuff Deluxe is the newest generation of the industry-standard compression, encryption, and archiving application. An easy-to-use interface and one-step QuickStuff function allow beginners to benefit immediately. With over 75 new features, it employs many new state-of-the-art compression (including file-specific op-
timizations) and new security methods. Multiple archives can be opened and manipulated in a Finder-like fashion (with sorting, copying, reordering, or deleting). View all brand viewers, a complete HyperCard-like scripting lan-
guage, and IBM-PC support (with desktop and uniprint) are included. (Utility) $65.

I'm Kerry, call me at:

MacWAREHOUSE
1-800-255-6227
(1-800-ALL-MACS)

Inquiries: 201-367-0440
FAX: 201-905-9279

Call anytime — day or night
24 hours a day, seven days a week

Midnight Express service available weekdays.
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<tr>
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<td>AEC Management Systems</td>
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<td>AEC Information Manager</td>
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<td>FileMaker II</td>
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<td>Free Software</td>
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<td>FoxBASE+ Mac</td>
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<td>Double Helix III</td>
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<td>ProVUE</td>
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<td>Panorama</td>
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### DESKTOP ACCESSORIES

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<td>Casady &amp; Greene</td>
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<td>QuickDEX</td>
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<td>JAM Software</td>
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<td>Smart Alarms (1-4 users)</td>
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<td>Smart Alarms (6-15 users)</td>
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<td>(17-25 users)</td>
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<td>Preferred Publishers</td>
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<td>Database 1.0</td>
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<td>Vantage 1.5</td>
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<td>Solutions</td>
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<td>SmartSnap &amp; The Clipper 2.0</td>
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### DISK DRIVES/BOARDS

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<td>MacStack 30 Meg</td>
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<td>MacStack 45 Meg</td>
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<td>MacStack 44 Meg Removable</td>
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<td>Integra 30 Meg</td>
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<td>Kenmore Technology Drive 2.4</td>
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<td>Peripheral Land, Inc.</td>
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<td>Infinity Dual Turbo</td>
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<td>Infinity Turbo 40 Meg</td>
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<td>Turbo Floppy 1.4</td>
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### DESKTOP PUBLISHING

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<td>Apps</td>
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<td>MicroTV</td>
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<td>Aldus</td>
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<td>PageMaker 4.0 or PrePrint</td>
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<td>Broderbund</td>
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<td>DTP Advisor</td>
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<td>Data Translation</td>
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<td>PhotoMac</td>
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<td>Emerald City Software</td>
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<td>SmartArt II, III or IV</td>
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<td>Letraset</td>
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<td>ColorStudio or FontStudio</td>
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<td>ImageStudio</td>
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<td>Ready, Set, Go!</td>
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<td>Olduvai 2.1 (OCR)</td>
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<td>Quantum Broderbund</td>
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<td>Xpress</td>
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<td>Gibson Beach</td>
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<td>Personal Press</td>
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<td>PLUS</td>
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<td>Springboard Publisher II</td>
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<td>TimeWorks</td>
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<td>Publish-It</td>
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### PERSONAL PRESS

**Personal Press (Silicon Beach)**

Personal Press creates professional layouts for you. Forget the long, steep learning curve, because Personal Press has AutoCreate to assemble stories and graphics into templates. It includes a fully featured word processor with spelling checker and thesaurus, controls for scanned images, color separations, posted notes, link navigator, extensive page previewing, and on-line help (desktop publishing) $199

**Power Chute**

Upon power failure Power Chute alerts all network users and initiates a graceful shutdown of the AppleShare Network. It communicates with a signaling American Power Conversion UPS (such as the 110SE or 307) via Mac or MIDI. Export MIDI notes into place with the mouse. $329

**Power Chute**

### EDUCATIONAL/PERSOAL

<table>
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<tr>
<td>Beacon Technology GEMS of the Word</td>
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<td>BrightStar</td>
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<td>Alphabet Blocks</td>
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<td>Talking Tyes</td>
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<td>Davidson</td>
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<td>Math Blaster Mystery</td>
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<td>Speed Reader II</td>
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<td>Fair Tide Technologies</td>
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<td>Navigator/mono</td>
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<td>First Byte</td>
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<td>The Dinosaur Discovery Kit</td>
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<td>The Puzzle Storybook</td>
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<td>The Rhyming Notebook</td>
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### FROM MacWAREHOUSE

- **Different Drummer**
  - March to the tune of a MIDI drummer. Composes patterns, songs, and tunes. Sound output via Mac or MIDI. $225
- **Relational Object**
  - Takes ordinary object-oriented drawing programs a step further. It adds the ability to link objects to other objects. Whenever you move an object, all linked objects will change accordingly. It can be used to create annotated illustrations, Gantt charts that update automatically, floor plans that change with new specifications, etc. (graphics) $115
- **Easy Color Paint**
  - Power Packed Palette. Jammed with features, Easy Color Paint delivers thrills and excitement to any would-be Picasso within mouse-reach of your Mac. Includes 17 tools, 256 colors, user defined patterns, multiple color palettes, coloring modes and much more. (graphics) $45
- **Publish-It!**
  - Complete self-contained desktop publishing program. Allows both professional & non-professional business communicators to write, design, and produce dynamic, sophisticated documents. From simple in-house newsletters & business forms to full-length magazines and distinctive annual reports; do it faster and easier than before! (desktop publishing) $225
- **The "ULTIMATE" SE Carrying Case**
  - Complete self-contained desktop publishing program. Allows both professional & non-professional business communicators to write, design, and produce dynamic, sophisticated documents. From simple in-house newsletters & business forms to full-length magazines and distinctive annual reports; do it faster and easier than before! (desktop publishing) $225
BUSINESS & PRESENTATION

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Comp. Sciences & Engineering ........... 39.
Adobe Systems, Inc.
TrasForm SetUp .............................. 225.
AEC Management Systems
FastTrack Schedule ........................ 115.
Aldus
Pendu 2.0 .................................. 289.
Antic Software
FlexForm Bus. Temp Vol 1 or 2 .......... 65.
Claris
MacProject II .................................. 369.
SmartForm Design w/Assistant .......... 295.
Cognition Technology
MacSMARTS PRO .......................... 249.
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Cricket Present ............................. 285.
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Top Down ..................................... 200.
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MacSMARTS PRO .......................... 249.
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Metro ImageBase Electronic Art (Metro ImageBase)
High quality 300 dpi electronic art from one of the world's leading publishers of ready to use art. Enhance brochures, menus, reports, newsletters and presentations. One large image per file - 100 per package. Packages available: Newsletter Maker, Business Graphics, Computers & Technology, ReportMaker, Borders & Boxes and 9 others. (grapics) $76. each

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Jojaki Tutor 30.
Softstreet
22nd Street or MacMunny 32.
The Software Toolworks
Cribbage & Gin King 39.
Life & Death or ChessMaster 32.
The Hunt for Red October 32.
Strategic Simulations
Pool of Radiance 32.
Three Silly Sands of Fire 32.
Visionary Software
SynchroCity 32.
XOR/PCAI
Lunar Rescue or MacGolf 2.0 34.
MacGolf Classic 32.
Road Racer 39.
NFL Challenge 54.
TaskMaster 29.

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Plus Pack 129.
Type Set 1 or Type Set 2 ea. 59.
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Letraset
LetraStudio 60.

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World Class Leader Board 26.
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Daily Double Horse Racing 24.
GrillQuest 19.
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Shufflepuck Cafe 24.
Where is the World is Carmen 27.
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Centron Software, Inc.
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CasinoMaster (5-pack) 49.
Electronic Arts
Miles Computing
Foot's Errand 32.
Puzzle Gallery 27.
Mindscape
Balance of Power, or Deja Vu ea. 29.
Hostage or Colony ea. 25.

Smart Alarms and Appointment Diaries (JAM)
The ultimate reminder system. Smart Alarms desk accessory creates reminders which interrupt you at an appointed time. Features snooze up to 1 hour, printing, choice of beeps, & text editing reminders. Appointment Diary desk accessory calendar for appointments. Features: Auto Layout, Day Layout, set reminders directly into Smart Alarms, Week at a view, Month at a glance, printing. Multi-User requires AppleShare or TOPS. (desk accessory) single user $49. 1-4 users $99, 5-8 users $149, 9-15 users $199, 16-25 users $299

TaskMaker (KOR)
The world has plunged into depression and devastation... the once mighty kingdom is no longer. Your mission: to restore order and prosperity to the kingdom, but you have no experience. Explore lands, caves and castles, discover secret riches, decipher cryptic messages and fight hellish beasties such as skeletons, zombies, orcs, elves, and giant caterpillars. To gain help, find the TaskMaster. With his guidance and your courage, the kingdom might be saved! (entertainment) $29.

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"Just the Fax Ma'am... Just the Fax" Not anymore when you combine high-end fax capabilities with the power of your Mac! Part of the new Promodem Data/Fax series, the 2400MFAX, originate-only and 4800bps fax capabilities to the enclosed 2400bps data modem. Includes MACKNOWLEDGE and a customized version of BackFAX. (modem/fax) $209.

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Disk-drive maker Microtech International has an agreement with Toshiba America to honor the warranty of Jasmine drives containing Toshiba mechanisms and hopes to negotiate similar agreements with other vendors. (Opening a drive voids the warranty, so use SCSI Probe software, available from BMLG and other shareware sources, to discover the maker of the mechanism.) Microtech will repair other Jasmine drives for a fee. Contact Microtech at 203/468-6223 or 800/626-4276 for more information.

Attention Uptime Subscribers

VIking Technologies, which published the subscription-based software service Uptime, filed for bankruptcy last year and in January sold its assets to Softdisk Publishing of Shreveport, Louisiana.

The company has taken over the Uptime subscriptions, sending up to six monthly disks to Uptime customers, depending on the number of disks left in their subscriptions. The disks contain original applications and magazine-like columns and departments. Any questions? You can reach Softdisk Publishing and Diskworld at 318/221-5134 or 800/831-2694.

Hacker Heaven

The Fifth Annual Macintosh Technical Conference, or MacHack ’90, is scheduled for June 13 through 16 in Ann Arbor, Michigan. Macworld editor, conference chair, and technogeek Brita Meng urges programmers to use this sterling opportunity to meet other programmers. Don’t miss the popular Apple-led Bash Apple session and the infamous Best Hack competition. Call Aimee Moran or Carol Lynn for more details at 513/882-1824.

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Many thanks to Apple for recently changing its outdated warranty policy and for offering owners of old Apple products the opportunity (through May 31) to buy six months of AppleCare and get six months free.

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Programming for the Rest of Us

CAN SOFTWARE DEVELOPMENT ON THE MAC EVER BECOME MAINSTREAM?

BY BRUCE F. WEBSTER

It is ironic that the Macintosh—perhaps the easiest personal computer to use—is one of the toughest personal computers to program. It is also no surprise: the difficulty in programming is a direct consequence of the complexity of the software supporting the Mac’s user interface. But it does present a real barrier to Macintosh users who would like to create custom applications, develop commercial products, or write programs just for the fun of it.

Suppose you have lots of experience using the Mac, but you have done little (if any) Mac programming. Are there any tools to help you get through the initial learning curve? Is HyperCard (or, at least, HyperTalk) the best solution? Does graphical programming really exist on the Macintosh? And will object-oriented programming solve all your problems? Let’s take a look at these questions and more.

Can You Say C?

Let’s start off by considering traditional, non-object-oriented programming languages: Pascal, C, BASIC, FORTRAN, Forth, Ada, and others. There are many such languages available for the Macintosh, but few are good choices for someone who’s never programmed on the Mac before. That’s because of the inherent difficulties—more than 500 toolbox routines, five volumes of Inside Macintosh to learn, and the significant amount of code needed just to fully implement the user interface. On top of that, if the language isn’t Pascal, you have the challenge of hooking up with the Mac’s Pascal-oriented toolbox interface.

Despite the burden that traditional languages place on Mac programmers, you should consider, or at least be aware of, some products that use traditional languages. Macintosh Programmer’s Workshop (MPW), from Apple, is a large, professional development environment. It comes with thick manuals, lots of disks, and (ironically) an interface geared toward command-line interaction; it’s not for the casual user. MPW’s greatest strength is its modular approach: you buy the basic MPW development system, then add the tools you want. These include languages such as C, Pascal, C++, 680x0 assembler, Modula-2, Ada, FORTRAN, and more. (Some are available from Apple, others from third-party vendors.) While this all may sound great, MPW doesn’t lend itself to introductory Mac programming. It’s big, complex, slow at times, and obscure in places. That’s not to say that you might not want to try it someday, but learn how to program the Mac first.

There are some traditional languages that provide solutions better suited for the masses. One example—two, really—is a pair of languages from Symantec: Think C and Think Pascal.

The two implementations offer similar features: fast compilation and linking; project management and source-level debugging, all in a highly integrated, Mac-style environment. These features alone have made both products widely accepted in the Mac community. But their most recent enhancements—object-oriented extensions, a Mac class library, and (for Think Pascal) a class browser and support of MacApp—make these products all the more useful to programmers new to the Mac environment. I’ll talk more about why later on.

If you do choose MPW or one of the Think languages, you might want to buy a programming aid. Several companies market source-code libraries or linkable modules that implement aspects of the Mac user interface or provide functionality that you might need. Examples of the former include MctInterface, from Holder, Egan & Company, and Professional Programmer’s Extender, from Invention Software. These packages give you the source code required to build a basic Macintosh application; you can then focus on adding functionality. A different approach is taken by FaceWare, which markets a set of code modules called FaceWare Pack that provide key functionality (user interface, text editing, graphic windows, and so on) and (continues)
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can be used with several different C, Pascal, and FORTRAN compilers for the Mac. In both cases, the idea is the same: to cut down on the difficulty of Mac development by letting someone else do all the initial hard work.

Even with help, traditional languages are still the most difficult way to go in Mac development. You'll almost certainly need to purchase Apple's development bible, *Inside Macintosh* (Addison-Wesley 1985–1988), and there are other books you may want to get as well.

**Building Bridges**

Since designing and creating the user interface is one of the most time-consuming tasks in Macintosh programming, new utilities such as AppMaker and Prototyper that substantially streamline the process are a boon for novices. Not only do they free up a programmer's time, but they also allow nonprogrammers to tackle what ordinarily would be a formidable task.

AppMaker and Prototyper both use the same approach. First, you lay out the user interface—windows, dialog boxes, menus, buttons, text fields, controls, and so on—using an interactive environment, so that you can see just how everything will look. Once you're satisfied, you can generate C or Pascal source code, which you then use within the program you're writing. (These tools presume that you're using an existing compiler, such as MPW or one of the Think languages.)

**Hyping HyperCard**

HyperCard was Apple's first real attempt to bring Macintosh programming to the rest of us. A simple yet deep programming environment that is given away with every System, HyperCard has led to hundreds of public domain and shareware programs, or stacks, some of which are impressive in their functionality and complexity. A number of add-on and utility programs for HyperCard (libraries and editors, for example) have come to market, and HyperCard has even inspired the more powerful SuperCard from Silicon Beach Software.

However, HyperCard has not led to a revolution in Mac software development for the masses. The HyperCard interface is so different from the standard Mac interface that many would-be programmers and users have a hard time treating stacks as serious or normal applications. And there are other limitations—such as lack of color support—yet to be addressed by Apple. If more aggressive support and development doesn't materialize, then HyperCard will probably start a long, slow decline as a useful tool for end-user development.

**Programming with Pictures**

Several development environments have appeared that allow you to build programs graphically. One of the first was V.I.P. (Visually Interactive Programming) from Mainstay. Put simply, V.I.P. lets you lay out a program's flow. You create boxes that define values, make tests, carry out functions, then
connect them to indicate the path(s) of execution. The biggest problem with V.I.P. is bandwidth: there's a real limit to how much of a program you can see on the screen at one time. This is true for any programming environment, graphical or not, but V.I.P.'s flowchart-like format is especially "verbos" in a visual sense.

More effective is Serius89, from Sereus, which bills itself (in a fit of hyperbole) as "the world's first desktop programming tool." Serius89 is designed to let nonprogrammers build complete applications. To do this, you build a list of objects—menus, windows, buttons, pictures, numbers, text—and define their attributes and relationships. Then you can select from a large number of functions (organized according to object type), define when and how those functions are used, and determine what objects they will act upon. Having set everything up, you can then have Serius89 "compile" your program design into a separate, stand-alone application. Although it sounds complicated, the interface is quite easy to learn and use. After working through the tutorial, I went back and built a very simple text editor in a matter of minutes—without programming.

For the nonprogrammer, the Serius89 environment is limited by the objects and functions that are already defined. (Serius does make a developer's version of Serius89 that allows programmers to create new objects and functions, and Serius hopes to make these objects and functions available to its user base.) But unless you have a source for such objects and functions, you may find Serius89 too limiting.

Objective Opinions

Now we get to the current panacea: object-oriented programming (OOP). OOP has been touted heavily for the last year or two in the microcomputer marketplace, and the phrase object-oriented is being heavily abused (much like oat bran in the food marketplace). This is not to say that the benefits of OOP are not real, but it does mean that calling something object-oriented doesn't guarantee those benefits, any more than sticking oat bran into a candy bar ensures that the candy bar will be good for you.

Briefly and all too simply put, object-oriented programming involves treating a program you build as a collection of objects, individual entities that hold information and send messages to one another. These objects have a taxonomy, that is, they are instances (actual copies) of a particular class (type) of object. Thus, you might have a general Window class that knows how to draw a window; how to resize it, move it, or close it; how and when to redraw its contents; and so on. When your program runs, it may create several instances of the Window class—actual windows—which then already know how to behave. If you need a custom type of window, then you create a subclass of

(continues)
the Window class and modify its behavior appropriately.

Why might an object-oriented approach to programming the Mac make things easier? Because you typically have a class library, that is, a hierarchy of classes of objects that implement the Mac user interface. Thus, you already have classes defined for event loops, windows, dialog boxes, menus, buttons, scroll bars, text, and so on. You can then create instances of these objects in your program and use them without having to know how to correctly implement their behavior. Note that this approach is very similar in purpose to some of the products discussed earlier (MacInterface, Professional Programmer's Extender, and FaceWare Pack).

This doesn't mean that an OOP language is inherently easier to learn than traditional programming. Consider Smalltalk/V Mac from DigitalTalk. This is a pure, classical object-oriented language in a rich development environment available on several platforms. It comes with excellent documentation, including a well-written tutorial. Some people take very quickly to Smalltalk; there are cases cited of children programming merrily in Smalltalk after only a few days of instruction. Of course, there are also children who play the violin at age four. Other people find themselves going in circles, trying to grasp mutually dependent concepts and being unable to gain a grip anywhere.

A more conventional approach involves using an object-oriented version of an existing language. The MPW Pascal compiler has had object-oriented extensions for some time, and an MPW C++ compiler is now available. And as I mentioned earlier, Symantec has added object-oriented extensions to Think C and Think Pascal. All these efforts provide object-oriented programming in the context of an existing procedural language.

But the object-oriented extensions aren't enough to make the task easier; you need a good class library. Apple has had one for years—MacApp. However, upper-level management at Apple did little to support its development or promote its use until about a year and a half ago. Not surprisingly, that coincided with the announcement of the Next system, with its much heralded (and rightly so) object-oriented development system. Once that happened, high-level Apple execs got religion about OOP, finally catching on to what others within Apple had been saying for years.

Of course, since MacApp is designed to be used within MPW, there are other barriers to overcome. As one developer of programming tools for the Mac put it, Apple has managed to replace one tough learning curve with another. Luckily, Symantec provides its own class library—the Think Class Library—for use with the latest versions of Think C and Think Pascal; the latter also supports MacApp directly.

A Hybrid Future?

Over the past two years, we’ve seen a new wave of Macintosh development tools that make it easier to create a development system to fit individual needs, tastes, and backgrounds. For example, a user with experience programming on non-Mac systems might put together AppMaker or Prototyper, Think C, and maybe some of the FaceWare modules. Someone with no programming experience at all might be better off staying with HyperCard or looking at something like Serius89.

The ultimate solution is not here yet. And I'm not sure what it will be. It might be a cross between HyperCard, Serius89, Prototyper, and FaceWare—a development environment in which you build a Mac interface, establish connections between the elements, use a simple yet powerful scripting language to define behavior, and drop in prefabricated software modules to add functionality. All the individual components exist, and they do seem to be roughly headed in the same direction, but that degree of system integration can only come from Apple.

Programming the Mac may never be as easy as using one, but we can hope. We can always hope.

See Where to Buy for contact information.

Contributing editor Bruce F. Webster is project manager at San Diego-based LaserGo. He can be reached via BIX (bwebster) and via MCI Mail (Bruce Webster).
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One of the oldest file transfer methods known to Mac is about to become obsolete. You can now forget about using your "sneaker network" to run disks and files between computers around the office.

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For more information, including a Laplink Mac III brochure, call us at (800) 662-2652, extension 202.

After all, why run your files around when you can use your computer?
Does sending Mac electronic mail by radio sound far-fetched? If Apple's Apple Complex Systems (ACS) group has its way, you'll be able to do just that. Written by two members of ACS, Ken Landau and Ricardo Batista, MacKDT is an E-mail and telecommunications program that sends and receives messages over the ARDIS (Advanced Radio Data Information Service) radio network. Developed at ARDIS's request and demonstrated initially at ARDIS's introduction, the program runs in the background under MultiFinder and works much like AppleLink. The only difference is that it uses radio waves instead of telephone wires to transmit and receive data.

MacKDT is named after Motorola's hand-held wireless terminal, the KDT-840, which includes the RF (radio frequency) modem necessary to access the ARDIS network. A joint venture between IBM and Motorola, the network allows data terminals or computers with special RF modems to access remote host computers via wireless radio links. IBM has been using its own nationwide private radio system to support its 18,000 field service technicians for six years. Motorola, meanwhile, offered a radio-based commercial data communications network in Chicago, Los Angeles, and New York.

When the ARDIS network goes online in early April, it will contain more than 1100 radio base stations and will provide service to more than 8000 cities and towns in 50 states. Initially, the ARDIS network will operate at 4.8 kilobits per second; future plans call for data rates to reach 19.2 kbps as the network expands.

According to ARDIS, the radio network will offer traveling workers a way to access corporate databases, perform data entry, and exchange E-mail that's better than modems using cellular phone technology. Perhaps most importantly, ARDIS uses 800- or 900-MHz radio bands that work indoors as well as outdoors.

MacKDT is a prototype application at present, but Apple is currently working on ways to incorporate the Motorola RF modem into Macs, most notably the Macintosh Portable. Landau believes the Mac Portable, MacKDT, and radio modem will prove to be a winning combination not only for Apple, but also for large businesses that need Mac-based wireless communications capabilities.

For example, MacKDT could be offered to corporate customers through Apple's Complex Support Group as one part of the answer to the customer support, installation, and...
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The Hungarian company Gráfisoft is known in this country for ArchiCAD, but in Europe it is also known for the high-end 2-D mechanical-design package topCAD, and Gráfisoft plans to market topCAD aggressively here beginning next year. topCAD, which was originally developed for VAXs and IBM mainframes, features a C-like programming environment with watch-me capability. Engineers can design mechanical objects such as cylinders, pistons, and valves while topCAD records them as macros in an editable command language. The objects can then be reused in a complex design such as an engine. You can create menus and assign macros to them as menu items, and a floating Prompt Window, besides suggesting the next appropriate action, has a miniature icon bar (similar to Icon-1) for attaching macros to icons. (A pixel-editor window is available for drawing icons.)

In a programmer's hands, topCAD can double as a CAD-application generator. The language has about 500 commands, and programmers who bump up against its limits when designing new tools (or making Toolbox calls) can use routines written in FORTRAN, C, or Pascal. For example, an end user might call an object such as a gear from the macro library and a topCAD application could use the Prompt Window, a dialog box, or a pop-up menu to request parameters, such as how many teeth to give the gears.

topCAD's 110 tools are context-sensitive. For example, when you select the circle tool, a second level of tools appears for drawing a circle through three points, around a center point, tangential to three points, and so on. topCAD imports and exports a wide range of formats (including a spreadsheet format, helpful for generating materials lists); provides 20 levels of undo; adjusts dimensioning when you change an object; and lets you select objects by characteristics, for example, all polygons and all splines on layers 127 through 155.

topCAD is already available in this country, but Gráfisoft has focused its energy on ArchiCAD and will not have a United States sales-and-support framework for topCAD until 1991. The U.S. list price is equivalent to European pricing at $4800. Copy- protection is common in Europe, and Gráfisoft is selling topCAD in this country with European-style hard-key copy protection, which requires a device on the SCSI bus. For more information contact Gráfisoft USA in South San Francisco, California, at 415/266-8720, 800/344-3468.

-B.L.

Under topCAD, a Language

Assigning digital ecosystems, from cellular automata to simulated ants.

A number of artificial life (AL) projects were created on the Macintosh. James Kalin demonstrated Maxis Software's SimCity, a combination game and educational tool in which a city populated by Sims (simulated citizens) must be kept running smoothly as it evolves. Kalin says he'll use some of the information he garnered at the conference to enhance future versions of SimCity, making the Sims more life-like and offering them different ecosystems.

Michael Travers, a graduate student at MIT's Media Lab, showed a simulated world where artificial ants leave trails for other ants to follow to artificial food. John Holland created Echo, a miniature world populated by organisms that move about their environment, eat resources (and each other), and reproduce, perpetuating the chromosomes of the survivors. Apple fellow Alan Kay described the Vivarium Project, in which elementary-school students can create their own creature-filled environments on the Macintosh.

So, has anyone come close to creating artificial life yet? Unfortunately, the artificial organism that meets most of the criteria for being "alive" is—you guessed it—the computer virus. These critters are, to tick off some requirements, complex, self-replicating, and tolerant of changes in their environment. They carry information, absorb information from their surroundings, and exhibit purposeful behavior. Horrifyingly enough, two Mac viruses—nVIR-A and nVIR-B, can "mate"—one virus overwriting a portion of the other's code to produce a new strain unlike either of the parents.

On the brighter side, one confer-

(continues)
If you can think of better ways to spend your time than backing up your hard disk, you need Fastback II. It's the world's fastest and most reliable backup software for the Macintosh. It's also the easiest to use, with simplified file selection, adaptable data compression, advanced error correction and other features to make your backups fast and foolproof.

You can even schedule automated backups to take place at any chosen time. Even when you're otherwise occupied.

After all, you have better things to do.
ence participant has harnessed the power of purposeful, self-replicating programs for good instead of evil. Harold Thimbleby of Stirling University, Scotland, introduced the concept of liveware, software that automatically updates a database that's passed from one user to another. Thimbleby got the idea for his autonomous database when he needed to collect information on some 50 colleagues who shared his interest in human-computer interaction. Toward this end, he created a HyperCard stack. Rather than send out 50 disks, get them back, and compile the information for each person, he decided to make the software do the work. His liveware application automatically adds information from one stack to another, allowing a community of users to keep a database up to date. An autotrigger option causes the stack to perform a merge whenever it encounters another liveware database; if this autonomy is too virus-like for a user’s taste, a manual merge button returns a degree of control to the stack’s owner. Thimbleby’s stack not only incorporates new cards, but time-stamps each entry to allow users to update existing cards. The database also includes a bulletin board where users can post messages.

Liveware, like any form of shared information, raises the issue of security. To prevent a stack from being corrupted, the originator of a database can specify a password, requiring authorized users to log in. If a database becomes damaged, chances are good that another user in the group will have an undamaged version.

Liveware has other potential uses. If you use one Mac at home and another at the office, for example, you could use a liveware application to keep the files on both machines current. Liveware could also be used by a system administrator to update software on a group of Macs when a new version of a program is released. Another potential application is automatic file backup.

Although viruses have made Mac owners squeamish about the idea of data crawling around on its own, perhaps liveware will revitalize communal computing. In the hands of responsible people, a little digital autonomy could be a good thing. —Erfert Fenton

**Crashing Works’ Party**

TML Systems, known to Macintosh developers for its TML Pascal, is writing a seven-module integrated package to challenge Microsoft where the giant has no competition. TML says the new product, code-named Zebra, will have much greater capabilities than Microsoft Works 2.0 but will list for the same price. Zebra’s seven parts include a word processor, a database, a spreadsheet, telecommunications, paint modules, and a charting and graphing module.

TML’s给予 the modules some unusual integration. Tools from every module are available in every other module where appropriate—for example, text tools are available everywhere (except in telecommunications)—giving you access to the Microlytics spelling checker and the word processor’s MacWrite-like style sheets in spreadsheets, databases, and charts. It also has live links so, for example, you can move spreadsheet data into the charting module, make a chart and paste it into your word processor and, when you change the original spreadsheet, Zebra will update the finished chart inside the word processor.

Zebra’s word processor presents a dialog box to choose database fields for mail merges. It can display text in columns, has on-screen headers and footers, and can wrap text around graphics. Live text from the word processor can also be linked to the draw module, which has linked text blocks to give Zebra some layout capability.

The database has a forms-oriented interface that warns you when you set a field outside the print area. It duplicates FileMaker’s query-by-example method and search syntax, and adds one feature FileMaker lacks: a scrolling memo field. Zebra implements XTND, Claris’s open file translation technology, and, being the hackers that they are, the people at TML Systems have cracked the Excel and Works file formats, so Zebra can import and export spreadsheets from both. Its spreadsheet duplicates Excel’s function set, though Zebra lacks a macro command language.

Zebra will list for $295. For more information, call TML in Jacksonville, Florida, at 904/636-8592.—D.L.

**The CAT’s Third Hat**

Chang Labs' CAT (Contacts, Activities, and Time) is back as CAT III, older, wiser, and—Chang Labs hopes—less mysterious. In previous incarnations the informa-

(continues)
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Data from a neutron-star simulation. Colors were remapped with Spyglass to highlight features.

including 2MB of RAM, a 40MB hard disk, and a cable for connecting to the Sharp Wizard. It supports a variety of Apple monitors, including the 13-inch RGB display. Options include up to 8MB of RAM and a choice of internal hard drive ranging up to 200MB in capacity. For more information, contact Dynamac in Denver, Colorado, at 303/296-0606 or 800/234-2349. —T.M.

Colorizing Data

Like many physical scientists, Colleen Barton has to isolate a few meaningful numbers buried in vast arrays of numerical data. Barton is a postdoctoral student at Stanford's Center for Borehole Geophysics, studying holes drilled by oil companies in search of petroleum. The instruments that scan the borehole walls return data sets that can run as large as 600 by 2000 cells—so many that Barton could never pick out where oil-bearing sandstone meets impermeable granite, for example, or the borehole plunges through a fracture in the earth.

Instead of looking at raw numbers, Barton converts them to color images. In conjunction with a cylindrical-geometry application she wrote herself, Barton uses an image-manipulation package that grew out of work at the National Center for Supercomputing Applications (NCSA) and is now for sale as a product called Spyglass. "I primarily use [Spyglass] for palette manipulation, extracting features that I wouldn't otherwise be able to see," Barton says. Compressing the palette around one region in an array is analogous to zooming in on a real image. By assigning more colors to a narrower range of numbers—increasing the

(continues)

The Dynamac SE/30 comes with an Apple SE/30 logic board and an internal fax modem installed.
The promise of multimedia just arrived. And it's from RasterOps.

Introducing the Video Colorboard 364, a single NuBus board that brings the world of full-motion video to your Macintosh.

In short, the Video Colorboard 364 is both a frame grabber and a display board, meaning you can selectively watch live TV or video from any NTSC or S-Video source on a Macintosh screen and capture any image.

Even more amazing, you can run an application program and show video on your Macintosh at the same time... without depending on MultiFinder.

If this sounds like a technological breakthrough, you're right. In fact, RasterOps has a patent pending on the circuitry that makes it possible.

Once the video appears on the screen, you can change the channel, brightness, contrast, or sound directly from your Macintosh, thanks to the RasterOps Video Tuner. This companion product also provides a speaker and headphone jack. And a second companion product, the RasterOps Video Expander, enables you to output Macintosh-resident graphics to a video recorder in true 24-bit color.
For applications that require recording on a video tape, the Video ColorBoard and Video Expander is the perfect solution.

The Video ColorBoard 364 also represents a multimedia building block. RasterOps developed the XCMD software for the Video ColorBoard 364 to interact with applications such as SuperCard, HyperCard, and MacroMind Director. You can create training aids, presentations, and other tools that take advantage of its multimedia capabilities. Regardless of your application, one of the best parts about the Video ColorBoard 364 is its introductory price. At $1,995, the Video ColorBoard 364 provides an incredible range of features at half the cost of competitive products.
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Ken Landis, MacUser

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image resolution—you can see where numbers make sudden changes in value.

Spyglass is four applications: Spyglass Transform, which reads and writes floating-point data in HDF files and provides tools for manipulating and recording the results; Spyglass View, with precise controls over color palettes (including a fiddle icon tool—for fiddling with colors) and the ability to animate a series of arrays; Spyglass Format, for turning a series of color images into an annotated presentation; and Spyglass Dicer (which is not derived from NCSA work), for boring holes and cutting chunks out of 3-D data sets to see what they look like inside.

Version 1.1 upgrades will add support for sparse data sets such as weather data; improved contour and surface plots that, the company says, will be as good as mainframe-generated contour and surface plots; better numerical control over color-mapping; and more import formats including TIFF, which will be useful for analyzing satellite photos.

Spyglass Transform and Spyglass View list for $395 each, Spyglass Format for $195, and Spyglass Dicer for $495. Bundled sets are available at a discount. For more information, contact Spyglass Software in Champaign, Illinois, at 217/355-1665.—D.L.

**Breaking Those Mind Chains**

David Zeeck is facing a series of problems. As executive editor of the *Kansas City Star*, he is, step-by-step, merging his paper's editorial staff with the editorial staff of the *Star's* former competitor, the *Kansas City Times*. Although the two papers' business operations have already merged, their editorial cultures have remained distinct. For example, Zeeck says, to do investigative reporting, "On the *Star* [we] always had a special-projects team. The *Times* always did it without a special team— their philosophy was that the whole paper should be involved."

To patch together answers to problems like that, Zeeck has been turning to MindLink, a HyperCard-based brainstorming tool. MindLink incorporates ideas developed by Synectics, a management consulting firm that spun off from Arthur D. Little in the early 1960s. (The name derives from syn, meaning bringing together, and ectics, meaning diverse elements.) Synectics consultants go into large corporations and, at rates typically running $10,000 or more, guide groups of managers in thinking creatively about their company's problems. (Before beta testing MindLink, Zeeck was familiar with Synectics through New Directions for News, a professional association of newspaper editors.)

MindLink leads you through developing wish lists and free-associating ideas, suggesting images and ideas to help your thoughts branch out. For example, on one card you might pose a problem; if you click on the Wishing Well button, you jump to another card where you can speculate about the problem or ask for triggers—key words, images, or even stories. MindLink may even prompt you to get up and go for a stroll outside. Meanwhile, MindLink gathers your ideas and stores them until you are ready for the key task: turning wild ideas back into practical solutions.

What did Zeeck decide about investigative reporting? "I believe in a projects desk, but the *Times* way has benefits too. So we'll . . . do it in a way where the investigative reporters are using other reporters from all over the building. "[MindLink] can't invent an answer you don't have inside you already," he adds. "But it might bring you to that answer more quickly. [And] it's much faster on the computer than in a group."

MindLink's price is $499. For additional information, contact MindLink in North Pomfret, Vermont, at 802/457-2025.—D.L.

**Image Compression: The Wave of the Future?**

Twenty-four-bit color images, color animations, and digitized video look great, but they present a growing problem because they demand vast amounts of processing power, data storage space, and network capacity. However, an image-compression processor recently introduced by C-Cube MicroSystems promises to reduce the problem by compressing digital images by as much as 200 to 1, with an average gain of 20 to 1. The result could be much faster market acceptance of performance hogs such as color DTF and multimedia applications.

Called the CL550, the processor can compress or decompress full-motion video at the standard 30 frames per second. It takes less than a second to process the average color photograph, according to C-Cube. Just as important, the CL550 uses a method of compression proposed as a standard by Microsoft and Digital Equipment Corp. (D.C.)

C-Cube cofounders Alain Rossmann (left) and Edward Sun show off the company's image-compression techniques.

**Using MindLink won't make you see colors, but it may blast the cobwebs from your mind with a dose of inspiration.**
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standard by the Joint Photographic Experts Group (JPEG) of the international standards group CCITT/ISO. If the proposed standard is adopted by the industry there is the potential for the chip and others like it to reside in computer systems communicating across diverse network architectures.

C-Cube says it is providing application developers with the C-Cube Compression Workshop, software that will let them adapt their applications to the image-compression processor. The Compression Workshop currently runs only on the Mac II family, but versions for both DOS and OS/2 machines are under development. The software costs $500. For more information, contact C-Cube in San Jose, California, at 408/944-6300. —T.M.

**Multimedia Art Education**

Part of modern experience is looking at modern art and wondering what to think and feel, and whether you’re really supposed to do either. Aware of this dilemma, educators from seven major museums undertake a research and development program to see how technology—specifically, their Macs—could make art less arcane. The project is near completion, and the results are two interactive multimedia prototypes. The subject of both is impressionism—the work of Monet, Cézanne, Cassatt, and Seurat—and both include a videodisc of imagery drawn from collections around the world.

Would you like to see Monet’s Water Lilies? Choose it from a menu of the artist’s works. Would you like a close-up of one lily so you can study the brush work? Place the cursor, click, and close in. If you like, select an audio explanation of what you see. Now, would you like to see the artist’s studio, to learn how he worked and what else he painted? From there you might like to consider examples of his preoccupation with light. Go to the menu, choose Rouen Cathedral, then select video stills and motion video, and watch the light change at different times of day and in different weather conditions. Then compare these video images, side by side, with Monet’s light studies and his final painting of the cathedral.

The prototype includes a videodisc player and disc, a Mac II, an Electrohome 19-inch long-persistence monitor, a Truevision NuVista 4M capture board, a NuVista VidI/O Box, and custom software, written in C.

What’s new about the technology here? First off, you see everything on one screen. The capture board and VidI/O Box convert the videodisc player’s analog signal to digital, so that graphics and menus stored on the hard disk are combined with imagery from the videodisc. (The standard Mac multimedia configuration has been a Mac running HyperCard to control images from a videodisc displayed on an NTSC monitor, making users watch two screens at once.) The custom soft-

**Datacopy Gray-Scale Scanner for Macs, PC ATs, PS/2s**

Xerox Imaging Systems recently introduced the Datacopy GS Plus, an 8-bit grayscale scanner that works with Macs, PC ATs, and PS/2 systems. The scanner offers resolutions from 75 to 300 dpi, variable in increments of 1 dpi.

The Datacopy GS Plus scans an 8½-by-11-inch document in two shades of gray and can accept standard (8½ by 11 inches) and legal-size (8½ by 14 inches) documents. You can attach an optional automatic document feeder to the flatbed scanner after removing the lid from the GS Plus. The document feeder has a list price of $595.

Available now, the Datacopy GS Plus has a suggested retail price of $2195. The scanner uses the SCSI interface. For more information, call Xerox Imaging Systems in Sunnyvale, California, at 800/248-6500. —T.M.

Frankie Mann (left) and Kathy Wilson helped create an interactive multimedia project on Impressionism.
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Mac to Welcome Open Plan

Welcom Software Technology is developing Open Plan/Mac, a version of its high-end project-management application Open Plan, which runs under dBase on DOS machines and under Recital on the VAX, for FoxBase+/Mac. The three versions share an identical interface, have identical feature sets (except that the VAX can manage ten times as many activities), and can share data files in a multiuser environment. Open Plan's key feature is the origin of its name: because a big chunk of it is written in uncompiled dBase (its computation engine is written in compiled FORTRAN), users can modify and customize Open Plan almost beyond recognition, adding new capabilities—for example, drawing and specification indexes or procurement registers—adding new fields, and reworking menus to accommodate added functionality.

Besides Open Plan's vast project capacity—10,000 activities, 250 resource types per activity, and unlimited resources per project—its feature set is impressive. It supports 256 calendars and generates reports using any or all of them. It also has a merge and copy system that makes it possible to duplicate parts of a project (for example, reusing floor 2 of a 20-floor hotel for floors 3 through 19); industry-standard Work Breakdown Structure and Organization Breakdown Structure; and sophisticated resource leveling with activity stretching, splitting, and reprioritizing to manage groups of workers with differing start and quit dates and multiple subprojects with different priority levels.

Open Plan uses the 250-command WRL (Welcom Report Language) for creating reports. For programming-shy project managers, Open Plan/Mac will ship with 60 standard time-phased and nonphased reports. WRL can coax very precise reports from Open Plan—for example, color coding noncritical task paths by how much float they have.

Supplemental modules are available for Open Plan on the other platforms, and Welcom is porting some of them to FoxBase+/Mac. OPERA (Open Plan Extension for Risk Analysis), a risk- and certainty-analysis module, should be available about three months after Open Plan/Mac ships; COBRA (Cost Breakdown Application), a performance-measurement and cost-reporting system that meets the United States Department of Defense's Cost Schedule Control System Criteria, should ship about three months after OPERA.

For users who prefer a Mac interface to the dBase- or VAX-like interface, Open Plan's extensibility should make it possible to write a front end in HyperCard or a similar application generator, though its massive feature set would make that quite a project. Open Plan/Mac costs $4200 for a single user; site licenses are less expensive per user. A demo version with full documentation is available for $100. OPERA will list for $2200 and COBRA for $5000.

For more information, contact Welcom in Houston, Texas, at 713/558-0514.—D.L.

New Graphing Tools from Bravo

Bravo Technologies was known in the Mac's early days for publishing the fast and clean spreadsheet MacCalc. Now Bravo is back with a new product tentatively named MacGraph, a sophisticated business and scientific graphing package to compete against DeltaGraph and the long-awaited FoxGraph. MacGraph creates pie, bar, stacked bar, and area charts, line graphs, and scatter plots—with many variations on each—and it has features for customizing tables of data.

Key among MacGraph's features is its open architecture. Scientists or financial analysts who exhaust its list of functions can write their own in a standard programming language, or use the many public domain routines already available. Drop a function in the appropriate folder and it appears under the Equations menu. MacGraph also provides logical, arithmetic, and comparison operators for manipulating data. Other tools for changing file types and cleaning up data facilitate importing data from instruments or other computers, including mainframes, and a dialog box provides a point-and-click method of creating new numeric formats.

MacGraph has some unusual but intuitive Mac interface extensions. It creates its own desktop (as Odestra's Data Desk and Double Helix do), with icons arranged down the left side of the screen. Two shades of gray indicate columns of independent and subindependent variables, and special (continues)
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—MacUser

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cursors appear when you sort and select data that simplify the graphing of discontinuous or hierarchical subsets of data.

