The largest word history got there
When we introduced Microsoft Word six years ago, we weren't planning on making history.

We had just one goal, and a fairly simple one at that: to make a word processor that suited people's needs.

Then again, we knew that the people we wanted to suit were a wildly diverse, independent lot: Mac users. So it made sense to let them tell us exactly what to put into Word.

Which they did.

First, there were some folks who didn't like tabbing much. Fair enough. For them, we developed Tables—an easier way to set up side-by-side paragraphs, columns of numbers, even forms. No tabs. No hassle.

Then we heard from a few more people. "Love the Tables gig," they said. "Now, about this text-numbers-graphics combo all in one document..."

We made that simple with "warm links." Once you've linked Microsoft Excel data to a document, keeping that document updated with the latest Microsoft Excel figures is easy. Just click your mouse.

Then there were those senders of mail, who didn't want to click-click-click-click-click.

So we built support for Microsoft Mail right into Word. Now, with just a click, everyone stays in the loop. And work in progress stays in progress.

As it happens, listening to what Mac users want is a pretty good way to design software.

How else can we explain Word version 4.0 being the most popular word processor in Mac history?

And those cards and letters are still coming: "Listen," someone'll say. "In case you're working on the next Word..."

Which we are. In fact, if you've got some input for us, feel free to drop us a line. Or if you'd like to find out more about Word, call us at (800) 541-1261, Department N24.

Our goal is still simple: to make Word the best word processor around. With the latest technology—translated into human terms, of course.

After all, we're only making history because we make word processors the way you like 'em.

Microsoft
Making it all make sense
The most-asked question of Mac desktop publishers, "Should I buy PageMaker 4.0 or QuarkXPress 3.0?" is answered in our face-off, p.142. (Photo by David Bishop.)

In 1991 computers and video are combining to create new media.

Outbound's future is in Apple's hands.

From calibration to color matching systems.

Behind the Champ Polar Filter.

How to Contact Macworld ........................................ 12
MacBulletin .......................................................... 17
Commentary/Jerry Borrell ........................................ 23
Letters ........................................................................ 37
Art Beat  ......................................................................... 69
By Cathy Abes

The Iconoclast .......................................................... 73
By Steven Levy

Conspicuous Consumer ................................................ 83
By Deborah Branscum

State of the Mac ........................................................ 103
By Bruce F. Webster

News ........................................................................... 113
By Dan Littman and Tom Moran

New Products .................................................................. 251

How To/Quick Tips ..................................................... 263
By Lou Poole

How To/Getting Started with Power Protection .............. 275
By Jim Heid

How To/Insights on QuarkXPress 3.0 ............................. 283
By Diane Burns

Updates ......................................................................... 293

Where to Buy .................................................................. 299

Best-Sellers .................................................................. 352
FEATURES

Page Wars ........................................ 142
By Steve Roth PageMaker 4.0 or QuarkXPress 3.0—which should you buy? We put these page-layout leaders to the test in a feature-by-feature comparison that pinpoints each one’s strengths and weaknesses.

Managing Networks .............................. 152
By Dave Kos Armed with the right network-management tools, you can tune up any size network and keep it running smoothly.

Digital Audio at Last ............................ 160
By Christopher Yavelow The desktop audio revolution is ring in a new era in affordable CD-quality sound on the Mac.

Color Printers Here and Now .................. 168
By Charles Seiter As features and quality go up and prices come down, making a purchase decision gets trickier. Macworld Lab tests 14 color printers to target the best buys in today’s crowded market.

Mac Video, Take II ............................... 178
By Peter S. Marx and Franklin N. Tessler In this update to last September’s report, we look at what’s new in Mac-based video to find out if the Mac is ready for a starring role in video production.

Publish Your Database ........................... 184
By Jim Heid Merging data and design may seem like a daunting task. But use the right combination of database and page-layout tools and you’ll get high-quality results—everything from mailing labels and lists to catalogs and directories.

Adobe Illustrator 3.0 ............................. 196
Design, page-layout, and production software.

Switchboard .......................... 198
Modular keyboard.

Business LaserPrinter 115 and OMS-PS 410 ........................ 200
Two PostScript page printers.

Timbuktu/Remote Access Pack .......................... 204
Remote access to your Mac.

Rival 1.1.4 and SAM (Symantec AntiVirus for Macintosh) 2.0 .... 211
Antivirus utilities.

The Norton Utilities for the Macintosh 1.0 .................. 213
Disk utilities.

Nisus 3.01 .................................. 215
Word processor.

Go Junior .................................. 218
Go tutorial software.

Playmaker Football 1.0 .............................. 220
Football strategy game.

ClickChange 1.01 and Personality 1.0.1 .......... 222
Customizing utilities.

WPduet .................................. 224
File-transfer kit for Tandy WP-2.

FileMaker Pro ................................ 226
Database manager.

Typist .................................. 231
Hand-held OCR scanner.

Bernoulli Transportable and Microtech R50 .................................. 234
Removable-media drives.

Plottergeist 1.0 .................................. 236
Chooser-selectable plotter driver.

Window Shopping .......................... 239
The Macintosh Bible Software Disks, Third Edition; Kneif-Finder Extender 1.02; Astrix 1.0; MacSleuth 1.0; Word Count DA 1.2; Cataloger 1.01; TrackMate 1.0; Quality Artware; Keyboard Shelf.

Reviews
The long-awaited Illustrator 3.0, p. 196;
Art Beat, p. 69, shows how it was used to create this illustration.

Color Printers Here and Now
The time has never been better to invest in color output. p. 168.
Buy our Mac-compatible color printer and get this IBM-compatible color printer free.

Introducing the new Phaser PX Color Printer from Tektronix. It's the first color printer you can hook up to Macs, PCs and workstations. At the same time. And for a mere $7995, you'll get all the features you could possibly want. Like PostScript-language compatibility. Brilliant thermal-wax color at 300 dpi. And certified PANTONE® Color. No other printer offers so much for so little.

Call 1-800-835-6100, Dept. 11C to find out more about the new Tektronix Phaser PX—the color printer anyone can use.

The New Tektronix Phaser PX®

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ETHERPORT CONNECTS MACS TO ETHERNET.
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SHIVA PROVIDES ETHERNET SOLUTIONS.
You responded so well to our acquisition of FastPath 4 from Novell, we’ve agreed to acquire EtherPort, too. As part of the Shiva family of multi-platform Ethernet solutions, both products are backed by the same commitment to support and enhancement that’s made Shiva The Network Communications Company. Watch for EtherPort boards for the new Mac LC and IIsi, as well as other improvements, coming soon. And call now for complete information about EtherPort and other Shiva products. 1-800-458-3550. 617-252-6300.

EtherPort™
by Shiva
The Network Communications Company
One Cambridge Center, Cambridge, MA 02142
All product names are trademarks of their respective manufacturers.
"We've Broken the Price Barrier to Large Screen Productivity!"

"Most Mac owners don't have large screens because they can't 'afford' them. So they put up with the squinting, eye strain, and the constant scrolling on a 9" screen. What a tragic loss of productivity!

But now with the ability to purchase factory-direct, you can't afford not to own a large screen. Without dealer markups and rep commissions you save over 40 percent.

But not all large screen systems are alike, so do your homework! We have four complete systems designed to seriously impact your productivity.

We're so proud of our display systems that each comes with a 30 day "Love-It-Or-Return-It" guarantee. So take advantage of this risk-free opportunity to increase your productivity with a large screen. You'll wonder how you ever lived without it!"

Ronald Eibensteiner, President/CEO

We've Made Large Screen Productivity Affordable.

Our engineers and designers were given the charter to build no-compromise display systems. The result is a full line of large screen display systems that rival the very best (Radius, SuperMac and RasterOps), at prices that make them a better value. The savings that you realize are not due to product differences so much as distribution differences. You see, we choose to bypass the middleman, thereby eliminating rep commissions and dealer mark-ups to save you over 40 percent.

Finally, A 20" Trinitron System That Breaks The S3000 Barrier!

Our engineers designed our ProView® System around Sony's patented Trinitron technology, which has become the standard by which all Macintosh screens are measured. Expect vivid color, superior geometric linearity, and sharp focus, only before available in systems selling for twice the price.

We designed our ProView interface cards to minimize component count and power consumption for superior reliability and long life. Our ProView 8-bit Interface lets you choose between 1, 4, or 8-bit modes and gives you up to 256 colors.

At $4297 Our 24-Bit Trinitron System Costs Less Than Most 8-Bit Systems.

Our new ProView24 Trinitron System gives you photographic image quality with 16.7 million colors available. If you're doing desktop publishing, color graphic design or retouching color photos, ProView24's photo-realism will enhance the speed and quality of your productions.

Our PixelView II Gives You WYSIWYG Scaling For Under $1000!

You've heard the reviewers speak of WYSIWYG (what you see is what you get) scaling and its importance to graphic applications. Now it's available on a two page display for under $1000!

Our engineers chose PiO4 phosphor for reduced eyestrain. And an anti-glare coating that allows the PixelView II to be used in any lighting situation. Plus a screaming 78Hz refresh rate for a rock solid flicker-free screen image.
An Entire 8½"x11" Page For Under $600!

Our PixeView portrait display allows you to view a full page at one time. You get a paper-like display with a crisp, stable image. And like all Mirror displays, the PixeView I has its own memory so it won't slow down your computer (like the IIsi or IIs's built in video circuitry). Its ergonomic design takes a minimum of desktop space and adjusts to any viewing angle.

EXCLUSIVE! Desktop Designer™ Software With Every Mirror Display System.

Desktop Designer™ is a unique set of utilities that lets you custom configure your new display system. Until now, features like Popup Menus, Enlarged Cursor and Menubar, Screen Saver and Screen Copy were available only from Radius on systems costing twice the price. These important features are included with every Mirror Technologies display system!

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Each Mirror display system was designed to make installation and operation a snap. All systems include everything you'll need to get up and running: monitor, interface card, cables, and software.

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We have a color interface for every Mac II and the SE30. And monochrome systems for the Mac Plus, Classic, SE SE30 and all Mac IIs. Whether your application requires color or monochrome, we have the solution!

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Our 30 day "Love It or Return It" guarantee lets you try one for 30 days risk free. We ship 95 percent of our orders within 24 hours, so you'll be saving time and money.

Make The Right Choice!

<table>
<thead>
<tr>
<th>Display type</th>
<th>PixeView I</th>
<th>PixeView II</th>
<th>ProView B</th>
<th>ProView 24</th>
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<tbody>
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<td>Resolution (dpi)</td>
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<td>Vertical refresh</td>
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<td>Pop-up menus</td>
<td>Yes Yes Yes Yes</td>
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<td>Enlarged menubar</td>
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<td>Full year warranty</td>
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<td>DeskPaint v1.5</td>
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<td>Tilt and swivel</td>
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<td>Works with Plus, SE, Classic</td>
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<tr>
<td>Dealer markup</td>
<td>No No No No</td>
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</tr>
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</table>

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Steve Rennie, President of REN Management Corporation

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• Byte, Award of Distinction, 1988.

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HiQ’s interface is an electronic extension of the engineering “project notebook.” It’s easy to learn and simple to use because you already know how. The notebook paradigm lets you design with HiQ, use specialized tools for solving your problems. Any of the notebook’s data items, scalars, vectors, matrices, graphs, programs (scripts), etc. have an associated editor and are integrated with a common “look and feel.”

MAINFRAME POWER AND 5x–10x PRODUCTIVITY GAINS CAN BE YOURS.

Take a deep breath and consider—HiQ has the richest and most extensive function library of any engineering program. Over five hundred robust built-in functions right at your fingertips. Features and capabilities not available in any other commercial product. Many of the most powerful microcomputer mathematics programs in the world. And HiQ also gives you the flexibility to design your own tools. Imagine having the power and the ability to design and use a specialized engineering tool you’ve created—in a single day.

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- A complete matrix and linear system analysis program
- A number of powerful equation solving capabilities
- Hundreds of mathematical and scientific functions
- Data and function integration programs
- A commercial quality differential equation solving program
- A unique integral equation solving program
- A high performance Fourier analysis program for data reduction and analysis
- A sophisticated linear and nonlinear optimization program
- An engineering boundary value problem solver package
- Numerous engineering statistical analysis capabilities
- A powerful program for finding real and complex roots and functions
- A complete interactive 2D and 3D graphical analysis program
- A full complement of digital signal processing tools
- All of the special functions of applied mathematics
- Plus several higher level capabilities. For instance, HiQ’s numerical editor enables you to determine both the structure and mathematical characteristics of any matrix of any size. The Optimizer contains linear programming, nonlinear unconstrained and constrained programs based on the best available algorithms successfully used on scientific mainframes. The Fourier and Statistical Analyzers have been developed and tested by specialists in those disciplines. And the scientific graphics program (Grapher) has essentially all the features of a stand-alone program. These include a completely interactive graphical environment permitting a variety of manipulative capabilities (e.g., viewing angle, aspect ratio, zoom in/out, color, shading, perspective/orthographic mode).

AND HIQ INCLUDES QSCRIPT, THE FIRST 4GL FOR ENGINEERING/SCIENCE.

HiQ contains the two essential elements necessary for developing specialized engineering programs: a powerful programming language (the first 4th generation language for engineering/science) and an extensive library of built-in functions. By constructing new permanent functions, sophisticated programs can be rapidly developed enabling dramatic 5x–10x productivity gains.

RESERVE YOUR COPY OF HIQ NOW—AT A SPECIAL PRICE.

HiQ will be available on the Apple® Macintosh® II series of computers in April and soon after on the SUN® workstations. However, you can reserve a copy of the HIQ Macintosh version now at a special price of $495. This is a 90-day limited time offer direct from Bimillennium Corporation, so act quickly. To reserve your Mac Version of HIQ at this special price call 1-800-488-8662. VISA/MasterCard/AmEx accepted.

See HIQ at MacExpo Jan. 10–13 Bimillennium Booth #5750 Brooks Hall.

Bimillennium Corporation 104 Albitz Way Los Gatos, California 95030

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This is not your average mouse...

Meet MVP Mouse™ from Curtis.

One look tells you, MVP Mouse is not just another trackball. Its ergonomic 3-button design responds to your every impulse as if it were an extension of your hand. Its 200 DPI resolution and automatic acceleration give you pinpoint cursor control plus the ability to "jump" across the screen with just a short, quick movement of your fingers. And its powerful control panel lets you select preset tracking and double-click speeds... or create your own! And it gives you dozens of button functions to choose from, including a Custom Command that simulates any ⌘-letter keyboard command.

You can assign any command to any button, quickly and easily on-screen. Optional Foot Switch acts as 4th command button.

Take MVP Mouse for a spin. Visit your nearest Curtis dealer for a hands-on demonstration.

#MVP-I Retail $149.95

For the Curtis dealer nearest you call (603) 552-4123, Ext. 92

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Circle 20 on reader service card
Apple Ships Initial LCs, Orders for Classic Outstrip Supply
The first Macintosh LCs have been shipped to dealers, and Apple has added the computer to its official price list. However, the first shipments are likely to be used by dealers as display models, with volume shipments still scheduled to take place in late January. Meanwhile, due to unexpected demand, the Classic was still in short supply at press time, with even the largest dealer chains on allocation. Apple has put on three shifts at the Singapore plant where the Classic is made, and is adding a production-line factory in Cork, Ireland.

Motorola Claims First Shipments of the 68040
After several production delays, Motorola announced in late November that it had begun initial shipments of the powerful 68040 microprocessor, which Apple has confirmed will be the heart of a future Macintosh. The 25MHz chip, also designed into workstations by Hewlett-Packard and Next, is rated at 20 MIPS by Motorola, making it several times faster than even the 40MHz 68030 used in the Macintosh IIx.

MicroPhone Goes Interactive
MicroPhone II version 4.0's interface builder, Dialoger Pro, adds support for interactive dialog boxes that can respond to values entered by users—for example, disabling check boxes or OK buttons—and can create floating palettes, modelless dialog boxes, and scrolling text fields. Scripters will find a full text-editor for writing scripts in 4.0 (the earlier script editor is also available). The expanded command set can, among other capabilities, read MicroPhone's timer and manipulate long (32,000-character) strings. Through Apple's Comm Toolbox, version 4.0 will support DECnet, TCP, multiport cards, and internal modems. MicroPhone II's price remains $295. For more information, contact Software Ventures at 415/644-3232.

In Focus Shows Thin-Panel Color Display for Mac II
In Focus Systems has designed a thin-panel display for the Mac II family. Intended in part to make Mac IIs more transportable, the lightweight LCD panel can display nearly 5000 colors on screen. Called the 5000M, the 10½-inch display refreshes at a rate of about 14 frames per second, acceptable for presentations, but slow enough that the cursor can sometimes "ghost" or disappear. The company expects future upgrades to achieve a rate of 30 frames per second. The device is scheduled to ship to OEMs in the first quarter. Its retail price was not set at press time, but the company says the target price is $2500. For more information contact In Focus at 800/327-7251 or 503/692-4968.

Bug Report
Two big-selling programs have been drawing reports of bugs and crashes. CE is not sending QuicKeys2 version 2.0.1, the second QuicKeys2 bug-fix, to users but the update is available on most online services or by calling CE at 515/224-1995. Claris, whose FileMaker Pro has reportedly scrambled databases, had not decided on a ship date or distribution method for a FileMaker Pro bug-fix by press time. For more information, call Claris at 408-987-7000.

Quantum Acquires La Cie
Peripherals vendor La Cie was acquired by Plus Development, which is a wholly owned subsidiary of hard-drive manufacturer Quantum Corporation. La Cie will operate as a separate entity and will standardize on Quantum drives in the capacities that Quantum manufactures. However, La Cie will continue to sell high-capacity drives from other drive makers. Joel Kammerman, La Cie's longtime president, will remain as general manager.

On Technology's New Plan
Meeting Maker is a new group-calendaring tool. Each user stores a calendar on the server, and Meeting Maker coordinates calendars as groups plan meetings and agendas. When you propose a meeting you can pick mandatory and optional guests and let Meeting Maker set the time (you can also pick times manually while looking at blocked-out times—but not activities—on other users' calendars.) Meeting Maker keeps track of who can attend and informs attendees when a meeting is cancelled or moved. Pricing was undecided at press time. For more information, contact On Technology at 617/876-0900.

Mobius to Unveil SE Display/Accelerator Board
Mobius Technology has announced its Mobius One Page 030 Display, a combination of a 15-inch monochrome portrait display and the company's Mobius APD 030, a display board that's also an accelerator for the SE. The board supports a resolution of 640 by 860 at 75Hz and 78 dpi. It also works with the Apple Macintosh Portrait Display and compatible monitors. The APD 030 board incorporates a 25MHz 68030 processor for acceleration and 1MB of RAM (expandable to 16MB).

(continues)
The board and monitor together will retail for $995, while the basic APD 030 board by itself will carry a retail tag of $595. Both the bundled subsystem and the separate display/accelerator board are slated for shipment on January 15. For more information, contact Mobius at 800/669-0556 or 415/654-0556.

Bitstream Up with the Times

Bitstream is upgrading its entire library of 1000-plus typefaces to PostScript Type 1 compatibility. The new fonts will be hinted but not regularized; will be compatible with Adobe Type Manager; and will have industry-standard names that avoid conflict with other vendors’ fonts. For more information, call Bitstream at 617/497-6222.

ModaCAD’s 3-D Look

Fashion-design software vendor ModaCAD is branching out with software that stands up. ModaVision System is a general-purpose 3-D modeling and rendering package that creates stereo screen images; wearing ordinary 3-D glasses, users can model objects that appear to project out of the monitor. Another new ModaCAD product called Envision can map new surface patterns onto scanned images—for example, replacing the upholstery in a car—while retaining highlights, folds, and other characteristics of the original surface. ModaVision lists for $5989; Envision lists for $1989. Both products are hard-key copy-protected. For more information, contact ModaCAD at 213/312-6632.

New OCR for Mac

OCR Systems’ first Macintosh product has some unusual features. ReadRight 2.01 is an intelligent (“omnifont”) package that can separate images from text and save them as TIFF files; supports linking text blocks to keep recognized text in order; can use templates for reading forms; and keeps track of double-sided pages. It comes with a spelling checker and lists for $495. For more information, contact OCR Systems at 215/938-7460.

Air Mouse Controls the Mac from Afar

An infrared pointer that can control a Mac or a PC from across the room should be available in the first quarter from Selectech Ltd. Called Air Mouse, the device consists of a one-button remote control—like unit and a base unit that sits on or near the computer. The base unit, which will connect to a Mac ADB port, constantly senses the position of the hand-held pointer and registers a mouse event when the user presses the button on the pointer. The Air Mouse will have a retail price somewhere between $450 and $500. For more information, contact Selectech at 802/860-7600, 714/494-1400 on the West Coast.

Deneba Opens Architecture

Deneba’s Canvas 3.0 will have an open, plug-in-module architecture like that of the company’s UltraPaint. The drawing program’s new version also supports Pantone colors; the ability to manipulate multiple points of a bezier curve at once; text with fractional leading, slanted margins, and text-wrap around irregular objects; and for architects, hatching and curved- and straight-wall tools. The price remains $395. For more information, call Deneba at 305/594-6965.

Software Vendors Hear the Music

A would-be VAR files a $2,695,000 lawsuit against Oracle alleging that the database giant makes deals it can’t honor. A Datquest report rips Oracle and other vendors for manipulating stock prices. Well-deserved bad publicity like this is driving the software industry to regulate itself; a first step is the recently established Software Business Practices Council (SBPC). Cognos president and SBPC chair Jeff Papows says the SBPC will deal with three issues: “vaporware; competitive product claims—unfair apples-to-oranges comparisons; and financial reporting practices.” Few Macintosh companies have joined the Council. For more information, software developers should contact Papows’s office at 617/229-6600.

Sitka’s Data Saver

TOPS publisher Sitka is developing a $139 utility that creates a trail of document versions and helps prevent overwriting files. Versionary duplicates a file and appends a version number to its name each time you save. You can control what and where it saves, set how many versions it keeps, and automatically compress copies. It is not appropriate for use with multiuser or transaction-processing databases. For more information, contact Sitka at 415/769-9669.

Law Bans Software Rental

A new law prohibits renting software without permission from the copyright holder. According to the Software Publishers Association’s counsel Mary Jane Saunders, the bill’s wording could cover software retailers who accept returns on software (except returns authorized by the publisher). Saunders said the SPA, which lobbied for the bill, “probably wouldn’t go after” dealers accepting returns, which often carry a hefty 25 percent fee.

Next Year’s Model

Changes in ModelShop give the 3-D sketching tool some practical CAD features. In version 2.0 you can draw on planes at any angle—not just parallel to the ground—and with Z-buffered rendering the program can properly render intersecting objects. The new version supports contour-mapping and can split the background (for example, to show earth and sky), has multiple independent lights and shadows, and can show 24 shaded or ramped colors. ModelShop 2.0 also provides a text tool for labeling objects; PICS support for creating animations; and DXF import and export to make up for its lack of dimensioning capability. Version 2.0 will list for approximately $750. For more information, contact Paracom at 415/956-4091.
Four Ways to Recognize a More Productive Mac User

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The Future of Television and Computers

In 1991 computers and video are combining to create new media

BY JERRY BORRELL

As I sat one evening in my office, looking at the bridge that connects San Francisco to Oakland and its thousands of tiny lights, one of my monitors caught my attention. The 13-inch Apple display was playing the evening news, courtesy of my RadiusTV adapter, when the local NBC affiliate announced that Saddam Hussein planned to increase troop strength in Kuwait to nearly three-quarters of a million soldiers—heightening the likelihood of war. (A cheery Christmas prospect that I might not otherwise have heard about with my irregular work schedule.) Espying a commercial, I adjusted the channel for PBS and MacNeil-Lehrer, where I heard a discussion by several analysts pondering how America will react to Iraq's upping the ante. I am struck by the fact that our country is facing a war that, even before it begins, is of a larger scale than the majority of the Vietnam War.

If the technology had been available, I would have sent a segment of the broadcast to the editors and designers here at Macworld via our QuickMail system. It made me ponder the moment when I will use this technology to create interactive documents, incorporating video, to create memos or editorials that people will watch in new ways. Documents that will improve the current state of television, which turns, in Tom Brokaw's words, television commentators into talking dummies. And which turns, in my mind, the mass of our society into head-nodding sheep.

I expect to be writing or, more aptly, creating such documents in 1991.

Video Products

It all started with the bright idea of hooking up a video source to the Mac. Aapps, a company in Sunnyvale, California, must be recognized for accomplishing this first, with its MicroTV board, and for its idea of keeping it cheap. (Products from Mass Microsystems and Truevision, pioneers in their own right, were very expensive.) The first monochrome board was no wonder of technology, but it was a pioneering product. The Aapps professional board with color, Digivideo Color, was closer to the mark.

The first Aapps board nevertheless caused many people to ask, What am I going to do with it? Frank Brooks, the president of Aapps, sat opposite me one day bemoaning the fact that people didn't get it. Companies with security guards watching a TV next to a computer monitor didn't get it. Real-estate agents with huge picture databases or videotape libraries of houses didn't get it. Educators didn't get it. Business types working late in their offices on computers didn't get it. The boards didn't receive the recognition in the market that they deserved.

One reason that people didn't get it was because the world of video has been beyond the average user's grasp, in terms of expense and complexity. The Aapps products changed that world. It's simple. Put a NuBus board in your computer. Hook up the board to a set of rabbit ears (that's what I use) or a VCR. Start it up, install an INIT and a DA, restart, and begin looking at television in a window on your Mac.

Then came the RasterOps board that had more sophisticated software—more features, including grabbing and storing frames (even groups of frames). Then came RadiusTV (and more expense, unfortunately) with even more features and a sexier interface. And Radius Theatrics software made it possible for Macworld to quit going to a service that had been taking three days to make video screen grabs into PICT files for the magazine—something I was able to accomplish with Theatrics in three minutes. I think you can imagine what that means in terms of simplicity. We're talking easy, as in a word processor is more painful to learn.

I'm not telling the entire truth. All the video boards leave nasty little pixels displaced on the screen in some irritating way—we politely call them artifacts and we don't say that the video boards are still buggy. And I (continues)
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don’t mention that my RadiusTV board won’t work with my SuperMac 19-inch monitor. And don’t even ask whether my Radius board will work with my RasterOps board—we’re talking ugly system crashes.

But if you’re careful about how you mix products, the results are exciting. So I took my RadiusTV to a presentation for several company presidents and was able to connect the hotel’s cable to my Mac and pop up a window with FNN (Financial News Network) running. FNN keeps a video display of the stock ticker running at the bottom of the television screen. The presidents got it.

Even Apple has discussed incorporating video capability in its system software. But displaying pictures on expensive monitors is not an effective use of computer monitor technology.

By 1992, video, type, data, images, and sound will combine in ways we’re only beginning to imagine

Eventually I figured out that I had to send a single frame of the broadcast as an enclosure to a message and thus avoid the Clipboard. So I sent it to Dennis McLeod, our design director. And lo, some 25 minutes later the file appeared on his desktop (good thing I do this stuff at night). All right, so I won’t be working with the new media tonight. Not until we have . . .

Image Compression

Two years ago a company called C-Cube was founded by a Silicon Valley wizard named Ed Sun, with the intent of creating specialized chips that compress images into small files—images reduced according to the JPEG (Joint Photographic Experts Group) standard, 20 or more times smaller than their original size. C-Cube created the chips and even built NuBus boards to house them, but just as the company began to convince companies (companies other than Apple that build high-performance workstations) to implement the chips, Macintosh developers began to figure out how to implement compression without any specialized hardware. There is now a product from Radius called ImpressIt that can compress an image by 10 to 1 or 15 to 1 in an instant without the need for expensive hardware. And other products will follow.

You’d think it couldn’t get any better, but these developments address only part of the problem I raised earlier. Remember, I said I wanted to send video clips. Farallon is working on sending what it calls movies, but the company is talking about the ability to replay a series of screen operations and accompanying annotation, which is useful in conferencing, support, and education.

But single video images or groups of video images are different. One second of video equals 30 still frames, requiring some much fancier image compression, based on another standard—MPEG (Motion Picture Expert Group). However, as you might guess, C-Cube and others are hard at work on schemes for compressing and decompressing video in real time. SuperMac, for example, was showing Who Framed Roger Rabbit? at last August’s Expo, decompressed in real
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Speed Comparison Charts (in seconds)

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Special Effects
Last summer saw the announcement of several NuBus boards, such as the one from Explorer. That incorporates software (actually firmware) that enables the Macintosh to perform special effects on still images, an ability formerly seen only in expensive systems for professional video-production suites. Effects such as twisting video frames 360 degrees in 3-D space, based on quaternion mathematics.

Those boards were being announced just as companies such as Avid and Digital V/F/X were announcing progress in integrating complex video editing systems around the Macintosh. Boards that, when combined with software applications, give the Macintosh professional video-production capabilities at relatively lower cost. Software such as Thomas and John Knoll's Photoshop, sold by Adobe Systems. John, a special-effects artist at Lucasfilm's Industrial Light and Magic subdivision, wanted a digital matte system that would allow him greater freedom to create elaborate backgrounds for the filmmaking process. So he talked his brother, a doctoral candidate at UCLA, into writing the program that became Photoshop. The kind of program that until recently could only be found for tens of thousands of dollars.

Photoshop, while a magnificently useful program, is not intended for the video environment (at least not yet). That missing part of the puzzle for the new media comes from a company called Light Source, where Mike Solomon (a cofounder of Aldus), Rob Cook (who wrote a host of algorithms while at Lucasfilm and Pixar) and Ty Roberts (who helped write Jam Session) are developing a video-editing product for the Mac that will have few rivals in any environment. The most important aspect of the Light Source project is the fact that this software,
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while sophisticated, will be affordable and relatively easy to use. The company also has a strategic relationship with NEC, which will sell a subset of the software for use with the NEC PC-VCR, a frame-accurate SuperVHS video recorder that, when connected to the Mac and driven by Light Source software, will give new meaning to the phrase "home video."

Documentary filmmakers the world over will have reason to rejoice when they are freed from the tyranny of renting time in central video-production facilities, and when they will be able to produce broadcast-quality video with an affordable, Macintosh-based editing system. We're talking under $10,000—including the Mac, software, monitor, two tape decks, and a video camera. This army of newly empowered video producers will help return quality and integrity to video program content development.

One of the next steps is that Light Source will take is to provide software that can read cues from the closed-captioning in broadcast signals. Radius already displays the closed-captioning employed by some TV shows, so you have to imagine that Andrew Singer and his crew of engineers at Radius are thinking about this too. But Light Source has a jump on allowing the Mac to track words, or cues, based on the closed-caption information (say, for example, any news report including the words "Apple Computer"). Because the captioning is sent in advance of the signal, the software can be set up to capture frames of video directly onto a VCR based on a record sequence initiated when key phrases appear in the captions. But I digress into fantasies of finally having access to powerful technology, when in the end we return to . . .

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The Right Time™ computerized trading system was developed by an expert portfolio manager for his own personal use. Over the last ten years of in-market use the software has been perfected and made easy to use. Now it's available for any smart trader who wants to make quick profits from quick decisions. Just look at the profits generated in the above chart!

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For More Information.

Call (800) 755-8277 or write for our free twenty page brochure or to place your order. Each of our end-of-day programs costs $599, any two $999, any three $1499, any four $1699, any five $1999 or all six for just $2399.

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STBSP Inc. 1991
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Circle 33 on reader service card.

COMMENTARY

mindless marketing presentations done in PowerPoint? Companies are scrambling to gain control over existing content for the new media because originating new materials is difficult, expensive, and requires talent—not marketing clout.

There is some good news. Many films made before 1963 have run out of copyright protection, and with each passing year the library of films in the public domain will become richer because many less commercially viable films will have had their copyright lapse. However, the content in existing film and music libraries will primarily serve the entertainment industry. And public-domain materials will serve specialist markets such as educational applications, not the new media.

So Where Will Content Come From?
The better publishers of the new media will develop staff experienced with video and with capturing video. Staff that will bring skills as content editors from disparate fields, and combine those sets of skills with desktop technology to create video as rich as any organization can produce.

Certainly we'll have the equivalent of what happened with the first waves of desktop publishing—more newsletter-quality material than you can shovel into a toxic waste dump—but it will get better fast. By 1992 we'll use these skills, and new software tools, to evolve the new media. Media in which video, type, data, images, and sound will combine in ways that we're only beginning to envision.

Certainly some of the new media will come from televangelists and car-wax salesmen turned into self-made millionaires preaching about management techniques or how to improve one's personality. Hey, these people are why God created remote-control devices.

The changes that I'm describing offer the hope that each of you reading this will begin to produce little books, plays, travelogues, family remembrances, pamphlets on how to fix kitchen sinks or repair your old house; the equivalent of magazines that you will view and share with your friends. And together we'll create the new media.
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When serious users need serious tools, they choose Hammer. Simply put, we make the fastest, most reliable, best-engineered storage and back-up systems in the industry. Each Hammer product embodies unsurpassed attention to detail and commitment to excellence - so it's no surprise that Byte, MacWeek, MacWorld and MacUser have all rated Hammer the fastest drive available for Macintosh and PC computers. And thanks to complete synergy between our hardware and software, we deliver unparalleled functionality - including true SCSI partitioning, mirroring, duplexing, and A/UX compatibility. Our latest Generation II software uses intelligent buffering and caching to maximize real-world performance, and its SCSI Control Panel lets you optimize hardware parameters for added flexibility and hand-tuned performance.

For more information about these and other serious tools, or for the Hammer dealer nearest you, call FWB at (415) 474-8055. Or FAX us at (415) 775-2125.

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Circle 373 on reader service card
The Best Macintosh Training Solution For Smaller Training Budgets

60% of all new software purchased is abandoned within 3 weeks according to a recent survey in PC Magazine. Statistics show that hundreds of thousands of dollars are wasted by companies and by individuals who purchase software programs that are never used.

The survey only mentioned programs that have been put away on the shelf. It didn't add in the staggering number of computer users who use only ten to fifteen percent of their program's capabilities.

Think of the price of today's Macintosh software. It isn't cheap! Is this money wasted? Only if your Macintosh is half used, if your programs have been stuck on the shelf, or if your Macintosh users are not 100% trained on the computer and each business program.

Ironically, few are budgeting equal amounts of money for training. The simple truth is that training is the least expensive investment you can make. New equipment can increase productivity by micro-seconds. Training can increase productivity by days and weeks.

Training Options.

MacAcademy was the first company to nationally offer both live workshops and video training. MacAcademy has specialized in Macintosh training for the past four years and has trained over 50,000 Macintosh users. VIDEO TRAINING is an ideal training solution for companies facing ever-smaller training budgets. Video training is effective, fast, and the least expensive training option available.

Why Video Training?

Speed Learning: The Macintosh is a graphics based machine. It thinks and operates through the use of pictures. Unlike the IBM which is character and keyboard based, the Macintosh is a visual machine. The emphasis is the screen. The best way to learn the Macintosh is by seeing each technique taught on the actual Macintosh screen. A MacAcademy Video shows you step-by-step each Macintosh technique. Each software technique is clearly and visually taught to the new user.

Flexibility.

Videos can be used by individuals or shown to entire companies. Videos can be checked out and taken home by new employees. Videos can be fast forwarded and rewound to review key techniques. Videos are easy. Studies have shown that many Macintosh users are lazy. Training programs that take a great deal of individual time and effort end up sitting right next to the abandoned software. People already are used to watching videos. MacAcademy videos are usually watched within the first two days!

Quality.

There are other video training programs out there. Most of them are only 45 minutes to an hour in length. Nearly all MacAcademy training videos run a full two hours. Each trainer featured on MacAcademy videos is our highest rated instructor for that program from the two-day live MacAcademy workshops featured in over 100 cities throughout the U.S. Our instructors are not actors or software sales people. They are business executives who have been chosen from hundreds of applicants due to their excellent teaching skills, their thorough knowledge of the program, plus their hands-on business background using the featured program. MacAcademy instructors are unmatched in the industry.

Selection.

MacAcademy now offers over 45 different Macintosh training videos (see next page for complete selection). In most cases we offer video training for beginners, for intermediates, and for the more advanced user.

Price.

Each video is only $49. If you pay hundreds of dollars for the program and thousands of dollars for the computer, doesn't it make sense to invest $49 to make that original investment even more valuable?

Guarantee.

MacAcademy is the most trusted name in Macintosh training. Over 10,000 companies currently rely on MacAcademy video training. We invite you to invest in the most effective and valuable Macintosh training available. If, for any reason, for a full 30 days after receiving your Video Training Tapes, you are not totally satisfied, simply return the tapes for a full refund.

To Order.

Please read the next page which lists all tapes now available and includes complete ordering information. Thank you for your business.
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Upgrade From Turbo Pascal To THINK Pascal™ For Only $99.

If you want to write Pascal programs that take advantage of Apple's latest hardware and software, or give object-oriented programming a try, you'll never be able to do it with Turbo Pascal. Because according to Borland (on CompuServe), Turbo will never be upgraded again.

That's why until February 28th, 1991 we'll upgrade you from any Macintosh Turbo Pascal to THINK Pascal for only $99. A savings of 60% off our regular $249.

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Just call Symantec at (800) 228-4122 Ext. 802 and have your copy of Turbo Pascal handy. We'll send you THINK Pascal, the fastest Pascal on the Mac.

THINK Pascal saves you time with a text editor that formats code automatically as you type it in. Its source level debugger makes finding bugs quick and easy. And because it can compile up to 44,000 lines per minute and link any file in under 2 seconds, you can see the results of your programming as you program. All of which makes THINK Pascal the fastest way to finished software. And the #1 Pascal on the Mac.

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Unlike other companies, we're committed to Macintosh programmers. We offer frequent upgrades, and even now, are working closely with Apple so that when System 7.0 arrives, you'll have programming tools to take advantage of it.

We give you unlimited free telephone support, ideas and help on CompuServe and AppleLink, even a dedicated user group: SPLash-Symantec Programming Languages Association.

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LETTERS

Plain Brown Wrapper

My wife instantly picked up on the masochistic theme of the cover design on your November issue ["Huge Hard Disks"]. Just what are you guys up to? Don't you know your magazine is sold on family newsstands?

I am reading the articles in this issue backward to look for satanic invocations.

John A. Wood
Cambridge, Massachusetts

Gee, and we thought we were talking about disk drives.—Ed.

Blame It on the Mac

I have to agree with Steven Levy [Iconoclast, November 1990] that my experiences with the Mac have been positive, but I don't attribute any writing success to it nor do I have any right to blame it for any shortcomings my writing may have. Yes, in our technological world it may seem as if computers can make things easier, but we can't let this make us think we can get by with shoddy work.

Jay J. Jacobs
Western Springs, Illinois

Mightier than the Pen?

I won't attempt to suggest Marcia Peoples Halio is wrong about the students in her classes [Iconoclast, November 1990]. But her conclusion that the Mac is somehow at fault leads me to suggest two brief items of anecdotal evidence that show her theories to be filled with holes.

The day I brought home my first Mac, I wrote the initial words of what was to become my first published novel. I was so thrilled with seeing my words on the Mac's screen that I wrote with the clarity and vision of one newly sighted. Gabriel Garcia Marquez gave up his treasured ink pen and paper for a Mac, and the world of literature doesn't seem to have suffered from the conversion.

May you live with MS DOS forever, Ms. Halio. That would be compensation enough for Macintosh lovers everywhere.

Richard Lees
Studio City, California

Closer Look

Does the Mac make you stupid? Perhaps, but I don't know. Yet the subline for Steven Levy's column in your November issue makes it appear that I do.

Although I think Levy did a fine job of summarizing the main points of my January 1990 article in Academic Computing, "Student Writing: Can the Machine Maim the Message," it is rather different. That would be compensation enough for Macintosh lovers everywhere.

Richard Lees
Studio City, California

Corrections

The Understanding Business created the 1990 U.S. atlas shown on page 174 of the October 1990 issue ("Prepress Progress Report"). The line "All three of the new Macintoshes use 8MHz Motorola 68000 co-processors" ("Mac Classic," December 1990) should have read "all three of the compact Macs." The error resulted from a change made during the production process.

The telephone number for CF5 Systems (Conspicuous Consumer, November 1990) is 415/849-3730.

Fractal Clip Art from Kayni Software (New Products, November 1990) retails for $37.95.

PSI Integration is the maker of the SE/30 Bus Adaptor Card with Cache/FPX Option and the Com (continues)

The 1990 index to Macworld articles is available by mail. To receive a copy, send a self-addressed, legal-size envelope with 50 cents postage to Index, Macworld, 501 Second St., San Francisco, CA 94107. The 1990 index is also available in the Macworld forum on America Online.
INTRODUCING THE RUGGED, RELIABLE, REMOVABLE BERNOULLI TRANSPORTABLE.

In a shakedown of removable storage devices, one drive quickly rises to the top. The new 44MB Bernoulli® Transportable. A revolutionary drive that delivers truly reliable hard-disk-like performance. Day in and day out. Whether in the office or on the road.

Bernoulli’s patented design spins a flexible disk at high speed, drawing it up to the read/write head. Which, unlike hard disks, makes Bernoulli virtually head-crash free. Should the drive encounter a jolt or dust particle, the disk falls harmlessly away from the head, making Bernoulli the toughest, most reliable removable system available. Period.

The numbers tell the whole story. Bernoulli drives have an unbeatable MTBF of 60,000 hours, twice that of our competition and 20 percent better than the most popular Winchester drives, putting Bernoulli in a class with the best hard drives. Bernoulli’s 44MB disks can take 1,000Gs of shock force — an 8-foot drop or all kinds of road abuse. And we back that up with an unprecedented Gold Standard five-year disk life guarantee.

The Transportable’s performance puts you in the fast lane, too. A high transfer rate, together with Bernoulli’s intelligent buffer and user-configurable cache, give Bernoulli exceptional real-life performance.

If you’d rather go cordless, there’s a battery-powered version, which, like the Transportable, fits neatly under a Macintosh SE. And now, Bernoulli takes your dollar the extra mile with dramatically reduced prices (as much as 20 percent lower) that affect the entire Bernoulli family, including the dual.

Which all adds up to one thing: Bernoulli’s closest competition isn’t close at all.

So call 1-800-289-4033 for free literature. Because no matter what road you travel, Bernoulli is the only system that can take it. Over the long haul.
Dealing with Duds

Regarding the September 1990 Commentary on switching to mail order, is it possible that authorized Mac dealers are actually some sort of money-laundering front for the underworld? Most of the salespeople I've encountered are so unknowledgeable that I leave the stores wondering why no one who knows the machines and applications has opened up shop in our area.

At one dealership, I ended up having to demo the graphics-placement capabilities of PageMaker 3.0 for another customer because the salesman could not figure it out. Then he tried to sell the customer the program for $59—no doubt because of the excellent support. My experience is that you can always get better software support from the mail-order outfits than you can from local dealers.

Andrew Koree
via AppleLink

Get Thee to a User Group

I am a longtime reader of your magazine and I liked David Pogue's article Life Online (September 1990). It did, however, leave some gaps for those who, like me, enjoy using networks like Compuserve but don't like the $250 price, and hate using networks like Prodigy but love the $9.95 price.

For users who like using networks but can't afford to, the answer seems simple: join a local user group. The trouble is finding one. A lot of readers, myself included, would like to see an article (continues)
Since we know you're pressed for time, we'll skip the standard introduction and get straight to the point.

- Double Helix is the fastest multiuser relational database for the Macintosh. This, you should know, is not our personal assessment, but rather the conclusive results of MacUser magazine's June 1990 speed-test. And of the four top databases, in five key commands, Double Helix finished first. By considerable margins.

WELCOME TO THE WORLD'S
VERY FIRST MAC-BASED
CLIENT/SERVER DATABASE.

- What makes Double Helix so fast?

Technically, it's because of our advanced client/server format. Unlike file servers, which slow your system down by shuffling copies around the network, client/server lets all users work directly off a master. This keeps network traffic down. And productivity up.

   In addition to speed, client/server provides another crucial benefit: total referential integrity. In other words, when one user makes a change to the master, the whole network gets updated—in real-time. On your screen. Right then and there. So everyone has the same data. And everyone's in sync. The end result: a group that's always working in one direction—forward.

- By the way, and for the record, we were the first ever to introduce a Mac-based client/server. And while it was revolutionary at its debut in 1986, it is, remarkably enough, still revolutionary today.

IMMEDIATE GRATIFICATION, RIGHT FROM THE START.

- Here is—and we quote—what MacWorld said in May 1990: "If you need a working database by Friday morning, and it's now Wednesday afternoon...your best bet is Double Helix."

Talk about fast. With Double Helix in hand, at all, you can, in a matter of hours, mold Double Helix to conform to your individual needs. And as your needs change, so can, with minimal effort, your applications.

DOUBLE HELIX IS THE MOST
AFFORDABLE MULTIUSER
SYSTEM AVAILABLE. HONEST.

- How do we figure? For one, the multiuser application is already included in every Double Helix box. And unlike other databases, it doesn't require any special file server software or hardware, saving you additional and quite substantial start-up costs. So with Double Helix, there's nothing more to buy. Nothing more to install. And nothing more affordable.

THE FASTER YOU GET GOING, THE FASTER YOU GET GOING.

- We've just spent the last 456 words talking about how fast and affordable Double Helix is. Now you can spend the next 14 numbers confirming it all for yourself. Call 1-800-323-5423, ext. 234 and we'll send you out a test flight demo and Quick Start instruction guide of your choice right away. After all, if you stayed with us this long, you've got no time to waste.
on how to locate local user groups, or have the address of a place that can provide that information.

Tom Harry
Minneapolis, Minnesota

We usually run Apple's user-group hotline number in appropriate articles. Call 800/538-9696, ext. 500, to locate groups in your area. Canadians only can call Apple's User Group Connection at 408/974-4060 for the same information.—Ed.

Three Mechanical Mice

Jim Heid's November article "Getting Started with Input Devices" implies that the mice used with today's Macs are the type that sense ball movement through the rotation of an electronic optical sensor. This is not true. Apple's older mice were of the optical design. The newest mechanical mouse is distinguishable by its heavy gray rubber ball. The optically operated mouse described in the article's figure has a lighter-weight black rubber ball.

The new mouse with the gray rubber ball was designed to be less expensive; unfortunately it is also of lesser quality. The noncontacting optical mechanism in the old mouse has been replaced by open rotary mechanical contacts that operate directly off the capstans. The new, gray-ball mouse exposes the ball to the interior of the mouse body, allowing any accumulated crud to eventually make its way into the open contacts. Anyone could have predicted that this would result in the jumpy, intermittent mouse operation that makes you want to pull your hair out.

A. Farrel Droke
Norman, Oklahoma

Apple currently ships three mice, and only fate determines which one you'll get. One species is electromechanical, using the ball to drive two wheels with metallic encoders ringing their edges. A current is made and broken as the encoders spin past electrical contacts. The other two mice use the optomechanical design described in Jim Heid's column.

Paul Prebin, product manager for Apple's input devices, describes how to tell the three rodents apart: The electromechanical mouse has a heavy gray ball with a rotating retainer ring and is made in the United States. The first optomechanical mouse has a lighter-weight black ball with a rotating retainer and is made in Taiwan. The second and latest optomechanical mouse (shipping since last summer) has a heavy gray ball with a rotating retainer and hails from Malaysia. As to the durability of the electromechanical mouse, Prebin says, "The optomechanical mouse meets the same stringent Apple quality specs as the other mice, and it should last for many, many years."—Ed.

Adding It Up

I was most surprised to read your article about laser printers and find that you panned the HP LaserJet IIIP ["Page Printers Revisited," October 1990]. I have recently purchased one and find it an excellent choice for my printing needs. Yes, it is a little slow. But it does everything I need it to do.

Most amazing of all is your report of the $3455 (continues)
Announcing The 24-Bit Board That Starving Artists Will Adore.

Allow us to introduce the Radius DirectColor/GX. For $1095, it will give your Apple 13″ RGB monitor breathtakingly beautiful 24-bit color, as well as on-board acceleration for speedy QuickDraw functions. Scrolls and fills that once took forever will be completed six times faster; Images that once looked merely alright will become awesome. And since the GX offers RadiusTV compatibility along with NTSC and PAL-rate output, you can capture images from almost any source and then incorporate them into video. But here's the best part. Because the GX is vastly more affordable than other solutions, you can donate the savings to your own artist relief fund. Or maybe check out some other Radius products. For a free brochure, dial 1-800-227-2795.