Unlike the venerable CA-Cricket Graph, with MacGraph all graphs generated from a data set stay together as one file using one background page, called a Letterhead, throughout. You can place graphics, headers, and footers on the Letterhead, making them appear on every graph's page, or you can add text and graphics page by page. MacGraph generates attractive finished graphs and provides the standard Mac drawing palette and 32-bit color support. You can modify almost every part of a graph, including text, frames, fills, line widths, how far tick marks are offset from axes, and so on. To overlay a line graph on top of a bar chart, you select the second set of data for the line graph and—what else—hold down the Shift key as you issue the line graph command.

MacGraph does not create true 3-D graphs, though it does make 2½-D-like shadows. Bravo Technology president Richard Ross says 3-D graphs must be skewed or distorted to be seen on a flat surface—a computer screen or paper—so they give inaccurate impressions.

MacGraph's list price was undecided at press time but should be less than $200. For more information, contact Bravo Technologies in Berkeley, California, at 415/841-8552.—D.L

Erasable Optical Drive Works with Macs and PCs

Tecmar has introduced an erasable optical drive that can work with Macintoshes and IBM PCs, holding up to 650MB of Mac, DOS, and OS/2 files on a single removable disc. Called the LaserVault 650, the device is based on a Sony erasable optical drive and requires an additional connection kit for each of the three types of systems supported: Macs, PC ATs and compatibles, and PS/2s and compatibles.

The LaserVault comes with software that you use to separate each removable, erasable optical disc into separate volumes, depending on the type of system you have. Other included software provides automatic setup and archiving features. The LaserVault uses the SCSI interface.

The LaserVault and connection kits for the Mac and PC AT were all scheduled to be available now. The LaserVault with PS/2 kit should begin shipping in July. The LaserVault drive lists for $5495 without a connection kit. For more information, contact Tecmar in Solon, Ohio, at 216/349-0600.—T.M.


This month's survey, which was mailed to 1000 subscribers, examines Macworld readers' use of and opinions about Systems and Finders. Readers were given a list of Apple-recommended Systems and Finders and asked if they were using the correct ones for their machines. A reassuring 83.3 percent of respondents answered yes, 9.6 percent answered no, and 7.1 percent said they did not know.

Readers who answered that they use a System and Finder not recommended by Apple were asked to state all reasons why. Of those readers, 52.9 percent pleaded ignorance and 26.5 percent said they didn't know how to get the upgrade.

Readers were also asked how often they used MultiFinder. 59.5 percent of all responding readers said they seldom or never use MultiFinder; 13.1 percent said they sometimes use it, 6.8 percent said they use it often, and 20.5 percent said they always use it.

When asked how likely they were to update to System 7.0, 48.6 percent of all respondents said they were extremely or very likely to make the update, 30.7 percent said they were somewhat likely, 15.9 percent said they were not very likely, and 4.8 percent said that they were not at all likely to update.

Of those readers who said they were extremely or very likely to make the update, 40.9 percent said that the most important feature of System 7.0 will be outline fonts, 16.4 percent picked virtual memory, 15.7 percent said Finder 7.0, and 13.2 percent cited interapplication communication.

—Jonathan Cassell

MACWORLD SURVEY

Are you using the recommended System/Finder?

- Don't Know 7.1%
- Yes 83.3%
- No 9.6%

Why not?

- Didn't know what version was recommended 52.0%
- Other 41.1%
- Didn't know how to get it 26.5%
- Didn't know about it 8.8%
- It's incompatible with my peripheral hardware 2.9%
- It's incompatible with my applications 2.5%

9.6 percent of readers responding to our survey said they do not use the System/Finder recommended for their CPU. Of these, 5.8 percent cited incompatibilities as the reason.

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Type Reunion .............................. CALL

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1st Aid Software, Inc. A package no hard disk user can tolerate without. Includes 1st Aid Kit (complete Mac troubleshooting, including file & disk recovery), Complete Undelete (utility for recovering deleted files), and Sector Collector (safeguards data on hard disks by isolating bad sectors).

Deluxe 1st Aid Kit .......................$116.

1st Aid Software
Complete Undelete ............... 36.
Deluxe 1st Aid Kit ............... 116.
Sector Collector ............... 36.

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Adobe Postscript Fonts
Adobe
1 Palatino .................. 123.
2 ITC Bookman ........... 123.
4 ITC Avant Garde Gothic ........... 123.
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18 ITC New Baskerville ........... 123.
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23 ITC Franklin Gothic ........... 180.
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Full Impact ........... 248.
FullWrite Professional ........... 252.

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FLASH ................ 119.
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MacZone page 4 of 8
Your MacZone Advisor Knows Hard Drives - and you should too.

Because the MacZone understands your need for information on hard drives, we have put together a comprehensive guide of our in stock hard drives. We hope that this guide will provide you with an inside look at each drive. Of course, if you have questions, please call one of our MacZone advisors at 1-800-248-0800.

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Above: Artist, Ray Davis; software, CADKey Render, which uses RenderMan (on an IBM PC). Right: Artist, Koji Sonoda; software, SystemSoft. For more details, see "Rendering Face-off." Facing page: Artist, Tony Tomson; software, Sculpt 3D.
Seeing, they say, is believing, and in most businesses it's necessary for people to believe with all their hearts before they'll invest money and time in a project. But how do you see something that doesn't yet exist? Or, in a different type of business, how do you create a believable illusion of something that never will or could exist? Answer: render.

On the computer, rendering is the process of adding color, texture, the illusion of transparency or reflectivity, and other visual effects to 3-D models. Some people prefer to use computer rendering instead of traditional methods because they want a high-tech look. Others use it because of the efficiencies they can realize. For example, computer rendering has a lot to offer animators, who create many views of the same subject, or product designers, who must create many treatments of the same view.

Three-dimensional modeling software with shading capabilities of various types has been around on the Mac for some time, but falling memory prices, faster Macs, and the advent of 32-bit color have only recently created an environment where true 3-D rendering is practical. In response, a number of companies have joined Visual Information—longtime maker of RayTrace Dimensions, until recently the only Mac rendering program—in this field. Now images produced by Mac software from Strata, MacroMind, Electric Image, Byte by Byte, and Pixar are beginning to show up everywhere from Disney Studios to the offices of Ford, ABC, and BBD&O.
Selections from the Library

These objects were ray traced in StrataVision and then mapped with textures from some of Strata’s attribute libraries. Rainbow onyx comes from the Decorative Stone collection, while the oak texture comes from Wood Grain; the other two are from unreleased collections. Strata “attributes” are more than just PICT files; each includes gloss information and a bump map.

Private Eye

Robyn Miller modeled and rendered this scene in StrataVision using the program’s mapping and ray-tracing abilities. He produced the lowered lighting effect by applying a Louver-shaped map to his main light source.

GET REALISTIC

All rendering software shares the goal of being able to add realistic visual effects to 3-D models, but different programs approach this pursuit in very different ways. To understand the distinctions among Macintosh rendering packages, you will find it helpful first to get a grasp of the basics of 3-D imaging.

The Model

The illusions created by rendering software are, for the most part, only skin-deep; the skeleton—the structure—is provided by the 3-D model. Computer modeling is the process of defining a graphic object in three-dimensional space (x, y, and z coordinates). When choosing a modeling program or method, it’s important to select one that is appropriate to the type of object you’ll be creating and to the rendering technique you intend to use.

There are three basic types of surface modelers. The simplest modeler creates wire-frame objects (not to be confused with wire-frame representation—any type of object can be viewed as a wire frame). Wire-frame models are the type produced by many CAD programs. They look like neon sculptures and are composed solely of intersecting lines. Each line is a separate object; they do not form surfaces that can be colored or shaded. Some programs, such as Dimensions Presenter, can translate wire-frame data into surface data appropriate for rendering. This is not, however, a trivial problem, and the results are unreliable. The translation process can be very time-consuming, and complex models may not translate accurately.

A more complex type of model is made of flat polygons—small two-dimensional surfaces made of three or more straight lines, or edges. You can stretch and distort objects built out of these surfaces by moving control points, much like sculpting with a wire net. The facets of a polygonal model can be interpolated in rendering for a smooth appearance. Polygonal models describe curves better that wire frames and lend themselves to a wide range of surface and lighting treatments. This is the type of object most Macintosh 3-D programs produce.

The most sophisticated modelers are known as parametric, or simply curved-surface, modelers. In these, the polygonal net becomes a mesh, known as a patch, with even more control points—four or more connected lines for each surface. The lines that form the edges of a patch are controlled by splines, which means that the surface of each patch can be curved.

It follows that curved-surface modelers are the best at defining objects with complex curves. They can do this more efficiently than polygonal modelers, since it might take a polygonal modeler 50 or even 100 facets to reproduce the contours of one patch. On the other hand, curved-surface models are more computationally intensive, and the software used to create them is generally more complex to work with. Only a few Macintosh programs—such as Design Dimensions, Microstation Mac, and MacBravo Modeler—can produce parametric models. In general, this type of model is used only when extremely high quality or absolute accuracy is required, as in high-priced advertising or simulation.

Remember that all of these modeling techniques produce only shells, not solid objects. If you were to cut any surface model in half, the software would not know how to treat the new edge or the interior space. Solid modelers are a separate type of 3-D software (see “Beneath the Surface: The World of Solid Modeling,” Macworld, March 1990). Of the renderers in this article, only Pixar’s as-yet-unreleased RenderMan engine is designed to handle solid models.

Scene Description

Once you’ve defined the 3-D objects that will be rendered, the next step is to organize them to describe a scene. This involves placing lights to illuminate the objects’ surfaces and determining the view by choosing a camera position and lens type.

The camera in rendering is designed to mimic a real-world camera, with a lens through which light rays converge at a focal point and focus onto an image plane. The rendering programs let you change the field of view by either imitating different cine lenses (as in ElectricImage Animation System) or changing the view by degrees (as in Dimensions Presenter).
Rendering Face-off

To compare rendering software, Macworld sent copies of the same DXF model to five companies. The model was based on an actual Chinese mask, which we sent to Cyberware Laboratories of Monterey, California, where it was scanned using a Cyberware Rapid 3-D Digitizer. The mask stand was also scanned, and saved as a 3-D file.

Along with the two DXF files, participating artists received a rough pencil drawing showing the mask's traditional colors and pattern, and a sketch showing how we wanted the scene framed and the desired placement—on a shelf in front of a mirror. The artists were given the option of re-creating the mask pattern or coming up with a surface treatment of their own.

The first image appears at the beginning of this article. (Page 136, bottom). Software: SystemSoft's soon-to-be-released modeller and renderer (see "Came Attraction"). Techniques: Koji Sonoda used a random-pattern generator to produce the wall texture and marble; he then ray traced the scene on a distributed network that ranged between five and nine Macs. The mask pattern is a wrapped PixelPaint file. (A) Software: Sculpt 3D. Techniques: Steve Speer ray traced the entire image after using Sculpt 3D's modeller to encode the mask pattern directly onto the DXF model. (B) Software: Dimensions Presenter. Techniques: Karl Mochel used computed patterns for the shell and stand. He painted the mask pattern in Studio/8 and then wrapped the pattern onto the model. The scene was then ray traced. (C) Software: MacroMind Three-D. Techniques: Ray Santiago rendered the basic highlights and shadows using Phong shading. A reflection map combined with specular highlights produced the metallic effect. The wood is a scanned texture map. (D) Software: ElectricImage. Techniques: Jay Roth used texture mapping to produce all the effects. The wood in the shelf and holder are stock files from Studio/8. Roth painted the mask pattern in Photoshop. For a closer look at two of these images, see Art Beat, in this issue.

By and large you can position the camera anywhere in the scene.

The light sources in 3-D and rendering packages also mimic actual lighting possibilities. The three most common lighting types are ambient, directional, and radial. Ambient light is nondirectional, distributing light uniformly like sunlight on an overcast day. Directional light sources mimic the effect of spotlights, with their cone-shaped spread, or direct sunlight, which has a distinct, parallel look. Radial lights illuminate from one spot but not in a specific direction, like a light bulb.

The color of objects is often determined not by painting but by assigning combinations of colored lights. Most programs offer the option to set multiple colored lights that can be positioned relative to your objects.

Rendering

Scene description sets the stage for the next step, which is rendering. Unlike traditional drawing, where all steps along the path toward producing a realistic representation are referred to collectively as rendering, in computer graphics rendering is the process of converting the numeric description of a scene into the individual color values of the display surface.
Broadly speaking, there are three main rendering techniques: ray tracing, shading, and texture mapping (see “Marching toward Realism”). Computer artists and designers often use these methods in combination to create a desired look in the most economical way.

Ray Tracing Ray tracing is an exhaustive, automatic process for capturing shadows, highlights, and reflections. For every pixel on the screen, a single imaginary ray of light is projected from the center of the camera into the scene and back. The software calculates the effects of all light sources as they interact with surfaces. These calculations take into account user-determined settings for reflectivity, refraction, and transparency.

Shading Flat shading, Gouraud shading, and Phong shading are familiar terms in 3-D graphic production. All rendering programs and many CAD and modeling programs offer these techniques. Like ray tracing, these shading methods are all illumination models; unlike ray tracing, they describe only the relationship between the surface shape of an object and the color and direction of its lighting. Thus, for example, objects rendered using these techniques have shading, but cast no shadows. Nor do shading techniques take surface characteristics into account.

Different shading methods will produce different effects. With flat shading, each facet of an object has the same color at all points. Abrupt color changes often occur at the edge between one surface and another.

Phong shading interpolates the flat polygons so that edges are smoothed and shades progress from light to dark without shifts. When an object’s surface has no abrupt shifts in contour, like a ball, Phong shading produces good results. But if the structure changes radically at an edge, a Phong shader may smooth the transition inappropriately.

Gouraud shading produces an effect that combines characteristics of flat and Phong shading. The edges of facets remain distinct, but the facets themselves are shaded smoothly from edge to edge.

Mapping Along with ray tracing and/ or shading, all the rendering programs covered in this article provide some option for texture mapping. In mapping, a 2-D PICT or other graphics file representing a desired texture, pattern, material, or other attribute is mathematically applied to an object. Programs that map generally offer three basic options (though the terminology may vary). Flat mapping is like putting a decal on a surface; this technique is used only for objects with relatively little curvature. The second type, often simply called wrapping, is like covering the object in saran wrap. No attempt is made to correct for distortion. In the third type, the program controls distortion by mapping to a predefined geometric model. Typically, the designer must tell the program that the object in question is most like a sphere, cylinder, or other basic shape (see “Selections from the Library”).

By using different types of mapping, you can simulate most of the visual attributes of a ray-traced image. For example, reflection maps—as the name suggests—can create the illusion of reflectivity. To make a reflection map, you begin by taking a snapshot, as it were, of the scene surrounding the object to which you want to add a reflection. You then map the snapshot onto the reflective object. By setting the transparency of the reflection map, you can determine the degree of reflectivity for the object. Cubic, or environmental, mapping is a more convincing method of reflection mapping in which the program makes six separate views of the scene surrounding a reflective object. This unfolded cube view is then automatically mapped over the object’s surface (see “From the Inside Looking Out”).

Even though creating an environmental map requires some effort, it’s still less time-consuming than ray tracing a scene, because you have the creative control of placing reflections only where you want them, adding only those needed to produce the desired level of realism.

Artists use another common type of texture map—bump maps—to create the illusion of relief. A bump map
is simply a PICT or other 2-D graphic file in which the highlights and shadows have been offset to give a 3-D, textural effect. Most surface-treatment type-rendering programs include facilities for creating bump maps. Mapping programs also have facilities that enable you to produce the illusions of shadows and glows, among other effects.

The non-ray-traced techniques just described all come under the rubric of surface simulation or surface treatments. A final form of surface simulation is exclusive to the RenderMan format, developed by Pixar.

**RenderMan**

One problem producers of 3-D graphics have had to contend with until now is that while formats exist for transporting 3-D geometry, there has been no common file format for scene description. Each modeling or rendering package has had its own way to specify lighting, camera position, and materials. This bars you, for example, from using a package on a PC to describe a scene and then porting it to a workstation for rendering.

By the time this article is published, however, many modeling and rendering packages will offer support for a standard created by Pixar, the former computer arm of Lucasfilm, now partly owned by Steve Jobs. The RenderMan standard uses the surfacetreatment techniques just described as well as some unique methods to provide for very high quality, photo-realistic rendering.

The Pixar system works like this: You create a model and describe the scene using a RenderMan-compatible package, setting calls as you go along for different types of lighting and materials with different textures or degrees of reflectivity. You then save the scene as a RIB (RenderMan Interface Bytestream) file, and export it either to a RenderMan application running on your Mac or to a device, such as a film printer, with a RenderMan interpreter built into it. The RenderMan interpreter processes the calls in the RIB file and renders the scene either to your screen or to output media.

All surface treatments and lighting effects require the presence of something Pixar calls shaders. In essence,
shaders are programs that describe the appearance of surfaces. Often the code for a shader actually contains information about the visual qualities of a given material. A redwood shader, for example, does not have a PICT file of redwood in it. Instead, it includes information about the textural, reflective, and tonal qualities of redwood. In RenderMan, just about any effect you may want is handled by a shader. In addition to simulating various materials, shaders might create atmospheric effects, environment maps, or even, in a somewhat twisted example, a wire-frame representation. Shaders also have the unique ability to actually displace geometry, moving polygons on the surface of an object to represent a desired texture, such as a screw thread.

RenderMan handles all models including wire-frame, polygonal, and parametric. At this writing most makers of Mac rendering software and many makers of modeling and CAD programs have announced support for the RenderMan standard. As yet, however, there is no commercially available RenderMan rendering engine. Pixar has announced that it will market a renderer, MacRenderMan, for $795. This bare-bones rendering engine, which offers no scene-description or modeling abilities, had a scheduled release date of May 1. Pixar also plans to market the RenderMan engine through third-party software companies, who may or may not enhance the interface with scene-description and other features. According to Pixar, the initial releases of the engine will ship with 9 to 12 shaders; the exact number and mix will depend on the provider. Pixar envisions that soon shaders will be like fonts, with users buying additional visual effects either from Pixar or third parties and plugging them into their systems.

Whichever rendering approach you take, you should try to previsualize the steps, thinking of what you want your final display to look like.

Software
So much for theory—what about products? By the time this article comes out, there should be five full-featured, general-purpose rendering programs on the market. They range in price from $495 to $7495, and their capabilities are just as varied.

ElectricImage Animation System
At the top of the price range is ElectricImage. I looked at a beta version for this article, but the company promised release before the end of spring. ElectricImage does not create models. Instead the program imports the greatest number of formats of all the programs under review. Object files are easily transported and converted to ElectricImage's FACT file format. The package is optimized for four-sided polygons and can translate simpler objects or surface-patch data into the FACT format (parametric surfaces are converted to polygonal objects without loss of complexity).

Designed with film and video applications in mind, ElectricImage can emulate any lens in the American Cinematographers Manual—including VistaVision, a format usually used for feature special-effects productions. The programs come with registration overlays to facilitate use with video and film.

ElectricImage does not do ray tracing, instead relying on reflection maps, standard shading, and manipulations of texture maps and other surface treatments. You can use interrelated sliders to control all color channels in addition to hue, saturation, and brightness. This, plus the ability to control opacity, transparency, and luminance in the Alpha channel and full 32-bit depth, allow for extensive control over the appearance of objects and the composition of scenes.

Although ElectricImage is expensive, it will be worth the investment for those of us who want to go out to videotape with film effects templates and video-compatible graphics.

Dimensions Presenter and RayTrace Dimensions VIDI packages its rendering capabilities in two packages. RayTrace Dimensions does just what it sounds like. Dimensions Presenter is for scene description, texture mapping, and animation. A planned upgrade of Presenter, 3-D...
**RENDERING ROUNDP**

<table>
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*Price: $1995 with Kanda Software's CAD Mover file-conversion utility.

Producer, includes smooth shading and the ability to save files in the RIB format as well as stronger animation features. Presenter reads a variety of 2-D and 3-D data files and allows you to convert some 2-D PICT files, such as those from MacDraft, into 3-D by embedding programming statements with the files. You can also create objects using the included MacDraft-like drawing program and lathing or extruding polygonal objects.

By offering separate smooth shading and ray-trace modules, VIDI is competing with Strata in the market for product design and engineering graphics. **StrataVision 3d**

StrataVision 3d is a mixed ray-tracing and surface-treatment renderer that also includes reasonably competent modeling capabilities. Version 2.0, slated for release sometime this spring, will have even better modeling abilities. Because everything is in one module, StrataVision makes it easy to mix standard techniques as called for. Its main strength is as a 3-D visualization tool that enables you to compose using elements from different origins. One nice feature is the ability to import text or PICT files and autotrace them as a first step toward converting them to 3-D objects.

To complement its renderer, Strata sells attribute libraries of PICT...
Chrome Dome
Michael Gold modeled this head in Design Dimensions using parametric bicubic patches. He used RayTrace Dimensions and Dimensions Presenter to ray trace, smooth shade, and antialias the scene.

Getting Realistic
gets powerful modeling and rendering program in Japan but, as this goes to press, has yet to find an American distributor. The package includes high-of-field calculations and the ability to perform depth-of-field calculations and to render on a distributed end features such as the ability to perform depth-a

Rendering Judgment
It's been part of the promise of the Macintosh as a graphics workstation that it would make high-end rendered 3-D scenes affordable for presentations or Mac-based multimedia. With the products just discussed, it looks like this capability has arrived, more or less.

Still, Macintosh users shouldn't expect to create the sort of 3-D rendered animations being done at places like Pacific Data Images or Pixar. The Mac 3-D modeling and rendering software does not have the powerful automatic animation functions applied in the entertainment industry, nor does the hardware have the power of specialized workstations.

If you do decide to buy into Macintosh rendering, go for as much hardware power as you can afford. You should definitely be working on at least a Mac II with an 80-megabyte hard disk minimum and 4 to 8 megabytes of RAM. And although an 8-bit video board is acceptable for working on and viewing rendered images, a 32-bit board (with 16 million colors) makes more sense. After all, since these programs are expensive and the process is time-consuming, you may as well have the best Mac display available to enjoy the amazing images you’ll be able to produce.

See Where to Buy for contact information.

Stuart Cudlitz is an artist and filmmaker who has designed computer graphics and special visual effects for feature films, broadcast television, and interdisciplinary fine arts.
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Midrange
Hard Disks

MACWORLD LABS TESTS 46 HARD DISKS IN THE 80MB-TO-150MB RANGE TO MAKE SURE YOU GET THE BEST-QUALITY BYTES FOR YOUR BUCKS

BY CHERYL E. SPENCER

ince we last reviewed hard disks under 300MB in capacity ("Turning 40," September 1989), drive makers have brought out several new products and revamped some older ones. One new class of hard disks has emerged—
pocket-size portables that take their power directly from the Mac. Still, the buying criteria haven’t changed: look for price, performance, service options, case design, and software.

Because drive technology and the recipe for producing a winning unit have remained so constant, vendors have had a chance to correct many deficiencies criticized in earlier products. GCC and Rodime, for instance, have completely reworked their older lines. In September, both of these companies sold hard disks that were slow performers with uninspiring cases, manuals, and software. Now GCC’s UltraDrive and Rodime’s Cobra are among the fastest performers; they sport new, sleek cases; and they include solid software and improved manuals.

Not every vendor has been so responsive. Drives from MacProducts and Relax still can’t duplicate folders reliably, and their case design has yet to be given a more modern, streamlined appearance. CMS has kept up the appearance of its Platinum line, but the company still doesn’t include any software—not even a copy of Apple’s marginally useful HD Backup.

Although the midrange market is crowded—Macworld Labs tested over two score hard disks for this article—in the end we were able to divide the offerings into three simple categories: those we like best, those that are good (but not especially so), and those we don’t recommend. The ones we like best contain a well-rounded set of features or are outstanding in a certain area (say, speed or support). The runners-up are products we would have no qualms about purchasing; if found at a bargain price or with good dealer support, they could be top picks. As for those we don’t recommend—a group that includes the portable units—well, let’s just say we found no reason to purchase them over the other choices.

The Winners
Deltaic, FWB, GCC, La Cie, Maxcess, MicroNet, Microtech, Rodime, Ruby, Storage Dimensions, SuperMac

The drives we like best include most of the fastest performers (see "Hard Disk Speed Tests"). But speed isn’t everything. For instance, hard disks from Maxcess, MicroNet, and SuperMac were average performers, but still made it into our top-picks list due to good software and good customer reports on service and reliability.

Based on an informal poll (letters Macworld has received and conversations on various Mac bulletin boards), hard disks from MicroNet and Storage Dimensions get high marks for reliability. Similarly, these companies offer good service (see "Hard Disks Compared"). Other service stars include La
Pictured are the Redline Cobra, Microtech Nova, GCC UltraDrive, Maxcess E-Series, and La Cie Cirres.
MIDRANGE HARD DISKS

SuperMac's DataFrame, Micro Net's Micro/Stack, and Doltoic's Server 100H and Microtech, with their five-year warranties, toll-free support, and guaranteed turnaround times for repairs, 72 and 48 hours, respectively.

All of our favorite hard disks include good formatting and diagnostic software, but a few products include even more. Any backup software other than Apple's HD Backup is a plus—Rodime's Cobra comes with Fastback, Microtech's Nova has DS Backup, and SuperMac's DataFrame includes DiskFit. Maxcess's hard disks include no backup software, but they do include CE Software's QuickKeys Lite (a macro program that, unlike the standard version of QuickKeys, limits you to 14 keystrokes), DiskTop (a useful file-management program), and MockPackage (a group of utilities such as a text editor and background printer). These excellent products are worth buying on their own. La Cie's Cirrus drives include hard disk-management software and SilverServer, an application that lets you share hard disks and modems over an AppleTalk network.

Case design also played a part in our decision. GCC's UltraDrive is sleek with rounded edges and classy lines, and it fits perfectly under a Macintosh SE. PWB's PocketHammer, La Cie's Cirrus, and Maxcess's V-Series are small, lightweight units that are easy to carry. You can purchase a carrying case for the PocketHammer; the Cirrus and V-Series come with one. You can also buy the La Cie and Maxcess hard disks in a case that fits underneath a Macintosh SE. Storage Dimensions' MacinStor and MicroNet's Micro/Stack have cases that are a bit larger and bulkier than the others.

It is hard to pick a price-for-performance leader since retail prices don't always reflect what you actually pay for a hard disk. If the vendor sells direct, then the price listed is what you will pay, barring a special promotion or a group discount. You may pay much less than the listed price if the vendor sells through a dealer only.

Although we can't objectively name a best buy we do have favorites. We found GCC's UltraDrive, La Cie's Cirrus, Maxcess's E-Series and V-Series, Microtech's Nova, and Rodime's Cobra to be the most appealing. The UltraDrive is the most slickly packaged and includes the best manual. La Cie and Microtech come out on top in service and support; La Cie and Maxcess offer the best software. Rodime's Cobra was a clear winner thanks to good speed, on-screen LEDs, and a nice case that includes two extra power outlets. But be forewarned that this unit makes a whirring sound when in use—several of us at Macworld liked to hear the drive working, but some users may prefer a quieter unit such as the Cirrus or Liberty 100 (see "A Little Quieter Please").

The Best of the Rest


Products in this category had nothing particularly wrong with them nor were they particularly impressive. Notice that Apple's Hard Disk 80SC is in this category. This disk provides reasonable speed, good manuals, and—if you opt for the external version—a perfect aesthetic match with a Macintosh SE. What you won't get is a cut-rate price.

PLI's PL100 Turbo isn't very fast, and the installation manuals are worthless, but it offers a nice set of custom software—a spooler, a disk optimizer, and a disk-cache utility which, with enough tweaking, can speed up the unit some 5 percent. Hard disks from Dolphin, IDS, and Mirror are faster but they don't offer much in the way of software (Dolphin's Integra includes partitioning software, and the IDS Prologue includes a varied assortment of shareware, but these are slim pickings compared to, say, the CE Software programs bundled with the Maxcess drives). Likewise, Hard Drives International's Power Drive doesn't have much to distinguish it from the crowd, except for an extremely low price. Still, the drive is solidly constructed and worked well during our tests.

The two hardest calls in this category were EMAC's Impact and the Liberty drive. Both are fast, small, and lightweight. You can even purchase a carrying case for the Liberty for an extra $29. Unfortunately, neither product has anything special to recommend it over La Cie's Cirrus,
### Hard Disk Speed Tests (IIcx)

#### Overall fastest

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<tr>
<td>GCS UltraDrive S 80 (Q)</td>
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<tr>
<td>Apple Hard Disk 90SC (Q)</td>
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<td>La Cio Ninja 80 (Q)</td>
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<tr>
<td>SuperMac DataFrame XP 100 (Q)</td>
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<tr>
<td>Ruby Systems Duvant 80 (Q)</td>
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<tr>
<td>Delphi Integra 80 (Q)</td>
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<tr>
<td>Storage Dimensions MacinStor ZFP 80 (Q)</td>
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<tr>
<td>FBW Pocket-Hammer 80 (Q)</td>
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<tr>
<td>Advanced Gravis HardPac 105 (Q)</td>
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<tr>
<td>Ruby Systems StarDrive 80 (Q)</td>
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<td>IDS Prologue 80 (Q)</td>
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<tr>
<td>Hard Drives Int'l PowerDrive 105 (Q)</td>
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<td>Liberty 105 (Q)</td>
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<tr>
<td>Tailgrass TravelPac 80 (Q)</td>
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<tr>
<td>EMAC Impact 80 (Q)</td>
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<tr>
<td>MicroTech Nova 105 (Q)</td>
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<tr>
<td>MacProducts Magic 105 (Q)</td>
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<tr>
<td>Delphi Porta 100 (C)²</td>
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<td>MaxxeSS E-Series 105 (Q)</td>
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<td>Relax Hard Plus 100 (C)</td>
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<tr>
<td>MacProducts Magic 100 128 (CDC)²</td>
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<tr>
<td>MicroNet Micro/Portable 100 (C)²</td>
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<tr>
<td>CMS Platinum 100 (C)</td>
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<tr>
<td>MacProducts Magic 80 (Q)</td>
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<td>IDS Prologue 105 (Q)</td>
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<td>PLL 100 Turbo (C)</td>
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<td>Eman Hard Drive 135 (F)</td>
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<td>Jasmine DirectDrive 130 (F)</td>
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<tr>
<td>Procom MD 100 (C)</td>
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<td>MicroNet Micro/Stack 105 (CDC)</td>
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<td>Relax Hard Plus 150 (CDC)</td>
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<td>CMS Platinum 150 (CDC)</td>
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<td>Toshiba America MacKit 140 (T)</td>
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<td>Procom MD 150 (M)</td>
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<tr>
<td>Heart Data 80 (Q)</td>
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<tr>
<td>Relax Hard Plus 80 (S)</td>
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<td>Jasmine DirectDrive 80 (Y)</td>
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<td>Procom MD 80 (V)</td>
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<tr>
<td>Eman Hard Drive 80 (S)</td>
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</tr>
</tbody>
</table>

#### Faster

**Note:** Faster drives are listed in order of overall fastest to overall slowest drive, based on their cumulative speed scores. Note that drives that use the Quantum mechanism generally fared best, although the top three drives—the Deltaic Server 100H, the Microtech Nova 150, and the Rodine Coda 100c—used CDC, Micros, and Rodine mechanisms respectively. The color coding provides an easy way to see which drives perform fastest (red) or slowest (gray) in any given test. (continued on page 151)
### MIDRANGE HARD DISKS

#### CUSTOMER SUPPORT

<table>
<thead>
<tr>
<th>Company</th>
<th>Warranty</th>
<th>Extended Warranty</th>
<th>Toll-free Telephone Support</th>
<th>Guaranteed Turnaround Time</th>
<th>Data Recovery on Request</th>
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<td>Apple Computer</td>
<td>1 year</td>
<td></td>
<td></td>
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<tr>
<td>Advanced Gravis</td>
<td>1 year</td>
<td></td>
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<tr>
<td>BSM</td>
<td>1 year</td>
<td></td>
<td></td>
<td></td>
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<td>1 year</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>Crate Technology</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deltex Systems</td>
<td>1 year</td>
<td></td>
<td></td>
<td></td>
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</tr>
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<td>Dolphin Systems</td>
<td>2 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ehman</td>
<td>1-2 years</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Eventex Systems</td>
<td>1 year</td>
<td></td>
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</tr>
<tr>
<td>FWB</td>
<td>1 year</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GCC Technologies</td>
<td>2 years</td>
<td></td>
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</tr>
<tr>
<td>Hard Drives Ltd</td>
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<td>Heart Data Corp.</td>
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<tr>
<td>IDS Systems</td>
<td>3-5 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jasmine Technologies</td>
<td>2 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>La Cie</td>
<td>5 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liberty Systems</td>
<td>1-2 years</td>
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<tr>
<td>MacProducts USA</td>
<td>1-2 years</td>
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<td></td>
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</tr>
<tr>
<td>Maxcess</td>
<td>2 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>MicroNet Technology</td>
<td>1 year</td>
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<td></td>
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<td>Microworx International</td>
<td>5 years</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Mirror Technologies</td>
<td>2 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCPC</td>
<td>2 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PLI</td>
<td>1 year</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>ProCom Technology</td>
<td>1 year</td>
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<tr>
<td>Relax Technology</td>
<td>1 year</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rodina</td>
<td>1 year</td>
<td></td>
<td></td>
<td></td>
<td>72 hours</td>
</tr>
<tr>
<td>Ruby Systems</td>
<td>1 year</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Storage Dimensions</td>
<td>1 year</td>
<td></td>
<td></td>
<td></td>
<td>48 hours</td>
</tr>
<tr>
<td>SuperMac Technology</td>
<td>1 year</td>
<td></td>
<td></td>
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<tr>
<td>Tatigrass Technologies</td>
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<td></td>
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</tr>
<tr>
<td>Toshiba America</td>
<td>1 year</td>
<td></td>
<td></td>
<td></td>
<td>30 days</td>
</tr>
<tr>
<td>Westcom</td>
<td>2 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 Up to the dealer.
2 Depending on which mechanism you buy.
3 For a fee.
4 Overnight replacement service for a small charge per year.
5 At press time, Jasmine had filed for Chapter 11 bankruptcy and was not shipping drives.

The service a company provides can be a make-or-break factor for users who are deciding which drive to buy. Even Apple has made concessions to customer support by upping its warranties to one year. If your drive goes bad, some companies guarantee that you will receive a replacement drive within a certain amount of time. Others offer a guaranteed turnaround time only to their dealers, who in turn can pass the guarantee on to the customer. Some companies will even try to save the data on a crashed hard disk if you ask—dealers can't do this easily since many data rescue attempts require that the disk be disassembled in a sterile room. One company, Mirror Technologies, offers a hard disk repair and data recovery service for a wide variety of hard disks. Prices for the service vary according to the size and type of disk.

---

**The Losers**

BSM, CMS, Crate, Ehman, Heart, Jasmine, MacProducts, Relax, Toshiba, Westcom.

Ehman's drives are one of the lowest priced, and I've used a 40MB unit for about three months with no trouble. Yet, one of the review units that Macworld Labs received had a SCSI connector that didn't fit properly with the cable and jammed when we plugged it in (I gave up disconnecting them). In addition, one of the three review units was missing the MacTree Plus software.

Ehman's formatting software is also poorly designed and gave us no end of trouble. Any hard disk attached to a Macintosh II should be set at a 1:1 interleave ratio to ensure maximum performance. The Ehman 80MB drive, however, performed extraordinarily slowly on write operations (such as saving or duplicating a file) when run on a Macintosh II at 1:1 ratio. For instance, it took the 80MB drive 36 seconds to save a PageMaker file at a 1:1 ratio and 4.5 minutes to duplicate a 10MB folder. By reformattin the drive to a 2:1 ratio (the standard for a Macintosh SE) we were able to improve the write times—the same PageMaker save took 19 seconds and the folder-duplication time was cut in half. Still, the Ehman 80 was one of the slowest performers.

The other two drives that Ehman sent us—a 100MB Quantum-based drive and a 130MB Fujitsu-based drive—were not obviously slow on write operations at a 1:1 interleave on a Macintosh II.
# Hard Disk Speed Tests (SE)

## Overall Fastest

<table>
<thead>
<tr>
<th>Drive</th>
<th>Fastest in test</th>
<th>Slowest in tested</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deltaic Server 100H (CDC)</td>
<td>113.6</td>
<td>18.8</td>
</tr>
<tr>
<td>Hard Drives In7 PowerDrive 105 (I)</td>
<td>116.8</td>
<td>19.9</td>
</tr>
<tr>
<td>GCC UltraDrive S 105 (Q)</td>
<td>116.8</td>
<td>19.9</td>
</tr>
<tr>
<td>Ruby Systems Dwarf 105 (Q)</td>
<td>116.8</td>
<td>19.9</td>
</tr>
<tr>
<td>Storage Dimensions MacinSter ZFP 105 (Q)</td>
<td>116.8</td>
<td>19.9</td>
</tr>
<tr>
<td>EMAC Impact 80 (Q)</td>
<td>116.8</td>
<td>19.9</td>
</tr>
<tr>
<td>Maccess E-Series 105 (Q)</td>
<td>123.0</td>
<td>19.5</td>
</tr>
<tr>
<td>La Cie Cirrus 105 (Q)</td>
<td>123.0</td>
<td>19.5</td>
</tr>
<tr>
<td>Jasmine DirectDrive 105 (Q)</td>
<td>124.3</td>
<td>20.9</td>
</tr>
<tr>
<td>Microtech Nova 150 (M)</td>
<td>124.3</td>
<td>20.9</td>
</tr>
<tr>
<td>Apple Hard Disk 80SC (Q)</td>
<td>124.3</td>
<td>20.9</td>
</tr>
<tr>
<td>Ruby Systems StarDrive 80 (Q)</td>
<td>124.3</td>
<td>20.9</td>
</tr>
<tr>
<td>Tallgrass Travelpac 80 (Q)</td>
<td>124.3</td>
<td>20.9</td>
</tr>
<tr>
<td>Dolphin Integra 80 (Q)</td>
<td>124.3</td>
<td>20.9</td>
</tr>
<tr>
<td>SuperMac Dataframe XP 100 (Q)</td>
<td>124.3</td>
<td>20.9</td>
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<td>Mirror MP 80 (Q)</td>
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<tr>
<td>Liberty 1050 (Q)</td>
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<td>20.9</td>
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<tr>
<td>PCPC MacBottom 94 (Q)</td>
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<td>Advanced Gravis HardPac 105 (Q)</td>
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<td>20.9</td>
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<tr>
<td>FWB PocketHammer 80 (Q)</td>
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<td>20.9</td>
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<tr>
<td>MacProducts Magic 80 (Q)</td>
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<tr>
<td>Microtech Nova 80 (Q)</td>
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<td>iOS Prologue 80 (Q)</td>
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<td>20.9</td>
</tr>
<tr>
<td>MicroNet Micro/Portable 100 (C)</td>
<td>124.3</td>
<td>20.9</td>
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<td>Dolphin Porta 100 (C)</td>
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<td>Redima Cobra 100E (R)</td>
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<td>MacProducts Magic 100 126 (CDC)</td>
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<td>PLI PL100 Turbo (C)</td>
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<td>iOS Prologue 105 (C)</td>
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<td>20.9</td>
</tr>
<tr>
<td>Jasmine DirectDrive 130 (F)</td>
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<td>Relax Hard Plus 100 (C)</td>
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<td>MicroNet Micro/Stack 105 (CDC)</td>
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<td>20.9</td>
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<td>Toshiba America MacKit 140 (T)</td>
<td>124.3</td>
<td>20.9</td>
</tr>
<tr>
<td>Heart Data 80 (Q)</td>
<td>124.3</td>
<td>20.9</td>
</tr>
<tr>
<td>CMS Platinum 150 (CDC)</td>
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<td>Relax Hard Plus 150 (CDC)</td>
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<td>20.9</td>
</tr>
<tr>
<td>Emman Drive 100 (C)</td>
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<td>20.9</td>
</tr>
<tr>
<td>Emman Hard Drive 135 (Y)</td>
<td>124.3</td>
<td>20.9</td>
</tr>
<tr>
<td>Jasmine DirectDrive 200 (F)</td>
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<td>20.9</td>
</tr>
<tr>
<td>BSM MacCider 105 (T)</td>
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<td>20.9</td>
</tr>
<tr>
<td>Relax Hard Plus 80 (S)</td>
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<td>20.9</td>
</tr>
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<td>Crate MacCrater 105 (T)</td>
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<td>Procom MD 100 (C)</td>
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<td>20.9</td>
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<td>Procom MD 150 (M)</td>
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</tr>
<tr>
<td>Emman Hard Drive 80 (S)</td>
<td>124.3</td>
<td>20.9</td>
</tr>
</tbody>
</table>

## The color-coded groupings were determined by first indexing the actual results and then dividing the indexed numbers into five groups.

- **Fastest in test:** The first four groups include drives that decrease in speed by 10 percent—the fifth group includes drives that are 50 percent or more slower than the drives in the first group.
- **Slowest in tested:** The absolute fastest drive in each test is indicated with a yellow rectangle while the absolute slowest is indicated with a black rectangle.

- **C** = Connor
- **CDC** = CDC
- **CI** = C. Itoh
- **F** = Fujitsu
- **M** = Micropolis
- **Q** = Quantum
- **A** = Rodine
- **S** = Seagate
- **SI** = Seagate (formerly Imprimis)
- **T** = Toshiba
- **Y** = YE Data

1 Dwarf 80 is the name of the portable version of the StarDrive.
2 Micro/Portable 100 is the name of the portable version of the MicroStack.
3 Porta 100 is the name of the portable version of the Integra.
4 Magic 100/126 is the name of the portable version of the Magic.
## MIDRANGE HARD DISKS

### HARD DISKS COMPARED

<table>
<thead>
<tr>
<th>Company</th>
<th>Product</th>
<th>Capacity/Mechanism/Price</th>
<th>Internal Version</th>
<th>Sold Direct or through Dealers</th>
<th>Portable Version Available</th>
<th>Dimensions (L x W x D, in Inches)</th>
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</thead>
<tbody>
<tr>
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<td>Apple Hard Disk 80SC</td>
<td>80MB/Q/$1799</td>
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<td>dealers</td>
<td>no</td>
<td>3.1 x 9.7 x 10.5</td>
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<tr>
<td>Advanced Gravis</td>
<td>HardPac</td>
<td>80MB/Q/$1595; 105MB/Q/$1795</td>
<td>no</td>
<td>dealers</td>
<td>yes2</td>
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<td>MacCior</td>
<td>80MB/Q/$885; 105MB/Q/$1281</td>
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<td>dealers</td>
<td>yes</td>
<td>3.1 x 9.9 x 11</td>
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<tr>
<td>CMS</td>
<td>Platinum series</td>
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<td>MacCrane</td>
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<td>105MB/Q/$1199; 105MB/QDC/$1299</td>
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<td>no</td>
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<td>Integra</td>
<td>80MB/Q/$1392; 100MB/Q/$1346</td>
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<td>dealers</td>
<td>yes</td>
<td>2.4 x 13 x 14.5</td>
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<td>Ehman Hard Drives</td>
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<td>direct</td>
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<td>dealers</td>
<td>no</td>
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1. C = Compaq, CDC = CDC, CI = Check, F = Fujitsu, M = Micropolis, Q = Quantum, R = Rodime, S = Seagate, SI = Seagate (formerly Imprimis), T = Toshiba, Y = YE Data.