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Circle 231 on reader service card
price tag for a useful setup. Let me itemize my costs: One HP LaserJet IIIP (with 1MB memory board), $1500; one GDT Software Jet Link Express printer driver, $150; one 250-sheet lower cassette at no extra cost; for a grand total of $1650 in Canadian funds, which includes all duties and taxes. How can you say that is expensive?

M. Dale Lauber
New Westminster,
British Columbia, Canada

Our figures still add up when you calculate the retail cost of making the printer truly Macintosh-compatible—that is, equipped with PostScript and a LocalTalk interface: $1495 for the printer, $275 for the AppleTalk interface, $695 for the PostScript cartridge, and $990 for the 2MB memory board. The HP LaserJet IIIP you describe lacks PostScript and can't be shared on a network; plus there's always the chance that incompatibilities will surface when you're using a third-party printer driver. What you have sounds like a good second-best solution, to be sure. By the way, sounds like you got a good deal on the no-cost 250-sheet printer tray; it retails for $195.—Ed.

Test Drive(s)

Why didn't you test more of the drives offered by your own mail-order advertisers in the article, "Huge Hard Disks" [November 1990]? One drive that particularly stands out in the advertisements is the Imprimis 330MB Wren Runner, which would appear to be the fastest of all drives, at 10.7 milliseconds seek time. The shortest seek time listed in your article is 12.0 ms.

In fact, of the top ten drives listed, only one has a retail price of under $3000.

Orrville E. Beau Wayland, Massachusetts

We try to include products from all vendors, but inevitably we miss some. Some vendors did not make big hard drives when we requested review units last April; a few did not respond to our requests. Nevertheless, we tested mechanisms from all the manufacturers you cite—and more. Five of the drives we tested—the Deltaic Systems Server 3000, the FWB hammer300, the MicroNet SB330, the Procom MO 320, and the Storage Dimensions MacStor 325—use the Imprimis Wren Runner (Imprimis is now part of Seagate). The seek times we published are not the manufacturers' claims often quoted in ads, but results from Macworld Lab's own tests.

Price is important when selecting any product, but it shouldn't be your only concern; consider as well reliability, service, support, and bundled software. Also, be sure to compare your dealer's discounted prices (not the vendors' list prices) with mail-order prices. Of the 21 vendors whose drives we tested, 10 sell directly to consumers: Deltaic Systems, Ehman, GCC, Hard Drives International, La Cie, Liberty, MacProducts, Microtech, Mirror, and Ruby.—Ed.

Drive Debacle

I had to laugh at the Service Hero box appearing in the Conspicuous Consumer column of the October Macworld. I agree with Michael Scoville that Direct Peripherals Inc. displays admirable customer service. What I

(continues)
"There was Pantone 485 everywhere. She wiped a tear from her big process blue. Her skin went completely Pantone 263."

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Circle 178 on reader service card
think he hasn’t yet realized is that the company developed this talent through lots of practice.

A while back, we purchased four DPI 20 external disk drives for various Macintoshs in our facility. At least three of them had to be sent back to DPI for exchange within their first few months of use. And several of those replacement disks also gave up the ghost and had to be exchanged repeatedly.

During this disk-juggling act, we came up with 20MB disks labeled as 30MB, and vice versa. All of the drives we received have their model/serial number tags on 1-inch-by-3-inch mailing labels, some typed and some handwritten!

Robert J. Koskewich
Downey, California

Still Bugged

Seems as though Quark has done it once again. QuarkXPress 3.0 is a disaster, and judging from busy signals and turnaround time, the calls for technical support are coming in more waves than the Iraqis have tanks.

Adding pages to a document causes the system to hang, with the only way out being to reboot. When adding pages or text or when inserting stuff, text does not properly reflow through the document. Occasionally the Save command goes off to never-never land, leaving the watch to spin, but look, Ma, no disk activity.

Dennis Erskine
via AppleLink

Debugged

I must take issue with the statement in your QuarkXPress 3.0 review (Reviews, November 1990) that claims the program is buggy. As a QuarkXPress user since 1988, I find 3.0 to be the least-buggy version yet; in fact, I have gotten only one system error in the two and a half months that I have been using it, as opposed to at least three a week with earlier versions. Quark has also sent all 3.0 users a “zapper” disk to correct all known problems with the first release of 3.0. Sure, QuarkXPress is slow on lower-end machines, but then you don’t send a child to do an adult’s work. Why should desktop publishing be different?

Lucas Feininger
Arlington, Massachusetts

Paper or Plastic?

I have just received my October issue of your fine magazine, and as usual, I enjoy reading it. I am deeply disturbed, however, that you still ship Macworld in a plastic wrapper.

In the interests of a better world, please cease this unconscionable practice. This issue is important enough to me that I will base my renewal decision upon it.

Michael Barrow
Pownal, Vermont

We’re willing to bet the October issue is the only one you received in a plastic wrap. We stopped poly-bagging the magazine close to two years ago. Ironically, the only issues we wrap are those that contain renewal notices.

—Ed.
If a picture is worth a thousand words, then why not use a word processor that processes pictures too?

Nisus® lets you communicate the way the Macintosh works—with words and graphics.

Most people aren’t really interested in whether a program is a word processor, a graphics program, or a page layout program. All they really want to do is communicate.

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Nisus lets you rotate text, which is very important if you are designing a self-mailer that folds into three panels. Nisus also enables you to print two pages up—pamphlet style. So, for example, suppose you want to print two pages on a single 8 1⁄2 by 11-inch sheet of paper turned sideways. You can do it with Nisus by a simple selection. Perhaps more important, however, is that this same command will collate your pages—in an 8 page document, for example, page 1 and page 8 will lie next to each other!

If you’re new to the Macintosh word processing market, you probably want a word processor that is easy to use. If you’ve been around for a while, you undoubtedly want a powerful word processor. Chances are you have tried either MacWrite or Microsoft Word. 4.0. One is easy to use, the other offers power. Both, however, have severe limitations which is why we developed Nisus in the first place.

Nisus has a built-in word processing language which does for word processing what built-in languages do for databases. For example, the language allows you to develop routines to index all proper names, a method to find and correct all double words, periods, and extra spaces, or index every word in a document except those you specifically want to exclude. You choose the features.


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10BaseT was recently adopted by the IEEE as a new standard for running high speed Ethernet over unshielded twisted-pair telephone wire. It can often be installed right over your existing telephone lines, keeping installation costs well below both thick and thin Ethernet, yet operating at the same 10Mb per second speed.

With a 10BaseT network, you can link all your Macs, PCs and any other workstations with a 10BaseT card to a central hub in a star configuration. It's easy to add or remove nodes, and isolate problems. If one computer goes down, the others stay up and running.

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As the leader in Macintosh technology, you can count on Asanté to have the fullest line of 10BaseT products available. Only Asanté offers interface cards for the Macintosh SE, SE/30 and Mac II family of computers to keep you well connected in a variety of ways.

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And with the Asanté 10T MAU™ transceiver, you can plug your PCs or other computers with thick Ethernet cards into your 10BaseT Macintosh network, and answer all of your needs.

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8059 TurboTax Personal/1040 1.0 .......................... 50.

**Deneba Software ... 30 day MBG**
4700 BigThesaurus 1.0 .......................... 64.
1768 Coach Professional 3.1 .......................... 124.

**Dow Jones ... 30 day MBG**
1786 Market Manager PLUS 2.03 .......................... 189.

**Dynapage**
Portfolio Systems ... 30 day MBG
6916 DynaPage 2.0—For filofax, Day-Timer, or any personal organizer. Manages & prints addresses, labels & rolodex cards too! Includes free DA $72, 7992 DynaPage 1.0—Prints any Macintosh file to personal-organizer pages. Just insert and go! .......................... 72.

**Fox Software ... 30 day MBG**
5572 FoxBASE III/Mac 2.01 .......................... $292.

**Franklin Software ... 30 day MBG**
7070 Language Master 2.0 .......................... 45.

**Informix**
4955 Win32 1.1A .......................... 245.

**Intuit ... 30 day MBG**
2425 Quicken 1.5 .......................... 35.

**Leonard Development ... 30 day MBG**
8039 SmartWorks 1.0 .......................... 185.
8227 SmartWorks Upgrade (MS Works) .......................... 99.

**Lifetree Software ... 30 day MBG**
6984 Correct Grammar 2.0 .......................... 55.

**Mainstay ... 30 day MBG**
7718 MacFlow 3.5 .......................... 169.
7715 MacSchedule 2.5 .......................... 139.
8613 MacSchedule Plus 1.0 .......................... 199.

**MECA ... 60 day MBG**
2796 Managing Your Money 3.0 .......................... 135.

**Microlytics ... 60 day MBG**
7506 Inside Information 1.0 .......................... 68.
7820 Random House Encyclopedia .......................... 68.

**Microsoft ... 30 day MBG**
2863 File 2.0A .......................... 123.
2864 Works 2.00B .......................... 179.
4969 Word 4.0A .......................... 245.
2865 Excel 2.2A .......................... 245.
5454 The Microsoft Office Suite .......................... 525.

**Microsoft Press**

**Niles & Associates ... 30 day MBG**
5048 EndLink 1.1.3 .......................... 58.
4602 EndNote 1.3 .......................... 85.
8010 EndNote Plus 1.0 .......................... 145.

**Nolo Press ... 60 day MBG**
4226 For the Record 2.0 .......................... 30.
2981 WillMaker 4.0 (not valid in LA.) .......................... 37.

**Oresta ... 30 day MBG**
5621 Double Helix III 3.0R6 .......................... 389.
6468 DataDesk 3.0 .......................... 459.

**Paragon Concepts**
5683 Nisus 3.0 1 .......................... 245.

**Portfolio Systems ... 30 day MBG**
7448 Dynapage Plus 1.0 1/2 Dynapage 2.0 1/2 .......................... 72.
7448 Dynapage Paper (100 sheets, 300 pages) 1/2 .......................... 14.

**PowerUp ... 30 day MBG**
7696 Calendar Creator 1.0 .......................... 35.
7697 Letter Writer Plus 1.1 .......................... 52.
far northern state

MacConnection
1-800/334-4444
MacConnection, 14 Mill Street, Marlton, NJ 08056 1-800/334-4444 603/446-7711 Fax 603/446-7791
Folks tend not to

Custom Applications ... 30 day MBG
6917 Freedom of Press 3.0—Brings PostScript printing capabilities to non-PostScript, black and white devices. New features include Adobe Type 1 support and compatibility with all Macs. $255.
8037 Freedom of Press Light (17 fonts) ... 56.

★Creative Software ... 30 day MBG
6645 Easy Color Paint 2.0 ... 45.
★Custom Applications ... 30 day MBG
8037 Freedom of Press Light (17 fonts) ... 56.
6517 Freedom of Press 3.0 ... 255.
★DeltaPoint ... 60 day MBG
6095 DeltaGraph 1.5 ... 109.
★Deneba Software ... 30 day MBG
6355 UltraPaint 1.0 ... 125.
1769 Canvas 2.1 ... 199.
★Design Science ... 30 day MBG
8205 Parafont 1.0 ... 59.
★Dream Maker ... 30 day MBG
MacGallery (Paint or HyperCard) ea. 27.
Clippets: Business 1 or 2 ea. 69.
7694 Clippets: Sports 3 ea. 69.
★Dubl-Click Software
WebPaint Clip Art ea. 42.
★Electronic Arts ... 30 day MBG
8056 Studio/32 ... 449.
★Familion Computing ... 30 day MBG
6770 MacRecorder Voice Digitizer ... 89.
2199 MacRecorder Sound System 2.01 ... 159.
★Foundation Publishing ... 60 day MBG
6728 Comic Strip Factory 1.0 ... 57.

★Microsoft ... 30 day MBG
2878 PowerPoint 2.01 ... 245.
PANTONE
7466 Process Color Imaging Guide ... 49.
Paracomp
7728 SwivelArt 1.0 ... 82.
4597 Swivel 3D 1.1 ... 295.
7441 Swivel 3D Professional 1.0 ... 439.
7839 FilmMaker 1.0 ... 439.
★Preferred Publishers ... 30 day MBG
7828 Exposure Pro 1.0 ... 69.
8055 Screenshot 1.0 ... 31.
Quark
7612 Quark XPress 3.0 ... 529.
★Solutions, Inc. ... 60 day MBG
3446 The Curator 1.05 ... 87.
★Springboard ... 30 day MBG
3530 Certificate Maker 2.0 ... 22.
4497 Top Honors 1.01 ... 57.
Stratas
7773 Stratisation 3D 1.5 ... 369.
7772 Stratisation 3D/Renderman Bundle 1095.
Strategic Mapping
6518 ALTAS+MapMaker 4.5 ... 369.

★Generic Software ... 60 day MBG
7454 Generic CADD 1.0 ... $375.
Innovative Data Design
2417 MacDraft 2.1 ... 279.
4707 Dreams 1.1 ... 349.
Letraset
2619 ImageStudio 1.5 ... 139.
2621 Ready Set Solve 4.5A ... 165.
6301 ColorStudio 1.0 ... 649.
★Linguist's Software ... 60 day MBG
7714 Capture 3.0 ... 45.
★MediaLab Tech. ... 30 day MBG
8218 Picture Link 1.1 ... 225.
★MicroFrontier ... 30 day MBG
7886 ENHANCE 1.03 ... 299.
★MicroMaps ... 30 day MBG
7554 MapArt (Paint) ... 41.
MapArt (EPS) or MapArt (PICT) ... 99.

ASD Software ... 30 day MBG
7085 FileGuard Extended 2.5—Protect your hard drives, applications, files/folders (including system folder) from unauthorized access, deletion, and/or illegal copying. Now with system usage audit trail. 5 & 10 user also available ... $139.

★SuperMac Tech. ... 60 day MBG
5625 PixelPaint Professional 2.0 ... 465.
Symmetry ... 30 day MBG
8721 Mariah 1.0 ... 94.
★Tactic Software ... 30 day MBG
8251 Icon It ... 45.
Magic Typist, Art Fonts, Sound Clips or Art Clips 1 ea. 50.
8261 Art Clips 2 ... 65.
9249 Font Share ... 129.
3G Graphics
3942 Images with Impact: Graphics 1 ... 50.
Images: Business or Accents ... 65.
★Timeworks ... 30 day MBG
7115 Publish It! Easy 2.0 ... 145.
5908 Publish It! 1.2 ... 222.
★T/Maker ... 30 day MBG
5167 EPS Business Art ... special 69.
Wildflower ... 30 day MBG
6512 SnapShot 3.0 ... 32.
★Zedcor ... 60 day MBG
3986 DeskPaint & DeskDraw 3.0 ... 115.

PROGRAMMING & UTILITIES

★Abbott Systems ... 30 day MBG
5236 CanOpener 1.1 ... 63.
★Advanced Software ... 30 day MBG
8051 In touch 1.0 ... 40.
★Affinity Microsystems ... 60 day MBG
1016 Tempo II 1.2 ... 93.
7835 Tempo II Plus ... 105.
★Aladdin Systems ... 30 day MBG
6169 Shortcut 1.5 ... 46.
6740 Stuffit Deluxe 1.1 ... 63.
★Aldus/Silicon Beach ... 30 day MBG
5100 SuperCard 1.5 ... 199.
★ASD Software ... 30 day MBG
7085 FileGuard Extended 2.5 (1 user) ... 139.
7422 FileGuard Extended 2.5 (5 user) ... 349.
7423 FileGuard Extended 2.5 (10 user) ... 579.
★Baseline Publishing ... 30 day MBG
7793 INT Manager ... 35.
★Berkeley Systems ... 30 day MBG
5737 After Dark 2.0 ... 22.
1541 Stepping Out II 2.02 ... 49.
★Bravo ... 30 day MBG
5404 SPAMM 1.1 ... 48.
## Individual Software

### Power Macros Excel or MS Word ea. $25.
- 4719 101 Scripts & Buttons HyperCard 1.2 25.
- **Insight Development** 30 day MBG
- 6171 MacPrint 1.23 94.
- **JAM Software** 30 day MBG
- 7558 MacList 1.0 40.
- 6089 Smart Alarms 3.0 w/ Appt. Diary 3.1 63.
- 6098 Smart Alarms 3.0 (7-14 users) 125.
- 6087 Smart Alarms 3.0 (5-8 users) 187.
- **Kent Marsh Ltd.** 30 day MBG
- 5457 QuickLock 2.0 57.
- 2501 The NightWatch 1.03 85.
- 6134 MacSafe II 107.
- **Kiwi Software** 60 day MBG
- 6267 KiwiEnvelopest 3.1 33.
- 7445 KiwiFinder 3.0 148.
- **Loop Software** 30 day MBG
- 5442 PictureBook 3.2 39.

### Innovative Data Design

**4707 Dreams 1.1**—Advanced, yet easy-to-use precision drawing and design software. Features include parallel line tool, glue and unglue, add and subtract, trim and fillet tools, true associative dimensioning and more. $349.

### Olduvai

- 4503 MultiClip 2.0 72.
- **ON Technology** 1 year MBG
- 6365 On Location 1.0 2 75.
- **Palomar Software**
- 8210 Plottergeist 1.0 199.
- **Preferred Publishers** 30 day MBG
- 6656 Personality 1.1 49.
- **Salient Software** 30 day MBG
- 7404 DiskDoubler 3.0 45.
- 7403 Partner 1.01 56.
- **Softstream int’l.** 30 day MBG
- 5440 HyperHit 3.0 119.
- 7450 HyperHit Relational 269.
- **Solutions, Inc.** 60 day MBG
- 3449 SmartScrap & The Clipper 2.1 56.
- 3448 SuperGlue II 2.0 75.

### Salient Software

**7404 DiskDoubler 3.0**—Expand your disk drive capacity. Fast, easy and safe, DiskDoubler dramatically increases the storage capacity of any Mac drive. “Performance is outstanding,” evaluates MacUser, 7/90 (4½ Mice rating). $45.
But if you're hopin'

★Somak Software ... 30 day MBG
  ScriptEdit 2.0 or SharpenUp 1.0 ... ea. $62.
  ★Spinnaker ... 30 day MBG
  6692 PLUS 2.0 ................................ 289.
★SuperMac Tech. ... 60 day MBG
  3377 DiskFit 2.0 ................................ 58.
★Symantec ... 30 day MBG
  5176 Symantec AntiVirus for Mac (SAM) ... 67.
  5724 Symantec Utilities for Mac (SUM II) ... 99.
  3421 THINK Pascal 3.0 ................................ 165.
  3420 THINK C 4.0 ................................ 165.
  6748 Norton Utilities for the Mac 1.0 ... 64.
★Symex ... 30 day MBG
  7147 MacEnvelope 5.0 ................................ 57.
  6666 MacEnvelope Plus 2.0 ................................ 159.
★Systems Compatibility ... 30 day MBG
  7927 Software Bridge 1.0 ................................ 79.
★tScriptsetting ... 30 day MBG
  8601 TScript Basic ................................ 54.
  8058 TScript 1.0 ................................ 92.
★TGS Systems ... 30 day MBG
  6667 Prograph 2.0 Compiler Version ... 245.
★Th e HandOff Corp. ... 30 day MBG
  (formerly Software Innovations)
  6647 HandOff II ................................ 52.

Systems Compatibility ... 30 day MBG
  7872 Software Bridge 1.0-Award winning word processing file conversion—now available for the Mac. Conveniently operates under Apple file exchange. Retains formatting as it converts 24 popular word processing formats ... $79.

★Williams & Macias ... 30 day MBG
  3781 LaserWriter Label Pack (216) ... 18.
  6926 myDiskLabeler III 3.0 ... 42.
  4976 Stick yBusiness 1.3 ... 51.
★Wolfram Research
  8276 Mathematica 1.2 ................................ 449.
  8273 Mathematica Enhanced 1.2 ... 699.
★Zedcor ... 60 day MBG
  3985 ZBasic 5.0 ................................ 99.

CD-ROM

Activision
  5127 Manhole (CD-ROM) ... 34.
  8125 Cosmic Osmo (CD-ROM) ... 46.
Broderbund Software
  5237 Whole Earth Catalog (CD-ROM) ... 89.
CD Technology
  8057 CD-ROM Porta Drive ... 649.
★Farallon Computing ... 30 day MBG
  6767 MediaTracks Multimedia CD Pack ... 319.
★Highlighted Data ... 30 day MBG
  7771 Webster's Dictionary (CD-ROM) ... 159.

Nutmeg Systems ... 30 day MBG
  The Nutmeg "19" Display—Delivers a flicker free, 72 dpi image. It features a tilt and swivel base; anti-glare screen. Please see line listings for grayscale and color Nutmeg products. 19" Monitor for Mac SE, SE/30, II or IIIs ... ea. $995.

★HyperGlot ... 30 day MBG
  7473 Learn to Speak French (CD-ROM) ... 159.
  7829 Learn to Speak Spanish (CD-ROM) ... 159.
★MacroMind ... 30 day MBG
  7712 MacroMind CD-ROM ... 125.
★Microsoft ... 30 day MBG
  6382 The Microsoft Office (CD-ROM) ... 599.
★NEC
  Image Gallery, Type Gallery PS, Photo Gallery or Clip-Art 3D ... ea. 246.
  6744 CDFP55 CD-ROM Portable Drive ... 389.
  6743 Mac Driver Kit ... 64.
★Passport Designs ... 30 day MBG
  8255 Desktop Music Creativity (CD-ROM) ... 189.
  8607 Music Production Kit (CD-ROM) ... 1259.
★Somak Software ... 30 day MBG
  7819 LaserArt CD-ROM Vol. 1 or 2 ... ea. 62.
  7768 Toshiba
  6749 XM 3201 CD-ROM Drive ... 779.
★Wayzata Tech. ... 60 day MBG
  8219 CD Funhouse ... 35.
  7966 U.S. Government Seals (CD-ROM) ... 49.
  7678 USA Factbook (CD-ROM) ... 75.
  7679 Disc Tracy Prog. Detective (CD-ROM) ... 75.
  7985 Best of MacTutor (CD-ROM) ... 99.

7374 Sport News Baseball Stats (CD-ROM) ... $139.
7964 N. Amer. Facsimile Book (CD-ROM) ... 269.

EDUCATION & RECREATION

Accolade
  8221 Balance of the Planet ... 29.
  8217 Ishido: The Way of the Stones ... 32.
  8220 Jack Nicklaus Greatest 18 ... 34.

Activision
  4486 Manhole ... 28.
★Alde/Silicon Beach ... 30 day MBG
  Dark Castle or Beyond Dark Castle ... ea. 32.
★Ars Nova ... 30 day MBG
  1215 Practica Musica 2.2 ... 69.
★Base line Publishing ... 30 day MBG
  7785 Talking Moose ... 23.
★Beacon Technology ... 30 day MBG
  HyperBible 2.0 (KJ or NIV) ... ea. 125.
★Bogas Productions ... 60 day MBG
  6135 Super Studio Session w/Music Library ... 99.
★Bright Star Technology
  1402 Alphabet Blocks 1.0 ... 30.

TIMESLIPS ... 30 day MBG
  2986 Timeslips III 2.0—Fast, easy, accurate time and billing for service professionals. DA stopwatch timer can be accessed in other applications. Many new customization features. Network Edition coming soon ... $195.

Broderbund Software
  4314 TypeIt 1.0 ... 18.
  6516 The Playroom (CP) ... 29.
  8266 SimonSancti e Series (CP) ... 29.
  4966 SimCity 1.2 (CP) ... 40.
  5871 SimCity Supreme 1.2C ... 47.
  7966 U.S. Government Seals (CD-ROM) ... 49.
  7678 USA Factbook (CD-ROM) ... 75.
  7679 Disc Tracy Prog. Detective (CD-ROM) ... 75.
  7985 Best of MacTutor (CD-ROM) ... 99.

Carina Software
  5726 Voyager 1.2 ... 88.
★Casady & Greene ... 60 day MBG
  2268 Crystal Quest 2.2 ... 29.
★Centron Software
  6525 Casino Master (B&W version) ... 41.
  8524 Casino Master (Color version) ... 45.
★Coda Music Systems
  8188 MusicProse 2.0 ... 299.
  5604 Finalite 2.5 ... 549.
★Davidson & Associates
  1734 Math Blaster! 1.0 (CP) ... 29.
  6128 Math Blaster Mystery (CP) ... 29.
  8278 Alge Blaster Plus ... 35.
we're still open,

Pronunciation Tutor - Beginner (Span., Fren., Germ., Itali., & Rus.) ea. 39.
Verb Tutor - Intermediate (Spanish, French, German) ea. 39.
Kanjimaster - Beg. (Japanese) 105.
Easy Kana 139.

Individual Software
7425 Training for Microsoft Word 4.0. 35.
5870 Bomber 1.3 (includes headphones) 32.
7622 Darwin’s Dilemma. 32.
7620 Learning Company 30 day MBG 30.
2670 Reader Rabbit 2.2 (CP) (ages 4-7) 30.
5453 Talking Math Rabbit 2.0 (ages 4-7) 30.
5429 Leister Productions 30 day MBG 30.
7126 Reunion 2.0. 38.

Microsoft 30 day MBG 30.
2868 Flight Simulator 1.0 (CP) 32.
4083 Balance of Power 1990 (CP) 29.
5841 Moriarity Revenge (CP) 32.

Nordic Software 30 day MBG 30.
8258 Turbo Math Facts 1.1. 21.
8256 Hyper Control 1.2. 31.
8260 Word Quest 1.0 31.
8257 PreSchool Pack 1.0 36.

Passport Designs 30 day MBG 30.
8253 TRAX 2.0 29.
8254 Desktop Music Creativity Kit 189.
3117 Master Tracks PRO 4 4.1.4 319.
8246 NoteWriter II 319.
8250 Encore 1.1. 379.
3115 MIDI Interface 85.

Penton Overseas 30 day MBG
VocalabLearnVoice levels I & II (French, Italian, Spanish, German, Russian, Hebrew, & Japanese) ea. 35.

Personal Training Sys. 80 day MBG

Postcraft
6466 Citadel 26.
5773 Strategic Conquest Plus 2.055 34.
5774 NetTrek—The Real Version 3.0 34.
3397 Leisure Suit Larry (CP) 23.

Streamstream Int’ll. 30 day MBG 30.
4073 Colour Billiard 38.

Software Toolworks 30 day MBG 32.
4519 Mavis Beacon Typing 1.3 (CP) 32.
4558 Life & Death (CP) 32.

Spectrum Holobyte 30 day MBG 30.
3464 Tetris 1.1 20.
6112 WizX 1.1 20.
8180 Face 22.
8181 Vettel 29.
3459 Falcon 2.2 30.

Spinmaker 30 day MBG 28.
2328 Sargon IV (CP) 28.

PASSPORT DESIGN ... 30 day MBG
8250 Encore 1.5-Play, compose & print music. Imports PRO 4, TRAX & std. MIDI files $379.
3117 Master Tracks PRO 4 4.1.4—Experience the power & sophistication of this intuitive MIDI recording studio $319.

EARTHQUEST
8050 EARTHQUEST 1.0 48.
★Electronic Arts 30 day MBG 30.
6716 Pipe Dreams 1.0 17.
6594 Starflight 39.
★First Byte 30 day MBG 30.
5294 Puzzle Storybook 1.0 (ages 3-8) 27.
5293 Dinosaur Discovery Kit 1.0 (ages 3-8) 27.
★Great Wave 30 day MBG 26.
4334 NumberMaze (B&W) 26, 8257 (Color) 36.
NumberMaze Decimals & Fractions 8049 (B&W) 26. 8044 (Color) 36.
2271 ConcertWare + MIDI 5.1 98.
★HyperGlot 30 day MBG Word Torture - Beginner to Advanced (Span., Fren., Germ., Ital. & Rus.) ea. 29.

Beagle Bros. 30 day MBG
7691 Flash 1.1—Start flashing your coworkers today! The friendliest way to transfer files over AppleTalk—without a File Server. Transfer files from the Finder or within any application $127.

Freesoft 60 day MBG
6115 War Knight 4- supports XMODEM, YMODEM, ZMODEM, Kermit, and CompuServe Error Correcting protocols. Includes Okyto 1.0, a Mac-to-Mac file transfer program, and a free subscription to Genie $85.

StudyWare
ACT, GMAT, GRE, or SAT Prep. ea. 29.
9008 LSAT Prep for the Mac 35.
★Terrace Software 30 day MBG 30.
8192 Mum’s The Word... 81.
7624 Nemesis Go Master 4.7 41.
7623 Nemesis Go Master Deluxe 4.7 88.
★XOR 30 day MBG 30.
8061 MacSki 40.
9040 MacGolf Classic (CP) 52.
3815 NFL Challenge 1.03 55.

NETWORKS & COMMUNICATIONS
★Abaton 30 day MBG 26.
6266 InterFax 24/96 Modern 418.

Dow Jones 30 day MBG
5295 News/Retrieval Membership Package—Allows off-line setup of personalized reports to retrieve and analyze key data from Dow Jones News/Retrieval’s 55+ databases. Includes five free hours of connect time $24.

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Our new hours will...

Applied Engineering
8365 DataLink Express .................. 175.
8364 DataLink/Mac .......................... 209.
8363 DataLink/Mac Portable .............. 209.

**Beagle Bros. ... 30 day MBG**
7691 Flash 1.1 .......................... 127.
5173 QuickMail 2.2.3 (10 user) ....... 315.

**Compuserve ... 60 day MBG**
1676 Macintosh Membership Kit ........ 23.
1673 Compuserve Navigator 3.0 ......... 49.
1674 Membership Kit/Navigator Bundle .. 69.

**DataViz ... 60 day MBG**
1823 MacLink Plus/PC 4.5 ............. 117.
4682 MacLink Plus/Translators 4.5 .... 98.

**Dove Computer ... 60 day MBG**
6758 DoveFax Desktop ................. 299.

**Dow Jones ... 30 day MBG**
5295 News/Retrieval Membership Package 24.

**EveryWare**
8077 AllShare 1.0 .................. 139.

**Farallon Computing ... 30 day MBG**
5707 Timbuktu 3.1 .................. 95.
4687 Timbuktu 3.1 30-Pack ............. 1285.
4686 Timbuktu/Remote 2.0 .............. 123.
6371 Timbuktu/Remote Access Pack .... 845.
6273 PhoneNET StarConnector 10-Pack .. 129.
4869 PhoneNET Connector 10-Pk (DIN-8) .. 198.
2260 PhoneNET StarController 300 .... 825.
6687 PhoneNET StarController-EN ....... 1599.
6766 MediaTracks .................. 189.
6768 MediaTracks Multimedia Pack ..... 319.

**Freesoft ... 60 day MBG**
6115 White Knight 11 .................. 85.

Hayes
2300 Smartcom II 3.2 ................. 94.
2307 Smartmodem 2400 .................. 349.
5991 VS600 Baud modem ................ 719.

Information Presentation Tech.
8060 Personal Server Network (PSN) .... 108.

Insignia Solutions
7557 Access PC 1.0 .................. 62.
7558 SoftPC-AT/EGA Module ......... 125.
4089 SoftPC 1.3 .................. 245.

Intel Corporation
5119 2400EX modem .................. 179.
6420 2400EX MNP modem .............. 229.
6650 2400EX MNP with QuickLink II .. 249.

**Int'l. Bus. Software ... 30 day MBG**
8581 DataClub (3 user) .............. $199.
8582 DataClub (3 user) .............. $199.

**Kennect Tech. ... 30 day MBG**
5631 Rapport .................. 195.
7588 Drive 360 .................. 249.
7590 Drive 1200 .................. 249.
5632 Drive 2.4 (includes FastBack II) .. 325.

**Microcom ... 30 day MBG**
7459 CarbonCopy Mac (Single, 2 req.) .. 117.
7465 CarbonCopy Mac (Twin Pack) ..... 169.
8027 MacModem V.32 .............. 689.

**Nuvo Tech ... 60 day MBG**
3000 TurboNet ST (DIN-8) ............. 30.
6751 TurboNet ST (12-Pack) ........... 279.
6750 NuvoLink II .................. 275.
6272 NuvoLink SC .................. 308.

**Orchid Technology ... 30 day MBG**
6949 OrchidFAX Modern ............. 429.
**Practical Peripherals ... 30 day MBG**
3102 2400 Baud External Modern .... 179.
5285 PM 2400OSA MNP Modern ....... 209.
3089 Mac Communications Pack 1.5 .. 225.

**Prometheus ... 30 day MBG**
8350 2400 Mini for Mac .............. 169.
8348 24/96 Minifax .................. 199.
8349 Maxfax .................. 295.

Farallon Computing ... 30 day MBG
6766 MediaTracks—Lets you record Macintosh screen activities into "tapes." You can easily edit and add text, graphics, and sound to your tapes, which your audience can watch and listen to at their convenience. $189.

**Shiva ... 30 day MBG**
3444 NetSerial X232 .................. 275.
4347 NetBridge .................. 339.
4942 TeleBridge .................. 339.
3443 NetModem V2400 .............. 429.
6917 NetModem V32 .................. 1395.
6519 EtherGate .................. 1629.
8189 FastPath IV .................. 1899.

**Sitka/TOPS ... 30 day MBG**
4188 TOPS Teleconnector (DIN8) ...... 23.
3720 TOPS Flashcard .............. 155.
6264 TOPS Networking Bundle 3.0 .... 187.

**Software Ventures ... 30 day MBG**
3459 MicroPhone II 3.0 .............. 215.
6720 FXGATE Plus 1.1 .............. 239.
8337 CommGate .................. 379.

**Synergy ... 30 day MBG**
6618 VersaTerm 4.1.1 .............. 88.
6619 VersaTerm-PRO 3.1.1 ......... 174.

**Traveling Software ... 60 day MBG**
3729 LapLink Mac III Connectivity Pac .... 93.

Kennect Technology ... 30 day MBG
Drives—Owners of any Macintosh (512c-1i) can get complete compatibility with all IBM and Apple formats by plugging one or more of Kennect's 3 ½ or 5 ¼ drives into Rapport. see line listing for prices.

**INPUT/OUTPUT**
**Abaton ... 30 day MBG**
7432 Scan 300/S (reqs. Scan Kit) ...... 999.

**American Power ... 30 day MBG**
5895 UPS 110SE .............. 209.
6686 UPS 370ci .............. 329.

Caere
8124 Typist .................. 479.
4476 OmniPage 2.1 .............. 539.
6660 OmniSpell 1.0 .............. 69.
6658 OmniDraft 1.0 .............. 69.

**CH Products ... 30 day MBG**
7343 Mach IV Plus Joystick (Quad or ADB) 51.
7344 Rollermouse (ADB) .............. 79.

**Computer Friends**
6271 ColorSnap 32+ .............. 649.

**CoStar ... 30 day MBG**
6090 LabelWriter .................. 185.
6067 LabelWriter Labels .............. 11.
7452 LabelWriter Labels (12-Pack) .. 63.

**Datadesk ... 30 day MBG**
6901 Switchboard (modular keyboard) .... 159.

**Software Ventures ... 30 day MBG**
3455 MicroPhone II 3.0-1990 Macworld World-Class Award for Communications-General. New version of top-selling telecom software. Build graphic front-ends to remote services and corporate mainframes ............... $215.

Kennect Technology ... 30 day MBG
Drives—Owners of any Macintosh (512c-1i) can get complete compatibility with all IBM and Apple formats by plugging one or more of Kennect's 3 ½ or 5 ¼ drives into Rapport. see line listing for prices.

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6686 UPS 370ci .............. 329.

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8124 Typist .................. 479.
4476 OmniPage 2.1 .............. 539.
6660 OmniSpell 1.0 .............. 69.
6658 OmniDraft 1.0 .............. 69.

**CH Products ... 30 day MBG**
7343 Mach IV Plus Joystick (Quad or ADB) 51.
7344 Rollermouse (ADB) .............. 79.

**Computer Friends**
6271 ColorSnap 32+ .............. 649.

**CoStar ... 30 day MBG**
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ART BEAT

by Cathy Abes

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

Artist: When Steve Lyons began his career as an illustrator ten years ago, he did acrylic painting using an airbrush. About a year ago he tried using the Mac in his work, and he's never looked back. Now all his artwork is Mac generated.

Hardware: Mac II with 8MB of RAM, 120MB internal hard drive, Wacom pressure-sensitive tablet.

Software: Adobe Illustrator 3.0, Adobe Photoshop 1.05.

How It Was Done: For the illustration depicting the long-awaited Adobe Illustrator 3.0 that opens this month's Reviews section, Lyons used—appropriately enough—Illustrator 3.0. "I wanted to create a richly textured background (reminiscent of Japanese paper) to contrast with the hard edges of the linear elements in the illustration," he said. To that end, he used Adobe Photoshop to make an EPS file, which could then be imported into Illustrator.

Working in Photoshop, Lyons first filled the drawing area with a brownish green color and then began drawing the squiggly lines using the brush tool and the Wacom tablet. After he had drawn a number of squiggly lines, he used Photoshop's Motion Blur filter (Filter submenu under the Image menu) to give the image a fuzzy texture. Then he added more squiggles until he had a fabriclike texture.

After converting the image from RGB to CMYK mode, Lyons began working in the black channel so he could add a subtle black grainy texture to the background (using the Add Noise filter). Then he saved the image as an EPS file in the Desktop Separations mode. This separated the (continues)
image into five files that could be placed in and printed from Illustrator.

Now he was ready to create the rest of the image in Illustrator 3.0. Using Illustrator's Place Art command, he imported the background files from Photoshop.

Next he focused on the central element of the composition: the three-dimensional I. He chose the Copperplate typeface as a model for the serifs of the I. After creating an I with the right proportions, Lyons used Illustrator 3.0's new Create Outlines command to convert the I from a font into a graphic that could be manipulated like any other PostScript object. This made it possible for him to use Illustrator's Snap to Point feature so he could accurately align the different sections of the I.

Lyons selected and skewed the I using the Skew tool (while holding down the Shift key to constrain to vertical motion only). He then cloned the I by selecting and dragging while holding down the Shift and Option keys. Because he wanted the cloned I to function only as a guide for placing the top and sides of the I, he gave it no fill and no stroke. With the Snap to Point option selected in the Preferences dialog box, Lyons created the sides and top by drawing over the outlines of the two 1's with the Pen tool. After choosing the colors for the various sections of the I, he selected and grouped the sections together. He then chose Copy from the Edit menu and Paste Behind from the Arrange menu to create a duplicate of the grouped I sections directly behind the original. Without ungrouping this new I he called up the Paint dialog box, choosing no fill and a light blue for the stroke. He also selected rounded joins (to smooth the corners around the entire I) and assigned a line weight of 6 points (since it was behind the original I only 3 points of the new I would show). This technique allowed him to put an even 3-point stroke around the entire three-dimensional I.

After finishing the other elements, Lyons created the dashed border surrounding the illustration. He achieved the border's two-color effect by first specifying a solid black line with a 5-point line weight. He then used Copy and Paste in Front to put a duplicate of the line directly on top of its predecessor. Finally, he called up the Paint dialog box and assigned the new line a stroke weight of 3 points, a dashed value of 6 points for the length of the dash and 4 points for the space between the dashes, and gave it a light green stroke.

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Outbound and Gagged
A SMALL COMPANY'S FUTURE IS IN APPLE'S HANDS

BY STEVEN LEVY

It was two Augusts ago that many of us became acquainted with what is now known as the Outbound portable. One by one the Macintosh cognoscenti snuck out of the Macworld Expo festivities and negotiated their way to a ground-floor hospitality suite in a Boston hotel. We found a group of executives wearing Cheshire-cat smiles, obligingly demonstrating what most everyone said was pretty much impossible in the summer of 1989—a true Macintosh laptop at a reasonable price. It was then called the Wallaby, acknowledging its marsupial talent of "docking" to a mother Macintosh.

Oh, we tried to hide our enthusiasm. We circled the machine—not much of a walk was required, since the computer was no bigger than a reference book, say, the Baseball Encyclopedia—and we admired its keyboard, tickled its pointing device, and pondered its backlit screen. If not everything seemed to work perfectly, we were assured that the product that eventually shipped would remedy those faults.

Then we asked our questions: How can you do this without Apple suing you? We aren't selling Apple's proprietary technology—the Macintosh ROMs, came the answer. Those you supply yourself, in a Mac Plus or Mac SE, which becomes the docking device once the ROMs are transferred to the laptop. People have to provide their own ROMs? Yes, they can buy new computers, or bring in old Macs that would otherwise have been upgraded or discarded. Or they can find used Macs. And you're sure that Apple won't stop you? It's perfectly legal!

We walked away with our hearts all aflutter. And our enthusiasm only increased when, a few months later, Apple Computer released its own pathetic version of a portable computer—a bulky, overpriced beast. Sure the Outbound, as it was finally called (because of a trademark conflict with Wallaby) upon its release last April, had a problem or two, but at least its designers were living on the same planet as their potential customers. The Outbound was light enough to carry along on a trip, compact enough to use on an airplane, inexpensive enough to buy with a mere five-thousand-dollar bill—and you'd get back a nice piece of change.

But is the Outbound really bound for glory? Is the company destined to be a big player in the Macintosh community? Should you buy one? The product has now been selling for almost a year, and I have some big doubts. Compounding the uncertainty is an extremely oblique announcement made by Apple Computer last summer, regarding, as a press release states, "Outbound's infringement on Apple's intellectual property rights." Apple stated that it now "allows" Outbound to sell its products. However, again quoting the press release, "specific details of the agreement were not made public." One detail that was most certainly not in the agreement, though, was the one that Outbound officials wanted most: the ability to package Apple's ROMs with their computer.

Born to ROM
Why was this crucial? Because without it, Outbound, even with the Apple agreement, is a quasi product, a curiosity rather than a complete computer. The protocol for buying an Outbound would make Rube Goldberg proud. You don't just saunter into a dealer, plunk down your cash, and walk off with a laptop. You must also buy, or otherwise provide, a Plus or an SE, from which the Outbound dealer extracts the ROMs and installs them in the Outbound. You return home with two computers, sort of: the Outbound and a "lobotomized" Mac that works only when docked to the newly loaded Outbound. Presumably, users will work on the docked setup at home, taking the laptop on the road.

This sounded all right when they explained it to us in Boston 18 months ago, but in the cold light of reason, the scheme is flawed. At Outbound's prices—$3000 for a floppy (continues)
disk version, $4000 for a hard drive machine, and a few hundred more for various extras, some of them essential—it's clear that Outbound customers aren't the types who have Mac Pluscs on their desktops. No, they're power users, hooked on Mac IIs, and the wimpy Macintoshes they plundered for the ROMs might as well be used as high-tech piñatas.

No wonder then, that some Outbound dealers operate in violation of Outbound policy, offering to sell prospective customers laptops complete with ROMs. Though Apple Computer has a problem with this—the company refers to ROMs in this situation, no matter where their origin, as "pirated"—the dealers are often quite brazen about the practice.

In preparing this column I called three Outbound dealers, describing myself as someone who had a Mac II and no interest in using a less powerful machine on the desktop. Did this mean I had to buy a Plus or an SE? I figured if any of the dealers was cheating on the rules, they would probably not deal with me on the phone, but I was wrong. The first dealer, not affiliated with Apple, said not to worry, he would sell me ROMs for $180. The second, who was an Apple dealer, also assured me that there was no problem, and ROMs would cost $150 extra. Only the third seller, also an Apple dealer, told me that I was out of luck; according to the official procedure, I must supply a Mac Plus or an SE. However, this dealer offered me a floor model of the Outbound, along with the Mac Plus that was on display. The discount was considerable. Why? "Because we're not moving the product and we want to clear out inventory."

At first blush, it would seem good news that one can buy the Outbound complete with ROMs for only a pitance more than the original price. But many users, particularly corporate buyers, are understandably wary of a scheme that circumvents standard company policy—both Apple's and Outbound's. Robert B. Louthan, the chief operating officer of Outbound, sounded quite glum when I described my experience to him. "The dealers' instructions are to follow the installation procedure," says Louthan. And if they don't? "We can't control them," he says.

While not disclosing any sales figures, Louthan contends that Outbound is doing quite well, selling computers "ahead of our plan." But he admits that his company's fortunes would be considerably improved if Outbound were allowed to sell Apple ROMs along with the computer. "It's a market resistance point, for sure. We feel we could better serve our customers if our relationship with Apple were broader."

In the meantime, many Outbound dealers are apparently using sleight of hand as a way of getting machines out the door. That doesn't inspire confidence in a company.

(continues)
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ROMs or no ROMs, Outbound has critics who think that the computer doesn’t offer much. “I’m really skeptical about the whole product,” says consultant Richard Schaefer of Technologic. Detractors cite reliability questions (some early problems, which Outbound claims have been corrected, have tarned the computer’s reputation); a less-than-crisp screen display; a built-in lack of power due to its reliance on the chips from Apple’s least powerful and now obsolete computers; and a confounding replacement for the mouse, a finger-controlled device called the Isopoint. (Craig Culver, who invented the Isopoint, charges that Outbound has poorly implemented his creation.)

Strange, some of the criticism comes from Apple Computer, co-signer of the mysterious agreement. Apple’s director of worldwide CPU marketing, Brody Keast, says, “It’s an interesting product, but not right for Apple or its customers. The battery life is under three hours. The Isopoint is not right for most people. You can’t have a model with both a floppy and a hard disk drive. The display is not that good. The weight is heavier than you’d like to see on a laptop. And when you calculate the cost of a complete system, the price is only a few hundred dollars less than our portable.”

My own assessment is not as harsh. I’ve been testing the Outbound for some time, and I’m moderately impressed. Not that it’s been all roses. At around ten pounds, the computer is more leaden than most laptops. The display is all too often haunted by smears of pixels past. It did take me a while before I finally reached the point where my Isopoint skills could be rated as adequate (things got a lot better when Outbound released a new version of its software, though according to Culver, the Outbound Isopoint is still “not OK—mechanically it’s got problems”). And the lobotomized Mac that accompanied my Outbound had no trouble finding its way to the closet. Yet I found the Outbound to be sufficiently useful to justify its presence on short business trips—in fact, it’s the only decent alternative available to me as someone who wants to run Macintosh software in any airplane without the desk space of Air Force One.

Even more encouraging was the fact that during the few months I’ve had the Outbound, the company made some necessary improvements. Outbound’s smartest move was the addition of a cable that allows you to perform the novel task of getting information in and out of the computer. (Outbound charges $149 for this SCSI adapter, but this option should be provided as standard equipment.) Another vital accessory was a new compact external floppy disk drive. I don’t want to sugarcoat the issue—there are still problems. Chief among them is the limited battery life (continues)
Version 2.0

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and the compounding problem that unless you keep the machine continually recharged, you may lose information on the so-called silicon disk. In fact, even when using the power cord, the general performance of a battery-low Outbound gets pretty dippy, with confusing error screens popping up. But overall, I can live with an Outbound. Moreover, I would like to see it evolve from a decent laptop to a fine product.

Lapped by the Competition

Unfortunately, I’m not sure whether Outbound will have the opportunity to grow and thrive. The company’s future depends largely on what is in that secret agreement with Apple—an agreement that Outbound could not live without, since it stiffled the constant threat of a lawsuit from, as Robert Louthan puts it, “Big Brother.” As one might expect, the pact’s secrecy has generated a caldron of rumors about what Outbound gave up to Apple. Many industry observers assume that Apple, in exchange for some amount of cash and a promise not to unleash its attack lawyers on the nascent company, purchased Outbound’s assets, notably its technology. Indeed, one former Outbound employee assured me that Apple now owned Outbound’s technology, leasing it back to the company for a period of under three years. The principals would not comment, of course, but if that is an accurate characterization, Outbound’s future depends on Apple’s whim. In any case, since we don’t know, we cannot rule out the worst. While Outbound seems to think secrecy suits its purposes, its potential customers may not want to deal with a company that proudly unfurls a pact and then refuses to divulge its implications.

But whether or not Apple does control Outbound’s technology, the agreement demonstrates one thing above anything else: Apple controls the marketplace for anything that follows the Macintosh standard. Make no mistake about it—Apple’s interests were not in emulating the Outbound, but in maintaining an ironclad grip on the Mac standard. “Outbound has no particular technology that we want,” says Brody Keast, confirming that the importance of the agreement was precedent—anyone else trying a similar laptop scheme will be operating under the specter of copyright infringement.

But when I asked Keast about Apple’s refusal to license its ROMs to Outbound, or at least to allow its customers to purchase ROMs directly, Keast provided a surprising response. It was not so much the principle that stopped Apple from considering options like that, but the fact that Outbound’s computer was not up to Apple’s standards. Keast confirmed that for a superior product, Apple might have been willing to deal.

Come on now, Brody—does Apple Computer really expect a leading-edge company to devote brilliant engineering skills and millions of dollars to develop a computer whose fate depends entirely upon Apple’s willingness to let it live? Given Apple’s aggressive stance toward protecting its property rights, it is remarkable that we have anything as good as the Outbound available in the marketplace. In the MS-DOS world—that huge universe that Apple presumably is trying to compete with—there are myriad choices of laptop and portable computers, dazzling models that make the Outbound and Apple’s portable look sick. That is not simply because the task of creating a Mac laptop is more difficult—it’s because Apple has closed off the marketplace.

One day, I am sure, Apple will keep its publicly stated promise to develop a line of portable computers that address varied customer needs, much in the same way that Apple provides a choice of desktop models. These may, or they may not, be developed in tandem with outside firms. (Rumors abound that Sony or Toshiba might be among them.) But Apple needs market share now, and we need competitive Macintosh laptops now. Instead of playing games with Outbound’s future, Apple should tend to its own—and play some serious catch-up with the rest of the world.

Steven Levy, a Macworld columnist, is currently writing a book on artificial life.
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Buyer Beware
Radiation finds its niche as a marketing tool

BY DEBORAH BRANSCUM

The Champ Polar Filter sounds like a winner. According to the product information sheet available last October, the Champ is “EPA tested and verified to reduce the Electro-Magnetic Radiation by 67%.” The screen “eliminates eyestrain and headaches” and “reduces potential harmful effects of continued computer use.” On the back of the flyer are brief descriptions of articles about computer health concerns. “Don’t Be Fooled!” warns a little box at the bottom of the page. “Radiation screens must be CERTIFIED. Many ‘glare’ screens on the market do not protect against radiation. The Champ is certified by the EPA.”

Despite the impression given by the product sheet, the Champ is not approved by the Environmental Protection Agency. The screen does not block 67 percent of all electromagnetic emissions, and specifically not the low-frequency magnetic ones that concern some scientists. The product may well block X-radiation as a testing certificate states, but it’s not clear that computer monitors generate a hazardous amount of X-rays.

Many safety products are being peddled to a newly fearful population of computer users. Buoyed by publicity about health issues in Macworld and other publications, some manufacturers are using confusing or inaccurate statements to sell their wares.

One such company is the Phoenix, Arizona–based Committee Against Radiation, Inc., which manufactures the Champ Polar Filter. The chairman of the company, Christian M. Banes, will not agree with this assessment. A dapper fellow of 68 who looks much younger than his age, Banes defended his company and its literature during a lengthy interview in Phoenix in late October. Banes told me his company plans to delete references to the EPA in its material, and the Champ’s San Diego distributor confirmed that it had stopped telling customers about EPA certification several months before.

That ought to be the end of the story—a simple misunderstanding that is now resolved. But the reality is more complex. In Phoenix I discovered that Chris Banes is a courtly, entertaining, opinionated guy who is selling a product in an area he doesn’t understand. He’s willing to make claims about his product but unwilling to take responsibility for them. “I do not make any claims about this screen whatsoever,” said Banes. “Never have. I simply say what other people have said that I consider to be good things about it.” But unlike Banes, I believe that if a company repeats claims about a product, it ought to be able to prove them.

Early on, the Champ was sold primarily on its optic qualities, but that changed after November 1989. That month Seth C. Hunt, retired from his job as deputy regional administrator in the EPA’s Denver office, sent a letter to Advance Computer Education, now the San Diego distributor of the Champ. The missive said, in part, “I was advised by...” (continues)
members of EPA's professional staff that perhaps the major concern facing America in terms of constant use of VDTs is exposure to the electromagnetic current being emitted from the terminals. It's the magnetic current which can cause cell damage to the user. With this knowledge and concern, I asked the Regional EPA Chief of the Radiation Programs to test the Champ Polarfilter Shield that I had acquired from you. Now the good news: Their tests showed the magnetic field was reduced from between 5 and 6 milligauss to as low as 2 milligauss when the shield was placed on the VDT. Congratulations for your achievements in helping to protect the health and safety of American workers." Hunt included a copy of the EPA test results with his letter.

No one can blame the company for wanting to take advantage of such news. (In fact, Hunt was so impressed that he became a Champ distributor.) Unfortunately, the letter was based on a flawed test, according to the EPA, and the company apparently didn't have the technical sophistication to recognize that. "The test results were incorrect," said Milton Lammering, the regional EPA officer who made the test measurements. "I made a mistake. Period." And Lammering said the product was never EPA certified—the EPA never endorses products.

N early a year later, the EPA asked the Committee Against Radiation to stop mentioning the agency in its material. Banes agreed but bridles at the notion he might have misled consumers by using the phrase EPA certified. "We have never suggested the EPA endorses the product," said Banes, a self-described former wonder boy of Madison Avenue as a copywriter. "Webster's dictionary says that a certification is another way of saying that you have received a letter as to the results of any tests. The word certified was not used with any malice, nor was it meant to mislead. What we have done is not deceptive because I've simply reported what a government agency has said."

Although Banes is willing to drop the EPA reference, he's not really convinced the agency's test results were flawed. Political pressure, he suggests, is forcing the EPA to backtrack. According to Banes, Lammering "has been instructed by the bureaucrats in Washington that the EPA is no longer in the radiation business and that he is to recant the test. Actually, they wanted him to say that he never did the test. And he refused to say that." The official in question, who has never spoken to Banes, disagrees. "I have had absolutely no political pressure," Lammering said. "I made a mistake in measurement and I'm trying to clear it up. It's got nothing to do with political pressures at all."

At this point, a reminder is in order: extremely-low-frequency (ELF) magnetic fields go through just about everything, including the Champ filter. It's not a moot point, since until recently a fair chunk of Champ literature was devoted to the menace of electromagnetic fields. Unfortunately, according to our test, the Champ has no effect whatsoever on magnetic fields and blocks only 17 percent of the very-low-frequency electric field.

Even so, Mr. Banes seemed unconcerned that the Champ, like other screens, failed the Macworld test. "My position, whether it is considered correct or incorrect by other people, is simply that a government agency tested this screen and I have the results."

GOOD NEWS, BAD NEWS

Although several companies imply that their products block extremely-low-frequency (ELF) electromagnetic emissions and thus magnetic fields, I've found only one that actually does the trick. E.L.F. Armor (formerly Bioshield) from Fairfield Engineering (515/472-5551) is a special steel-alloy cylinder that fits over the neck of a cathode-ray tube to reduce emissions. The product is available only for compact Macs; other versions are expected.

Macworld Lab tested the $79.95 product, which must be installed by the company or an Apple-certified technician, using a Mac Plus and a Holiday Industries HI-3600 VDT Radiation Survey Meter. Measuring from the front of the display at a distance of 4 inches, the magnetic field was reduced from 6.4mG to 4.5mG. From 12 inches, the field was reduced from 2.6mG to 0.59mG. And from 28 inches, the field was reduced from 0.36mG to 0.14mG. Magnetic emissions at the sides and back of the monitor were also reduced; electric fields were not significantly affected.

The good news is that E.L.F. Armor significantly reduces ELF magnetic fields. The bad news is that such a reduction may not be enough to affect any health risk that may exist. As yet there is no scientific consensus about ELF field exposure—no one can say what level, if any, is hazardous.
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results of that test on their stationery signed by their top person at that time, witnessed by two other people who have voluntarily, after their retirement, given me corroborating information,” said Banes. “I can take two positions. I can say the EPA hasn’t the slightest idea what they’re doing. Or, for selfish reasons, I can choose to believe the EPA. And I choose to believe the EPA because I have no knowledge or expertise that would allow me, even remotely, to disagree with a scientist.”

And that, perhaps, is the crux of the matter. It doesn’t seem unreasonable to expect that the chairman of a company named Committee Against Radiation should be educated about the different types of radiation and understand why the EPA was wrong when it claimed the Champ filtered out magnetic fields. (It’s a mistake for Banes to rely on Seth Hunt’s expertise in evaluating the issue. As the genial former EPA employee told me, “I’m not a scientist, I came up through the management ranks.”) At one point Banes said, “I don’t know what a milligauss is, nor do I ever intend to find out, because I don’t care.” When I suggested that he was trying to capitalize on the press and the fears that people have to sell a product, he said, “You say I’m trying to capitalize. I might be trying to educate. That’s a possibility. There’s a possibility that I’m a really nice person and that I’m trying to do good for people.”

That’s entirely possible. It’s also possible that Mr. Banes is more interested in winning new distributors than in educating consumers, since new Champ distributors are required to invest close to $30,000 for initial inventory. Mr. Banes strikes me as a caring but misguided man who’s tried to make the cash register ring by telling people that his product will “knock out computer radiation.” But that claim is only partly true.

Dr. Richard J. Glonek of Phoenix is one of two optometrists who have endorsed the Champ. He likes the screen’s ability to block ultraviolet rays and “the added benefit of blocking electromagnetic emissions.” And he said he advised all his pregnant patients not to work on computers.

I asked Dr. Glonek if he felt better about his pregnant patients working in front of a computer with a Champ filter. His answer was yes—until I broke the news that the Champ was virtually useless for blocking electromagnetic fields. “I was reluctant in the beginning to endorse anything,” said Dr. Glonek. “I knew the optical qualities and polarization were there, so I was very comfortable about that. But as far as the electromagnetic emissions, I was relying on the EPA results and the materials [the company] gave me.”

There are some promising product developments (see “Good News, Bad News”), but there’s also a lot of hype. The Committee Against Radiation hasn’t been alone in using the fear of radiation as a marketing tool.

(continues)
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One example is the Maxi-Lite video-display safety apron. The gentleman who designed the predominantly lead apron, A. D. Carroll, sent out a press release that states the product guards against X rays and ‘includes the addition of a protective layer of aluminum material to guard against extremely low frequencies.’

I called Carroll to ask if that meant the product blocked electric fields and magnetic fields. He said it did both. According to MacWorld tests, that’s not true. The Maxi-Lite apron did block up to 71 percent of the electric field, but had no significant effect on the magnetic field.

Carroll, however, said he believes his product blocks magnetic fields, but he can offer no evidence. “What you’re looking for, you’re not going to find,” Carroll told me. “There’s no proof. This is a new field. There is not a means to test these things properly.”

Carroll, like Christian Banes, seems to have a good heart. But a good heart doesn’t guarantee good engineering. And pregnant women concerned about X rays shouldn’t be lulled into thinking the 5.25-pound Maxi-Lite apron also protects them from magnetic emissions.

(Pregnant women should check with their doctors before buying a lead apron-type product. According to the Canadian Centre for Occupational Health and Safety, the use of lead aprons is “inappropriate and possibly hazardous to the health and safety of operators of VDT equipment.”)

It’s not only small companies that make confusing or potentially misleading claims. Polaroid is marketing a glare filter that reportedly “fights VLF/ELF radiation and static.” But Polaroid is referring to electric fields, not magnetic fields. A company official said new literature would make a distinction. (To its credit, Kensington Microwave dropped an advertisement for an antiglare filter that appeared in Macworld after we complained about similar wording.)

It’s not easy to know what companies mean when they sell radiation shields. Many screens that claim to block electromagnetic emissions, like the Polaroid product, block virtually all of the electric field, but do not affect the magnetic field at all. Some, like the Champ, claim to reduce both X rays and electromagnetic emissions but significantly reduce only X rays.

But X rays may not be the problem. According to U.S., Canadian, and Swedish government officials, monitors generally emit X rays at close to a background level. The Radius Two Page Display, for example, was tested at .05 millirems per hour; the government standard is ten times higher. But as author Bob DeMatteo writes in Terminal Shock (NC Press Limited, 1985), “Today we know that X ray damage is cumulative and that any exposure, however slight, entails risk.” So users must decide if an additional precaution against X rays is necessary. (When buying a monitor, look for the (continues)
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Circle 367 on reader service card
IT ALL STARTED INNOCENTLY ENOUGH.

Then the conflicts began. At first we did it just for fun. A screen saver. A menu clock. But you know how it goes: you keep wanting more. A font/DA manager, then an anti-virus utility and a spell checker. Soon we had a system folder full of INITs. All rushing into RAM at every startup.

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"My top recommendation..."
—MacUser, August 1989

"Simply outperforms and outclasses its competitors..."
—MacWEEK, June 12, 1990

following on the back: “This product complies with DHHS Rules 21 CFR Subchapter J applicable at date of manufacture.” That means a production model was tested and met the government standard.

As we went to press, Christian Banes called to say that because of this article, he was rethinking the way he sells the Champ screen and is writing new literature. “If the filter does not perform as the EPA said it performs, then we have been misled by the government... and we will take steps to correct that,” he said. “It is too easy to make money to be involved in making money by misleading someone.”

Banes deserves credit for considering the issues I’ve raised, and I hope Committee Against Radiation changes its literature accordingly, as Banes said it will. And I hope the industry as a whole changes its marketing approach to the radiation issue by becoming knowledgeable, honest, and clear about the limitations of such products.

But don’t hold your breath.

(Research assistance by Loren Stein.)

SERVICE HERO

Ronald L. Blake of Jackson, Tennessee, ordered 70ns RAM from Technology Works but received 80ns RAM instead. A replacement memory board was shipped, but Blake never received it. Although the shipping company claimed the product had been delivered, Blake still didn’t have the correct board. Another replacement was sent overnight, and Blake was instructed to use the Technology Works account to ship back the original memory board at no cost, much to his delight.
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- SuperSpool 5.0 .......... 57.

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Abbott Systems
Canopener 1.1 ............ 62.
Aiaddin Systems
Shortcut ............... 39.
Stuffit Deluxe ........... 62.
ALSEQ
DiskExpress II .......... 53.
Master Juggler .......... 63.
ASD Software
Fileguard ............... 138.
Baseline Publishing
Talking Mouse ........... 24.
Mac Cheese ............... 58.
APB Express .............. 59.

Beagle Bros Inc.
FLASH .................. 126.

Berkeley System Design
After Dark ............. 22.
Stepping Out H 2.02 ...... 48.

Casady & Greene
QuickDEX ............. 33.

CE Software
MacPackage Plus ........ 36.
Quickkeys 2 .......... 93.
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Int/Out (1-5 user) ..... 127.
Int/Out (1-10 user) ..... 180.
QuickMail 2.1.1-5 users ..... 207.
1-10 users ..... 307.
1-50 users ..... 1,257.
DataViz
MacLink Plus PC 4.5 ..... 116.

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Contact Nitel-Phone:Net DIN-8 ..... 30.
Phone:Net DIN-9 (10 pk) ..... 195.
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StarCommac (single) ..... 67.
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Phone:Net/AppleTalk Adapt. ..... 8.
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Farallon
Media Tracks 1.6.8.
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Silicon Beach
SuperCard 1.3 ..... 118.
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HyperCard II Relational ..... 268.

Wayzata Technologies
Quickstart ..... 48.
Seals in the US Gov't. ..... 49.
All of Mac Tutor ..... 160.
Disc Tricky ..... 75.
The USA Factbook ..... 75.
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Baseball Guides & Register. ..... 138.
VW Remanufactured ..... 69.

GEM - Public Domain ..... 75.

HYPERWAVE & CD's

Activation
Cosmic Omen CD ROM ..... 45.
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Quickstart ..... 48.
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All of Mac Tutor ..... 160.
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Sound Clips 1-4 ..... 45.

ACCESSORIES

Avery Labels
Mac Label Pro ..... 48.
Casio
Casio B.O.S.S. ..... 219.
CasioLink/Mac ..... 98.
CoStar
LabelCenter ..... 18.
Organizer ..... 195.
Organizer Jr. ..... 68.
I/O DESIGNS
MacLinkage - Carrying Case
(3.5Kb) ..... 48.
Mac Plus ..... 64.
Mac SE ..... 78.
Mac II ..... 98.
Mac ICX ..... 84.
The Ultimate SE Case ..... 84.
Rion Ultimate Carrying Case
Green - Pink - Yellow ..... 88.
Kensington Microwave
Dust Cover SE KBD ..... 9.

Kensington Microwave
Dust Cover SE ..... 9.
ImageWriter II Cover ..... 8.
Anti-glare Filter ..... 32.
SE Rad/anti-glare Filter ..... 51.
Anti-glare Filter 13 Apple ..... 63.
System Saver ..... 63.
System Saver SE ..... 52.
Universal Printer Stand ..... 15.
Mac II/II+ extended cable ..... 19.
Mac III Monitor Stand ..... 54.
Mac II Monitor Stand ..... 64.
Mac II Micro Cable Ext. Kit. ..... 32.
Masterpiece Mac II ..... 105.
Extended ADB Cable ..... 24.
Universal Copy Stand ..... 22.
Printer Muffler 99 ..... 34.
PowerTool 10 ..... 27.
PowerTool 20 ..... 27.
PowerTool 30 ..... 54.
Apple Security Kit ..... 32.
LaserWriter II Security Kit ..... 32.

Kensington Microwave
A-B Box (DIM-8) ..... 63.
ScanBase ..... 31.
PowerBacker 360 ..... 260.
PowerBacker 450 ..... 537.
PowerBacker 550 ..... 397.
PowerBacker 800 ..... 746.
PowerBacker 1200 ..... 960.
Pass Proo ..... 70.
SoftClip 6.

Mac Packs - Linebacker
Apple - Wine or Gray
ImageWriter II Bag ..... 45.
Mac Plus/SE Bag ..... 45.
Mac SE Bag XI ..... 69.

Snack-a-Mac
Snack-a-Mac Stuffed Mac ..... 6.
Gives:
SE/Plus w/ keyboard ..... 17.
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Apple monitor & ext. keyboard ..... 18.

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SuperCard 1.3 ..... 118.
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Wayzata Technologies
Quickstart ..... 48.
Seals in the US Gov't. ..... 49.
All of Mac Tutor ..... 160.
Disc Tricky ..... 75.
The USA Factbook ..... 75.
The CIA Factbook ..... 80.
Baseball Guides & Register. ..... 138.
VW Remanufactured ..... 69.

GEM - Public Domain ..... 75.

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Cosmic Omen CD ROM ..... 45.
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Quickstart ..... 48.
Seals in the US Gov't. ..... 49.
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Disc Tricky ..... 75.
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<table>
<thead>
<tr>
<th>Micron - 8 Bit Color Cards</th>
<th>RasterOps</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution 640 x 480</td>
<td>MultiMedia</td>
</tr>
<tr>
<td>Mac II or SE/30 ..........</td>
<td>1255</td>
</tr>
<tr>
<td>Resolution 1024 x 768</td>
<td>1259</td>
</tr>
<tr>
<td>Mac II or SE/30 ..........</td>
<td>1259</td>
</tr>
<tr>
<td>RasterOps</td>
<td>1259</td>
</tr>
<tr>
<td>ClearVue/GS Gray Scale</td>
<td>Sigma Designs</td>
</tr>
<tr>
<td>System Mac II &amp; SE/30</td>
<td>L-View Multi Mode</td>
</tr>
<tr>
<td>1692.</td>
<td>SE/30 or Mac II</td>
</tr>
<tr>
<td>ColorBoards</td>
<td>1475</td>
</tr>
<tr>
<td>206 (II, IIci, III, IIx)</td>
<td>1475</td>
</tr>
<tr>
<td>264 (SE/30 - 13&quot;)</td>
<td>1475</td>
</tr>
<tr>
<td>264 (Mac II - 13&quot;)</td>
<td>1475</td>
</tr>
<tr>
<td>349</td>
<td>1475</td>
</tr>
<tr>
<td>394 (Mac II - 13&quot;)</td>
<td>1475</td>
</tr>
</tbody>
</table>

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Accolade

- Music W ave of the Stones... 33
- Stratego ... 33
- Jack Nicklaus' Greatest 18 ... 35

Actionvision

- Cosmic Ozone ... 39
- Manhole ... 27
- Shanghai ... 18

Addison Wesley

Addison Wesley
- The Hobbit ... 22
- Broderbund
- SimEarth ... 39
- Ancient Art of War ... 25
- Ancient Art of War at Sea ... 25
- Shuffletape Cafe ... 22
- SimCity 1.1. ... 28
- SimCity Color ... 46

Addison Wesley
- Casady & Greene
- Crystal Quest 2.2 ... 28
- w%Critter Editor ... 39
- Mission Starlight ... 28
- Sky Shadow ... 28

CinemaWorks

- 3 in Three ... 31
- Electronic Arts
- Chuck Yeager's A.F.T ... 31
- Weaver Baseball ... 33
- Startlight ... 39

Infocom

- Archon: Quest for Excalibur ... 28
- Quarterstaff ... 19
- Leather Goddess of Phobos 19

Infoline

- Bomer (network phones) ... 31
- Davison's Dilemma ... 31

Lucasfilm

- Pipe Dream ... 16
- Indiana Jones: The Last Crusade ... 33

Microsoft

- Flight Simulator 1.02 ... 31
- SimEarth ... 69

Great Wave

- KidsMath or Kids Time ... 25
- NumberMaze ... 25

Hyperlign

- Russian
- Introduction ... 28
- Word Torture 3.0 ... 28
- Verbal Aspect - Inf. ... 41
- Pronunciation Tutor ... 34

Indiana Software

- Training for PageMaker 4.0 ... 34
- Typing Encore 3.5 ... 17

Learning Company

- Math Rabbit ... 30
- Reader Rabbit 2.2 ... 30

Nordic Software

- MacKids PreSchool Pack ... 34
- Turbo Math Facts ... 22
- Word Quest ... 25

Broderead

Broderead
- SimEarth ...

Educational Software

- Smart Tools
- M. Becon Teaches Typing ... 31
- Acca-Weather ... 53
- WordWise ... 40

True BASIC, Inc.

- Algebra, Arithmetic, Calc ... 39
- Discrete Mathematics ... 39
- Pre-Calculus for the Mac ... 39
- Probability Theory ... 39
- True STAT ...

COmputers Plus WorkBook

- Algebra Combo Pack ... 44
- Calculus Combo Pack ... 44
- Pre-Calculus Combo Pack ... 44

Visionary Software

- Lifeguard ... 48

Beagle Brothers

- Flash ...

Palo Alto Software

- Business Plan Toolkit ...

Informix

- WingZ ...

How to Write a Business Plan

**Business & Presentation**

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**Accounting & Finance**

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**Input and Output Devices**

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**T/Maker**

**WriteNow 2.2**

WriteNow 2.2 is a fast, powerful word processor with a large collection of writer's tools. For example, it has a 135,000 word dictionary, plus the Writer's Theater, which contains 1,4 million synonyms and antonyms. Also, you can use WriteNow 2.2 combined with Grammatic 1.0. Grammatic improves the quality and clarity of your writing. It checks for common grammatical and stylistic errors, cliches, cliche, and commonly financial waste.

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All the Colors of Space

BY BRUCE F. WEBSTER

The system I'm using to write this column has two monitors, one 13-inch and one 19-inch, both Sony Trinitrons. They display the same color background pattern, but that pattern looks brown on one monitor and dark salmon on the other. And making a hard copy of the image on a color printer yields output that varies from both displays. Anyone who works with color faces some basic questions: Can these devices be coordinated in their color representations? If so, how does the final result mesh with the rest of reality? And what might it cost to accomplish all this?

Oh, Say, Can You CIE?
The problem with color spaces, mechanisms for specifying colors, is that they are device specific and somewhat subjective (for definitions of color expressions see “Colorful Terms”). My two monitors persist in displaying different colors for the same RGB/HSV value. Current products let me calibrate the two monitors so that they show the same set of colors—but which set should they show? And how do those colors relate to what I might get by printing an image using the same RGB/HSV value appropriately translated to CMYK?

The answers, such as they are, lie in a color space defined 60 years ago by an international committee, the Commission Internationale L'Eclairage (CIE). Without today's technologies to tempt them into compromise, the CIE produced a solution that was accurate, complete, and based on reality. Unlike the color models mentioned above, the CIE color space encompasses all possible visible colors.

There are actually several CIE color models (CIE XYZ, CIE xyY, CIELUV, and CIE LAB), but they represent different mappings into the same space and can be translated one into the other. You can also create a calibrated RGB, HSV, or CMYK color model by defining each point (color value) in that color space as having a particular CIE specification.

Characterization
The potential value of the CIE color space lies in its objectivity. With the right instrumentation, you can analyze a given color from a given device and determine what its CIE specification is. If you do that for the device's complete gamut of colors, you then have a CIE specification for each color in that device's native color space (RGB, CMYK, and so on). This process is often called characterizing the device; the resulting data is called the device profile.

Characterize two or more devices, and you then have a means by which you can—in theory—reproduce on one device the exact color generated by another. Suppose a characterized display is producing a color (red, green, or blue) in RGB space. That display's device profile tells what the corresponding CIE specification (x,y,z) is for that color. To reproduce that color on a characterized printer, you use the printer's device profile to convert the CIE specification (x,y,z) into the printer's CMYK color space, producing the color (c,m,y,k).

Problem solved, right? Wrong. If the display and the printer have different gamuts, which they almost certainly do, the printer may be unable to produce a specific color corresponding to a given CIE specification (x,y,z). A complementary problem is the inability to see on the display certain colors the printer can produce. For true color matching, both issues must somehow be addressed.

Calibration
So far, plenty of companies are interested in tackling those problems. One of the oldest (and most expensive) approaches is RasterOps' self-calibrating monitor, which uses equipment originally manufactured by Barco. While this monitor keeps itself calibrated, it has no facilities for color matching with other monitors or with output devices. RasterOps has some new solutions under development but wasn't willing to discuss them as of this writing.

(continues)
The major pioneer has been Radius, with its PrecisionColor Calibrator. One end of this device connects to an ADB port and the other attaches to the front of a color display. The PrecisionColor calibrates by comparing the actual colors produced to the signals being sent to the display. The software (which runs as a Control Panel device) then adjusts two of the display’s color attributes (gamma value and color temperature) to user-selected values. That way you can ensure display consistency for a given monitor over time. And by using the same settings for different monitors, you can ensure color consistency between those monitors.

That’s all nice, but it does little to address coordinating display colors with output colors. Radius has tackled that problem by working with Pantone Inc. to produce CIE specifications for the entire set of Pantone Matching System (PMS) colors, a printing industry standard for spot color. With these specifications, the PrecisionColor Calibrator can adjust a supported monitor to accurately display PMS colors. Furthermore, Radius and Pantone are working together to promote these specifications as an open standard.

The trick, though, is being able to pick those PMS colors within an application. Apple’s standard Color Picker doesn’t support direct selection of PMS colors, so the application has to have a custom picker; furthermore, that picker must use the data produced by the PrecisionColor Calibrator in order to match the PMS colors with the correct RGB values. Radius has created such a picker with supporting routines, and (according to Radius) it has been implemented in applications by companies that include Aldus, Adobe, Letraset, Electronic Arts, and Quark. But that solution doesn’t handle colors outside the Pantone gamut, nor does it handle continuous-tone color images such as art or photos, or direct output to printers that don’t support PMS colors.

Color Matching
SuperMac, seeing that opening, has formed an alliance with Tektronix to produce a more general solution. The result is the SuperMatch Professional Color Matching System. The hardware component, the SuperMatch Display Calibrator, looks and works very much like the Radius calibrator, though SuperMac claims greater flexibility in setting gamma levels and color temperature. The company also claims its product can calibrate a larger assortment of monitors than Radius’s can. Both of those differences may well have disappeared (or at least narrowed) by the time this column sees print; at any rate, they will be a source of constant change and competition.

What is more significant about the SuperMac product is its approach to color matching. The calibration process allows the SuperMatch software to establish a relationship between the display’s color space and the TekColor color space. TekColor, developed by Tektronix, uses a calibrated HVC (hue, value, chroma) color model based on CIE specifications. Tektronix is promoting TekColor as an open standard. (Does anyone promote closed standards?)

The SuperMatch system also supplies an alternate color picker as well as Apple’s standard Color Picker. The alternate picker not only allows direct color selection from the TekColor color space but it can also display as overlapping regions the color gamuts of both the current display and a selected, TekColor-characterized printer. This allows the user to limit color selection in the document to the gamut common to both, while the calibration ensures that the colors will appear the same on display and output. And since the color picker is implemented on a system-wide basis, no special application support is required.

The key phrase above, of course, is TekColor-characterized printer. To date, there are only two: the 4693DX and the ColorQuick, both from Tektronix. Other companies have announced their intent to support the SuperMatch system, but it remains to be seen, however, how many will actually characterize their products and how soon.

Newcomer to the Fray
The most recent entry into this fray is Kodak, which—you guessed it—has announced an open standard for color (continues)
The difference between our JPEG compression solution and theirs is obvious.

There's a big difference between our high performance compression/decompression solution and C-Cube's — ours is available now.

And that's not the only difference.

The Micron Xceed™ ICDP-II with Storm Technology’s PicturePress™ software offers a variety of features you can't get with C-Cube's CL550™-based products. Like fully adjustable compression settings, thumbnail views, software easily upgraded to future JPEG versions, lossless compression and JPEG + +™ — an exclusive feature that allows you to compress different user-selected parts of the same image at different quality levels.

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So call us at 1-800-642-7661 for more information and the name of your nearest authorized dealer. And find out how, at $995, the Xceed ICDP-II for the Mac® II family is obviously different, and obviously better.

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<table>
<thead>
<tr>
<th>Features</th>
<th>Micron ICDP-II</th>
<th>C-Cube CL550-Based Card</th>
</tr>
</thead>
<tbody>
<tr>
<td>True JPEG Implementation</td>
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<td>Yes</td>
</tr>
<tr>
<td>Upgradable to Future JPEG</td>
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<td></td>
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<td>Versions via Software Updates</td>
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<tr>
<td>JPEG + + Support</td>
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<td>Lossless Support</td>
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<tr>
<td>Application Plug-ins (Photoshop™)</td>
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<td>Free Software-Based Decompression Module</td>
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<tr>
<td>60 MIPS Programmable Processor</td>
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</table>

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STATE OF THE MAC
calibration and matching. Kodak's angle is different, however. The Kodak Photo CD system, scheduled for commercial release in 1992, will transfer photographic images from 35mm film negatives and slides, to high-resolution (2048-by-3072-pixel) digital images stored on write-once compact discs, to printed pictures—all at consumer prices. With Kodak's system, color information shouldn't get lost or muddled along the way. And, if the Kodak system works, third-party computer systems should be able to access, display, and print those digital images with a great deal of fidelity.

Its strategy may be different, but Kodak's basic approach is not. The company has announced a device-independent color model, PhotoYCC, that bears some parallels to TekColor. PhotoYCC is a calibrated RGB model based on the CIE color space, with primary colors identical to those agreed upon by the companies developing high-definition television (HDTV) technology.

Kodak has also announced its own color-management system for device calibration and profiling, much like SuperMatch. Kodak has said it intends to have these technologies available for Macintosh, DOS and Windows, OS/2, and UNIX environments.

Like the other companies, Kodak has a list of third parties pledging support to one degree or another for the newly announced technologies. But the names on Kodak's list are a bit weightier and include IBM, Apple, Sun, Hewlett-Packard, Digital Equipment Corporation, and Next. Software vendors announcing support for PhotoYCC include Aldus, MacroMind, AutoDesk, and Software Publishing. Perhaps most significant, Adobe has announced that PhotoYCC will be directly supported in PostScript Level 2 and will be documented in the revised edition of the PostScript Language Reference Manual.

Who Needs It, Anyway?
How is this all going to sort out? Of these various standards which will predominate? One might favor Kodak because of its very deep pockets, broad market presence, and heavy-duty lineup of third-party supporters.
For starters, we’ll hand you the most in-depth statistical software you can buy. Flexible software that gives you the power to enter, edit, manage, analyze and present data. Software to help you get your job done right. Then we'll hand you the support that comes with over 25 years of experience in setting the industry standard for documentation and training. Support you'll find only at SPSS. So if you're in the market for statistical software, save yourself some time. Look to SPSS, suppliers of statistical solutions to over 2 million users worldwide. Call 1(800)45 STATS or FAX (312)329-3668. We'll lend you more than an ear.

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COLORFUL TERMS

A color space (or color model) is a mechanism for specifying colors. A gamut is the range of colors that can be produced or displayed by one device. Each device has a fixed gamut but can be driven by more than one color space. When you choose a color space for a particular device, say a monitor, any color that you actually see on the display is produced by a combination of software and hardware. Based on the color’s specification, the hardware and software causes the monitor to output a color from the monitor’s gamut.

Each color within a color space is usually defined as a set of values. For example, the red-green-blue (RGB) color space—the default for Color QuickDraw and most color display boards—defines each color as a combination of three values: one representing the red, one the green, and one the blue component of that color. An absence of these three primary colors yields black; the maximum amount of all three mixed together yields white.

I do favor Kodak, but for a completely different reason: it’s the only company planning a solution that considers the needs of a significant number of computer users. Face it—few Macintosh users have a compelling need for precisely matching their displays with color printer output, and fewer still care whether their monitors match someone else’s. Serious users of color prepress and high-end publishing will definitely need calibration and matching, as will print shops and in-house departments using color PostScript printers. But that’s a tiny fraction of the Macintosh marketplace, which itself is a small percentage of the entire computer market.

In contrast, Kodak plans to offer a consumer product—Photo CD—that could be of interest to literally millions of people. If Kodak is successful, in 1992 you’ll get your 35mm film developed onto a CD for less than $20 per roll—with a single CD holding up to 100 photos—and then view those pictures on a computer or TV set using standard CD ROMXA and CD-I drives. Given the commercial potential of Photo CD, every computer manufacturer supporting CD ROM drives will want to support Photo CD and, thus, PhotoYCC.

This is not to say that the products from Radius, SuperMac, and others will disappear. Each is likely to be successful in its own niche; in time, some may also come to support PhotoYCC. Whatever happens, though, it seems certain that most Mac users will continue on, content with the colors on their uncalibrated monitors and uncharacterized printers. And with good reason: it gives them all the colors they need or care about.

Contributing editor Bruce F. Webster is vice president of R&D at San Diego-based Pages, Inc. He can be reached via BIX (webster) and via MCI Mail (Bruce Webster).
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The Art of CD ROM
by Meridian

From the earliest recorded history, people have always been passionate about the creation of new tools - to improve how they work, play, learn and communicate.

Not too long ago we humans downloaded information directly onto the walls of caves. A few hundred centuries passed, and caves gave way to hieroglyphics - the first written communication - literally etched in stone.

At Meridian Data we'd like to think that CD ROM is yet another great step forward - for all humanity.

Not since the Gutenberg printing press (not a bad tool for keeping pace with ecclesiastical intrigue), has communication been transformed so rapidly, and in such a positive way.

Companies are fast discovering that CD ROM is the most economical way to share information. In fact, one CD disc can replace 300,000 pages of information. That's the equivalent of 1500 floppy disks - and we can only guess as to how many miles of cave paintings that might be!

Today - there are more companies and government agencies doing more CD ROM discs using Meridian's CD ROM development tools than ever before. In fact, 7 out of 10 CDs today are produced with a little help from Meridian. Gutenberg himself would have been impressed with that achievement.

It's no surprise to us. The need to share information has never been more critical. The world is rapidly changing - and businesses and institutions alike must continue to adapt to change - while keeping costs in line.

Meridian's VR Publisher™ for example, is our most cost effective desktop solution, supporting MS-DOS® and Macintosh® as well as multimedia development. Prepare any database for preview. Test variables before committing to the final mastered disc - the VR Publisher can handle all of your premastering needs. And when combined with the VR Professional™ you can even develop one-off discs, the best way to handle minimal CD disc runs or multimedia presentations - fully supporting ISO 9660 International Standards.

And with Meridian's CD Net products you can go to the next step, once your final disc is mastered. Make any CD ROM available to everyone on your Local Area Network (LAN). CD Net makes the distribution of information that much easier - more accessible to a much wider audience than ever before.

Things have certainly changed since the days when a cave painting was the only way to share information. Fortunately, there's been a few improvements since then. We believe that CD ROM just happens to be the latest and greatest one.

At Meridian Data we have the most comprehensive CD ROM solutions - including premastering, CD ROM networking and multimedia. Let us help you to get your disc rolling - right away.

Order our FREE disc about the Art of CD ROM. Call (408) 439-3100 or Fax (408) 438-6816.

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Newfound FreeHand

It must be nice to schedule a product release for three months after the arch-competitor's product ships. It certainly gave Aldus time to think about Adobe's Illustrator 3.0, and to get Aldus FreeHand 3.0 ready to compete with it.

FreeHand 3.0's simplified interface adds several palettes that eliminate many trips to dialog boxes. You can name, move, and print layers from the Layers palette, or store custom half-tone screens, line colors, and the like on the Styles palette.

FreeHand 3.0 has no type-size limit, and, like the new Illustrator, it can convert Type 1 and Type 3 fonts to modifiable outlines. Unlike Illustrator 3.0, FreeHand 3.0 won't let you edit text on screen or link boxes for flowing text, but wrapping text around the inside or outside of elliptical shapes (not an easy task in either program) is simpler than in earlier versions of FreeHand.

FreeHand's drawing tools have greatly increased accuracy and some new features. The Composite Paths command lets an object show through holes in a superimposed object, and you can select objects within a group, both features matched by Illustrator. FreeHand 3.0 also automatically reblends elements in a blend and automatically reblends when you make changes. (Automatic reblend can be turned off for speed, and, even in beta form, FreeHand 3.0's screen redraw is faster and smoother than in 2.0.)

FreeHand 3.0 can display and separate color TIFF images, allows you to work in preview mode, and supports monitor and printer calibration—all features lacking in Illustrator. Illustrator 3.0, on the other hand, has a set of graphing tools that shorten the cycle of preparing graphs and charts.

Pricing for Aldus FreeHand 3.0 was not set at press time. For more information, call Aldus in Seattle, at 206/622-5500. —D.L.

Cloud over SyQuest

A pair of lawsuits filed by peripherals vendor Microtech International and removable hard drive manufacturer SyQuest have cast a shadow over the reputation of SyQuest's very popular SQ555 drive mechanism. Microtech's suit, which alleges that SyQuest failed to meet a guaranteed failure rate of 5 percent or less, was filed in October. SyQuest subsequently sued Microtech for non-payment of $851,000 allegedly owed by Microtech for drives it received from SyQuest. SyQuest is also suing Microtech for making "false and misleading" remarks about SyQuest.

The controversy centers around the reliability of the SQ555, which is the heart of removable hard drives that are currently sold by about 18 to 20 peripherals vendors. The SQ555-based drives are the de facto standard for removable media in the Mac market, with about 500,000 installed units, according to SyQuest. Microtech says it experienced a higher-than-acceptable rate of failure with the devices, and that repeated attempts by both companies to solve the problems were unsuccessful. SyQuest says that its overall return rate, including drives that were dead on arrival or were later rated "no problem found," is about 6.7 percent, with a smaller percentage being actually defective. Some of the drives were also simply damaged by users, SyQuest notes.

SyQuest vice president of market-
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Lawsuits between Microtech and SyQuest have cast a cloud over the reliability of SyQuest’s removable drives.

The Big Crunch

Back at the dawn of the Macintosh era, David Russell wrote MathView Professional, a prodigiously fast engineering-math program, while he was working full-time as a mathematician at Lockheed.

As the newer Macs began to resemble workstations, Russell decided it was time for a new kind of software. His vision of a utopian program for engineers and applied scientists called for an encyclopedic function set, a highly evolved Mac interface, blazingly fast 2-D and 3-D graphics, and a built-in scripting language.

After pulling together a management team and financing, Russell formed Bimillenium Software to market his new product, HiQ. It is hardly an exaggeration to say that HiQ compares to older equation-solving packages the way Microsoft Excel compares to the Calculator DA. Work in HiQ is organized in Project Notebooks, on-screen representations of 3-ring binders, each with a title page, a table of contents, a work area, and an index. In the work area, you can use a repertoire of more than 500 basic and high-level functions (HiQ solves not just ordinary differential (continues)
AW...WHAT THE HECK!

DesignCAD 2D/3D

Professional CAD System for the Macintosh

When we introduced this product we had to ask ourselves, "What should DesignCAD 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, damn 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.

DesignCAD has disproved a common misconception about computer software: you don't always have to spend a lot of money to get high-power quality software. DesignCAD for the Mac has features of CAD systems costing thousands of dollars! Yet, DesignCAD is priced at least 50% to 80% BELOW comparable CAD packages... AND DESIGNCAD IS BETTER!

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Along with extensive hardware support, you get software compatibility! DesignCAD comes with (at no extra charge, of course!) file transfer utilities to let you read and write files in other formats such as IGES, DXF, HPGL, XY or XYZ coordinates, ASCII text files, EPS, Postscript and PICT or PICT2. NOW THAT'S COMPATIBILITY!

DesignCAD offers fully integrated 3D geometry!
Need 3D capability? Great! Look at how DesignCAD fully integrates its very powerful 3D mathematical foundation with excellent 2D drafting attributes, which are in a league all of their own, offering first-rate ease of learning and use.

DesignCAD is easy to use!
Tests prove that DesignCAD's user-friendly interface allows you to quickly produce complicated drawings in a fraction of the time required from the competition. Flexibility and power found within DesignCAD means you save time and money! DesignCAD is truly the CAD system that ANYONE can use!

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• Trimming
• Related and/or Auto-Update Viewing
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• Ray Casted shading
• Specular Highlighting
• Unlimited color support
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answers short of buying yourself a company overview of math programs when doing matrix computation and numerical integration.

Bimillennium is developing HiQ for UNIX and IBM's RS/6000. The company also has plans for a compiler and a finite-element-analysis package after HiQ is out the door (ship date is scheduled for April). There will also be a student version of HiQ that does not require a math coprocessor. If you have a complex problem with a numerical answer (HiQ doesn't do Mathematica-style symbolic computation), it's the fastest way to get that answer short of buying yourself a Cray. HiQ will list for $495 for three months after it ships, and then for $695. Later products have not been priced. For more information, contact Bimillennium in Los Gatos, California, at 408/866-2010.—Charles Seiter

The Mac Desktop Reconsidered

Ever wonder why the Mac's desktop metaphor ends so abruptly? Why can you drag an object around inside a MacDraw document—but to move it to another document you first have to copy it to the mysterious Clipboard?

Belgian programmer Martin Scheffer asked himself the same questions and concluded that there is no good reason. So he is writing software that breaks down the barriers between documents and even between applications. For example, using the as-yet-unnamed utility you could select a range of cells in a spreadsheet and drag it right out of the spreadsheet window into a word processor docu-

Managing Pages

With dozens, hundreds, or even thousands of elements making up a QuarkXPress document, it can be tough to keep track of them all. Page Director, a stand-alone application and QuarkXPress plug-in, tackles that problem by pulling together all the elements of a publication, keeping track of their sizes, locations, positions, page jumps, and even use of color. You can position the elements on dummy-up pages or on a spreadsheet-style run sheet that shows name, number of columns, depth, page number, section, type, color, jumps, and so on. You can even attach comments to any element or page.

Once you've built the dummy, you save it as a Page Director file, open XPress, and import the Page Director file for fine-tuning.

One very clever feature of Page Director is its ability to suggest color configurations for different sizes of publications—telling you where color is available based on printing signatures. If you place a color element on a page that isn't marked for that color, Page Director gives you the option of changing the item's color, moving it to another page, or changing the publication's color configuration. (continues)
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IN FOCUS SYSTEMS, INC.


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MacDraw Pro’s zoom tool works like Claris CAD’s so you can select an area which then expands to fill the screen. Other CAD-like features include the ability to move objects from layer to layer, and the ability to stop in the middle of drawing an object to change your tool’s parameters or alter another object. Pro has a bezier curve tool that works by dragging directly on curves, without handles.

MacDraw Pro also leaves the 8-color ghetto behind for 32-bit color, Pantone support, and color gradients that can have up to four different colors or highlights. You can control the direction of gradients as well as the shapes and positions of highlights (by dragging them around in a special window), and custom colors or gradients can be named and assigned to an on-screen palette.

MacDraw Pro’s price remains $399. For more information, contact Claris in Santa Clara, California, at 408/987-7000.—D.L.

New Products for the New Macs

Makers of Macintosh add-ons are practically falling over each other in their haste to introduce products that are compatible with the new Classic, LC, and IIsi.

Dove Computer Corporation announced its Marathom 030 Classic, a 16MHz 68030 processor upgrade for the Mac Classic. Dove is including virtual-memory software from Connectix and Symantec’s SAM 2.0 antivirus and SUM II disk utilities. The Marathom 030 Classic was slated to ship January 1 at a list price of $799. For more information, contact Dove in Wilmington, North Carolina, at 919/763-7918 or 800/622-7627.

RasterOps announced the availability of five display products for the Mac LC. The 8LC Display Board is a 256-color adapter that supports a 19-inch monitor. It lists for $995. The 8LC Display System is the same board bundled with a 19-inch color monitor with a resolution of 1024 by 768 and a 75Hz refresh rate. Its list price is $3795. The ClearView/GLSC Display System is a 19-inch gray-scale monitor and adapter for the LC. It has the same resolution and refresh rate and lists for $2195. The ClearView/LC Mono-

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FREE!
Award Winning Microlytics
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With every drive, we're including a collection of over a dozen CE Software utilities that includes QuickKeys, DiskTop, MockPackage, Ask, and Vaccine. And we've included Microlytics GoFer, a high-speed text search and retrieval utility, and Inside Information, the first hierarchical dictionary for the Macintosh. Several of these wonderful utilities received MacUser Eddy awards and MacGuide Golden Gavel awards.

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Mirror Technologies helped pioneer Macintosh mass storage back in 1985. Since then we have developed the most comprehensive line of storage and back-up solutions available. We offer internal and external hard drives, 45Mb removable drives, tape and DAT backup, rewritable optical, and CD-ROM.

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Our new T1200 incorporates the latest digital audio tape (DAT) technology that stores 1.3Gb of data on a pocket-sized cassette. Complete with Automated software for unattended backup, Tape and AppleShare compatible.

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Choose A Better Drive At A Lower Price.

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<thead>
<tr>
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(s) = Seagate, (f) = Fujitsu, (g) = Quantum

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Gray-scale monitors

Gray-scale monitor that works with the California, circuitry in all its monochrome and arc Adapter board. Both it has begun including hazard. The display includes an 030 Direct Slot Adapter board. Both display adapters are shipping now. For more information contact Radius in San Jose, California, at 408/562-4200.

Radius rolled out display boards that allow the Radius Pivot rotating monitor and the Radius Two Page Display to run with the llsi and the llci. The display includes an 030 Direct Slot Adapter board. Both display adapters are shipping now. For more information contact Radius in San Jose, California, at 408/562-4200.

Sigma Designs has begun shipping the PageView GS, a 15-inch portrait gray-scale monitor that works with the llsi and the llci. The company said that it has begun including VLF-reducing circuitry in all its monochrome and gray-scale monitors as a standard feature (very-low-frequency electromagnetic fields are a suspected health hazard). The PageView GS has a resolution of 640 by 870 pixels, a 75Hz refresh rate, and it lists for $899.

For more information, contact Sigma Designs in Fremont, California, at 415/770-0100.

MicroNet Technology announced 45 storage devices for the Classic, LC, and llsi. The drives start at 20MB and go up to 2,022GB. The 40MB drive lists for $695, while an 80MB device lists for $995. For more information, call MicroNet in Irvine, California, at 714/837-6033.

Microtech International announced the Io-3, a 3MB RAM board for the Classic that lists for $299. The Io-1 is the same board with 1MB of RAM, upgradable to 1.5MB or to 3MB. The Io-1 lists for $179. Microtech also announced Classic-compatible versions of its Europa line of internal drives, with capacities ranging from 20.5MB to 101.1MB. List prices of the new drives range from $409 to $929. The RAM boards and drives are all currently available. For more information, contact Microtech International in East Haven, Connecticut, at 203/468-6223.

Storage Dimensions announced two 1-inch-high internal hard drives for the new Macs. The 40MB and 80MB drives have 19ms access times and will retail for $759 and $1059, respectively. Both are now shipping. For more information, contact Storage Dimensions in San Jose, California, at 408/879-0300.

MegaGraphics announced a Macintosh LC version of its two-page monochrome. Called the 4001 Rival, the 19-inch monitor lists for $1698 including the display adapter. The graphics subsystem is available in two versions; the first version runs directly from the LC slot, the second version includes an adapter with a 68882 math coprocessor and a PMMU for compatibility with System 7.0 when the new system software ships. The second version will have a slightly different name and its price was not set at press time. For more information, contact MegaGraphics in Camarillo, California, at 805/481-3799 or 800/487-6342.—T.M. (continues)
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PC Magazine, Best of 1989 Awards
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The New Mathematica

Version 2.0 of Mathematica is getting features that will make it more versatile and more useful for engineering and applied research, as well as for publishing math books and articles.