2. Portable version only.

3. Sold direct to corporations, schools, government, or in areas where there are no dealers.

4. Drive(s) not received in time for testing.
<table>
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<tr>
<th>Case Material</th>
<th>Type of Termination</th>
<th>Partitioning Software</th>
<th>Backup Software</th>
<th>Password-Protection Software</th>
<th>Other Software</th>
<th>Best Seek Time on Mac IIcx (in Milliseconds)</th>
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A LITTLE QUIETER PLEASE

This spiral graph represents the way loudness is measured. That is, for every 3-decibel increase, loudness doubles. Drives represented by dots closest to the center of the spiral are quietest (about the level of bedroom noise) while those on the outer edges are much noisier (about the level of conversational speech). Not surprisingly, the portable drives (which don’t include a fan) were generally the quietest. Some drives that were tested for speed arrived too late to be tested for noise level.

1Porta 100 is the name of the portable version of the Integra.
2MicroPortable is the name of the portable version of the Micro/Stack.
3Swall 80 is the name of the portable version of the StofDrive.
4Magic 100 126 is the name of the portable version of the Magic.
5Sierra 100 is the name of the portable version of the Hard Plus.

although they still came in near the bottom of our speed tests. As an experiment, I retested the drives at a 2:1 ratio on the Macintosh II, again using the PageMaker save and folder-duplication benchmarks. Surprisingly, the drives performed at exactly the same speed as they had when run at a 1:1 interleave ratio. I then performed the same tests using an updated driver (version 2.2.6) that Ehman claimed would increase the drive’s write speed 3.5 times. No matter what interleave I set, the drives still ran the tests at the exact same speed. Hold off on buying the Ehman drives—any bargain price you find won’t be worth the frustration you’ll have in getting these drives up and running.

We can’t recommend Jasmine’s DirectDrive, in spite of its nice array of software, excellent manuals, and sleek case. For the last several months, we’ve heard complaints from numerous customers about Jasmine’s inability to service its hard disks and its problems in fulfilling new orders. Support lines are always busy and calls aren’t being returned. Then, just as this article went to press, Jasmine filed for protection under Chapter 11 of the bankruptcy laws. Although the company claims it will honor all outstanding service claims and orders, it cannot do so until it receives more financing (see MacBulletin, May 1990). Order from Jasmine at your own risk.

The other hard disks to avoid are slow performers with little software and unhelpful manuals. Toshiba’s MacKit doesn’t even come with a hardware-installation manual. In all of these drives, formatting software is poorly designed, and in some cases (such as units from Relax and MacProducts) the driver doesn’t work consistently. (Relax—which sells its driver to MacProducts—claims it was unaware of any problems. The company is working to fix the driver.)

We very nearly deleted the Westcom drives from this review. The company moved its headquarters during the review period and didn’t leave a forwarding telephone number. It also was not listed in directory assistance. We only found out about the move when someone from Westcom called to request that we return the company’s hard disks. The whole fiasco seemed close enough to a Twilight Zone event to make me uncomfortable with the company’s ability (and willingness) to provide good customer support.

Portables

Advanced Gravis, Crate, Dolphin, IDS, Liberty, MicroNet, Relax, Ruby, Tallgrass.

The minute you see one of these small, lightweight hard disks you’ll want one. They are cheaper and quieter than standard hard disks from the same company. How did the vendors
achieve these advantages? Simply by removing the power supply. Instead of hooking these units to a power outlet, you attach a cable from the hard disk to the Mac's floppy drive port.

Don't be too hasty in buying one of these portable units, however. We found that these tempting beauties have severe limitations. For instance, they won't run on a Mac II or IIx because those machines don't include a floppy drive port. This alone makes the portables impractical for any application where you need to move megabytes of data between a variety of nonnetworked Macs.

You can buy an external power supply to connect a portable as you would a standard hard disk. But an external power supply defeats the portables' size and weight advantages. Plus, the power supply costs an extra $70 or so. That's equal to what you save on the portable in the first place. Relax's Sierra 100 currently requires an external power supply—this drive can't power off the floppy drive as it is supposed to.

Even an external power supply, however, won't solve the problem these hard disks have in booting from a Macintosh IIfx or IIci with an internal hard disk. When a Mac boots up it starts with the peripheral with the highest SCSI address (6 is the highest, 0 the lowest). Because those Macs are so fast, you would normally turn on an external hard disk before turning on the Mac, thus ensuring that the platters are up to speed when the Mac calls on the drive. But since a portable takes its power from the Mac, you have to turn on both at once. Invariably, the portable's platters are not ready; the Mac passes them and goes to the internal hard disk, which is always set at a SCSI address of zero (0). You then have to restart the Mac to get the portable to mount. Even that scheme couldn't get the Aristotle HardPac and Tallgrass TravelPac to run on a Macintosh IIfx.

The only real advantage these portable hard disks offer are for Macintosh Portable users. Since a portable hard disk doesn't require a power outlet to work, you can use one with a Macintosh Portable while waiting in airports or working outdoors. Only portables from Dolphin and iDS offer a sleep feature that reduces power requirements to a bare trickle whenever the Macintosh Portable is idle for a while. Overall, we see no real reason to buy one of these units over the slightly bigger (but still small) hard disks like the EMAC Impact, FWB PocketHammer, La Cie Cirrus, Liberty 100, or Maxcress V-Series.

**A Bit More to Know**

All of the hard disks we tested used drive mechanisms from one of several vendors—usually Quantum, Seagate, or Connor. You can draw general conclusions about a product's performance once you know which mechanism it uses (Quantum-based units are generally the fastest, for example), but the efficiency of the vendor's software driver also counts. The Quantum mechanisms have a solid reputation for reliability (despite the seek problems these drives had last year) as do the Wren drives from Seagate (these drives are produced by Imprimis, which is now a part of Seagate). More recently, *Macworld* has heard good reports from users and dealers on mechanisms from Connor. Still, you'll want that reputation backed by a vendor who offers good service and support either to you or to your dealer.

Quantum-based hard disks are also a bit more expensive than products from other manufacturers. Some companies sell hard disks with different drive mechanisms at different prices (these are all listed in "Hard Disks Compared"). With these companies you can specify which mechanism you want. Other companies, however, sell hard disks that contain different mechanisms for the same price. These companies don't always know which units they will have in stock when you order, so they frequently cannot comply with requests for particular mechanisms. Buy these hard disks for their support, software, and case design rather than for performance statistics.

Mac hard disk buyers have reason to be pleased. Prices have dropped while quality has risen. Although no unit scores perfectly in every category, some, such as our top-picks, come closer than did hard disks in the past.

See *Where to Buy* for contact information.
Silently and inexorably, data networks are growing every day. Business has for some time seen how much can be accomplished with computer-to-computer communications. Now individuals are realizing that with a Mac, a modem, and the appropriate software, they can take advantage of information services available by telephone.

Whether it's a local bulletin board service (BBS) or a commercial information service you're tapping into, you need a way to channel the information you want into the Mac. That's where telecommunications programs come in. Telecommunications programs both control what goes on between Mac and modem, and act as the intermediary between the Mac and the computer on the other end of the telephone line.

I looked at six of the most popular general-purpose telecom programs—Macknowledge, MicroPhone II, Smartcom II, VersaTerm-Pro, White Knight, and Zterm—to see what each offers. To review the programs, I used my Mac Plus with 2.5 megabytes of RAM and two U.S. Robotics Courier HST Dual Standard 9600-bits-per-second (bps) modems.

Most BBSs and information services communicate using text characters, and all of these programs support such text-based services. Some commercial information services, however, have developed software that lets you access information with the conventional Mac interface instead of text command sequences (see "Picture Perfect").

Getting Connected
The main purpose of communications software is getting you connected. To do that, the software has to be compatible with your modem. The easiest way to ensure compatibility is to make sure that the modem is Hayes-compatible, that is, it understands the Hayes AT command set. The Hayes command set is the standard method for communications programs to control modems. If you have a nonstandard or high-speed modem, or if your phone line goes through a PBX system, compatibility is something you need to pay particular attention to.

(For more information, see "Choosing a 2400-bps Modem," Macworld, May 1990, and "Getting Started with Communications," Macworld, May 1990.)

Macknowledge, MicroPhone II, Smartcom II, VersaTerm-Pro, White Knight, and Zterm all work with Hayes-compatible modems. For those of you who don't have Hayes-compatible modems, Macknowledge and MicroPhone II give you the option of selecting or writing special drivers.

Once the Mac and modem can talk to each other, the next step is to make sure that setup can talk to the remote modem and computer you're...
dialing in to. Whether that remote computer is a stand-alone Mac or an IBM PC, a BBS or an information service, a minicomputer or a mainframe computer, you must make sure that its communications parameters match those on your setup. Those parameters—bits per character, parity, and stop bits—ensure that the two computers are speaking the same digital language. All of the software I looked at lets you set these communications parameters.

Terminally Happy
Telecommunications software has to do more than just connect a Mac with another computer. You need an accurate display of the information the remote computer is sending to you. You also want to make sure the remote computer understands the commands and data you’re sending to it. To do these things, the Mac must be able to mimic a display device the remote computer is familiar with. And this brings us to the topic of terminal emulation.

The emulation you choose depends on the service (or computer) you call. All the software I looked at supports a variety of terminals; the most commonly supported ones are teletype emulation (TTY) and VT100.

TTY is the simplest—some people might say the dumbest—of all terminal emulations. It’s not much different from a typewriter, except it displays data on a computer screen instead of paper. The English-language characters used by TTY (and most other terminals for that matter) are defined by the ASCII character set.

By supporting VT100 or VT102 emulation, a program can make a Mac function like the Digital Equipment Corporation VT100 terminal series. VT100 terminals are more sophisticated than TTY terminals. For example, they can print in specific regions on the screen (like the top or bottom) without disturbing other parts of the display; TTY terminals, in contrast, just spew out lines of characters. Since most electronic services support it, VT100 terminal emulation is a good thing to have. I use this terminal setting almost exclusively.

Capturing Information
Chances are you’ll probably want to save some of that text scrolling across your screen. Telecom programs have a screen buffer that temporarily holds incoming data. You can copy that information and paste it into another file. With the exception of Smartcom II and Zterm, all of the communications programs reviewed here let you select text and save it as a table to import into a spreadsheet.

But there are other ways to save online information. For example, you can save text to a capture buffer, a separate file you create on disk. Doing this puts all the information into one or more stand-alone files without continual cutting, copying, and pasting. You can also print text line by line, in some cases page by page, as soon as it’s received by your modem.

Personally, I use file-capture capabilities in communications software more often than printing capabilities, because I often need to move files from my Mac to my ZS8 laptop. But for sharing information, paper is still the best way. So don’t ignore printing capabilities in communications programs.

Downloading Files
To capture more than text—for example, applications or formatted files such as PageMaker documents—your communications software must first support what is called MacBinary mode. MacBinary ensures that a downloaded Mac file or ap-
application turns up on your desktop as an icon you can double-click to open.

You also have to make sure that the file gets received without any errors. By using one of several error-control protocols with MacBinary, you can easily download error-free files from a remote computer, BBS, or information service. Xmodem and Ymodem Because it’s almost universally supported in one form or another on all computer systems that transfer information, support for the Xmodem protocol is absolutely necessary in a Mac communications program.

There are two main variants of Xmodem. The classic Xmodem protocol sends information 128 bytes at a time. The sending computer then waits for an acknowledgment from the receiving computer that information has been received correctly. The 1K version of Xmodem sends 1024 bytes at a time instead of 128 bytes.

As a result, a lot of Xmodem transmission time is spent waiting for acknowledgments. But Xmodem works, even over noisy phone lines. Ymodem is an extension of Xmodem that permits batch transfers. Batch transfers let you group multiple files together and send them with one command.

Zmodem Zmodem is a much more efficient file-transfer protocol than Xmodem. In fact, based on characters transferred per second, Zmodem routinely beats out Xmodem by a factor of more than three to one. Unfortunately, not all information services support Zmodem file transfers (two that do are BIX and GEnie). If you often transfer files modem to modem, however, look for Zmodem support in your communications software. It will save you time, and as a result, cut down on your phone bill.

Finally, there’s another protocol that may pop up. Kermit, developed by Columbia University, is marginally faster than Xmodem. Kermit is available on many minicomputers and UNIX systems, so you will want to make sure your communications software supports it if you transfer files between a Mac and those types of computers.

Scripts and Macros
To get onto and around on an online service, you type text commands, which don’t usually vary from session to session. If you had a communications program that did the typing for you, it could eliminate typing errors. It would also save you from having to remember all the commands necessary to navigate that service.

That’s where macros and scripts come in. Generally, a macro enables you to send a text string or execute a telecom command with one simple menu or keyboard shortcut. For example, a macro might be a specific command—such as “get mail.” A script usually lets you perform a series of actions with one single command. You could write a script to dial a service, log on, download any messages waiting for you, and then log off. Some programs even let you assign a script to a menu item, 12-key combination, or button.

By the way, some programs use different terms. Smartcom II uses autopilot to refer to both scripts and macros; VersaTerm-Pro calls its macros command sets.

If you plan to do a lot of scripting, you’ll be glad to know that some communications programs generate scripts automatically. Macknowledge, MicroPhone II, Smartcom II, VersaTerm-Pro, and White Knight can all “watch” while you perform a task. The program then records the prompts, your responses, and so on, necessary to accomplish that task in a script. Having this handy feature means you never have to write a script from scratch. Keep in mind, though, that a recorded script isn’t always the optimal script. You may have to edit it further to get exactly what you want.

Now that you know what the features are, let’s take an in-depth look at what each telecom program offers.

Macknowledge
First let me say this: Macknowledge is not your typical general-purpose telecommunications program. Instead, it’s a stand-alone set of scripts written for general-purpose telecom. More accurately, Macknowledge is a run-time version of Prometheus’s Acknowledge, a framework or development environment for serious (and I mean very serious) telecommunications professionals.

Macknowledge is the only program I looked at that can automatically configure settings for different modems, a handy feature if you have a nonstandard modem. Prometheus provides a set of prewritten scripts for a variety of information services—BIX, CompuServe, Dow Jones, GEnie, MCI Mail, and others.

You activate those scripts by clicking on icons for those services in Macknowledge’s Control Palette. The first time you use a script, Macknowledge asks for a user name, password, and access telephone number for that script’s service. If you don’t know the access number, a unique Macknowledge feature can help: a table of phone numbers uses your area code to help you select the right number. I thought that was great. Unfortunately, the only time you can see that table is the first time you run a particular script. If you want to change phone numbers later in a script—or user names or passwords, for
that matter—you must do so in Macknowledge's Lookup Table, which maintains that information for scripts (see "Macknowledge").

Macknowledge scripts are written in Telecommunications Access Language (TAL), a full-featured programming language. Although the program offers a watch-me feature that records actions and then translates them into TAL code, I found that watch-me didn't work all the time. Sometimes my scripts worked and sometimes they didn't—but worst of all, I couldn't find a way to protect my password within a script. This was incredibly frustrating because it meant I had to learn TAL to use Macknowledge. A script editor called EZ-TAL tries to make writing or editing TAL scripts a point-and-click affair, but doesn't really succeed.

Aside from scripting, there were some other things that bothered me about Macknowledge.

First, it doesn't support Ynomed and Zmodem protocols. Second, unless you close it, the Control Palette floats above the Macknowledge window (the terminal emulator screen) all the time, blocking your view of that screen. Third, the way the supplied scripts are written, you can only log off services from Macknowledge's menu. If you log off manually, the program isn't smart enough to know that you've already disconnected, and tries to log you off again.

**MicroPhone II 3.0**

MicroPhone II 3.0 gets my vote as the most improved of the recent round of telecom-program upgrades. It now has a full suite of features, including support for Zmodem, ISO-7 international character sets, and optional password protection for documents or scripts. You also get a text editor DA that can manipulate text files under 32K in length.

Of the programs I looked at, MicroPhone II has the most extensive scripting abilities. To create a script, you can use either the program's Watch Me feature, import a text file as a script, or write a script from scratch. Editing a script is easy too, thanks to MicroPhone II's script editor. Depending on the command you select, the program is intelligent enough to help you complete that scripting command (see "MicroPhone II"). To learn more about scripting, you can always look at either the fully indexed, very readable manual or the copious sample scripts Software Ventures provides with the program.

You can create custom dialog boxes for scripts—a capability unique to MicroPhone II. Another unique feature is the program's ability to incorporate HyperCard external functions (XPCFs) and external commands (XCMDs) in a script. This means you can design and add custom functions to MicroPhone II that the Software Ventures gang never thought of.

My one big complaint about MicroPhone II is that it still has too few keyboard equivalents for commands. This problem has been fixed somewhat in version 3.0: you now can do things like quit, copy, cut, and paste using the standard keyboard shortcuts. But to perform more sophisticated tasks—for example, send or receive a file, or change file-transfer protocols—you still have to either make menu choices, click on an icon, or create your own macros.

**Smartcom II**

Smartcom II's attractive icon-based interface is likely to appeal to users with little or no programming experience. Where VersaTerm-Pro is stark and a little obscure, Smartcom II offers context-sensitive help at virtually any point—just click on the help button. (Neither MicroPhone nor White Knight offers any online help at all.) And
rather than requiring you to conquer a scripting language. Smartcom II lets you construct autopilots using icons at the bottom of the editing window (see "Smartcom II"). You can design a script to become either a menu choice or a button. I found that Smartcom II's autopilot feature worked flawlessly, generating scripts that worked without any editing. One unique Smartcom II feature lets you connect two Macs, both running Smartcom II, send mouse-driven graphics back and forth.

Despite Smartcom II's icon-based interface, some small elements are counterintuitive. I went bonkers looking for a way to hang up the phone until I finally read the manual, which told me to click on the phone icon. My biggest problem with Smartcom II, however, is that it's limited to Xmodem transfers. Most people eventually need more than that in a general-purpose telecom program. I know I do.

VersaTerm-Pro
VersaTerm-Pro is also the only program I reviewed that currently supports Apple's Communications Toolbox, which will be included in System 7.0 (until System 7.0 arrives, you install the Communications Toolbox as an INIT). The Communications Toolbox is a set of common tools—routines, functions, and features—that a program uses to provide data-connection, terminal-emulation, and file-transfer capabilities. (Several other vendors, for example Software Ventures, have announced their intention to support the Communications Toolbox.)

According to a draft manual I saw, VersaTerm-Pro will not use Communications Toolbox terminal-emulation tools. VersaTerm-Pro already provides text and Xmodem file-transfer capabilities, so Synergy Software has elected not to offer those Apple Communications Toolbox tools. However, Synergy does plan to ship the serial- and modem-emulation tools—in addition to any other useful tools that crop up in the future—to VersaTerm-Pro versions as soon as they become available from Apple.

In keeping with its terminal-emulation bent, VersaTerm-Pro offers good macro capabilities, but no scripting. Synergy supplies some prewritten macro sets (for VMS Mail, UNIX Mail, and Kermit, for example), and you can write your own using VersaTerm-Pro's Automatic Macro Define feature. The macro language is primarily based on text-and-control-character entry (see "VersaTerm-Pro"). Help buttons are available in most dialog boxes, but there are few keyboard shortcuts. In addition to the lack of scripting, some other missing features make VersaTerm-Pro less useful as a general-purpose telecom program. For example, it doesn't support the 1K variant of Xmodem, nor does it support Zmodem.

White Knight II
White Knight is a renamed—and updated—version of Red Ryder 10.4. And if you like using

### PICTURE PERFECT

Unlike general telecommunications software, custom software provides front ends tailored to specific information services. And that customization translates into more Mac-like interfaces to those services—a big difference from the text-based interfaces usually encountered on bulletin boards.

Two examples of front-end programs are Desktop Express and CompuServe Navigator. Desktop Express helps you navigate the MCI Mail service; CompuServe Navigator lets you bypass the sometimes tortuous CompuServe interface to get mail and follow threads. Both simply put a graphical user interface on top of the usual text-based interfaces. While you can log on to MCI Mail and CompuServe with a general telecommunications package, that isn't an option for Connect.

Then you open and close folders to find messages or download files. Although America Online doesn't let you download files in the background, it does provide online conferencing and a sophisticated chat feature so you can "talk" with other users in real time.

Then, there's Prodigy. Yes, there are graphics and you can use the mouse, but still, Prodigy gets the dubious distinction of being the most un-Mac-like Mac telecom program I've seen (maybe because IBM is one of the Prodigy sponsors?). All menus and DAs are inactive so you can't cut, copy, or paste any screen information—and you can only print when there's a print button on the screen.
keyboard shortcuts, White Knight is your program. You can pretty much do everything without ever touching the mouse. Keyboard commands are grouped together by function. For example, typing \texttt{3F} brings up the group for file-transmission commands; you then type \texttt{S} to send a file or \texttt{R} to receive one (see “White Knight”).

Other enhancements to White Knight include Zmodem support and a reworked user interface. The scripting language has been somewhat improved by the addition of new script commands that reduce the need for “panic” options within a script (panic is what the program does when it can’t carry out an action after a predetermined time period). Another addition to the scripting language is support for external commands, or RCMDs. White Knight RCMDs are similar to HyperCard XCMDs but proprietary; you can’t use an XCMD as an RCMD.

White Knight lets you decide whether you want to capture incoming text streams with or without line feeds at the end of each text line. Smartcom II, VersaTerm-Pro, and MicroPhone II assume you don’t. And with the exception of MicroPhone II, White Knight is the only program that lets you create a mini-BBS so that other people can download files from your Mac.

White Knight lets you record actions for scripts and macros. Unfortunately, White Knight’s recorder feature was disappointing. To make usable scripts I had to manually insert “wait” statements between certain actions, just as Red Ryder used to make me do; I didn’t have to do this with Smartcom II or MicroPhone II. While I had no trouble printing from within the other telecom programs, I did have a problem printing to my Hewlett-Packard DeskWriter from within White Knight. While there was a workable solution—copying text into a text editor that did print to the DeskWriter—it was still annoying.

Zterm
Zterm is a $30 shareware program, but you shouldn’t let that keep you away from it. (Red Ryder garnered its fame as a shareware program too.) Zterm’s primary strength is its support of Zmodem—it also offers all the other major file-transfer protocols. It’s a cheap, fast way to send and receive files.

Zterm’s macro keys let you keep communi-
All of the programs get you online. The differences have to do with style and user interfaces.

Picking What's Right
When I started this article, I was an admitted White Knight snob. I still think White Knight is the precision tool of communications programs. Its scripting language gives you lots of leeway to modify the program, but you are expected to understand what you are doing. White Knight's manual assumes you're fairly familiar with telecommunications and with programming concepts. In the right hands, White Knight offers unparalleled performance; in the wrong hands, it's very unforgiving.

As a general-purpose telecom program, Macknowledge didn't offer me anything that another program couldn't do as well or better. Writing a Macknowledge script really requires some programming experience with a language such as Pascal. And all the different types of Macknowledge documents (phone journal, lookup tables, scripts, and general documents) make things very confusing for users. Whether or not you like Macknowledge depends on how much you like those supplied scripts, and on how much you like Acknowledge's general framework. I definitely didn't like the scripts. I can see how an experienced TAI programmer could develop a very nice Mac interface (like Connect's, maybe) for an information service using Acknowledge, but I don't recommend Macknowledge for general-purpose telecom.

On the other end, Smartcom II is the simplest to use of all the telecom programs. And, most important, it's bulletproof. I think it would be hard for anyone to make a non-recoverable mistake with this program. I know many folks who are very happy with Smartcom II and have used it for years without incident. I miss the Zmodem protocol but find Smartcom II's ease-of-use quite seductive. If I let myself, I could succumb quickly.

VersaTerm-Pro is a great tool for working with VAXs or when you want Tektronix terminal emulation. In fact, a lot of people think there's currently no finer tool for getting at a VAX from a Mac than VersaTerm-Pro. Once you're logged on to the remote computer, it's fine. It's the getting there that VersaTerm-Pro doesn't help you much with: most notably, the program lacks the scripting a lot of people want for working with BBSs or commercial information services.

The program I now turn to for most of my day-to-day communications is Zterm. It's quick to load, quick to use, and supports Zmodem—exactly what I want to see in a telecom program. I don't mind Zterm's lack of scripts; I just write a few macros to do log-ons. And because I download many files from information services and BBSs, Zterm's file-transfer log more than compensates for any of the program's deficits.

For general users, though, I have to recommend MicroPhone II. It has come a long way since I last used it and was the best surprise by far of all the telecom programs. I was impressed by its logical and well-executed interface; it offers the most-common terminal emulations and all the file-transfer protocols. Its scripting feature is powerful and friendly at the same time. Nonprogrammers will find writing scripts a lot easier in MicroPhone II than in White Knight; programmers can easily take advantage of script-language extensions and utilities. Unlike some of the other general-purpose programs, Microphone II gives you the choice between easing into telecommunications or diving in. That makes it a winner.

See Where to Buy for contact information.

Larry Loeb is the editor of the Macintosh Exchange on the Byte Information eXchange (BIX), but his day job is being a dentist.
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Electronic mail (E-mail) has quickly become one of the most important applications for networked users. And like other network services—for example, file servers and print spoolers—the success of an E-mail system depends on how well it meets the requirements of users and network administrators alike.

Certainly, both users and administrators are interested in a system's functionality. But often the two have different points of view on what's required from an E-mail system. For example, a user wants an E-mail system that is easy to use; an administrator wants a system that's easy to set up and maintain, is reliable, and can be used on large networks. Then there are important control issues to consider. Who should define address lists—a user or the administrator? What mail forms should be used—anything a user can dream up, or only forms that meet corporate standards?

To help you pick an E-mail system, I'll take a look at how features of current Macintosh E-mail systems address user and administration concerns. I'll focus on the products that currently use a Mac as the mail server: CE Software's QuickMail, Microsoft's Microsoft Mail, and TOPS' InBox.

Not all E-mail systems that allow a Mac to send and receive mail (in other words, act as a client) require a Mac as a server. Two systems, Dayna Communications' DaynaMail and cc:Mail's cc:Mail, can run on Mac servers; however, both require PC-based servers to take advantage of their most sophisticated features. Another program, WordPerfect Office, will offer E-mail—and other network services—to Mac, MS-DOS, and VAX users when it's available (see "The PC Invasion").

**What's Important in E-Mail?**

To a user, the answer to the question is obvious: E-mail should be easy to use. But let's see what lies beneath that deceptively simple answer.

Addressing mail to anyone on the E-mail system should be easy. Finding someone's E-mail address shouldn't be a struggle, nor should you have to know which mail server is responsible for processing that person's mail. And, of course, you should be able to keep address lists for the individuals, or groups of individuals, you most often send mail to. Options such as status logs and customizable forms can also make using an E-mail system easier. Finally, some users, either in field offices or traveling on the road, may want remote access to E-mail too.

**Addressing** With InBox, the manager and each individual user can define address lists, but only the manager can create groups of addresses. To compensate, InBox lets users create their own *address books*, which can include names from any InBox server. A user can effectively define a group by putting several names into an address book, and then selecting all those names (via InBox's Select All command) as the address list for an E-mail message.

One unique feature of InBox is its support for *aliases*. Aliases let you enter a new name for anyone listed on the mail server when you put that person into an address book. For instance, in your InBox address book, your boss could be listed as Boss or your chief programmer as Head Hacker.

QuickMail, on the other hand, permits any user to define personal address lists or address groups. All you have to do is select names from any QuickMail servers on the network. This flexibility posed some problems in earlier versions of QuickMail: to update address lists, you had to manually query each server to get any address changes. And since each QuickMail server can hold multiple *MailCenters*—such as one for network communications and another for a telecom gateway—you had to query not only each server, but each MailCenter as well.

Happily, QuickMail 2.2 provides a nearly automatic solution for the updating problem. A facility called NameServer periodically polls all QuickMail servers and keeps track of all the latest valid addresses. Instead of going to each MailCenter, users just query NameServer with a new QuickMail command, Verify Addresses. In addition, a Find button in QuickMail's address window lets you search NameServer's database by first
name, last name, or department for the address of any QuickMail user. Only the first few letters of the name are necessary to guide the search.

Unlike InBox or QuickMail, Microsoft Mail takes a more centralized view of E-mail. Thus it places more restrictions on users. Only the administrator or manager for each Microsoft Mail server can define user addresses or address groups. While this approach promotes addressing uniformity across workgroup or departmental boundaries, it prevents you from customizing the system to make it easier to use.

Microsoft Mail does, however, provide some features that can make E-mail addressing easier on large networks. Because Microsoft Mail automatically updates the address lists on each server, you always see an up-to-date global directory of all the E-mail users on the network. If seeing all the users is overwhelming (and it can be for large networks), you can switch to a local mode and see only the names of those users attached to the same server as you are. There’s also a search mechanism to help you find someone’s address; just type the first few letters of a name, and Microsoft Mail highlights the correct address in the address list.

Tracking Mail The most common method to check if mail you’ve sent has been delivered or read is to request a return receipt. InBox, Microsoft Mail, and QuickMail all support that option. But if you want more specific information on message status, only QuickMail can help you.

QuickMail maintains a mail log for every user that shows whether a sent message has been read or is still unread, and whether it has been printed, deleted, or filed. However, be forewarned: if you tell QuickMail to keep message information in the log for a long time (for example, 30 days after sending), or if you send lots of mail, the log can get very large. And the larger the mail log, the more slowly QuickMail loads.

File Enclosures Attaching files to a message is an easy and convenient way to move work files around among members of a workgroup. It’s certainly easier than setting up a file server or pasting text into a message.

InBox, Microsoft Mail, and QuickMail all permit file enclosures, between two Macs and between a Mac and PC. Although you enclose a file in a mail message pretty much the same way in all the E-mail systems, there are some notable differences. InBox and QuickMail both permit multiple file enclosures per message; Microsoft Mail permits only one.

When it comes to sending files to PCs, only QuickMail automatically assigns DOS extensions to files sent from a Mac. Before you send a file to a PC user with Microsoft Mail, Microsoft recommends that you rename the file according to DOS conventions (8 characters long, with DOS extensions) to make it easier for the PC user to recognize the file you’ve sent. You should follow the same advice with InBox.

Mail Forms InBox has a very limited repertoire of message forms: a basic message form and a phone message form. Microsoft Mail and QuickMail, on the other hand, offer customizable forms, but differ in how they implement the feature.

In keeping with its centralized approach to E-mail, Microsoft Mail stores all forms on the mail server.
Joe, who is logged on to Mail Server A, sends mail to Dan and Steve. In a store-and-forward E-mail system, Server A stores mail for both Dan and Steve until it can deliver that mail. Dan receives his mail when he logs on to the network and Server A. Steve’s copy gets forwarded from Server A to Mail Server B whenever Server A connects to Server B. That could be immediately, if both servers are on the same network, or later, if the connection is made by modem. Server B then stores Steve’s copy until Steve logs on to that server.

While any user can design new forms using Microsoft’s HyperCard forms stack, only the mail manager can install a form (via Microsoft’s Forms Mover) on the server. Once installed, the form becomes available to all users of that server.

In contrast, QuickMail forms are stored on each user’s Mac, not on the server. Using the QM Forms application, any QuickMail user can design and install personalized message forms. Should a recipient not have a given form, QuickMail sends the form along with the actual message. This approach does have one disadvantage; if too many users have their own customized forms, unnecessary increases in network traffic can result.

Remote Access  Thanks to products from Shiva, Hayes, and InfoSphere, it’s a relatively simple matter for someone with a modem to become part of an AppleTalk network, which allows a remote user to access the mail server just like any local user. However, due in part to the nature of AppleTalk protocols, network access via modem slows down E-mail system response time.

QuickMail offers two simpler, faster solutions for remote access to its mail servers. First, you can use the QM Remote application on a Mac to dial a mail server directly via modem. Once connected, you can either send or receive mail. Second, you can use any terminal-emulation program (on a Mac or even an IBM PC) to dial into the mail server. You then get a simple text-based menu system for sending and receiving mail.

Near-Mindless Management?  For E-mail system managers, installation and maintenance issues are key. You have to worry about propagation of address lists, storage of messages and files, and reliability. If you handle multiple E-mail servers, you want to make sure those servers communicate when they should. And nowadays, the appeal of a Mac-based E-mail system may depend on how seamlessly it can exchange mail with existing corporate E-mail systems (see “Gateways to the World”).

Server Setup  You can install InBox two different ways, either as a Mail-Server Message Center or as a File-Server Message Center. The Mail-Server Message Center relies on InBox software to send messages between users; it can only be installed on a Mac; The File-Server Message Center, meanwhile, uses existing file-service networks (AppleShare or TOPS) to send mail. It can be installed on any computer that runs the TOPS file server, such as a PC, VAX, or Sun workstation.

InBox handles up to 20 users per mail center. If you need more capacity, you have to use InBox Plus, which permits up to 100 mailboxes per message center, as well as more than one message center on a server. InBox Plus also provides gateways to other mail systems, a capability the plain vanilla InBox doesn’t have.

Microsoft Mail does not depend on a file server, but can be installed to run in the background on AppleShare or TOPS servers. The Microsoft Mail server can also run in the background on any networked Macintosh. Frankly, I do not recommend the latter installation, unless you want to make an enemy of the person who works on that Mac.

Like Microsoft Mail, QuickMail doesn’t require the existence of a file server, but will run in the background of an AppleShare or TOPS server. QuickMail has its own server software, QM Administrator, to maintain its...
# Electronic Mail Features

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<td><strong>CLIENT</strong></td>
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<td>Type</td>
<td>DA</td>
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<td>DA</td>
<td>DA</td>
<td>DA, application</td>
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<td>Number of enclosures</td>
<td>1</td>
<td>no limit</td>
<td>1</td>
<td>16 (+ clipboard)</td>
<td>no limit</td>
</tr>
<tr>
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<td>Bad-mail notification</td>
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<td>Conferencing</td>
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<td>Online help</td>
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<tr>
<td>Individual address lists</td>
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<tr>
<td>Priorities</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Import, export address book</td>
<td></td>
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<td>native</td>
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<tr>
<td>User mail-status log</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>User-defined aliases</td>
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<tr>
<td><strong>ADMINISTRATION</strong></td>
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<tr>
<td>Server administration</td>
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<tr>
<td>Usage log at server</td>
<td></td>
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<tr>
<td>Controlled access to gateways</td>
<td>varies with gateway</td>
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<td>Special addresses</td>
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<tr>
<td>Custom installation</td>
<td></td>
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</tbody>
</table>

- = Yes, - = No. *M = manager-defined; U = user-defined. # DynaMail is also available as a node-to-node mail system. \(^\) Importing and exporting is supported in node-to-node version. \(^2\) User can define address book and because the recipient’s server is unavailable—is held at the originating server. When unreachable users or servers become active on the network again, mail gets forwarded accordingly.

Rather than incorporate server-to-server communications in the InBox Plus Message Centers, InBox Plus includes a second program, Router, which controls communications between different servers. Using it, you can design redundant routes between servers for added reliability.

In contrast, Microsoft Mail servers maintain server-to-server communications on their own. Not only do servers store and forward messages destined for other servers, but they also exchange user lists to form one large global address list. Every user has access to that list for addressing mail.

QuickMail also maintains server-to-server communications internally;
Server Administration  Once a Microsoft Mail server is set up, you can administer it from any Mac on the network. This administration scheme is convenient because you can easily maintain all servers from one Mac—even if you have to use the Chooser to select each server one at a time.

Also included with Microsoft Mail is Microsoft Mail Administrator, a program for generating reports about mail servers. With it you can list servers, local users, local groups, and global users. A very detailed report on server usage includes information such as the number of messages and file enclosures in each user’s mailbox and the amount of owned and shared space on the server. These reports should be sufficient for any manager to maintain mail servers.

As with Microsoft Mail, you can administer InBox mail servers from any computer on the network. Using an application called InBox Admin, you can add users, create mailboxes, and so on. However, InBox offers no special administration tools to generate reports about disk space or the number of messages stored per user.

All administration of a QuickMail mail server takes place on the server itself via the QM Administrator application. QM Administrator generates a variety of reports, among them Serial Number and Dead Mail. You can also get a detailed mail-usage report for each user on a MailCenter; this report lists the user’s name and address, the number of mail-log entries and mail items, and the size of the mail log and mail items.

Mail Storage  Microsoft Mail stores all messages and enclosed files in a single, proprietary-format database file on the server. While this scheme might offer performance advantages, it’s also a case of putting all your eggs in one basket. If the file gets corrupted, everything’s gone.

In contrast, QuickMail stores a separate copy of a message and enclosure for each addressee, using the Mac’s Hierarchical File System (HFS). This does lead to some added requirements for server disk space, especially if large files are sent as enclosures. But if one file gets corrupted, it only affects one recipient.

InBox’s storage method is, in some respects, a hybrid. Like Microsoft Mail, InBox uses a proprietary database scheme to store sender and receiver information. However, like QuickMail, it stores one copy of a message—and any enclosed files—for each addressee.

### Addressing the Issue
This composite from the three major E-mail programs shows how users can deal with the large address lists often found on large corporate networks. The two screens from Microsoft Mail (top) show how the global address list is simplified by restricting the list to those users on the Local server (upper screen). The center screen illustrates the creation of a personal Address Book in InBox, with the user selecting only those names of interest. The two bottom screens show how a QuickMail user uses the NameFinder to find the addresses of any user on any MailCenter (in this case, names starting with the letter M) by searching the database of addresses maintained by QuickMail’s NameServer on the mail server.
This diagram depicts how a client Mac and mail server from the three major Mac E-mail programs interact. In each case, the program's own names for components are used. A folder icon represents an HFS folder on either the user's Mac (for mail storage, for example) or the mail server (for storing unsent and received mail, as is the case with QuickMail and InBox). A text file icon on the user's side means mail is stored as text only. An envelope means mail can also be stored in its original format for rereading, replies, and forwarding. Text files on the server usually mean that some component of the mail system is stored as a special file. Microsoft Mail stores all mail and user information, such as directories, in one large file.
**Gateways to the World**

Simple LAN-based E-mail systems may suffice for small businesses and for workgroups within large corporations. But often Mac E-mail users in large corporations need to exchange messages with other workers in the same company. Those other workers may use an E-mail system, such as VMS mail or PROFS, installed on a mainframe computer. Or two geographically separate offices may use MCI Mail, EasyLink, or AT&T Mail to send E-mail between their two LANs. In either case, mail gateways are necessary to handle the differences in message formats and user addressing.

QuickMail, Microsoft Mail, and InBox all offer gateways into systems that are used by large corporations. At this point, QuickMail has the largest number of different kinds of gateways. Microsoft is offering a few gateways for Microsoft Mail and promising more in the next months. By virtue of its support for MHS mail servers, DaynaMail can use a variety of gateways. TOPS, meanwhile, plans several gateways for InBox, the newest product on the market, which currently offers fewer gateway options than its competitors.

**Evaluation Time**

Each E-mail vendor thinks that its product has certain features that make it better than the others. After working with InBox, Microsoft Mail, and QuickMail, here’s what I think about how those features are implemented.

For addressing, it’s a close call. I like QuickMail best because it offers the greatest flexibility in setting up address lists. But that reflects the fact that I consider user-defined address lists more important than automatic updating. Microsoft Mail’s automatic global address updating scheme is better than QuickMail’s.

Unlike QuickMail, Microsoft Mail lets you type an address, which can be more convenient than selecting one from an address book. If only Microsoft permitted user-defined address lists, it would have come out on top. InBox’s alias feature is nice, but I consider its approach to user-defined address groups contrived, and not terribly intuitive.

For tracking mail, QuickMail is the clear winner. Microsoft Mail and InBox only offer receipts. Those receipts are themselves mail messages; delete one, and you won’t be able to refer back to it. QuickMail’s Mail Log status report contains more detailed information than a receipt—and you can tell QuickMail how long to track a message and its status. If you don’t want a Mail Log (QuickMail has a receipt feature too), you can always turn the option off. QuickMail also lets you create your own folders to store mail you’ve already read.

Overall, QuickMail is the most flexible E-mail system for file enclosures. If you’re using Macs for E-mail only, QuickMail and InBox are about equal in file-enclosure capability. Both allow you to enclose more than one file per mail message. I think it’s archaic that Microsoft Mail supports only one.

If, on the other hand, you have both PCs and Macs on your E-mail network, QuickMail comes out ahead of both InBox and Microsoft Mail. QuickMail is the only system that filters file names and adds DOS extensions to a file when you’re exchanging files between Macs and PCs.

When it comes to forms, I think QuickMail is more flexible than Microsoft Mail. Because Microsoft Mail’s forms design program is based on HyperCard, Microsoft Mail forms are limited in size to HyperCard cards. QuickMail’s QM Forms application puts no limitations on a form’s size.

InBox has no forms-design capability to speak of.

For remote access to E-mail, QuickMail is the winner again. It’s the only package that lets you dial directly with a modem into a mail server. I find that capability particularly useful when I’m on the road. If I have a Mac with me, I use QM Remote to retrieve and answer mail; if I’m carrying around a laptop, I use a terminal emulator.

On the managerial side of things, InBox is the most flexible to set up; you can use a variety of computers as the mail server. Microsoft Mail and QuickMail both require a Macintosh. I occasionally find myself constrained by QuickMail’s QM Administrator application, primarily because it must run in the foreground to send and receive mail by modem. Therefore, you are not able to use it and the AppleShare Print Server software on the same server simultaneously.

Some administrators may believe that Microsoft’s globally updated address list is the best way to go and that QuickMail’s NameServer still demands too much user interaction to ensure current address lists. That may be true for networks that are continually changing; however, I consider that situation to be rare. Networks have a tendency to settle down and require only minimal changes in address lists.