Much of the upgrade builds on Mathematica's existing strengths. "Of the 843 built-in functions in the program, 284 are new," notes Wolfram Research president Stephen Wolfram. "But besides this, we now have a very fast solver for ordinary differential equations, and our linear algebra routines can compete favorably with MatLab in speed." Wolfram claims symbolic-computation speed has been increased 10- or 20-fold, with a built-in expression compiler that automatically generates internal pseudocode from user expressions. For those who use Mathematica as their primary programming language, debugging in Mathematica 2.0 is greatly enhanced (it can trace all types of operations through a program's execution history).

in speech analysis, filter design, and many special problems in physics.

Mathematica 2.0 graphics are faster, easier to use, and more extensive, with research journal-quality basics such as borders, tick marks, insets, and labeling; for books, magazines, and presentations, the program can now plot 3-D specular (reflective) surfaces, displaying shiny baubles spinning in space.

Document handling in Mathematica notebooks has been expanded to accommodate large documents, textbook typographic conventions, and real-world color printing (for example, the program converts RGB to CMYK). Addison-Wesley is publishing Exploring Mathematics with Mathematica, a book written by Jerry Glynn and Theodore Gray and produced entirely in Mathematica (Gray designed the interface for the Macintosh version of Mathematica).

The standard version of Mathematica 2.0 for the Macintosh will list for $595 ($39 for students); a version that takes advantage of a math co-processor will go for $895. Wolfram is also writing a new edition of his companion book, which will cost $47.50 hardbound and $33.50 paperback. For more information, contact Wolfram Research in Champaign, Illinois, at 217/358-0700. —Charles Seiter

The Paper Dance

The Mac version of Mathematica 2.0 features sound input and output—you can manipulate digitized sounds mathematically or generate sounds from Mathematica's vast function set. Besides producing eerie sound effects, this facility has practical applications

Mirror Cracks the Price of 20-Inch Color

Mirror Technologies has introduced the Mirror ProView Trinitron, a low-cost 20-inch color display system for the Mac. The ProView Trinitron consists of a Sony monitor and an 8-bit graphics adapter board and comes direct from Mirror for $2997, considerably less than similar display subsystems that can carry retail prices over $5000.

The display system produces 256 colors at 1024 by 768 pixels and has a refresh rate of 74.6Hz. The adapter board comes in versions compatible with the Mac II series, the IIsi, and the SE/30. The monitor's screen has an antiglare coating that rotates incidentally.

(continues)
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MicroNet is proud to offer the fastest rewritable optical disk system available. The difference is clear with the new Canon MO. Unlike other systems it spins at 3,000 rpm, achieving sustained reads of 675 KiloBytes per second. This is greater than double the rate of other systems.

A great deal of attention has been paid to reliability. As a result the Canon MO has become a reality far in advance of its time. The subsystem has been designed to work perfectly under various operating conditions, employing a unique air flow and dust filtration system.

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light waves a quarter turn on their way to the glass surface, and another quarter turn when they reflect, with the net effect that many reflected light waves cancel themselves out.

The ProView Trinitron is bundled with VideoPaint, color painting and editing software from Oluvai. The monitor also comes with utilities that provide pop-up menus, a screen saver, and the ability to enlarge the cursor or the menu bar.

The Mirror ProView Trinitron began shipping last November. The $2997 tag on the ProView Trinitron is a firm price, since the company sells direct only and not through discounters. For more information, contact Mirror Technologies in Roseville, Minnesota, at 612/654-4500 or 800/654-5294.—T.M.

Look Ma, No Gloves

Imagine entering a computer-generated world and interacting with what you find there. This technology, often called virtual reality, is being applied in many ways. In architecture it lets clients stroll through a building months before construction begins; in war, it won't be long before helicopters fly through forests strafing the ground, controlled by pilots sitting at simulated helicopter cockpits in underground bunkers; in society, it may not be much longer before you can trade your view of the world with a friend.

Vivid Effects has developed a unique approach to virtual reality. The company's Mandala system currently runs on an Amiga stuffed with three custom video boards; a live video camera stacked on top of a big monitor puts your image right into the reality. For example, in one Mandala scene you stand in front of a rock-and-roll band (brought in from a laser disc player). Cartoon drums hang suspended next to your on-screen image, and you can hang along in time with the music. In another Mandala reality, you and a friend rack up points by knocking cartoon balls about inside a life-size pinball machine. And in still another, as you dance you see your body surrounded by colors that swirl and change with your motions. One of the nice things about Mandala is that, unlike most other virtual-reality environments, it doesn't require wearing wired gloves, a body suit, or stereoscopic goggles, leaving you free to move about, and leaving reality designers free to mix the real with the virtual.

Mandala has a full set of authoring tools for designing realities. For the Amiga, the three boards and software run $5900; run-time software and boards cost $3200. Vivid Effects is working on Macintosh software and hardware but has no definite time frame for shipping a product; the company is also considering marketing a $600 software-only system that works with standard Mac video hardware. For more information, contact Vivid Effects in Toronto, Ontario, at 416/340-9290.—D.L.

Display Board Supports TV, Compression, Acceleration

MegaGraphics will announce at the January Macworld Expo a multifunction display adapter designed to accept multiple expansion boards with a variety of added features. The NuBus board, unnamed at press time, incorporates its own proprietary bus so that high-performance functions such as real-time video capture can be executed without going through the bottleneck of the NuBus. The basic board is an 8-bit graphics adapter that users can upgrade to 24 bits with a snap-in VRAM module. The board can also accept upgrades for acceleration and JPEG-compatible image compression without expansion boards.

The first true expansion board, which MegaGraphics expects to show at the Expo, will be able to capture real-time video at 30 frames per second and 24 bits per pixel. MegaGraphics said that other companies are developing products that will work with the proprietary bus on the new board, but declined to name the companies or their planned products.

The multifunction board will be (continues)
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for printers, NTSC for U.S. television broadcasts, PAL for European TV, and so on. Kodak sees PhotoYCC as a common ground between all those other color spaces; rather than try to make an RGB device use CMYK, all devices use PhotoYCC, which is compatible with all existing standards. As a result, a color image on a Mac would match a laser printout of the same image, but also a slide of the same image, or the image displayed by an IBM PC or a Sun workstation.

Of course, converting a color's representation from one color space to another requires mathematical transforms and calculations. Kodak claims that PhotoYCC has been designed to minimize the number of computations needed to retrieve and display digitized color images.

Kodak plans by year end to publish the PhotoYCC color-interchange specification, which is also compatible with high-definition television (HDTV). So far, it has garnered support from Apple, Adobe Systems, Aldus Corporation, and Next. According to John Warnock, chairman of Adobe, Adobe will provide support for PhotoYCC in all of its PostScript Level 2 devices. IBM, Sun Microsystems, Hewlett-Packard, Autodesk, Microsoft, and Trucvision are among other manufacturers pledging support for PhotoYCC. For more information, contact Kodak at 716/724-1630.—Brita Meng

**Kodak Serves Up Color Standard**

Eastman Kodak Company has proposed a universal digital-color standard aimed at solving color inconsistency problems. Dubbed PhotoYCC, it's the first color-interchange space (a mathematical expression of color) that addresses not just the Mac but all computers, in addition to the photography, broadcasting, and printing industries. (For more information on color space, see *State of the Mac*; in this issue.)

Each of those environments utilizes a different color-interchange space: RGB for computers, CMYK for printers, NTSC for U.S. television broadcasts, PAL for European TV, and so on. Kodak sees PhotoYCC as the common ground between all those other color spaces; rather than try to make an RGB device use CMYK, all devices use PhotoYCC, which is compatible with all existing standards. As a result, a color image on a Mac would match a laser printout of the same image, but also a slide of the same image, or the image displayed by an IBM PC or a Sun workstation.

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**Curtis Trackball Adds Foot-Switch Option**

The latest in ergonomic design from Curtis Manufacturing is the MVP Mouse, a three-switch trackball that features on-screen configuration and an optional foot-switch. The on-screen configuration is set up from the Custom Control Panel, software that Curtis includes with the trackball. The software lets the user assign any one of dozens of commands to each button. It also can adjust the tracking speed and the double-click speed.

The MVP Foot Switch, which acts as a fourth button, can be used to reduce hand and wrist problems that can result from repetitive motion. The ergonomic layout of the MVP Mouse itself has the three buttons spaced around the far side of the trackball. The device also has a sloping wrist rest to reduce strain.

The Curtis MVP Mouse is available now at a suggested retail price of $149.95. The MVP Foot Switch, also available, lists for $29.95. For more information, contact Curtis Manufacturing in Jaffrey, New Hampshire, at 603/532-1125.—T.M.

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**Swiss Army Board**

MegaGraphics' multifunction board starts with 8-bit color and upgrades to 24-bit color and a video digitizer.

compatible with the entire Macintosh II line, according to MegaGraphics. It will drive MegaGraphics displays at up to 1024 by 826 resolution, or other vendors' displays at 1024 by 768. The display adapter works with monitors that measure 16 inches to 19 inches diagonally. The company expects to ship the basic board and all of the above options in the first quarter of 1991. Prices had not been set at press time. For more information, contact MegaGraphics in Camarillo, California, at 805/484-5799 or 800/487-6342.—T.M.
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They’re made by two very good companies. They both have the same great features. Yet, there’s one thing that makes NEC’s Silentwriter®2 Model 90 look better on paper than the Apple Personal LaserWriter® NT. It’s eight hundred dollars less.* Pretty amazing, when you consider how much NEC’s Silentwriter2 has going for it. Of course, it’s completely MAC compatible. It also has WYSIWYG screen fonts, 2MB of memory, the ability to do envelopes and the richest blacks you’ve ever seen. All this and it’s MS/DOS compatible and 2PPM faster, too. But most importantly, the Silentwriter comes with Adobe® PostScript®. So whether you’re printing newsletters or flyers, sales sheets or shareholders reports, you’ll have thirty-five different typefaces to help you create the most dazzling documents possible. For product literature, call 1-800-NEC-INFO. NEC’s Silentwriter2 Model 90.

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The PowerUser drive is packed full of quality components like the "state of the art" Seagate hard disk. There's a rear panel SCSI address selector switch and two 50-pin SCSI connectors.

Microtech Athena drives include two 50-pin SCSI ports for daisy-chaining. Comes with 5-year Manufacturer's warranty.

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50MB | $599 | DR1 0293
100MB | $899 | DR1 0294

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Cutting Edge drives include many features found on more expensive machines, including two rear-mounted AC sockets for single-switch power up of your whole system, and a universal power supply that allows every drive to operate on both 120 and 240 volts.

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Each drive includes the popular Disk Manager Mac software by On Track.

<table>
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<td>$745</td>
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* Roach mechanism ** Microtech Nova comes with 5-year warranty. Microtech Europa, Cutting Edge and PowerUser drives come with 1-year warranty. *** 40+ MB Removable Cartridge Drive comes with 1 cartridge. Additional cartridges available. Item availability and prices subject to change without notice.

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TO UPGRADE A 4-SOCKET MAC PLUS OR SE TO THIS AMOUNT OF MEMORY

<table>
<thead>
<tr>
<th>Memory</th>
<th>Do This (Install in multiples of two only)</th>
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<td>2 MB</td>
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</tr>
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<td>4 MB</td>
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TO UPGRADE AN 8-SOCKET MAC II, IIx, III, IIIc, or SE 30 to THIS AMOUNT OF MEMORY

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<th>Do This (Install in multiples of four only)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 MB</td>
<td>Remove all four existing 256K SIMMs, install four 1 MB SIMMs, leave remaining sockets for future expansion.</td>
</tr>
<tr>
<td>5 MB</td>
<td>Keep existing 256K SIMMs, install one 1 MB in remaining sockets.</td>
</tr>
<tr>
<td>8 MB</td>
<td>Remove all four 256K SIMMs, install eight 1 MB SIMMs.</td>
</tr>
</tbody>
</table>

The chart explains exactly what you need to achieve the desired level of performance.

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Rival Monitors
(MegaGraphics Display System)
MegaGraphics Large Screen Monitor Systems include both the interface card and the monitor. Choose monochrome, gray scale, 8 or 24-bit color. All monitors include an ergonomically designed tiltable stand. The systems operate at a high refresh rate (60 to 75 Hz) to deliver a stable, flicker-free image with a 75-dpi resolution (1024 X 825 pixels). All come with the manufacturer's one-year warranty (extended warranties available through the manufacturer at extra cost). Hardware. Starting at $1269.
MacModem 9600 V.32 (Microcom)

MacModem V.32 uses MRN Class 9 technology for superior throughput up to 38,400 bps even over noisy telephone circuits. The result is high speed, error-free data transfer for reliable cost-saving data communications. Compatible with CCITT V.32. V.22, Bell 212A and 103 modulation standards as well as the Hayes® AT command set. Includes Carbon Copy Mac Twin-Pack and Quick Link II (modem.) $689.

MacPrint 1.2

Let you print Mac documents on your HP Laserjet or Laserjet IID printer. It handles all the HP internal commands and prints the others as bitmaps. Cable included. Does not support PostScript. $95.

Metro ImageBase Electronic Clip Art

Add power to your Mac documents with fabulous art images. They make newsletters, presentations, reports and brochures communicate more effectively. Each of the 18 ImageBase packages contains at least 1000 topically-related images drawn by professional artists. $85 ea.

Managing Your Money for Macintosh 4.0

Contains all of the great tools of 3.0, but a newly designed interface makes it easier to use. For budgeting, check writing, portfolio management, net worth calculation and long term planning. Includes Checkfree electronic bill paying service. $135.

Easy Color Paint 2.0 (Creative Software)

With Easy Color Paint, you’ll be creating graphics on your Mac in no time! It puts you in control of 17 tools, 256 colors, user defined multi-colored patterns, gradient fills, multiple color palettes, resizable windows, adjustable fonts and brushes. Also, color inversion and blends, and “wacky coloring.” It has brush and lasso modes to simplify operation, rotation in 90 degree increments and PAttch windows for detailed editing. (graphics). $47.

DeltaGraph 1.5 (DeltaPoint)

Creates 25 types of charts and graphs (including seven 3D styles). Use the Data Notebook to import data (up to 10,000 points) in a spreadsheet format and DeltaGraph will create the chart you want: Embed your graph by importing EPS or PICT files. Or use the drawing tools which include Bezier curves, fill patterns (hori- zontal, vertical and radial) and full color controls. Lets you print your graphs on either QuickDraw or PostScript printers, plus plotters and film recorders. It’s the perfect solution for creating both business and scientific charts. (business). $109.
**GUARANTEE**

Many of our products come with a thirty day money back guarantee. If you are not completely satisfied. Ask for details when you place your order.

---

**Overnight Delivery Only $3.00**

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**LANGUAGES**

<table>
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**MEMORY UPGRADES/ACCELERATORS**

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**MUSIC AND SOUND**

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<td>Coda Fire 2.5</td>
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<td>Electronic Text</td>
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<tr>
<td>Deluxe Recorder</td>
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**SmartOne 2400/1200 (Best Data Products)**

When you need a 2400 baud modem, you keep your eyes on one of the two available cards, SmartOne 2400/1200 provides an economical alternative. For less than the cost of some 1200 bps units, you get a Hayes compatible modem with auto answer/originate, 300, 1200, and 2400 baud operation, pass-through phone jack, speaker with programmable volume and a manufacturer’s two-year warranty. Includes free Quicklink II communications software, modem, cable, and CompuServe/Prodigy Start-Up Kit offer. (modem) $139.

---

**QuickImage 24 Video Frame Grabber (Mass Microsystems)**

Captures 24-bit full-motion color or 8-bit gray scale images. It firsts in a single NuBus slot and automatically switches between NTSC and PAL signals. QuickImage saves images as PICT files, uses video input and output, and video features. It works with any Mac monitor and display card. (graphics) $749.

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**SECURITY & VIRUS PROTECTION**

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<td>Aladdin Systems Inc</td>
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<td>CE Software</td>
<td>$64</td>
</tr>
<tr>
<td>QuickDrive 2.9</td>
<td>$97</td>
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Maccessories SE Anti-Glare Filter (Kensington)

The Maccessories SE Anti-Glare Filter from Kensington has a ceramic coating that reduces glare up to 96 percent and improves contrast up to 20 percent. Kensington has added a protective layer to reduce the ELF and VLF electromagnetic energy passing through the SE screen. Also, a special protective coating and a ground wire dissipate static electricity, keeping dust from building up to the screen. (Accessories) $52.

Plainsoft (RSD)

Plainsoft increases workplace productivity through detailed management of time and resources. Use its intuitive user interface and powerful relational database to simultaneously manage and record activity concerning hundreds of people, events, materials and locations. Coordinate individual and group agendas, find available time slots for appointments, keep track of deadlines and priorities, distribute tasks, group tasks, prioritize tasks, and track the status within each resource, and share information between Macs and PCs over any LAN. Everything is kept confidential through multi-level password protection. (Business) $199. Office 5 pack $579. Office 10 pack $839.

LifeTree

Correct Grammar 49.
Microlytics Word Finder 2.0 34.
MicroSoft Word 4.0 245.
Preferred Publishers Vantage 1.5 52.
Tactil Magic Typist 49.
T/Maker MathNow 2.2 Special 119.
WordPerfect Corp. WordPerfect Call.

Power User™ 2400 baud Modem

Install a new Power User 2400 baud modern and log-on to CompuServe™ or any of the exciting on-line services. This new, full-featured modem comes complete with everything you need to start communicating. It's easy to install and ready to use - call or send an error checking. Only $99.

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New! Send Important documents to destination fax machines with the Mini Send Fax. Mini Send Fax combines the technologies of the Power User 2400 bps data modem and an internationally compatible 9600 bps modem. Only $149.

Circle 78 on reader service card
The question is everywhere in the Mac page-make-up world these days—on the online services, during panel discussions, and in computer stores, service bureaus, and hip downtown bars: "Which one should I buy, Aldus PageMaker 4.0 or QuarkXPress 3.0?" Between them, these programs define the standard for powerful, professional page makeup on the Mac.

So which should you buy? The last thing you want to hear me say is "it depends," so I won't. I will say, though, that in their recently upgraded forms both programs are great; designers around the world are using both to produce consummately professional publications. The programs' feature sets vary widely, however, and their working styles are quite different. The goal of this article is to detail those differences and to offer real, concrete judgments about the strengths and weaknesses of both programs so that you can decide which suits you better.

No program works in a vacuum, so I'll be mentioning other software in the course of this comparison—in particular, add-on products such as the $49.50 Aldus PrePrint separator and the various XTensions that add features to QuarkXPress. The ability to accept extensions is a significant feature in itself. Current offerings for QuarkXPress range from shareware utilities and Quark's Freebies XTension to the $79.95 QuarkXTrias package of a dozen add-ons on up to XTensions that cost several thousand dollars each.

My judgments about each program's sections and subsections, as reflected in the subheads of this article, are summarized in "Final Report Card."

BY STEVE ROTH
**WITH QUARK YOU CAN CUT AND PASTE—OR SIMPLY DRAG PAGE ELEMENTS—FROM ONE DOCUMENT TO ANOTHER. THIS IS A REVOLUTION ON THE MACINTOSH THAT BEARS WIDE IMITATION.**

**Interface**

Windows, palettes, tools, and controls

Both programs use the metaphor of a pasteboard lying under the pages, which makes it easy to create bleeds in either program. The pasteboards are implemented quite differently, however. Each page in QuarkXPress has its own pasteboard, while PageMaker pages take turns appearing on the publications single pasteboard. QuarkXPress allows you to drag items between pages, while PageMaker makes items on the pasteboard available from any page or spread.

PageMaker opens only one document at a time, so in order to move page elements between documents, you have to laboriously open, copy, close, open, and paste (though the new story filter lets you view and import whole stories or all the text from other documents).

QuarkXPress can have as many as seven documents open at once, and you can cut and paste—or simply drag page elements—from one document to another. This is a revolution on the Macintosh that bears wide imitation. You can also drag items into a QuarkXPress Library of elements—another impressive innovation, and one of QuarkXPress's best new features. You can save and open multiple Libraries, and you can drag items from the Libraries into other documents or onto other pages.

QuarkXPress also offers a Document Layout palette that makes it easy to rearrange pages, work with master pages, and move from page to page (the advantage of palettes is that they stay accessible on screen at all times, unlike dialog boxes). PageMaker offers a similar method for moving between pages, but it doesn’t enable you to rearrange page order.

QuarkXPress's remarkably useful Measurements palette makes effecting local changes in page elements easy. You just select an item and click on the palette, then tab through the shown fields, entering values as in a dialog box, but without having to go through the relatively slow process of getting to a dialog box. Even within QuarkXPress's dialog boxes, you can see changes instantly by turning on Auto-apply, which effects changes as soon as you release the mouse button or tab to the next field.

PageMaker has palettes for applying and editing global settings—colors and styles (which QuarkXPress hides in menus and dialog boxes). All local changes, however, are made via menu items, dialog boxes, and keyboard shortcuts.

**Rules and guides** PageMaker's rulers provide greater precision in magnified views. You can specify custom vertical ruler increments (15-point increments with 15-point leading, for instance), and there's a snap-to-ruler feature that you won't find in QuarkXPress.

Both programs let you drag out ruler guides, but QuarkXPress's guides have a big problem: you can't grab them if a page element is in front of them—even if you have the guides set to In Front.

**Zooming and scrolling** QuarkXPress lets you type in custom zooming percentages and configure the zoom tool for custom increments. Even better, you can drag a magnifying glass tool to select an area to fit in the window. Also, you can zoom out to see several pages at once; in PageMaker you can never see more than two pages at a time.

Even though QuarkXPress has more features than PageMaker, navigating within a page or spread can be a pain in QuarkXPress for two reasons: the Fit in Window command doesn't center the page in the window (often only a corner is visible), and there's no grabber hand for moving the page around. The omission of this little item is probably the program's biggest failing. In QuarkXPress there are "live" scroll bars (watch the page move as you move the scroll bars), but you have to mess with both the vertical and horizontal bars to move diagonally. PageMaker's ability to center the current selection when zooming to any magnification is also a big plus not available in QuarkXPress.

**Page Elements**

Lines, boxes, ovals, and polygons With QuarkXPress, all text and graphics are contained in boxes that can be simply containers, or graphic elements, or both. Picture "boxes" can also be ovals, or polygons that you can reshape—especially useful for silhouetting scanned images. When you select a box with Quark's Contents tool, the
box becomes opaque, obscuring other elements both in front of it and behind it.

In PageMaker, there are no such containers; text and graphics are independent elements. You create boxes, ovals, and lines separately, and layer them on top of or behind text blocks and imported graphics. The Quark approach lets you do more things, with fewer elements, but the PageMaker approach is simpler, especially for beginners.

**Line weights, fills, and tints** PageMaker limits you to several canned line weights and percentage tints, and you can't apply a percentage tint to lines or type, except by defining colors such as "13 percent black" (this works fine unless you're doing spot-color work). QuarkXPress lets you set line weights, fills, tints, and colors in any combination.

**Selecting, moving, and scaling** Selecting is pretty predictable in these programs, but PageMaker has one big plus: you can select items that are in back of other items by using E-click. QuarkXPress makes you do a lot of layer shuffling.

PageMaker is better for manual repositioning; you can see items as you move and scale them (Quark just shows you their bounding boxes), and you can position items using the snap-to-ruler feature mentioned above.

QuarkXPress, on the other hand, offers numerical positioning that PageMaker users only dream of. You can nudge items in increments as small as .1 point and even add to and subtract from existing specs; if the y-axis position for an item reads 8", type +2 after it (9.5+2) and the item moves down 2 inches. You can also scale graphics by percentage—a feature glaringly absent from PageMaker.

**Grouping, alignment, and distribution** PageMaker lets you group items only through a clumsy place-the-Scrapbook workaround. QuarkXPress lets you group items, and you can scale and position those items within the group. You can't scale the whole group, however. QuarkXPress also provides alignment (top, middle, bottom, left, center, right) and distribution controls (positioning several items a given distance apart), both of which PageMaker lacks.

PageMaker's Option-paste technique pastes a copy of an object directly on top of the original and also provides for easy, drag-then-do-it-again step-and-repeat duplication. QuarkXPress has an explicit step-and-repeat command that lets you specify the number of copies and their offsets—its faster but less interactive.

**Rotation and skewing** PageMaker lets you rotate only text blocks, only when they're unthreaded, and then only in 90-degree increments. QuarkXPress lets you rotate page elements in microscopic increments (you can even edit and format rotated text) and rotate and skew the contents of picture boxes.

**In-line elements and paragraph rules** Where PageMaker lets you work with in-line graphics, QuarkXPress works with in-line boxes; and those boxes can contain either text or graphics. In either case, the elements move along like any text character as text reflows.

Paragraph rules in the two programs are virtually identical in function, except that PageMaker has serious limits on line attributes in general. Each program lets you specify the position of rules (before and/or after paragraphs) relative to text baselines. PageMaker's automatic controls are nice for beginners, but QuarkXPress provides more flexibility.

**Imported graphics** You can import all the major file formats into the two programs (QuarkXPress also imports raster image file format [RIFF]—handy for ImageStudio and ColorStudio users). And QuarkXPress and PageMaker
IF A BLUE CIRCLE LIES ON TOP OF
A RED SQUARE, QUARK WILL SPREAD THE BLUE
CIRCLE SLIGHTLY—OVERPRINTING ON THE RED
SQUARE—TO PREVENT A WHITE LINE APPEARING
BETWEEN THE TWO ON PRESS.

treat cropping and scaling about the
same, except that you can specify a
percentage in Quark, and PageMaker
has a feature that automatically scales
bitmaps for best results at various
resolutions.

QuarkXPress’s image control for
bitmaps (contrast, brightness, gamma
correction, and halftone settings) is
superior to PageMaker’s, though it’s
still not much by image processing
standards.

Color Both programs
let you specify colors using
several models, print on
color printers, and create
spot-color overlays. Quark-
XPress also lets you pull
process-color (cyan, magenta, yellow, and black)
separations of everything
except color bitmaps (you
can do those as well if you
buy a program like Adobe
Photoshop or SpectreSeps
QX that creates Desktop
Color Separation files).

If you buy Aldus Pre-
Print, PageMaker gives you
full process-color capabilities,
including separations of
color bitmaps. PrePrint
requires that you print
PostScript to disk from
PageMaker, though, and
then run that file through
PrePrint. If neither you
nor your service bureau
has process-separation
software, you have no
process-separation abilities at all.

In spot-color work, again, Quark-
XPress beats PageMaker hands down.
Since you can’t specify a percentage
tint for PMS colors of type or lines in
PageMaker, there’s no way to specify,
for instance, an 80 percent tint of
PMS 276 for subheads. Can’t be done.
Nor (in the absence of PrePrint) will
PageMaker knock out the colors
underneath a spot-color EPS graphic.
QuarkXPress will.

QuarkXPress also has automatic
trapping; if a blue circle lies on top of
a red square, for instance, Quark
will spread the blue circle slightly—over-
printing on the red square—to prevent
a white line appearing between the
two on press.

Document Construction
Spreads and master pages Where Page-
Maker lets you create only 2-page
spreads, in QuarkXPress you can cre-
ate multipage spreads—for a three-
fold brochure, for instance. Quark-
XPress lets you build up to 127 mas-
ter pages (254 facing pages) per
document to serve as templates for
your document pages. So you might
have different master pages for sec-
tion openers and chapter openers in
a book. And Quark lets you change
master items on document pages;
PageMaker doesn’t. When you alter
a master page in Quark, you can choose
whether previously created document
pages should change or remain as they
were originally created.

Text flow and autowrap Both pro-
grams can flow imported text through
multiple columns and pages, adding
dates as needed. QuarkXPress lets you
specify the number of columns within
taxa box and then reflows everything
into the specified number of columns.
PageMaker, in contrast, has no text
boxes, and once you’ve flowed text
into columns, you have to manually
rework the whole thing to change the
number of columns.

QuarkXPress wraps text around
text boxes, graphics boxes, and the
graphics themselves, or you can
specify your own polygonal text-wrap
boundary. PageMaker also has po-
olygonal wraps, but the
program won’t wrap
around text blocks or do
automatic irregular wraps.

There’s one other key
difference in how the two
wrap text: QuarkXPress in-
cludes paragraph indents in
wrapped items; Page-
Maker ignores paragraph
indents when wrapping
text, so it wraps tight to
the wrap boundary. While
there are some situations
where Quark’s method is
useful, there are more
where it’s incredibly
troublesome.

Long Documents
Sections and page numbering
The only difference here is
that QuarkXPress lets you
break up documents into
sections, and each
section can have its own
distinct numbering. With
PageMaker you cannot
break a document into sections, but
you can chain multiple documents
into a book for printing and indexing
(the numbering isn’t updated between
documents automatically).

Generating tables of contents and
indexes This category is simple.
PageMaker does an excellent job of
building tables of contents and indexes
(though for indexing you still need to
think). QuarkXPress has no tools for
those jobs, but the Sonar Bookends
Time Trials
All times are in seconds.

<table>
<thead>
<tr>
<th>Time Trial</th>
<th>PageMaker</th>
<th>QuarkXPress</th>
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<tbody>
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<tr>
<td>Search</td>
<td>4</td>
<td>16</td>
</tr>
</tbody>
</table>

When it comes to speed, QuarkXPress has a clear edge over PageMaker. Quark repaints the screen faster, but what isn’t revealed here is that it repaints the screen much less frequently. PageMaker is constantly redrawing everything on the page, even when you make minor adjustments.

These tests were conducted under Finder with MasterJuggler and the LaserWriter Plus screen fonts, on a Macintosh IIx with 8MB of memory, an Apple 12-inch color monitor, and an Apple 256-color video board.

XTension ($129.95) makes these features available.

“Continued on” lines Same story here, but in reverse. QuarkXPress provides for automatically updated “continued on page xx” and “continued from page xx” lines attached to text boxes. PageMaker has no equivalent.

Source-file management PageMaker’s Links controls put it well ahead of QuarkXPress for tracking and managing all the source files and revisions (of text and graphics) that make up a publication—keeping track of what’s changed and updating as necessary. The Picture Usage XTension (included with QuarkXPress) offers similar but less-powerful features for graphics, and the CopyFlow XTension ($395) offers excellent file management features.

Text and Type

Word processing Text editing is difficult on laid-out pages because you’re always scrolling all over the place, so PageMaker provides a Story Editor command—which brings up a word processing window where text appears without formatting; changes made in the story editor appear automatically in the formatted document. QuarkXPress has no such facility. On the other hand, PageMaker needs the story editor more, since PageMaker’s screen updating is slower (and it updates more frequently).

You can perform find and change operations and check spelling only from PageMaker’s story editor. With QuarkXPress, you do everything in normal layout view; it’s nice not to jump between modes, but it gets pretty slow when you’re checking spelling or searching a heavily formatted document.

The programs’ Find and Change features (for text and/or text formatting) are almost identical, with one exception: PageMaker lets you find and change paragraph styles in addition to font, size, and type style (a very useful feature).

Spelling checks While QuarkXPress’s spelling checker is serviceable (and works better than PageMaker’s if you want to check just a single word), PageMaker’s spelling checker works better for checking whole stories or documents. When you tell the spelling checker to ignore a word it doesn’t recognize, PageMaker remembers and doesn’t flag that word on any subsequent spelling checks during that session. QuarkXPress’s auxiliary dictionary is a text file that you can edit with a word processor—for example, you could copy your word processor’s dictionary right into XPress’s auxiliary dictionary. Not so for PageMaker.

PageMaker uses the same dictionary for both spelling and hyphenation. When you add a word to the dictionary during a spelling check, PageMaker even suggests ranked hyphenation points (and lets you enter your own) and then hyphenates the word according to those points from then on.

Type attributes and leading You can specify type size in an acceptably large range of sizes in both programs, but QuarkXPress has an edge in type size and leading increments—.001 point compared with PageMaker’s .1 point—important when fitting display type to an exact width. Quark offers a superior leading method—baseline-to-baseline—though PageMaker’s proportional leading is equally effective once you get used to it.

Kerning and tracking Beyond the automatic kerning that has become de rigueur for page-makeup programs, both programs offer tracking—automatic spacing adjustments for different fonts at different sizes—and manual
PAGE MAKER OFFERS SUPERIOR TOOLS FOR WORKING WITH LEADING-GRID-BASED DESIGNS. ITS CUSTOM VERTICAL RULERS AND ALIGN TO GRID FEATURE ARE MUCH MORE FLEXIBLE THAN QUARKXPRESS’S LOCK TO BASELINE GRID FEATURE.

kerning. PageMaker’s kerning increments are a little bit coarse at .01 cm, while Quark’s are infinitesimally ( .005 cm). Also, QuarkXPress includes kerning and tracking table editors; with PageMaker you need to buy third-party programs (Edco’s $99 LertTuck and PMTracker, for instance). PageMaker provides prebuilt tracking tables, however, for the PostScript fonts that come with a LaserWriter NT. With Quark you have to build your own.

Baseline shifts, superscripts, subscripts, and drop caps Both programs let you control the size and position of superscripts and subscripts. PageMaker lets you control this on a character-by-character basis, while QuarkXPress’s controls apply instead to a whole document. Quark also lets you control both horizontal and vertical scaling, however, even for small caps and superior characters (PageMaker has no superior type style).

In addition, QuarkXPress has an explicit baseline shift control for moving characters up and down. With PageMaker you have to fiddle with the superscript and subscript settings for selected characters.

QuarkXPress’s automatic drop cap function is one of the greatest hoons to desktop publishers ever invented. While you can now create initial caps that flow with the text in PageMaker (using the superscript and subscript controls), Quark’s function—designed specifically for drop caps—far outclasses that workaround.

Hyphenation and justification PageMaker and QuarkXPress have very similar justification parameters, but the two programs vary significantly in hyphenation approaches. PageMaker has a large ranked-hyphenation dictionary (with each word break ranked for how good a break point it is) in addition to a hyphenation algorithm. Quark offers only an algorithmic hyphenation, with a small dictionary of exceptions to which you can add. PageMaker’s hyphenation is significantly better as a result.

QuarkXPress lets you save and reuse hyphenation and justification parameters and incorporate them in styles, and the program can restrict itself to suggesting hyphenation points if you prefer manual hyphenation. PageMaker can highlight loose and tight lines (those it can’t justify within your word-spacing and letterspacing parameters) so you can fix them manually (one of the Xtras XTensions will search for loose and tight lines, which is somewhat less useful).

Keeps and breaks Both programs let you prevent a paragraph from breaking across a page, as well as let you keep a paragraph together with ensuing paragraphs (to keep subheads with following text, for instance).

Leading grids, vertical alignment, and justification PageMaker offers superior tools for working with leading-grid-based designs (where vertical measurements are based on body-copy leading). Its custom vertical rulers (with the Snap to Ruler option) and Align to Grid feature are much more flexible than QuarkXPress’s Lock to Baseline Grid feature.

On the other hand, QuarkXPress will align text at the top, middle, or bottom of a text box, or justify it vertically, inserting space between lines and paragraphs to fill the box. PageMaker, which doesn’t use the text-in-a-box metaphor, offers no similar feature.

Tabs PageMaker and QuarkXPress are about equal in their tab-handling powers, with a couple of exceptions. PageMaker lets you change an existing tab stop by selecting it and typing in a new position, leader character, and/or alignment. Quark’s Apply button (and auto-apply) makes it easier to see results immediately and set tabs interactively.

Table Editor, a separate program bundled with PageMaker, lets you build spreadsheet-style tables with multiple lines of text within each table cell. It’s weak typographically, however, so it’s not very useful for high-quality work, and it only saves tables in PICT format, so you can’t edit them on the page.

Special characters Both programs offer the basic complement of special characters (line breaks, en and em dashes, thin spaces, and so on), but QuarkXPress lets you make any of those characters either breaking or nonbreaking. 
QuarkXPress's Indent to Here character causes the rest of the paragraph to indent to the location of that character. You can make special characters visible in Quark; the same is true in PageMaker, but only in story view.

Style sheets Styles operate similarly in QuarkXPress and PageMaker, basically following the Microsoft Word model. PageMaker offers more control over the interaction of styles and local formatting, however, and its Styles palette makes editing and applying styles easier. In Quark you can assign keyboard shortcuts for applying styles. If you can remember the shortcuts, Quark is faster than PageMaker; otherwise Quark is slower because you have to go through a hierarchical menu. There's no way to merge two styles in Quark. If you have paragraphs tagged “normal” and “body copy” and you want them all tagged “body copy” (a common scenario if you use Word), there's no way to do it.

QuarkXPress's biggest problem with styles, though, is that you can't see what style is applied to a paragraph without going to a hierarchical menu (no, it's not on the Measurements palette). In PageMaker the current paragraph's style is visible in the Styles palette; in Story view each paragraph's style is called out to the left of the paragraph.

Text filters Both programs offer good import and export filters for Mac word processors. PageMaker offers filters for IBM PC and compatible word processors (and an RTF—rich text format—filter, useful for power users of Microsoft products), while QuarkXPress offers a wonderfully robust embedded-text tagging and coding language that lets you specify just about any of its formatting controls via embedded text commands—great for database publishing and highly automated production publishing. PageMaker's Smart ASCII filter pales by comparison.

Stability and Support

Stability QuarkXPress has a history of multiple maintenance upgrades following major releases, and version 3.0 is following in that tradition. A patch came out within a month of 3.0's release (and another is imminent as of this writing), but the program is still much less tolerant of diverse systems than PageMaker is. Some users report no problems, while others have ongoing and serious difficulties. PageMaker is quite solid by comparison, and stands out especially for not losing work when the system does crash (largely due to its mini-save feature, which saves changes whenever you turn pages).

Manuals and help from perfect, PageMaker's manuals are better than QuarkXPress's, which are prone to heavy worded statements of the obvious, such as, "To specify whether you want to print to photographic paper or clear film in the imagesetter, click either Paper or Film in the Paper Type area."

PageMaker's online help also exceeds QuarkXPress's menu item and palette descriptions, with topics like "Converting 3.0 documents" and "Long documents in PageMaker."

Tech support The quality of support is difficult to quantify, but Aldus has a much better reputation than Quark in this area as well. Quark is in the difficult position of having a user base that is growing rapidly; but whatever the reason, QuarkXPress users report endless ringing and busy signals. Aldus also has better policies.

Colors and Traps Not only can you build libraries of colors in QuarkXPress for both process- and spot-color separations, you can also specify that any two colors should trap, or overlap, where they meet. Typing a negative number in the Trap field results in a choke—the surrounding color encroaching on the surrounded.
## FINAL REPORT CARD

For each boldface subhead below (Rulers and Guides, for instance) the author has assigned an overall grade that reflects the program's performance as a whole in this area. The subheads underneath detail the key differences that distinguish one application from the other. If both programs have a feature, and it works equally well in each, it is not covered.

Grades were awarded on the following scale:  
- **A** Yes, or offers everything available in either program. Feature is well implemented.
- **B** Very usable, but missing some features, or features are not well implemented.  
- **C** Still usable, but missing important features, or features are badly implemented.  
- **D** Barely usable, glaring absence of features, or terrible implementation.  
- **F** No, or feature is missing from applications.

### INTERFACE

<table>
<thead>
<tr>
<th>PM</th>
<th>QX</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Windows, palettes, tools, and controls</strong></td>
<td>C</td>
<td>A</td>
</tr>
<tr>
<td><strong>Number of open documents</strong></td>
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<td>7</td>
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<tr>
<td><strong>View multiple spreads</strong></td>
<td>F</td>
<td>A</td>
</tr>
<tr>
<td><strong>Drag items between documents</strong></td>
<td>F</td>
<td>A</td>
</tr>
<tr>
<td><strong>Color and style palettes</strong></td>
<td>A</td>
<td>F^*</td>
</tr>
<tr>
<td><strong>Document layout palette</strong></td>
<td>F</td>
<td>A</td>
</tr>
<tr>
<td><strong>Libraries</strong></td>
<td>F</td>
<td>A</td>
</tr>
<tr>
<td><strong>Measurements palette</strong></td>
<td>F</td>
<td>A</td>
</tr>
<tr>
<td><strong>Magnify tool</strong></td>
<td>F</td>
<td>A</td>
</tr>
<tr>
<td><strong>Change and save tool settings</strong></td>
<td>C</td>
<td>A</td>
</tr>
<tr>
<td><strong>Rulers and guides</strong></td>
<td>A</td>
<td>C</td>
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<td><strong>Snap-to-ruler increments</strong></td>
<td>A</td>
<td>F</td>
</tr>
<tr>
<td><strong>Custom points per inch</strong></td>
<td>F</td>
<td>A</td>
</tr>
<tr>
<td><strong>Ruler guides</strong></td>
<td>A</td>
<td>C</td>
</tr>
<tr>
<td><strong>Zooming and scrolling</strong></td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td><strong>Grabber hand</strong></td>
<td>A</td>
<td>F</td>
</tr>
<tr>
<td><strong>Fit in Window command centers page</strong></td>
<td>A</td>
<td>F</td>
</tr>
<tr>
<td><strong>Custom zoom</strong></td>
<td>F</td>
<td>A</td>
</tr>
<tr>
<td><strong>(percentages and increments)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Zoom to marquee-dragged area</strong></td>
<td>F</td>
<td>A</td>
</tr>
<tr>
<td><strong>Center selection when zooming</strong></td>
<td>A</td>
<td>F</td>
</tr>
<tr>
<td><strong>Thumbail views</strong></td>
<td>F</td>
<td>A</td>
</tr>
<tr>
<td><strong>Continuous redraw while scrolling</strong></td>
<td>F</td>
<td>A</td>
</tr>
<tr>
<td><strong>Scroll between spreads</strong></td>
<td>F</td>
<td>A</td>
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### PAGE ELEMENTS

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<thead>
<tr>
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<tbody>
<tr>
<td><strong>Lines, boxes, ovals, and polygons</strong></td>
<td>C</td>
<td>A</td>
</tr>
<tr>
<td><strong>Oval and polygonal graphic boxes</strong></td>
<td>F</td>
<td>A</td>
</tr>
<tr>
<td><strong>Arrowhead lines</strong></td>
<td>F</td>
<td>A</td>
</tr>
<tr>
<td><strong>Set radius for rounded corners</strong></td>
<td>B</td>
<td>A</td>
</tr>
<tr>
<td><strong>Line weights, fills, and tints</strong></td>
<td>C</td>
<td>A</td>
</tr>
<tr>
<td><strong>Custom line weights and percentage fills</strong></td>
<td>F</td>
<td>A</td>
</tr>
<tr>
<td><strong>Assign different color/fill to line and fill</strong></td>
<td>F</td>
<td>A</td>
</tr>
<tr>
<td><strong>Apply percentage of spot color to type and lines</strong></td>
<td>F</td>
<td>A</td>
</tr>
<tr>
<td><strong>Custom borders</strong></td>
<td>F</td>
<td>A</td>
</tr>
<tr>
<td><strong>Selecting, moving, and scaling</strong></td>
<td>B</td>
<td>B</td>
</tr>
</tbody>
</table>

---

1. Can import formatted stories from other documents.  
2. Styles palette available via an XExtension.  
3. Available via an XExtension.  
5. Available via Xtras XExtension.

### TEXT AND TYPE

<table>
<thead>
<tr>
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<tbody>
<tr>
<td><strong>Word processing</strong></td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td><strong>Story editor</strong></td>
<td>A</td>
<td>F</td>
</tr>
<tr>
<td><strong>Find, change, and spelling-check in layout view</strong></td>
<td>F</td>
<td>A</td>
</tr>
<tr>
<td><strong>Find and change paragraph styles</strong></td>
<td>A</td>
<td>F</td>
</tr>
<tr>
<td><strong>Spelling-check</strong></td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td><strong>User dictionaries editable as text</strong></td>
<td>F</td>
<td>A</td>
</tr>
<tr>
<td><strong>Same dictionary for spelling and hyphenation</strong></td>
<td>A</td>
<td>F</td>
</tr>
<tr>
<td><strong>Type attributes and leading</strong></td>
<td>B</td>
<td>A</td>
</tr>
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</tr>
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<td><strong>Type-size increments (in points)</strong></td>
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<td>.001</td>
</tr>
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<td><strong>Number of type styles</strong></td>
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<td><strong>Horizontal-scaling range (in percent)</strong></td>
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<td>.001</td>
</tr>
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<td><strong>Leading increments (in points)</strong></td>
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<td>.001</td>
</tr>
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<td><strong>Leading methods overall</strong></td>
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<td>A</td>
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<tr>
<td><strong>Kerning and tracking</strong></td>
<td>C</td>
<td>A</td>
</tr>
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<td><strong>Kerning and tracking increments (ems)</strong></td>
<td>.01</td>
<td>.005</td>
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<tr>
<td><strong>Kerning and tracking editors</strong></td>
<td>F^*</td>
<td>A</td>
</tr>
<tr>
<td><strong>Baseline shifts, superscripts, subscripts, and drop caps</strong></td>
<td>C</td>
<td>B</td>
</tr>
</tbody>
</table>

---

1. F-keys and numeric keypad only.  
2. Available with support contract.  
3. Closed Friday 3 to 4.  
4. From first call.

### DOCUMENT CONSTRUCTION

<table>
<thead>
<tr>
<th>PM</th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Spreads and master pages</strong></td>
<td>C</td>
<td>A</td>
</tr>
<tr>
<td><strong>Accommodates spreads more than 2 pages</strong></td>
<td>F</td>
<td>A</td>
</tr>
<tr>
<td><strong>Number of master pages per document</strong></td>
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</tr>
<tr>
<td><strong>Allows changes to master items on document pages</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Maximum page size (in inches)</strong></td>
<td>17 x 22</td>
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</tr>
<tr>
<td><strong>Text flow and autowrap</strong></td>
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<td>A</td>
</tr>
<tr>
<td><strong>Multicolumn text boxes</strong></td>
<td>F</td>
<td>A</td>
</tr>
<tr>
<td><strong>Automatic irregular wraps</strong></td>
<td>F</td>
<td>A</td>
</tr>
<tr>
<td><strong>Paragraph indents and text wrap</strong></td>
<td>A</td>
<td>C</td>
</tr>
<tr>
<td><strong>Long documents</strong></td>
<td>A</td>
<td>C</td>
</tr>
<tr>
<td><strong>Sections and page numbering</strong></td>
<td>B</td>
<td>A</td>
</tr>
<tr>
<td><strong>Generating tables of contents and indexes</strong></td>
<td>A</td>
<td>F^*</td>
</tr>
<tr>
<td><strong>“Continued on” lines</strong></td>
<td>F</td>
<td>A</td>
</tr>
<tr>
<td><strong>Source-file management</strong></td>
<td>A</td>
<td>C^*</td>
</tr>
</tbody>
</table>
Product upgrades from Aldus include some expert tech support (Quark's do not), and additional tech support is available for only $89 per year, compared to QuarkXPress's $195 annual fee. That $89 includes a toll-free number, another $60 buys you priority service and other free or discounted support.

Which to Buy

QuarkXPress is clearly the overall feature leader. Its numeric positioning, rotation, skewing, oval and polygonal picture boxes, color capabilities, libraries, grouping, alignment (and a dozen other features in Quark's Freebies XTension alone) make QuarkXPress the power program for Mac page makeup. It's a great program for complex designs, and absolutely the top choice for color production.

On the other hand, despite some glaring holes, PageMaker is smoother and simply feels better to use. Its grabber hand, custom vertical ruler, Snap-to-Rulers command, "6"-click to select through layers, easy-to-grab ruler guides, zooming conventions, stand-alone (boxless) text and graphics, and ability to show objects while they're moving all add up to a wonderful environment for navigating around a document. PageMaker appeals to those who like to design on screen, adjusting everything visually and using the mouse. It may be an easier program to learn. And PageMaker's well-implemented style controls and table-of-contents and index generation make it the leader for long documents.

The other considerations besides features—stability and support—also favor PageMaker. How many problems and frustrating phone calls does it take to cancel out a program's great feature list?

(For those who care, a Windows version of PageMaker 4 should be shipping by the time you read this. A Windows version of QuarkXPress has been announced for shipment sometime in 1991.)

So what's the verdict? I hear about a lot of PageMaker users moving to QuarkXPress these days, but I don't often hear of anyone making the opposite move. The users who switch express a reluctance to leave PageMaker's comfortable embrace and Aldus's reliable support, but they're lured by QuarkXPress's speed, feature list, and well-honed interface. In the near future, we can expect XTensions to continue to fill out QuarkXPress's capabilities. If version 2 is an example, problems with version 3.0 will eventually be worked out. And we can only hope that as Quark's revenues grow, tech support will improve. When all that comes to pass, the choice between these two contenders—currently a difficult one—will be easy.

See Where to Buy for contact information.

Steve Roth is a coauthor of Real World PageMaker 4.0 (Bantam Computer Books) and editor of The QuarkXPress Book (Peachpit Press).
AN ASSORTMENT OF PROGRAMS THAT MAKE MANAGING AN
APPLETALK NETWORK EASIER

Managing Networks

As any person in charge of an AppleTalk network
knows, managing a network is a multifaceted job.
One minute you're monitoring network traffic to
see where bottlenecks are. The next minute
you're trying to determine why a printer has
suddenly disappeared from the network. Then there are the larger, everyday issues such as tracking
what version of system software each Mac is running.

With the variety of tasks that constitute network management, no single AppleTalk-
management program exists that does it all. There are, however, a number of programs and
devices that, when combined, are invaluable aids to people who administrate networks. You
could even say that no network manager should be without them.

Network-management tools basically fall into six groups. The International Standards
Organization (ISO) defines five categories in an attempt to standardize the functions of
network management. They are fault management, performance management, configuration
management, security management, and accounting management. Another field of network
management, what I call facilities management, concerns the users attached to the network,
not the network itself (which the ISO categories cover).

Most of the available AppleTalk network tools address fault, performance, and facilities
management. But options for the other three areas can be limited and may require a little
improvisation on your part.

Finding Fault

Fault management means dealing with abnormal events on a network. You never know when
something might go wrong, but it's an occurrence you should always be ready for. Like the Boy
Scouts, the motto of all network managers is Be Prepared.

Take the simple problem of loose cable connections, a common reason why a computer on
the network can't find a laser printer or a server anymore. You can inspect the cables, but that's
difficult—if not impossible—to do when wires are hidden behind walls, in ceilings, or even

BY DAVE KOSIUR
Managing a LAN

This urban transportation layout represents various aspects of managing a local area network that combines LocalTalk, Ethernet, and token ring networks. The automobiles that run on roads represent AppleTalk packets on LocalTalk networks; the trains on train tracks represent AppleTalk packets on faster Ethernet and token ring networks. The ramps that let autos piggyback onto railroad cars are routers. The service station represents a multiport repeater, such as a StarController.

In situation A, a Mac responds to a polling

underground between buildings. A better solution would be to use a program like Apple's InterPoll, Farallon Computing's NetAtlas or PhoneNet CheckNet, or AIS's NetMap to see what devices are visible—and thus what devices are not visible—on the network.

InterPoll, NetAtlas, PhoneNet CheckNet, and NetMap are all examples of network pollers (see "Managing a LAN"). InterPoll and NetAtlas enable you to send a series of "echo packets" to a specific device to check the integrity of the cable. The packets are called echo packets because the device being checked should respond and return the same packet contents to the sending device. If that doesn't happen, you know there's a problem with that device's network connection.

On the other hand, rather than sending echo packets to each specific device, PhoneNet CheckNet and NetMap request that every device on the network identify itself. PhoneNet CheckNet and NetMap then list all visible device names.

NetAtlas provides graphical maps of the network. These maps are very useful as references when things go bad on a network (see "Mapping Things Out"). NetAtlas even lets you compare a new map to an old one on screen to see the changes, a convenient feature that makes it easier to find a device that disappears from a network.

A breed of fault-management tools, called traffic monitors, is aimed at solving another common network problem: device malfunctions. Sometimes one device—a printer or router, for example—goes bad and starts flooding the network with junk signals. That can slow network performance drastically, even to the point of preventing other devices from communi-
cating over the network at all. (For more information on routers, see “Networking for the Novice,” Macworld, December 1990.)

Unlike pollers, which actively check for devices on the network, traffic monitors “listen” to the network, a process that enables them to receive all packets sent on the network. Traffic monitors can then display live histograms of network traffic. In addition, because they usually retain information on the source and destination of each packet, traffic monitors can generate cumulative counts of packets, broken down by source or destination. By using traffic monitors to watch the network, you can determine how normal—or abnormal, as the case may be—traffic patterns are. In some cases, you can even pinpoint the device that’s causing a slowdown because it’s transmitting so much more than usual.

Farallon’s TrafficWatch II, which can measure the number of both LocalTalk and EtherTalk packets sent between nodes on a network, is currently the only true traffic monitor available to AppleTalk network managers. TrafficWatch II displays traffic data in real time and includes Microsoft Excel macros for turning saved traffic data into graphs to show where traffic is heaviest (see “Traffic Cop”).

But other network-management programs can also act as traffic monitors, even though that’s not their primary function. For example, Avant Garde Group’s EtherPeek and Neon Software’s NetMinder Ethernet both can serve as traffic monitors for Ethernet networks. EDI Communications’ MacToken can monitor traffic on token ring networks. (More about these programs shortly.)

**Analyzing Packets**

If a traffic monitor reveals that no device is clogging the network, you need to turn to a packet analyzer. A router might be transmitting improper routing tables or broadcasting nonsense packets on the network, overwhelming legitimate traffic. Like a traffic monitor, a packet analyzer passively (some might say promiscuously) listens to all the traffic on the network. In contrast with a traffic monitor, a packet analyzer provides much greater information about packets. Not only can you count packets with a packet analyzer, you can also capture those packets for in-depth analysis (see “Managing a LAN”).

By capturing and analyzing packets on the network, you can determine if any packets are erroneous. If, for example, a router is sending an incorrect routing table over and over again due to a hardware failure, comparing routing tables from a healthy router with those from a sick router can tell you what is wrong. (If you are comfortable doing this on a regular basis, you are definitely a network guru.)

The first packet analyzers, Novell’s LANalyzer Network Analyzer and Network General’s Sniffer, are available as stand-alone units using portable PCs or as software that can be run on any MS-DOS computer. Both the LANalyzer and the Sniffer can capture and store Ethernet and AppleTalk packets in addition to packets generated by Transmission Control Protocol/Internet Protocol (TCP/IP), Arnet, and Xerox Network Service (XNS) protocols.

But the LANalyzer and the Sniffer are expensive, ranging in price from $9980 to $20,000, and they don’t run
Mapping Things Out The network maps created by Farallon's NetAtlas can be as detailed as you like (as in this example), showing node numbers, device names, zone names, and computer models. You can reduce the map's size to show, for example, just the symbols and names of each machine.

Traffic Cop Bar graphs are one of the simplest ways to monitor network traffic for peaks or lulls. TrafficWatch II from Farallon Computing displays live histograms of traffic percentages for each device on the network. In addition, Traffic Watch II does double duty as a poller by showing a list of devices on the network.

on Macs (even though they can analyze Mac networks). A reasonable alternative is to use Mac software, such as Etherpeek or NetMinder Ethernet, which offer similar capabilities to—though not all the facilities of—the LANalyzer and the Sniffer. Instead of a PC, Etherpeek and NetMinder Ethernet employ either an SE/30 or a NuBus Ethernet board to monitor the network. This means, of course, that you must have an Ethernet network for the programs to be of any use.

Etherpeek and NetMinder Ethernet are similar to TrafficWatch II in that they can collect traffic data, but Etherpeek and NetMinder do so only on Ethernet networks. Either program lets you display packet contents in an easy-to-use manner. You can use filters to select only those packets corresponding to specific protocols and destinations. Graphs can display traffic according to the source or destination nodes or according to protocol type—AppleTalk or TCP/IP, for example (see “Analysis without a Couch”).

If you manage Macs on a token ring network, EDI Communications’ MacToken is the packet analyzer for you. MacToken uses the Apple TokenTalk NB board in a Mac II as the interface to a token ring network. In addition to graphically displaying network traffic data such as packet size and ring utilization, MacToken can also display a logical map of the network and a network event log that can be color-coded for selected events.

If you want to analyze packets on a LocalTalk network, you currently have one option. Watch is a free program written by two engineers from Cayman Systems. It can display and analyze packets from both LocalTalk and Ethernet networks; it also includes some rudimentary graphs of packet counts and traffic. Although Watch is updated from time to time—the program and updates are available on Internet and AppleTalk—Cayman does not offer technical support for it.

There are two new LocalTalk analyzers that should be available soon. The Avante Garde Group has announced LocalPeek, a program that provides the same packet analyzer and traffic monitor functions that Etherpeek does. Similarly, Neon Software is going to offer a LocalTalk version of NetMinder Ethernet, dubbed NetMinder LocalTalk, which captures, analyzes, and decodes all AppleTalk protocols running on LocalTalk networks.

Managing Configurations
As networks get larger, they inevitably include more network devices: repeaters, routers, gateways, and so on. Without proper tools, maintaining such devices can be a manager's nightmare.

One solution is to use proprietary vendor software to manage everything. It's limiting, of course, because you then must buy every router, gateway, and so forth from just one manufacturer.

The advantage is that you can usually configure a device (assign zone names and network numbers for routing) and collect basic statistics on the device's operation (number of packets in, number of packets out) in one fell swoop with one piece of software. Most of the software currently available in this category ships with the hardware.

Examples of such software include Shiva Corporation's Internet Manager and Network Resources Corporation's (NRC) MultiGate Manager. They recognize, configure, and control all Shiva and NRC internet products, respectively. MultiGate Manager is particularly interesting because it interfaces with an Oracle database to make data integration and report generation easier. Farallon's StarCommand software and Nuvotech's TurboStar software are designed to configure and control their respective star controllers; StarCommand works with both LocalTalk and Ethernet star controllers.

Other tools that you can use to maintain device configurations and names are Farallon's Timbuktu and Timbuktu/Remote. If you have all your diagnostic and control programs on the Mac in your office, you can use Timbuktu to run those programs from any other computer on the network. Timbuktu/Remote, meanwhile, enables you to check things from home. The Timbuktu solution is convenient, but it's not completely foolproof. If you can't connect to the Mac in your office, you won't be able to do anything for the network.

Feeling Secure
Security is another important aspect of managing a network, especially if you store confidential information on a file server. Luckily, routers such as those from Shiva, Solana Electronics, and Farallon now include an option
to make the network zones that they define available to everyone or only to users in selected zones. This capability prevents users in one department from using the file printer in another department, for example.

If you permit remote access of the network by modem, there are two different levels of access control you can opt for. The most basic is password security: a user who dials into the network must provide the correct password to connect. Shiva’s NetModems and NetSerial both offer password options, as does Solana’s R-Serve and C-Server.

If a simple password scheme isn’t secure enough for your purposes, you can use what’s called dial-back, or callback, control. With callback, the user calls the device and tells it his or her name. Then the device breaks the connection. It then looks for that name on its list of permitted callers, and calls the user back at the phone number it has listed for that user.

Farallon’s PhoneNet Liaison, a software router, is the only program that offers callback control for dial-in network access. Liaison can also log all calls made into the network, as well as let you control the zones a dial-in user can access.

**Network Accounting**

Accounting management doesn’t mean keeping CPAs in line. Nor does it mean adding up the costs of cabling and workstations. Instead, accounting management lets you track who uses which network resources—laser printers, modem lines, and so on—and how often. Accounting-management software provides usage logs that let you charge back to the proper departments the cost of maintaining those devices. Or you can use the logs to prove that the network needs either expanding or upgrading.

Unfortunately, there’s little available in the way of Macintosh-based accounting-management tools. AppleShare’s own administration program produces very little usage information about its server volumes; you can use it, however, to generate a space-usage report. Electronic-mail programs—QuickMail, InBox, MS Mail—also can provide reports on disk usage for storing messages. If you use a program to spool documents to a laser printer, you may be able to get a usage log from that program. For example, the AppleShare Print Server maintains a print log that you can save as a text file for reviewing and charge-back.

Although they are not specifically designed for network use, Casady & Greene’s A.M.E. and SoftView’s MacIntUse can help you with accounting management. Both programs monitor file use on AppleShare and TOPS servers. And you can use either A.M.E. or MacIntUse to keep a log detailing which applications have been launched and when.

But if you really need accounting management, you may have to resort to a PC-based solution. One elegant implementation for printers is PServe from Cooperative Print Solutions. PServe acts as a print spooler for multiple printers and maintains detailed logs for each printer. To use PServe as the spooler, the PC it runs on requires an AppleTalk adapter board. PServe can even generate charge reports for each type of print job. As for file servers, PC-based servers such as 3Com’s 3+ and Novell’s Netware offer extensive facilities for account management.

**Facilities Management**

Even if a network is running smoothly, its network manager can still have headaches. There’s always the problem of distributing product upgrades and system software, and that’s where facilities-management tools take over.

The first facilities-management utility was actually Apple’s InterPoll. In addition to checking the integrity of a network connection, InterPoll—if the Responder INIT is installed on each Mac—can identify each Mac and show you the versions of system software and LaserWriter drivers in use. InterPoll is capable of working across zones and can be used on LocalTalk, EtherTalk, and TokenTalk networks.

But that capability is pretty rudimentary. Knowing the versions of the System, Finder, LaserWriter, and LaserWriter Prep files just isn’t enough information to solve other conflicts that can occur on a workstation or over the network.

Enter the new heroes in network management. They bear the names ENTERPRISE-WIDE MANAGEMENT

With Macs increasingly becoming a part of large corporate networks—commonly referred to as enterprise-wide networks—it’s become vital for Macs to fit in with how those types of networks are managed. Currently, there are three protocols, or frameworks, for managing such large, multi-vendor networks: IBM’s NetView, Digital Equipment Corporation’s Enterprise Management Architecture (EMA), and the Standard Network Management Protocol (SNMP).

Of the three, only SNMP which runs over TCP/IP networks, can recognize Macs and AppleTalk routers. One reason for this is SNMP’s extensibility. Any vendor can add management information to SNMP packets for its devices. That’s allowed companies like Cayman Systems, Shiva, and Network Resources Corporation to add SNMP-compatible information to their IP routers.

But SNMP’s extensibility is also one of its problems. If SNMP-management programs from other vendors can’t recognize that added information, it’s lost on the network. The device can’t be seen, much less managed, by the management program.

In July, Apple announced that as part of its ongoing joint development effort with DEC, Apple would support EMA by creating an AppleTalk tool for DEC’s DECnet management station. That software, currently under development, would allow network administrators to manage, control, and configure both DECnet and AppleTalk environments with one set of network-management tools.

None of IBM’s NetView systems or add-ons recognize the Macintosh as a manageable entity, nor do they recognize AppleTalk networks. Does that surprise you?
NetControl, StatusMac, Network SuperVisor, NetUpdater, Administrator's Aid, and Aperture Network & Resource Manager. They just may let you sleep more peacefully every night by giving you a better handle on Macintosh hardware and software configurations. ICATT's Administrator's Aid lets you send messages that can be displayed on Macintoshes at start-up. For example, one message could remind users to update a file; another could tell users to delete outdated files. In addition, Administrator's Aid lets you automatically copy or delete files from a workstation's System Folder. (Obviously, this capability requires careful and judicious use on the part of a network manager.) Administrator's Aid actions can be set so that they affect individuals, groups, zones, or everyone.

International Business Software's NetControl, Pharos Technologies' StatusMac, and Network SuperVisor from CSG Technologies use either an E-mail form or a small, easily transportable application to collect a fairly extensive profile of each workstation.

How extensive? Well, you can see which INITs are loaded, the amount of RAM cache used, the versions of applications used, what hardware and NuBus boards are in the machine, and so on. It's important to point out that none of these programs can peek at, see, or otherwise collect information contained in personal files on individual Macs.

No wonder, then, that a database is needed to keep track of all this information. StatusMac and NetControl use a built-in database, while SuperVisor is based on 4th Dimension, giving it added flexibility in generating reports and statistics (see "Finding the Users").

The success of these programs depends on the active participation of each user on the network. (Individual users are usually responsible for running the profiler that collects information.) Users should be aware that if they fail to send in a profile to the network manager, they risk not getting an update to a needed software program.

Merely being able to collect system data to look for conflicts isn't enough. You want to be able to correct those conflicts over the network, if possible. For instance, you may want to send a new version of the LaserWriter Prep file to certain users. MDG Computer Services' NetUpdater is designed with this kind of network management in mind. It allows you to define scripts for certain actions, such as "update QuickMail address books" or "replace Compactor 1.0 with Compactor 1.2." You can then apply these scripts to selected Macs on the network.

Aperture Technologies' Aperture Network & Resource Manager, meanwhile, offers some unique network-
management capabilities. Based on graphical database technology, the program allows you to maintain databases for information as diverse as floor plans, site plans, users, equipment, wiring closets, and organizational charts. Then, you can tie floor plans with equipment information, tie site plans with user information, and generate reports. By keeping all this information in one central location, Aperture Network & Resource Manager relieves headaches for network managers.

**Managing to Manage**

With such a broad slate of network-management tools, what should you use? Since no one program will meet all your needs, it's up to you to create your own network-management toolbox.

Many network-management functions, such as checking traffic and searching for missing devices, are best handled by Farallon's PhoneNet Manager's Pack. The PhoneNet Manager's Pack was obviously designed with these problems in mind, since it includes such necessities as PhoneNet CheckNet, TrafficWatch II, and NetAtlas. This package should cover many problems in both LocalTalk and EtherTalk networks.

If you're using an Ethernet network that has other protocols running on it besides EtherTalk (TCP/IP or DECnet, for example), and you don't yet have an analysis tool for the network, either EtherPeek or NetMinder Ethernet will serve you well. EtherPeek displays more data graphically, but NetMinder offers some calculations, such as bandwidth utilization, that are useful. Although its interface and functionality aren't as developed as those of either EtherPeek or NetMinder Ethernet, Watch is good for checking packets on both Ethernet and LocalTalk networks. If you're running on token ring, there's only one choice: MacToken.

For those who have to manage software distributions and updates, NetUpdater is the most versatile package, since it not only obtains information on the software being used but also facilitates networkwide updates. If you are not worried about the update procedure, I suggest using Network SuperVisor, partly because it can tie facilities information to drawings of the physical locations of the Macintoshes.

Whether it involves software updates, troubleshooting, or system security, managing a network is almost always a challenge. You can easily resist the temptation to throw your hands in the air by putting network-management tools to use and by adapting other programs to network management. Finding the right combination of programs can be a struggle, but the long-term dividends make the effort well worthwhile.

See Where to Buy for contact information.

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Producer and recording artist Jeff Lorber recently used a Mac Iicx and Sound Tools to edit M. C. Hammer's "We Pray" album. "Sound Tools enabled me to do edits on my current projects that would be virtually impossible with traditional razor-blade technology," he notes.
Digital Audio at Last

digital sound was one of the Macintosh's earliest distinguishing characteristics. Pioneering Mac aficionados quickly customized their computing environments with stock recordings that played at start-up, shutdown, or on command. Third-party products such as MacRecorder, Studio Session, and Jam Session enabled users to incorporate recorded sounds into HyperCard, SuperCard, and MacroMind Director documents.

This was fine if you were satisfied with 8-bit sound recorded at a 22kHz sampling rate. Those in need of affordable compact disc-quality sound had to wait. Until now. Finally, low-cost software and hardware products offer direct-to-hard-disk 16-bit recording and playback sampled at 44.1kHz. And it all works with the point-and-click ease Mac users have come to expect.

**The Hardware: Digital Audio Boards**

Digidesign's Sound Accelerator NuBus board kicked off the desktop audio revolution. It provides CD-quality stereo audio playback, direct from a hard disk, at -10dBm to +4dBm levels. The frequency response is from 20Hz to 20kHz with a signal-to-noise ratio of greater than 90dB.

The Sound Accelerator board doesn't ship with software for direct-to-hard-disk recording. It does, however, include Digidesign's SoftSynth SA software, a real-time additive and FM-synthesis program, and two utilities—MIDI Preview allows you to play sound files from a MIDI keyboard, and Sound Installer inserts special synth resources into compatible programs or even the Macintosh System file itself. These resources allow the Sound Accelerator to play back both 8-bit and 16-bit, mono and stereo sounds. The synth resources greatly enhance the playback of 8-bit samples and add support of chunky sound files, which play back at 8 bits through the Macintosh speaker or at 16 bits through the Sound Accelerator.

Digidesign's newer Audiomedia board is in many ways already a second-generation digital audio board. It differs from the Sound Accelerator by offering four-track playback. This new board also lets you apply multiple EQ and DSP effects in real time. The two main features missing from the Audiomedia board are of interest only to pros: synchronization to external SMPTE (Society of

**BY CHRISTOPHER YAVELOW**
Motion Picture and Television Engineers) Time Code and digital input and output.

The Audiomedia board ships with its own software for recording, editing, processing, and playing back digital audio directly from disk. Two powerful HyperCard stacks provide XCMDs to add digital audio to your own stacks. As is the fashion, Digidesign's Sound Access stack does all the work for you, creating buttons that play specified sounds, installing required resources, and even copying the buttons to the stack you choose.

**Analog and Digital Input and Output**

To record sound with the Sound Accelerator, you need one or more of Digidesign's hardware sound-input peripherals. The less expensive Analog Interface box connects with the Sound Accelerator via an RS-422 cable that provides left, right, or stereo input from -10dBu to +8dBu. The high-priced Pro I/O box features balanced +4dBu XLR connectors and Apogee anti-aliasing filters.

The Rolls-Royce of input devices for the Sound Accelerator is the DAT I/O Digital Interface. This permits transfers of sound data to and from the Mac without leaving the digital domain. The two most popular formats—SD, PDIF, and AES/EBU—are both supported. A digital audio tape (DAT) deck is required. If you mix down directly to a DAT, your music needn’t ever pass through the analog domain till it reaches consumers’ ears.

**What’s DAT?**

Digital audio tape decks are becoming the standard for professional music recording, and lower prices have brought them into the consumer market. Many digital audio decks record at the 44.1kHz sampling frequency used by compact discs, and when digital audio tapes are copied to one another in the digital domain, there is no signal degradation. Because DAT is a standard (the manufacturers learned their lessons with Beta and VHS VCRs), tapes play identically on any DAT machine regardless of the tape type, noise reduction, or bias settings. Digital audio tape looks like a miniature VHS tape and often carries a warranty guaranteeing that it will “perform to your satisfaction for your lifetime.”

The main problem with DAT so far is that DAT recording is too perfect. In fact, with a CD player capable of outputting digital data and a DAT recorder capable of recording digital data, it is possible to rip off an exact copy of the data that was used to master the CD. Record and CD companies are worried that DAT recorders will cut into their profits. Because of lobbying by music industry groups last year, Congress put a temporary halt on consumer DAT imports.

Consumer DAT recorders are now approved for import, and CDs have a copy inhibit bit in their subcodes that limits digital recording of the data (note: this does not prevent analog recording by a DAT or any other machine). With the copy-inhibit scheme, you can make one digital copy of a CD or DAT, presumably for use in your car. Fortunately, for those of us who want to make multiple copies of our own music on digital audio tape, professional DAT recorders provide a variety of options to defeat copy inhibit schemes.

**Random Access Audio**

Besides the advantages of CD-quality playback and recording, direct-to-hard-disk recording provides virtually instantaneous access to any sound or portion thereof on a hard drive. The power of this system will be clear to
changing chel locations of poincers on one track in rim e with respect a hard drive, it is usually nondestructive—the original recording remains unchanged.

Software Advances

Digidesign’s Sound Designer II software, used in conjunction with the Sound Accelerator board and Analog Interface box, completes the Sound Tools package. In earlier incarnations, Sound Designer (and most Sound Accelera\-tor–compatible software) was marketed as editing software for digital sampling keyboards. Many of those features are still present.

Digidesign and Passport Designs also market sound-editing software for the Sound Accelerator and Audiomedia boards. Besides Sound Designer II, Digidesign also ships a scaled-down version of the same program with the Audiomedia board. Passport also offers two packages: Alchemy and Sound Apprentice. The main thing missing from the Passport programs is the ability to record directly via either of the boards. With the Audiomedia board, this is not a problem because it ships with recording software.

The two Digidesign and two Passport programs all provide a complete set of basic features for editing, processing, and playing back sound from a hard drive (see “Converting Sound Bytes into Sentences with Alchemy”). That’s where the similarity ends. The bells and whistles are so different that it would be wise to consider owning programs from both companies.

All four programs compute fast Fourier transforms (FFTs) that analyze a sound’s harmonic spectrum. These graphs show the frequencies of the sine waves that make up the sound and how their amplitudes change over time. The Digidesign packages render this analysis in dazzling 3-D, but these graphs are not editable. Alchemy’s two-dimensional FFT doesn’t show frequency transformation over time—your time reference is the selection’s duration—but you can edit the level of each frequency (see “Two- and Three-Dimensional Sound”).

Alchemy offers powerful options for editing amplitude and frequency envelopes, options that are missing entirely from Sound Designer. But Digidesign’s Passport options have no counterpart in the Passport products. An unlimited number of playlists may be associated with a sound file. A playlist defines the order of playback for specified sound regions as well as the transitions between those regions. And with random access audio, you can designate any portion of a sound file as a region and have it appear anywhere, any number of times, on a playlist (see “They’re Playing Our Song”). Both companies offer parametric EQ, but Digidesign offers digital 7-band stereo or 14-band mono graphic EQ.

Finally, while Passport allows you to mix the Clipboard into a selected region of a single sound file, Digide-
## DIGITAL AUDIO FEATURES

<table>
<thead>
<tr>
<th>Feature</th>
<th>Alchemy</th>
<th>Audiomedia</th>
<th>Deck</th>
<th>Sound Apprentice</th>
<th>Sound Designer II</th>
<th>StudioVision</th>
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### SYSTEM CHARACTERISTICS

- **File formats**
  - Sound Designer (16-bit mono)/V (16-bit stereo)
  - AIF (16-bit multichannel/MTC)
  - and resource (8-bit/16-bit Chunk/SoundLab)

### RECORDING (DIRECT TO HARD DISK)

- **Number of tracks**
  - /number of main tracks: 7/7
  - Number of sample rates/ranges: 96/8 to 24/11
  - Record during audio or MIDI playback: NA
  - Loop record/sound on sound: NA
  - Punch in and out: with pre-roll and/or post-roll
  - SMPTE (MTC) toggle/SPY/MIDI clock: NA/NA

### PLAYBACK

- Preview sound before opening: NA
- Sync P3 to SMPTE (via MTC/SPY/AI/DAI Clock): NA
- Simultaneous MIDI playback: NA
- Playlist/save playlist as sound file: NA
- Digital bounce tracks: NA

### DISPLAY

- Sound info in Open file dialog/open multiple files: NA
- Duration Display: NA
  - HMs/Min: NA
  - Feet and frames: 16mm and 35mm
  - SMPTE 24 to 24 drop/30 non-drop: NA
  - Sample number (dec and HEX): NA
  - Overview (stereo L & R/L & R composite): NA
- FFTs: NA
  - 3-D or 2-D/h vs or h vs
    - /configurable: 3-D/10.5K/1.0 / * / no
  - Cut, copy, paste, mix mix, and out-point editing: NA

### EDITING

- Selection endpoints ("auto-zero")/smooth: NA
- Cut/copy/insert/overlay point: NA/NA
- Clear/center (clean up)/extract (trim)/strip silence: NA
- Reverse/move/move separate/scrub: NA
- Mix (number of files or Clipboard only): NA
- Envelope editing (amplitude/frequency): NA
- Normalize/remove hum/noise Gate: NA
- Fade in/out/cut/crossfade: NA
- Change gain (by percentage): NA
- Sample rate conversion (resampling) limits: NA
- Parametric EQ/4-band graphic EQ: NA
- Time compression and/or expansion: NA
- Pitch shift with preserve duration: NA

* Dependent upon external sampler.

- = fully implemented; \( \text{or} \) = partially implemented; \( \text{or} \) = not implemented
Apple’s MIDI Manager Ties It Together

A) The triangular connectors to the right of the modem and printer port icons indicate input and output connectors. The presence of the clock icon means that timing information may be passed along.

B) Vision supports input and output for both printer and modem ports with two sets of 16 MIDI channels (32 MIDI channels in all).

C) Deck’s icon has one MIDI input connector and four MIDI output connectors. The icon is selected and all associated connections are highlighted.

D) The MacProteus board has one set of MIDI-input and -output connectors.

E) Digidesign provides front-panel controls for the MacProteus board, which can control more than one board with two sets of input and output connectors.

F) Opcode’s MIDIplay stack permits MIDI output only.

G) Passport’s Sound Exciter is a virtual software synthesizer supporting timing and a single MIDI input connector.

Apple’s MIDI Manager—a piece of system software consisting of an INIT, a driver, and a desk accessory—permits true MIDI multitasking in MultiFinder. The heart of the MIDI Manager is the PatchBay DA where MIDI Manager-compatible programs and boards automatically appear as icons complete with inputs and outputs ready to plug in to one another by merely dragging. Severing a connection is accomplished by holding the mouse button down until the cursor becomes a knife, and using the knife to cut the desired connection. Double-clicking on an icon in PatchBay typically brings up that program's control panel. Collections of connections such as the one above may be saved as patches and reloaded.

In this illustration, Deck is recording MIDI data coming in from the Mac’s modem port. Along with previously recorded MIDI data, the MIDI data is then passed to the MacProteus board and Sound Exciter. MacProteus’s software “front panel” is wired up to the MacProteus board and is connected to the Mac’s printer port to control an external Proteus board. Vision is set up to receive MIDI data from, and send it to, either of the Mac’s serial ports and to send data from its modem port to Deck and from its printer port to the MacProteus. In addition to being routed to Vision, MIDI data coming in from the Mac’s printer port is passed to the Sound Exciter, as are an additional 16 channels controlled by Deck. Opcode’s MIDIplay stack is set up to output its data from the Macintosh’s printer port. During this whole process, Deck is playing back three digital audio tracks and recording a fourth audio track, all at CD quality.
playing eight notes at a time. Like the MacProteus, Sound Exciter relies on Apple’s MIDI Manager. Consequently, you can play Sound Exciter or MacProteus from a MIDI keyboard or patch directly to it from most software. What’s really amazing is that nobody ever thought of doing this before.

**Combine MIDI and Digital Audio**

MIDI does not deal with any real sound data, only the events that trigger sounds, and digital audio only deals with sound data, not MIDI event triggers. If you are beginning to wonder whether these breakthroughs will divide the Macintosh music community into two camps, digital audio versus MIDI, don’t worry: the software bridging the gap between these two worlds is already here.

Unlike the products mentioned earlier in this article, Digidesign’s Deck software provides for four tracks of digital audio along with 32 channels of MIDI data. The program resembles a portable four-track tape recorder, and if you have ever operated a cassette deck you may not need to read the manual. Deck is optimized for the Audiomedia board, although most of the program’s functionality is available with the Sound Accelerator board (see “Virtual Four-Track”).

Deck’s separate EQ and DSP effects modules for each track mean that EQ plus one of four other effects can be applied to tracks individually. Deck supports time-honored recording studio practices like punching in and out, loop recording, and sound on sound, as well as unlimited digital track bouncing with no generation loss or signal degradation. Bouncing tracks refers to mixing down a group of tracks to a single track in order to free up their space for recording new material. With analog tape, this technique results in greater distortion with each bounce. Interestingly, when bouncing tracks with Deck you don’t need to set aside an open track to bounce down to. Thus, all four tracks can be bounced down to a single track, or to two tracks for stereo, as if Deck were a six-track recorder.

Deck’s controls and faders may be mapped onto any MIDI controller or moved with the mouse. In either case, fader movements for volume, pan, EQ, and effects can be recorded for an automated mix down. This automation can be edited, and you can watch the faders move themselves on screen during playback.

Besides recording and playing back 32 channels of MIDI data together with digital audio, you can import and export data freely with any MIDI sequencer supporting the standard MIDI file format (nearly all do). However, if you want full-blown MIDI sequencer editing with digital audio tracks too, look at Opcode Systems’ new StudioVision.

Opcode’s revolutionary MIDI sequencer, StudioVision, is a Macintosh musician’s dream come true (see “Vision of the Future”). With StudioVision, you can record up to 16 stereo digital audio tracks, although you can play back only two at once. StudioVision lacks the DSP features of dedicated hard disk recording programs.
but it does support cutting, copying, and pasting of digital audio; MIDI-controllable volume and stereo pan faders; and merging of up to 16 tracks into a single track. It can intelligently separate a digital audio track into its component elements and quantize (apply rhythmic autocorrection) audio events to MIDI note events.

Although you can import regions and playlists from Sound Designer and Audioslave, you hardly need to in StudioVision because you can achieve the same effect by Option-dragging a selection to copy it, just as you would in a graphics program. Like playlists, these copies of regions do not increase the size of the file. If you define a selection in StudioVision, there is a single menu command that transfers you to Sound Designer II with the new region selected.

Opcode is adding features to StudioVision daily, and this has not gone unnoticed by the competition. Mark of the Unicorn recently announced the imminent arrival of its entry into this market: Digital Performer.

**Bring It All into Multimedia**

You do not have to be a professional musician to use any of these tools. Anyone creating multimedia can greatly enhance their endeavors with any of the tools described in this article. Most of the current multimedia platforms are compatible with both digital audio and MIDI. HyperCard and SuperCard have the ability to drive simultaneous playback of audio and video. MacroMind Director can play interactive movies scored with either 16-bit stereo or resources or disk-based sound files. The RAM overhead in the case of the Audiomedia board is a mere 50K. With Opcode’s MIDIplay, Passport’s HyperMusic, or EarLevel Engineering’s HyperMIDI 2.0, you can enhance the MIDI aspects of these programs.

The fact that you don’t read a note of music and can’t carry a tune doesn’t matter anymore, either, because there is a whole industry of clip music mushrooming around us for just this situation. Clip music—available as MIDI data, sound files on CD-ROM, or CD recordings—is one way to avoid licensing fees for copyrighted tunes (see "Sorry, No Free Samples").

**Sound Predictions**

Desktop CD-quality audio is revolutionizing both multimedia and the music industries. Although these board are not even a year old, many of the self-running presentations at the two most recent Macworld Expos were based on Audiomedia or Sound Accelerator boards, and some were even using the MacProteus board.

It’s really not hard to see where this is all leading—to the full integration of sample-editing and MIDI-sequencing software. We will surely see an increase in the number of tracks just as we did in the evolution of analog tape recording. Additional presentation tools will soon provide for audio—programs like Aldus Persuasion, Symantec’s More 3.0, CA-Cricket Presenters, and Microsoft PowerPoint—it’s only a matter of time. Farallon, for instance, is reportedly on the verge of announcing a significant software release that will work with 8- or 16-bit sound. Now musicians can appreciate what graphic artists went through as 32-bit color became reality. You wake up every morning wondering if this is going to be the day when it all comes together.

See Where to Buy for contact information.

Christopher Yavelow is an award-winning computer-assisted composer based in Hollywood. IDG Books will release Yavelow’s* Macintosh Music and Sound Bible in early 1991.
Color Printers are better than ever. Here’s a look at this year’s group.

Color Printers Here and Now

When Macworld looked at color printers last February, we found many things to like, but we found a few less-lovable traits as well. Color printer technology and the color printer market are both changing fast (we revised the prices in the features table four times in a single month). Prices are down, quality is up, and software problems are slowly dissolving. The range of color printers is still very wide; at one end you can get a low-cost (close to $1400) ink-jet printer that does a clean job of printing color text and simple graphics, while at the high end you can find a professional color-graphics printer that produces glorious, page-size, photo-realistic images, merely for the price of a roomful of Mac Iicxs.

Many of these printers came to our cozy Mac world from harsher, colder, bluer environments, and their lack of software and interface manners may be taken occasionally for hostility. A promising sign is the prevalence of PostScript-based printers. Tolstoy remarked that all happy families are alike, but every unhappy family is unhappy in its own way. The Macworld Lab staff observed that all PostScript printers were easy to use and gave consistently good results, while every non-PostScript printer had problems with output in at least one application. This observation (about the printers, not the families) is particularly encouraging because one might thus legitimately hope that System 7.0 and TrueType will provide a scheme whereby these printers might be judged by their intrinsic capabilities rather than by the frequent deficiencies of their driver software (see “Systematic Printing”). Perhaps by mid-1991 Apple will have solved the driver problem for printer developers, or at least created a simpler problem.

The printers that Macworld Lab tested were chosen according to a simple criterion: they were commercially available rather than just announced in late 1990. We found that the printers have many traits in common. I’ll point out the appropriate applications for each type of printer based on output and suggest what changes you will see this year.

Liquid, Solid, Gas

At room temperature there are only three states of matter, and all of them can be employed to bring color to the page. An ink-jet printer is mechanically the simplest, consisting only of liquid ink reservoirs and a piezoelectric nozzle for propelling microdroplets of this ink. In principle, the ink-jet printer could overlay these droplets to produce stunningly shaded colors. In real life, the ink has to be dense enough for vivid pure tones—overlaid drops would produce only mud. Color gradations in inkjets are therefore represented by halftones or dither patterns, in which shades consist of closely spaced checkerboards of dots. Ink-jet vendors, keenly aware that picture quality depends strongly on their choice of dithering pattern, try to be flexible: the driver for the Sharp JX 730 includes 11 different dither patterns from which to choose.

BY CHARLES SEITER
The Best of the Bunch  If you don't think that color printers can produce nearly photo-realistic images, then take a look at a print from Kodak's XL 7700 dye-sublimation printer. But dye-sublimation printers don't currently support PostScript, text is very jagged, and the cost per page is high.

A Well-Rounded Solution  On the other hand, thermal wax-transfer printers support PostScript, produce excellent text, and are cheaper per page to use. But the images (such as this one printed on the OceiColor), while good enough for presentations and proofing, just aren't as alluring as those from a dye-sublimation printer.

Thermal wax-transfer printers use melted dots of solid, colored wax to create an image. The colored wax is transferred from thin sheets of cyan, magenta, yellow, and black wax film to paper, producing rich, enamel-like colored surfaces. To print continuously varying tones, thermal wax-transfer printers must use dithered halftone schemes. Thermal printers have two advantages over ink-jets, however. First, the Macworld Lab resolution test patterns show that when printing images with tight spacing, the thermal printer's semisolid dots are easier to control than are liquid ink dots. Second, the thermal printer mechanisms are expensive enough to warrant inclusion of PostScript. In the cases where a printer uses a custom halftoning algorithm rather than the default PostScript algorithm, the resulting photograph-like images are lovely. The Seiko ColorPoint PS provides an outstanding example of how well custom halftoning can work.

Dye-sublimation printers use colored translucent dye that can be mixed on the same pixel to create a different color, and thus deliver more photo-realistic images than either ink-jet or thermal wax-transfer printers do. As part of your general education, you should know that sublimation means the direct conversion of a solid to a gas (without a melted liquid state in between—dry ice evaporating is nearly the only common example) and is an ancient bit of alchemical terminology in modern science; to medieval researchers, a substance would "sublime" if it passed directly into ethereal form. Down in the mundane world of printers, a heating element releases as vapor little bits of dye from a dye sheet; this vapor reacts with specially coated paper. Since the colors are as transparent as cellophane, 300-dots-per-inch (dpi) resolution means 300 different little specks of nicely tuned color in a linear inch, rather than larger, lower-resolution chunks of dithered or halftoned colors. And these colors are indeed sublime; there's no comparing them with the colors from other types of printers (see "The Best of the Bunch" and "A Well-Rounded Solution").

Think Ink
All ink-jet printers share some characteristics. They're inexpensive enough that you won't get PostScript, so the vendor has to provide fonts for smooth text printing. The liquid ink these printers use provides a duller-finished printed surface and less-brilliant color when it dries than do thermal wax-transfer printers. For business presentations, this ostensible liability can become an asset: when projected, overhead transparencies of bar charts printed with more translucent inks can be more pleasing than those printed with denser, darker waxes.
The least expensive ink-jet printer is the HP PaintJet Color Graphics Printer from Hewlett-Packard, with a retail price of $1395 and a street price approaching $1050. As the timing results indicate (see "How Quickly Can They Print?"), the HP PaintJet is not a printer for the Macintosh user in a hurry (for best results on transparencies, it calls for two passes), but driven at its highest resolution, and with the outline fonts provided by Hewlett-Packard, there’s simply no complaining about this device as a low-cost business-graphics engine. Its big brother, the $2995 HP PaintWriter XL, is much faster, more capable (it can handle 32-bit Color QuickDraw), and accepts more paper sizes. According to Macworld Lab test results, there are strong family similarities between the two printers’ color ranges and in their use of odd, MacPaint-like dot-and-cross fill patterns to represent continuous gray scale (see “Almost Smooth”). Hewlett-Packard gets high marks for its exemplary documentation and complete packaging on both of these printers.

In contrast to the complete Hewlett-Packard packages, the Sharp JX 730 uses Computer Associates’ Cricket Expression QuickDraw driver and either of two third-party parallel interface boards. Because so many pieces of the JX 730’s setup are derived from third parties, you must spend considerably more time reading manuals and fiddling with hardware than you do when setting up the Hewlett-Packard printers. But the JX 730 prints clean text and provides enough choices of dither patterns to allow a good ink-jet attempt at continuous-tone reproduction.

Tektronix’s ColorQuick Ink-Jet Printer produced the most photo-realistic output among ink-jet printers, thanks to Tektronix’s diligent efforts at matching printed output to screen colors and at developing a custom halftone scheme. (The Sharp JX 730 and the ColorQuick use the same Sharp engine.) The ColorQuick’s colors are bright (and Tektronix offers software for calibrating them), and the gradations are smooth. The printer handles 24-bit color images without difficulty, and for an ink-jet, at least, it’s quick (it uses the SCSI port instead of the parallel interface used by the Sharp or the standard Apple serial printer port used by the HP PaintJet). With both the JX 730 and the ColorQuick, ink handling provided some unpleasantness in the Macworld Lab—the reservoirs splashed a bit on setup and the jets clogged at first—but these problems diminish with routine use.

**SYSTEMATIC PRINTING**

Many of the printers have software deficiencies that System 7.0 promises to fix. QuickDraw-based printers, for example, produce unusually jaggy type for presentation overheads—unless the vendor provides custom fonts (the Hewlett-Packard solution) or unless you install Adobe Type Manager. With System 7.0’s promised TrueType outline fonts, QuickDraw printers will be able to produce text at the printer’s best resolution—assuming the printer vendors write drivers conforming to Apple’s TrueType specifications. Although Apple may leave the details of color presentation (dither patterns, for example) up to the vendors, it is possible that Apple may define how 8- and 24-bit color should be represented.

These definitions may be modeled on PostScript, which is currently undergoing color-standard refinement. The standard angles at which halftone screens are printed in PostScript are derived from the printing industry’s higher-resolution practice, and they work acceptably on commercial-grade systems. But these angles produce odd results in lower-resolution thermal wax-transfer printers. Different vendors take different ways around this problem. Océ Graphics’ software includes a PostScript file to reset the default angles; this produces superior results on the Océ printer but is less suitable for color offset printing and isn’t Pantone certified. Tektronix and Seiko use drivers that replace PostScript half-toning entirely. While the details are not yet settled, System 7.0 is likely to require printer-driver dialog boxes in which variations from a standard scheme can be set directly from a uniform set of buttons. Right now in this every-vendor-for-itsel f world, printouts often don’t show the printers’ optimal ability.
The HP PaintWriter XL (top) does an admirable job, especially considering its price. The NEC Colormate PS (middle) handles gradients even better although not nearly as smoothly as the Seiko ColorPoint PS (bottom). The Seiko uses a custom dither pattern, while the NEC uses the standard PostScript dither pattern.

Use. Test-pattern output with the ColorQuick was sometimes eccentric, showing odd variations in our 10 percent to 90 percent tone-density test (colors printed at 40 percent were clearly darker than those printed at 50 percent), but the transparency and picture output rivaled that of much more expensive thermal wax-transfer units.

Stacks of Wax

With a little fine-tuning, any one of the thermal wax-transfer printers tested could produce brilliant output. The resolution (usually 300 dpi) is excellent, and the colors are solid and bright (almost overwhelming on primaries). But at this stage of evolution most of these printers could stand a last few bits of polish.

At these prices ($5695 to $15,995) you might rightly expect a PostScript interpreter in the printer. Five of the thermal wax-transfer printers (those from Oce Graphics, QMS, Seiko, Tektronix, and NEC) use PostScript or are PostScript-compatible, and thus produce generally similar results when printing images with sharp boundaries or text. The printers that use standard PostScript—the OceColor, NEC Colormate PS, and QMS ColorScript 100—produce output that shows a mild case of banding (see “Almost Smooth”) and a severe case of doliies, an unkind reference to the little polygonal patterns that result when a color picture is printed with the PostScript default 6-by-6-dot halftone cell. (At press time, QMS sent us new software that includes additional, custom PostScript screen angles. QMS claims this will eliminate the doliies.)

For reference, in conventional color printing, four colored grids of dots (one each for cyan, magenta, yellow, and black) are set at slightly different angles in order to prevent moiré patterns from cropping up when a printer misregisters the layers. This scheme works best at the high resolution (well beyond 300 dpi) of commercial color printers. The 6-by-6 PostScript dither blocks, on the other hand, give an effective resolution of 50 blocks per inch instead of the 300-dpi these printers are capable of printing.

In a bad case of doliies, a color picture looks as if it's being printed with small mud-colored doughnuts (see “Patterns in the Printouts”). Some vendors avoid the doliies by bypassing PostScript for a custom halftone algorithm optimized for the printer engine's ultimate capabilities; after all, if the printer can produce 500 tight color dots per inch, optimized driver software should produce near-photographic-quality prints. Both the Tektronix Phaser PX and the Seiko ColorPoint PS include custom halftoning that makes these printers' images stand out from the crowd (see “Patterns in the Printouts”). The Phaser output shown is particularly remarkable.
THE NEW CHALLENGERS

State-of-the-art may soon be challenged by Iris Graphics' 3000 series of continuous-color ink-jet printers and Metrum Information Storage's Colorado Color Imaging Recorder high-speed dry-silver color-process printer.

Of the printers, the 3000 series has the most potential appeal to Mac users. The 3000 series printers (which use a custom, software-based PostScript interpreter) are expensive by Mac market standards (a shade under $50,000), but they provide an effective resolution of 1800 dpi—hence the name continuous color. Plus, you get a large-format print engine that has been tested and accepted for years in the color printing industry. Iris, a division of graphics-industry heavyweight Scitex, estimates per-page cost at only 46 cents. A less expensive, medium-format printer in the same series, called SmartJet, is also being readied.

The Colorado is an advanced printer capable of photographic-quality printing. It uses special silver-based paper and was originally developed for high-end markets such as medical diagnostics. The Colorado will cost approximately $10,500, and will be able to produce an A-size print in 30 seconds thanks to its SCSI interface. The quality and per-print cost (about $1.50) is comparable to that of a dye-sublimation printer. And since the Colorado is driven directly from screen RGB data, printed colors look like the colors on your screen.

for its clarity because the printer refused to perform at 300 dpi on our Adobe Photoshop match print, so the image was printed at 72 dpi. (Tektronix claims that when Photoshop sends a file to the printer, it expects a small buffer such as the one in a typical laser printer. Instead, it finds the Phaser PX's large, 1.5MB buffer, which slows down the printer's response time to an application's print request. The result is a "cannot communicate with printer" error message.) This glitch in the Phaser PX was the only serious anomaly we uncovered in testing thermal wax-transfer printers.

Tektronix and QMS are both trying to make their products acceptable to traditional color printing shops by calibrating printer output to the Pantone Matching System (PMS). Tektronix commissioned Pantone to create a custom color-lookup table for the Phaser series and relies on application software vendors to implement the table. QMS's large-format (11 by 17 inches) ColorScript 100 Model 30i uses direct Pantone certification: If you use a Pantone-licensed application (such as Adobe Illustrator, Aldus FreeHand and PageMaker, QuarkXPress, and a growing list of others), QMS guarantees color correspondence between the Model 30i's printed images and the final color-separated CMYK job as it comes back from a commercial printer. Printers from Seiko and Océ can generate Pantone test patterns from number codes; this trend will likely make Pantone certification mandatory for large-format printers serving the graphic arts market.

Some thermal wax-transfer printer manufacturers have deliberately held off including PostScript until Apple finalizes the specifications for its TrueType font technology. We tested two QuickDraw-based thermal wax-transfer printers—the G370-10 thermal color printer from Mitsubishi Electronics America (EA) and the CHC-445 from Mitsubishi International—that are similar to each other and distinct from the PostScript bunch (note: Mitsubishi EA and Mitsubishi International are two separate companies with confusingly similar names). QuickDraw does a pretty fair job of continuous-tone shading, but large-size text looks simply terrible unless you install Adobe Type Manager. With ATM, text clears up wonderfully, at last resembling the output you have a right to demand from units that cost more than a LaserWriter. Both products are slow compared to the other thermal wax-transfer printers, and both have software quirks that need to be fixed. The CHC-445, for example, cheerfully announces in a dialog box that it is printing a MacDraw II document, no matter what software created the document in question. The G370-10 allows you to invoke a quad-spiral dithering scheme (seen also with printers from Shinko), which produces better continuous tones than QuickDraw does.