When it comes to administrative tools, InBox falls far short of Microsoft Mail and QuickMail, both of which offer extensive report-generation capabilities. I think Microsoft Mail may have a slight administrative edge over QuickMail here, because you can administrate any server from any Mac on the network.

QuickMail currently has the largest number of working E-mail gateways. If you want to link a Macintosh E-mail system to other mail systems, QuickMail has the edge.

It probably comes as no surprise that I consider QuickMail the best E-mail system. It offers the most features, including many that aren’t available in InBox and Microsoft Mail. Most important, QuickMail is flexible enough that if you decide you don’t want to use a feature, you can usually turn it off. Because of QuickMail’s many features, it takes a little longer to learn than the others. Once you’ve learned it, though, you have a powerful package at your fingertips.

See Where to Buy for contact information.

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Dave Kosciur is a Macworld contributing editor, and the editor of a Macintosh networking newsletter, Connections. If he keeps using E-mail so much, he’ll forget what his mail carrier looks like.
When Apple introduced the 300-dots-per-inch LaserWriter, we all wanted one. We were tired of the ImageWriter's jaggies, and PostScript output looked so precise and professional. Not all of us were able to rationalize the LaserWriter's $6000 price tag, however. Especially if our printing needs were limited to business correspondence and simple page layout.

Apple may have been the only game in town back then, but today a variety of hardware and software options await the low end user. Several major manufacturers now produce either high-resolution dot-matrix or ink-jet printers that make the most of Apple’s QuickDraw routines, and they do it at prices that make sense—in many cases, less than $1000.

You won’t get PostScript at these prices, but all of the printers mentioned in this article ship with their own precision bitmapped or outline fonts. Bitmapped fonts are designed to take advantage of specific printer resolutions (300 dpi, for instance) and many are quite nice looking, but you must install each point size in the System file. Larger point sizes take up a great deal of memory and so you have always been limited in the number of bitmapped fonts you could store in the System at any one time.

Outline fonts, on the other hand, can be mathematically scaled, so they take up much less memory and they retain their smooth, optimized curves even when blown up to larger sizes. Three-hundred-dpi outline fonts used to be the exclusive domain of Apple’s LaserWriter INT, but now software utilities such as Adobe Type Manager (ATM) bring outline fonts to even the humblest non-PostScript devices, completely changing the rules of the game. In addition, Apple has recently announced that it will be including its own outline font manager, dubbed Royal, in System 7.0. (See Erfert Fenton’s feature, “Battle Royal,” in Macworld, April 1990, for an unraveling of many font mysteries.)

In this article I’ll look at four kinds of printer-software combinations, each a step above the last in print resolution and in price. The first is the humble and familiar ImageWriter II. Because many readers rely on this printer, I’ll use it as an example to show what ATM (and eventually System 7.0) can do for print quality. The second, still
Dots What It Takes

Since the ImageWriter II's fundamental problem is insufficient dot density, the obvious brute-force engineering approach to correcting this deficiency is to add more dots per inch in the print head. Apple realized this years ago and commissioned the ImageWriter LQ, a printer with a unique 27-pin print head and 216 dpi resolution in its slowest, highest-resolution print mode. Since the ImageWriter LQ is a QuickDraw printer relying on bitmapped fonts, it's fair to describe the LQ as a wide-carriage ImageWriter that prints at two to three times the ImageWriter's resolution. For several years, the LQ was the only printer of its kind available on the Macintosh market, but its reputation was marred by complaints of frequent mechanical problems.

Now the LQ faces three formidable competitors. The 24-pin Epson LQ series—here represented by the 180-by-360-dpi model 950—uses four printer-resident fonts (Compressed, Pica, Elite, and Proportional) for highest-speed letter-quality printing and four precision bitmapped fonts (the inevitable Times, Helvetica, Courier, and Symbol) for more Mac-like effects. The Toshiba Three-In-One, a 24-pin printer that offers resolution up to 360 dpi in high-resolution graphics mode, includes four outline fonts, the names of which you might easily guess at this

**ATM Limits**

One much-hoped-for effect of ATM is absent: laserlike printing at 10- and 12-point sizes. The problem is that 12 points is 1/6 inch: this gives the program and printer 1/4 of 144 vertical dots (that's a mere 24) to work with from the top of a capital letter to the bottom of the downstroke on a lowercase p. That works out to 4 or 5 dots to use in rounding the bend at the bottom of a lowercase g, and even an optimized outline font can't hide the fact that you're trying to make a smooth curve from 5 bricks. The problem is obviously worse at 10 points and less severe at 14 (sometimes 1 or 2 extra dots in a letter make a big difference in smoothness).
point (the same standard four). As with most printers that started life in the IBM PC world, the Toshiba Three-In-One has higher-speed Courier, Elite, and Draft resident fonts. It also handles bitmapped fonts reliably as long as you have installed the exact font and point size you want to use. Finally, GCC Technologies has released its 24-pin printer, the Writelmpact, at 180 by 360 dpi. Writelmpact’s selling point is the set of 22 outline fonts that come with the printer, a set that can be expanded with a 38-font additional package from GCC.

**Pin Comparison**

As you can see in “A Print Sampler,” all competent 24-pin (or, in the case of the Apple ImageWriter LQ, 27-pin) printers can in principle produce similar results. The exact appearance of type, particularly in very large and very small point sizes, is determined more by ribbon condition than by the brand name of the printer. A new ribbon, for example, can print clogged and dark-looking 10-point text, and very old ribbons aren’t up to the task of printing blacks adequately for text that is 24-point or larger. The samples also show that using custom outline fonts, where provided, is the equivalent of using ATM. For example, the Toshiba Three-In-One gives smooth output since it employs GDTS Softworks’ outline font implementation, and the GCC Writelmpact uses Bitstream outlines. Used alone, the Epson LQ-950 output is not quite as good as previous printers, and the ImageWriter LQ comes in last, but ATM puts both of these back in the competition.

The printers in this category are rugged, good at low-cost day-to-day output, and convenient for printing labels and envelopes. If you run these letter-quality dot matrix printers at optimal resolution with outline font software, they’re a practical choice in situations where low speed (relative to laser printers) and high noise levels aren’t objectionable.

**Think Ink**

Another approach to high-resolution printing is the ink-jet printer. Because it uses nonimpact technology, the advantages of this type of printer include compactness and quiet operation. Within the last few years, several companies have refined ink-jet technology, and although it’s necessary for you to be more careful in selecting paper and in handling the sometimes-still-wet output, these printers have some advantages in light-duty printing situations.

The best known ink-jet printer is the Hewlett-Packard DeskWriter, a 300-dpi printer with a loyal following and impeccable ergonomics. The DeskWriter depends on precision bitmaps—four standard fonts come with the printer (more are available from Hewlett-Packard)—but Adobe Type Manager specifically mentions the DeskWriter as a supported device for its outline font manipulation. This is a significant development, since at 300 dpi, outline fonts excel not just in the larger sizes (as we saw with the 144-dpi ImageWriter) but all the way down to 6 points or so.

Two other ink-jet printers, included more as examples of the craft than as direct competitors of the DeskWriter, are the Tektronix ColorQuick and the Kodak Diconix M150 Plus. Both of these are really special-purpose devices, but they give us an opportunity to see the effect of dots-per-inch in ink-jet practice. The Tektronix is optimized for color printing, but it does a creditable job of 216-dpi black-and-white printing. Since it costs as much as a low-end laser printer, you would probably consider it only
if your printing activities include significant amounts of color work.

The Kodak Diconix (available in a previous incarnation as the GCC WriteMove) is a 192-dpi printer that comes with Adobe Type Manager as part of the package. The key feature of the Diconix, however, is its size—it's very slightly larger and heavier than the manual Apple provides with the ImageWriter LQ. This means you can put the Diconix in a briefcase and operate it from rechargeable batteries if you like.

Comparing Ink-Jet Printers

Comparing the print quality of the inkjet printers is difficult, because the three printers really target different specialties. Only the DeskWriter represents a best-effort, no-compromise attempt at laserlike black text quality. Nonetheless, the Tektronix has undeniable appeal for those in need of color capabilities, and the Kodak printer boasts portability.

It's just shocking to see the tiny Diconix rapidly roll out text of decent letter quality. It's equally shocking to see the tiny Diconix rapidly roll out text of decent letter quality. What is even more shocking is that you can now get smooth fonts at 300 dpi.

Correspondence the DeskWriter is outstanding (see “A Print Sampler”). Tektronix's ColorQuick is nearly in this same league, but at its price it is competitive only against other color printers.

Previewing PostScript Output

Because serious typography takes place in the wild blue yonder past 300 dpi—beyond most of our budgets—those in need of professional typeset quality should use a PostScript-based imagesetter of the kind found at service bureaus. The problem is that if you send pages directly to a service bureau, you can't be sure of what the output will actually look like. So, how do you avoid the expense and extra work entailed in fixing unanticipated glitches before sending a file to the imagesetter? How do you preview PostScript-device output?

One solution involves combining the Hewlett-Packard DeskWriter with the software package Freedom of Press ($495 suggested retail list) from Custom Applications. Freedom of Press lets you output PostScript files to non-PostScript devices; in effect, you operate a printer as if it were PostScript-based. This means that you can set up pages in any PostScript-oriented software and print them on the DeskWriter at less-than-typeset resolution but with correct spacing and layout.

Almost PostScript

For several years, the standard for high-resolution printing in the Macintosh realm has been the PostScript printer, specifically Apple's LaserWriter IIINT and IIINTX. None of the early non-PostScript printers could take advantage of outline fonts, and their output suffered. To match PostScript performance, some printers included a PostScript interpreter, which speeded up performance; but the interpreter amounted to another 68xxx-based computer complete with several megabytes of RAM buried somewhere inside the printer, and you had to pay premium prices.

That was then, this is now. With the advent of Adobe Type Manager and PostScript-clone interpreters, you can now get smooth fonts at 300 dpi.
with less-expensive hardware. For instance, Apple's venerable LaserWriter IIISC, a low-cost QuickDraw-based alternative to the II series, can now be enhanced with the outline fonts available in ATM, and it should soon benefit from the font-handling changes in System 7.0. Another example, GCC Technologies' Personal LaserPrinter II (PLP II) is shipped with the same set of 22 outline fonts as the WriteImpact dot matrix printer and can be supplemented by 38 more, each offering the unmistakable advantages of outline fonts.

As you can see in "Printer Specs," even at 300 dpi, there are differences between properly smoothed fonts and relatively coarse bitmaps—note the difference between LaserWriter IIISC output with and without ATM. Even with the improvement that ATM brings to the IIISC, the expanded font set gives the PLP II greater flexibility than the IIISC, and at a lower price; and the PLP II's output quality is equal to or better than the IIISC's at any combination of font and size. When using outline fonts, both of these printers can compete with fancier, more expensive models for output quality, if not for speed. The PLP II is slower because it makes the Mac itself perform the outline computations. Networking capabilities are also somewhat limited, although both can be upgraded to Apple's and GCC's business-class laser printers.

**Time to Choose**

As recently as two years ago there were few acceptable alternatives to Apple's own printers. Those who attempted to install non-Apple printers typically found the process to be a nuisance, and the printers themselves were liable to exhibit unpredictable quirks. Now a dozen major printer manufacturers have entered the Macintosh market with printers that are not only good enough for business correspondence but for informal desktop publishing as well. They are no more trouble to install or operate than Apple's own offerings. These printers not only have the intrinsic hardware resolution to produce near-PostScript results from plain old QuickDraw units, but the recent in-
A PRINT SAMPLER

Apple ImageWriter LQ

See 24-point Times Courier Helvetica

Apple ImageWriter LQ (with ATM)

See 24-point Times Courier Helvetica

Apple ImageWriter II

See 24-point Times Courier Helvetica

Apple ImageWriter II (with ATM)

See 24-point Times Courier Helvetica

Apple LaserWriter IIISC (with ATM)

See 24-point Times Courier Helvetica

Epson LQ-850

See 24-point Times Courier Helvetica

GCC Personal LaserWriter II

See 24-point Times Courier Helvetica

GCC WriteImpact

See 24-point Times Courier Helvetica

Hewlett-Packard DeskWriter

See 24-point Times Courier Helvetica

Kodak Diconix M150 Plus

See 24-point Times Courier Helvetica

Tektronix ColorQuick

See 24-point Times Courier Helvetica

Toshiba Three-In-One

See 24-point Times Courier Helvetica

Toshiba Three-In-One (with ATM)

Sample output from each printer has been enlarged by 127 percent.

Introduction of ATM, and the imminent release of System 7.0, erases most of the class distinctions between these two types of output devices. And as a pleasant surprise, you can expect ongoing software developments in the coming year to enhance the output capabilities of any printer you buy.

If you don't have a printer now, the market sorts itself out pretty simply. First, there's not much reason to buy an ImageWriter II anymore—there are 24-pin printers for nearly the same price. Among 24-pin printers, you may as well pick the cheapest one you can buy locally; Adobe Type Manager has erased most of the differences that vendors' software packages used to create, but you are still likely to want to line up service you can reach conveniently. If your printing requirements are restricted to a few pages per day, the Hewlett-Packard DeskWriter (or for portability, the Kodak Diconix M150 Plus) is a quiet alternative to a 24-pin printer.

Finally, if you have a $1000 printer budget, scrounge up a few hundred more and get a GCC PLP II. The print quality compares favorably to that of printers costing thousands more, it's fast enough, and installation has been improved over the first PLP. In mid-1990, it's the outstanding bargain in QuickDraw printers.

As this article went to press, Hewlett-Packard announced an Adobe PostScript cartridge and an AppleTalk interface kit for the LaserJet models IID, IIP, and III. Since the IIP has a list price of $1495 and the AppleTalk kit and PostScript cartridge are priced at $275 and $695, respectively, this is a price breakthrough for a true PostScript printer, especially since LaserJets are often heavily discounted. When LaserJets are loaded to the recommended memory level, another $1000 or so must be added to this, but they are still important bargains for true Adobe PostScript.

Charles Seiter has been experimenting with non-Apple printers for Macworld for four years. His background includes development of custom drivers for high-resolution scientific plotting.

See Where to Buy for contact information.
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AE DataLink Mac ........... see feature
AE DataLink MacPortable .... $259
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<table>
<thead>
<tr>
<th>Capacity</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 Mb External</td>
<td>$509</td>
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<tr>
<td>80 Mb External</td>
<td>$769</td>
</tr>
<tr>
<td>105 Mb External</td>
<td>$819</td>
</tr>
</tbody>
</table>

The internal series comes preformatted complete with cables & mounting hardware.

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 Mb Internal</td>
<td>$415</td>
</tr>
<tr>
<td>80 Mb Internal</td>
<td>$675</td>
</tr>
<tr>
<td>105 Mb Internal</td>
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</tr>
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DEADLINE
Macworld must receive entries by July 5, 1990.

RULES
Please submit no more than four works; each work must be accompanied by an entry form. Include a $5 (USA) administrative fee with your package (make check or money order payable to Macworld). Send hard and disk copies of each piece; disk copies may be omitted if the work will not fit on an 800K floppy. Animated entries may be on disk or half-inch videotape. Work will be returned only if you include postage and packaging. Macworld is not responsible for loss or damage. For more information, call 415/978-3176.

Since work will be judged on technical innovation as well as aesthetic value, each piece must be accompanied by a detailed description of how it was produced. Macworld and its international affiliates reserve the right to publish entries.

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Title of work

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Return postage enclosed

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PHOTOSHOP 1.0
Pros: Full-featured; has multiple channels; good for special effects; easy to use.

Adobe's long-awaited Photoshop has finally arrived. The program was designed by Thomas and John Knoll, the same people who designed the original Barneyscan software, and was then acquired by Adobe, who added some real nice touches and made it more user-friendly. It's a rich program with features for the most sophisticated color professionals and a lot of practical production tools.

Adobe Photoshop is not a paint program. Even though Photoshop's paint tools rival those available in some of the best paint programs, not all of the paint tools found in popular paint programs are included. Photoshop is an image-manipulation program rivaled only by high-end systems like Scitex.

Tools of the Trade
Standard features include a magnifying tool that works like Illustrator 88's (actually it's more like FreeHand's magnifying tool, because the spot where you click the tool becomes the center of the screen).

The text tool lets you enter text through a window, similar to the way Illustrator does. You can specify font, horizontal alignment, point size, leading, character spacing, style options, and antialiasing. Letter spacing can be adjusted to $\frac{1}{10}$ pixel or $\frac{1}{10}$ point. You can kern individual letters pixel by pixel by bringing type in from an alpha channel (discussed later) and progressively deselecting and adjusting characters. Also, lots of special effects can be applied to type by using an alpha channel.

The smudge, brush, and airbrush tools all use the same set of brush sizes and shapes, including one custom brush shape available in the Brush window. You can create a custom brush shape from any 64-by-64-pixel selection; that custom brush becomes the default custom brush for all the painting tools. Each painting tool has options for adjusting fade-out, spacing (how close each color is to another), and repeat rate (the rate at

Patricia McShane composed this image using scans of 35mm slides. She skewed and rotated the earth and pasted it into masks for each face of the tablet, controlling the shadows using paste controls. With the Threshold, Brightness/Contrast, and Distort commands and the Motion Blur filter, McShane modified Pegasus to give him movement. Using a mask, she pasted the desert behind the foreground. A transparent border was added using paste controls. Color was corrected and imperfections were removed by cloning with the rubber stamp tool.
which color is applied to the image when the mouse is stationary). All the painting tools except the line tool have an option for adjusting opacity (by percentage).

With the rubber stamp tool’s unique Clone option, you click on an image on any spot you want to duplicate, click anywhere else on the image or in another window, and you begin cloning the image—placing an exact or modified copy of the part you chose—at that point. You can also use the rubber stamp tool to save your image, make changes, and then, without saving again, have selected portions of the image revert to the last version you saved. For example, save a color image and then convert it into a gray-scale image, then wipe off the grays to reveal the color image that was last saved. You can apply effects, including patterns, to the image being restored. Super special effects.

All the paint tools work in normal mode, color-only mode, or a darkened or lighten-only mode on pixels that are lighter or darker than the foreground color.

The blend tool creates blends from the foreground color to the background color in a linear or radial method. The blur tool and sharpen tool decrease and increase, respectively, the contrast between adjacent pixels. The line tool lets you adjust arrow length, width, and the angle of the arrowhead.

Photoshop’s selection tools allow you to select parts of an image or specific colors. You can then move the selection or even change colors. The rectangular and oval selection marquees constrain the selection to a square, an oval, a specified height-to-width ratio, or a size you define and apply with the click of the mouse. The lasso tool not only lets you select objects freehand but also lets you use the option key to select with straight lines and freehand lines interchangeably. A basic magic wand, with tolerance setting, lets you apply a user-specified amount of fuzziness to the 1-pixel edge of a selection—letting you very accurately control how softly the edge of the selection blends with the background. The Eyedropper color-selection tool lets you select foreground and background colors from the active window or an inactive window on the screen.

All the selection tools are flexible and adjustable and work with the Shift and Control keys. The Grow command (in the Select menu) progressively selects pixels surrounding a selection with increasing tolerance. The Similar command finds and selects other pixels in an image that are similar to the ones selected.

The cropping tool is great. You access it through the Cropping Tool Options dialog box to preselect the width, height, and resolution of an image (to create a constraint); Photoshop automatically sizes or resamples your image as necessary. In addition, you can rotate the selection window to crop an image at any angle. The cropping tool is a very useful production tool that can be a real timesaver when you’re preparing many images for output at the same size.

**Multichannels**

RGB, of course, is supported, along with CMYK, gray scale, bitmap, index color, HSB, and multichannel (any file with additional alpha channels used for masks, and so on). Photoshop’s files can have up to 16 different channels. An RGB file would initially have three channels: red, green, and blue. A channel is similar to a printing plate. For example, the RGB channels make up an RGB image. In addition, you can create up to 13 alpha channels, which are separate 8-bit channels that align with the RGB channels. These alpha channels can be used to edit an image or to save selection masks. Photoshop also allows you to perform calculations between channels and save the results to new channels. This is great for simulating blue-screen replacement effects (see “Star Quality,” Macworld, June 1989). The ability to perform calculations and to have multiple channels or multichannel files will appeal to anyone who needs very sophisticated control of the color in an image.

Multichannel files are possible because Photoshop uses its own virtual memory, with your file size limited only by the space on your hard disk. Of course, a file larger than RAM capacity slows things down: the program has to access the hard disk with each operation. But until we have huge amounts of RAM, virtual memory is the only way to work on large files.

Photoshop also lets you set your monitor to emulate printed process color. Once your monitor is set you will see a good representation of the changes encountered by converting from RGB to CMYK color—an essential feature for correcting an image for process printing.

Photoshop has some great filtering effects and also supports plug-in filters created by third-party software developers.

**The Joy of Photoshop**

Printing with Photoshop is a joy. I do not have actual benchmark test re-

---

A Nice Interface

On the left, an alpha channel (created from a selection of the rose) is copied back to the RGB channels in the form of a graduated selection. The Mode menu shows available image modes, along with all the file’s channels as a submenu. Using a movable color palette, you define foreground and background colors as values of RGB, CMYK, or HSB, or mix colors on the scratch pad. At the bottom a pop-up shows image size, total channels, and resolution.
sults, but Photoshop seems to print through an imagesetter faster than anything I have encountered. And it gives you lots of control over printing. The Transfer Function dialog box enables you to adjust highlights, 1/4 tones, midtones, 3/4 tones, and shadows for all the process colors individually; to adjust the monitor’s gamma curve settings; and to save all the settings as a transfer function file for future use or modification. As a result you have some real calibration control over the printer's dot gain. Halftone screens are created using Adobe's special algorithms.

The icing on the cake is trapping, the ability to have adjacent colors overlap to compensate for misregistration in printing. Photoshop is the only program I know of that can spread the appropriate sections of an image to create trapping in the final printed piece. The extent of the trap is set in pixels, points, or millimeters. The program then looks for changes in color based on the trap size and automatically sets traps.

Photoshop is easy to use. Considering the vast number of features and tools involved, I believe Adobe has done a good job of keeping things organized and simple. However, I think that the different ways in which Photoshop handles image size and resolution can be confusing. The features and tools work great but they take a little getting used to.

The big manual takes a good three days to get through, but it's worth reading. Each feature is first described in general terms, then followed by a detailed step-by-step example on its use. The manual has good screen shots and color, but the section describing how to split and merge channels could use at least one example. Overall, there need to be more examples in the manual.

I haven't worked with Letraset's ColorStudio yet, but I don't think there's a Mac program that can do as much as Adobe Photoshop. It gives me the feeling that with enough time, any touch-up or special effect can be achieved. If you want to experiment with and process high-quality color images on the Mac, this program is a must.—Arne Hurty

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spend an afternoon twiddling terminators to get everything working. As an alternative, you can buy a two-connector adapter from GCC.

The Software Side

If you're familiar with the original PLP or with GCC's WriteMove or WriteImpact printers, you'll feel at home with the PLP II's software. Like the aforementioned printers, the PLP II uses Bistream outline fonts. The fonts are stored on a hard disk (yes, a hard disk is required). The PLP II comes with the Courier and Symbol fonts, as well as Bistream versions of Helvetica, Helvetica Condensed, Times, and Palatino (called Swiss, Swiss Condensed, Dutch, and Zapf Calligraphic, respectively). Additional fonts are available from GCC, as is a converter application that lets you use Bitstream's MacFontware library with the PLP II. I also used the PLP II with Adobe Type Manager with very good results.

During a print job, the PLP II's print driver uses the outlines to generate font bitmaps in the sizes required for the current page. A bitmapped image of the page is then created on the Mac's hard disk and transferred via the SCSI bus to the printer. A set of prebuilt font bitmap files containing common point sizes also accompanies the printer. You can reduce printing times by copying these prebuilt fonts to the hard disk; they use about a half-megabyte of disk space.

Let the Mac Do It

This let-the-Mac-do-it approach to imaging pages is identical to that of the original PLP and has the same advantages and drawbacks. On the plus side, this approach allows the PLP to be electronically simple, and therefore, inexpensive. A PostScript printer, by contrast, does its own page imaging using an internal microprocessor and several megabytes of costly RAM and ROM (see Macworld, October 1989, "Paging All Printers").

On the negative side, the PLP's approach can be slow. How slow depends on the print job and the Mac. You must endure long printing times if you print typographically complex documents using a 1MB Macintosh Plus. (And to rub salt in the wound, the PLP II does not work with popular print spoolers such as SuperMac's SuperLaserSpool.) With simple documents printed from a multimegabyte Mac II, performance is a bit more sprightly.

If you consider a maximum of 4 pages per minute (ppm) sprightly, that is. Still, the PLP II is generally faster than Hewlett-Packard's DeskWriter, a low-cost, 300-dpi ink-jet printer. You can boost performance by about 15 seconds per page by adding an optional 1MB upgrade to the PLP. Adding more memory and an accelerator board to the Mac boosts performance with complex documents, but you eventually hit the 4-ppm wall. (At press time, GCC announced the PLP III, an 8-ppm printer available for $1899.)

Another drawback is that you sometimes have to print complex documents in two steps, especially on 1MB and 2MB Macs. Two-step printing isn't complicated—you simply quit the application you're using and then run the PLP's Print Manager utility—but it isn't terribly convenient, either. Adding memory to the Mac usually eliminates the two-step routine.

My Personal Opinion

Because the PLP II requires the Mac to create page bitmaps, it can't be shared on a network. If you want to be able to print from more than one Mac, you'll be better served by a PostScript printer, which shares easily. You'll also need a PostScript printer if you plan to use PostScript-oriented applications such as Adobe Illustrator 88 or Aldus FreeHand. And if performance is more important than cost, you might consider Qume's CrystalPrint Publisher or one of its cousins, although, be cautioned, they don't do envelopes.

But if you are looking for top-quality output, compatibility with the vast majority of Macintosh applications, and the security that comes with buying from a veteran Mac hardware manufacturer, buy the PLP II. It is reliable, its software is well designed, and its manual is excellent. And its output looks great, even if you do have to wait a while to see it. Look at it this way: while you are waiting, you can think up ways to spend the money you saved.—Jim Heid

See Where to Buy or circle 752 on reader service card.

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**TYPEALIGN 1.0**

**Pros:** Adds text-positioning capabilities to Adobe Type Manager fonts; good user interface. **Cons:** Works only with Type 1 fonts; limited number of effects. **Company:** Adobe Systems. **Requires:** Mac Plus; System 6.0.2; Adobe Type Manager. **List price:** $99.95.

In the biological world, many organisms adapt to certain ecological niches to cut down on competition. Adobe Type Manager evolved to fill the need for readable fonts for low-resolution devices such as the Mac's screen and dot matrix printers. Now, a new program called TypeAlign has developed a symbiotic relationship with ATM, enhancing the capabilities of the latter with a number of special effects (see Reviews, Macworld, February 1990 for a review of ATM). While ATM displays readable text at almost any size, characters become distorted when placed at an angle. TypeAlign lets you place text on a slanted or curved path, retaining smooth character shapes for screen display and low-resolution printing.

TypeAlign was developed by Emerald City Software. Adobe Systems recently acquired Emerald City and will be distributing and supporting all the Emerald City products.

**Instant Effects**

TypeAlign is installed as a disk accessory, making it available from within any application. Say you're laying out an ad in PageMaker, for example, and want to add the word *Neat* at an angle. Open up TypeAlign, and a text-effects window appears (see "Align 'Em Up"). Select the straight line from the tool palette and draw a line at any angle (unfortunately, TypeAlign provides no digital readout, so you'll have to set the angle by eye). Next, click on the text tool and start typing. Smooth, readable text appears on the slanted line in Times, the utility's default font.

You can change the font or other text attributes—size, style, or shading—by selecting a block of text and choosing Type from TypeAlign's menu. (continues)
This face will change the face of electronic publishing.

The beautiful reproduction you're looking at is the direct product of electronic publishing. Surprised? The photo is by Andrew Unangst, renowned for the graphic beauty of his work. The unprecedented resolution of this page is by the Nikon LS-3500 Film Scanner, soon to be renowned for the graphic beauty of its remarkable, high definition detail and color fidelity.

Unangst worked with a Nikon F3. The LS-3500 worked with a Mac® II. But any MS-DOS® or UNIX®-based system would have been equally adept. The original was a 35mm positive. But a 35mm negative, color or monochrome would have worked brilliantly, too.

The crisp enlargement is the result of a scanning resolution that's far superior to any previously possible. A precision Nikon lens was conceived specifically for the task. The scanner has resident intelligence so operation is effortless. And our proprietary color separating software can be used easily by your receptionist and creatively by your Da Vincis. All with unmatched precision, control and economy.

The machine is about half the size of a Mac. And goes for about what it now costs you merely to compose film seps for a couple of ads just like this one. But then, they could never be quite like this one.

Don't just take what we've said at face value. Find out more, call or write: Nikon Electronic Imaging, Dept. EL-B, 101 Cleveland Ave., Bayshore, NY 11706, (516) 222-0200 Ext. 324. Or call 1-800-NIKON-US (645-6687) for the dealer nearest you.
Align 'Em Up
TypeAlign lets you place text at an angle or on an arc or free-form path. You can pop effects directly into the document you’re working on, or save them for later use.

You can also add color to any or all characters in an effect if your screen and printer support color. TypeAlign lets you mix fonts, styles, shades, and sizes in a single effect. (Keep in mind that since TypeAlign works in conjunction with ATM, it works only with fonts supported by ATM—namely, the Type 1 PostScript fonts manufactured by Adobe and a few companies that license Adobe’s font technology. The font-selection situation is improving, however; the recently released version 2.1 of ATM supports Bitstream fonts, and Image Club Graphics plans to release a utility that converts non-Adobe fonts to Type 1 fonts.)

You can edit an effect as you work on it, centering or justifying the text, for example, or adding or deleting characters. A kerning control lets you add or subtract space between characters. And you can zoom in for a closer look and increased kerning precision. (I had no trouble editing text on a Mac II, but found cursor positioning sluggish and unresponsive on a Mac Plus.) A template option lets you “see through” the TypeAlign window to the document below, to see how TypeAlign text will look in the document.

When an effect is ready, you can copy it to the Clipboard and paste it into your document, or save it as a PICT or EPS file. You can also save a TypeAlign effect in Illustrator 88 format and edit it with that program.

In addition to the angled line, TypeAlign lets you place text on an arc or on a free-form path you draw; you can reshape the freehand line by dragging control points or by adding and dragging new ones. Once you’ve placed text on a path, you can distort it (into a perspective effect, for example) by dragging a handle.

TypeAlign works with a goodly selection of Mac programs, including word processors and page-layout applications. It doesn’t work with Canvas, CA-Cricket Draw, or SuperPaint, however, and although TypeAlign works with paint programs, these programs display text as bitmaps that don’t take advantage of high-resolution printers such as the LaserWriter. Like its companion ATM, TypeAlign is a boon for ImageWriter owners, creating crisp text output at virtually any size. (Even ATM can’t produce perfect ImageWriter characters at sizes below 8 points or so, but this shouldn’t bother most TypeAlign users, since the program’s effects are appropriate for display type at large sizes.) TypeAlign works with both QuickDraw and PostScript printers, taking advantage of the resolution and printing capabilities of whatever printer you use.

The Bottom Align
To increase TypeAlign’s chances of survival, Emerald City employed a technique found among plants and animals: mimicry. The purple-and-yellow box with a large red letter closely resembled ATM’s package, enticing ATM owners to go through the familiar routine of paying $99 for a text utility. Adobe purchased TypeAlign but may not even have to redesign its package.

Is TypeAlign worth $99? That’s a matter of opinion. If you want a utility that’s available at the flick of the mouse to place readable text on a slant, arc, or free-form path, then TypeAlign is a worthwhile investment. Because of its specialized typographical niche, TypeAlign has a fairly limited repertoire, but what it does it does well.

If you already own a PostScript graphics program like FreeHand or Illustrator or a draw-and-paint program like SuperPaint, you can achieve many of TypeAlign’s effects. Personally, I don’t mind seeing scratchy-looking angled text on the screen, as long as it prints out cleanly on my LaserWriter. But if you’ve found that ATM enhances text on your ImageWriter or other printer, you might well want to enhance ATM’s capabilities with TypeAlign—Erfert Fenton

See Where to Buy or circle 872 on reader service card.

ABATON INTERFAX 24/96

Pros: Operates in background with or without MultiFinder; prepares documents for sending prior to transmission; displays faxes on screen; supports distribution lists; modem includes MNP Class 5. Cons: Allows phone-directory entries by name or company, not both. Company: Abaton (a subsidiary of Everex Systems).


Although stand-alone facsimile machines are still too expensive for many small businesses, fax modems such as the Abaton InterFax 24/96 offer Macintosh users standard fax capabilities at a more modest price. The 24/96 is a dual-purpose unit. It sends and receives faxes at 9600 bits per second (bps) and functions as a 2400-bps Hayes-compatible data modem.

Hardware Setup
All you need to do to set up the hardware is connect the serial cable from the 24/96 (25-pin) to the Mac’s serial port (8-pin), string the telephone cord from the 24/96 to a wall jack, and plug in the power cable. All cords and cables are supplied. Optionally, you can also connect a phone handset to the unit. The phone operates normally whether the 24/96 is on or off.

The software includes InterFax Control (a Control Panel device that enables you to monitor transmissions), FaxMaker (a Chooser-level print driver), two special-purpose fax fonts: SWA Swiss and Dutch (Helvetica-style and Times-style fonts), and the InterFax program.

The InterFax Program
Before using the 24/96 for the first time, most users will want to run the program’s configuration routines. The modem configuration dialog box allows you to enter your name or a brief message that will appear in the page header whenever you send a fax, how many rings the unit must sense before answering the phone, and the speaker (continues)
Color Hardcopy To The Macs.

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Circle 65 on reader service card
volume. Other configuration options specify whether or not page headers on faxes you receive should be printed, where on disk incoming and outgoing mail should be stored, and how—or if—you should be notified of incoming faxes.

Like any good fax application, Abaton's lets you set up a phone directory that can contain as many as 800 entries (and you can create multiple directories). If addresses have something in common, you can combine entries into distribution lists. When you want to send a fax to each of your sales reps, for instance, you just select the appropriate distribution list and let the 24/96 take care of them one after another.

To save time and paper, the 24/96 includes an on-screen viewer that lets you examine any incoming or outgoing faxes. Screen magnification can be set from 5 to 1000 percent, and the image can be rotated 90 degrees in any direction—which is a great way of handling faxes that were sent upside down.

The program logs all completed transmissions, both incoming and outgoing (see “Delivered Mail”). Unsuccessful transmissions, or faxes that have been scheduled for later transmission, appear in a separate Fax Schedule window as miniature envelopes with the recipients' names and a stamp icon. The image on the stamp shows if there were problems with the transmission.

The biggest advantage of using a fax modem is that, since most of your documents are created on the Macintosh and stored on disk, there's no need to scan them before sending. Of course, a fax modem's no good if you need to send copies of information that hasn't been created on the Macintosh (ad slicks or contracts, for example). Although the 24/96 has no scanning capabilities, the 24/96 can control a scanner if you should decide to add one to your system. Options are also provided to convert fax files into graphics (PICT, MacPaint, or TIFF formats), and to change the same graphic file types into faxes.

Sending and Receiving Faxes

The FaxMaker driver allows you to create faxes from within almost any application that uses the standard Macintosh Print routines. All you have to do is open the Chooser from the Apple menu and select the FaxMaker icon as the current printer. Until you reset the Chooser, any application that you print from automatically sends the current document as a fax instead.

When you select Print from a word processor, spreadsheet, or other program, the FaxMaker's Print dialog box pops up. To send the document as a fax, you merely indicate the desired quality and page range, then click Schedule to select a destination from the phone directory (or to enter an unlisted one). You can also set a special delivery date and time, if you wish. Otherwise, the transmission occurs immediately.

For transmission, the file is compressed and font substitutions—if indicated—are automatically made. Because the Macintosh screen resolution is about one-third of a fax machine's printing resolution (approximately 200 dots per inch), fonts look best if you have a size that is three times as large as the font in use. The SWA Swiss and Dutch fonts that come with the InterFax 24/96 include the appropriate triple-size fonts for any point size between 9 and 24.

Receiving a fax with the 24/96 requires no action on your part—other than making sure that the 24/96 and the Mac are on. The standard notification for an incoming fax is that the Apple icon changes to a flashing telecommunications symbol. You can also set a beep tone to indicate a successfully received fax.

The InterFax cdev

The InterFax cdev software shows how the current transmission is progressing and includes detailed information on the speed, fax quality, and number of pages; notifies you of unopened faxes; and shows when the next outgoing transmission is scheduled. The cdev also offers the only way to stop a transmission in progress. It also reports errors and automatically retries a call five times—at five-minute intervals.

Modem Features

The 24/96's 2400-bps data modem includes built-in diagnostics, autoanswer, support for the Hayes AT command set, MNP Classes 2 through 5 (for automatic error control and data compression), and voice-to-data switching. To activate voice transmission you simply pick up your phone handset. You don't even need to do anything to switch between modem and fax capabilities. The 24/96 automatically uses whichever mode is appropriate for the current transmission. Nine LED status lights mounted on the front panel show what the fax or modem is up to at any moment.

In modem mode, the 24/96 operates flawlessly in my tests. In fax mode, the only problems I encountered were the result of my not reading the entire manual before plunging in. I didn't benchmark the 24/96 against a standalone fax machine, but I found the transmission times acceptable (about 24 seconds for a half page of text). If you're considering buying a fax modem, the 24/96 should be high on your list of candidates, and it comes with a one-year parts-and-labor warranty.

—Steven Schwartz

See Where to Buy or circle 703 on reader service card.

Delivered Mail

The InterFax application maintains a log of completed outgoing faxes, showing the date, time, recipient, number of pages, and the connect time. With this log, even if you schedule transmissions for the wee hours of the morning, there's no need to wonder if they get through.
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When we introduced this product we had to ask ourselves, "What should this software cost?" To help with our decision we hired accountants. We consulted with industry "movers and shakers." We purchased the finest spreadsheets available. Many people said, "The software should sell for $3,000.00 or more." Others said, "It's good, darn good—sell it for at least $2,000.00." Opinions varied. Finally we said, in the Great American Tradition, "Aw...What the Heck! Let's see the competition beat this $699.00.

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DesignCAD 2D/3D
Professional CAD System for the Macintosh

Dealers circle 336 on reader service card
End users circle 337 on reader service card
If you own a black-and-white scanner, but your Macintosh system uses color, you've probably wished many times for some way to capture color images for inclusion in a desktop presentation or a publishing project. ColorSet, an ingenious combination of color acetate filters and software from Studiotronics, provides just such a capability.

Not a Scam
Scanning in color with a black-and-white or gray-scale scanner sounds at first like it's too good to be true, but a scanner that's color-blind has a great deal in common with one that isn't. Both read grayscale information using the same type of light-detecting sensor, a charge-coupled device (CCD) array. Color scanners differ in that they record colors by positioning three color filters (red, green, and blue) between the image being scanned and the CCD array. The simplest color scanners scan an image three times, changing the filter with each pass. The information from the three scans is then combined to form a color image. ColorSet works the same way, except you have to pitch in and change the filters yourself.

When you initiate a scan with ColorSet you indicate the region of the image you want to scan. Then the software prompts you to position one of the three filters between your image and the glass plate of your scanner for each of three successive scans. ColorSet then combines the information from all three scans and presents a color image in an editing window.

Regardless of the kind of monitor you have, you're given the option of creating an image in 8-, 16-, or 32-bit mode (256; 65,536; or 16.7 million colors). If your monitor is limited to 8 bits, ColorSet will display scanned images using 256 colors but still retain all of the color data for the color mode that you selected when the scans were made. In other words, you don't need a 32-bit color monitor to create a 32-bit image. If your scanner, like the Apple Scanner, only captures 4 bits per pixel, the images will be limited to a maximum of 4096 colors. However, images scanned in 32-bit mode with 8-bit scanners can contain a maximum of 16.7 million different colors.

Editing Tools
Although ColorSet doesn't provide all the capabilities of an advanced image processing program like Photoshop or ColorStudio, it does supply enough editing tools to create usable images most of the time. Six slider controls enable you to adjust the contrast and brightness of each of the primary colors. To adjust the contrast or brightness of a specific area of an image, you use a brush tool to select the desired area first. If you wish to change a subset of colors, you first select the desired colors by clicking or shift-clicking on the appropriate color squares in a color palette box. Although Undo isn't available after each adjustment, you have the ability to mark (that is, save) the condition of the color palette after each change that you decide to keep. Choosing Revert to Original later on will then reset the image to the marked palette instead of the original palette. When you finish editing your image you can save it to disk in 8-bit PICT, 32-bit PICT, or in color or gray-scale TIFF format. By saving a scanned image in gray-scale TIFF format, users of 4-bit scanners can create 8-bit images with 256 shades of gray.

Registration Woes
A major drawback to using ColorSet is the need to maintain perfect registration of the three scans. Typically this is achieved by securing the top of the image to be scanned with a low-tack tape (a roll of 3M's Post-it Correction Tape 658 is included with ColorSet). Securing a page bound in a magazine or book is difficult, if not impossible. In most cases you'll have to either cut out the image or remove the page from the binding. Also irksome is the need to keep the filters clean and free of lint.

All Scanners Are Not Equal
ColorSet works better with some scanners than with others. In my tests with the Apple Scanner I had to manipulate the images to bring out blue hues (continues)
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correctly. However, the clarity of the images I got was surprising, considering the inherent limitations of using a 4-bit scanner to create color images. Studiotronics claims that the best results are obtained with the Hewlett-Packard ScanJet Plus and that acceptable images can be obtained with Abaton's 300/GS scanner. Due to the limited range of control over brightness and contrast with Micronet's scanners, however, Studiotronics does not recommend using Micronet scanners with Colorset.

Color in HyperCard Stacks

Included with Colorset is an XCMD for displaying color PICT files in a display window from within HyperCard stacks. Using the ShowScan installer stack you can install the XCMD in any of your stack projects or into your Home stack. When you call the XCMD from a HyperCard script you need to specify the file name and path of the PICT file you wish to display and the x and y coordinates of the top left corner of the window that will contain it. You can also specify the number of seconds that ShowScan will display the image; by setting the delay value to zero, you can make the image window remain on screen until you click the mouse button. Since ShowScan's display window typically covers most of HyperCard's window, you'll need to use a graphics program to annotate your color pictures if you want text to accompany an image.