Color to Dye For

In dye-sublimation printers, the theme of "brilliant print engine, unfinished Mac interface" reaches a thundering conclusion. Both the Mitsubishi EA S340 and the Kodak XL 7700 produce striking photographic color images; in the case of the higher-resolution Kodak XL 7700, it is unlikely that this magazine's commercial printing technology can accurately reproduce the luminous, almost three-dimensional quality of these images (see "The Best of the Bunch"). The transparencies look even better, if that's possible. Most non-graphics-spe-
Printed Colors

Color Gamut

This color gamut chart shows the range of printable colors from some selected printers: an ink-jet, a thermal wax-transfer printer, and a dye-sublimation printer. The range of a perfect color printer would extend over the whole chart.

Saturation

This bar chart shows saturation values for cyan, magenta, and yellow output. The higher the saturation, the richer the colors. Macworld Lab used a Minolta spectrophotometer to measure saturation.
Now You See Them

Thermal wax transfer

If you were to magnify the images printed on a thermal wax-transfer color printer 50 times, this is what you’d see. Thermal wax-transfer printers produce colors by laying down angled grids of cyan, yellow, magenta, and black dots. These grids are called halftone screens. Some color printers use standard PostScript angles, which can produce circular patterns; other color printers include custom angles for smoother results.

Now You Don’t

Dye sublimation

Dye-sublimation printers don’t use halftone screens. Instead, these printers actually mix varying percentages of cyan, magenta, yellow, and black ink to produce a specific color. The resulting image looks much like a photograph—there are no patterns or visible dots of color. On the downside, the special paper and ink required for these printers are quite expensive—a single print can cost nearly $5.

How Quickly Can They Print?

PostScript Printers

All times are in seconds

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<thead>
<tr>
<th>Printer</th>
<th>Second</th>
<th>First</th>
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</thead>
<tbody>
<tr>
<td>QMS ColorScript 100 Model 10</td>
<td>92/152</td>
<td>118/208</td>
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<td>NEC Colormate PS</td>
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<tr>
<td>Tektronix Phaser PX</td>
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<tr>
<td>QMS ColorScript 100 Model 30i</td>
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<td>121/191</td>
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<tr>
<td>Seiko ColorPoint PS</td>
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Presentation Graphic

We printed a typical business-oriented bar chart from Aldus Persuasion. All the printers were fairly quick to print the first copy of the chart, but slowed when printing the second copy. Kodak’s XL 7700 could not complete this test since its driver works only with Adobe Photoshop.

QuickDraw Graphic

Next we printed two copies of a QuickDraw image created in Adobe Photoshop. Overall, the PostScript printers performed best, although three QuickDraw printers—the Mitsubishi Electronics America S340, the Tektronix ColorQuick, and the HP PaintWriter XL—ran as fast as the speedy PostScript QMS ColorScript printer.

PostScript Graphic

Finally, we printed two copies of a complex PostScript graphic from Aldus FreeHand. Print times increased dramatically over those for QuickDraw images. (We didn’t time the QuickDraw printers since printing PostScript images yields unpredictable results.) The Seiko ColorPoint PS could not print the image using the Better printing option—Seiko fixed the problem, but not in time for us to print timing results.

QuickDraw Printers

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<thead>
<tr>
<th>Printer</th>
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<td>Tektronix ColorQuick Jet Printer</td>
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<td>HP PaintWriter XL</td>
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<td>Mitsubishi International CNC 445</td>
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<td>Mitsubishi G370-10</td>
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<td>Sharp Ink Jet Color Image Printer</td>
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Kodak XL 7700: Could not complete
COLOR PRINTERS COMPARED

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¹ QMS just introduced a lower-cost ($12,995) version of the Model 30 called the Model 30i. The Model 30i’s PostScript controller is contained inside the unit, making it cheaper to manufacture. ² Price does not include parallel interface board and software driver. ³ ¹ = tractor feed.

Patterns in the Printouts: The QMS ColorScript 100 is one of several printers that use standard PostScript halftones. Upon close inspection, images printed with these halftones often appear to have been stamped with lots of small doughnuts, making the overall image muddy or washed out (left). Tektronix’s Phaser PX uses a custom dither pattern to avoid the doughnuts and produce better output (top right). Seiko’s ColorPoint PS also uses a custom dither pattern. We liked this one best of all—it produced the most detail in a very monotone, light-colored image (bottom right).
saturation and hue values directly (and save them to a configuration file) and to choose a Size to Fit option to accommodate paper up to 11 by 11 inches. You must use the Size to Fit option with Photoshop; otherwise the Kodak XL 7700 prints brilliant images the size of a large postage stamp.

Kodak realizes that more interface work is needed to make this magnificent device a convenient Mac tool. At this writing, a proper Chooser-level driver is promised for January, with PostScript Level 2 (continuous-tone scale, PostScript hue and saturation control) as the software base. A SCSI interface and server capabilities are also promised. Concerning a final development with great potential for improving print speed, Kodak representatives shyly note that their firm is a leader in JPEG image compression and decompression; if Kodak can get a networked printer to deal directly with compressed files, throughput speed could be greatly improved. Since it sells printer imaging paper at several dollars per sheet, Kodak is probably uniquely motivated to solve dye-sublimation printing speed problems.

Colors on the Horizon

Of the three printing technologies, ink-jets are the most mature and show what can be accomplished with a few years of steady development. The ink-jets are best suited to presentation graphics; the most popular models are used for producing A-size transparencies and color graphics for business reports. The HP Paintjet is inexpensive, easy to use, and certainly good enough for most presentation graphics; the other ink-jets squeeze more results out of the technology but with an increase in physical or software-configuration complexity.

The most sophisticated thermal wax-transfer printers produce output close in quality to that of conventional color printing. Wax printers are the best current choice for graphics shops. B-size printers are even available for printing color proofs. The Tektronix Phaser PX and the Seiko ColorPoint PS produce sharp text and smooth color shading and are the price-to-performance champions; watch this area closely, though, if you are serious about color graphics, because prices are changing rapidly, and simple software upgrades can make a major difference in output quality.

Finally, it may be said that the bridge is still under construction between the Macintosh domain and the glowing, sophisticated realm of dye-sublimation printing. You can make the trip now if you don't mind the rickety construction, but unless you have a pressing graphics need you may want to wait until the job is more finished. Parts of the technology (image compression, PostScript Level 2) to make either the Kodak or XL 7700 Mitsubishi Electronics $340 printers optimally useful are still in development, and more-refined products will likely appear in the year ahead. With healthy sales figures on all color printers, and with frequent rounds of price cuts, you may be printing in color sooner than you think.

*See Where to Buy for contact information.*

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**Contributing editor Charles Seiter** has been testing printers for Macworld for five years. He is currently developing color-imaging applications in analytical biochemistry.
Judging by the constant stream of product announcements from video hardware and software vendors, you'd think that television production couldn't survive without the Macintosh. While it's true that video products for the Mac continue to bring new capabilities at lower cost, the potential for Mac applications in broadcast television remains largely untapped. In this article, we'll fill you in on what's happened since our last report (see "Prime-Time Video," Macworld, September 1990), and we'll let you know what's still missing from the Mac video equation.

**Video Production**

Back in the 1950s, when live broadcasting was the rule, whatever transpired in the television studio went out over the air—sometimes with embarrassing results. Directors were restricted to two or three camera angles, and special effects were crude by modern standards. (Some critics feel that these limitations made for better television, but that's another subject entirely.)

Nowadays, aside from newscasts and sporting and other special events, most TV shows are recorded in advance for later broadcast. All the work that goes on after the action has been filmed or videotaped is called *postproduction*, an intricate process that involves combining the various elements into a finished production. Although it's not always obvious to the viewer at home, a television program consists of hundreds of short *sequences*, or shots, spliced together. The editor—whose work can make or break a production—is responsible for choosing the shots that best convey the story. In addition, he or she must also ensure that the *cuts*, or transitions, between sequences are smooth and don't distract the audience.

Because techniques for film editing are well established, most television editors still work with film, transferring the final product to tape for broadcast. Faced with tighter production budgets, though, producers are turning to videotape to save on processing and other costs. But videotape...
presents editors with a whole new set of problems. Film consists of a strip of individual pictures, so it's relatively easy to locate the precise frame for a cut. In fact, movies are edited by actually clipping and splicing many short pieces of film. Since video pictures exist only as magnetic signals, videotape has to be edited electronically.

To get television editors edit video with the same precision as film, the industry has developed a code for uniquely identifying every frame in a video sequence. Dubbed SMPTE timecode after the Society of Motion Picture and Television Engineers that devised it, the scheme uses a separately recorded signal that identifies each frame on the videotape. This code allows videotape editors to work on a frame-by-frame basis, a process known as frame-accurate editing. Frame accuracy is an essential feature in any video product intended for broadcast applications.

Pictures, of course, tell only half the story. Postproduction also entails adding sound to the action. Just as the final video track usually includes action from many different sources, the audio track usually combines multiple individual sound tracks.

Sometimes everything the viewer hears, including dialogue, is added in postproduction. In a process called automatic dialogue replacement (ADR), actors watch themselves on film, or videotape, and re-create their speaking parts on a new audio track. Sound effects and music are recorded on still other tracks. Finally, the individual sound tracks are put together on a single audio track that is synchronized with the picture.

So video postproduction is really a two-stage affair. In the first step, the editor chooses the sequences that go together to make up the final program. As you'd expect, editing usually involves a lot of experimentation to discover what works and what doesn't. In the final step, the individual shots are seamlessly combined into a complete production.
For high-end applications, the final postproduction process is usually accomplished using expensive online editing systems like the CMX-6000, which can read the edit lists that specify timecoded start and end points for all the sequences in a program. Rental costs for such online facilities can be prohibitive, however—often several hundred dollars an hour. As a result, editors usually do their rough, experimental work using less expensive equipment. That’s where the Mac comes in.

Products designed to work with video decks and videodisc players under Mac command are known as edit controllers. Far less expensive than traditional systems, such as the CMX-6000, Mac-based edit controllers—Avid Technology’s Avid/1 Media Composer and Digital FX’s Video F/X, for example—are designed for professional editors working in corporate video departments, and these Mac-based products can manage the inserting and dubbing needed to produce a video program.

The $10,000 Video F/X system consists of an outboard controller box for managing video equipment and a NuBus board for encoding and decoding NTSC (National Television Standards Committee) and RGB (red, green, blue) video. (Remember that television video signals use NTSC, which is different from the RGB video used on the Mac.) Video F/X requires a II-series Macintosh with 8MB of memory and a 40MB hard drive, along with a video monitor and two video decks, or one video deck and one videodisc player. Using Video F/X software, you create a series of video clips, represented by small pictures showing the first frame in each clip. You can assemble the clips in any order and specify fade-ins and fade-outs. Once the video sequences have been laid out, Video F/X assembles the final videotape for you.

One feature unique to Video F/X is its support of PostScript fonts and graphics. The system can render any encapsulated PostScript (EPS) or PICT file on video; it also lets you add antialiased text—that displays smoothly on video—to a video presentation (see “Text without Jags”). Narration and background music can be recorded and combined with the audio track from the source video.

In the Avid/I system (around $60,000), source video and audio are digitized in real time and stored on disk. So users can access images quickly during editing, the Avid/I displays low-resolution, 8-bit digitized images on screen. Individual frames can be selected, trimmed, and assembled into a rough edit. After editing, the Avid/I sends the true-color versions of those 8-bit images to videotape.

The Video F/X and Avid/I are fine for in-house video production. But they lack the complex transition effects and control options you find now in high-end editing systems, and are therefore unsuitable for online broadcast work. However, both systems are capable of producing industry-standard edit lists for use in professional postproduction facilities. That allows you to do a rough edit of a presentation on the Mac-based system and perform the final assembly on a high-end editing system.

**Video Cut and Paste**

Not everyone’s video-editing needs are as complex as a broadcast editor’s or a corporate video editor’s. For people with more modest requirements and budgets, there’s NEC’s PC-VCR and video software from Light Source. Light Source’s Multimedia Toolkit allows Macintosh users to control the PC-VCR directly from within HyperCard stacks; it’s available from NEC for $149. A more full-featured Light Source video software package offers the Video Logger, which clips video segments by choosing in- and out-points on the video, and the Video Sequencer, a time-line editor that assembles video segments to create an edited videotape. NEC sells that bundle, which also includes the Multimedia Toolkit and a disk-accessory remote PC-VCR controller for $295.

Other specialized products are available for use with specific applications or particular equipment. For example, the DQ-Animax Desktop from Diaguest and Advanced Digital Imaging’s MacVac are two Mac II boards that each control frame-accurate videotape recorders. They enable animators to create videotapes frame-by-frame from applications such as MacroMind Director. Both DQ-Animax and MacVac come in two versions—one with a serial port and another with serial and parallel ports.

If you’re interested in just con-
controlling playback and recording of a video source, other products are available. Video Master from VENT is a hardware box that allows Mac owners to control videotape decks, CD-ROM drives, and videodisc players via built-in infrared remote controls. It connects to the Mac's serial port. Designed to control only video devices, Video Master doesn't provide functions like video display, overlay, and special effects.

The VidClip VideoTape Control Toolkit for HyperCard from APDA contains a set of tools designed to enable HyperCard developers to write stacks that control Sony consumer videotape equipment. An equivalent product for controlling videodisc players, The Voyager VideoStack, comes from The Voyager Company. Apple also provides a videodisc player control system, the HyperCard VideoDisc Toolkit, that's similar to The Voyager VideoStack.

Here's Looking At You
Currently the Mac can't record and store live video to hard drives. But even if you can't record and store live video on a hard drive, you can record and store single images (or frames) from video cameras, video decks, and the like. A variety of frame-grabber boards from numerous vendors are designed specifically to digitize still images from video for display on the Mac screen. For more information about frame-grabbing and Mac video output, see "Prime-Time Video" in Macworld, September 1990.

Some boards, such as Mass Microsystems' ColorSpace FX (when used in conjunction with the ColorSpace III), the RasterOps ColorBoard 364, the RadiusTV from Radius, Aapps's DigiVideo Color, and the QuickView Studio from E-Machines, enable you to see live video in a Mac window. You can then take advantage of the boards' frame-grabbing abilities for capturing key images.

Once you've captured an image, there are several things you can do. You can send the graphic as-is to videotape via an encoder/decoder. Encoder/decoders are usually external devices that convert video from one format to another—most commonly Mac RGB to NTSC.

Another thing you can do is to manipulate the image. To create special effects and overlays, you can take advantage of overlay and effects capabilities offered by some Mac add-in boards. For example, the $2495 QuickView Studio lets you digitize up to two video sources in 16 bits and view them simultaneously on the Mac screen. Text and graphics can be overlaid on the video signal, and special effects like flips and spins can be created in real time. The processed images are exported into applications like MacroMind Director.

Likewise, boards such as the ColorSpace FX and Workstation Technologies' WTI-Moonraker are designed to combine video with Mac graphics for subtitles and other graphics effects. Truevision's Nu-Vista+ includes a digital chroma keyer, which enables you to dynamically merge live video with computer-
<table>
<thead>
<tr>
<th>Product</th>
<th>Company</th>
<th>List Price</th>
<th>Minimum Configuration</th>
<th>Edit Control</th>
<th>Image Capture</th>
<th>Display</th>
<th>Video Overlay/Video Effects</th>
<th>Encoder/Decoder</th>
<th>Device Controller</th>
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* Digital audio; captures close-captioned information. 1 Digitizes audio.
generated graphics. The DVA-40000/Macintosh from VideoLogic and Intelligent Resources' Video Explorer, feature custom silicon chips that enable the boards to perform not only standard video effects such as fades, wipes, and dissolves, but also more sophisticated effects—zooms, pans, mosaic effects, and so on.

The View down the Road
So what's missing? Expensive systems like the Video F/X and Avid/1 are still too limited for most broadcast productions. And no Mac-based system as yet provides the resolution broadcast editors need for digital images.

There is no question that the Mac will be up to the demands of broadcast video postproduction. It will eventually be able to record, edit, and play back broadcast-quality video, and it will eventually be used in Hollywood. When it gets there, though, the rules may have changed.

Sometime during the course of the next five to ten years, television and video in the United States will be replaced by a newer system called high-definition television (HDTV). With twice the number of scan lines and a wider picture, HDTV images rival movies in impact.

Compared to NTSC video, HDTV is much more compatible with computer graphics. Frame-grabbers for NTSC usually produce only 460 by 480 pixels with 16 bits of color. HDTV provides a resolution of 1920 by 1085 pixels with 32 bits of color at higher frame rates than normal TV. That greatly reduces the annoying flicker that results when computer images are transferred to video. With many more pixels making up each frame, however, HDTV places an even greater strain on processing equipment.

One studio in New York, the Rebo High Definition Studio, is already experimenting with HDTV on the Mac. Rebo's product, the ReStore, permits storage, retrieval, and manipulation of HDTV images in real time. While HDTV equipment is not expected to be on store shelves for at least three years, the ReStore is available now for about $40,000.

The motion picture and TV industries are a strange combination of new and old. State-of-the-art dubbing stages and Digital Audio Tape recorders exist side by side with Moviolas designed in the 1920s. Sound editors often create fades by rubbing alcohol directly onto the magnetic stripe containing the audio recording. Film is spliced by hand using nothing more than tape and razor blade. Perhaps that's one reason films cost so much these days; they're all handmade.

The Mac offers benefits for preproduction, filming, and some postproduction because it can keep everything organized. For the producer or editor with modest needs, Mac-based video provides a viable alternative to expensive production facilities. However, until the Mac offers all the features of traditional editing systems like the CMX, it is unlikely many Macintoshes will star in Hollywood postproduction.

See Where to Buy for contact information.

Peter S. Marx develops image-processing applications in Los Angeles. He doesn't actually own a television, preferring the Mac for his video entertainment.

Franklin N. Tessler, a radiologist and Macworld contributing editor, watches ultrasound images during the day and television at night.

PUTTING THE SQUEEZE ON VIDEO

While we've discussed the Mac as an editing controller and video-output device, we've avoided the topic of using video sequences on the Mac itself. Certainly, the ability to record video sequences for use in presentations and multimedia applications could propel the Mac from the static world of PICT and TIFF files to that of motion images. It would be like going from a slide show to a motion picture.

Alas, although the Mac is powerful enough to perform almost any spreadsheet or word processing function, it is unable to record even ten seconds of NTSC video without resorting to data-reduction methods such as image compression. And when HDTV hits the United States, the required processing power is going to far exceed that available in today's Macs.

A number of companies are working on hardware- and software-based image-compression products. Based upon standards called JPEG (Joint Photographic Experts Group) and MPEG (Motion Picture Experts Group), these products can record video directly onto hard drives using a destructive, or lossy, form of image compression. It's called lossy because some information is discarded or "lost"; the resulting images do not exactly match the originals—in order to compress the image. (For more information on compression, see "The Big Squeeze," Macworld, January 1991.) However, because JPEG and MPEG are destructive, they can't be used in broadcast-quality video production.

One company that's actively working on the video-compression problem is SuperMac Technology. SuperMac has demonstrated a board and software that compress 24-bit color images, video, and audio onto storage devices—for example, a hard drive or magneto-optical drive. The company claims that with its technology, movable hard drives can store up to a half-hour of video. The same board, currently code-named Digital Film, also decompresses video in real time for playback in a window on the Mac screen.

SuperMac plans to ship the board the first half of this year for under $5000.

Apple, meanwhile, has demonstrated a software-only solution to video compression at several conferences. Basically, Apple's software turns the Mac into a low-quality equivalent of a videodisc player. The software uses a proprietary compression scheme that, when combined with relatively small images, produces high frame rates on most Mac models.

At Educom, Apple demonstrated an interactive newspaper combining video from CNN Headline News with text from the Associated Press and graphics from USA Today. The interactive newspaper was produced using HyperCard 2.0 with proprietary video playing XCMDs written by Apple. Users accessed the previous night's news by clicking the mouse. Despite the small viewing area for the video clips (2½ by 1½ inches), they conveyed the majority of the information found in television news. Accompanying text provided news junkies with more substantive information.
YOU’VE GOT THE INFORMATION ON FILE. WITH THE RIGHT SOFTWARE, YOU CAN PUBLISH IT AUTOMATICALLY.

Publish Your Database

catalogs, directories, course schedules, labels of all types—if you produce documents like these, you’re a candidate for database publishing. Database publishing enables you to maximize efficiency by using a single database to create a variety of documents without ever having to lay the documents out manually. It works best with publications that are highly structured and repetitive and is especially useful for any document that’s frequently revised.

There are two paths to the marriage of data and design. The easy way is to use a database manager’s form-layout features to format the hard copy. You can’t get too fancy with this approach, but you can get acceptable results quickly. The more circuitous route involves combining a data manager with a desktop publishing program. This way requires more work but delivers better-looking results. And by coordinating a programmable database’s ability to create coded text files with the publishing program’s style-sheet abilities, you can enjoy the best of both worlds without doubling your effort.

This article examines both techniques. Along the way, I evaluate just how well several data managers and publishing programs handle database publishing jobs. For the data managers, I use Microsoft Works, ACIUS’s 4th Dimension, and Claris’s FileMaker Pro. The publishing programs I consider are Aldus PageMaker 4.0, QuarkXPress 3.0, and Letraset’s DesignStudio 1.01. I concentrated on these programs because they’re popular, but many of the concepts discussed here apply to other programs as well.

BY JIM HEID
ONE-STOP SHOPPING

Most Mac database managers provide basic page-layout features that let you move fields around, create boxes and rules, paste a company logo or other graphic into a database form, and use various fonts and type styles. In short, they provide everything you need for simple database publishing tasks—inventory reports, mailing labels, schedules for in-house seminars, or company phone directories.

Database publishing at this level is easy because the database program doubles as a publishing program, giving you one-stop convenience and eliminating the headaches involved in moving data from one program to another. The drawback? Having to work within the layout and typographic limitations of the database manager.

To test the database publishing facilities, I produced a client directory, personalized form letters, mailing labels, and name tags for a direct-mail announcing a company open house. My database contained fields for client names and addresses and the last contact date. Similar data-management tasks might include an employee director that would yield a personalized form letter announcing a charity drive and mentioning the employee's last contribution, or a club membership database that could provide a form letter announcing a forthcoming dues payment.

Here's how each product fared:

- **Microsoft Works**: Works is an excellent jack-of-all-trades program, but it's no database publishing tool. Works lets you position fields where you want them, but you can't mix and match fonts or sizes in database forms or reports, and the headers and footers print in one, unalterable font and style. You can't make style changes (bold, italic, and so on) in forms, and in reports the only permissible style change is that whole columns can be in bold or italic.

By using Works' word processing module, you can coerce the program into producing formatted labels and reports. Works' word processor provides access to the program's drawing tools and has a print-merge feature that lets you include fields from a database (see "Working around Works"). You switch between the draw layer and the word-processing layer frequently, and you tweak tab settings till the cows come home, but it works. And the print-merge feature is exactly what you need for personalized form letters.

- **4th Dimension**: This everything-but-the-kitchen-sink data manager has an excellent set of form-layout features. Tool palette icons let you align fields and other objects in relation to one other. Headers and footers can contain graphics. You can create multiple break areas that highlight totals or other summary information. And layouts can contain buttons that, when clicked, activate other layout windows or execute routines written in the program's script language.

4th Dimension (4D) also handles form letters beautifully, thanks to its ability to include fields in text areas. Text areas can also contain variables, which reflect the results of calculations. In my direct-mail form letter, for example, I included a variable called WeeksSinceLast that printed the number of weeks since the most recent client contact (4D calculated this variable by subtracting the date of the last contact from the current date).

4D's real strength is that you (or a database consultant) can combine these talents with the program's runtime application features to create turnkey database publishing applications that look and work like standard Mac programs. Indeed, the 1990 edition of ACIUS's 4th Dimension Solutions Directory lists such an application. Desjardin Consulting's DB Report Writer automates the production of structured documents by providing fields for holding and entering repetitive text, and generates rich text format (RTF) files that many word processors and publishing programs can import. Another turnkey database-publishing application is Eclipse Service's Classified Ad Tracking System, which automates the process of producing newspaper classifieds. The system keeps track of advertiser information and the text of ads, sorts ads by category, produces camera-ready art, and handles billing. Classified Ad Tracking System was created with Odesta's Double Helix II, another high-end database manager with excellent form-design features. Eclipse offers another turnkey application—Events Listing System—that generates newspaper events-listing sections.

**FileMaker Pro**

The trouble with high-end, programmable databases is that they have high-end learning curves. Claris's FileMaker has always provided a more accessible mix of data-management and form-design features than do programs such as 4th Dimension or FoxBase +/Mac. FileMaker Pro makes
a good thing even better. Indeed, FileMaker Pro provides the best layout features of all the data managers discussed here. You can zoom in and out on a layout, align fields and objects to each other, lock objects to prevent modification, and display on-screen rulers and T squares for precise positioning (see "FileMaker Pro Layouts"). A Preview command lets you see exactly how a page will look when printed. And many of these features work like their counterparts in Claris's MacDraw II, so you'll feel at home if you're familiar with that program.

Formatting mailing labels in FileMaker Pro is easy, too, thanks to a Label Setup dialog box that lets you specify the labels' dimensions and how many to print across the page. Formatting custom form letters can be tricky, however, since you have to mix field items and distinct text items. The 4D approach—letting you include fields by putting their names within angle brackets (<>)—works better.

**The Best Form**

For one-step database publishing of everything but form letters, use FileMaker Pro. Its superior layout features combined with its ability to switch between layouts in a flash give you complete flexibility in presenting data. 4D has great layout features too, but they, like 4D in general, take time to master.

Regardless of which program you use, I recommend coming up with different forms for data entry and for creating printed materials, especially if you're using a laser printer for the latter. For on-screen viewing, the Mac's ImageWriter fonts (Geneva, New York, and so on) are generally more legible than the screen fonts that correspond to laser printer fonts such as Times and Helvetica. Also, if you position as many fields as possible to fit within one screen, you won't have to do as much scrolling during data entry and searching sessions.

**THE TWO-STEP**

Where fine, professional-quality typography and layout are concerned, the publishing features in all database managers fall short. No Mac database manager provides manual- or automatic-kerning features for improving text spacing. Their features for producing shaded boxes and rules are limited compared to those of page-layout programs. While several data managers support spot color for fields and graphic elements, none can print color separations. And only a masochist would use a database manager to produce a large, graphically complex publication such as a 500-page catalog or a yellow pages phone directory. The range of features necessary for working efficiently on such a large project just aren't available in a database program.

For tasks like these—and for any job demanding top-quality typography—you need to combine a database manager with a desktop publishing program. Of course, this also means learning another program, but the benefits are well worth it.
program. This wedding of data and design often takes place at the business end of a shotgun. Getting a data manager and a publishing program to communicate requires an intimate familiarity with both. You'll need to master the database manager's data-exporting features and the publishing program's importing and style-sheet.Formatting features.

Fortunately, for publications requiring frequent updating—such as telephone books, catalogs, and price lists—you need to perform setup chores only once. Producing updated versions is a matter of exporting the changed data and then importing it. PageMaker users can even create links to a database to produce updated versions automatically.

For the test task, I produced a catalog, inventory reports, and tape labels from a video-rental store database (see "Data on Display"). The database contains fields for a film's title, rating, length, description, and rental history. You could adapt this rather generic application to fit any product-oriented database—books with card-catalog numbers, or widgets with part numbers and shipping weights, for example.

The foundation of two-step database publishing, exporting and importing database files, can be more complex than swapping word processor files, especially when you're publishing columnar documents (such as my inventory report), where fields are aligned in their own columns and each record has its own row. The complicating factors are delimiters; these characters inserted by the database publishing program as it exports to text as boundaries, separating each field and each record.

Delimiters come in two flavors: tabs and commas. In a tab-delimited text file, a tab character separates each field; commas do the job in a comma-delimited text file. Because it's likely that a field itself contains a comma—as in the film title Hush, Hush, Sweet Charlotte—each field value in a comma-delimited text file is usually also enclosed within quotes (see "Delimiters Demystified"). Tab-delimited text files are ideal for publishing columnar documents. After importing the text, you select it and then format it as desired. The tab codes that separate each field serve to separate the columns in the document.

The techniques for importing a text-only file depend on the publishing program. In Aldus PageMaker, use the File menu's Place command; if you have PageMaker's Smart ASCII filter installed, select the No Conversion option and then click on OK when the filter's dialog box appears. In QuarkXPress and DesignStudio, use the Get Text command after creating a blinking insertion point in a text frame.

After importing text, you can use the publishing program's search-and-replace feature to massage the data into the format required by the publication. For example, if you had to import a comma-delimited text file because that's the only format your database manager supports, you can change all the commas or commas and quote combinations to tabs. In PageMaker 4.0, type "^t" in the Find What text box and "^p" in the Change To text box. Or, if you want each field item to appear on a separate line instead of in its own column, change each field delimiter to a carriage return. For a tab-delimited text file, type "^t" in the Find What text box and "^p" in the Change To box. In QuarkXPress 3.0, type "^t" and "^p". In DesignStudio, type "^t" and "^r" (press Option-D to get the d symbol).

**Formatting in Style**

After importing a text-only file, you need to adjust its font, tab, and line-spacing settings, among others. You can perform these chores manually by choosing formatting commands, but you save time and automate the production process by using a publishing program's style-sheet features, which let you store and recall sets of text attributes (see "Automatic Publishing"). For the video store's videocassette labels, for example, I created styles called Spine Title, Front Title, and Rating, each describing the format of those label components. After importing the database text file, I was able to quickly format the text by selecting each text item and then applying the appropriate style sheet.

You can automate this repetitive formatting even further using tagged text-only files, in which text is preceded by tags—style-sheet names sandwiched between angle brackets, as in "Spine Title". When you import a tagged text file, the publishing program reads the tags, discards the tag text so it doesn't appear in the publication, and assigns styles to the accompanying text.

To add tags to a database text file, you could manually edit the file using a word processor, inserting the tags where appropriate and then saving the modified file. But that's not exactly automated publishing. A better way is to use a programmable database manager such as 4D, Double Helix, Fox Software's FoxBase+/Mac, Blythe's Omnis 5, or even HyperCard. These programs enable you to write short routines that export data and add tags (see "Following Procedures").

**The DataShaper and xdata Difference**

Programming a database manager is tedious at best, and torturous the rest of the time. And many data managers, including FileMaker, lack the programming language needed to create tagged text files. For PageMaker users, the solution to both problems is...
DataShaper from ElseWare Corporation (formerly BenWare).

Created by the former product manager for PageMaker 4.0, DataShaper is a powerful input and output filter for PageMaker. First you use PageMaker itself to create and format placeholders, codes that mark the position and format of the data you'll import. Next, you select the placeholder text and export it using DataShaper's export filter; this creates a format file. To import the database text file, you choose PageMaker's Place command, then choose the format file. DataShaper's own dialog box then appears, where you choose the database text file. DataShaper loads PageMaker's mouse pointer with the imported text, which you can place with or without PageMaker's autoflow feature. (Autoflow is ideal for producing multiple pages having a consistent format.)

DataShaper can also rearrange the order of fields as you import them, automatically generate an index from a database, and import and place TIFF images along with database text. You can even use PageMaker's Links command to link the publication to the database text file. With the link in place, you can simply export a database each time it changes, and then start PageMaker and tell it to update the publication. DataShaper also includes a downloadable PostScript font for printing postal-service bar codes on envelopes and postcards. Throw in several sets of templates for directories, catalogs, mailing labels, form letters, and name tags, and you have what may be a database publisher's best friend.

If you use PageMaker, that is. QuarkXPress users will want to investigate Em Software's xdata, a database-publishing extension for QuarkXPress that I examined in prerelease form (it's expected to ship long before you read this). xdata is similar to DataShaper in that it requires you to first position and format placeholders—prototypes, in xdata parlance—that represent the fields you'll import.

But where DataShaper requires arcane, single-character codes for many formatting operations, xdata provides an English-like programming language, similar to HyperCard's HyperTalk. As a result, you have to do a bit more typing to create prototypes, but their workings are easier to understand at a glance. The language also gives xdata useful features DataShaper lacks, such as the ability to extract certain characters from a field—for printing just the last four numbers of a full telephone number, for example.

xdata 1.0 lacks some of DataShaper's talents, however. xdata can't import TIFF images, it (and QuarkXPress) lacks the ability to create a link between a publication and a database file for automatic updating, and it can't print postal service bar codes. But even without those features, xdata is an excellent database-publishing complement to QuarkXPress.

Finally, QuarkXPress users who produce classified ads should check out Baseview Products' ClassManager, an extension consisting of a multuser database manager that tracks advertiser information and copy, and formats ad text for importing into QuarkXPress.

Who Does the Best Two-Step?

With their ability to import graphics as well as text and establish links to database files, DataShaper and PageMaker 4.0 form the most powerful database publishing duo available.

As for Letraset's DesignStudio,
Letaset sells DesignScript, an add-on that provides a command language for DesignStudio. (QuarkXPress 3.0 includes a similar language.) In a process similar to the one just described for adding style tags, a programmable database can be used to add command statements to exported text. DesignStudio then reads the commands and executes the format changes. Because it allows you to control virtually all of DesignStudio's layout features, DesignScript is actually more powerful than DataShaper. However, DesignScript lacks many commands vital to database publishing, such as one that automatically closes up extra space in a mailing label when a company name is absent.

The concepts I've discussed also apply to information that's exported from a spreadsheet program. All popular spreadsheet programs create tab-delimited text files; it's easy to select rows and columns and copy them to the Clipboard for subsequent pasting into a publishing program. And if you spend a great deal of time formatting spreadsheet data, you might want to investigate RagTime 3, which combines spreadsheet features with moderately powerful layout capabilities (see Macworld, Reviews, August 1990).

In the end, data managers such as FileMaker Pro lessen the need to use a separate publishing program to produce attractive hard copy from a database. That's good, because even with add-ons like DataShaper and DesignScript, two-step database publishing requires considerable effort and debugging. In your first attempts, fields may appear where they shouldn't, or they may not appear at all. You'll fine-tune your export commands and style sheets more often than you'd like.

But when everything works, you'll appreciate the power of database publishing, as the publishing program creates page after page of properly formatted text and graphics. Two-step database publishing is clearly overkill for producing mailing labels and in-house documents where quick turnaround is paramount. But for professional publishers, the ability to automate document production without sacrificing professional-quality typography and layout is a boon. Indeed, given the pervasiveness of catalogs, directories, business cards, and other structured publications, database publishing may be the best thing to happen to graphic arts professionals since the Mac itself.

See Where to Buy for contact information.

*Contribution editor Jim Heid* has been writing about the Mac since 1983. His latest book, coauthored with Peter Norton, is *Inside the Apple Macintosh* (Brady, 1990).
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### E-Machines Color 7.1 HD w/video card

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### Ibeam CT20 20" Trinitron w/8-bit card

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### RasterOps ColorBoard 264 (Mac II) w/video card

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### Generation Systems Publisher SE Card

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### Connectivities

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<td>Asante MacCon + SE/30ET</td>
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<td>Farallon PhoneNET StarController 300</td>
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<td>Farallon PhoneNET StarController EN</td>
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<td>Farallon PhoneNET Connector (DIN-8)</td>
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<td>Farallon PhoneNET Repeater</td>
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<td>Farallon Timbuktu 3.1</td>
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<td>Farallon Timbuktu/Remote 1.01</td>
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<td>Farallon Timbuktu/Remote Access Pack</td>
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<tr>
<td>Farallon PhoneNet 3.0 for EtherNet</td>
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### New Daya Dos Mounter 2.0

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### DayaTalk PC

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### DayaTalk Speed Guard Collision Filter

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### Printers & Accessories

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<td>LaserWriter INT w/cable and toner</td>
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<td>LaserWriter INTX w/cable and toner</td>
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<td>Kodak Dicomix M150 w/ATM &amp; cable</td>
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<td>QMS PS-810 w/cable &amp; toner</td>
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### The Organizer Cart Jr. by GoStar

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### The Organizer Cart Jr. by GoStar

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### LabelWriter by GoStar

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### Scanners

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<tr>
<td>Thunderware ThunderScan</td>
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<tr>
<td>Microtek MS-II</td>
<td>$1029</td>
</tr>
<tr>
<td>Microtek MSF 300GS w/SCSI</td>
<td>$1559</td>
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### The Microtek 3002S handles it all; 24-bit color, 256 shades of gray-scale, fine line, even text — and an affordable price. The 3002S comes with scanning & editing software, built-in SCSI, plus ColorStudio & ImageStudio Software by LetterSet...

<table>
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<tr>
<td>$1895</td>
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### XRS 3c Transparency/Slide Upgrade...

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### Connectivities

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</tr>
<tr>
<td>HP DeskWriter Printer</td>
<td>$205</td>
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### Out of serial ports? Add four more with AE's QuadraLink.

Simply plug the QuadraLink card into a NuBus slot in your Mac II, and you have four new serial ports, ready for your network printer, scanner, graphics tablet or whatever. The QuadraLink package includes software to create a "shadow driver" so its serial ports will be recognized by older software... 

<table>
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<th>Price ($)</th>
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Upgrade Your Macintosh

New Low Prices! Fast 80ns SIMM Modules
2 Megabyte Upgrade (Plus/SE)...............$110
4 Megabyte Upgrade (SE/30/Mac II).......$220
9 Megabyte Upgrade (HFS)....................$349
16 Megabyte Upgrade (68030).................$1099
1 Megabyte Upgrade (Mac Classic)...........$119
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DoveFax combines a 9600 baud fax modem and a 2,400 baud Hayes compatible data modem into one compact unit. It performs true background operation allowing you to convert, send, & receive faxes while you continue working. And, the pre-scheduled transmission feature allows you to send faxes after hours when rates are lower. Ask about voice mail option. ... $295

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DayStar PowerCache IICl 50 MHz.............$2195
DayStar Fast Cache IICl ......................$279
DayStar PowerCard 030 25 MHz (II,IIx) ......$1095
DayStar PowerCard 030 25 MHz (II) ...........$1095
DayStar PowerCard 030 40 MHz (II,IIx) ......$1199
DayStar PowerCard 030 40 MHz (IIcx) .........$1199
DayStar PowerCard 030 50 MHz (II,IIx) ......$1899
DayStar PowerCard 030 50 MHz (IIcx) .........$1899
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**ADOBE ILLUSTRATOR 3.0**

**Pros:** Improved type-handling; excellent control of type along a path; type can be converted to editable outlines; has single-page display option; has direct-selection and convert-point tools; new guide and automated graphing features. **Cons:** No online help; no grids or coordinate system; no tab-stop control; inadequate support for non-PostScript printers; saves scans in EPS format only; exported EPS images do not display in 24-bit color. **Company:** Adobe Systems. **Requires:** Mac Plus; 2MB RAM; hard drive. **Recommended:** Mac II. **List price:** $595.

Adobe Illustrator was the first drawing program to take advantage of the full range of graphic possibilities offered by the PostScript page-description language. Despite a long list of firsts—including the first automated tracing tool, the first object-oriented pattern option, and the first blending feature—Illustrator’s poor type-handling capabilities exiled thousands of artists to its closest competitor, Aldus FreeHand. Even loyal Illustrator users expressed disappointment that Adobe, a leader in PostScript typeface design, seemed satisfied with its program’s abysmal treatment of type: a single text block was restricted to a maximum of 255 characters, all in the same style, size, and typeface; you couldn’t justify or kern type; and you couldn’t join type along a free-form path.

Finally Adobe has remedied all of these problems, so that Illustrator 3.0 does what its forebear Illustrator 88 should have been able to do all along. You can now create and manipulate type directly in the drawing area. You can even flow text between multiple text blocks. A direct-selection tool allows you to select points and segments within grouped objects. Users who need a precise drawing environment can position guides that attract the cursor as you draw or modify images. An automated graphing feature allows you to create bar, line, and pie charts.

**Interface Lift**

Though Illustrator 3.0 is similar in structure to previous versions, you’ll notice a few changes. All objects are created and manipulated in the familiar square field that represents an 18-by-18-inch drawing area. But rather than being divided into a clumsy gridwork of printing tiles, the drawing area now contains the dotted outline of a single page. The area around the page acts as a nonprinting pasteboard. Alternatively you can subdivide the drawing area into multiple whole pages or partial printing tiles using options in the Preferences dialog box.

The lower left-hand corner of each Illustrator window contains an information bar showing the active tool or the current operation. This information can be helpful if you aren’t quite sure how to operate a selected tool (for example, “Pen: click or drag first anchor”), but otherwise it verges on useless, failing to provide the kind of placement coordinates and transformation details included in the FreeHand information bar. Even more disappointing, this limited information bar represents the extent of Illustrator’s online help.

**The New Toolbox**

The toolbox has been more than doubled, now including 39 tools. One notable addition is the direct-selection tool, used to select and modify one or more elements in a grouped object without affecting other items in the group or disrupting the integrity of the group. You can also select groups that are in the next level up in the grouping hierarchy by Option-clicking two or more times. Each successive Option-click selects the group that contains the current group. Consider the case of a rectangle, which is a shape that is automatically grouped with a center point. If you Option-click the
You can create type inside a path or along the outline of a path. If you choose the letter, you can drag the l-beam handle to position type (top). The Create Outlines command converts type to editable outlines, which may be modified like standard paths or even used as guides (bottom).

**All in Good Type**

You can create type inside a path or along the outline of a path. If you choose the letter, you can drag the l-beam handle to position type (top). The Create Outlines command converts type to editable outlines, which may be modified like standard paths or even used as guides (bottom).

rectangle using the direct-selection tool, you select only its outline; Option-click a second time to select both outline and center point; Option-click a third time to select any additional objects that may be grouped with the rectangle.

Another new tool is the convert-point tool, which can be used to reshape an arc to form a corner or change a corner to an arc. This has long been possible in FreeHand, in which converting a point is as easy as selecting a radio button. The process is slightly more complicated in Illustrator 3.0 but more versatile as well. Dragging the convert-point tool from either a point or bezier control handle, you both convert the point and reshape its adjacent segments in a single gesture.

Rather than displaying all 39 tools at the same time, Illustrator has a hierarchical toolbox sectioned into 16 slots. To select a tool that is not currently displayed, drag from a tool icon to produce a menu of alternates for that slot.

**Hiring a Guide**

Many artists complain that Adobe Illustrator lacks the features needed to create schematic and architectural renderings. Illustrator 3.0 remains deficient in this regard. Unlike Aladus FreeHand, Illustrator 3.0 still lacks a coordinate system for precisely positioning points and curves. Illustrator also fails to provide grids, a feature common among even the most rudimentary drawing programs.

The only structural enhancement to Illustrator 3.0 is the introduction of guides. As in FreeHand, you can create a horizontal or vertical guideline by dragging from one of the rulers. You can even create free-form guides by selecting an object and choosing the Make Guide command. In either case, the guide neither prints nor previews; it simply attracts the cursor as you draw or modify elements. In theory, the guides enable you to create customized grids to meet specific requirements. In practice, establishing even a simple grid structure requires more time and effort than it's worth.

**The Single-Page Champ?**

Illustrator 3.0's motto is "Precision drawing, page layout, and production...the single most powerful design tool you've ever owned." This claim seems to be primarily based on the program's new type-handling and graphing capabilities. You can pour long stories into multiple columns and display data in six kinds of charts. You can even import text from a word processor—Microsoft Word, MacWrite, and WriteNow formats are supported—and import tab-delimited data from a spreadsheet.

Like any good page-layout program, Illustrator lets you drag the type tool to create a rectangular column of text. If a story exceeds the boundaries of the column, a small plus sign appears to indicate overflow type. To flow the text into another column, simply clone the outline of the column (by Option-dragging it with the direct-selection tool) or select any existing path and choose the Link command.

Illustrator 3.0 manages type along a path far more expertly than FreeHand does. Type is automatically kerned to account for the shape of the path, eliminating excessive gaps and overlapping characters. You can adjust the vertical placement of type along a path (called Vertical Shift) so that the text appears above the path, below the path, or somewhere in between. If you don't like the way the text sits on the path, you can drag a special handle associated with the text block to move type back and forth on the path, or flip it to the other side (see "All in Good Type").

For logo designers, Illustrator's tour de force is its Create Outline command, which converts all characters in a text block to standard paths. There are only two prerequisites: Adobe Type Manager 2.0 (included with Illustrator 3.0) must be installed, and the printer font for the current typeface (Type 1 fonts only) must be available.

Compound paths allow you to see through hollow areas in letters. To draw an O for example, you might draw a black-filled oval and then draw a white-filled oval in front of it. However, if this O appears against a colored background, the white oval will appear opaque, not as a hole. A compound path allows the white oval to represent an unfilled area in the O, effectively cutting a hole through the shape and revealing any background object.

To create a chart, you simply drag one of the six graphing tools—bar, stacked-bar, line, pie, area, or scatter—to determine the dimensions of the chart. A Graph Data window appears in front of the chart. Admittedly, Illustrator's worksheet is nowhere near as powerful as a worksheet in a full-fledged spreadsheet program like Microsoft Excel; it can't perform calculations and you can't insert or delete cells. Illustrator's primary strength in this area is the freedom it provides for editing a chart once it is created.

Charts are organized into hierarchical groups of objects: one group contains a single bar, the next group up contains an entire series of bars, and so on. This hierarchical organization makes the process of reshaping and transforming graph elements as easy as, well, pie.

(continues)
Does all this add up to the best program for creating single-page documents? Almost, but not quite. For one, Illustrator 3.0 does not include a spelling checker or a hyphenation dictionary. You can insert discretionary hyphens (Shift-hyphen) on a word-by-word basis, but you can't control the overall hyphenation scheme of a story or paragraph. More bewildering, Illustrator does not provide any means for determining tab stops. In fact, the tab character isn't even properly supported. Pressing the Tab key moves the insertion marker to the beginning of the next line of type. This makes creating numbered or bulleted lists awkward, if not nearly impossible.

Selective Support
Illustrator's biggest problem has always been its lack of support for the non-PostScript crowd. Like its ancestors, Illustrator 3.0 does not print high-resolution images to non-PostScript printers, including ImageWriters and LaserWriter SGs. Also, Illustrator 3.0 can only import images saved in encapsulated PostScript (EPS) format; MacPaint, PICT, and TIFF files are not supported, except as nonprinting tracing templates.

And if you're looking for high-end color export, look again. The PICT component of an EPS image exported from Illustrator 3.0 doesn't appear on 24-bit monitors that are set to display millions of colors although the file will print correctly. Adobe claims that this problem will be addressed in a future maintenance release. FreeHand suffers from none of these inadequacies.

Adobe's narrow worldview is irritating, but not crippling. If you own a PostScript output device and don't require a draw package with image-editing capabilities, you'll find that Illustrator's functions far outweigh its faults. Here is an amazing application, even by Macintosh standards, packed with powerful capabilities that make it—without a doubt—the best design package currently available. If you're an illustrator or graphic designer, Adobe Illustrator 3.0 is one program you'll have to see to believe.

—Deke McClelland

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Thermal Printing Systems from Kodak

Circle 377 on reader service card
keys (with Home, End, and so on), and numeric keypad. Thus, there are initially only six possible configurations, since you must use all three modules and only those three. Additional modules, of course, are sold separately.

**Key Components**

Even so, the Switchboard offers a welcome set of improvements and thoughtful touches. The Option, ⌘, and Control keys are intelligently laid out on both sides of the space bar; it’s indeed a pleasure to have an Option key within one-hand’s striking distance of, say, the F key. Owners of Datadesk’s previous keyboard, the Mac-101, will be grateful to note that the numeric keypad is back to the configuration nature intended it to have, with an equal sign on the top row. Finally, Datadesk has painted the symbols on the keypad and cursor keys (such as +, =, and the arrows) at a slightly-larger-than-standard size. That extra point or two makes life easier when, for example, you’re glancing back and forth from the numbers you’re entering to an open spreadsheet in Excel.

As though these improvements to the standard keyboard weren’t enough, Datadesk even lets you reconfigure the keyboard’s brains. Flip one of the easy-to-access DIP switches, and you’ll never again type U>S>A: the keyboard makes Shift-period (and Shift-comma) transmit a regular period or comma to the Mac, like the typewriters of old. Another example: the Switchboard’s Caps Lock key is above the Shift key. But if you prefer to have Caps Lock in the lower-left corner, as on the Apple keyboards, flip another DIP switch and the Switchboard mentally reverses the Control and Caps Lock key positions. The appropriately shaped physical replacement keys are included in the Switchboard package.