If you already own an Apple Scanner or HP ScanJet Plus, Colorset is a practical and economical way to get color images into your Macintosh. If the pictures you need to scan are bound, or if you need to scan a lot of color images on a frequent basis, consider purchasing a color scanner instead. Keep in mind that working with color images obtained from either Colorset or a color scanner, particularly large ones or those that are 32 bits deep, will tax the resources of almost any Macintosh system, particularly with regards to the amount of disk space you'll need. However, scanning color pictures for display on the Macintosh is undeniably a lot of fun and can bring new ideas and creativity to your work.—David L. Foster

See Where to Buy or circle 715 on reader service card.

**Reviews**

Font-creation Software

**PARAFONT 1.02**

**Pros:** Closely approximates traditional typographic symbols; makes modification of PostScript fonts easy; allows generation of entire sequences of related symbols with a single command; can apply identical set of modifications to any number of original fonts. **Cons:** ParaFont consumes more printer memory than comparable conventional fonts. **Company:** Design Science. **Requires:** 512KE. List price: $99.

Despite the unarguably high quality of most PostScript fonts, the traditional typographer can still find subtle aesthetic failings to criticize. For example, since Macintosh fonts lack genuine fraction characters, you have to create ungainly simulations by typing out full-size numerals separated by a slash character. And have you noticed how all the numerals in a Macintosh font are allotted the same amount of space on a line, regardless of each numeral's actual width? That's fine when you want to line up digits in a table, but it results in unnatural-looking spacing for numbers within a block of text.

Design Science's ParaFont lets you quickly and easily correct these and similar deficiencies by generating symbols from existing characters in any PostScript font. Of course, you could use Fontographer to hand-tailor symbols for every font you use, character by character—assuming you have the time and design skills. But the ParaFont solution is much faster, and the results will satisfy all but the pickiest typographers.

ParaFonts

ParaFont relies on the same basic techniques utilized by such font special-effects packages as Laser FX and SmartArt, though the emphasis here is on typographic detail rather than flash. The fonts created with any of these programs contain no character outlines of their own. Instead, they simply consist of PostScript language commands that create and then modify copies of entire fonts or individual characters already resident in the printer. This results in an inherent, but usually tolerable, drawback: a ParaFont font consumes more printer memory than an ordinary font, since both the original font and the copy must be present.

ParaFont can change a character's proportions by scaling the vertical and horizontal dimensions independently. The program can slant a character forward or back, or reposition it relative to the text baseline. ParaFont can change the amount of space to the right of the character, the thickness or relative position of an accompanying underline, or the width of the outline that prints when you choose Outline on the Style menu. For convenience, you can reassign a character to a new key, or combine several characters into one (to create complete fractions that you can type with a single keystroke, for instance). In fact, you can even merge characters from other fonts into the base font.

Relying on these few basic modifications and ParaFont's built-in options, you can rectify standard Mac fonts' most common typographic omissions. To create a one-key typographically correct fraction, for example, you just type the numerator and denominator into the appropriate dialog boxes. The program then downsizes the original numerals to 65 percent of their width but only 60 percent of their height—a change of proportions consistent with typographic convention. You can create fractions with a diagonal bar or horizontal bar; in either case, ParaFont positions the numerals properly as numerator or denominator, as the case may be. If you can't anticipate all the (continues)
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Circle 104 on reader service card
fractions you’ll be using ahead of time, you can also generate two sets of similarly scaled individual numerals, one set raised above the baseline for use in numerators, the other on the baseline for denominators.

ParaFont can also turn ordinary capital letters into small caps, which are often used for titles, headings, and other items that benefit from a delicate emphasis. In this case, ParaFont shrinks the letter to 90 percent of its original width and scales its height to a little more than that of a lowercase x in that font. Similarly, another option creates elevated, miniaturized superior characters, which are smaller, not as high as the standard superscript, and have different proportions. You can have the program build facsimiles of the ligatures that are missing from most Mac fonts. Other numeric functions automatically add proportional spacing to standard numerals or transform them into old-style numbers (where the numbers descend the baseline) for use in formal text. Finally, for situations where these automatic modifications don’t fit your needs, ParaFont lets you type in your own scaling, slanting, and spacing values for each character.

**Easy Transformations**

ParaFont is extremely easy to operate. For the main screen you can choose a Key Caps–like representation of the keyboard layout or a simple table of characters. The one design gaffe I uncovered in ParaFont is that this window fills only about half the display and can’t be enlarged to show the entire font at once. Double-clicking on a character in the main window (which looks a lot like the keyboard in Key Caps) brings up the transformation dialog box for that particular character. Alternatively, you can select a group of keys in the main window’s keyboard graphic; ParaFont then automatically generates a series of modified characters en masse. For example, you can have the program generate a complete set of commonly used fractions all at once.

By substituting new characters for rarely used symbols, you can produce a ParaFont font that includes all the ordinary letters, numerals, and punctuation marks from the original font, along with a generous supply of new fractions, small caps, and ligatures. When a font is complete, you just tell the program to save it in PostScript and screen formats. If you want to apply the same modifications to another font, you simply change the base font and rename using a new name.

For most Mac users, the quality of ordinary PostScript fonts is more than sufficient. But if you want your desktop published documents to look professionally typeset down to the finest detail, get a copy of ParaFont.

—Steve Cummings

See Where to Buy or circle 791 on reader service card.

### HyperCard and CD Audio Program

**CD COMPANION SERIES: LUDWIG VAN BEETHOVEN SYMPHONY NO. 9**

**Pros:** Highly interactive; beautifully designed. **Cons:** None. **Company:** The Voyager Company. **Requires:** Mac Plus, hard disk, CD ROM player. **List price:** $99.95.

Reading about great music is a lot like reading about great food. No one would argue that reading a restaurant review is anything like eating the meal it describes; likewise, reading about a symphony is a pale substitute for hearing it performed. Now, however, The Voyager Company’s first CD Companion Series title, Beethoven’s Ninth Symphony, uses the Mac to bridge the gap between first-hand experience and expert commentary by using HyperCard to control a CD player. The product consists of a five-level HyperCard stack, written by UCLA professor Robert Winter, and a CD with a digitally remastered 1966 Decca recording of Beethoven’s Ninth Symphony, performed by the Vienna Philharmonic with Joan Sutherland, Marilyn Horne, James King, and Martti Talvela.

**Exposition**

CD Companion, though, is much more than just a tour through the symphony with simultaneous translation. Each of the stack’s five levels offers a fully interactive way to explore the music at your own speed and in your own sequence, and each level is designed to take you through the symphony in a different way. All the levels work together; at any point it is easy to switch from one to another to go into a particular subject in greater depth, return to the symphony for uninterrupted listening, pause the music to look up unfamiliar terms in a glossary supplemented with audio examples from the CD, search for any word on any card, or refer to on-screen help. By conveying the same information in a variety of ways, CD Companion allows you to learn about the symphony in whichever way you learn best.

**Development**

The first level. The Pocket Guide, presents the symphony structurally; all four movements and their sections appear on one card for easy access in any sequence. Click on the Scherzo da capo in the second movement, and you immediately hear that section; to compare that with the closing of the third movement, just move the cursor to the score of the third movement and click to hear that section.

The next two levels, Beethoven’s World and The Art of Listening, are longer sections that provide background about Beethoven’s life and times as well as an explanation of the symphonic form in general and the Ninth Symphony in particular. Both essays are amply illustrated with graphics and audio examples from the CD (see “Learning By Doing”). Throughout, Winter’s commentary strikes a delicate balance—it manages to be (continues)

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Learning By Doing

In The Art of Listening, you can learn about specific musical themes in the Ninth Symphony by following highlighted notes on the musical score. Playing the music from the Mac allows you to hear it in a simplified form. Playing it from the CD lets you hear it in its full symphonic beauty.
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both academically comprehensive and intellectually involving. Surprisingly, it isn't boring.

The fourth level, A Close Reading, was my favorite. It provides simultaneous commentary on the symphony as it plays. On the left side of the screen, you can read about the music in a commentary box and see the number of the measure currently being played; to the right is a map of the symphony so that you can always see where you are within the larger structure of the work. Above the commentary box is the name of the movement you're in, along with Beethoven's musical markings for it ( Allegro ma non troppo, un poco maestoso). By clicking on the movement number, you can move directly to the relevant section in The Art of Listening to read more about that movement; you're able to return to the same card in A Close Reading with one mouse click. And you can pause at any time to use the Notes section for your own notes.

Buttons occasionally appear, inviting you to hear something in isolation, such as a theme or variation. Clicking on these buttons brings up a card with the score for just those measures so that you can see them, hear them, and then return to the symphony when you are ready to move on. During the "Ode to Joy" choral section, the lyrics appear in either English or German. The most magical thing, though, is how easy it is to resume the symphony after a pause; there are none of the awkward gaps or skipped sections that I remember from the music lab at my university, where I would read a workbook and skip a needle all over a mistreated record.

Recapitulation

The fifth level of the stack, The Ninth Game, is a funny, irreverent quiz. Designed for one to four players, the game makes it fun to answer questions about specific musical features of the symphony, factual questions about the score itself, and the life and times of Beethoven, as Beethoven's bemused portrait looks on. Correct answers are greeted with cries of "Sehr gut" and "Ach, du Liebe" that sound as if they come from Beethoven himself, while incorrect ones prompt shouts of dismay and sounds of breaking glass, along with helpful replies from Ludwig himself to help you learn from your mistakes. If you particularly please the master, he dons sunglasses and sports a flower on his lapel, or winks at you in a gleeful manner (see "Ludwig Incognito").

Coda

If the combination of flexible interactivity, expert commentary, and definitive recordings of great music appeals to you, CD Companion is for you. The Voyager Company plans to release future volumes in the series and is currently working on Stravinsky's Rite of Spring. I used HyperCard to control an audio CD sounds like a tantalizing prospect, The Voyager Company also sells CD AudioStack, two stacks that provide you with all the tools you need to create your own companionable CD and stack programs. CD AudioStack even comes with its own audio CD, The Movies Go to the Opera, to practice on. Personally, I'm looking forward to an in-depth investigation of The Beatles' Abbey Road. —Liza Weiman

See Where to Buy or circle 713 on reader service card.

MIDI Sequencer

MASTER TRACKS PRO 4

Pros: Clean screen layout; graphic song-overview window; support for 32 MIDI channels; full sync capabilities; flexible edit filters and quantize controls; full graphic display and editing of all data. Cons: No graphic display of note velocities; no snap-to-grid mode in graphic editing windows; no density control for pencil tool in controller editing windows. Company: Passport Designs. Requires: Mac Plus; MIDI instrument. List price: $495.

Passport's original Master Tracks Pro was very successful because it was one of the first programs for the Mac to offer graphic editing capabilities and innovative windows that could display data such as tempo changes and pitch-bend movements in easy-to-understand graphic form. Even better, the program's layout was extremely clean, and it was simple to operate and learn. Over the years Passport has refined the editing displays and added many new features, but Master Tracks Pro 4 still has as simple a layout as the original Master Tracks product.

Look-and-Feel

Because of their excellent visual design, earlier versions of Master Tracks Pro have long been popular among users who need a professional-level program but have little experience with computers. This simplicity is not achieved at the expense of power, however; Passport has endowed Pro 4 with high-end features like 32-MIDI-channel capability, sync to MIDI time code (MTC), and advanced tempo controls that greatly simplify composing music locked to video. With 64 multichannel tracks to record on and a built-in System Exclusive data librarian that can store patches from most synthesizers, Pro 4 should be able to satisfy the needs of all but the most demanding professionals.

Passport also includes one feature that no other Mac program has, a measure-by-measure graphic overview of the song being worked on. In Pro 4 it's in the main window, called the

(continues)
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Track Editor (see "Right on Track"). Each box on the grid represents one measure of music; a solid box indicates that there is data at that measure in the track, a hollow box indicates an empty measure. As you build up more and more tracks, this display provides invaluable visual feedback about the song under construction. You can quickly insert markers at any point in a sequence to delineate sections. The Track Editor window scrolls while the sequence plays back, keeping the currently playing measure at the left edge of the window. You do most of your editing with the mouse by dragging to select edit regions and clicking to set paste or insert points. If you hear a bum note that needs fixing, a quick double-click anywhere in the grid opens the Step Editor for that track, precisely at the measure you clicked on.

Step In for Editing
The Step Editor is where most tweaking of single notes takes place. You can stretch, move, erase, and insert notes with the mouse, and zoom the display to any of six views. Double-clicking on a note pops up a box showing the note's start time, pitch, MIDI channel, attack and release velocity, and duration, all of which can be edited numerically. Non-real-time, or step, recording can be done from this window as well, allowing you to use live MIDI input to place notes on screen. You make region-specific edits in the Step Editor in much the same manner as in the Track Editor window, using the mouse to select the data in question, but in the Step Editor the regions can be as small as 1/240 beat. In the Track Editor, in comparison, the regions always snap to measure boundaries, making selecting large regions much quicker. Unfortunately, in the Step Editor you can't set the cursor to snap to any grid when selecting regions, so selecting rhythmically precise regions is trickier than it needs to be.

Two other features make Master Tracks Pro 4 stand out: the Fit Time, which very elegantly creates the tempo changes necessary to make a selected region of measures fit a specified number of minutes or seconds; and the Change Filter, which allows you to specify what notes will be affected by editing commands chosen from the Change menu. Other programs have similar filters, but none of them allow you to specify a map of beats within the measure that will be affected, or allow you to select every x measure.

In Control
Master Tracks Pro 4 also offers graphic display of MIDI Continuous Controller data. Pro 4 displays movements of the pitch-bend wheel, changes in keyboard pressure (aftertouch), program, change commands, and any of the 128 MIDI controllers as plots of data value against time. A slow fade on a synthesizer's volume pedal looks like a ramp on the screen, and if it's not perfect, you can easily redraw it with the pencil and eraser tools. For users of synthesizers and effects devices that can map incoming MIDI controllers to sound parameters, Pro 4 provides an excellent environment for automation control. You can even edit tempos in this fashion, which makes creating complex tempo changes a breeze. Like both the Track Editor and the Step Editor, these editing windows can scroll during playback and can zoom in to any of six magnifications.

One drawback to using the pencil to draw controller data, however, is that Pro 4 enters one controller event for each screen pixel you draw across. If you zoom way in to draw a precise curve, you wind up entering lots of data, which hogs memory and clogs up the MIDI data stream. Although there is a menu command that thins out controller data within a region, you have to thin out the data each time you draw it.

Filling the Bill
Passport has really made Pro 4 a complete workspace by including niceties like a notepad that stores text information inside a file, and a song playlist that cues up strings of separate files to create a set for live playback. Passport has added a List Editing window, which is very efficient for some operations. There is also a facility for remote control of play, record, rew ind, and so on, buttons from keys on a MIDI keyboard.

Many companies have refined graphic editing even further than Passport, however, leaving Pro 4 a little shy on features. Opcode's Vision, for example, can show the attack velocity of each note in graphic form and has sophisticated cursor controls that make editing individual notes much quicker (see Reviews, Macworld, October 1989). And Mark of the Unicorn's Performer can show five or more different types of MIDI controller data in one window, as opposed to Pro 4's one-per-window display.

This slight feature gap is offset by the fact that both competing programs are much more confusing and harder to learn. Pro 4's interface is far smoother and cleaner than either competitor's, and Pro 4's Step Editor makes cutting and pasting sections of songs easier than on any other program. With 95 percent of the capabilities of the competition, and a simple design that makes everyday operations less confusing, Pro 4 stands out as the one professional-level sequencer that you don't have to be a rocket scientist to use.—Charles Clouser

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A Capitalist Plot

Data Desk encourages you to investigate data through plots first and traditional tabular analysis second. This figure shows businesses color-coded by industry category, one of Data Desk's many applications of color in data analysis.

Data Desk, plots show businesses grouped by industry category or profitability category, plotted against gross sales. Since Data Desk makes it so easy to explore data, you might ultimately find that different industries fall into distinct plotting zones on a scatterplot of log (sales) versus log (assets), a useful insight into business structure (see "A Capitalist Plot").

Once you have found an interesting relationship by examining a variety of plots, you can perform numerical tests for statistical significance. Besides highlighting relationships for further investigation, graphical methods also allow the investigator to note and edit outliers or other anomalies in the data.

**Vital Statistics**

Data Desk has always included standard summary statistics, regression analysis, correlation statistics for non-parametric analysis, and principal components analysis. Data Desk allows unlimited variables and variable values, stored in the program's own relational structure, and a huge library of menu-based transformations. A feature called HyperViews gives context-based suggestions to pursue on appropriate lines of analysis.

Data Desk now includes a linear modeling section for analysis of variance and covariance (ANOVA and ANCOVA) that accommodates most experimental designs, including unbalanced and missing cells. The modeling section is especially useful because it accepts sets of data points selected and cut from Data Desk with the lasso tool—this makes ANOVA an efficient follow-up to insights developed during graphics manipulation. As an aid to beginners, linear modeling is performed from a Design Window that steers you through the initial model setup.

Other new features are sliders and the use of color as a plotting variable (rather than mere chart decoration). You can point to a plot axis, select it, and slide it, changing the plot origin. You can also define slider controls for any type of graph and use slider values in a computation.

Color as a variable is a simple but powerful concept; you can, for example, display a profit-versus-loss plot for a collection of businesses using variable blueness for degrees of profit and redness for loss. For really information-packed plots, color can be used as a fourth variable on a three-axis rotating plot. There's one more important graphics enhancement—Data Desk now offers scatterplot matrices. Plots can also now be presented in sequence through link buttons, and each window can include a note panel for comments.

**Real-World Conclusions**

If you need a statistics program that includes the whole list of tests from the handbooks, you should pick SYSTAT instead. If you need to make presentation graphics from data sets, Abacus Concepts' StatView II is better, and if your main concern is performing ANOVA on well-defined experiments, the top choice is Abacus Concepts' SuperANOVA (see Reviews, Macworld, May 1990). If you're a student you'll find that Data Desk 3.0 is not specifically keyed to mainstream college texts, unless you're lucky enough to be working with Student Data Desk.

But Data Desk does something that no other statistics program does as well. Specifically, it lets nonprofessionals investigate and find the same relationships in data that a professional statistician would find. That's a large claim, but it's a fact that Data Desk lets you perform a better analysis, with less formal background, than does any other Mac statistics product. For the vast range of possible users who are neither professional analysts nor analysts-in-training, Data Desk 3.0 offers the shortest path from numbers to real-world conclusions.—Charles Seiter

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The Macintosh Buyer's Guide / Spring 1989

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Database publishing has always been the black hole of desktop publishing on the Macintosh. Despite the abundance of jazzed-up, feature-laden desktop publishing programs, formatting database or spreadsheet files in page-layout programs has always been cumbersome. Considering the time, energy, and patience desktop publishers spend on formatting individual fields from tab-delimited files, it is a wonder that Aldus, Quark, and Letraset have never addressed the issue of database publishing. Conventional front-end type-setting systems have had this capability for quite some time.

Repetitive Redundancy
When you’ve placed a tab-delimited text file in PageMaker, formatting is tedious and time consuming if you want different type specifications for each field in the file. Electronic style sheets for formatting in PageMaker and other page-layout programs apply to either lines or paragraphs—there is no way to automate the process of selecting Field 1 and formatting it one way, selecting Field 2 and formatting it another way, and so on.

A good illustration is the 4-field, tab-delimited FileMaker text file that we use to produce the Where to Buy section here at Macworld. To get from here:

701 (tab) Product (tab) Great Product Inc. (tab) 415/555-5555
to here:

701 Product Great Product Inc. 415/555-5555
always took hours.

In addition, the work was mentally and physically repetitive, making it doubly tedious. Imagine having to format individual database fields and add punctuation over and over again to hundreds of entries.

The Tab’s Delimit
DataShaper imports and formats unformatted text-only, tab-delimited files from a variety of spreadsheet and database programs. The program works best with database and spreadsheet applications that use the standard Mac character set. DataShaper is compatible with Ashton-Tate’s dBase, Microsoft Excel, Microsoft File, Claris’s FileMaker II, ACIUS’s 4th Dimension, FoxBase+/Mac, and most programs that save tab-delimited text-only files. It worked successfully with all the programs mentioned. Files that use commas rather than tabs to delineate fields need to be converted to tab-delimited files (use the search-and-replace capabilities in most word processors).

After installing DataShaper, you open PageMaker, where you create placeholders (a pair of percent signs followed by a lower-case letter, for example, %%a) to correspond to every field in the data file. DataShaper then formats, rearranges, and reorders each placeholder complete with punctuation, spacing, tabs, and alignment. Next, DataShaper creates a format file by exporting the placeholder file using the filter in the Export menu.

Once the format file has been created, you select the file using the Place option in PageMaker’s File menu. Another dialog box appears, in which you select the unformatted data file. PageMaker then automatically formats the text.

Because each field is identified as %%a, %%b, %%c, and so on, you must be familiar with the contents of each field in the data file. Creating my first format file involved some trial and error as I learned how to identify placeholders as categories.

The only bug I found in DataShaper could be dangerous, although not fatal. While documentation is otherwise meticulous and well-organized, it refers to two distinctly different files as format files. One is the placeholder file, where the user specifies the %%a field, %%b field, and so on; and the other format file is the file created when the Export function is used from the placeholder file. While checking for bugs, I named the file I was creating with the Export function the same name as the placeholder file that was currently open. The program alerted me that I could not copy over that file and had “failed to export.” I then tried to create a format file with a different name but got the error message “Failed to export. No room in local heap.” This was the only problem I encountered in my extensive use of DataShaper.

It takes time to learn to format correctly, but DataShaper ultimately saves time and is an absolute necessity if you deal with tab-delimited database or spreadsheet files. In one test, a file that took four hours to format in PageMaker without DataShaper now appeared exactly as it should (formatted and spaced) after a 30-second filter pass with DataShaper.

Support Galore
With two software tutorials, nine software templates (ranging from a mail merge model to tape-cassette and VHS labels), and documentation that includes troubleshooting and advanced techniques, DataShaper is a small but incredibly useful product for desktop publishers. Automating redundant formatting tasks should have been one of the first things desktop publishing on the Mac could do for us. Fortunately, despite one fly in the ointment, DataShaper is a balm for many a tired desktop publisher’s hands.—Luis Camus

See Where to Buy or circle 721 on reader service card.
Macintosh Training That Works

"I have been using FileMaker for about a year now and decided to get the MacAcademy tape to see how the program was presented, the content, and to see if other tapes would be useful. After looking at the tape I promptly ordered three more! Needless to say I was pleased, as the tapes are professionally done and most useful. You and your company do a fine job."  
Mr. James H. Patterson, M.D.

DAYTONA BEACH, FL- "There's got to be a faster, easier, and less expensive way!" This statement sums up the frustration that Randy Smith felt three years ago as he tried to find training for the Macintosh computer.

That frustration led to the creation of MacAcademy, now the nation's leading Macintosh training program, and the recent introduction of the country's first complete Macintosh Video Training Series. MacAcademy teaches over 18,000 people each year in 65 major metro areas. The program is proud of the fact that both beginning and advanced Macintosh users, from over 12,000 companies large and small, have found MacAcademy's live workshops to be an excellent, low priced training solution.

In order to offer additional training, MacAcademy's next step was to put each of their dynamic training workshops on video. (And to offer an additional dozen training videos for programs not even offered at MacAcademy.)

Now you may choose from over 26 different, 2-hour, VHS MacAcademy Videos for only $49 each. A complete list of programs can be found in the coupon below.

MacAcademy Video Training tapes offer tremendous advantages for today's Macintosh user. When using the videos you actually see the steps take place on a Macintosh screen. A small inset will show you the instructor and the mouse or keyboard. The instructors featured on the videos are MacAcademy's top rated teachers who have trained employees of all but two of the USA's Fortune 500 companies and who have each received a consistent rating of excellent.

Training videos offer the valuable advantage of building a learning and reference library. If you ever want to brush up on a technique, simply go back to the video and review the technique demonstrated. If you hire a new employee, simply have them review the video for the program they'll be using. Videos offer the unique flexibility of teaching both individuals or hundreds of people at one sitting.

In addition to a super $49 price, the videos also carry a 30-day satisfaction guarantee. If you're not totally satisfied, simply send the tape back for a full refund.

MacAcademy will continue offering the nation's highest rated live training courses in major cities. But in addition, you may also build your Macintosh training library.

Videos may be ordered by phone with credit card information, or by mail with check, credit card, or purchase order. You may also send orders by FAX. Your business is appreciated and your satisfaction is guaranteed.
Over the past few years, many Macintosh CAD products have claimed superiority, ease of use, and speed. Ashlar Vellum 1.0 is different in that its forte is in enabling people who are unfamiliar with CAD programs to become productive users in a matter of hours.

The Basic Features

Vellum 1.0 has a small and simple tool palette and well-organized menus. The Selection Mask dialog box allows you to quickly and easily select only certain objects, colors, or layers. Unfortunately the tool palette does not move from its position on the left side of the drawing window, which results in extensive mouse mileage for anyone who uses a large-screen monitor. Similar tools are grouped together under one tool icon on the palette; for example, you can draw a circle by selecting either center, radius, diameter, three points, or two tangent lines from under the circle tool.

Vellum's basic engineering functions include calculations of perimeter, area, centroid, and moments of inertia of any selected object. Vellum also includes trimming, and another tool that lets you choose between filleting and chamfering by selecting from pop-up icons (most CAD packages require that you select each individual line when filleting or chamfering; Vellum, on the other hand, allows you to select a corner by holding down the Shift key and clicking the pointer near the corner you need filleted or chamfered).

No CAD package is complete without special duplication commands like linear and polar duplication, and Vellum offers easy special duplication commands through a floating dialog box. Vellum also gives you a floating dialog box for editing geometric objects. You can change an object's shape, color, or location by simply keying in the new parameters.

In addition to using the menu or keyboard commands to execute functions such as zooming and construction-line drawing, Vellum also offers some unique commands. For example, to zoom in on a particular area, you hold down the # key and drag diagonally across the area of interest. This fills the screen with a new view defined by the diagonal line you traced on the screen. Vellum's construction lines are temporary dotted lines you create by holding down the # key and dragging the cursor. They enable you to establish endpoints and intersections relative to the rest of the geometry of your drawing and, unlike lines created using the tool palette's line tool, construction lines can be easily erased.

A floating palette with tools for horizontal, vertical, oblique, perpendicular, and angular dimensioning is available. Vellum calculates these dimensions and places them as a geometric entity on your drawing. However, because you do not have control over where Vellum places the geometric entity, you must drag it to a place where it does not interfere with other geometric objects or dimensions. Most CAD programs allow you to specify placement without having to go through this extra step.

A floating dialog box is used for placement of geometric dimensioning and tolerancing, for example, concentricity, perpendicularity, flatness, total runout, parallelism, and positional and material conditions, which are based on ANSI Y14.5.

Complementing Vellum's superior dimensioning capabilities is its integrated parametric-design feature, which lets you enter variables for dimensions that can be redrawn to give you the actual shape of an object. For example, a rectangle can be expressed as a value, with the adjacent side defined as a value of the first. You can then take this feature a step further: While setting the dimensions of an object, you can define the value of the object as something other than the actual value of the geometry. When all dimensions have been specified, Vellum draws the object to the specifications outlined by the dimensioning.

Vellum has an unusual feature, called the Drafting Assistant, that lets you see your cursor trailed by an endpoint, midpoint, intersection, center, or tangent. This attribute can save you considerable time, since it eliminates the need for constant trips to the menu to select different point snaps.

Strikes and Families

Although Vellum performed with no problems, I was disappointed at the memory and storage requirements for this 2-D package. I used a Mac IIX with 8MB of memory and the program on a Pinnacle Micro erasable optical disc. When you run the Vellum installer, the program checks to make sure that your machine has 4MB of memory.

A DXF translator is built into Vellum; however, it did a sloppy job of translating different AutoCAD Release 10 DXF files. Layers, vertical dimensions, and text notes did not transfer properly. The tool palette should float so that you don't have to mouse across the screen to get to it.

At $995, it's hard for Vellum to compete with Claris CAD, IDD's Dreams, or Diehl Graphicsoft's Blueprint—especially if you do not need built-in parametric design or geometric tolerancing. If and when Vellum uses less memory and disk space, and is less expensive, it may give Claris and other high-end CAD vendors a real run for their money. I am looking forward to the future release of Ashlar's 3-D package to complement Vellum.

—Victor Eigenhoy

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Just imagine a hard drive for the Macintosh line of computers that lets you spend less time waiting and more time creating. A drive that maximizes your computer capabilities and makes fast work of database management, desktop publishing and computer-aided design. A drive that can connect your network in a flash, and be very reliable. It's not a dream. Rodime Systems' Cobra Series offers access times as low as 14.5 milliseconds and storage as high as 650MB. And up to 48K of look-ahead caching to take advantage of the high performance of these drives. Cobra internal drives range from 45MB to 210MB while our external Cobra drives go from 45MB to 650MB. So, you can work with a long list of advanced software applications.

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- MacWEEK says "JMP is powerful and easy to use. The programmers’ delight in writing JMP is evident throughout and makes the program intuitive and a pleasure to use.”

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For a free video preview of JMP, call our JMP Sales Department at (919) 677-8000. In Canada, call (416) 443-9811. Or, write us at the address below.

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Phone (919) 677-8000 □ Fax (919) 677-8123

To use JMP, you need an Apple Macintosh with 1+ meg. 2 meg recommended.

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RECORDHOLDER-PLUS 3.1

**Pros:** Excellent online help; table-of-contents window; helpful input pattern and verification features. **Cons:** Limited telephone support. **Company:** Software Discoveries. **Requires:** Mac 512K. **List price:** $99.95

RecordHolderPlus version 3.1 is the latest upgrade of a fine database-management program that has been around for years. Although 3.1 costs about twice as much as the original version, it is still proof that well-written, competent programs need not cost as much as a major appliance.

**Multwindowed Interface**

RecordHolderPlus makes fine use of the Macintosh interface. In the data entry mode, three windows appear on screen: Display, What to Find, and Table of Contents (see "RecordHolderPlus Data-Entry Mode"). The scrollable and resizable display window is where records appear one at a time and where you enter and change data. The What to Find window is where you enter search terms and Boolean operators to call up specific records. You can even hunt for partial matches in any field. This feature, combined with the program's capacity—a file can be as large as 16MB if you have a hard disk, and a record or field can be as large as 32K—makes RecordHolderPlus very practical for storing text-intensive records.

The Table of Contents window displays a list of the fields you have chosen to index the records in a database. This unique feature of RecordHolderPlus not only gives you an easy way to view the records in a file but also provides a way to access them. With the Table of Contents window active, you can scroll until the record you want appears, or you can type in the first few characters and the program moves to the section of the list you want. Clicking on an entry brings the appropriate record into the Display window and makes that window active. New to version 3.1 is an auto-scroll feature, which automatically adjusts the Table of Contents window to show the record that is in the Display window.

**Data-Entry Shortcuts**

RecordHolderPlus makes data entry especially easy by offering a variety of input options. For instance, you can tell the program to convert the first letter of each word or all characters in a particular field to uppercase, a veritable godsend for those of us who never learned to use the Shift key properly. Input patterns take the awkwardness out of entering values like telephone numbers by automatically putting in parentheses, hyphens, or any other constant characters that you specify.

RecordHolderPlus supports a wide variety of field types. In addition to the standard text, number, money, and date fields, you can have check boxes and radio buttons; table lookup fields with a limited number of entry options; and pictures. You can also designate computed fields using field names and arithmetic operators or complex numeric and text functions.

You can customize the data entry form—that is, the way the record appears in the Display window—by dragging each field to where you want it on the screen. You format report layouts in much the same way. RecordHolderPlus's flexible report mode now supports footers and up to four levels of subheads, and subtotals along with the heads and totals that have always been available. The import feature is also quite flexible, allowing you to import text files with various types of delimiters and with fields that correspond to only some of the fields in your database. For example, you can use an imported text file of names and phone numbers from some other application to get your database started and fill in other fields manually.

**Incremental Changes**

The changes that have been made to RecordHolderPlus are incremental, little niceties to make a good program even better—but it's still completely compatible with previous versions. RecordHolderPlus 3.1 also has password protection, which lets you prevent unauthorized people from chang-
Good news, bad news
First the good news: When it comes to performance and reliability, Hewlett-Packard disk drives are unmatched. And now, they're available for your Macintosh system, complete with software, cabling and a five-year warranty.

The bad news? With formatted capacities of 330 and 660 Mbytes, they're not for everyone.

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System Specifications

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>5.75&quot; h. x 13&quot; w. x 9.25&quot; d.</th>
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</thead>
<tbody>
<tr>
<td>Transfer rate</td>
<td>1.5 Mbytes/s</td>
</tr>
<tr>
<td>Track-to-track</td>
<td>3.5 ms</td>
</tr>
<tr>
<td>Average seek</td>
<td>16.5 ms</td>
</tr>
<tr>
<td>Maximum seek</td>
<td>32 ms</td>
</tr>
</tbody>
</table>

*Five-year warranty applies only to hard drives. Optical drives are covered by one-year warranty.
ANDREW TOBIAS
MANAGING YOUR MONEY 3.0


Managing Your Money 3.0 has the same general look and feel as the previous versions. The main (or Home) screen still allows you to write checks; spend, receive, and transfer money; record and handle investments; plan for insurance and retirement; estimate your current year's taxes; and schedule reminders and write yourself notes. Managing Your Money's (MYM) Help icon is still in the lower-left corner, the Exit icon at the lower right, and the Quote-of-the-Day light bulb icon is still next to Help, ready to give you a wise (and usually humorous) quotation on a click's notice.

The top menu bar still duplicates many of the palette icons, although it has been altered somewhat. Net Worth has been removed, and its selections have been integrated into the Money menu. The Reports menu items, unlike many others, are window-sensitive, so selections' availability depends on the window you're using.

What's New?
Much of what's new in version 3.0 are incremental improvements. You can now record transactions with the Enter key rather than by using the mouse. Some menu commands are different "to make the program more intuitive for nonfinancial folks," according to MECA. The latest tax laws have been incorporated (for estimating taxes), and an IRA Decision Analysis menu selection has been added. MECA updates its tax tables nearly annually—a feature usually available only in a dedicated tax program.

There are, however, a few more noticeable improvements, the most significant of which is MYM's increased printing capabilities. Printing accuracy for the LaserWriter IIC and ImageWriter with sheet feeders has been improved, and MECA has added support for the Hewlett-Packard DeskWriter.

An obvious improvement is MECA's customer support. The company has installed a new technical-support phone system (similar to WordPerfect's), which I tested and found to be excellent. Since MYM offers unlimited free telephone support, this is definitely an important plus.

MYM's Strength
Managing Your Money's greatest strength is its nonecheckbook financial functions. While checkbook programs, such as MacMoney or Dollars and Sense, allow you to track investments and perform insurance and tax functions, these functions are done as checkbook manipulations or add-on windows. MYM treats all those distinct financial functions as dedicated activities, thus making the work easier and more efficient.

In addition to features found in the high-end check writers like projecting savings yields and loan costs, MYM offers powerful financial functions that can help you analyze the tax benefits of an IRA account, analyze bond yields and investments, and make mortgage refinancing decisions. MYM also has a dedicated menu to track your stock investments.

Another strong point is the excellent calendar-management segment that makes it easy for you to schedule daily activities and reminds you of important events.

MYM's Insurance & Retirement Planning
MYM provides several dedicated forms for financial planning and decision making. This is the form used for planning insurance and retirement. Comprehensive, dedicated forms like this are not found in personal check-writing programs like MacMoney, Dollars and Sense, and Quicken.

MYM's Weakness
Unfortunately, MYM's basic check-writing segment is not as quick and convenient as most dedicated checkbook programs. It's not that MYM's basic spending money, receiving money, and transferring money screens are poor; they're not. Writing a check or making a deposit in MYM is fairly simple. The check appears at the top of the screen, and an entry form for assigning the cost to a category is on the bottom. To write a check you click on the source account, fill in the amount, and type the name and address of the payee onto the check portion of the screen. Then move to the bottom of the screen and click on the category you want to charge. The program fills in the amount and the check is ready for printing.

To charge to two or more categories ($50 to a credit card account and $3 to an interest-paid account, for example), you keep clicking in the category window until the total equals the amount of the check. To see the categories to which the check amount is charged, you click on a Recap button and the amounts paid to each category appear in a pop-up window.

To edit checks, you select Review Transactions from the Money menu and your entries appear in a scrollable window. Double-clicking takes you to the check-writing window. After editing the check or category assignments, you click on the Record button, which returns you to the Review Transactions window.

Dedicated check-writing programs allow you to work on your checkbook with a scrollable check register in the same window. In addition, check-writing programs like MacMoney offer you a Name box, where you can click on a name. The payee name, address, and a default category are automatically entered on your check. With MYM, however, you must type the payee information and select the payment category each time. You could, of course, set up the check as a recurring transaction, but this option is also available in check-writing programs.

The Bottom Line
If you just want a check-writing program, stick with the high-end programs (continues)
PUT YOUR COMPANY'S IMAGE ON THE LINE.

The line is a networked Linotype publishing system. And many companies have learned that our experience in high-quality PostScript® publishing makes it the line to follow when you want a high-quality image.

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All this is supported by a worldwide team of experts on every aspect of electronic prepress, from training to network configuration.

Put it all together and you get the assurance of knowing that our top-quality products are part of a proven publishing solution.

Isn't that really the bottom line?


This ad was entirely produced on a Linotype Publishing System.
like MacMoney or Dollars and Sense, or the simple but still fairly powerful Quicken. However, if you are serious about managing your personal finances and willing to invest the effort of setting up the program and a little extra time to maintain your information, you'll benefit greatly from Managing Your Money. If you really want to plan for your retirement, meet your insurance needs, plan for your children's education, and manage your investment portfolio, I don't think you'll find any personal financial management software that will do a better job of guiding and assisting you.—Alan L. Slay

See Where to Buy or circle 101 on reader service card.

**Math Education Game**

**MATH BLASTER MYSTERY**

**Pros:** Educational and fun; teaches more-advanced concepts than most math games; uses color; 30-day money-back guarantee.  
**Cons:** Students may lose interest in some activities.  
**Company:** Davidson & Associates.  
**Requires:** Mac Plus. List price: $49.95.

Macintosh owners are blessed with a variety of quality software for helping students with math concepts. Preschoolers and elementary school kids have fun learning basic arithmetic with programs like Math Rabbit, KidsMath, and Number Maze. High-school students can take advantage of Broderbund's Geometry and Calculus programs to learn higher math concepts. Now Davidson & Associates has partially bridged the gap between those two age groups with Math Blaster Mystery, an outstanding educational program for middle-school mathematicians.

Math Blaster Mystery isn't just another arithmetic drill-and-practice program; it's a collection of math activities designed to help preteens develop logical thinking skills and learn strategies for solving problems. These activities use color graphics, simple animation, and clever games to make the learning process fun.

The opening picture menu offers four activity choices: Follow the Steps, Evidence, Decipher the Code, and Search for the Clues. Each activity can be adjusted to any of four different skill levels.

**Step by Step**

Follow the Steps looks at first glance like a multiple-choice practice drill. The program displays a word problem like this Level 1 example: "Erin flipped a coin ten times. It came up heads six times and tails the other four times. What is the probability that it will come up heads the next time she flips the coin?"

Instead of asking immediately for the solution, Follow the Steps guides the student through the problem-solving process with this series of prompts: "What does the problem ask you to find?" "What information is needed to solve the problem?" "Select the correct expression." "Select the correct solution." For each of these intermediate steps, the program displays four possible answers; by choosing correctly, the student progresses to the next prompt, until the final solution is reached.

A menu provides students with instant access to a variety of formulas and definitions that may be helpful in solving the problems. Twenty-five problems are provided for each of four skill levels, and Math Blaster Mystery includes an easy-to-use editor for adding additional word problem data files.

**Playing the Numbers**

The next two activities do look like games; in fact, they're based on traditional, nonelectronic games. Weigh the Evidence is a graphic variation on the classic Towers of Hanoi puzzle. There are three scales. Four labeled weights appear on one scale's balance pan; three of the weights must be moved to one of the other two pans to match the target weight. The student must first figure out which three of the weights add up to the target value and then move them, one at a time, without ever placing a heavier weight on a lighter one. Depending on the skill level, the weights can contain a combination of positive numbers, negative numbers, decimals, percentages, or fractions.

Decipher the Code is like a mathematical version of hangman or Mastermind. The screen contains a series of blank boxes; the student must guess what numbers and arithmetic operators go into those boxes. For example, the solution to an eight-box level 4 puzzle might be $5 + 31 = 4 \times 9$.

**Digital Detective**

The last game, Search for the Clues, is the most original and entertaining of the bunch. For each puzzle, the screen is crowded with colorful pictures reminiscent of a pulp mystery: a car on a couch, a maid with a feather duster, and the like. A click on any of these animated pictures might reveal a clue for solving a number mystery, such as $n < 25$ or $n$ is odd or $n$ is a factor of 39. The student reads the clue, guesses a number, and returns to the picture screen to select another clue, repeating the process until the correct number is guessed (see "Search for the Clues").

Throughout all four activities, the program awards points based on logical responses. Students can print out certificates showing point totals and ranks (Computation Cadet, Digital Detective, Chief Problem Solver, and so on). Points and ranks provide motivation for many kids, and they're used in the program's automated record-keeping option.

As a parent and a teacher, I'm impressed with Math Blaster Mystery. It's a thoughtfully designed tool for helping kids to develop a variety of prealgebra skills and concepts. My under-12 software testers approve, too, but for a different reason. They like Math Blaster Mystery because it's fun.—George Beckman and friends

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Introducing the Metro with SCSI Sentry

EMAC has found a way to prevent unnecessary Macintosh hard drive fatalities with SCSI Sentry, an engineering breakthrough in disk drive reliability. It protects your disk drive from damaging shorts that can trap data inside your hard disk. Which makes any drive with the SCSI Sentry substantially more reliable.

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CopyFlow is a powerful tool for managing QuarkXPress files. It allows users to import and export files, saving time and ensuring consistency. Its user-friendly interface and comprehensive features make it an essential tool for any QuarkXPress user.

CopyFlow uses a new feature called the Tag Editor, which allows users to tag their files and manage them more efficiently. This feature alone makes CopyFlow a valuable investment for anyone using QuarkXPress.

In addition to its tag editor, CopyFlow also includes a feature for managing font sizes, which can be a time-consuming task for many users. With CopyFlow, this process is simplified, making it easier to work with multiple document styles.

Overall, CopyFlow is a must-have tool for anyone using QuarkXPress. Its features are comprehensive and its user interface is easy to navigate, making it a valuable addition to any publishing workflow.
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Drawing and Mapping Program

AZIMUTH 1.0

Pros: Produces maps with a nearly infinite range of view points; object-oriented drawing tools make customizing maps easy.
Cons: Poor documentation; slow; key-disk copy protection.
Company: Graphsoft.

Graphsoft's Azimuth is an object-oriented drawing-and-mapping program for those who want to create illustrations using maps of states or provinces, countries, and continents. It works best on a top-of-the-line Macintosh with a fast microprocessor, but it will run on a Mac Plus and enable you to produce almost infinite variations of a map. You can create a two-dimensional outline map centered on any point by entering the appropriate latitude and longitude, or you can make the land mass appear as if it were being viewed from a satellite orbiting the planet or from the space shuttle coming in for a landing.

Unfortunately, this program, which incorporates CAD as well as regular drawing features, is flawed by documentation that appears still to be in the draft stage. Be prepared for some frustration because basic steps are missing from the instructions. To make matters even worse, the manual lists no technical support telephone number. Even when I did manage to phone Graphsoft, no one could answer my questions. Finally, I reached a programmer who spent over an hour walking me through the fundamentals of creating a map. When the secrets of using Azimuth were unlocked, however, it revealed itself to be a clever program.

Tailoring a Map

Azimuth comes on 6 disks and gives you 12 menus (not counting the Apple menu), plus a full complement of tools (see "Azimuth Window"). You manipulate the data file for a given map by setting different combinations of view angle (or aim), azimuth, distance, and scale, replotting after each try.

According to my dictionary, an azimuth is "an arc of the horizon measured between a fixed point and the vertical circle passing through the center of an object." It is a difficult concept to grasp and perhaps even more difficult to envision, given the multiple variables you have to work with. I had the most satisfactory results plotting the horizon before plotting a map.

When the principal map appears on the screen at precisely the view, angle, and scale that you want, you are ready to add surrounding states or countries one by one (see "Michigan Map"). An accompanying application called CombineData, which is not documented in the manual, lets you group several maps into one file. By using this feature, you can add surrounding maps all at once, thus saving some steps and maybe a little time. Even so, the more complicated the map, the longer the plotting takes. While plotting the Eurasian land mass on a map of the globe, Azimuth tied up my Mac Plus for 30 minutes. State and country maps are faster to complete than whole continents, but each time you change the aim you must do another "initial" plot. So until you have the knack of choosing the combination of settings that will produce the map you have in mind, you're liable to spend a lot of time replotting.

You can use Azimuth's drawing tools, including plain and filled shapes and a freehand line tool, to customize your cartographic creations. A locus tool lets you affix markers or symbols to your maps to designate cities and other features. You have to eyeball the placement of symbols, however, because although Azimuth displays the cursor's on-screen coordinates, it does not let you place a locus using latitude and longitude coordinates. It also lacks an on-screen ruler.

Azimuth lets you compose sets of maps in layers, as if you were working on sheets of clear tracing film. An element that is common to all maps, such as a frame, can be made visible to all layers while individual maps can be designated as visible only when the layer containing them is active. The program offers three options for saving finished maps: a floating-point format that retains the coordinate system; a lower-accuracy PICT format that can be opened in other Macintosh programs; and a scaled PICT format intended for use with the MacPlots II printer driver.

One graphic designer I spoke with exports Azimuth maps into MacDraw II; another moves them into Aldus FreeHand. They are both enthusiastic about Azimuth, however, because, as one designer put it, the program does what no other software can do on an off-the-shelf Mac. Significantly, perhaps, both got one-on-one lessons and did not learn the program from the manual.

Getting Lost in Azimuth

The manual is Azimuth's biggest shortcoming. It is filled with dense paragraphs, but it fails to explain simple aspects of the product. If you need to produce maps of varying sizes and views to illustrate publications, Azimuth will do it for you. Be prepared, however, to learn by doing.

---Gerry Lukos

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ADDRESS BOOK PLUS 1.0

Pros: Prints address books, Rolodex cards, envelopes, and labels; paper sizes are customizable; includes dialer DA.
Cons: Doesn't print two sides; DA opens slowly. Company: Power Up Software.
Requires: Mac Plus. Hard disk recommended. List price: Basic package $89.95; with binder $129.95.

DYNODEX 1.1

Pros: Prints two-sided address books; good user interface; flexible selection facility. Cons: Limited paper sizes; no DA version; doesn't print envelopes or labels. Company: Portfolio Systems.

Maintaining an address book can be a real pain. Scribbled names and phone numbers, mistyped entries, and inevitable rubouts as your friends and contacts move can make it a messy job. Address Book Plus and DynoDex take different approaches to the problem of maintaining and printing an address book.

Address Book Plus

Power Up offers Address Book Plus in two packages with identical software. The basic package includes pin-feed six-ring paper to use in a loose-leaf binder; the Pocket Address Book package comes with a leather binder and a spiral binding that you put together after you have printed your address book pages.

The program opens to the Browse format, a horizontal listing of all the fields in the address book. Address Book Plus comes with six display formats: Browse, Address Book, Phone List, Rotary File, Label, and Envelope. The Browse format is the default when you create a new Address Book file. The new data that you enter in the Data Entry window is immediately visible in the Browse format.

Address Book Plus comes with 16 predefined fields such as Job Title, Birthday, and a section for remarks. You can rename any field using the Modify Field dialog box. Some of the fields have a Smart List option. Smart List is a search feature that gives you the option of scrolling through a list to look for a particular entry, or typing the first few letters of the item you want directly into the appropriate field. For example, instead of typing San Juan Capistrano, type san in the city field, press Tab, and Address Book Plus automatically gives you the first entry that starts with san. If there is more than one possible entry, a pop-up menu with all the options appears.

Address Book Plus not only lets you display entries by name, company, and/or profession, but it also has ten user-defined categories. Categories could include business, personal, service club, and so on. Each entry must be assigned at least one category. This allows you to list a person by name, Dr. John Brown, by profession, Doctor, and as a personal contact.

Despite all of its convenient data entry features, Address Book Plus sometimes feels awkward in use. Because the entry screen covers the Browse format on Macs with 9-inch monitors, you will be constantly switching back and forth between the two views. Another problem is that the Address Book Plus program and documentation refer to the address-book print-out sizes in generic terms, such as senior loose-leaf, rather than associating size with a specific brand of address book such as the Day-Timer. This can be confusing if you are trying to buy an address book to use with your printouts.

Address Book Plus integrates well with Power Up's new DA, Letter Writer Plus, a word processor designed for easy letter creation and envelope printing. Letter Writer Plus is an improved version of ExpressWrite (see Reviews, October 1989). Address Book Plus documents can serve as mail merge data files for Letter Writer Plus. The combination of the two packages should easily meet most people's needs for address books and common business correspondence.

DynoDex

One of the most successful companies in recent years is filoFax, a British firm whose six-ring organizer has spawned several clones, including Day Runner and Lefax. DynoDex can print double-sided address pages in the filoFax format. The DynoDex package includes a six-ring binder, clear letter tabs, and 100 sheets of the punched and perforated DynoDex paper.

The DynoDex user interface emphasizes speed and convenience. The data entry screen is always visible, and almost all menu choices have keyboard equivalents. If you prefer using the mouse, there's an icon palette with the most common functions. At the top of the entry screen is a WYSIWYG display of how the record will print (see "Entry Ways"). DynoDex lets you rename all the field headers and control which fields are printable. It also has an Initial Caps function that speeds data entry by automatically capitalizing first letters. A small but useful feature DynoDex has is that Address Book Plus doesn't let you set tab order, so you can skip over fields that you don't normally use, like the country field.

Instead of a Browse screen, DynoDex displays fields in Just Phones (shows names and phone numbers), (continues)
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Name and Address, or All Fields. You can print any of these lists. Having the lists next to the entry screen, rather than behind it as with Address Book Plus, makes it easier to browse the list and view and change the entries.

DynoDex provides many more flexible tools for finding, organizing, and selecting records than Address Book Plus does. Both programs let you find records using any field, but DynoDex gives you the capability to change the found records. Its selection function can use two fields at once, with logical and arithmetic operators.

**Telephone Dialing**

DynoDex dials from within the application; Address Book Plus comes with a DA called Address Book Dialer. Both programs let you specify tone or pulse dialing through a serial port or the Macintosh speaker. Presumably, the DA is for quick and easy use while you’re working in other applications; unfortunately, the Dialer takes a long time to open, and this problem gets worse as you add names. On an SE/30 with 5MB of RAM, the Dialer took 12 seconds to open a file of 330 names and 20 seconds for a 650-name file. This is too slow for casual use; the best solution is to leave the DA open all the time under MultiFinder.

The two programs share a disadvantage when dialing through a modem. They dial the number just fine, but at the end of the dialing string they don’t send a command to disconnect the modem. This leaves the modem on the line, preventing the recipient from hearing you until the modem times out and switches off. There are workarounds in both programs, but both should tell the modem to disconnect.

**Printing**

Both Power Up and Portfolio Systems supply paper for use with their products. Portfolio provides six-ring DynoDex paper in four colors and also sells unpunched half-page paper. Power Up has a large selection of pin-feed and single-sheet pages for its program. One sheet of the six-ring DynoDex paper provides three filoFax-size pages, and the extra space on the page is used to print the DyNet, a reduced listing that you can staple together and carry with you (see “DynoPrinting”). Although it’s possible to print on an ImageWriter with DynoDex, it’s best to use a laser printer or another sheetfed high-resolution printer like the HP DeskWriter. The current version of DynoDex can print the DyNet only on PostScript printers and the GCC Personal LaserPrinter. Portfolio plans to provide DynoDex printing on QuickDraw printers, such as the Apple LaserWriter IIISC and the HP DeskWriter, in the next release. DynoDex prints in four main formats: six-ring; three-ring half-page, which is used by the larger Day Runner; three-ring letter size; and DyNet. Printing flexibility is where Address Book Plus shines. It has five standard sizes for address books and phone lists, and two standard sizes for envelopes, Rolodex cards, and labels. And for every format, if you don’t like the standard sizes, you can define a custom paper size. You can print to single-sheet paper on the LaserWriter or to tractor-feed paper on the ImageWriter. Unlike DynoDex, which only lets you set one font for the whole print job, Address Book Plus allows complete control over the font and style of individual fields. DynoDex prints four lines for each record, regardless of how long or short that record is; Address Book Plus intelligently expands and shrinks the record height to match the amount of information. Unfortunately, Address Book Plus prints on only one side of the page.

I found printing with both programs to be very easy. DynoDex gives you exhaustive instructions on feeding the pages so that both sides print correctly, and Address Book Plus’s preset formats resulted in perfect print jobs on both LaserWriters and ImageWriters. Printed output from both programs was excellent.

**Get Organized**

Both programs have much to recommend them. And both have faults. They both have excellent import and export functions, so your address books can easily be used as mail merge data files. DynoDex suffers from the lack of a DA version and from its inability to print envelopes and labels. Portfolio Systems said at press time that DynoDex 2.0, which should be available by late spring, will add those features. Address Book Plus’s DA needs to be faster, and adding twosided printing and better selection functions would also help.

If its somewhat limited selection of print formats meet your needs, and if you have a high-quality printer, then DynoDex is a good choice for its excellent user interface and double-sided printing. But if you need to print other-size address books, Rolodex cards, envelopes, or if you’ll be printing on an ImageWriter, then Address Book Plus is a better choice.

—Tom Negri

See Where to Buy or circle 763 (Address Book Plus), 727 (DynoDex) on reader service card.

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**32-bit Graphics Board**

**SPECTRUM/24 SERIES III**

**Pros:** Built-in graphics accelerator; hardware pan and zoom; support for 13- and 19-inch monitors; huge virtual desktops; RGB NTSC video output.

**Cons:** Expensive. **Company:** SuperMac Technology. **Requires:** Mac II; 2MB RAM. Hard disk and additional RAM recommended. List price: $3999.

Since the Spectrum/24 board was reviewed in the January 1990 Macworld, two significant things have happened: SuperMac has augmented its 24-bit board with a graphics accelerator, and Apple has released two 24-bit graphics boards of its own (including one with an accelerator).
erator). Because of these developments, a brief second look at the Spectrum/24 is in order.

All the earlier advantages of the Spectrum/24 are still in place. You can create a virtual desktop larger than the actual display (up to 4096 by 1536 pixels), and pan smoothly and quickly. You can zoom in and out (2x magnification), with full panning and functionality while zoomed in. And you can get a 32-bit display on a large 1024-by-768-pixel screen.

Do You Need an Accelerator?

The major new feature of the Spectrum/24 is the on-board graphics accelerator. Why do you even need an accelerator? Simple. In 32-bit mode, each pixel uses four times as much memory as in 8-bit mode. That means that if you scroll an image in 32-bit mode, you are moving four times the data that you would in 8-bit mode. This doesn’t mean, however, that every graphic operation takes four times as long, because much of the work is independent of the current bit depth, (otherwise, 8-bit graphics would take eight times as long as 1-bit graphics).

The graphics accelerator on the Spectrum/24 works with certain 32-bit QuickDraw commands (but only when the display is in 32-bit mode). When you start up, the SuperMac CDEV patches the selected low-level QuickDraw commands. When those commands are called, control is passed to the accelerator on the Spectrum/24. The accelerator carries out the necessary operations and then returns control to QuickDraw. This acceleration affects only the display connected to the Spectrum/24.

Adding a graphics accelerator to the Spectrum/24 board improved the performance of only some operations. Using GeeBench, a QuickDraw routine—performance program developed by Apple’s Jean-Charles Mourey, we ran 28 comparison tests (see “Spectrum/24 Benchmarks”).

The single greatest boost is in the performance of the Regular CopyBits routine, whose performance improved by a factor of 12.0. Other benchmarks—mostly scrolling and filling routines—show a six- to sevenfold improvement in speed. There is no apparent acceleration in line drawing (which doesn’t really need it—speed is already comparable to 8-bit mode) or in highlighting and inverting text.

Overall, the Spectrum/24 display in accelerated 32-bit mode performs as well as, if not a bit better than, the Mac IICl’s built-in video in 8-bit mode (which itself is just a touch faster than 8-bit mode on Apple’s 8-bit video board).

Should you consider buying this board? Possibly, but only if you need both the graphics acceleration and the large screen display. The SuperMac ColorCard 24 with accelerator costs $1,498 and gives you an accelerated 24-bit display on Apple’s standard 13-inch RGB monitor. For a little more ($1,999) you could get Apple’s new Macintosh Display Card 8×24GS, which has two additional benefits: it supports Apple’s complete line of Mac monitors, and it boosts performance of all video boards plugged into the Mac. There are nonaccelerator 24-bit video boards but if you’re going to go to 24-bit color you’ll be better off in the long run spending your money now for graphics acceleration.

Given the downward trend in video board prices, your best bet is to carefully evaluate your needs and shop around. The Spectrum/24 is a powerful and expensive solution intended for people who really need the large display and acceleration, pan, zoom, virtual desktop, and so forth. If that doesn’t describe you, you could save thousands of dollars by choosing something more modest.

—Bruce F. Webster

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Interactive Physics (IP) is a remarkable program—at once more and less than its name suggests. What you get with IP is a complete, fast mechanics-simulation engine, reminiscent of that found in Simul, with an interface that makes it easy, even fun, to set up simple or complex simulations. You also get a short but exceptionally clear manual, a set of demonstrations of fairly complicated setups, and a large portfolio of experiments—some corresponding to standard topics in classical mechanics, and others to topics in beginning mechanical engineering courses.

The material covered is covered exceptionally well, but I wish there were files of simulations for celestial mechanics, electricity and magnetism, wave behavior, and maybe even quantum mechanics. In view of the magnitude of the programming effort required to simulate plain Newtonian mechanics, however, Knowledge Revolution may have to issue these other topics as additional programs. In contrast, Senses's program, Physics, is a set of standard simulation-demonstrations carefully keyed to physics textbook contents such as electricity and magnetism, orbits, and waves; though more inclusive, it doesn't compete with IP's depth in mechanics.

**Artificial Reality**

You can model elementary situations in mechanics in Simul, Stella, or Extend; but IP, with an interface specifically designed for these tasks, takes only about five minutes to learn.

To create a spring simulation in IP, all you do is draw a polygon with a MacDraw-like tool, pick a spring from the tool palette, and connect the spring from any point on the screen to the perimeter of the polygon. Then you pick a dashpot, or damping force, from the tool palette and connect it at another arbitrary point on the perimeter of the polygon. To make your model even more complex, draw a square underneath the polygon and secure its position with the anchor tool.

When you select Run from either the palette or the Experiment menu, the polygon falls, stretches the spring, and strikes the square. Then, after clunking past the square, the polygon wobbles around in irregular damped oscillation for many seconds until it finally comes to rest with the spring in a stretched position.

**Accuracy simulation at this level of complexity really belongs to engineering rather than introductory physics. A simulation with dashpots and colliding blocks and irregular masses is almost too complex for beginners, except to illustrate how common highly irregular or actually chaotic dynamical systems are in real life. A more typical beginning-physics example would be a spring connected to the center of a circle, bobbing endlessly along a single axis; this serves as the simplest model of regular oscillation.**

In the artificial reality of IP, the same tools model both simple and complex systems with ease. A sophisticated user could supplement the program's omissions by adding experiments, for example, setting up models with springs and masses to mimic wave interactions or orbital mechanics.

**A Class Act**

This last idea may suggest one way to use IP in classroom instruction, its intended market. In contrast to some types of physics-lab practice, in which you must model mechanical systems as special cases of electronic oscillators, in IP you can fabricate mechanical analogs of the electromagnetic systems. This method at least has the advantage of highlighting the power of simple differential equations to describe dynamical systems of any kind.

But Interactive Physics goes far beyond the type of problem that allows an analytical solution. One demonstration, starting with a set of blocks offset on a base, lets you watch the blocks slowly tilt over, slide off each other, and crash, tumbling and bouncing, to the ground. Individual parameters, such as mass, surface friction, and elasticity, can be set for each block; you can even set gravity to match the planet of your choice (see "Earthquake"). Although simulation is ostensibly in the domain of physics, it doesn't take much imagination to see its value as a demonstration in civil engineering or architecture.

**The Newtonian Realm**

Knowledge Revolution has produced a specialized simulation program that emphasizes Newtonian mechanics: springs, masses, levers, inclined planes. IP's simulation kernel is efficient enough that the program can handle problems in practical mechanical engineering beyond the beginning-physics domain suggested by its name and documentation (the Car Crash demo is quite convincing). Interactive Physics delivers this power to the average Macintosh user—if you can use MacDraw you can use IP. It deserves to find admirers both inside academia and out in the real-world engineering trenches.—Charles Seiter

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The Microsoft Office is far more than just a Microsoft program delivered on a CD-ROM disc; it's a package of four of Microsoft's most powerful and most widely used applications tied together with a fancy HyperCard ribbon and decorated with a bevy of miscellaneous tools and toys.

The Crowded Office

The four Microsoft programs included on the Office CD-ROM—Word 4.0a, Excel 2.20a, PowerPoint 2.01b, and Mail 2.0—are functionally identical to their popular floppy-disk counterparts. Why, then, should you consider buying the Microsoft Office package rather than buying the programs separately? For starters, to save money. These four applications purchased separately would cost approximately $1310.00 list price; the Microsoft Office lists for $949. This would be a significant savings in and of itself (if you already own a CD-ROM drive), but there's more.

Microsoft has enlisted many other companies to contribute ancillary software to the package. Bonuses include screen fonts from Adobe; a laser-font family from Bitstream; a sampling of clip art in EPS, bitmap, and PowerPoint format from T/Maker, Geographics, and Multi-Ad Services; Smart Art DA with six text-manipulation effects; SmartScrap DA; Word Finder thesaurus; DocuComp document comparison software; business templates for Excel from several companies; and a number of other goodies. Limited test-run versions and animated demos of several programs, including Gopher, GeoQuery, and Adobe Illustrator are also tossed into the deal. Finally, the package includes five slick multimedia "intros" (read, commercials) for the Office and each of its principal applications.

This makes for something of a hodgepodge. To smooth the seams, Microsoft has built a HyperCard shell with a series of hierarchical menus and buttons for navigating quickly between programs. This shell must be installed on a hard disk along with the applications using the Office Installer stack. While it's technically possible to run the applications directly from the CD-ROM, the CD player's slow access time makes that solution less than practical. You can leave the other Office files on the CD or move them to the hard disk, depending on how often you access them and how much space is available on the hard disk.

The Paperless Office

No printed documentation comes in the package at all (there is, however, a coupon allowing you to order all the manuals for an additional $15). The manuals normally packed with Word, Excel, PowerPoint, and Mail have been translated into a series of HyperCard stacks, each of which can be read sequentially like a book or used as a quick-lookup reference. Many sections of the documentation are enhances with helpful animated sequences. The powerful search engine built into the Microsoft Office documentation makes it easy to locate references to particular topics in a fraction of the time it would take with a standard set of manuals. In general, the Office's online documentation has a number of thoughtful touches that make it easy to use across applications. On paper, this seems like a great idea. Nobody likes to read manuals anyway, and online help is both more immediate and more flexible. Nevertheless, replacing manuals with online documentation involves some trade-offs, especially for new users of the software.

You Can't Take It with You

In the first place, you can't take it with you. Secondly, the interactive tutorials (Getting Started with Word, and so on) aren't effective unless you have enough memory to run HyperCard and the application simultaneously under MultiFinder, switching back and forth between the two as you read instructions and carry them out. On a small screen, this constant window swapping quickly becomes tiresome.

The third trade-off involves the complexity of the Office's overall structure. In spite of Microsoft's efforts to unify the package, the multiple levels and forms of documentation make it easy for new users to feel lost in hyperspace. Inside Word or Excel, for instance, you can use the application's built-in help function. You can return to either application's Office menu screen and browse or search for keywords. If you choose to browse, you have several separate books to choose from. If all of these choices confuse you, you might need to hit the Help button in the Office menu for Office Help. If you still can't find what you're looking for, don't forget the Read Me files that are tucked away in a hierarchy of folders on the CD.

The Office of the Future?

If you have a CD-ROM drive, the Microsoft Office is a superb collection of software at an extremely competitive price, with or without the optional printed manuals. By itself, it's probably not sufficient justification for buying a CD drive unless you're buying software for an officeful of Macs. But if the Office is indicative of the kinds of things that we can expect, the future of CD ROM looks bright indeed.—George Beekman
For a limited time, when you buy Adobe Illustrator 88™ software, Adobe Type Manager™ software comes along with it, free. So if you want the drawing program used by professional designers and illustrators, buy it now. While you can also improve your type's screen image—without spending a dime. Call 1-800-344-8335 to find your nearest Adobe Authorized Dealer today. Because what's new today is gone tomorrow.
This month I review an application that helps maintain an inventory of your possessions and a stack that shows how to protect those possessions from earthquakes.

I also look at a stack that will help you learn a foreign language and another that will add spice to your English.

Know Your Stuff 2.1

Many of us live in houses crowded with electronic equipment, hobby paraphernalia, and collections ranging from art to baseball cards—and run one or more part-time businesses to help us pay for all those possessions.

A new Omnis 3-based application, aptly titled Know Your Stuff ($49.95 from Working Systems), provides an easy-to-use personal and business inventory system.

Most database programs are either so general that they take hours just to learn and then more time to set up, or so specific that they can be used only by, say, real estate sales people. What I like most about Know Your Stuff is that it can be customized for almost any type of list, but it also has enough structure that you can learn it and set it up in about two hours.

First you choose the general categories of stuff that you want to track. These can be as diverse as an inventory of your part-time jewelry business, a detailed list of your collection of rare stamps, and a roster of your Cub Scout den. You designate each category as either single or multiple—the latter being used for lists in which the quantity of each item, such as in a retail business, can vary.

The categories come preset with eight fields (called Labels): Name of Stuff, Type of Stuff, Date, Unit Cost, Location, Description, Last Modified Date, and Time (the last two are entered automatically by the program) (see “Entering Data in Know Your Stuff”). Additionally, multiple categories include Quantity, Total Cost (entered automatically), Max Quantity, and Min Quantity. Virtually all that remains is to create a list of Types such as Appliances or Tools, and to name up to five additional alphanumerical labels, three numeric labels, and one date label.

As with all Omnis-based applications, Know Your Stuff lets you prepare reports using a full range of logical comparisons. You can search for records that contain, equal, or do not equal a set of characters within a specific field or fields. The program also looks at numeric and date fields for data that is lesser or greater than a specific number or that falls within a range. You can also create an Order Report that lists all records where the Quantity is below the Min Quantity.

Know Your Stuff is not without problems. One easily correctable shortcoming is that the manual is too skimpy; it attempts to explain things in a sentence or two when at least a paragraph is needed. A more serious failing is that Know Your Stuff does not print address labels. The program exports (and imports) only in comma-delimited fields, so the exported text will not work with most spreadsheets or label software. Of course there are workarounds for this—you can import the list into a word processor and use a global change to replace commas with tabs or returns as needed, but that's an extra step.

If you can get up the ambition to do the input, Know Your Stuff does an excellent job of doing the tracking.

Earthquake Preparedness Stack

The need to keep inventory lists was dramatically demonstrated when California’s Loma Prieta earthquake forced many homeowners to tally up their losses for insurance and tax purposes. The Earthquake Preparedness Stack ($24 from Environmental Compliance Associates) won’t help with insurance but can assist in protecting your possessions by explaining everything a layperson needs to know about earthquakes, including information ranging from how earthquakes are formed to how to survive one.

The user interface is as well-conceived as the textual material is informative. You get to any of the six sec-

(continues)
Preparing for an Earthquake

The Earthquake Preparedness Stack displays advice on how to prepare for an earthquake. This screen provides ways to protect office equipment.

The most exciting, but probably least informative, section is Experiencing a Quake. To get a feel for what shaking is like, you click on a button that straddles the Main Gate during the 1906 San Francisco earthquake.

The last section, Preparedness & Survival, is the most valuable. You click on any area of a sketch of a house, such as the basement or the attic window, to have the program display a field that describes how to earthquake-proof that area. Or you can view drawings of public places, such as a city street or a classroom, and learn what someone in that area should do during a quake. This section provides some surprising information, including the fact that staying indoors in a downtown area is a good choice (falling glass is a greater potential hazard than the possibility of a building collapsing on you); and if you are on an upper floor of a high rise during an earthquake, expect the building to sway—it is built to do that.

The information here is clear and accurate. The scientific data is about equal to the information you'd find in a good encyclopedia, and the information on preparedness and survival is about what you would see in pamphlets available from state and federal agencies.

If you or your company is located in earthquake territory, I strongly recommend adding this to your library. It's cheap enough, and 10 percent of the purchase price goes to earthquake relief agencies.

MacFlash Cards 1.01

MacFlash Cards ($25 per module from The Language Quest Software Company) is another good example of a HyperCard learning tool; this one is for memorizing foreign-language vocabulary words. Level 1 and Level 2 modules are available for German, French, Spanish, Russian, and Latin. Last month I reviewed another flash card-like vocabulary builder, called VocabuLearn/CE from Penton Overseas, that included an audio cassette and a hard-copy word list. MacFlash Cards provides no audio or hard-copy material, but it gives you more control than VocabuLearn/CE over how you study.

As with standard flash cards, you view an English or foreign word and, after trying to remember the foreign or English equivalent, you can look at the correct answer. You can choose whether the foreign or English word appears first, and you can specify that the cards be displayed in either alphabetical or random order.

MacFlash Cards provides a number of ways to designate certain words for later review. The program can collect all the words you view at each practice session into a Word Set (which you can save to disk). Alternatively, you can select specific words to be placed in a Word Set. Finally, as you go through a practice session, you can mark cards that you have trouble with, and later have the program include only those marked entries in your session.

The marking system could have been the program's strongest feature, it falls short in that you must mark a minimum of 250 cards to have a review session. The program also can't eliminate cards as you learn them, a practice I use with paper flash cards.

One quibble is that the program requires you to use an arrow key to get to the first word card. The developers didn't take into account that many schools, including the one in which I occasionally teach, still have some older keyboards that lack arrow keys. There are HyperCard workarounds (ctrl-d, for example), but they are not described on the screen or in the documentation.

Besides one quibble and two shortcomings, MacFlash Cards is an excellent learning tool that, by providing so many ways to view cards, helps you remember the words.

Slang Thesaurus

When I wasn't studying flash cards during late elementary and early junior high school, one of the things my buddies and I did was try to find dirty words in the classroom dictionary. Of course, none were to be found there, and we had to content ourselves with less exciting, but equally verbetened, slang words such as ain't. While my lexicographical interests have broadened a bit, perusing Slang Thesaurus ($35 from Slippery Disks) still fascinates me.

Of course this HyperCard stack contains the standard obscenities and racial epithets that you would expect. But this extensive list also includes slang words and phrases including Yiddishisms; military usage words; and Cockney, Australian, West Indian, and Spanish colloquialisms.

If you like Cockney rhyming slang, you'll find too Irish stew for too true (words of approval) and Uncle Ned for bed. Military slang contains luney chicken for gossip and yard bird for recruit.

The HyperCard interface on this stack is fine. Each letter of the alphabet has one or more index cards filled with nonslang words. You click on any of these words to get to a card that contains, in four scrollable fields—Nouns, Adjectives, Verbs, and Adverbs/Phrases—the slang equivalents.

As you view the slang words, you can select, by highlighting, those words that you want placed on a short list for printing. Unfortunately, this short list only contains the slang words, not the nonslang equivalents.

If part of the load of your nine-to-five is to churn out a smoking bit of prose, this stack can fork over a handy log up.  

See Where to Buy or circle 770 (Know Your Stuff), 778 (MacFlash Cards), 801 (Slang Thesaurus) on reader service card.
Dr. Productivity Says:

"Quit running around the office like a Type A bozo."

"Don't confuse activity with productivity. Get QuickMail."

"Don't settle for hard-to-use mail. No one will use it."

"Don't settle for feature-wimpy mail. You'll outgrow it."

"Don't settle for hard-to-use mail. No one will use it."

"QuickMail gives you true store-and-forward technology, real-time conferencing, custom forms, a mail log, wide area connectivity, access to mail from laptops or terminal packages, easy-to-use, automated gateways to the public networks like MCI Mail™, UNIX® mail, AppleLink® and more. Others talk about gateways. We've been delivering for months. (Beware of companies with Edsels in their ads.) You won't outgrow QuickMail. Apple uses it. NASA uses it. Every major Macintosh® publication uses it. You can't go wrong."

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"As we said before, CE Software's QuickMail is the best electronic mail package on the Mac, and the latest updates have only increased its lead over Microsoft Mail and Inbox."

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To make our newest laser printer dramatically better, we asked for outside help. Yours.

And the suggestions we received were simple, practical, even beautiful. So, we think, is the result. The NEC Silentwriter*2 printer.

"It should handle different sizes of paper easily."

It does. Interchangeable cassettes let you switch from standard- and legal-size to envelopes to labels, all in a matter of seconds. It also has a single...
supply toner cartridge that you just pop in, clean and simple.

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More, faster, better. Our engineers heard it time and time again. So they gave the Silentwriter2 a lightning-quick processor and lots of memory. So you can use today’s most sophisticated graphics software. For better-looking brochures, labels and transparencies.

“To have Adobe® PostScript® built in would be key. The more fonts, the better.”

We agree. So, the Silentwriter2 290 comes with a built-in PostScript interpreter as well as HP® LaserJet Plus™ emulation. And we made the Silentwriter2 260 with features like LaserJet® II emulation, which supports most standard software. What’s more, it’s a terrific value—the best in its price range. Plus, both are members of the most complete line of personal computers and printers available.

Call 1-800-NEC-INFO today (in Canada, 1-800-343-4418), and check out the Silentwriter2 260 and 290 printers. We think you’ll like what you see. After all, you designed them.

WE’RE MAKING THINGS BETTER FOR YOU.

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Circle 90 on reader service card
NEW PRODUCTS

Edited by Mary Margaret Lewis

This section covers Macintosh products formally announced but not yet evaluated by Macworld. All prices are suggested retail. Please call vendors for information on availability.

HARDWARE

AMIE
Interface emulator that enables the Mac to link to a Unisys/Sperry network. Makes the Mac plug-compatible with the Uniscope terminal network. Hardware supports various forms of connectivity and handles communications-line protocol. Software emulator is compatible with UTS and SVT terminals. $195. Air Land Systems, 703/573-1100.

C21LMAX 21" Flat Screen Monitor
21-inch flat-screen color monitor with tilt-and-swell base. Adjusts dynamically to horizontal scan frequencies from 48kHz through 96kHz and vertical-frame rates from 60Hz through 80Hz. $3895. Image Systems, 612/935-1171.

ClearVue/GE and ClearVue/GE30
Gray-scale display systems for the Mac II and SE/30. These systems display 256 shades of gray, have a 75Hz refresh rate, and offer hardware Pan and Zoom capability. $2195 each. RasterOps, 408/562-4200.

ComputerEyes/Pro
Video digitizing system that consists of a NuBus board and bundled software. Captures images from any standard video source; captures either black-and-white or color images with 8 or 24 bits of color information per sample. Supports MacPaint, TIFF, and PICT2 file formats. $499.95. Digital Vision, 617/329-5100.

DigiChannel Nu/Xi
Multichannel communications board that works with A/UX to let Mac act as host computer in microprocessor-based multiuser system. Has Motorola 68000 12MHz microprocessor, 256K of dual-ported RAM, and up to 128K of ROM. Eight-port version $1295; four-port $995. DigiBoard, 612/922-8055, 800/444-4273.

Dynamac SE/30
SE/30 with 2MB, 5MB, or 8MB of RAM that comes with 40MB, 100MB, or 180MB hard drive; built-in 2400-baud data modem; and built-in 4800-baud sending fax modem. CPU is the size of Mac Portable. $8995. Dynamac Computer Products, 303/296-0606, 800/251-2349.

Half Height Drive Series
Series of 100MB, 200MB, and 250MB half-height disk drives offered as internal and external devices for the Mac SE, SE/30, II, IIX, IIXc, and IICl. Includes backup, optimizer, spooler, and cache software. $1099 to $1999. PLI, 415/657-2211.

JX-600 Commercial Color Scanner
Color scanner scans from 30 dpi to 600 dpi and can zoom from 1200 dpi to 100 dpi. Includes color-separation capabilities. $14,995.

Shark Electronics, 201/529-9500, 800/223-2121.

MacBlitz
Gocomputer board for the Mac that uses RISC technology to let Macintosh users access machines running UNIX via the standard Mac interface. Has its own memory, UNIX operating system, RISC processor, input/output controller, and can perform simultaneous operation and file sharing with the host computer. Under $10,000. DuPont, 302/733-9886.

MacLab
Self-contained, software-configurable data-acquisition platform that connects to the Mac and can be used in conjunction with MacLab software packages. Files can be exported to any of the statistical, graph, spreadsheet, and page-layout programs available on the Mac. $3950. World Precision Instruments, 203/469-8281.

MacTwin
Hardware-and-software 5250-emulation product that provides local access to an S/3X or AS/400 system from a Mac SE, SE/30, (continues)
or Mac II. Supports up to seven sessions, with one session available for attaching to Mac-compatible printers. SE model $995; Mac II model series $1095. Emerald Technology, 206/485-8200.

**NetAccess**

Gateway that gives machines on an AppleTalk network access to IBM AS/400 or System/3X machines. Consists of a NuBus board and HyperCard interface. Provides transparent database access and file transfer to host system for mass storage. $3995. KMW Systems, 512/338-3000.

**NetModem V.32**

9600-bps, V.32, and Hayes-compatible stand-alone modem for AppleTalk networks. All Macs and PCs on a network can access the NetModem V.32 for outgoing communications. modem includes dial-in network-access feature to let remote users access the network from a single Macintosh or PC and any other modem. $1999. Shiva, 617/864-0914.

**PixelView I and PixelView II**


**QuaSi**

Workstation that uses an SE logic board. Open-ended configuration enclosure allows the use of an 800K drive as well as up to two 3½-inch or 5¼-inch mechanisms for use of hard disk, CD ROM, or tape backups. Comes with full-page monochrome monitor. $1890. Shreve Systems, 800/227-3971.

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**HP offers you the best things next**

From input to output, Hewlett-Packard leads the way. With a full line of Mac-compatible printer and scanner choices.

For photographic-quality scanning, there's the HP ScanJet Plus scanner. Combine that with one of HP's high-quality printers. The DeskWriter, the new LaserJet III, the LaserJet IIIP, or the LaserJet IID. HP even has color printers. The PaintJet and the PaintWriter XL.

Plus, HP stands behind all their products with exceptional service and support. And a one year warranty. It doesn't get much better than that.

There is a better way.
RP88B25 Coprocessor
25MHz coprocessor for Mac II that uses Motorola's 88000 RISC architecture. Has built-in floating-point processor and provides up to 9 MFLOPS and 21 MIPS. $10,995 to $18,495 depending on configuration and memory. Tektronix, 503/627-7844, 800/835-9433.

Stowaway 2400
Compact, portable 2400-baud modem based on TLP technology; designed to eliminate the possibility of a line being dropped during a communication session due to low battery power. Supports V.22 bis, CCITT, V.22/Bell, 212A/Bell 103 standards, and the extended Hayes AT command set. $295. Vocal Technologies, 408/980-5181.

SureKey/2
Mouse-size lock box (with software) that plugs into any Mac serial port and is used for data security. Can be set to automatically lock at a specified time. Computer can continue to run while locked. $350. Key Concepts, 219/234-4207.

SOFTWARE

40 Mover
Software that simplifies copying objects from one 4th Dimension 2.0 database to another. Lets you move commonly used parts of different databases into new or existing databases to reduce design time. 1MB minimum memory. $200. ACIUS, 408/252-4444.

Adobe Type Sets 1 and 2
Two font software packages for use with Adobe Type Manager. Each set contains seven display fonts from the Adobe Type Library. To be used with non-PostScript printers. 1MB minimum memory. $99 per set. Adobe Systems, 415/961-4400.

The AIM Problem Solver
Introductory version of the AIM machine learning tool that synthesizes network solutions from databases of examples. Determines network structure, node types, and coefficients automatically. Allows 25 input variables and has a separate Encode Module to automatically produce royalty-free networks in ANSI C code. 1MB minimum memory. $495. AbTech Corporation, 804/977-0686.

CheckFree
Electronic bill-payment service that provides the ability to pay all bills and handle all routine financial tasks electronically, regardless of the financial institution an individual uses. Transmissions to the CheckFree Processing Center are encoded. Payment requests are handled through the Federal Reserve Bank network rather than the consumer's individual bank account. 512KB minimum memory. Software kit and manual $49.95; software kit and quick-referral manual...
The Contractor Solution
Business-management software for contractors that provides estimating, job costing, and accounting functions, and includes office-management features such as letter writing, bill paying, and processing paperwork. Program keeps track of whether each job is making or losing money, and keeps up-to-date general ledger entries, calculating 1099 totals and monitoring subcontractor's insurance. 2MB min. memory. $399.50. Salient, 415/852-9567.

Documenter for Psychiatry
Medical charting program designed to help psychiatrists document cases and create and maintain outpatient charts. Can be used to track and measure patient diagnoses, medications, lab tests, consents and releases, and appointments. Prints prescriptions, reports, and progress notes. 2.5MB min. memory. $298.50. Lanstar, 313/663-6363.

DiskDoubler
File-compression utility designed to compress any Mac file that is compatible with MultiFinder. Compresses individual files on a disk maintaining the folder structure; is available at Finder level. 1MB min. memory. $59.95. Salient, 415/852-9567.

With the HP LaserJet III, you can...
The Grade Machine
Teacher's grade-keeping application that provides full-screen editing of grades in a spreadsheet format, generates progress reports for individual students and summaries for the entire class. Progress reports may be made confidential. Teacher controls grading scales, comments, extra credit, and other preferences. 512K min. memory. $49.95. Jim Holbrook, 206/641-0352.

HyperEntrepreneur
HyperCard-based program designed to help user learn what it takes to start a small business and to decide whether or not to start one. Includes self-assessment exercises, examples, games and quizzes, and advice on beginning a business. 1MB min. memory. $285. HyperTrain, 518/854-7203.

HyperSource Micro
Training software that consists of three segments: one for Aldus PageMaker, one for desktop-presentation packages (Aldus Persuasion, CA/Cricket Presents, Letraset USA StandOut, Microsoft Powerpoint, and Symantec More II), and an examination of Apple's Mac product offerings. 1MB min. memory. $119. Prism Technologies, 705/674-8254.

Intuit's IsSpice for Macintosh
Spice program for all Mac platforms; provides universal gateway for circuit designers to perform powerful CAE functions using enhanced version of Spice compatible with Berkeley Spice 2G.6. 1MB min. memory. Professional version $210; without coprocessor $95. Intusoft, 213/393-9494.

Kiwifinder Extender Tool
Tool for organizing hard disk and retrieving files; designed to extend the scope of the Finder. Allows user to view hard disk seven different ways. Files may be arranged by file name, type, creator folder, creation date, modification date, and keywords. 1MB min. memory. $99.95. Kiwi Software, 805/685-4031.

LandCADD Light
LandCADD Light software that combines a limited number of functions from various modules of LandCADD landscape-design software. LandCADD Light can be operated as a stand-alone product or in conjunction with any LandCADD module or any architectural or civil engineering application software. 1MB min. memory. $695. LandCADD, 303/688-8160.

refine your characters.
NEW PRODUCTS

Layouts
Collection of 219 page-layout templates for business cards, brochures, newsletters, and other personal publishing needs. This package includes a quick reference guide, tutorials, and a pictorial index. Has the ability to alter color and typeface and to insert custom logos and other graphics. 1MB min. memory. $179.95. Starburst Designs, 702/453-3371.

LifeArt
Collection of human anatomy clip art to be used for medical publishing, slide production, and two-dimensional animation. Consists of 70 illustrations of the body's major anatomic parts. 1MB min. memory. $229. TechPool Studios, 216/932-5200.

MacBible

MakeTest
Application for teachers and trainers to create test questions and print tests. Stores answers, topics, difficulty levels, and notes with questions; provides variety of printing options. Can be used to create multiple-choice, true-false, essay, matching, and free-form tests. 1MB min. memory. Single user $419; 5-pack $399; 10-pack $699; 20-pack $999. Mountain Lake Software, 415/665-5302.

MacTools Deluxe
Disk-management utilities for data recovery, hard disk backup, disk optimization, partitioning/file-management, and encryption and password protection of data. 1MB min. memory. $129. Central Point Software, 503/690-8090.