The arrangement and labeling of the Switchboard’s keys are so intuitive and thoughtful, in fact, that you may be startled to see keys that have been labeled with IBM PC users in mind. There they are: SysRq, Break, Scroll Lock, and others, looking as comfortable on a Mac keyboard as a snowman in Miami. The Return key is labeled Enter (that’s right: two Enter keys). And Datadesk has changed the Delete key’s name back to Backspace. Of course, one remarkable feature of the Switchboard is that it can indeed be used with either a Mac or an IBM computer with nothing more than a DIP-switch flip. But dyed-in-the-wool Mac users will wish Datadesk had also included replacement keys for the ones bearing alien-looking legends.

**The Magic Touch**

There’s one more aspect of keyboard design that Datadesk has attacked with a vengeance: the touch. There have always been two typist camps: tactile types, who like each key to produce a little audible/tangible click when it’s pressed; and feather-touches, whose main objective is to type as much with as little effort as possible and who prefer clickless keyboards. The company must have become weary of the endless debate between the two: now you can choose. The normal Switchboard has the clicking feel of any keyboard; if you press very lightly and slowly, you can actually feel the tension point you push past when you’re typing. Working on it is satisfying, if noisy, experience. (Datadesk says that according to their research, almost everyone prefers such a clicky touch.) But if you (or your easily-distracted co-workers) prefer to use a quieter, less clicky, infinitesimally less labor-intensive keyboard, Datadesk’s soft-switch model is also available.

The only touch you might dislike is on the optional trackball module. Below the ball is the “mouse button”—a thumb bar that’s a delight to use. But on both sides of the trackball are click-lock areas; when clicked, they make the Mac think the mouse button is being pressed continuously, until you click one of these areas a second time. The trackball isn’t available at this writing, but the prototype trackball’s click-lock areas take lots of time to get used to and require an uncomfortable amount of force to click. And there are cursor keys just above the trackball; that’s convenient. But they’re in a peculiar, L-shaped arrangement; that’s not.

**Switch Boards?**

Except for the IBM key labeling, the oddities of the trackball, and the fact that Datadesk doesn’t include label templates for function keys, there’s virtually no downside to the Switchboard. At the very least, for a street price lower than that of Apple’s extended (and clickless) keyboard, you get a superior input device. Like Datadesk’s other keyboards, this one is as rugged as they come. And, with its sharp-looking acrylic-covered LED indicators, it’s even a little stylish.

But with its improvements in key layout, its configurability, and its potential for future expansion, the Switchboard is more than a worthy contender. It represents a careful and successful rethinking of the Macintosh component we should think more about.—David Pogue

See Where to Buy or circle 768 on reader service card.

### BUSINESS LASERPRINTER IIS

**PROS:** Moderately fast controller teamed with 8-ppm engine provides good all-around performance; SCSI connector accepts hard drive font storage; 200-sheet paper tray is included; sleep mode reduces power requirements; excellent documentation.

**CONS:** Setup is slightly harder than with QMS-PS 410; additional accessories required for use with IBM PCs; HP and Diablo emulation modes cost extra.

*Company:* GCC Technologies.
*List price:* $2899.

**QMS-PS 410**

**PROS:** Fast controller processes complex documents quickly; emulation sensor adapts to incoming data, eliminating mode switches; good documentation; excellent print quality; contains 45 fonts.

**CONS:** 4-ppm engine is a bottleneck for some jobs; paper tray holds only 50 sheets.


Now showing in the you-say-“tomato”-I-say-“tomato” department: the QMS-PS 410 and GCC’s BLPI IIS, two PostScript-based laser printers priced at under $3000. What a study in contrasts these two printers are: The QMS-PS 410 caters to both the Mac and IBM PC (continues)
Any resemblance to other Macintosh utilities is pure coincidence.

If that sounds like an outrageous statement, it sure is. But then, this is one outrageous set of utilities.

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worlds, the BLP IIS is made for Macs. The QMS-PS 410 uses a laser-based engine, while the BLP IIS uses light-emitting diodes (LEDs) to expose its images.

But most significant, the QMS-PS 410 combines a swift controller with a slow engine, while the BLP IIS pairs a slower controller with a fast engine. As a result, which printer is faster depends on what you print. That’s true with most page printers, but these two prove the point especially well.

Start Your Engines
The QMS-PS 410 uses Canon’s 4-pages-per-minute LBP-LX engine (formerly called the P-310), the same mechanism used in Apple’s new Personal LaserWriters and Hewlett-Packard’s Laserjet IIP (see “Page Printers Revisited,” Macworld, October 1990). As with other Canon engines, setup is simple: pop out two plastic shipping spacers, slide in the disposable drum and toner cassette (good for 3500 pages), and you’re done.

The BLP IIS uses an 8-ppm Oki Electric OL-800 engine, a faster and heavier-duty version of the OL-400 that’s used in GCC’s popular Personal LaserPrinter as well as in the BLP IIS’s slower sibling, the BLP II. Setup is slightly more complex than for the QMS, with three components to install instead of just one, but the process is straightforward and clearly illustrated in the BLP IIS’s thorough manual. The toner cartridge lasts for roughly 2500 pages.

Each engine uses a different type of light source to expose images. The QMS-PS 410’s LX engine uses a laser, while the BLP IIS uses an array of LEDs that flash on and off. The latter approach involves fewer moving parts, and that, in theory, could mean longer engine life. Output quality from both engines is excellent, although I had to boost the BLP IIS’s print darkness setting in order to get blacks as rich as the QMS-PS 410’s.

As for paper handling, it’s no contest. The BLP IIS’s cassette holds 200 sheets, while the QMS-PS 410’s multipurpose tray holds a mere 50. QMS sells a 250-sheet cassette (which Apple includes with its Personal LaserWriters) for $195. It’s worth it to avoid annoying out-of-paper error messages.

Contrasting Controllers
The controllers in the QMS-PS 410 and BLP IIS are as different as the engines they’re attached to. The QMS-PS 410 uses a 68020 processor running at 16.67MHz—the same chip and clock rate used by much costlier printers, including Apple’s LaserWriter LINTX.

The BLP IIS uses the slower 68000 microprocessor, although it runs at the same 16.67MHz clock rate. Both printers come with 2MB of memory. The QMS-PS 410 can be expanded to 6MB; the BLP IIS, to 4MB. Both printers provide the standard 35 fonts found in nearly all PostScript printers, but the QMS-PS 410 throws in another 10—the Garamond and Helvetica Condensed families, with five styles of each.

In performance testing, the QMS-PS 410’s 68020 was faster in tests that depend on processing speed. The BLP IIS’s second-place times, however, were still better than those of the Texas Instruments microLaser and the Apple Personal LaserWriter NT, two other hot contenders in its class. And in tests that depend largely on engine speed, the BLP IIS’s 8-ppm engine helped it finish first, ahead of even the $3995 NEC SilentWriter 2 290.

But speed isn’t all that differentiates these printers’ controllers. The BLP IIS provides a SCSI connector that can accommodate a hard disk for downloadable font storage; the QMS-PS 410 doesn’t. By eliminating font downloading time, a BLP IIS would be faster than the QMS-PS 410 when printing documents containing several downloadable fonts.

If you plan to use a printer with IBM PCs as well as Macs, the QMS-PS 410 is the better choice. It includes a Hewlett-Packard PCL Level IV emulation mode, and rear-panel Centronics parallel and RS-232C serial ports. A plug-in board containing an HP graphics language emulation mode is also available for $295.

The BLP IIS provides no emulation modes, although HP Series II and Diablo 630 emulations are available for $149. And in order to equip it with the serial port needed for reliable PostScript communication with PCs, you’ll have to buy GCC’s $149 PC Accessories Kit, which includes a serial interface and PC printer utilities.

Even if you add the aforementioned options to a BLP IIS, the QMS-PS 410 is still the better printer for mixed environments, thanks to its ability to automatically configure itself to match the type of data it’s receiving. For example, if you send a document formatted for an HP LaserJet from a PC via the parallel port, the QMS-PS 410 automatically switches to the HP emulation mode. If, a minute later, you send a Mac document via LocalTalk, the printer switches to PostScript and LocalTalk modes. This emulation sensing is a real innovation that eliminates fiddling configuration switches and wondering which port is currently active.

The BLP IIS offers no such nicety, although its front-panel LCD screen and keypad make it easier to configure than most printers, including Apple’s. Besides allowing you to configure ports and emulation modes, the keypad and display let you disable the printer’s start-up page and adjust various settings. To perform such tasks with the QMS-PS 410, you need to (continues)
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Brains versus Brawn

The QMS-PS 410's emulation-sensing feature makes it the best choice for offices that mix Macs and PCs. Its fast controller makes it well suited to printing complex documents and illustrations, but its 4-ppm engine and skimpy 50-sheet paper capacity make it the wrong printer for large networks and for printing long documents or multiple copies of the same one.

The BLP IIS isn't as receptive to PCs, although it doesn't snub them to the extent that Apple's printers do. Its controller is no slouch, and its SCSI port can boost performance with downloadable fonts if you add a hard drive. But what sets the BLP IIS apart is its 8-ppm engine—the fastest engine available on any under-$3000 page printer.

In the end, these two printers illustrate how important it is to choose a printer based on the types of documents you print. Both are excellent values—well designed and packed with features that cost thousands more not long ago. One may be a tomato while the other's a tomatto, but neither is a lemon.—Jim Heid

See Where to Buy or circle 622 (BLP IIS), 275 (QMS-PS 410) on reader service card.

REVIEW

**TINMBUKTU/REMOTE ACCESS PACK**

**Pros:** Modern supports V.42bis data compression at speeds of up to 9600 bps; can start up Mac remotely by modem; can display remote Mac's screen in movable, resizable window.

**Cons:** Displays screens in black and white only; screen updates can be slow for 13-inch or larger monitors.

**Company:** Farallon Computing.

**Requires:** Mac Plus. List price: $1295.

You're on the road and you realize that you left an important file on the Mac back in your office. How can you get it? Well, thanks to Farallon's Timbuktu/Remote Access Pack, you can use another Mac to call the office, start up the Mac there, retrieve a copy of the file, and then shut down the office Mac.

The Modem

The Access Pack includes a 9600-bps V.32 modem that supports the V.42bis data-compression algorithm, Timbuktu/Remote 3.0, a Remote/WakeUp Cable, and Auto Shutdown software. Formerly, use of the MNP Class 5 compression algorithm offered a compression factor of 2 to 1. With V.42bis, compression factors can be up to 4 to 1. The compression varies with the type of file; spreadsheets and text files can be compressed more than sound or application files.

This Is Your Wake-up Call

A unique feature of the Access Pack is the ability to start up the Mac via the modem. Farallon accomplishes this with its Remote/WakeUp Cable—a standard modem cable with an extra cable for attaching to an ADB port on the Mac—and Timbuktu/Remote.

After attaching the Remote/WakeUp Cable to the Mac, you have to set Timbuktu/Remote to the Patient setting, that is, one that waits a specified time for any INITs to load after the Remote/WakeUp Cable starts up the Mac. Farallon recommends waiting about two minutes, but I've found that you have to use an even longer waiting period if you have a lot of INITs (my Mac takes about three minutes to load all of its INITs).

The final step is to install the Auto Shutdown cdey. It allows you to specify how long the Mac stays on after a connection is made.

To use the wake-up feature from a remote Mac, you use Timbuktu/Remote to call the remote Mac's modem. When the modem answers, the remote Mac starts, loads its INITs, and then switches to Timbuktu/Remote. Now the two Macs can talk to each other—you can start an application or transfer files using Timbuktu/Remote. You might have to be fast, though, because the Auto Shutdown software starts its timer as soon as all start-up activity is finished. I set the timer to more than 5 or 10 minutes, knowing that the Mac will shut down even after I disconnect the modem on my end.

Timbuktu/Remote

Timbuktu/Remote 2.0 includes some significant changes that make the software easier to use. One feature I've wanted is the ability to put the remote Mac's display into a movable, resizable window. Version 2.0 now does that, and puts a special black border around the window so you can easily distinguish it from other windows. Unfortunately, the latest version of Timbuktu/Remote still does not display colors; it converts everything to black and white in the Timbuktu window.

Despite the monochrome display, Timbuktu/Remote can still be pretty slow in updating screens and cursor movements. I found that 9600-bps communications between two Mac IIs with 13-inch monitors was bearable, but only barely so. My partner on the other Mac complained that the jerkiness of the cursor movement was particularly disturbing.

Should you purchase the Timbuktu/Remote Access Pack? If you're shopping for a high-speed modem, and you need to communicate between a Mac on the road and one in your home office, then the Access Pack is a good idea. Remember, though, that you're going to have to buy two Access Packs to link the two Macs. If your main concern is the modem, you can get other good-performance high-speed modems at lower prices (see "High-Speed Modems," *Macworld*, November 1990).—Dave Kosiri

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<thead>
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<th>PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abbott Systems</td>
<td>$63</td>
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<tr>
<td>CardOpener v1.1</td>
<td>$63</td>
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<td>Broderbund</td>
<td>$45</td>
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<td>Simulink</td>
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<td>CE Software</td>
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<td>v0.44</td>
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<td>Freedom of Press</td>
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<td>Softsafe 1.1.2.3</td>
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<td>Insight Development</td>
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<td>Now Utilities</td>
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<td>CD-ROM Software</td>
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<tr>
<td>Waystar</td>
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<tr>
<td>28012 U.S. Casino</td>
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<tr>
<td>28014 World Factbook 1989</td>
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<tr>
<td>MOSTLY DRAWING</td>
</tr>
<tr>
<td>Waystar</td>
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<tr>
<td>29302 Quick Art</td>
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<tr>
<td>GRAPHIC ART COLLECTIONS</td>
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<td>NEC</td>
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<td>29080 Clip Art 3D</td>
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<td>29887 Waystar</td>
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<td>29804 US Seal (CD-ROM)</td>
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<th>SHORTCUT/TIME SAVING UTILITIES</th>
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<td>Individual SW</td>
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<tr>
<td>39420 101 Scraps &amp; Buttons</td>
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<td>Software Innovations</td>
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<tr>
<td>39510 HandOff II</td>
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<td>SCREEN SAVER UTILITIES</td>
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<td>Berkeley Systems</td>
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<td>39423 After Dark v2.0</td>
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<td>39599 Pro 4.0</td>
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<td>39538 Protector Shark</td>
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<td>VIRUS DETECTORS/ERADICATORS</td>
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<tr>
<td>HSC Software</td>
</tr>
<tr>
<td>39414 Virex (30 Pack)</td>
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<tr>
<td>Virus Utilities</td>
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<tr>
<td>39413 Virex v2.7</td>
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<tr>
<td>Symantec</td>
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<tr>
<td>39442 SAM v2.0</td>
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<tr>
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<td>Advanced SW</td>
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<td>39544 Oricalc v1</td>
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<tr>
<td>Data Storage, Management/Repair</td>
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<tr>
<td>Central Point</td>
</tr>
<tr>
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<td>39540 Sun Ix v2.0</td>
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### Antivirus Utilities

**RIVAL 1.1.4**

**Pros:** Extensible for new viruses; transparent in use; both detects and removes viruses. **Cons:** Can’t be customized for new virus without vaccine from company. **Company:** Microseeds Publishing. **Requires:** Mac Plus; System 6.0. **List price:** $39.

**SAM (SYMANTEC ANTIVIRUS FOR MACINTOSH) 2.0**

**Pros:** Very complete virus checking; extensible for new viruses. **Cons:** SAM Interceptor doesn’t destroy viruses; advanced options not for the squeamish. **Company:** Symantec Corporation. **Requires:** Mac 512K; System 6.0. **List price:** $99.95.

Ugly as the fact may be, computer viruses are something we have to live with. Although the great majority of viruses are more annoying than deadly, protecting your floppy disks and hard drives is important, especially if you frequently exchange floppies with other Macintosh users. SAM (Symantec AntiVirus for Macintosh) was one of the first commercial products to fight viruses, and Rival is one of the new contenders. Both products do the job, but they take different paths.

**SAM**

SAM 2.0 is a big improvement on an already good product. The program has two parts. The SAM Intercept INIT goes in the System Folder and loads each time you start the Mac. SAM monitors activity and alerts you when it sees a possible virus attack or other suspicious activity. The SAM Virus Clinic is an application that scans disks for infections, and repairs infected disks.

You configure SAM Interceptor’s many options using the Control Panel. The most important of these options is the ability to set one of four levels of protection. The Basic level prevents infection by known viruses and their variants. The Standard level alerts you to changes, such as when an INIT is added or removed or when code resources are added or changed. The Advanced level adds a few more categories of changes, and the alerts provide more technical information. The Custom protection level includes all of the Advanced level protection, but it lets you turn off certain categories of suspicious actions.

The higher the protection level, the more likely it is that SAM will flag normal activities, as well as various suspicious activities. For example, at the Advanced level, installing a font or DA with Font/DA Mover causes SAM to alert you to a change. You can have SAM learn that a particular program you use is allowed to perform a specific action, but sometimes it’s best to pay the price of protection: annoyance. Still, it’s a good idea to turn off SAM temporarily when you install or remove programs. You can set SAM Interceptor to scan all floppy disks for infection automatically or only when you hold down a key. You can even scan all or part of a hard drive whenever you start up or shut down.

You use SAM Virus Clinic to actually eradicate a virus once it’s found. Virus Clinic scans floppy disks and hard drives and repairs them, removing any virus it finds and adding a checksum to each file it inoculates. Whenever that file is subsequently opened, the checksum is compared, and you’re alerted if the file has changed.

The biggest change in SAM 2.0 is that it now keeps up with new viruses almost as quickly as they appear. With SAM Virus Clinic, you can add definitions for new viruses, updating your protection whenever a new virus rears its head (see “Vaccination Time”). Symantec makes new virus definitions available on its forum on CompuServe, on its own BBS, and via a 24-hour Virus Hotline, which is a toll call. Update disks with vaccine for new viruses cost $15.

SAM has several features that make it useful for network administrators, or anyone who is responsible for many Macs. You can set up SAM Interceptor to require that users enter a password to change any of SAM’s options. You can insert into the Interceptor alerts a line of text that tells network users to call a certain extension (or to send you an E-mail message) when viruses are detected. And you can disable features that could let users circumvent their virus protection.

**Rival**

Where SAM tries be the no-holds-barred virus fighter, Rival takes a more relaxed approach. It protects against viruses but doesn’t alert you to other suspicious activities. Installing Rival is simplicity itself; you just copy it to the System Folder and restart.

Rival checks each file for infection as it is opened. Rival also looks for active viruses at start-up and alerts you to any attempt to format a hard drive (except for the act of erasing a drive from the Finder). When Rival detects a virus, an alert pops up with two buttons: Stun and Repair. Stun disables the virus but doesn’t remove it; Stun lets you open and use infected files on locked or read-only media, such as a CD ROM, but prevents the virus from spreading. Repair removes the virus from the disk or hard drive. Unlike (continues)
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SAM, which requires you to use the separate Virus Clinic, Rival lets you wipe out the virus as soon as it attacks.

Rival has five modes, all accessed from the Control Panel. The Volumes mode lets you check and/or repair individual files, folders, or whole disks or drives. The Floppies mode checks and ejects floppy disks. The Report mode gives you an analysis of the disks and drives you've checked. The Vaccine mode shows which vaccines are currently installed. And the Help mode is an excellent online help file.

Rival, like SAM, can be updated as new viruses appear, but instead of typing in parameters, you need to install a small (2K to 4K) vaccine file. Microseeds makes new vaccines available on its support forums on CompuServe, America Online, and Microsoft's own BBS, the Virus Express service, which costs $50 and entitles you to receive the next six vaccines on disk. User groups can get a free subscription to Virus Express, and are encouraged to distribute the vaccines.

The Right Prescription
Both programs have excellent online help and manuals, and technical support was very good from both companies. In tests with viruses, an unaltered SAM 2.0 caught the WDEF virus but missed the ZUC (Zucchini) virus. After I added the ZUC virus search string with SAM Virus Clinic, the programs stopped the ZUC virus cold. Rival, which came with vaccines for ZUC and WDEF installed, stopped both viruses before they spread or infected my hard drive. Both programs removed the viruses from my hard drive and disinfected floppy disks with no problems.

For the average Macintosh user, I recommend Rival. It's completely transparent in operation, does a good job in preventing virus infections, and has more built-in vaccines. More-advanced users, or anyone who manages networks, should get SAM for its excellent customization features and its extensive scanning options. Whichever program you get, be sure to contact the manufacturer from time to time and get the latest updates, so that you are protected from the warped ingenuity of the virus authors.—Tom Negrino

See Where to Buy or circle 747 (Rival) or 189 (SAM) on reader service card.

THE NORTON UTILITIES FOR THE MACINTOSH 1.0

Pros: Excellent file-recovery tools; fixes many types of directory and file damage; wide variety of utilities.

Cons: UnErase doesn't show the amount of free space on the destination disk; still can't fix all disk problems.

Company: Symantec Corporation.


A hard drive will crash sooner or later, and the best way to deal with it is to be prepared. Norton Utilities for the Macintosh provides an excellent suite of recovery tools. The programs also do a good job of recovering files on floppy disks that have crashed. In addition to file recovery, there is a smorgasbord of other disk utilities that help keep your hard drive and floppy disks running smoothly.

Physician, Heal My Disk
The data-recovery tools section of Norton Utilities is made up of four parts. Disk Doctor diagnoses and repairs damaged or crashed floppy disks or hard drives. It scans a disk, alerts you to problems as it finds them, and asks if you want to fix them (see "Say 'Ahh' "). UnErase recovers files that have been accidentally deleted. Format Recover resurrects hard drives that have been mistakenly erased, or that have crashed. FileSaver is an INIT and Control Panel device that creates invisible files containing the information needed by Format Recover and UnErase's QuickUnErase mode to restore the data. These files are invisible and take up less than 1 percent of a hard drive's disk space.

Disk Doctor is unique among Mac utilities in that it attempts to correct problems on floppy disks and hard drives; competing products merely allow you to recover data from damaged hard drives. Disk Doctor successfully fixed most of the floppy disks I tried it on, failing to fix only 1 of more than 20 bad floppies. Disk Doctor had more difficulty with hard drives. Some hard drives required more than one pass to fix all the directory problems, and the program reported that it couldn't fix some problems at all, specifically some Volume Information Block damage. Still, Disk Doctor fixed 7 out of the 10 hard drives I tested.

FileSaver keeps a record of all the documents, applications, and folders on a disk or drive. FileSaver also keeps track of all the files that have been thrown in the Trash.

QuickUnErase uses the FileSaver data to show you a list of recently deleted files, along with their chances of recovery, from Excellent to Poor. Recovering files is as simple as selecting them from the list, picking where you want the recovered files to be placed, and clicking on the UnErase button. You can also use UnErase on disks or drives that weren't prepared in advance with FileSaver, either by searching for files of a particular type, or by searching for a word or phrase. UnErase doesn't tell you the amount of free space on the destination disk, so if you are recovering to floppies, you can easily select more files than will fit on a floppy disk. This is not a particularly serious problem, but in a package of this caliber, it should be fixed.

Format Recover is best used on hard drives that have been accidentally erased using the Finder's Erase Disk command. In reality, when you choose Erase Disk, the Finder doesn't scrub the information off each sector of a hard drive; it just writes a new, empty directory to the drive. Format Recover first searches the hard drive for the FileSaver information, then uses
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it to restore the old directory. The whole process took less than four minutes on a 140MB hard drive with approximately 70MB of free space. When you use the Erase Disk command on a floppy disk, the Finder rewrites the physical format of the floppy, and no recovery is possible, however.

Not a One-Trick Pony
The Norton package includes several other utilities designed to make your life easier. Speed Disk is a disk optimizer, speeding up a hard drive by defragmenting the files so that they can be accessed more quickly. It is easy to use and works well. Speed Disk has both an Easy and an Expert mode, allowing more-advanced users more control over the optimization process. In Speed Desk Expert mode, you can actually use the Magnifying Glass icon to see which disk blocks are in use, and what files occupy them. Interestingly, Speed Disk can detect (but not fix) some problems, such as B-Tree Extents file damage, that Disk Doctor misses.

The Fast Find DA is similar to Apple’s Find File but is much faster. Fast Find searched a 140MB hard drive in only a few seconds. Faster searching capabilities are only available in utilities, such as On Location, that index a hard drive. Fast Find also allows you to view the contents of files or launch files. Layout Plus, an expanded version of the shareware Layout application, lets you customize the way the Finder displays files and folders on the desktop. For example, you can change the font, size, and position of text views; the spacing and color of icons; and the appearance and behavior of windows.

KeyFinder is a DA that displays the entire set of characters of a font and the keystrokes that produce the character. Directory Assistance is an INIT that brings some of the functionality of the Finder to the standard Open and Save dialog boxes. It adds File and View pop-up menu buttons to the dialog boxes. The File menu lets you create a new folder, duplicate or delete files, Get Info, or quickly locate a file on the current volume. The View menu sorts the file list by name, date, or file type. (Unfortunately, Directory Assistance in version 1.0 is incompatible with the excellent Boomerang utility, which also adds a pop-up menu to the Open and Save dialog boxes.)

And last and certainly least, there’s DiskLight, an INIT that puts a small icon in the menu bar that flashes whenever there’s any floppy disk or hard drive activity. It’s mainly useful for people with internal drives that don’t have a visible activity LED.

Norton Utilities comes with extensive online help and an excellent user manual. The manual includes a series of step-by-step procedures for recovering crashed disks, with separate procedures if you’ve previously installed FileSaver and if you haven’t. The Norton Disk Companion, sent to all registered users, explains in a way that anyone can understand such things as how the Mac stores files and how hard drives work.

Disk Doctor and UniErase are very good, but they’re not yet a complete replacement for other disk utilities. Although Norton can recover or fix a wider range of hard drive problems than can Symantec’s Norton Utilities for Macintosh (SUM II 2.0), the latter was able to recover some hard drives that Norton could not, and vice versa. In cases where both utilities could recover a drive, Norton completed the job much more quickly. Since Symantec recently acquired Peter Norton Computing, it will be interesting to see whether the two packages stay separate or merge together.

Prognosis: Very Good
Norton Utilities for the Macintosh is an impressive first Mac entry for Peter Norton Computing and sets the pace for the competition. Although there are still a few rough edges to the software, it far outpaces Symantec’s SUM II and Central Point Software’s MacTools Deluxe in ease of use, speed, and the ability to recover a wide assortment of crashed and damaged floppy disks and hard drives. And the additional utilities included make the Norton package an excellent value. I highly recommend the software, and I also recommend that you start using it before your drive crashes.

—Tom Negrino
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delete them all or change their appearance with a single command. And you can select text vertically, which is great for preserving the format of tabular information when you're moving it around in a document ( alas, Nisus lacks a true table-editing function).

A Place for Everything
If you've ever wanted a cubbyhole where you could park a passage of text you might need later on, one of Nisus's ten clipboards should suffice. After you cut or copy the text, you just switch to another clipboard and continue editing, cutting and pasting as necessary. When you're ready to retrieve the original text, you switch back to the appropriate clipboard and paste. Nisus's cut-and-paste feature has another thoughtful touch, an option that ensures that one and only one space remains between words after a cut or a paste.

Three distinct search-and-replace functions offer three levels of power and complexity. The garden-variety Find/Replace command can comb a file in either direction; the other two functions let you carry out sophisticated document transformations with relative ease. It's a snap to hunt down text attributes like font or style changes, or locate special characters such as tabs or line ends—you just choose the attribute or character you're interested in from a menu. But the real boon is the ability to search for patterns, not just specific characters, and to locate text according to its relative position in the document. For instance, you could find all numbers between 5 and 87, locate capitalized words that don't begin a sentence, or find a text string only if it comes immediately after a particular character. To top it off, all three search functions work on closed files, making Nisus a more powerful text-retrieval tool than Gofer.

Undo It All
There's an Undo command, of course, but it doesn't poop out after one or two uses—you can reverse the effects of almost 33,000 prior commands, assuming memory permits. The program will compare any two open files for you, or let you synchronize two open files so that they scroll in lockstep as you scrutinize them yourself. You also get a competent spelling checker and thesaurus, a glossary for expanding abbreviations into complete words or phrases, and a host of little creature comforts that speed editing chores, help eliminate errors, and facilitate file management. There is, however, one useful feature conspicuous in its absence—a word-count routine.

Fully Featured Formatting
If I seem to have slighted Nisus's formatting capabilities, it's only because the program's text-editing features are so impressive. In fact, if you require finer control over layout and typography than Nisus offers, you probably need a desktop publishing program. Some highlights: each paragraph can have its own ruler, and you can copy rulers from one paragraph to another to set margins, line spacing, tabs, and other characteristics with a single command. For more extensive formatting chores, a full style-sheet system is provided. You can change the layout of headers and footers on every page if you like. Pagination is automatic.

Imported PICT graphics can be placed on the underlying page or directly into the text stream. You can even edit graphics—Nisus's built-in drawing tools may be superfluous for most hard-core writers, but even they may consider them as occasionally useful extras.

Nisus deals a dual blow to the perpetually irksome problem of file exchange. The first component of the solution is conventional: the program effortlessly reads and writes Microsoft Word and MacWrite files, retaining nearly all text formatting in the process, and comes with import filters for PageMaker 3 and 4. But what makes Nisus unique is the way it handles its own files. In them, the program stores formatting information—ruler settings, font and text style changes, and so on—separately from the text itself. Nisus documents thus appear as plain text files to other programs, and can be opened as such. Likewise, you can transfer a Nisus file to a PC or other type of computer without a translation step.

Taming the Program
Obviously, taming a program of this depth requires some work, but Nisus provides you with the necessary tools. Lots of keyboard shortcuts are built into the program (in fact, every option in the dialog boxes has one), and it's extremely easy to create your own for any menu command. More than a simple key-stroke recorder, Nisus's macro feature provides a full programming language. It can even run DAs as part of complicated macros that bring back text or numbers to your document and paste them in.

Learning the program could have been made easier, however, the large manual is incompletely indexed, while the online help system is too slow and is organized around Nisus's menus rather than according to tasks you might want to perform. Nisus suffers from one overall shortcoming, a sluggishness on the screen that's particularly noticeable on slower Macs. The program's performance isn't awful, mind you, it's just that there's a brief delay when you open menus, type text, or display a new file.

The better-known word processors have more text-editing power than most people need. But if you want the ultimate software for expressing your thoughts in writing, Nisus has the rest of them beat.

—Steve Cummings

See Whose to buy or circle 709 on reader service card.
**GO JUNIOR**

**Pros:** Best introduction to go yet developed; extra entertainment features.

**Cons:** Beginners might want more online help. Company: Toyogo.

**Requires:** Mac 512KE. List price: $35.

Tic-tac-toe succumbed to computer analysis in the late 1940s, on computers with less than a kilobyte of memory. By 1990 the best chess programs on large computers could challenge chess players up to the master level. But go, the 4000-year-old pastime that's the national game of Japan, is another matter. It's deceptively simple—opponents try to enclose areas on a board by placing black or white stones at points on a grid—but calls for considerable ability in pattern recognition, an area far from its ultimate development as a branch of computer science.

Ten years ago some go authorities were confident that no computer version of go would make even a useful sparring partner for beginners. Then a number of programs appeared, the best of which could play near the local go club champion level (more on go's remarkably precise ranking scheme below). The most successful commercial go program for the Mac has been the Nemesis Go Master from Toyogo, based on an innovative approach to the game described by Bruce Wilcox in a series of papers exploring optimal go strategy for human players.

**Let's Go**

The basic Nemesis program is strong enough to beat any beginner who's not a native genius at the game. It contains lots of options that help midlevel players but won't do much for neophytes. Toyogo has therefore produced Go Junior, a program specifically designed for introducing go to beginners. It's friendly almost to the point of goofiness, has settings that allow beginners to win one often enough to maintain interest, and takes into account the traditional sequence of stages of personal go-playing development.

When you start up Go Junior, the default board that appears is the 9-by-9 vertices board used to teach beginners but which is also used in mini-tournaments for elementary school students. This board (compared to the full-scale 19 by 19 board) allows you to learn the basic rules for capturing stones and enclosing areas in go, and get practice at fighting and winning small-scale battles. The idea is that when you know how to handle conflicts involving a few stones, you can begin to study the strategies necessary for decent play on a larger board—play at 19 by 19 is qualitatively much subtler than at 9 by 9, where the action often resembles simpler games such as the popular Othello or Pente. Since the basic representation of go on a black-and-white screen is stunningly austere, Toyogo has tossed in some nontraditional touches to keep young persons amused: captured stones assume unhappy faces and make Pac-Man-like exits from the board, the program announces "atari" in a synthesized voice, and a call to the automatic scoring function (a double-click on the calculator icon) shows the winning color grinning triumphantly (see "Win with a Grin").

As an instructional aid Go Junior preserves the settings-flexibility of Toyogo's advanced products. You can call for handicaps up to nine stones (a handicap means you get free stones of your color to place on the board at the beginning of the game) and set your computer opponent to play levels from 13 to 35 kyu. In go's meticulously developed ranking scheme, 35 kyu is the rating of a guy who just walked out of the dorms into a university go club by mistake, while 13 kyu is the much better rating of a smart person who has been practicing diligently for perhaps a year. (Once you go past 1 kyu, you enter the realm of expert rankings, reckoned in dan. For reference, 1 dan is the lowest, the 9-dan Japanese professionals are basically the best on earth, and America now has a few 7-dan players.)

For tutorial purposes, this setting range is perfect. In tests with beginners (ages 7, 14, and 32), the 7-year-old, for example, was delighted to find that he could win 9 by 9 games at a five-stone handicap with the program set to 35 kyu. The other test subjects rapidly calibrated themselves with the simplified (compared to Toyogo's fancier products) settings menu. The oldest subject, who has had a long-standing desire to learn go (and a Ph.D. in physics) found that she could play at the 20-kyu level on a 19 by 19 board after playing for several hours per day for two months and virtually memorizing Wilcox's Instant Go handbook. Go Junior won't play any higher than this—the manual notes that if you can beat this program on the big board at that level, it's time to challenge Go Master itself.

**In Black and White**

In an earlier review, Macworld called Nemesis Go Master the best way to learn the game. Now we have Go Junior, optimized for teaching beginners, and it's even better as an instructional product. At $35 suggested retail, it's cheaper than most crummy plastic go sets, but at most mail-order discounts, it's cheaper than desperately crummy cardboard sets, not widely available in the United States anyway. If you live in many parts of this country it may be the only way to learn go, and even if you live in Honolulu, it's still probably the best.

Please be warned that this game is addictive, is more interesting than all but the most engaging jobs (it has in fact interfered with more than one math career), and makes most other board games seem childishly unsophisticated. Those cautions having been stated, Go Junior may be recommended absolutely.

—Charles Seiter

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PLAYMAKER FOOTBALL 1.0

Pros: Intellectually exciting; simulates coaching experience. Cons: No color; arcade aspects superfluous.

Company: Bruderbund Software.

Requires: Mac 512K. List price: $49.95.

Playmaker Football is a thinking sports fan's computer game. If you're a Monday-morning quarterback who revels in analyzing the subtleties of play design, play selection, and the all-important draft, Playmaker is your game.

You're the Coach

Playmaker Football simulates the entire experience of coaching a football team, from drafting and developing players in the Team Draft mode, through designing plays on the chalkboard in the Chalkboard Editor, to calling plays on the field in the Game Mode. Decisions you make in each of Playmaker's modes contribute to your team's success or failure in a game.

There are several ways to play Playmaker Football. The easiest way is to use 2 of Playmaker's 13 ready-made teams in the Game Mode. The teams have names like the Plugglies, the Whammers, and the Badmen—and players with names like quarterback Johnny Awesome and guard Obsta Kul. Each team comes with its own playbook, from which you can choose one of about 70 unique offensive, defensive, or special plays for each down.

The playing field is seen from above, with each player represented as an animated figure. Although small, the players are animated adequately for you to see and understand the action on the field (see "Hike!"). Unfortunately, Playmaker gets a five-yard penalty for its lack of color graphics.

Digitized sound effects of players grunting and crashing into each other add bone-crunching realism. Audience applause and boos punctuate good or bad performances.

Picking the Plays

In coaching a ready-made team, the name of the game is play selection, choosing which of the 70 plays is best for your situation. On each down Playmaker lets you call either a running, passing, or special play, or you can call a corresponding defensive play. Unlike Accolade's 4th & Inches, which gives the user no control over play calling, Playmaker lets you call plays through a dialog box that allows you to choose from a list of all plays or from a list with only one type selected—running, passing, or special.

Calling plays for Playmaker's ready-made teams can make for gripping action. And you have to call them quickly, because the computer referee gives you only 45 seconds to pick before he slaps your quarterback with a five-yard delay-of-game penalty.

Manual Fumbles

You can control where your quarterback throws the ball by pressing the Option key and clicking on a point on the field, but I found this to be a surefire way to get an incomplete pass or an interception. It's also possible to control the direction of the ball carrier. Once again, I found it better to defer to the computer's judgment.

When your team is on defense, pressing the Option key gives you control of the middle linebacker, which is quite useful for going after receivers and will usually help your game. And you can make your return man call a fair catch by pressing the space bar, or have him let it bounce by hitting delete on punt returns.

Building Your Team

Playmaker's Team Draft module displays the pictures and gives data on your 30 players (15 on offense and 15 on defense). Double-clicking on a player's picture brings up a bar chart displaying his speed, strength, intelligence, agility, and discipline. Each player can have a maximum of 100 points in each of these categories.

While the football purist may chafe at using this unusual rating scheme, the Playmaker point system makes it possible for each coach to field a team with an equivalent amount of talent. By allotting a maximum of 7500 points to distribute among the players, Playmaker prevents coaches from making every player on their team a superathlete.

Hike! A view of the field in Game Mode as the Whammers line up to run HB Screen L against the Buckwings' tough 4-2 WS Double Cover defense.

You can use these points to concentrate on your attack. For instance, the Whammers' fullback, Hefty Hunter, comes with a strength rating of 100, a speed rating of 80, and an agility rating of only 60. In order to beef up the Whammers' sagging running attack, I reduced wide receiver Fingers McGov's discipline rating from 100 to 60, and used the extra points to make Hefty faster and more agile. In the next game, the Whammers' running game improved dramatically, and my computer opponent—programmed to focus on hot players—began to concentrate more on my fullback, allowing me to get away with more passes.

Chalk Talk

The last module of the game is the Chalkboard Editor, which lets you both design plays from scratch and alter plays from a playbook. The first time I designed an offensive play from scratch, I added it to the Whammers' playbook and watched glumly as the opposing team smashed through my line and sacked my quarterback. A better way to start designing plays with the Chalkboard Editor is to use an existing playbook that already has a solid blocking scheme.

Finally, the Chalkboard Editor allows you to teach the computer your coaching style, in effect training an assistant coach that can take over for you in the Game Mode. Each play has a corresponding Artificial Intelligence Window, which allows you to set how frequently a certain play will be called or in what situation it will be called when you let the computer coach your team.

Overall, Playmaker Football is the best football game for the Macintosh I've ever played. —Jonathan Cassell

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**Customizers**

**CLICKCHANGE 1.01**

**Pros:** Provides many predefined examples; imports/exports elements; has powerful editor for creating animated color cursors. **Cons:** Synchronous sounds. **Company:** Dubl-Click Software. **Requires:** Mac Plus; System 6.0. **List price:** Version 1.0.3 $79.95.

**PERSONALITY 1.0.1**

**Pros:** Asynchronous sounds; can selectively disable features to resolve compatibility conflicts. **Cons:** Limited alternatives to standard Mac elements; some compatibility problems; expensive. **Company:** Preferred Publishers. **Requires:** Mac Plus; System 6.0.2. **List price:** $79.95.

Face it. Nobody buys screen savers like After Dark or Pyro to prevent phosphor damage to their monitors. You buy them because they make your Mac—and by association, yourself—look cool. Period. Aside from helping you express your individuality, such “utilities” are virtually useless, but they’re a lot of fun nonetheless. The same can be said of ClickChange and Personality, a new breed of Control Panel devices (cdevs) that offer the capability to customize the Mac’s look-and-feel (and sound, if you want to get technical). With either cdev you can replace the standard interface elements—cursors, windows, buttons, colors, and sounds—with funky alternatives that are bound to make your friends green with envy. While both products have remarkably similar feature sets, they are worlds apart when it comes to functionality.

Both utilities work basically the same way. You copy the cdev into the System Folder of the start-up volume and then restart so the INIT (start-up document) portion of the file is loaded into memory. The INIT hangs around waiting for other applications to call standard toolbox routines—the Mac’s internal utilities that define windows, dialog boxes, buttons, and so forth. When the INIT spots a toolbox call that you have customized, the INIT substitutes its own alternative definition for that of the Mac. The result is that you can slap different front ends onto the Mac’s interface easily and often.

When first accessed through the Control Panel desk accessory, ClickChange and Personality look like twins. They both have large buttons that, when pressed, present options for changing standard Mac elements such as cursors, buttons, sounds, windows, and colors. That is where the similarity ends, however. Because once you actually delve into these utilities, a cursory comparison quickly reveals that ClickChange is by far the superior product.

**Crazy Cursors**

The superiority of ClickChange is nowhere more obvious than with the cursor options. Personality gives you 8 arrow cursors of different colors to choose from (on a monochrome monitor, however, they all look the same). ClickChange, on the other hand, comes with 83 animated cursors of all types. There are dogs that do backflips, rotating cubes, bouncing balls, flying HeloCars, and so on. Additionally, the powerful built-in editor allows you to modify any of the existing cursors, or design your own from scratch. You can then export your creations and share them with other ClickChange owners.

**Sound F/X**

Like the shareware offering SoundMaster, both utilities let you link particular sound effects to Mac events. For instance, the Mac can say “good night” whenever you shut down. Of course, you need the digitized “good night” sound resource file. Preferred Publishers leaves that up to you with Personality, cavalierly recommending that you create your own sound files with Farallon’s MacRecorder, or get them from online services or user group libraries. Dubl-Click, on the other hand, goes the extra mile, providing with ClickChange 31 fun sounds that can be imported into your System file to supplement the standard boing, clink-klank, monkey, and simple beep.

Due to Personality’s use of a pop-up menu, assigning sounds to events in that program is uninteresting and laborious. It does, however, have two advantages over ClickChange. First, Personality’s sounds are asynchronous, which means that you can continue using the Mac while the sounds play. With ClickChange’s synchronous sounds, the Mac halts operation until the chosen sound has been played. The other advantage of Personality is that it can choose randomly from several sounds tied to a single event.

**Chameleon Colors**

If you’re bored with the standard Mac colors for elements such as menus, windows, and buttons, ClickChange and Personality allow you to change them to whatever colors you like. Both utilities work exactly the same way: click on an element and then choose a color from the Mac Color Picker. Yet again, ClickChange does Personality one better by allowing you to name different color combinations and save them as sets (the package comes with 28 predefined sets for you to choose (continues)
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from). Making multiple color changes in Personality, however, soon becomes an exercise in tedium because there is no way to save default sets.

**Window Dressing**

It is ironic that shortly after Microsoft gave IBM-cloned owners the ability to mimic the Mac with Windows 3.0, both ClickChange and Personality came along offering Macintosh users sample alternative window designs. With its eight options, ClickChange gives you a taste of what it’s like to use the point-and-click interfaces of Windows or the Next and Sun Microsystems workstations, to name a few. Personality, on the other hand, offers only two three-dimensional alternatives to the standard Macintosh window, neither of which is very inspired.

**Button Blowout**

With ClickChange, you have six different styles of buttons from which to choose. Aside from the standard buttons, Personality offers only one 3-D alternative. To make matters worse, Personality places a gray background behind all button text, which makes dialog boxes cluttered and all but unreadable.

While their feature sets are more alike than different, the two programs do have features unique to each. Personality allows you to change the standard menu font (Chicago 12) to any font installed on the Mac. Furthermore, an option gives the menu bar and menu items a 3-D look. I wasn’t able to get this feature to work correctly until I removed almost all of the INITs from my System Folder, and even then this feature seemed to suffer from some compatibility problems. Luckily, Personality has the ability to selectively disable its features within certain applications to resolve such compatibility conflicts.

ClickChange differentiates itself with a unique scroll bar feature. There are six different styles of scroll bars to choose from—from Next-like to slightly 3-D—and you can request double arrows at the end of each scroll bar if there is room. With double arrows, you needn’t move the cursor to opposite ends of a scroll bar just to move around within a document. Just click on the appropriate arrow. Very handy, especially for owners of large screens. Another nifty feature is the proportional elevators option in the scroll bars. Instead of always being the same 1/4-inch square, an elevator’s size changes to approximate the proportion of the information displayed in a window to the total size of a document. This feature is part and parcel of the Apple IIGS operating system, and should be adopted for the Macintosh too.

Telecomputing modem jockeys can probably download a collection of public domain and shareware INITs and edes that perform some of the same functions as Personality and ClickChange, but there’s no guarantee that they’ll work together. If you really want to impress your friends and put a little fun back in your Mac, ClickChange is clearly the way to go. It’s a comprehensive collection of fun goodies executed in an extremely professional package. Feature for feature, it blows the doors off Personality, and as the couple de grace, it’s less expensive.—Owen W. Linnmayer

See Where to Buy or circle 528 (ClickChange) or 715 (Personality) on reader service card.

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**File-Transfer Kit for the Tandy WP-2**

**WPDUET**

**Pros:** Kit includes cables; works with any Mac; quick and functional.

**Cons:** Transferring files from Mac to Tandy slightly confusing.

**Company:** Cabochon. **Requires:** Mac 512K. **List price:** Version 1.01 $99.95.

The Tandy WP-2 is a flat, notebook-sized, portable laptop word processor from Radio Shack; it costs $350 but is often on sale for $300. Its blue-on-yellow LCD display shows eight clear lines of text, the full page width across. Of all the non-Macintosh portable operating systems, the WP-2’s might be the most comfortable to Mac users; you select text by highlighting it, choose commands from menus, and copy and paste text between documents. It’s much easier to use than, say, the Cambridge Z88. There are immediate pop-up help screens everywhere; the most important 26 commands are painted right onto the keyboard itself; and—unlike some Tandy/Radio Shack electronics—the WP-2 comes with an impressively lucid manual. It’s safe to say that this notebook computer is among the friendliest you can buy.

There are only three limitations to the WP-2. First, its full-size keyboard feels mushy. Second, it comes with very little memory—enough to hold only about 10 pages (you can add up to six times as much memory, though). And finally, it cannot talk to the Mac.

Unless, of course, you get WPDUET. There’s nothing to this package—just a program and a cable. The cable has two heads at each end, ensuring compatibility with any old or new Mac. The program quickly and simply shuffles files from the WP-2 to the Mac, in the process converting them to any of several word processing formats: text only, with line breaks, MacWrite II, or Rich Text Format (readable by WriteNow, Word, and Write).

The **Word Processor Process**

One end of the WPDUET cable plugs into the Mac’s modem port; the other goes into the WP-2’s RS-232 jack. On the Mac, you launch the WPDUET program—the most minimalistic, graphically void program you’ll ever use. There are only two commands in the Direct menu; the one you want is “Direct connect to WP-2.” A tiny status box appears on the Mac screen; that’s all you’re going to see through the entire transfer process.

From now on, you do all the work on the WP-2. Go to the Files screen, the WP-2’s text-based equivalent of the
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Circle 90 on reader service card
Finder. Highlight the file you want to send to the Mac, and invoke the Copy command. The WP-2 asks where you want to send the file. One nice aspect of this machine is the many options you have for file storage: a permanent RAM disk; a 200K 3½-inch disk (if you buy the optional disk drive); an expensive, optional, removable RAM board; or a cassette tape (slow and annoying, according to Cabochon).

WPduet makes the WP-2 think that a Mac is a massive external disk drive. Therefore, you select Diskette, so that the selected file gets moved to the Mac. In a few seconds, the transfer is complete. The file has been copied to the Mac, and any bold or underline formatting you established on the WP-2 is preserved.

**Duet of Features**

WPduet also sends files—alas, text files only—in the other direction, from the Mac to the WP-2. What's strange is that, once again, you do all of your file manipulation using the WP-2's file-directory screen, not the Mac's Finder. And because file names on the WP-2 cannot be longer than 8 characters, Mac file names show up on the WP-2 screen in truncated form: a Mac file called 1990_Sal.DA becomes "1990_Sal.DA" (O stands for Document, A for ASCII).