MicroCat
HyperCard-based program designed to guide technicians in component-level Mac repair. Lets user point to graphic or text that comes closest to describing the damaged machine and indicates which component is faulty and how to test it. Covers common and uncommon repairs. 1MB min. memory. $100. Micromat, 415/898-6227.

Nastalique Nizami
Typesetting software for Indo-Iranian languages Urdu and Farsi. Requires a PostScript printer for out-

With the HP ScanJet Plus, you've

The HP ScanJet Plus scanner provides 8-bit photographic-quality scanning.

That means 256 shades of gray for the hottest-looking output from your Mac. And it's so easy, too. At the click of a mouse, you can get negative or mirror images, as well as scaling in 1% increments from 4-200%. All for $2,190, about what you would expect to pay for a 4-bit scanner.

So if you want the richest, most detailed images from your Mac, you’ve got it made with Hewlett-Packard. Call 1-800-752-0900, Ext. 1005 for your authorized HP dealer.

There is a better way.

HEWLETT PACKARD
Circle 344 on reader service card

For all its amenities, ease of use, good image quality, and low price, Publish! recommends the HP ScanJet Plus as their "Best Buy".

The Macintosh Yellow Pages
HyperCard-based directory of all major Mac products including software, hardware, accessories, books, CD ROM titles, and magazines. Contains an index to aid in product searches. 1MB min. memory. $39.95. The Macintosh Yellow Pages, 617/225-7121.

Letter Writer Plus
Business letter software that lets user add graphics or text headers at the top of the page, change the position of a header, and scale graphics just by typing a new scale factor in the dialog box. Can be linked with Power Up's Address Book Plus. 1MB min. memory. $89.95. Power Up, 415/345-5900.

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Nastalique Nizami
Typesetting software for Indo-Iranian languages Urdu and Farsi. Requires a PostScript printer for out-
Partner

Software that automates the task of creating and editing graphics within a word-processed document or publication. Lets user keep all publication data, graphics, and text in one file. 1MB min. memory. S99. Salient, 415-852-9567.

PerfectPartner

Business-management program for the day-to-day operation of small businesses. Captures data about a company's customers, products, employees, and services necessary to prepare sales receipts and project invoices for all transactions as soon as completed. Tallies financial information from receipts and invoices to provide status and payment history. 1MB min. memory. Single copy $459; volume discounts available. The Process Resource, 508/226-6616.

Professional Investor

HyperCard-based professional portfolio-management software for the Macintosh. Designed for stockbrokers, financial planners, and portfolio managers. Tracks clients, portfolios, and transactions; maintains a history of all transactions for each client's portfolio; keeps track of each tax lot; and allows for selling partial lots. 1MB min. memory. $349.95. Balthrop, Brader, Wood Associates, 503/741-2225.

Professional Output Manager-Desktop PS1

Utility program that functions as a driver for graphics programs to specialized imaging and printing devices. Provides graphics professionals with the ability to preview images via an electronic light box, arrange images in any order, and schedule imaging or output for unattended operation. 1MB min. memory. $595. Visual Business Systems, 404/956-0325.

QuickHelp for 4th Dimension

Desk accessory help system for 4th Dimension version 2. This DA contains an entry for every command in the 4th Dimension language and includes a description of the commands, associated commands, manual references, and a complete parameter specification. 1MB min. memory. $99. After Hours Software, 818/783-5690.

Retail Engine Sales Recorder

Software to record sales for one or more stores. Optional bar-code reader can be used to scan tags with SKU or UPC information. Allows user to define criteria for report searches and sorts. 1MB min. memory. Houlberg Development, 619/287-7444.

Sauna

Tool for thermal modeling of electronic equipment. Can be used to create thermal models of entire electronic enclosures, circuit (continues)
boards or heat sinks, with a solver feature that can predict set of temperatures. 1MB min. memory. Standard version $995, advanced versions $2995. Tatum Labs, 313/663-8810.

**SBT Sales Orders**

Sales-order processing system that generates, schedules, and maintains sales orders and back orders; tracks inventory; and writes sales orders and COD tags. Can be used separately or integrated with the SBT Accounts Receivable and SBT General Ledger modules. 1MB min. memory. $695. Software Business Technology, 415/331-9900.

**SpeedPlanner**

Prepublication planning and production tracking system that yields full pagination for PICT-compatible page-layout programs. Electronically dummies pages; contains ad stack tools for placing ads in predetermined patterns, following specified criteria; and automatically locates ads and stories, placing them onto appropriate page. 1MB min. memory. Preplanning package $4995; full-pagination package $8995. Digital Technology, 801/226-2984.

**Spyglass Transform**

Interactive data-analysis tool designed to convert floating-point numbers into images. Can represent data as simple scaled color images, interpolated images, polar images, or line graphs. Program lets user select part of a generated image and see the corresponding data values. 1MB min. memory. $395. Spyglass, 217/355-1665.

**Starflight**

Fantasy role-playing adventure game that takes user into a galaxy of 270 star systems and 800 planets. Takes place in the year 4619. The player's mission is to find colonizable worlds, gather minerals and ancient artifacts, and learn the secrets of the universe. $1995; Advanced version $2995; Apple Macintosh version $2995. Tatum Labs, 313/663-8100.

With the HP DeskWriter, you can...
of alien races. 1MB min. memory. $49.94. Electronic Arts, 415/571-7171, ext. 541.

StrataFlight

Add-on motion-scripting utility that lets users add motion to three-dimensional, 32-bit color images and scenes created with StrataVision. Supports creation of a series of independent PICT files and viewing of both PICS and PICT file formats. 1MB min. memory. $189. Strata, 801/628-5218.

SymbolWorks

Re-creation of a collection of universally understood interpretative symbols used by designers. Contains more than 120 encapsulated PostScript illustrations for use with page-layout, illustration, and CADD applications capable of importing EPS files. 1MB min. memory. $99.95. International SymbolSigns Library, 916/442-4045.

SyncMaster

Mac-compatible interface and synchronizer with dual-port design that has two MIDI inputs and six MIDI outputs. Includes SMPTE reader-generator that reads and generates all SMPTE formats. Supports flywheeling, jam sync, and reshaping of SMPTE code. 1MB min. memory. $349. J. L. Cooper Electronics, 213/306-4131.

Techbase

Database-management system for analysis of numeric data sets used in engineering and scientific applications. Relational database lets user add or delete fields and tables at any time. Produces flat, polygon, cell, layer, or block table types. 1MB min. memory. $2030. Minessoft, 305/292-6449.

Tracon-Air Traffic Control Simulator

Air-traffic-control simulation re-creates environment of terminal radar approach control centers at various major U.S. airports. Generates realistic traffic flows from various aircraft types and thousands of possible routes along real airways and radio fixes. 1MB min. memory. $49.95. Wesson International, 512/228-0100.

Visual Arts—Publishers Resource

Collection of desktop publishing images. Includes office, food and leisure, flowers, technology, sports, geography, and other types of images. Contains dingbats and page borders. 1MB min. memory. $250. Electronic Pen, 404/296-8625.

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**ACCESSORIES**

**Archive DiskFile Modular Cube Unit**
Cardboard file that holds 75 standard 3½-inch disks. Files fit together in a cardboard sleeve to form a pull-drawer cube. $7 per file. Weber & Sons, 201/431-1128, 800/225-0044.

**BNC-Net Series**
Devices to protect from coaxial spike, surge, and interference problems on a network. Available in tee or in-line configurations. Devices install directly on equipment to be protected. $60. Electronic Specialists, 508/655-1532.

**Compuvision Lenses**
Lenses that are designed to block 100 percent of UV light exceeding wavelengths of 400nm, and a major fraction of blue light above 400nm. Glasses are designed to blunt the hazards of UV light, and filtration of blue light improves vision. With frames $29.95; clip-ons $19.95. American International Optical Direct, 503/692-8049.

**SideClip**
Paper holder that attaches to the side of any computer monitor to hold documents for easy viewing. Allows the user to hang papers next to the monitor to prevent neck- and eyestrain caused by constant looking up and down. Holds up to eight pages at a time and swings out of the way when not in use. Attaches with Velcro. $6.95. Kensington Microwave, 212/475-5200, 800/535-4242.

**Surge**
Surge-protection device that provides four-line protection. Device can be used interchangeably for protecting modems, fax machines, fax modems, answering machines, and solid-state telephones on phone lines. Uses metal oxide varistor technology to help protect equipment. $25. Museum Quality Solutions, 804/474-4939.

**ZipKit**
Toner recharging kit available for Series I and Series II LaserWriters. Enables user, even one who isn't mechanically inclined, to disassemble, clean, recharge, and reassemble cartridge easily. Necessary tools included. $55. Dart Products, 305/255-8508.

**BOOKS & VIDEOS**

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How-to guide about creating digital documents that communicate clearly. Teaches how to create menus, messages, hyper-text, and help files; discusses the nature of online documentation; and gives a variety of reasons for using online documentation in software design. Written by William Horton. Hardcover $34.95; softcover $24.95. William Horton Associates, 205/536-8207.

Mastering Graphics on the Macintosh
Book that focuses on specific software such as MacPaint, MacDraw, and HyperCard and how to use them; emphasis is on design rather than technical details. Written by Dan McNeil. $21.95. Chilton Book Company, 215/964-4000, 800/545-1214.

Music and the Macintosh
200-page hands-on guide to Macintosh music software with a discussion of synthesizers, samplers, sequencers, and synchronization. Describes what a user needs to know to begin producing music on the Mac. Written by Gary Yelton. $16.95. MIDI America, 404/452-8154.

To have your product considered for inclusion in New Products, send an announcement with product name, description, minimum memory, peripherals required, pricing, company name, and phone number (and two copies of software) to New Products Editor, Macworld, 501 Second St., San Francisco, CA 94107. We reserve the right to edit submissions.
You know what it's like. If you're in graphic arts, you know there's a lot of grunt-work. Like rubbing-down type. And tracing and filling letters to comp-up headlines.

'Trying to get true colors from a junkyard of dried-out markers.

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Counting characters.

Spinning proportion wheels.

Tracing off the Lucy.

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DrawingCard's flat screen eliminates distortion and with its excellent resolution and contrast you can see the effect of small changes in the colors right on the screen. Or evaluate the visual effect of half-point variations in type size and leading. You can even see the precise amount of letter overlap when you set your headlines "tight and touching."

And with DrawingCard displays, what you see on the screen is what you get on your printer because screen resolution is true 72 dpi.
There are three DrawingCard systems to choose from. Our 8-bit GrayVision display system with 256 shades of gray is ideal for desktop publishing and design projects using line art and black-and-white halftones.

Our 8-bit ChromaVision system with 256 colors is the perfect match for the great majority of desktop publishing, design and illustration projects where 4-color reproduction is needed. And our 24-bit ChromaVision Plus system (shown above) with 16.7 million colors is the ultimate display where color accuracy is especially critical such as color retouching.

DrawingCard display systems are just one way CalComp, a worldwide graphics leader, supports the arts on Macintosh. There's also WIZ, a new mouse system that combines the features of a traditional mouse with the power of a graphics pad. Plus a complete line of high-performance printers.

So stop using those antique hand tools today. After all, the graphic arts should be full of inspiration, not perspiration. For more information about DrawingCard displays, call: 1-800-CalComp.
In Canada, call: (416) 635-9010.

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THE POWERPLANE:
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Quick Tips
HIGH-DENSITY DISKS, PRINTING BITMAPPED IMAGES, SE/30 STRATEGIES, AND MORE

BY LON POOLE

Can you name three differences between 1.44MB (high-density) floppy disks and 800K (regular) disks? Too many people think there are only two significant differences: price, and that extra little hole opposite the write-protect hole. In an attempt to cut costs, these foolish people cut an extra hole in an 800K disk and then initialize it as a 1.44MB disk. I'm not going to tell you where to buy the hole punch that makes the conversion, because I wouldn't be doing you any favor.

The third and most important difference between 1.44MB disks and 800K disks is the coating that magnetically stores your programs and documents. The magnetic bits in the coating of a 1.44MB disk resist demagnetization more strongly than the magnetic bits on an 800K disk do. (A disk's ability to resist demagnetization is expressed in terms of coercivity, which is measured in oersteds. The coercivity of an 800K disk is 600 oersteds, whereas the coercivity of a 1.44MB disk is 720 oersteds.)

A 1.44MB disk must resist demagnetization more strongly than an 800K disk because initializing at the higher capacity packs the magnetic bits in the disk's coating closer together. When you initialize an 800K disk at 1.44MB, its magnetic bits may eventually demagnetize each other. "You might start seeing data loss in a month's time," says Dick Clark, a training specialist at disk maker Dysan. He also warns that hopped-up disks are more susceptible to external magnetic fields. "A magnetic paper-clip dispenser with a paper clip sticking out the top has a strong enough magnetic field to affect a disk leaning against it," he says.

If you need 1.44MB disks, buy the real thing.

Early Warning
A tip published last December suggested tearing off the last 50 sheets of a box of fanfold paper to serve as an early warning. To Don Hauser of Brea, California, this provides an upset stomach to replace a headache (to quote an old ad). What if you are in the middle of a printing job when you arrive at your "early warning system"? Instead, Hauser suggests marking with a red marker in the tear-off margin of the paper at the point where you wish to be alerted. That way, there is no interruption—just a bright red alert.

Printing outside Crop Marks
The tip in January showing how to print a job ID outside the crop marks of a PageMaker document is somewhat misleading. The screen illustrating the tip shows a text block being created on a master page. However, this text will not print on the regular pages, asserts Jo Ellen Ackerman of Cliffsides Park, New Jersey. PageMaker sees this text as being on the pasteboard, not on the page.

Ackerman's solution is to create the job ID as a graphic using any drawing or painting program. Alternatively, you can type the job ID in PageMaker, copy it, paste it into the Scrapbook, and use PageMaker's Place command (in the File menu) to convert the text into a graphic. If you're putting the graphic at the bottom of the page, be sure to include blank space at the top of the graphic. If you're putting the graphic at the top of the page, include blank space at the bottom of the graphic. Place the graphic on the master pages with the blank space on the page and the job information hanging off the page, as shown in "Job Info." The graphic will print on all pages where master items are showing.

Best Bitmaps
Bitmapped (paint) graphics don't always look their best when printed on a LaserWriter. They're created by HyperCard and by paint-style graphics applications at 72 dots per inch. Those dots are 4.166667 times larger than the dots a LaserWriter uses to print the bitmapped graphics at 300 dpi. Because that's not an even ratio, bitmapped graphics can look lumpy on a LaserWriter. However, reducing the printed image by 4 percent (using (continues)
Reduced Bitmaps

Get sharper bitmapped graphics on a LaserWriter by reducing them to 75 percent (top), 50 percent (middle), or 25 percent (bottom) with the Precision Bitmap Alignment option set.
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When you purchase any portable Mac from us, you’ll also get the Sharp Wizard electronic organizer and connecting cable, and MindShare software that manages your tasks, appointments, contacts and business correspondence — and talks to your Sharp Wizard.

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*Dynamac sells only fully-configured Macintosh Portables. **Dynamac SE/30 available upon FCC approval. Apple, Macintosh and Mac are registered trademarks of Apple Computer, Inc. Dynamac is a registered trademark of Dynamac Computer Products, Inc. Other products and brand names are trademarks of their respective holders.

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you can’t set a 24 percent reduction using Page Setup. You have to set the reduction to 25 percent and check Precision Bitmap Alignment.)

At any of these reductions none of the dots that make up the bitmap graphics are lost; they are simply condensed into a smaller area. For example, reducing by 50 percent effectively increases the resolution of bitmapped graphics from 72 dots per inch to 144 dots per inch. The more dots per inch, the finer the detail of the printed image. “Reduced Bitmaps” illustrates the kind of improvement you can get.

Unfortunately, some patterns in bitmapped images reduce poorly: the dots clump together when the patterns are reduced. Jean-Jacques Greif of Paris, France, suggests using sparser or coarser patterns if you know in advance that you’re going to reduce the picture. For example, use a light gray pattern for the desktop instead of the standard medium gray, as shown in “Reduced Desktop Grays.” Also, he recommends you turn off the Page Setup command’s Graphics Smoothing option. When you’re reducing with smoothing on, thin white lines and inverted (white) text can be overwhelmed by dark backgrounds.

Change Standard Application Font

Q Is there a way to change the standard font in an application? I am using Adobe Type Manager and would like to designate one of my outline fonts as the standard font.

Marc Berezin
Soldotna, Alaska

A The factory setting for the standard application font is Geneva. You can change it using the Font List module of MasterJuggler from A/Soft (713/353-4090). Most application programs use the standard application font in new documents unless you change it using the Font menu or an equivalent, but not all do. Microsoft Word, for example, uses New York. To change the standard font in Word, use the Define Styles command (from the Format menu) to change the Normal style, and click the Set Default button.

SE/30 Enthusiast

Q When I discovered the small price difference between the SE and the SE/30 I became enthused about the latter. I have a few questions, though. Is there only one internal floppy disk drive because of the internal hard disk

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Requires Mac II or newer. Format compatible with MacWrite II and III, WordStar, Wordperfect, Microsoft Word, WordStar, PageWriter II, and PageMaker II. Works with all system fonts. Includes Lexpertise’s popular WriteItYay! Check with Lexpertise for further information on product compatibility. It’s the perfect writing tool for professional and personal use.

Reduced Desktop Grays
A light gray desktop pattern doesn’t turn black when reduced to 25 percent.


Circle 183 on reader service card.
drive, or because of space limitations? I'd like an SE/30 with two internal floppy drives. Also, how much of the software I use on my Plus will be compatible? Lastly, I'm trying to find a board for the SE/30 that sends composite NTSC signals to my color TV.

Ryan Rasmussen
Monticello, Minnesota

I assume you plan to use an external hard disk with the SE/30. You won't notice the machine's high performance much if you saddle it with just a couple of floppies. That's probably why Apple designed it for just one internal floppy. There's room inside for a second floppy drive (in place of an internal hard disk), but the cabinet has only one opening for floppy disks. You'd have to perform major surgery to get a second floppy drive in an SE/30. However, you can connect an external floppy drive.

Software compatibility prospects are excellent if you're using software published in the last year and a half. When Apple introduced the SE/30, the company tested over 100 popular application programs and found that 95 percent were compatible. Since then, the other 5 percent have probably been revised to work with the SE/30.

The SE/30 is color-ready. Several manufacturers, including RasterOps (408/562-4200) and SuperMac Technology (408/245-2202), make video adapter boards that output the same color signal as a Mac II. I don't know of any SE/30 video adapters with NTSC output, but you can use a regular SE/30 video adapter with an external NTSC converter designed for standard Mac II color video, such as the NTSC Converter from Julian Systems (415/686-4400) or the RGB/Videolink 600 from RGB Technology (415/848-0180). For more information, see "Mac TV Tools," Macworld, September 1989. (continues)

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**SPIRAL TEXT**

The hard part of creating spiral text in Aldus FreeHand 2.0 is constructing a spiral path. These instructions show one technique. (This tip was contributed by Giovanni Gotti, of Dongo, Switzerland.)

Draw a circle and use the Ungroup command (Element menu) to ungroup it. Next draw and ungroup three or more additional circles, decreasing the radius of each by the same amount. (The Snap To Grid can be helpful here.) Then align the circles as shown.

Using the Knife tool, cut each circle in half at the points indicated. Then remove the half-circles you don't need.

Working from the outside in, select the remaining half-circles two at a time and join them using the Join Elements command (special submenu of the Elements menu).

First select your text, then select the spiral and use the Join Elements command to bind the text along the spiral path.
Tomorrow's leaders are being shaped by two of the most powerful forces in America today: Computers and You.

In an unprecedented way, the computer industry is bringing technology and learning to neighborhoods more commonly associated with hardship than hardware. In San Francisco's Tenderloin, kids have given up graffiti to study PC architecture, graphics and desktop publishing. They work in a learning center equipped with Apple® computers and IBM® PC-compatible systems, as well as an impressive and growing software library, all provided through donations. And they're learning from volunteer instructors like David Bunnell and Adam Osborne.

The goal of Computers and You is to make a difference through technology. And it's working. By the end of the first quarter, students had already found jobs. For some, their first ever. And it doesn't stop with the Tenderloin. Our vision is to fully develop the San Francisco center and then recreate it in cities across the U.S.

A donation of equipment, time and especially money from you or your company can help make this vision a reality. To find out how, call us at (415) 922-7593.


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Signature Font

Is there a way to download cursive signatures into a LaserWriter INTX? We want to cut down printing time when we print form letters. It seems to us that downloading the signatures before beginning the print job would quite radically decrease the formatting time in the printer. Presently we scan our signatures as EPS files and paste them into our letters.

J. Michael Yeager
Henry J. Urbanek
Waterford, Connecticut

The Art Importer from Alsys (214/424-8888) creates PostScript fonts that contain artwork instead of letters, punctuation marks, digits, and so on. For example, you could create a font that has your cursive signature where Times has the letter A. You could then insert your signature by choosing your special font and typing an A. Instead of displaying an A, the Mac displays your signature. Using an art font is a lot like using the Symbol font.

The Art Importer accepts EPS and PICT drawings, but doesn’t accept bitmapped images. Scanned images are bitmapped, although they may be saved as PICT or EPS files. To use a scanned image with The Art Importer, you must first convert it to an EPS or PICT drawing by tracing. Both Adobe Illustrator and Aldus FreeHand have automatic tracing features that do most of the work for you.

MultiFinder on Demand

I’d like to use MultiFinder on demand by double-clicking on its icon, as described in last February's State of the Mac column. How do you move the icon to the desktop so it is accessible at any time? Nothing I have tried moves it from its menu location.

W. Scott Champney
Johnson City, Tennessee

Open the System Folder, locate the MultiFinder icon, and drag the icon out of the folder. You can put it anywhere on the desktop. If MultiFinder is active when you move its icon, you can temporarily inactivate it by restarting the Mac and holding down the ⌘ key from the time you see the Welcome to Macintosh message until the Finder’s menu titles appear. If you want MultiFinder always inactive, use the Set Startup command in the Finder’s Special menu to set the Finder option, and then restart. You can activate MultiFinder without restarting the Mac by holding down the ⌘ and Option keys while double-clicking the MultiFinder icon. Once MultiFinder is active, double-clicking on its icon results in a message advising that it couldn’t be opened because it’s busy. You know MultiFinder is active when you see a miniature icon in the upper-right corner of the menu bar. Also, About MultiFinder appears at the bottom of the Apple Menu.

PC Display on Compact Mac

TIP: SoftPC from Insignia (415/771-7001) works very well for running MSDOS programs on a Mac II, SE/30, or accelerated SE. However, a compact Mac’s 9-inch monitor doesn’t display IBM graphics satisfactorily. The solution is to use Stepping Out II, a Control Panel device from Berkeley Systems (415/540-5536) that lets you work on a bigger screen area than your monitor can display at once. (You pan across the big screen area by moving the pointer to the edge of the screen.) Set Stepping Out II for a standard Mac II screen size (640 by 480 pixels) and enlarge the SoftPC window by clicking its zoom box.

John Willis
Frederick, Maryland

We pay from $25 to $100 for tips published here. Send tips or questions (with your address and phone number) to Quick Tips, Macworld, 501 Second St., San Francisco, CA 94107. Send electronic mail to CompuServe (70370,702) or MCI Mail (294-8078). All published submissions become the property of Macworld.

Lon Poole answers readers’ questions and selects their tips for this monthly column. He has written many personal computer books, most recently the quick reference HyperTalk (Microsoft Press, 1988), and has just finished a new book of Mac tips (to be published this summer by Microsoft Press), Amazing Mac Facts.

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Now the leader in hard disk security announces the ultimate data protection system for your Macintosh. DiskLock works with any SCSI hard disk to provide foolproof password protection for individual files, folders, or your entire hard disk. You can even protect all three levels with different passwords for absolute maximum security. DiskLock automatically locks your files when you shut down or leave your Mac unattended, and alerts you to any unauthorized access attempts.

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H ave you had any viruses lately? I refer not to the cold-and-flu variety, but to computer viruses, programs that invade the Mac and slow its performance, cause system errors, or—at their most evil—destroy applications and documents.

The term virus implies a natural entity that you can't help but pick up now and then, like a cold. The truth is, computer viruses are tools of vandalism—they're bricks heaved through your Mac's windows by people with apparently nothing better to do with their time and programming skill. No viruses exist for the viruses that cause colds, but computer viruses could be stopped dead if their creators turned their energies toward being productive, not destructive.

But then, so could war, crime, and pollution. And like them, viruses will be around for some time. What can you do? First, don't lose any sleep over viruses. They exist, but your chances of being victimized by one are small, especially if your Mac isn't on a network and you don't swap software with other users. Second, be prepared—just in case. Arm yourself with knowledge of how viruses spread, of their symptoms and remedies, and of the measures you can take to avoid them.

It Came from Ohio

Some of the technical concepts behind viruses have been around for decades, but the first microcomputer viruses appear to have been created in 1983 by Frank Cohen, a University of Cincinnati professor who was researching his doctoral thesis on computer security. Cohen's viruses were created under controlled conditions; none reached the outside world. Interviewed in 1988, when viruses enjoyed a burst of media attention, he admitted to being reluctant to publish his findings, but did so to warn the world of the virus threat. "I had planned to devote my thesis to ways to defend against viruses," he said. "Instead, I used it to prove that you can't defend against them."

Viruses are difficult to fight because they're designed to spread. A virus contains software instructions that enable it to copy itself into legitimate files, called hosts. Some viruses infect only application files, while others invade documents or the Mac's system files. Still others begin by infecting a system file and then copy themselves to uninfected applications.

Most viruses spread when you copy an infected file from one Mac to another, although some spread simply when you insert an infected floppy disk. Now imagine millions of Mac users exchanging files through user groups, office and university networks, and online bulletin boards and information services—the propagation possibilities are endless. Last year, a new virus was discovered in Belgium in early December; by Christmas, it had spread throughout the United States.

A virus doesn't just replicate itself, it also inflicts its own unique symptoms on the machines it infects. Viruses can be malicious or mischievous. A malicious virus might deliberately damage applications, cause system errors, or erase files on a hard disk. A (continues)
mischievous virus might simply display a message or joke at a predetermined time; its creator is out to spoil your windows, not smash them. To date, most Macintosh viruses have fallen into this second category.

But even a mischievous virus can be trouble. It might cause a system crash by trying to use memory or resources that a legitimate program is already using. Its programmer may not have tested it thoroughly, or it might conflict with your Mac's combination of hardware and startup documents (INITs). The bottom line: There's no such thing as a benign virus.

Names and Strains

Most Mac viruses have odd-sounding names—nVIR, Hpat, INIT29—that reflect the technical makeup of the virus's software. Some viruses earn more pronounceable monikers, like the "Peace" virus, set loose by an attention-hungry editor of a Canadian Mac magazine. It was designed to display a "universal message of peace" on March 2, 1988, and then erase itself. Its victims—including Apple, which inadvertently shipped a few thousand infected copies of FreeHand—didn't find the medium appropriate to the message.

Now and then a new strain of an existing virus appears. That's been the case with the nVIR virus, whose original program code was once posted on a computer bulletin board in an attempt to aid creators of antivirus software. It may have helped them, but it also gave budding virus creators a head start in creating new strains.

"Field Guide to Viruses" lists the names and symptoms of the viruses that have been identified as of late February.

Is Your Mac at Risk?

Generally, the more Macs your machine comes in contact with, the greater the risk of infection. Consider yourself at risk if any of the following describe you.

- You swap programs, HyperCard stacks, or disks with other Mac users. Even an erased disk can carry the WDEF virus if you erase the disk by dragging its contents to the Trash. If a friend hands you a blank disk to fill with your latest shareware finds, be sure the disk was erased using the Finder's Erase Disk command before you insert it into your Mac.

<table>
<thead>
<tr>
<th>Virus Name</th>
<th>Nature of Infection</th>
<th>Symptoms</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARX</td>
<td>Infects applications only (including the Finder), not other system files or documents.</td>
<td>May cause crashes due to its poor programming.</td>
<td>Disinfected applications aren't identical to original, but generally still run. Best approach is to replace infected application with an uninfected copy from its master disk.</td>
</tr>
<tr>
<td>INIT29</td>
<td>Infects any file (document or application) containing resources. Spreads easily via applications and system files.</td>
<td>Its poor coding may cause printing problems, INIT conflicts, and MultiFinder crashes. When you insert a locked floppy disk, a dialog box appears saying the disk needs repairs. Normally, this dialog box doesn't appear with locked disks.</td>
<td>INIT29 can spread very rapidly because it infects unlocked floppy disks as soon as they are inserted.</td>
</tr>
<tr>
<td>nVIR (strains &quot;A&quot; and &quot;B&quot;)</td>
<td>Infects System file first, adding code that subsequently infects each application you run. Finder and DA Handler files usually become infected.</td>
<td>System hangs, files may disappear. Mac may beep when applications are started. &quot;B&quot; strain causes Mac to say &quot;Don't panic&quot; if System Folder contains the Macintosh file. Otherwise, you may hear random system beeps.</td>
<td>The original program code for nVIR was posted on some bulletin boards and information services. As a result, several &quot;clones&quot; have appeared: Hpat, nFLU, AIDS, MEV#, and F*** (whose actual name can't be printed here). Their symptoms are generally the same.</td>
</tr>
<tr>
<td>Peace (also called MacMag, Drew, and Breadwin)</td>
<td>Infects System file.</td>
<td>&quot;A message of peace&quot; appeared on March 2, 1988; virus then destroyed itself.</td>
<td>Rare these days, but still could be encountered on old disks.</td>
</tr>
<tr>
<td>Scores</td>
<td>Infects System file first, lies dormant for two days, then searches for and infects a new application at 3½-minute intervals. Adds invisible files called Scores and Desktop (the _ character represents a space) to System Folder.</td>
<td>System crashes, printing problems. Miscellaneous problems with MacDraw and Microsoft Excel. May cause &quot;insufficient memory&quot; messages. Increases size of files it infects by 7K. Notepad and Scrapbook files may have generic document icons (dragged-over page).</td>
<td>System 6.0.4's System file is irreparably damaged and must be replaced with an uninfected copy from its master disk.</td>
</tr>
<tr>
<td>WDEF (strains &quot;A&quot; and &quot;B&quot;)</td>
<td>Infects only the invisible Desktop file contained on all floppy and hard disks. Spreads rapidly through the sharing of floppy disks.</td>
<td>Slows performance. Significantly slows performance of AppleShare server. Crashes Mac and Portable. &quot;B&quot; strain causes Mac to beep each time a Desktop file is infected.</td>
<td>You can remove this virus from an infected disk by rebuilding its Desktop file. Press Shift and Option while inserting the disk. (For hard disks, restart and hold down Shift and Option.) To avoid infecting an AppleShare server, do not grant &quot;make changes&quot; privilege to the server's root directory (desktop level).</td>
</tr>
</tbody>
</table>
• You download programs and HyperCard stacks from bulletin boards or information services. Most bulletin boards and information services check incoming files for viruses before making them available to subscribers, but a new virus can slip through undetected if the service's virus-detection software can't recognize it.
• You're connected to other Macs on a network. A network is an ideal transmission medium for viruses, especially if several users access applications stored on a file server.
• You use a desktop publishing service bureau or university laser-printer center. Some service bureaus have been criticized for taking a cavalier attitude toward virus checking and prevention. If you use a bureau or central printing station regularly, look into its virus-prevention measures.

How to Protect Yourself
If you don't fall into the preceding categories, you aren't immune from viruses, but the threat is minimal. Whether or not you're in the high-risk group, here's how to protect yourself.

• Lock floppy disks whenever possible. A virus can't infect a locked disk. Always lock the original master disks of an application before inserting them; you'll need virus-free masters in case one of your programs gets infected.
• To lock a disk, slide its plastic write-protect tab so you can see through the square hole. If you don't have a hard disk, it won't be possible to work with locked floppies. Your best defense is to do the following.
• Back up religiously. If the worst happens, you'll have something to fall back on—unless the backups are infected, too. To avoid that, keep at least two sets of alternate backups made at different times. Don't neglect to back up the files in your System Folder, too; most viruses attack them first, and by having a backup, you won't have to laboriously reinstall your favorite fonts and desk accessories. (See this March's Getting Started for tips on backing up.)
• Be wary of a new freeware or shareware program. Instead of trusting it to your hard disk, run the program from a floppy first and watch for abnormal behavior, such as system crashes or significantly slowed performance. Use the Control Panel or Alarm Clock desk accessory to change the Mac's date setting, then run the program again; some viruses lie dormant until a certain amount of time passes. (The Scores virus, for example, waits four days before doing some of its dirty work.)

Bypassing your hard disk protects you from Trojan horse programs, which appear to be legitimate applications, but which damage or erase files when you run them. A Trojan horse differs from a virus in that it isn't designed to spread by replicating itself; if a Trojan horse strikes, you can prevent future problems by deleting it. Trojan horses have been rare in the Mac world, although earlier this year two surfaced on a bulletin board system in Edmonton, Alberta. Called Mosaic and FontFinder, they appear to be utility programs, but when run, they erased the directory of the Mac's hard disk and displayed a message saying "Gotcha." Prior to their appearance, the Macintosh world's best-
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known Trojan horse was a HyperCard stack called Sexy Ladies, which displayed smutty images while erasing data from the disk it was stored on.

- Protect your networks. Only applications known to be uninfected should be copied to a network file server. If you’re in charge of running a server, establish guidelines to prevent anyone else from copying programs to the server. Also consider using the file server for document storage only, and running applications from local hard or floppy disks (not a bad approach in any case, given the less-than-blazing speed of LocalTalk cabling).

- Consider using one or more virus-detection utilities. These are programs you can use to scan suspect disks for viruses, remove viruses from infected programs, and guard against future infection. They’re often described as the vaccines of the computer world, but the truth is, they’re more like chicken soup—not guaranteed cures, but certainly worth trying.

If you suspect a virus infection, see “When Infection Strikes” for some tips on what to do.

**Mac Medicine**

After the Big Mac Viral Epidemic of 1988 (which snared more media attention than victims), programmers on the side of law and order began developing ways to detect, disable, and prevent viruses. Today, you can choose from four commercial virus-detection utilities and nearly a dozen shareware or free ones.

The commercial packages—HJC’s Virex, Symantec’s SAM, Mainstay’s Anti-Toxin, and 1stAid Software’s Anti-Virus Kit—include an application for scanning suspect disks and repairing infected ones, and a watchdog INIT, which can help prevent infections (see “Virus Hunt”).

It’s a good idea to use a virus-detection application’s scan mode to check for viruses before backing up.

Virex also has a Record/Scan command that saves information about the size and contents of one or more files. If you suspect infection, run the Record/Scan procedure again, comparing the results with the first scan. This is a useful way to spot a new virus that the utility might not otherwise detect. Anti-Virus Kit has a similar feature called Incubator.

Watchdog INITs provide several lines of defense against future infections. They automatically scan a newly inserted floppy disk for viruses, if one is found, you can eject the diseased disk and throw it away or you can try to repair it. The INITs also display a warning dialog box if you try to start an infected application. Virex’s INIT also watches for the Mosaic and FontFinder Trojan horses.
SAM’s watchdog INIT can also help prevent “unauthorized” modifications to applications and the System Folder. When a program (virus or otherwise) tries to modify an application or system file or attempts to add a new INIT to the System Folder, a warning appears that lets you prohibit or permit the operation. (You can also tell SAM to automatically allow a specific type of modification, to eliminate unnecessary warnings.)

As for the free and shareware virus utilities, the most popular are John Norstad’s Disinfectant (a detection and repair application), Don Brown’s Vaccine (a watchdog INIT), Jeffery S. Shulman’s VirusDetective (a detection and repair DA), and Apple’s Virus RX (a detection application). “Virus Fighters” summarizes the features in these and other virus utilities.

At least one virus-detection utility belongs in every Macintosh user’s software library. Start with Virus RX, Disinfectant, and Vaccine—they’re free, and they may be all you’ll need. For extra protection, consider one of the commercial packages. I’ve never needed one, so I can’t make a first-hand recommendation. My colleague Bruce Webster, however, favors Virex and SAM (see Reviews, Macworld, January 1990).

If security is extremely important, you might also consider Casady & Greene’s AME. Short for Access Managed Environment, AME provides more security than you’ll find at a Secret Service company picnic. You can create a list of people permitted to use your Mac, and then define privileges—such as the ability to create or delete files, use printers, or insert floppy disks—for each user. For virus protection, you can register your healthy applications as “trusted,” and then instruct AME to compare an application to its registration to verify that it hasn’t been altered. If it has, AME won’t allow it to run.

No Sure Cures

As I mentioned earlier, a virus-detection utility can’t guarantee immunity. It’s possible for a new virus to bypass a utility’s detection and prevention features. When a new virus appears, a detection utility must be revised to recognize it. Updates for commercial programs usually cost $15–$25; if a few new viruses appear each year, you’ll spend a small sum keeping your medicine cabinet up to date—and you’ll be partially unprotected until the latest versions arrive.

It’s also worth noting that watchdog INITs can cause problems if you’re not careful. SAM’s Intercept INIT, in particular, lets you intercept certain activities that some programs perform as part of their normal operation. SAM includes a list of over a dozen software and hardware products that Intercept may not work properly with—one of them is HijC’s Virex INIT. With virus utilities, two watchdogs do not necessarily offer twice the protection of one.

Some people believe virus-detection utilities challenge virus writers to create new strains that can bypass their protection measures. They may be right; the WDEF virus contains a stealth mechanism that enabled it to evade most detection utilities when it appeared last December. Last January (continues)
this escalating software arms race prompted 1stAid Software to discontinue its Anti-Virus Kit. At this writing, Anti-Virus Kit is still sold and supported, but will no longer be updated as new viruses appear.

What Are My Chances, Doc?

How likely are you to get a virus? In a Macworld reader survey that ran in the October 1988 issue, only about 8 percent of our readers had been infected. I've never had a virus, and I hang out on a half-dozen information services and run untested shareware with abandon. I do use Vaccine, but I don't back up as often as I should. OK, I'm a hypocrite—a doctor who tells you to watch your diet while his own cheeks bulge with M&M's.

Or maybe I simply give viruses the attention they deserve. The virus threat is minimal; you'll probably never see one. But they are out there, and new ones could appear at any time.  

See Where to Buy for contact information.

Jim Heid is a Macworld contributing editor who each month focuses on a different aspect of Mac fundamentals. His latest book, coauthored with Peter Norton, is Inside the Apple Macintosh, an advanced user's guide published by Brady Books.

### WHEN INFECTION STRIKES

Y

our Mac is acting up. Should you suspect a virus? Not at first, unless the problem is a dialog box containing a universal message of peace. Most system errors or other problems can be traced to nonviral causes: conflicting INITs, a damaged disk, loose or damaged printer cables, or application bugs (see “Getting Started with Troubleshooting,” Macworld, August 1989). I learned this the hard way last year: I spent two days trying to eradicate a suspected WDEF infection after my system slowed to a glacial pace, but the problem turned out to be conflicting INITs. It goes to show that even the threat of a virus infection can impair your productivity.

After you've eliminated nonviral possibilities, compare your list of symptoms to those in “Field Guide to Viruses.” Run Apple's Virus RX utility, Disinfectant, and any other virus detectors you might have. If the detection utility identifies an infection, you need to take action.

- Isolate the patient. If you're on a network, disconnect the LocalTalk connector where it attaches to the Mac's printer port. Inform other members of the network before disconnecting your Mac and be sure they know your machine is infected—theirs probably are, too.
- Replace the infected files with healthy backups if you have them. (You did back up yesterday, didn't you?) If you don't have healthy backups, use a virus utility to try to repair the damaged files. First, because the disinfecting process itself could damage the files, back up the files the utility says are infected. Copy them to floppy disks and be sure to clearly label those disks as infected. If one utility fails to repair the files, try another. If you can't fix a file, delete it. Once you've successfully repaired or deleted all infected files, run the detection utility again.
- After you repair the files, erase the infected backup disks. Don't use the Finder to erase the disks; you might reintroduce the virus when you insert an infected disk. Instead, use a magnetic disk eraser such as Radio Shack's catalog number 44-232. A bulk eraser uses a strong magnetic field to scramble the disk's microscopic magnets, so don't use it near your good disks.

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**Virus Fighters**

<table>
<thead>
<tr>
<th>Product</th>
<th>Developer</th>
<th>Price</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anti-Virus Kit</td>
<td>1stAid Software</td>
<td>$79.95</td>
<td>Includes watchdog INIT and scan and repair application. May no longer be available; will not be updated.</td>
</tr>
<tr>
<td>AntiPan</td>
<td>Michael Heimel</td>
<td>free</td>
<td>Removes nirV infections and prevents future nirV infections. Detects nirV clones.</td>
</tr>
<tr>
<td>AntiToxin</td>
<td>Mainstay</td>
<td>$59.95</td>
<td>Includes watchdog INIT and scan and repair application. Awkward design; not recommended.</td>
</tr>
<tr>
<td>Eradicat Em</td>
<td>Dave Platt</td>
<td>free</td>
<td>INIT that repairs and protects against WDEF infections.</td>
</tr>
<tr>
<td>GateKeeper</td>
<td>Chris Johnson</td>
<td>free</td>
<td>INIT-clue that protects system files and applications against infection. An alternative to Vaccine—more thorough checks, but requires some setup time. Recommended for use with GateKeeper Aid.</td>
</tr>
<tr>
<td>GateKeeper Aid</td>
<td>Chris Johnson</td>
<td>free</td>
<td>INIT that repairs and protects against WDEF infections.</td>
</tr>
<tr>
<td>Symantec AntiVirus</td>
<td>Symantec</td>
<td>$19.95</td>
<td>Includes watchdog INIT and scan and repair application.</td>
</tr>
<tr>
<td>Vaccine</td>
<td>Don Brown (ICE Software)</td>
<td>free</td>
<td>INIT-clue that warns you when a program attempts to modify system or application resources. Highly recommended.</td>
</tr>
<tr>
<td>Virus</td>
<td>HUC</td>
<td>$99.95</td>
<td>Includes watchdog INIT and scan and repair application. Recommended.</td>
</tr>
<tr>
<td>Virus RX</td>
<td>Apple Computer</td>
<td>free</td>
<td>Detects Scores, nirV, INIT29, ANTI, and WDEF. Doesn't repair infected applications.</td>
</tr>
<tr>
<td>VirusBlockade II</td>
<td>Jeffrey S. Shulman ($30 shareware)</td>
<td>$30</td>
<td>Virus-detection clue. Works with VirusDetective to scan inserted floppies for viruses.</td>
</tr>
<tr>
<td>VirusDetective</td>
<td>Jeffrey S. Shulman ($35 shareware)</td>
<td>$35</td>
<td>A powerful desktop accessory you can configure to detect new viruses as they appear. Doesn't repair infected applications, but does scan for WDEF infections.</td>
</tr>
</tbody>
</table>
That's right. For the third year running, the readers of Macworld magazine have voted the Kensington Turbo Mouse "Best Input Device" for Macintosh computers.

Who were the contenders? Every other trackball and mouse on the market. (Not to mention joysticks, keyboards and graphics tablets.) The winning secret? Simple.

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Insights on Panorama 1.5
Widening Your Database Horizons

BY TOM NEGRINO

When ProVue Development's Panorama was introduced, it provided a wide variety of tools for organizing data. Now with the release of version 1.5, you'll find even more versatility in this flat-file database, including line items in forms and variable record heights in reports, as well as improvements in macros, lookups, equations, and Flash Art. In this collection of tips, shortcuts, and workarounds, there should be enough to satisfy everyone from the casual user to the advanced database designer. Except where noted, these tips apply to all versions of Panorama. Thanks to Russ Wyllie of ProVue and Panorama power user Derek Martin, Jr., for sharing their expertise.

In Fine Form
Because Panorama's form-and-report generator is so fully featured, if you don't study the manual thoroughly you can easily miss tips for speeding up your work. For example, when you're designing a print report form, it's usually important to line up objects on one tile with those on another. In a typical report, titles on a header need to line up with data-cell objects on a body tile. To simplify report setup, instead of creating each tile from scratch by clicking and dragging, Shift-Option-drag a tile to make a second tile of the same dimensions so that they'll align automatically. To align tiles that already exist, choose the Align Objects command from the Arrange menu and select the Left & Right option from the resulting dialog box.

The Magnify tool in graphics mode lets you zoom in up to eight times, without affecting the other tools and commands. Pressing the Shift key turns the magnifying glass into a microscope, which lets you zoom out to a 25 percent view of your form.

If you've selected an entire object, the Nudge commands allow you to move it pixel by pixel. After you've changed the size of an object by dragging one of its handles, you can use either the Nudge commands or the arrow keys to tweak its size. Each nudge moves the handle that was dragged one pixel. You can continue nudging an object's size until you select another object.

When you're working with smaller objects, you may find it difficult to select the handles at the corners of the object. Pressing the S key invisibly expands the handles to fill nearly the entire object. This is especially useful when you have many small objects selected and there are many handles visible.

One of the forms editor's most useful features is Cluster Resize. If you select many objects at a time with the marquee, dragging on one object's handle causes all the objects to resize at the same time. This saves a lot of time when you're adjusting the height or width of rows and columns in a table. An added bonus is that if you resize the objects in the middle of a table, the surrounding objects move to make room for them.

The Dimensions dialog box not only lets you specify an object's size precisely, it also lets you key in the dimensions relative to the upper-left corner of the object. Just type a plus sign before the number (see "Setting Sizes").

Date- and Time-Stamping a Report
To put the current date and time in a report, enter the following text into a paragraph object in the form window. Then place the paragraph object onto a header or footer tile.

{datepattern(today()),"Month dd, yyyy, ")
+timepattern(now(),"HH:MM AM/PM")

The date and time will appear in this format: February 5, 1990, 3:00 PM (continues)
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- **Charles Hotel: 864-1200 $160/$170 Mcrindle 451-1900 $185/$205**
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- **Back Bay Hilton 236-1100 $145/$165 Lenox Hotel 536-5300 $145/$165**
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To make a reservation, simply mention that you are attending MACWORLD Expo/Boston. There are only a limited number of rooms available at discounted rates. Plan early. Please mention all special rates when you call to make a reservation.
Register for MACWORLD Expo/Boston by July 10 and save $10-$15. 

This is your chance to preregister for MACWORLD Expo/Boston, Wednesday, Thursday, Friday, and Saturday, August 8, 9, 10, and 11, 1990, at the World Trade Center, Bayside Exposition Center, and the Wang Center.

Please choose your package and fill out this form completely. Incomplete forms will be returned. Use one form per person. (Make photocopies to register additional people.) Then send the completed form(s) along with payment to: MACWORLD Expo, P.O. Box 4010, Dedham, MA 02026. Please do not staple check to form.

Registration cards must be received by July 10. Cards received after July 10 will be returned. Purchase orders cannot be accepted. Registration fees are not refundable. For further information call the MACWORLD Expo/Boston Hotline at 617-361-3941. U.S. attendees will be mailed their badges on or about July 24. (Be sure to check box indicating where badge should be sent.) All other badges will be held at the Preregistration Counter at the Bayside Exposition Center for pick up beginning Wednesday, August 8.

MACWORLD Expo Attendee Bonus:

All registration fees to MACWORLD Expo/Boston include a six month, $7.50 paid subscription to MACWORLD Magazine. (MACWORLD’s basic subscription rate is $30.00 for 12 issues.) When you preregister, we’ll include your MACWORLD Magazine subscription request form in the preregistration package.

Please register me for:

- **Package One** $65:
  - Conference sessions* and exhibits.
  - Preregister by July 10.
  - ($80 at the door)

- **Package Two** $15:
  - Admission to exhibits only.
  - Preregister by July 10.
  - ($25 at the door)

- **I am an International attendee**

Please send my badge and further information to:

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Card holder signature

(Signature necessary to be valid.)

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Cash only at the door. After July 10, you must register at the show.

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<th>Which personal computer(s) do you own/use?</th>
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*All conference sessions are on a first-come, first-served basis with no guaranteed seating.

All registration fees are non-refundable.

Please fill out this form completely and send it, along with your check or money order to: MACWORLD Expo, P.O. Box 4010, Dedham, MA 02026.

Please do not staple check to form.
EXTRA! EXTRA! MACWORLD Expo comes to Boston, August 8-11.

Mark your calendar and make your reservations. The biggest Macintosh event in the world comes to Boston Wednesday, Thursday, Friday, and Saturday, August 8, 9, 10, and 11, 1990.

In four action-packed days, you'll pick up all the latest Macintosh news — hot off the presses. Find out about new hardware, New software, New peripherals. New services. New ideas. And new ways to put your Macintosh to work — in the office, in the lab, in the studio, in the classroom, or in your home.

With over 400 exhibiting companies, there's something for everyone.

Whether you're interested in networking, spreadsheet analysis, databases, multimedia, education, research, word processing, accounting, law, CAD-CAM, forecasting, design, publishing, illustration, animation, music, programming, or fun and games, you'll find it at MACWORLD Expo/Boston.

Visit more than 400 exhibiting companies spread over 300,000 square feet of space. Attend dynamic seminars and workshops run by industry experts. Sharpen your Macintosh skills on the spot. And more.

Flash! MACWORLD Expo/Boston has a whole new look.

MACWORLD Expo/Boston offers you more conference sessions and covers even more topics than ever before — in an expanded four-day format that still leaves you with plenty of time to visit the hundreds of exhibits or attend the all-new Treasuries of Practical Tips.

(More on this later!)

Start off the day with the MACWORLD Expo Great Debates and Keynote Presentations, guaranteed to lift your spirits and rev your engine. You'll get the latest scoop straight from leading Mac insiders. Then choose from eight different Conference tracks scheduled for Wednesday through Saturday, August 8, 9, 10 and 11 — all available on video and audio tape at a nominal cost.

1. The Multimedia Mac (NEW in Boston!). Learn about the incredibly exciting integration of video, sound, and animation on the Macintosh platform.

2. Designer Solutions (NEW in Boston!). You asked for it! And here it is — two days of intensive sessions especially for architects, graphic artists, engineers, advertising agencies and others who want to get the most out of the Macintosh as a design tool.

3. Software Review Sessions (NEW in Boston!). The software reviewers of leading Mac publications tell it like it is. Get authoritative, unbiased overviews of the best-selling Macintosh software packages.

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7. Special Interest Group Meetings. These sessions serve the special interests of users in an amazingly broad range of fields — including Education, the Home Office/Small Business, Healthcare, Law Offices, International Issues, and more.

8. Late-Breaking/Popular Demand Topics. We'll top off the agenda with sessions that reflect the newest market developments. Included here will be the ever-popular MACWORLD Expo User Group Extravaganza (MUSE), where users can share information, compare tips and strategies, and discuss their concerns and problems.

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Saturday, August 11, is your chance to pick up tricks, tips, and techniques that would otherwise take weeks to collect. We've packed all the powerhouse pointers and time-saving ideas learned through years of MACWORLD Expos into a series of two-hour "Treasuries" filled with practical how-to's on specific programs and products.

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Save $15 on a full registration, including all Conference Sessions and Exhibits, by registering before July 10 ($65 in advance, $80 at the door.) Or preregister for Exhibits only and save $10. ($15 in advance, $25 at the door.)

Preregistration not only saves you money, but time as well. We'll send you your admission badge early so you can walk right into MACWORLD Expo! And avoid long lines at the door.

To preregister for MACWORLD Expo/Boston, simply complete the attached form and send it in with your payment (by check or credit card.) For more information, call the MACWORLD Expo Hotline at 617-361-3941.

And discover what's new in the world of Macintosh.

MACWORLD EXPOSITION

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Setting Sizes

By adding a plus sign before the values in the Dimensions dialog box, you can specify an object’s dimensions relative to its upper-left corner. Here, the object’s upper-left corner is one inch across and one inch down from the upper-left corner of the layout. From that point, the object will be four inches wide and three inches tall.

Hiding Macros

Often you’ll want to create macros that don’t need to be listed in the Macro menu, because either they work behind the scenes in your database or they execute automatically. For example, a macro that automatically calculates invoice prices after you enter the amount and cost of a line item shouldn’t be listed in the Macro menu, because a user could choose it accidentally at the wrong time and make the data incorrect. To keep a macro from showing in the Macro menu, when you name it put a period before the macro name.

Making Check Boxes and Radio Buttons

Panorama doesn’t have a tool for creating check boxes and radio buttons on forms, but with version 1.5 you can create reasonable facsimiles of these objects by using a column in the database, either a circle or a rectangle, a Flash Art object, and a simple macro attached to a button object. These facsimiles then look and behave like standard Macintosh buttons (see “Simulated Radio Buttons”).

To create a check box, first create a column in the design sheet to hold the data, which we’ll call ChkBx. Set the data type to Compressed, and create a value bar with only one value—
On. Now create and name a new form and click on graphics mode. Use the rectangle tool to draw a square, then use the line tool to draw two lines forming an 'X' through it. Select the two lines you have just drawn and cut them. Open the Flash Art window and paste them in, naming the window 'X', then close the window. Return to the form, select the Create/Edit Flash Art tool, and draw a square Flash Art object that exactly covers the previously drawn square. When the Flash Art dialog box appears, enter the following Flash Art caption equation:

\[
?([\text{ChkBx}]="On", "X","")
\]

This equation says, "If the value in the column ChkBx is On, then display the Flash Art object called X. Otherwise, display nothing."

Then make sure the Center button in the dialog is selected, and click OK. Now open a new macro window, name the macro ChkBx (note the period before the name, preventing the macro from being listed in the Macro menu), and enter the following script:

```
ScrapCalc {info("ColumnName")}
If {ChkBx "On"}
Column {ChkBx}
```

"On"
Else
Column {ChkBx}
Column clipboard

Once the macro is created, return to the form and choose the button tool. Use it to draw a button object that covers the previously drawn square and Flash Art objects. Then, when the button dialog appears, select your new macro—ChkBx—from the list, make the button transparent, turn off the auto-highlight feature, and click OK. Using the Create/Edit Caption Text tool, name your check box according to the value you want it to have, select data mode, and you will find your check box ready to use. If you place a double quote character ("' in the Default column of the design sheet, the check box will default to the previous record's setting for each new record.

You can create radio buttons (generally a group of them) in a similar fashion. In an accounting database, for example, you might want to use a group of radio buttons to indicate the credit card (MasterCard, Visa, American Express, and so on) to which a sale was charged. Create another column in the design sheet to hold the data (this time called RdBtn). Give it a type attribute of Compressed, and add a value bar, entering a different value for each button in the group. Now open a form and click on graphics mode. Use the oval tool to draw a small, white-filled circle (hold down the Shift key while drawing to get a perfect circle), and then a smaller circle, filled black. Select the black circle you have just drawn and cut it. Open the Flash Art Gallery and paste it in, naming the window Btn. Return to the form, select the Flash Art tool, and draw a Flash Art object that covers the previously drawn white circle. When the Flash Art dialog box appears, enter the following Flash Art caption equation:

\[
?([\text{RdBtn}]="Value", "Btn","")
\]

Then select the Center button, and click OK. You should substitute the actual value (such as MasterCard) you're using in the button for the value parameter in this Flash Art caption equation. Copy this first two-part but-

(continues)
ton and paste another button for each possible value. Open the Flash Art dialog for each one, and change the value parameter to reflect the value associated with that button. Now open a new macro window, name it RdBtn, and enter the following script:

```plaintext
ScrapCalc {info("ColumnName")}
Column {RdBtn}
"Value"
Column clipboard
```

Create one macro for each possible value, naming them so that each is easily identified. The fastest way to do this is to copy the first macro and paste it into successive new macro windows, changing the value parameter in each one.

Once your macros are created, return to the form, and choose the button tool. Use it to draw a button object that covers each of the previously drawn circles and Flash Art objects. When the button dialog appears, select the associated macro from the list, make the button transparent, turn off the auto-highlight feature, and click OK. With the Caption Text tool, name each button, select data mode, and your radio buttons are ready to use.

Again, placing a double quote character in the design sheet's default column will default the button setting in each record to the previous record's setting. If the buttons don't work correctly on the first try, chances are you've left out a quote mark or made some other typo in the equation.

**Hiding Columns in the Data Sheet**

You may want to design a database with some hidden columns to hold data that users don't need to see, such as the_chk1x and RdBtn columns described in the last tip. Although you can't completely hide a column in the data sheet, you can make it virtually inaccessible. First, go into the design sheet and set to zero the column width of any columns you want hidden (this actually makes them each one pixel wide). Next, move all your zero-width columns to the end of the data sheet. Finally, in the last normal-width column put an automatic macro that jumps to the next record or creates a new record whenever a user tries to leave that column.

**Skipping Columns during Data Entry**

The Time Card example file that comes with Panorama includes an equation that calculates the day whenever you enter a date in the Date cell (see "Column Jumping"). So why bother tabbing through the Day column when you never key data into it anyway? Using Panorama 1.5's Close Window macro, you can make Panorama skip the Day field every time you tab out of the Date field. Just create a macro consisting of this one command:

```
Column ccTime In
```

Then set it up as the Close Window macro on the Date field.

(continues)
New Forms of Business.

Paperwork. The essential inconvenience. Whether it's invoices, travel expenses, office memos or tax returns, Informed™ software and Macintosh® computers can help you change mountains of paperwork into well-organized forms of information.

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Circle 297 on reader service card
Finding Duplicate Records

Use the following macro to locate a potential duplicate entry in a column:

SortUp
Unpropagate
Find = " "

The macro goes through the database, comparing each record it finds to the previous one. You can then check each pair to make sure they really are duplicates before deleting any. Choosing Find Next will advance you to the next potential duplicate.

To make this duplicate-searching technique more accurate, first use an equation to combine elements of multiple columns into an empty column before running the macro. For example, to combine the first initial plus the last name, use this equation:

```
Firstname[1,1] + " " + Lastname
```

Or to combine the zip code plus the address, use this equation:

```
str((Zip)+" " + Address)
```

When Nothing Is Valuable

Value buttons are a convenient way to enter data into a cell. Not only do they limit the choices to a few entries, but they also make sure the entered value is spelled correctly. However, they're very authoritarian, forcing you to make an entry in a cell whether you want to or not. That means you don't have the option of using a value bar to tab through a cell without entering data. But there is a way to get around this limitation. Set up the following equation in the design sheet (Computer is the name of a column in this example):

```
(Computer)?("none","","Computer")
```

When you select the None button, the equation swoops in, intercepts the data, and skips to the next field (see "No Value").

Selecting Unusual Groups of Dates

Panorama 1.5's new Select Logic Equation option allows for some rather unusual date selections. For instance, here are some equations for choosing all records entered on a Tuesday, all records in a particular quarter, everything entered on weekends, and only (continues)
You can't get any brighter than this. If you want the brightest, boldest color money can buy, you want a Tektronix color printer. No other printer on the market can make you look this good.

And our prices will make you wonder why you ever used black and white. Printers start at $2495. You can get certified PANTONE® Color that's compatible with PostScript language and Adobe fonts for only $8995.

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Nisus 2.1, which now reads and writes Microsoft® Word files, has a Find/Replace command that is only one example of the many differences between Nisus and Microsoft Word.

With Nisus's Find/Replace command you have full use of font, style, size, and a full complement of ASCII characters—in short, what you would expect from the Macintosh—you can even search by position or color.

The most powerful database programs have a built-in language, so why shouldn't a word processor? That's why Nisus has an integrated word processing language that will let you extend the power of Nisus to solve your specific needs. For example, one user created a function that automatically indexed all proper names in a document.

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**Equation Tips**

- Equations can do a lot more than just perform math operations. How about copying the entire contents of one column into another? Just click in the empty field, choose Equation from the Math menu, choose the name of the field containing the data from the Columns menu, and click OK. The contents of the first column will be pasted into the empty one.

- A fairly common application of automatic equations is to update a Modification Date column whenever you modify a cell in a record. For instance, you might want to update the Dues Paid Through column of a club membership roster whenever you change a dollar amount. To do so, paste this equation into the columns you would like updated:

  - `{Date} = today()`

- The following equation concatenates three text fields into one three-line field—`chr(13)` is the ASCII value for a carriage return.

  - `{Field 1} + chr(13) + {Field 2} + chr(13) + {Field 3}`

- If you come up with a good equation that you use only occasionally, rather than relying solely on your own (human) memory, paste it into your NotePad DA, along with a notation about what it does.

**Sharing the Wealth**

If you've found a shortcut or undocumented trick not mentioned here, spread the word to other Macworld readers by sending it to *Quick Tips*, Macworld, 501 Second St., San Francisco, CA 94107.

See Where to Buy for contact information.

Tom Negrino is a Macintosh consultant and writer, and a director of the Los Angeles Macintosh Group. He is a frequent beta tester of new database products.

**Insights**

*How to*

Those entered during the work week:

- datepattern(\{Date\}, "DayOfWeek") = "Tuesday"
- datepattern(\{Date\}, "Quarter yyyy") = "First 1989" datepattern(\{Date\}, "Day") = "Sat" OR datepattern(\{Date\}, "Day") = "Sun" datepattern(\{Date\}, "Day") = "Sun"

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Children are our greatest resource. The Boys & Girls Club provides them with a positive environment in which to learn and grow. Make a contribution today, so they can make one tomorrow.

**MISCELLANEOUS**

**Children are our greatest resource.**

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From the desk of Guy Kawasaki:

I got a MicroNet drive and loved it. Then I visited MicroNet and found out that it's truly a Macintosh Way kind of company. What a bunch of hardware tweaks!

Deep, indulgent, complete and elegant products—that's the MicroNet Way. Check out MicroNet when you need a Macintosh hard disk.

Author of "The Macintosh Way" and renowned Apple Evangelist.

Call today for data sheets and the name of your nearest MicroNet dealer.
The Mac has always had great potential in graphic arts. But until now, no one has really provided a tool to unleash it. There has always been some form of mechanical trade-off imposed by input devices that inhibited artists from letting their imaginations flow naturally.

Now, Wacom introduces a totally “real” graphic tool, one that lets you interact with the Mac as intuitively as you would with a canvas. With Wacom’s cordless, pressure-sensitive stylus your will is converted through manual pressure to line width, spray density, color change and other programmable effects. This allows you to create “real time” artistic images free of the artificiality and limitations of other input devices. And since the Wacom stylus has neither cable nor battery, it is also ultra-light and maintenance free.

Wacom, a leading name in computer graphics worldwide with proven man-machine interface technology, invites you to a new era in Macintosh graphics with a promise:

Once you experience it, you’ll never look back.

Performance/Specifications: • Resolution: 1,270 lines/inch (0.02mm) • Accuracy: ±0.01 inch (±0.25mm) over entire active surface • Maximum reading speed: 205 points/second

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Here’s our list of the current versions of Mac software that were shipping at the time we went to press. We hope you’ll find it useful, because these days keeping track of the latest CPU is tough enough.

CopyFlow version 2.0 adds menu selections that give the user the ability to automatically import and export text or artwork to and from page layouts; is fully integrated with QuarkXPress; and supports Quark Extended Style Tags and North Atlantic Publishing Systems’ style tags. North Atlantic Publishing Systems, P.O. Box 682, Carlisle, MA 01741; 508/250-8080. Free upgrade; $395 new.

Falcon version 2.2 includes midair collisions; supports the Mac SE/30, Portable, IIc, and IIci; and has increased support for non-Apple hardware, including SuperMac, RasterOps, and Radius monitors. Sphere, Inc., 2061 Challenger Dr., Alameda, CA 94501; 415/522-3884. $3 upgrade; $59.95 new.

Pyro version 4.0 is programmable and includes Aquarium, Blocks, Dimwit (a Macintosh II screen dimmer), Doughnuts, Fireworks Too, Kaleidoscope, Marquee, Restless Picture, Slinky, and Stars modules. All selected modules are used in rotation from one screen save to the next so you do not have to open the Control Panel. Fifth Generation Systems, Inc., 11200 Industriplex Blvd., Baton Rouge, LA, 70809; 504/291-7221. $15 upgrade; $39.95 new.

### PRODUCT UPDATES

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**Bold** = first time the product is being listed

* = minor update

**V.** = version

**Req.** = minimum RAM and system software required

**Rev.** = last time price/price was increased this to an earlier version

**Price** = cost for updates to registered owners

* = contact your dealer for update policy

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#### BUSINESS INQUIRIES

**Product** | **V.** | **Req.** | **Rev.** | **Price**
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#### BUSINESS INQUIRIES (continues)

**Product** | **V.** | **Req.** | **Rev.** | **Price**
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One Of America's Best Run Companies Gives 95% Of Its Money To Charity.

CARE was recently named the best run, best managed charity in America. We aren't surprised. 95% of every dollar we receive goes to help impoverished people. Only 5% goes to run our organization. No other company could survive on margins like that. But a lot of starving people can.

We're Helping People Learn To Live Without Us. 1-800-242-GIVE
Now that Adobe Type Manager™ is opening up a whole new world of type to every Macintosh® user, it’s time to venture beyond the standard fonts—like New York, Venice and Geneva.

Introducing the Adobe Type Set™ font packages. Each sells for just $99 and includes seven carefully chosen fonts worth hundreds of dollars if we sold them separately. So your dollar goes further than ever.

But the really far-reaching news is what happens when you combine ATM™ with the Adobe Type Sets. For starters, you’ll get printed text that more closely matches your screen image—even from a low resolution, dot matrix printer like the ImageWriter®. If you’re an Apple LaserWriter® or other Adobe PostScript® printer owner, you’ll be amazed at how your screen type can be scaled to virtually any size, on the fly, and still look smooth and legible.

So if you’ve been tempted to explore the wonderful world of fonts, this is your chance to travel first class. With a select group from the Adobe® Type Library.
## PRODUCT UPDATES

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To have products listed in this section, send upgraded software, an outline of changes since the previous release (indicate if it's a maintenance upgrade), upgrade price, minimum RAM and system software, suggested retail price, company name, mailing address, and phone number to Updates, Macworld, 501 Second St., San Francisco, CA 94107.
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For Desktop Publishing,
You're Only Getting Part
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Scanners are great for Desktop Publishing. But their other uses can make a huge difference to the way you use your computer.

Imagine never having to retype another document to input it into the computer. With OCR software and a Chinon scanner, you can input text instantly.

Chinon's unique overhead scanning design and proprietary technology means you can scan large books — or even three-dimensional objects. No other scanner can claim that capability.

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Torrance, CA 90503

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When you're developing things people have never seen before, you need a special set of tools.

There's a reason why Apple has always been recognized as the place where the most innovative software shows up first.

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WHERE TO BUY
A Guide to Products Featured in This Issue

This listing provides companies and phone numbers for products mentioned in this issue. Allow several weeks for responses to reader service card inquiries. Asterisks indicate vendors who prefer to be contacted by phone.

Reader Service

1. 3-Mail 3Com Corp.; 408/652-6100, 800/638-3266.


5. America Online Quantum Computer Services, Inc.; 703/448-8700, 800/227-6364.


7. Anti-Virus Mainstay; 818/991-6540.


10. Ashlar Vellum Ashlar; 408/746-2980.

11. Ashlar Vellum Graphsoft; 301/463-9488.

12. cc:Mail cc:Mail; 415/961-8800, 800/448-2500.

13. CD Companion Series

Reader Service

Ludwig Van Beethoven
The Voyager Company; 213/451-1383.

Colorfast Ink-Jet Printer Tektronix, Inc.; 503/682-7377, 800/885-6100.


Compuserve Navigator Compuserve, Inc.; 614/457-8600.

Connect/World Information Network Connect Inc.; 408/973-0110, 800/262-2038.

The Coordinator Action Technologies; 415/654-4144.


Data Desk Odessa Corp.; 708/498-5615, 800/323-5423.

DataShaper BenWare Co.; 206/517-9625.

DayMail Dayna Communications, Inc.; 801/513-0203.

Desktop Express Dow Jones & Co., Inc.; 609/520-4000.

DeskWriter Hewlett-Packard; 800/752-0900.

Diconix M150 Plus Diconix, a division of Eastman Kodak, Inc.; 800/342-6649.

Dimensions Presenter Visual Information Systems; 818/948-8854.

DynoBex Portfolio Systems, Inc.; 718/935-9501, 800/729-3966.

EarthquakePreparedness Stack Environmental Compliance Associates;

ElectricImage Animation System Electric Image; 818/444-1819.

Epson LO-950 Epson America, Inc.; 213/539-9140, 800/922-8911.

FaceWare Pack FaceWare; 217/528-5812.


HARD DISKS

Advanced Gravis Computer Technology Ltd.; 604/434-7274, 800/563-8668.

Apple Computer, Inc.; 408/990-1010.

B&H; 212/499-8300.

CMS Enhancements, Inc.; 714/259-9555.

Crate Technology; 818/766-4001.

DeltaT Technologies; 408/954-1055.

Dolphin Systems Technology; 714/558-3220.

Ehman, Inc.; 307/789-8000.

EMAC; 415/498-1111, 800/821-0806.

FBI, Inc.; 415/474-8055.

GCC Technologies; 617/890-0880, 800/422-7777.

Hard Drives International; 602/967-4999, 800/254-3475.

Heart Data Corp.; 818/994-1691, 800/999-8133.

iDS Systems, Inc.; 408/41-0500, 800/733-0078.


La Cie, Ltd.; 503/684-0143, 800/999-0143.

Library Systems, Inc.; 408/983-1127.

MacProducts USA; 512/343-9590, 800/622-3475.

Maxxess; 215/528-1213, 800/356-2892.

MicroNet Technology, Inc.; 714/587-6035.


PCPG; 815/884-2002.


Procom Technology, Inc.; 714/549-9449.

Relay Technology; 415/471-6112, 800/848-1313.

Roxime, Inc.; 407/994-5885.


Storage Dimensions, Inc.; 408/479-0300.

SuperMac Technology; 408/245-2202.

Tallgrass Technologies Corp.; 913/492-6002, 800/825-4727.

Toshiba America Information Systems; 714/583-3000, 800/334-3445.

Westcom; 919/355-0920, 800/442-8591.

HyperCard Apple Computer, Inc.; 408/996-1010.

ImageWriter II, ImageWriter IQ Apple Computer, Inc.; 408/996-1010.

InBox TOPS; 415/769-9669, 800/445-8677.

Interactive Physics Knowledge Revolution; 415/553-8153.

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JetLink Express™: The ultimate Macintosh® software printer driver for the HP LaserJet™ series, HP DeskJet™ series and HP compatible laser printers. JetLink Express includes D outline fonts. Features supported include: reduction, enlargement, gray scales, and more.

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Whether you run a small business or your knowledge about computers happens to be less than monumental, Microsoft® Works 2.0 has you covered.

Microsoft Works 2.0 is actually five tools in one: word processing, spreadsheet, database, drawing and communications. But as far as you're concerned, it's one integrated program—so it's easy to move between the different productivity tools and use them together.

In fact, from the moment you take it out of the box, Microsoft Works 2.0 is easy to use. It comes with an animated training program written in HyperCard® format. As well as online help and unlimited phone support to help answer any questions you may have about Works' features.

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The word processor can create everything from a simple memo to a detailed report—and it even includes a spell-checker aimed at eliminating typos.

Of course, if your document needs to be supported with numbers, you can always jump over to the spreadsheet to compute and analyze data. And then transform it all into easy-to-read, easy-to-understand charts.

As for information that keeps your business going, the database is indispensable for keeping track of clients and orders. And you can count on the communications module to bring information to your desktop through a modem.

If you'd like to learn more about Microsoft Works 2.0, just call (800) 541-1261, Dept. 176 for the name of your nearest dealer.

No wonder Microsoft Works 2.0 is the best selling application in its class. Aside from being a great value, Microsoft Works 2.0 is one program that can handle a myriad of business needs.

It's that simple.
It's simple.

HOME FRONT
Real Estate News for the Greater Aspen Community - Published by Martin Realty

Lowest Lending Rates Since 1965!

Last week mortgage interest rates reached a five-year all-time low. First Montague offered a 30-year, 10 percent new home loan at 8.5 percent with no points. Unheard of in recent years.

Rates of homes have jumped 13 percent over sales recorded during the same period last year.

New home sales are up 17 percent.

Several local lenders have put together special new home financing packages in cooperation with local custom builders. Call our Aspen office at (437) 639-2914 for details

Crow Construction Opens This Year's Alpine Woods Development

The Alpine Woods development will be open for public tours from July 15 until August 31. Each home represents a distinct style from the many different homes that are being offered. All homes are beautifully designed to create an attractive neighborhood.

Alpine Woods

Each home has been fully decorated by a local interior design firm and is open for viewing.

Just shopping for ideas, we recommend this year's Alpine Woods development.

You can park at the Denny Shopping Center and take a tour too from 9:00 a.m. to 6:00 p.m. daily.

HOME OF THE MONTH

Lakefront Country House: Designed for Entertaining!

This lovely brick and cedar country house can be toured just fifteen minutes from downtown Aspen. Nestled in giant firs, it represents true Colorado style.

The master bedroom suite features a panoramic view of Lake Diamond. The master suite also has a two-story bedroom and includes a separate lounge and a stunning mountain view.

The living room, family room, and bedrooms (7) feature large windows and interior brick surfaces. The three-car garage has a large work area and extra storage.

The three-bedroom, two-bath house is a perfect solution for those who want to live in a beautifully designed home.

The three-bedroom, two-bath house is a perfect solution for those who want to live in a beautifully designed home.

COMMISSIONED SALES REPORT—JUNE

Sales Person | Type | Rate | Sales YTD | Billings | Check Amt.
--- | --- | --- | --- | --- | ---
Shannon Pitt | Commercial | 3.99% | $230,000 | $18,000 | $214,000
Lisa Davis | Residential | 3.99% | $250,000 | $200,000 | $250,000
Pete Cohen | Residential | 3.99% | $280,000 | $100,000 | $280,000
Richard Howard | Commercial | 4.99% | $300,000 | $300,000 | $300,000
Mike Lerner | Residential | 4.99% | $320,000 | $320,000 | $320,000
Gary Cohen | Residential | 4.99% | $350,000 | $350,000 | $350,000
Mary Freeman | Residential | 3.99% | $400,000 | $400,000 | $400,000
Jim McArthur | Residential | 3.99% | $420,000 | $420,000 | $420,000
Barbara Miller | Commercial | 3.99% | $450,000 | $450,000 | $450,000
Robby Keesun | Commercial | 3.99% | $500,000 | $500,000 | $500,000

Residential

New | 200,000 | $200,000 | 100.00%
Prev. Owned | 35.18% | 46.16%
Land Only | 13.33% | 18.33%
**PRINTERS & MONITORS**

### Dot Matrix

- **Seikosh** Imagewriter/Mac Compatible $215

### EPSON Letter Quality Printers

- LQ-510* (24 PIN) $328
- LQ-850, LQ-950, LQ-1050, LQ-2550 Call

**EPSON LQ Printer Software** $5

(*Requires Serial Card)

### Hewlett Packard

- H.P. Deskwriter 300 d.p.i. $599

### Hewlett Packard PaintJet

- $5129

### Hard Drives

- CMS Externals
  - MacStack 20...32ms $398
  - MacStack 30...28ms $428
  - MacStack 45...28ms $548
  - MacStack 60...38ms $648
  - MacStack 80...28ms $748
  - PD 100...25ms $898
  - PD 170...18ms $1498
  - 44 Megabyte Removable $798

### CMS Internals

- (SE, II, IIX, IIC) $448
- 40 Megabyte $848
- 100 Megabyte $1498

### UNIMAC Kits

- Cutting Edge 800K Drive $149

### Tape Back-up Systems

- CMS TS-60..60 Meg $698
- CMS TS-150..150 Meg $798

### Kodak Printer

- Portable M150 $528

### Raster Ops

- Colorboard 264/2 $599
- Boards/Monitors Call

### Other Models

- Call

### Monitors

- **Magnavox 14” Color Mac Display** 640 x 480 Resolution $509
- Fine Dot Pitch, Tilt & Swivel Base

### E-Machines

- Big Picture Z-21 $1798
- Big Picture Z-21 IQ $2598
- Big Picture T-16 color $2898
- Big Picture T-19 color $4398

### NEC MacSync

- Radius Full Page Display $1095
- Other Models Call

### Sigma Designs

- Pageview SE 15” $798
- Silverview 21” $1598
- Silverview 21” (CS) $2398

### Sony 1304

- Datadisk Keyboard $698

### DAT 

- Mac 101 or ADB version $129
- Keytronics Keyboard $119
- Modems
  - Beverly Hills 2400 External $129
  - Beverly Hills 2400 Internal $299

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Circle 5 on reader service card
## MACINTOSH SYSTEMS

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<thead>
<tr>
<th>Model</th>
<th>Description</th>
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<td>Ilci, 105mb Quantum internal, 5mb RAM, Apple 13&quot; RGB Monitor, Mouse, Keytronix Extended Keyboard</td>
<td>$6,129</td>
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<td>MAC IIcx</td>
<td>Ilcx, 40 mb Internal, 8 bit color, 5 mb RAM, Extended Keyboard Mouse, 14&quot; Color Monitor</td>
<td>$4,949</td>
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<td>MAC SE/30</td>
<td>SE/30, 105mb Quantum, Mouse, 5mb RAM, Extended Keyboard</td>
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<td>MAC SE</td>
<td>SE, FDHD Drive, 40mb internal, 2mb RAM, Mouse, Keyboard</td>
<td>$2,369</td>
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## OTHER MAC-STUF

### 1 Meg SIMMs
- Quality, 80ns SIMMs for any Macintosh, backed by a lifetime warranty. $73

### APPLE FDHD
- Apple 1.44mb floppy internal replacement FDHD $300

### QUANTUM
- 2 YEAR WARRANTY!
  - Internal | External
  - 40mb | $365 | $489
  - 60mb | $599 | $715
  - 105mb | $649 | $765
  - 120mb | $799 | $925
  - 170mb | $925 | $1069
  - 210mb | $985 | $1099

For any Macintosh, the Quantum can't be beat in quality or price.

### IMPRIMIS WREN
- Internal | External
  - 300mb | $1759 | $1799
  - 600mb | $2499 | $2549

### NOVY QUICK-30
- UPGRADE your Plus, 512KE or SE with the Novy Quick-30
- SYSTEM 7.0 Compatible!
- 68030 MicroProcessor, MMU, Co-Processor Option, and 4mb option available!
- Special Introductory Price.
- 16nhz Version $699.00

### APPLE CPUs

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<tr>
<td>Portable w/40hd</td>
<td>$4,895</td>
</tr>
</tbody>
</table>

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## COLOR DISPLAY

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
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<tbody>
<tr>
<td>RasterOps ColorBoard264</td>
<td>$559</td>
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<tr>
<td>RasterOps ColorBoard208</td>
<td>$359</td>
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<tr>
<td>NEC MacSync 14&quot; Color Display</td>
<td>$489</td>
</tr>
<tr>
<td>Magnavox 14&quot; Color Display</td>
<td>$519</td>
</tr>
</tbody>
</table>

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<thead>
<tr>
<th>Model</th>
<th>Internal</th>
<th>External</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 32ms</td>
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<td>$349</td>
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<tr>
<td>31 32ms</td>
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<td>81 28ms</td>
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<td>$579</td>
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**Quantum**

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<th>Model</th>
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<tr>
<td>40 19ms</td>
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<td>80 19ms</td>
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<td>105 19ms</td>
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<tr>
<td>170 15ms</td>
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<td>$1,099</td>
</tr>
<tr>
<td>210 15ms</td>
<td>$1,199</td>
<td>$1,299</td>
</tr>
</tbody>
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<thead>
<tr>
<th>Model</th>
<th>Internal</th>
<th>External</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imprimis MacWren 170 16ms</td>
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<td>Imprimis MacWren 300 16ms</td>
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<tr>
<td>Imprimis MacWren Runner 330 10.7ms</td>
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<td>$2,199</td>
</tr>
<tr>
<td>Imprimis MacWren 600</td>
<td>$2,549</td>
<td>$2,599</td>
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</table>

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<table>
<thead>
<tr>
<th>Retail Price</th>
<th>Sale Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>$3,499</td>
<td>$2,595</td>
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</table>

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<thead>
<tr>
<th>Type</th>
<th>Price</th>
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<tbody>
<tr>
<td>Macintosh FX &amp; LaserWriter II SIMMs</td>
<td>$22</td>
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<td>256K SIMMs</td>
<td>$22</td>
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<tr>
<td>4Mb Surface Mount/Low Profile (80ns)</td>
<td>$485</td>
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<tr>
<td>INDEX Macintosh Portable RAM 1Mb (Static RAM)</td>
<td>$375</td>
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<tr>
<td>INDEX Macintosh Portable RAM 4Mb</td>
<td>CALL</td>
</tr>
<tr>
<td>INDEX Macintosh Portable RAM 8Mb</td>
<td>CALL</td>
</tr>
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<table>
<thead>
<tr>
<th>Model</th>
<th>Size</th>
<th>Internal</th>
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<td>Quantum</td>
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<td>1.2GigaByte</td>
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<td>$4525*</td>
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**SYQUEST**

<table>
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<tr>
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<tbody>
<tr>
<td>MacTel 45R w/Cart...</td>
<td>CALL</td>
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### HARDWARE

<table>
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<tr>
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<td>Hewlett Packard</td>
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<tr>
<td>Transparency Option</td>
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</tr>
<tr>
<td>LaCie &quot;TSUNAMI&quot; Hard Drive</td>
<td>CALL</td>
</tr>
</tbody>
</table>

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- Prices subject to change without notice and availability.

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<table>
<thead>
<tr>
<th>Phone</th>
<th>Fax</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 800 950-8411</td>
<td></td>
</tr>
<tr>
<td>3007 N. Lamar, Austin TX 78705</td>
<td></td>
</tr>
<tr>
<td>Tel: (512) 451-2600 Fax: (512) 451-3323 Tech Support: (512) 458-2222</td>
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- **Microsoft Word** | Microsoft
- **Microsoft Excel** | Microsoft
- **Microsoft Works** | Microsoft
- **Aldus PageMaker** | Aldus
- **WordPerfect for the Macintosh** | WordPerfect
- **QuickDraw** | Intuit
- **QuarkXPress** | Quark
- **MacWrite II** | Claris
- **FileMaker II** | Claris
- **dBase Mac** | Ashton-Tate

## HARD DISKS*

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- **MacKit 140** | Toshiba America
- **MacStack SD20** | CMS Enhancements
- **MacStack SD40** | CMS Enhancements
- **Apple Hard Disk 20SC** | Apple Computer
- **Apple Hard Disk 48SC** | Apple Computer

## ADD-IN BOARDS/MEMORY

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- **ColorBoard 264** | RasterOps
- **Radius Accelerator** | Radius
- **Spectrum/8 Series III** | SuperMac
- **Video Board/Large Screen** | Radius
- **Radius Interface Display** | Radius

## EDUCATION SOFTWARE

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- **Where in the World Is Carmen Sandiego?** | Broderbund
- **Where in Time Is Carmen Sandiego?** | Broderbund
- **Where in the USA Is Carmen Sandiego?** | Broderbund
- **Reader Rabbit** | The Learning Company
- **Math Blaster** | Davidson & Associates

## UTILITY SOFTWARE

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- **Adobe Type Manager** | Adobe
- **SUM II** | Symantec
- **SAM** | Symantec
- **PC Tools Deluxe for the Macintosh** | Central Point Software
- **Fastback II** | Fifth Generation Systems

## ENTERTAINMENT SOFTWARE

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- **SimCity** | Maxis Software
- **Flight Simulator** | Microsoft
- **Tetris** | Spectrum HoloByte
- **Shufflepuck Cafe** | Broderbund
- **Leisure Suit Larry in the Land of the Lounge Lizards** | Sierra On-Line

## NETWORK/DATA COMMUNICATIONS

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- **TOPS** | TOPS
- **LocalTalk** | Apple Computer
- **AppleShare** | Apple Computer
- **Netware for the Macintosh** | Novell
- **MacLink Plus** | DataViz

## PRODUCT WATCH

Recent or forthcoming products of particular interest.

- **ColorBoard 364** | RasterOps
- 24-bit graphics and real-time video board
- **DrawTools** | Parsons
- Illustration tools for MacDraw II
- **Shade** | SystemSoft
- 3-D rendering package

Source: Exclusive InfoCorp survey of more than 125 Macintosh retailers and selected mail-order vendors. Covers sales during February 1990.

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The right filter can combat eye fatigue, help eliminate headaches, even reduce overall body stress.

Yet, the irony is that something so good for your eyes can be such an eyesore.

In fact, most filters look like they belong to someone else's system.

The fit is sloppy. The colors don't match. The materials are different.

Kensington has a different idea.

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An example is our Maccessories® SE Anti-Glare Filter.

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The styling is complementary. The color identical. Even the same material is used.

And unlike generic filters, the fit is perfect. So light passes through the filter, never around it.

Kensington uses only optical quality glass with a ceramic anti-reflection and scratch-resistant coating.

The result is a 96% reduction in glare. And an improvement in contrast and clarity of up to 20 times.

In short, the most advanced eye-protection system you can find today—it even filters out VLF and ELF radiation and dissipates static.

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