Furthermore, it's a little hard to accept the fact that you're actually viewing the names of Mac files—which haven't yet been transferred—on the screen of the WP-2. Because they're showing up in the WP-2's directory window, you might incorrectly assume that they've already been transferred. Your only clue is that the word Diskette—meaning the Mac—is still highlighted at the top of the WP-2 screen, so you know you're viewing the Mac's directory.

The remaining problem with transferring from the Mac to the WP-2 is that the Mac's memory capacity is gargantuan compared to the WP-2's. You simply can't transfer some Mac files to the WP-2 without breaking them into smaller chunks. (The WP-2's main system memory—what you use to edit documents—is a nontemplate 10 pages. Storage memory, on the other hand, is expandable.) In cases where the Mac file is too large, thereefore, the WP-2 simply tells you, "Insufficient memory."

**Diskette Duties**

WPduet also transfers files to and from the WP-2's optional $200 Portable Disk Drive. This battery- or AC-powered unit is far less impressively designed and documented than the WP-2 itself (probably because it wasn't developed specifically for this machine). Nonetheless, it provides a useful and permanent storage medium for WP-2 files. It uses regular Mac disks, formatting them so that they hold only 200K apiece. The drive plugs directly into the WPduet cable; the laptop itself isn't even part of the hookup.

The WPduet interface for the disk drive is more elegant: in this mode, the portable drive's files appear in a pseudo-Finder window on the Mac screen. By clicking and Shift-clicking, you highlight the files you want to transfer, then choose "Copy selected files to the Mac"; WPduet does the rest. Other self-explanatory WPduet commands are "Copy a Mac file to the portable drive," "Initialize the disk in the portable drive," and "Delete selected files from the portable drive."

**Duet for One**

If you're looking for a low-cost laptop, research the Tandy WP-2. It costs hundreds less than the Cambridge Z88 (the one advertised as Mac Lite), but it comes with much less memory. The WP-2 storage-memory expansion options are as follows: a 32K RAM board (Radio Shack: $120), a 32K chip (Radio Shack, $50; third-party, $17), or a 128K chip (third-party only, $79). Each 32K buys you about 20 pages of storage. Particularly in light of its menu-driven, clearly labeled interface, the WP-2 can be a very good value.

You don't, however, have to do any research on WPduet. It does what it does, smartly and simply. Cabochon, WPduet's maker, is a one-man operation. Having noticed that there was no existing method for Mac users to reap the advantages of the friendly, inexpensive, eminently portable WP-2, this fellow sat down and invented one. Because of that entrepreneurial spirit, a sizable gang of Mac-owning writers can now hit the road.—David Pogue

See Where to Buy or circle 799 on reader service card.

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**FILEMAKER PRO**

**Pros:** Much-improved layout features.

**Cons:** Slow on Mac Plus, SE, and Classic; significant bugs. **Company:** Claris Corporation. **Requires:** Mac Plus; second disk drive; System 6.0. List price: $299.

As Macintosh hardware and software become more sophisticated, so do users' expectations for new products. Claris's FileMaker Pro, the latest incarnation of the successful Mac database program, will please some new users but might disappoint longtime FileMaker aficionados who were hoping for a more substantive upgrade.

Claris changed the program in two main ways. The first was to revamp FileMaker to bring it in line with other Claris products—adding a spelling checker, the Claris Help system, and the XTND architecture, which allows for import and export with many other programs. The second was to add features based on user requests, mostly to help with designing layouts.

**Layout Heaven**

The new Layout features are terrific for database designers, especially if you have used previous FileMaker versions. You can name your layouts, and there's a pop-up menu in the upper-left corner that lets you switch easily between layouts. The Layout mode sports rulers and visible, user-definable gridlines. You can zoom in to 400 percent and zoom out to 25 (continues)

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**Smarter Layouts** In Layout mode you can see several of FileMaker Pro's new features, including the Tab Order dialog, with the editable labels for numbering each field; the improved pop-up palettes for color, line, and fill; the Zoom In and Zoom Out icons; and the pop-up menu for switching between layouts.
Fully Functional Copy
The demo is a full working copy of the program. All the functions are active and can be used.

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percent (these sizes are also available in the Browse and the much-improved Preview modes). The Size box tells you type in the exact dimensions and location on the page of a field or other object.

The ability to slide objects has been improved, and at long last, you can move objects one pixel at a time by using the arrow keys. To change the position of several objects at a time, there's an Align Objects command, which lets you line up objects' sides, tops, bottoms, or center, and if you choose, distribute objects equally along the grid. Objects can be grouped, locked in place, placed in front of or behind other objects. For easier data entry you can change the Tab Order for each field (see "Smarter Layouts"). Objects and fields can be specified as nonprinting. Color, line, and fill options are enhanced and easier to use.

One especially useful new feature is the ability to give layouts buttons that can trigger scripts or commands, or switch to other layouts. In fields that contain value lists, you can opt to show the values as check boxes, radio buttons, a pop-up menu, or a pop-up list.

You can now sort and reorder both fields (from the Define Fields dialog box) and scripts (from the Define Scripts dialog box). Fields also have a new Time category, useful for hourly billing, for example. FileMaker's calculation capabilities have been improved with the addition of 22 new functions, most of which are math and trigonometric functions, or functions that allow you to manipulate Time fields. Most eagerly welcomed is the new Summary function, which lets you perform some calculations on Summary fields.

Like FileMaker II, Pro is a multiuser database, but it uses its own unique host-guest scheme for file sharing, rather than the familiar AppleShare multiuser approach. Multiuser performance has been improved in Pro. It would still be preferable if the database could be placed on an AppleShare file server and accessed in the standard way.

Performance Test

Despite Claris's advertising claims to the contrary, my benchmark tests showed no significant performance gains using FileMaker Pro over using FileMaker II (See "Test Track"). And FileMaker Pro is significantly slower than FileMaker II when running on a Mac Plus, an SE, or a Classic. When entering data on these machines—such as typing into fields and tabbing between them—fast keypunchers have to slow down their typing speed to match the program. Claris needs to fix this problem. Switching layouts via scripts also seems slower than before.

There's sometimes a noticeable delay as menus are being opened and the menu choices appear.

FileMaker Pro is not only a much larger application (770K versus 354K for FileMaker II), it also supports the recent trend toward requiring more RAM to run comfortably. Pro wants a 1MB partition in MultiFinder—double that of FileMaker II.

Bug Patrol

Unfortunately, this first version of FileMaker Pro comes with a generous supply of bugs. Because of a previously unreported quirk in FileMaker II files, conversions of some FileMaker II files to Pro can result in scrambled scripts, file crashes, and data loss. Claris Tech Support has a workaround that repairs FileMaker II files so they can be converted successfully, but following the suggested procedure can take an hour or more per file conversion. After you export numeric records in SYLK format for use in Excel, the records appear in Excel as text, not numbers.

Hairlines created in FileMaker II end up in Pro layouts as 1-point lines. There are problems printing to the HP DeskWriter, and printing a range of pages, say pages 3 to 5: FileMaker Pro acts as if it is printing, but no pages actually print. TIFF and encapsulated PostScript graphics can be imported and placed on layouts, but they do not print at full quality on the LaserWriter.

A particularly dangerous bug: Choosing Delete Record gives you a confirmation dialog box with two buttons, Delete and Cancel. Cancel is the outlined, default choice, but pressing the Return or Enter keys activates the Delete button! The really frustrating thing about this bug is that it's inconsistent; sometimes the dialog buttons work correctly. Claris says that a maintenance release that fixes the bugs is forthcoming but at press time had no details on when it will be available or what the upgrade policy will be. It might be available by the time you read this, so check with Claris.

It's Nice, but Is It a Pro?

The changes since FileMaker II, the last version of the program, are incremental rather than revolutionary. The slim, 16-page manual What's New is an unwriting testament to the lack of (continues)
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fundamental changes. Compared to competing products such as Panorama or File Force, FileMaker Pro still comes up a bit short in the features department. As good as Pro's layout mode is, Panorama's layout editor gives the designer valuable tools, such as cluster resize and expanding objects' handles, that are unavailable in FileMaker. Pro still lacks a real macro or scripting language like Panorama's. You can't format data during data entry for such obvious things as all caps for state names, or format data as telephone or Social Security numbers, as you can in Panorama and File Force. You can format calculated fields after entering data, but the process is needlessly complex. Complex calculations must still be formatted as single, long formulas; you can't break them into easily digested pieces on separate lines in the calculation editor, nor can buttons trigger calculations. Also, you don't have the use of variables in calculations. The program still virtually ignores punctuation marks in fields, so it's difficult or impossible to clean up data with punctuation imported from other programs.

Some of these complaints are long-standing, and yet they still haven't been addressed. Furthermore, users of previous versions will have to get used to the interface changes: Claris has changed several hot-key equivalents and added alert boxes where none existed before, sometimes requiring more keystrokes to do a function.

Laying Out the Choices

So what's the verdict on FileMaker Pro? Mixed. New users, and longtime FileMaker designers, will love the myriad new layout features and quickly take advantage of them to build more and better functionality into their files. But for people who have to actually enter data into those new files, things are more problematic, especially for those using 1MB Pluses, SEs, or Classics—still the majority of Macs on people's desks. FileMaker Pro is just too slow on these machines.

At Claris's upgrade price of $100, happy FileMaker II owners might decide that there aren't sufficient advantages to the new version to justify the cost, at least until Claris fixes the bugs and the speed problems. On the other hand, FileMaker Pro is still an easy program to set up and use, enhancing many of the appealing features that have made it a best-selling Mac database. At $295, it's a good value and is worth the investment. For users with Macs that have the horsepower to run FileMaker Pro acceptably, it remains a leading contender in the database wars.—Tom Negino

See Where to Buy for contact information.

**Hand-Held OCR Scanner**

**TYPIST**

**Pros:** Recognizes multiple fonts, styles, and sizes; inserts recognized text directly into applications. **Cons:** Offers only rudimentary capabilities for scanning graphics; inadequate manual; no on/off switch. **Company:** Caere Corporation. Requires: Mac SE; 4MB RAM; hard drive; System 6.0; Multifinder. **List price:** $695.

Last August, just a demonstration of the Typist was enough to make several Macworld editors drool and scream, "I want it!" Well, I got it. And after working with this combination hand-held scanner and optical character recognition (OCR) system, I've got—as the line goes—some good news and some bad news. The good news is that the Typist really does work. The bad news is, it has a few quirks and deficiencies Caere needs to address.

Like other OCR products, the Typist transforms scanned images into ASCII characters. But unlike other OCR programs I've worked with, the Typist isn't a stand-alone application that creates separate text files. Instead, it works by flowing recognized text directly into a word processing document, a spreadsheet, a page-layout file, or whatever, as if the text were coming from the keyboard. Wherever the cursor is located in a document, the Typist inserts text.

The Typist recognizes 6- to 72-point type in any nonstyled font, in 11 Latin-alphabet languages. It can handle output from a variety of sources: typewriters, laser printers, typesetters, newspapers, even dot matrix printers. You can also use the Typist to scan images, although it's clear that Caere doesn't see image scanning as the Typist's primary function. Scanned images can be saved in PICT2 or compressed or uncompressed TIFF formats.

**On Your Mark**

The hardware—the scanner itself—is a SCSI device. That's not a problem, but the SCSI adapter box Caere provides is. First, the box has only one SCSI port, which means you can't daisy-chain other SCSI devices from it (without using a T adapter cable); second, it isn't internally terminated. The Typist's 300-dpi scanner, mean-

(continues)
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Typist Benchmarks

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<th>Recognition Time</th>
<th>Errors</th>
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<tr>
<td>Spreadsheet</td>
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<td>882</td>
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Typist was tested on the same four documents used in previous tests for OCR program benchmarks (see "Text without Typing," Macworld, October 1990). The spreadsheet was a 1-page, landscape-oriented, legal-size table of dates, printed on a LaserWriter in 10-point Times. The manuscript was a 10-page document printed on a LaserWriter in double-spaced, 12-point Courier. The 3-page Apple press release used a light condensed version of Garamond. And the Macworld test was a 6-page, 3-column feature article. Recognition time includes the time necessary to scan each page of a test document. Substitution errors are characters incorrectly recognized by Typist; recognition errors are characters not recognized by Typist.

while, features rubber rollers on the bottom to avoid skidding—a nice touch. A switch located on the scanner lets you adjust dithering for halftone image scans (dithering must be turned off for text recognition).

The software consists of a desk accessory and two INITs. Although the DA controls the Typist (see "In Control"), it’s the INIT named trapj—essentially Caere’s OmniPage OCR engine—that makes the Typist what it is. Loaded at startup time, trapj lurks in the background of MultiFinder. When you scan text, the Typist moves the active application (the word processor, spreadsheet, and so on) to the background, and brings the OCR engine to the foreground. A character window and status bar appear so you can check the quality of the scan and monitor recognition progress. As soon as the engine finishes recognition, the application returns to the foreground so the Typist can insert the new text.

The Typist scanner has a scan width of 5 inches, so you need to make two passes to capture an entire 8½-by-11-inch page. You can scan down, right to left, or left to right. With horizontal scans, a stitching feature enables the Typist to automatically discard repeated text that appears in overlapping scans. On multicolored documents, you can also set the Typist to read only the center, left, or right column.

**Read All About It**

I tested the Typist on a variety of documents—typeset, laser printed, and dot matrix—and was happy with its accuracy. It worked well on high-quality typeset text (from Macworld and Newsweek) and newspaper text (from the Boston Globe and the National). It also performed surprisingly well on draft-mode dot matrix printouts. In fact, the Typist’s accuracy closely matched that of other OCR programs (see “Text without Typing,” October 1990). I had no compatibility problems with several applications, including MacWrite II, Word, Excel, and PageMaker.

The Typist is pleasantly tolerant of not-quite-perfectly-straight scans. But despite the Typist’s horizontal scan capability, I found it difficult to get a clean scan from a thick book; the hand-held scan head just can’t pass over a page as cleanly as a flatbed scanner can. Another thing that takes getting used to is positioning the scanner. It’s hard to see where you started and stopped scanning.

As far as speed is concerned, the Typist cannot really compare to flatbed scanner OCR solutions. It is not the recognition process that makes the Typist slower, but scan time. The Typist is best suited to recognizing short- or medium-length sections of columnar documents. Use it on several full-length pages, and you’ll start wishing for a flatbed scanner. For example, it took 15 Typist scans, compared with 6 flatbed scans, to recognize 6 pages from Macworld.

There are some important differences between the Typist and its OmniPage sibling. First, the Typist cannot automatically strip out the graphics in a text scan as OmniPage can. I found that the best solutions to this problem were either to make very short scans around the graphic or to cover the graphic with a piece of white paper during a scan. Second, the Typist does not automatically strip soft hyphens (those that split a word on two lines) from recognized text; you have to remove them yourself. Third, the Typist does not maintain text attributes—bold, italic, font size—in recognized text.

**Too Good to Be True?**

The Typist is definitely not perfect. By placing so much emphasis on OCR capabilities, Caere has neglected other not-so-trivial aspects. The most obvious omission is an on/off switch. You want to turn the Typist off—you disconnect it from the Mac SCSI port. If scanning text is easy with the Typist, scanning images is a chore—the image scan controls are incredibly poor. The manual, by no means information-packed in the first place, jumps between instructions for Mac and PC users, confusing matters further. Nor does the online help offer any more information than the manual.

Still, if you haven’t seen the Typist, you should check it out. It’s certainly the most convenient OCR method I’ve worked with, perfect for a short scan here, a short scan there. And there’s nothing like the sight of the Mac automatically tabbing between spreadsheet cells and typing on its own—very quickly. Best of all, the performance the Typist offers matches that of flatbed scanner OCR solutions. That’s something Caere should be proud of.—Brita Meng

See Where to Buy or circle 780 on reader service card.
**REVIEW**

**Removable-Media Drives**

**BERNOULLI TRANSPORTABLE**

**Pros:** Crash-resistant Bernoulli technology; swift file copying and data transfer; slim, lightweight cartridges; international power supply; switchable SCSI termination. **Cons:** Relatively heavy. **Company:** Microtech Corporation. **Requires:** Mac Plus. **List price:** $1399.

Removable drives that combine unlimited storage with high performance and easy transfer of large data files offer some real advantages over hard drives. Two new products, Microtech's RS0 (developed by Ricoh) and Iomega's Bernoulli Transportable, are competing with the popular Syquest cartridge drives in the removable-drive market.

Both new removable drives come with a promise of high reliability, a welcome feature considering that the greatest problem I've had with my Syquest drive during three years is that the cartridges tend to develop bad blocks during extended use, which results in lost data and uncopyable files in many cases. And although it's difficult to accurately judge reliability, both new drives performed flawlessly throughout the course of my three-month evaluation.

**Not Speed Demons**

I tested the drives' speed against my Syquest drive using DiskBasher and DiskTimer. Both drives turned in benchmarks between 19 and 38 percent slower than the Syquest drive. But in general use I found the performance of the three drives to be approximately equal, with one notable exception.

The Bernoulli Transportable was surprisingly swift at Finder-mediated file duplications and transfers—25 percent faster than the Syquest drive and 37 percent faster than Microtech's Ricoh drive. This is due, at least in part, to a 44K RAM cache that's transparently installed at start-up by Iomega's device driver.

**Like Large Floppies**

All three drives use removable cartridges whose plastic casings are almost the same size, but none of the cartridges are interchangeable between different drives. This can certainly be a deciding factor if you regularly need to send large data files to a service bureau or coworker. Unless you are using the same drive mechanism, removable cartridges won't be useful.

With its sliding shutter, the Bernoulli's cartridge resembles a floppy disk on steroids. It is the lightest and slimmest of all three cartridge formats, weighing only 5 ounces.

**Ricoh versus Bernoulli**

Although the Ricoh and Bernoulli cartridges both enclose a spinning disk of storage medium, their overall design philosophy is quite different. The disk inside the Bernoulli cartridge is flexible like the medium inside a floppy disk. When the Bernoulli's disk spins at high speed, it levitates and draws near the read-write head. If there is a physical shock, dust particle, or power loss, the disk simply falls away from the head. After the obstacle or disturbance has past, the disk literally flies back up. Iomega claims the system can endure up to 5000 g shocks during operation (a shock roughly equivalent to the drive's falling 8 feet).

Since this system is largely protected from dust and other airborne particles, Iomega makes the system relatively open to the air. The cartridge's shutter can be easily opened manually and you can even see into the interior of the cartridge when it's inserted.

The Ricoh cartridge in the Microtech drive contains a rigid disk much like the platter of a fixed hard drive. Because the read-write head hovers closely over the rapidly rotating disk whenever the cartridge is inserted, this type of system is far more vulnerable to dust and shocks, either of which might cause the head and the medium to crash into each other. Consequently, Ricoh cartridges are manufactured in a clean-room environment and are equipped with a shutter mechanism that makes it nearly impossible to accidentally open a cartridge and expose the medium to dust-laden air. This design feature and a modest 9 percent greater storage capacity are the primary distinguishing features between the Ricoh and Syquest technologies (the real-world capacities are 42.3MB for the Syquest and 46.3MB for the Ricoh).

**Minor Complaints**

The Ricoh drive has one quirk that users should take care to avoid: if you forget to eject the cartridge and you don't wait for the drive platter to stop spinning before you remove the disk, you can damage it. The Microtech manual carries a section in bold-face type warning of the danger, but it (continues)

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*The Microtech RS0 (top), the Iomega Bernoulli Transportable (bottom)*
Let NewGen satisfy your hunger for high-resolution with an affordable 800 dpi printer!

Add powerful applications like PageMaker®, FreeHand® and Adobe® Type Fonts to produce typeset quality output at your own facility.

The NewGen TurboPS/480 can produce PostScript® language compatible output at 800 x 400 dpi, nearly four times the resolution of other laser printers. And when we say PostScript compatible, we mean it, including Type 1 fonts, special effects and EPS files from all your favorite applications and programs.

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If you have an appetite for high-speed, high-resolution PostScript language printing, call 714/641-8900 today to get your TurboPS evaluation kit.

Dealer inquiries welcome.
seems to me that a cautionary statement should be printed on the drive itself (perhaps on removable tape).

The most unappealing aspect of the Bernoulli Transportable is the fact that it needs to be cleaned occasionally in order to remove accumulated dust and grime that might otherwise cause frictional wear on the read-write head and medium surface. A cleaning cartridge and cleaning fluid is supplied with the drive. Bernoulli claims a mean-time-between-failures rate of 60,000 hours for a drive that is cleaned every month, a very respectable indication of overall reliability.

Not Quite Transportable
You'll hesitate before carrying the 12-pound Bernoulli Transportable to and from work. But the unit is enclosed in a sturdy metal case designed to take hard knocks during transport, and the carrying handle that swings out from the front of the drive makes it easy to carry. The Bernoulli also comes with external switches to change the SCSI address, turn termination on or off, and switch between 115v and 230v operation, a handy feature for overseas travel. Another advantage of the Bernoulli system is that it has the optional software (available from Iomega), the drive works with any MS-DOS computer equipped with a SCSI port. And with an additional program called Bernoulli File Exchange, Mac and MS-DOS users can exchange files too large to be transferred from one system to another on floppy disks.

Toll-Free Technical Support
Both drives come with toll-free technical support, a noteworthy feature that more drive manufacturers should offer. Iomega's Bernoulli Transportable comes with a one-year warranty that's extendable to two years for an extra $75. The Microtech R50 comes with a two-year warranty and a promise to send you a new drive within 48 hours if yours should fail. Iomega will provide a new drive the very next working day for a $50 charge.

Making the Choice
Both the Iomega Bernoulli Transportable and the Microtech R50 are solid products that provide high-performance removable storage at nearly equal cost. If you expect to be using a removable-cartridge drive for everyday use as your principal hard drive or for storing data, either of these drives is probably a better choice than a Syquest drive, based on my experience. If you need a sturdy, transportable drive that's relatively insensitive to hard knocks, the Bernoulli Transportable deserves a close look. But if what you're looking for is the ability to quickly back up a hard drive, or easily send large files, Syquest drives can do the same job as either of these drives at nearly half the cost.—David L. Foster
See Where to Buy or circle 621 (Bernoulli Transportable), 696 (Microtech R50) on reader service card.

Choose Plotter-Device Driver

PLOTTERGEIST 1.0
Pros: Cable supplied, renders LaserWriter fonts. Cons: Does not work with all software packages; font rendering takes a long time.
Company: Palomar Software

Output from computer-aided design (CAD) systems has always presented unique problems because most CAD drawings are larger than 8 1/2 by 11 inches. Printers that can handle larger sizes tend to be either very expensive or have unacceptable dot matrix output. Plotters offer high-quality color drawings on relatively inexpensive hardware. Palomar Software has released Plottergeist 1.0, a plotter driver that rivals Microspot's MacPlot.

Plug and Configure
Connecting a plotter to the Macintosh is not quite as simple as plugging in the cable and choosing Print from the File menu. Some knowledge of baud rate, stop bits, parity, and handshaking helps tremendously in setting up the connection. Palomar supplies Choose software and a cable that works with most plotters. Selecting page setup in your CAD program enables you to select pen speeds and colors, as well as chord tolerance for the smoothness of curves.

Text quality is an important issue. I am accustomed to the precise vector-based fonts that are standard with high-end CAD packages such as AutoCAD and MacBravo. Packages such as Claris CAD and MacDraw II use the basic Apple LaserWriter fonts and therefore Plottergeist must follow suit. In order to obtain acceptable text output from the plotter, Plottergeist renders these fonts for each particular point size. Once rendered, the result is stored in a file, thereby making future plots using the same font and point size much faster. Although its output is exceptional, Plottergeist's rendering time is extremely long. You can plan on at least one to two days' rendering time for each font. You can select Rough Draft from the Page Setup dialog box to produce quick output, but you compromise text quality.

Performance
I used a Hewlett-Packard Draftmaster I and a Mac IIfx with 8MB of RAM and an 80MB hard drive to generate plots from Claris CAD, MacDraw II, Blueprint, and MiniCad 3.0. AutoCAD Release 10, Douglas CAD/CAM, Douglas Schematic, MacBravo Modeler, and DynaPerspective did not function with Plottergeist. (According to the company, Plottergeist version 1.1 will be able to work with AutoCAD and DynaPerspective, but it was not available at press time.) Also, after converting my Mac IIfx to a IIfx with 16MB of RAM, I needed a software serial-switch patch, available from Apple or Palomar, to run Plottergeist through the serial port.

Overall, Plottergeist works as well as Microspot's MacPlot Chooser driver, which is supplied in its simplest form with MacDraw II, MacProject II, and Claris CAD. The engine is also used in IDT's Dreams with a minor interface change. The decision to spend a substantial sum of money for Plottergeist 1.0 depends on whether you need background plotting capabilities and LaserWriter fonts. If you output a lot of engineering drawings and graphic art, Plottergeist is a good buy. If, however, you only occasionally produce engineering drawings, Plottergeist is probably too expensive.—Victor Elgibany
See Where to Buy or circle 722 on reader service card.
There's more to comparing LaserJet PostScript® Language Emulation Cartridges than just the name

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<tr>
<th>Pacific Data Products</th>
<th>Hewlett-Packard</th>
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<td><strong>Warranty</strong></td>
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Don't settle for less just to buy the HP name. Ask for Pacific Data Products' PacificPage P•E. It's the PostScript language emulation cartridge for HP LaserJet IIP, IID, III and IIID printers that offers you more for less.

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When you need to create the impossible, just do what comes naturally—use PixelPaint Professional 2.0.

Call 1-800-624-8999, ext. 210, or see your local SuperMac software reseller.
Among the products I review this month are a boxed collection of shareware, an INIT that provides a better way to open files in applications, and an astrology program.

The Macintosh Bible Software Disks, Third Edition
The Macintosh Bible Software Disks, Third Edition ($38 from Goldstein & Blair) has placed over 20 of the best shareware and freeware programs on a two-disk set. You try the programs, choose the ones you like, and send a check ranging from $5 to $15 to the software developer.

Many of these programs can be combined to substitute for full-blown applications. For example, between Calendar 2.1 and To Do 1.0 and SuperClock 3.9, you have most of the functions of a calendar program that could cost over $100.

Others are cost-effective alternatives. Blackout 1.21 might not have all the features of a commercial screen saver, but it only costs $5, and it does the job of darkening the screen when the Mac is not in use. And if you don’t want to spend over $100 for a commercial communications package to access electronic bulletin boards, FreeTerm 3.0 does a fully creditable job, and it’s entirely free.

KiwiFinder Extender 1.02
KiwiFinder Extender ($99.95 from Kiwi Software) eliminates virtually all the problems in the Open dialog box, provides a file-finding feature that is better than Apple’s Find File desk accessory, and includes a Search feature.

When KiwiFinder Extender, an INIT, is installed, the files in the Open dialog box in any application can be viewed by Name, Type, Creator, Create Date, Modified Date, or Keywords. To let you view all your files, the Open dialog box ignores the Finder’s hierarchy of files and folders. For example, when you view by Name, the Open dialog box displays 26 virtual folders in alphabetical order. If you click on the B folder, you view all the files beginning with B even if, in actuality, these files are scattered in dozens of folders throughout the Finder.

As we buy larger disk drives, organizing the numerous files and folders on them becomes more and more difficult. KiwiFinder can help.

Astrix 1.0
The brochure for Astrix ($69 from Microseeds Publishing) assents that it “foretells the future and casts horoscopes which are truly insightful and always fun.” Being basically a nonbeliever, I will leave it to others to decide whether the horoscopes cast by Astrix are insightful. For every planetary position, Astrix displays one stock phrase.

For example, each of my daily horoscopes for over a year contains the phrase: “Pluto transiting the Second House marks a time when you must be judicious in personal decisions about finances.”

Astrix does all the math and drawing work necessary to cast a natal or daily horoscope chart, and you can choose from the three major house systems astrologers use today. The manual has a concise glossary of astrological concepts and terms, and the program comes with birth information on 18 famous and infamous people for practice. But if, as I do, you find astrology to be a trivial diversion, stick to the newspaper columns.

MacSleuth 1.0
My first thought after opening MacSleuth ($149 from Dariana Technology Group) was, Who needs it? The program provides reports, on screen or hard copy, of the software and hardware attached to your system and Mac. It lists desk accessories, INITs, dcs, drives, type of processor, modem and printer port peripherals, amount of installed memory, and so on.

The thing is, I already know most of that stuff. I’m well aware of the peripherals connected to my Mac. If I forget which dcs I have installed, all I have to do is access the information from the Apple menu; and while I have to admit I didn’t know my video scan (continues)
rate was 60.15Hz, I can’t see that that knowing affected my life much.

My guess is that 90 percent of Macworld readers know as much or more about their hardware and system as I do. But there are thousands of Mac users who don’t read computer magazines. A consultant set up their machine with the necessary hardware and software, taught them to use a few applications, and left. When this user gets into trouble, and has to telephone for support, MacSleuth can provide ready answers to the tech rep’s questions.

By reading MacSleuth data over the phone, mailing a hard copy, or sending the screens over a network, you can limit the need for on-site support and save yourself a bundle.

**Word Count DA 1.2**

 Virtually all the newest versions of word processor applications have word count functions. But if you’re still using an older version of a word processor, such as Microsoft Word 3.0, Word Count DA ($19 from Intelligence Active Software) can complement your system.

Besides counting words, paragraphs, and sentences, Word Count DA also counts the number of words longer than 2 syllables and calculates typographical words (number of characters divided by 5). Personally, I’d prefer that it just count the number of characters and leave the dividing to me, but that’s a quibble.

Word Count DA does have one unique feature; it measures the reading difficulty of a document by calculating the ratio of sentence length to number of difficult words (words with 3 or more syllables). The result is supposed to represent the grade level of the writing from third grade to professional. If you write sixth-grade text books, this feature might help you. But for the rest of us, it’s pretty useless.

**Cataloger 1.01**

I have to admit to being a pack rat of the worst kind: a disorganized one. I have hundreds of applications and documents scattered throughout 200 or 300 disks. The problem is that few of these disks are labeled accurately. So to find a particular file, I must remember which disk I placed it on.

I’ve used TrackMate in about ten disk drives, including those in three 5-year-old Mac Pluses. In two of those three Pluses, the cleaning disk did not eject entirely. I didn’t have this problem with newer Mac Pluses or with Mac SEs. The company says the problem occurs in a minority of older drives, which sometimes are not aligned properly. If you have a newer machine, you have nothing to worry about.

**Quality Artware**

Quality Artware ($144 per module from FM Waves) consists of seven modules of contemporary, humorous clip art (with a program that allows you to convert the images to PICT or TIFF files). The modules include Fashion, Glamour, Fantasy, Animals, Agenda for the Nineties, and Business Images. There are about 100 images per module, and they differ from the run-of-the-mill artwork you normally see in clip art collections. Many of the collection’s images aren’t suitable for standard office use but they might just wake up sleepy newsletters or office memos.

**Keyboard Shelf**

Kensington Microwave is known for its ingenious and sturdy Mac accessories. Its newest product, Keyboard Shelf ($59.95), is a stand that elevates a Mac Plus or SE series so that a shelf becomes available under the Mac to store the keyboard. In terms of design and construction, this product fits in with Kensington’s reputation for excellence. But its main purpose—to save valuable desk space—only happens when the keyboard is not in use and can be tucked away.

This device also raises the Mac for better viewing and provides a small recess under the keyboard area to hold a couple of floppy or paper clips. If your Mac is often sitting unused, and you can utilize the space in front of it for paperwork, buy this. It looks great, and it can eliminate some clutter on your desk.

*See Where to Buy or circle 618 (Astrix), 624 (Cataloger), 674 (Keyboard Shell), 675 (KiwiFinder Extender), 683 (The Macintosh Bible Software Disk), 689 (MacSleuth), 728 (Quality Artware), 774 (TrackMate), 788 (Word Count DA) on reader service card.*
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Applied Engineering Ugradable 2400 baud modem with complete communications software. Add on options include & Send-Fax for faxing text and graphics directly from your screen and MNP5 for automatic error correction and data compression. Top quality, full featured modem that grows as your needs grow.

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Mac's Place

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Even at a party, Bob found Mac's Place irresistible.

Bob eschewed chit-chat. He preferred to have a meaningful conversation with his Mac. He couldn't help himself. It was all that great stuff he'd gotten from Mac's Place. Software. Hardware. And great advice. Bob knew that Mac's Place is the only Mac mail order company staffed by people who really know Macintosh hardware and software inside and out. And the only one that runs entirely on Macs. So call Mac. And have a party of your own.

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MIDI Keyboard Controller 315.
Music Entry Pad 216.
PCM Sound Module 716.
Pitch to MIDI Converter 286.
Mora Monophonic Speaker 130,
Stereo Mono Amplifier 135.
Video Editor 485.

Filemaker Pro $225.

"Claris" The leading Macintosh database manager. Manage information and generate comprehensive reports. Access powerful database features without programming. And get real work done right away—even if you’ve never used a database before.

Macintosh Music System $896.

Roland Everything you need to start making music includes sound module with 128 synthesized sounds, 30 percussion sounds, and special effects; 49-note MIDI keyboard controller; Opcode EZvision software with Editor/Analyzer; Opcode MIDI Interface, cables.

Mac’s Place

Arts Nova $64.
Ars Nova One of Mac User’s "Best 200 Mac Products of 1989." Includes sampled sound, textbook, and a wide range of activities—scales, intervals, chords, melody and rhythm. Fun to use and fully MIDI compatible (MIDI not required).

TimeWorks
Publish It! Easy 2.0 199.
Zonderline
Designer/Designware 3 114.

MUSIC/SOUNDS
Arts Nova
Practica Musica 2.2 94.
Digidesign
AudioMedia 798.
Fugue Types 268.
MacPhat saturation 608.
Electronic Arts
Deluxe Music Con Set 2.5 82.
Faraklah
DiskPaper 42.
MacRecorder 2.0 45.
MacRecorder Voice Digitizer 19.
SoundEdit 4.

Great Wave Software
Concertware Plus MIDI V5.0 88.
Opcode Systems
Book of MIDI 29.
CUE Film Movie System 415.
EZVision 88.
Galaxy Universal Librarian 169.
MIDI Pay 45.
Pro + MIDI Interface 58.
Studio + Two MIDI Interface 105.
Studio 3 MIDI/GMP Interface 108.

Video
339.

Passport Designs
AudioTrax 117.
Desktop Music Orion Kit CD 165.
Hyper/Music Midi Player 45.
MIDI Interface 74.
MIDI Transport 286.
Note Writer II 318.

ImageGrabber 2.0 $33.
new year, call us.” —Mac

Macintax Personal '91 $64.

Softview The best selling tax product for the Macintosh. The award winning Macintax will help you gather, organize and complete your taxes—ready to submit to the IRS. Full integration with 13 state supplements.

FastLabel & Fast Envelope $45 ea.
Print any label or envelope on any printer! These desk accessories import text and graphics from almost any application. Use preformatted templates or create your own! Cut and paste your entries, type them, or import and save your lists.

TypesStyler $114.
Broderbund Software Let TypesStyler add pizzazz to all your documents. Bend, stretch, and twist typefaces. Add shadows, colors, fades, and patterns to text. TypesStyler will do it all with visually and Macintosh font—and do it with ease.

Personal Training Systems $49.95 Ea.
Imagine having a private tutor who talks you through every new skill. Just listen, practice, and learn—whenever and wherever it's convenient. There's a cassette-based tutorial for everyone from beginners to experts (see Educational section for a listing).

L-View 19" Monitor & Card $1527
Sigma Designs Low-emission monochrome display for Mac II and SE/30. Six resolutions, instant mode switch with Hot Keys, flicker-free 92 Hz refresh rate. Paper-white phosphor, tilt/swivel, front panel on/off switch, contrast & brightness controls.

“One call and you'll never go back.” —Mac
### Programming

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<tr>
<th>Company</th>
<th>Product Name</th>
<th>Price</th>
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<tr>
<td>Addison Wesley</td>
<td>HyperCard Guide Inc. 2.0</td>
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<td>Mac C Programming Primer Vol 1</td>
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<td>Inside Macintosh Series</td>
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<td>Complete Book of HyperTalk 2</td>
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<td>Mac Pro Guide to MPW Vol 1</td>
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<td>RedEdit Complete Inc. Disk V2</td>
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<td>Bantam Books</td>
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<td>ART Manage</td>
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<td>Beagle Bros Software</td>
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**Portable CD ROM Reader $459**

NEC This compact and lightweight (2.2 lbs) reader delivers the dependable performance of full-size readers and full CD-ROM capability at an affordable price. Includes Interface Kit.

### M3 CD ROM

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**Reality Technology** Designed for the individual investor and perfect no matter what your level of expertise. Gives you objective information on up to 1200 mutual funds and 10,000 stocks and bonds. Earn more by investing wisely more effectively!

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<td>Retravel</td>
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<td>Now Software</td>
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<td>Psybron Systems</td>
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### Nisus $235

**Paragon Concepts, Inc.** Power features include unlimited undos, noncontiguous selection, integrated thesaurus, foreign language dictionaries, Power Search, and Power Search + to streamline all writing jobs. Even simplifies complex tasks like reformattting downloaded mainframe files.

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**“Call us. We won’t give you the same...”**
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ASD Coordinate individual and group agendas, find available time slots for appointments, keep track of deadlines and priorities, distribute tasks evenly, optimize resources, and share information between Macs and PCs over any LAN.

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AUSD Protect your hard disks, applications, files, and folders (including the System) from unauthorized access and deletion. Includes audit trail capability. Also available in five- and ten-user office packs.

Mac To Mac Check Listings

911 Utilities $89
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Abaton Color Scan 300 $1498
4x4 bit Color and Gray scale 300 dpi Scanner. The image scanning power of the future is here now in this excellent color/black & white scanner from one of the top names in the business. Compete with most popular graphics and OCR packages with Adobe Photoshop, 1-year warranty, 90-day on-site service.
"We know more about Macs than they do!"

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**Think C 4.0 $160.** Symantec C language compiler with built-in editor and integrated multi-window text editor. Smart Linker links any size program in an instant. Extremely fast compiler with superior code generation. Includes object libraries and a number of features to speed you through your work.

**AppMaker $228.** Bowers Development Automatically programs the Mac user interface (menus, windows, dialog, and alerts). Supports object-oriented and procedural programming languages. Customizes to suit individual programming conventions. MacUser gave this one 4 1/2 mice — and so will you!

**Everex**
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At Mac’s Place, we've come up with a sure fire way to make sure you get exactly, precisely the hard drive that's perfect for you. Instead of ordering a pre-packaged drive, we let you specify the components you want. Then we put it all together for you.

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Better decisions. Better relationships. Less stress. Synchronicity is a one-of-a-kind creative decision-making and intuition development program that makes life a game you win more often. Regular use improves timing and confidence. It’s fun too!

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Mosey Pad
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560-Meg BU Tape CS500HD ... 18

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Supra Modern 2400 Plus ... 158

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Lightning Scan ... 325

ThunderScan 5.0 ... 179

Total Systems Inc
Gemini 800MHz Accelerators
SE 20Mhz ... 995
SE 33MHz ... 1165
SE 48MHz ... 1295
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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

8LC Display Board and Display System

Display board provides 256 colors or grays on a 19-inch color monitor for the Mac LC. Supports image resolutions of 1024 by 768 and 640 by 870 pixels at a 75Hz screen refresh rate. Includes two-and four-times-original image enlargement. Extended Desktop feature creates a larger desktop window for working with large documents. $995; 8LC Display System (includes 19-inch monitor) $3795. RasterOps, 408/562-4200.

Com-Lok

Hardware security unit that protects networked Maccs or other personal computers from unauthorized remote access and network-transmitted viruses. Unit operates independently of the modem to act as a barrier between the computer and phone line. Callers must enter an 8-digit security code to be connected to the computer. $5995. Upgrade General Import Export, 612/758-8118; 800/555-3751.

The Complete Fax Modem

Portable fax/data modem for 9600-bps send-and-receive data transmission. Awakens the Mac from sleep mode when an incoming call is detected; travels well. $599. PSI Integration, 408/559-8544.

Computer Power Monitor

Device designed to monitor line voltage and indicate power-line variations that are known to cause computers and other voltage-sensitive equipment to malfunction. Unit measures true Root Mean Square voltage, recommends typical solutions for indicated problems, and checks wiring polarity. $538. Tasco, 303/762-9952; 800/999-9952.

The Cork 30

CPU with 68050 microprocessor; 25MHz 68882 co-

The Cork 30

processor; built-in 8-bit color capability; three Nu-Bus expansion slots; 4MB of RAM upgradeable to 8MB; 1.4MB floppy drive; standard Apple SCSI connectors and digital sound; and built-in modem and voice-mail capabilities. $2999. Cork Computer, 512/313-1301, 800/621-2675.

I/O Port System

System that attaches to the Macintosh with standard keyboard cables to monitor and/or automate most electrically operated devices found in the home. Can monitor fire and security systems, operate automatic sprinklers, program lights to turn on and off. Also includes modules for writing your own software. $479. Ansan Industries, 815/874-6881.

Mac Classic Hard Drives

20MB and 100MB internal hard drives for the Mac Classic. 20MB $299; 100MB $999. CMS Enhancements, 714/222-6000.

MacRam Classic


MacRam Classic

PDS Adapter Card

Adapter board for the Macintosh IIfi that allows most of the boards designed for the Mac SE/30 to work in the processor-direct slot of the IIfi. Corrects the most-common compatibility problems between SE/30 boards and the PDS. $149. Nutmeg Systems, 203/966-7972.

Quadratrace

Serial board that enables Mac II-series owners to use four serial devices in addition to the current two and to control them individually and simultaneously. $299. Applied Engineering, 214/241-0055.

(continues)
SE Upgrade System
Upgrade system replaces an existing Mac SE with a streamlined version that can be purchased with a 14- or 15-inch monochrome monitor. Upgradable by user or by dealer. Without monitor $845; with 14-inch monochrome display $995; with full-page monochrome display $1295. MicroMac, 714/363-9915.

Technology Work Cache Card
Cache board for the Mac IIci. Uses 25-nanosecond static RAM, which makes the board more than three times as fast as the standard dynamic RAM used by the Mac IIci's logic board. Designed to boost the Mac's processing speed by 30 to 70 percent. $299. Technology Works, 512/794-8553, 800/688-7466.

Umax Color Scanner
24-bit color scanner for use by desktop publishers. Scans a document three times (to red, blue, and green signals) and reads through a single charge-coupled device sensor or a single light source with a three-color filter. Connects via SCSI interface. $2495. Umax, 408/982-0771.

SOFTWARE

Alge-Blaster Plus
Educational software that covers first- and second-semester algebra in one program and includes a graphing game. Designed for ages 12 to adult. This program offers a step-by-step approach to algebra and optional hint screens that can be used in problem solving. 1MB min. memory. Single version $59.95; teacher's version $69.95; five-disk lab pack $179.95. Davidson & Associates, 800/556-6141, 800/545-7677. P.O. Box 2961, Torrance, CA 90509.

Balloon Stack
HyperCard stack illustrating method for creating 34 balloon animals. Figures are illustrated and cross-referenced by name and category. Screen images are provided for each finished figure. Comes with approximately 30 balloons. 1MB min. memory. $35. BugByte, 302/994-1502, 800/284-9220.

With the HP LaserJet III, you can

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AS YOU LIKE IT
refine your characters.

The HP LaserJet III printer delivers the most refined 300 dpi print quality ever. And it’s easy to use. When configured with Adobe® PostScript® and AppleTalk interface, the LaserJet III is completely compatible with your Macintosh. All for only $3,700®.

HP offers other Macintosh compatible LaserJets. The new LaserJet IID printer with increased paper-handling capability for $5,125®. And the affordable LaserJet IIP printer for only $2,595®. Call 1-800-752-0900, Ext. 1168 for the name of your nearest authorized HP dealer and ask for the Macintosh versions of the LaserJet line.

There is a better way.
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.

HP HESTLETT PACKARD
MacSleuth

Systems-analysis tool designed for use by network administrators, technicians, and other technically oriented users. Can be used to diagnose information concerning NuBus slots and SCSI interfaces; locates all INTIs; displays settings in permanent RAM (PRAM). Can identify all nodes currently connected to an AppleTalk network. Could be used by a network administrator to determine software that is currently running on remote nodes connected to the network. Generates reports; contains context-sensitive help. 1MB min. memory. $149. Dariana Technology Group, 714/994-7400.

MapArt

Collection of clip-art maps that includes 4 world maps, 12 regional maps that show country borders, and 23 country maps that show state and provincial borders. Maps include country and major city as well as names, and latitude and longitude lines. 1MB min. memory. $179. MicroMaps, 609/397-1611.

Max

Graphic programming environment in which complex applications can be built by linking together simple modules. Constructs applications that process data in real time for use in the design of applications that incorporate MIDI, music, video, digital audio, or animations. Contains 150 objects that handle calculations, hardware communications, and user interface functions. 1MB min. memory. $395. Opcode Systems, 415/369-8131.

Negotiator Pro

Program to improve personal influence and negotiation skills. Provides structured planning and preparation, a small expert advisory system, 27 tactical options, and a summary of current negotiation theory in more than 120 hypertext entries. Combines hypertext, edit windows, and training. 2MB min. memory. $299; $99 each for ten or more copies. Beacon Expert Systems, 617/738-9300.

NetControl

Network administration software that provides detailed information about all software and hardware connected to a Macintosh network. Information includes reports on the status and dynamics of a network, to assist in resource management, and recommendations for changes in equipment or software where that might boost the performance of a network. 1MB min. memory. Single-zone administrator $249; multiple-zone administrator $649. International Business Software, 408/522-8000.

MapArt
Once Upon a Time:
Volume III

Third in a series of educational software designed for children ages 6 to 12. This volume, Journey through Time, focuses on three story themes: space odyssey, medieval times, and wild west. Includes a digitized voice, graphics, and book-making capabilities. 1MB min. memory. $49.95.

OverView

Presentation software for managers who frequently customize presentations to suit different audiences.

Integrates with user's existing word processing, drawing, and spreadsheet programs to create presentations from their documents. Users can import images via the Clipboard or print slides directly into OverView from any application using the LoopWriter driver, which is included. 1MB min. memory. $159.95. Loop Software, 415/326-4803.

PassProof

Security protection system that combines hardware and software locks to prevent unauthorized access. Comes with physical lock and security software that logs user activity, automatically blanks the screen after a specified time, and offers password protection. 1MB min. memory. $99.95. Ken- sington Microwave, 212/475-5200, 800/555-4242.

Periodic Law

Chemistry database that contains information for approximately 13 properties of the first 103 elements. Helps students to study the periodic table and the group trends of the elements. Users can search for elements using up to three criteria. Program displays in text, graph, and tabulated lists. 1MB min. memory. $72. EME, 203/798-2050, 800/848-2050.

Personal Trainer for the SAT

Software designed to help high school students obtain higher Scholastic Aptitude Test (SAT) scores. Gives step-by-step method of preparing for SAT, scores and analyzes practice SAT tests, then creates up to six individualized study programs for each student. Charts show score progression. 1MB min. memory. Single-user version $59.95; teacher's edition $69.96; five disk lab pack $229.95.


Projectile Motion

Open framework for learning how to set up, solve, and understand the physics of free-fall and projectile motion. Multishow environment. Contains an animated simulation of various trajectories in real time. 1MB min. memory. $64. EME, 203/798-2050, 800/848-2050.

With the HP DeskWriter, you can
have it all. (But keep it to yourself.)

The HP DeskWriter printer puts laser-quality printing right at your fingertips.

With a small size and a $995* price tag, the DeskWriter printer easily fits on your desk and in your budget. And its advanced 300 dpi inkjet technology lets you print sparkling text and detailed graphics.

The DeskWriter is also designed for easy use with your Macintosh, and has both serial and AppleTalk interfaces. It even includes scalable and outline fonts. Combine that with the DeskWriter's whisper-quiet operation, and keeping it to yourself will be that much easier. So call 1-800-752-0900, Ext. 1004 for your authorized HP dealer.

There is a better way.
Pigments for your imagination.

HP color printers let you draw splashy color from your Macintosh.

Entertain your thoughts with HP's PaintJet and PaintWriter XL color printers. Both are fully Mac-compatible and let you use all Quickdraw-based software applications. That means high-quality Macintosh II output in 16.7 million colors.

Print on paper or transparencies with 13 scalable outline fonts. And for shared use, the PaintWriter XL offers AppleTalk, faster speed, and auto sheet feed. For sample output and the name of your authorized HP dealer, call 1-800-752-0900, Ext. 1167.

There is a better way.

HEWLETT PACKARD
neck, and back. $59.95. Kensington Microwave, 212/475-5200, 800/535-4242.

**Trackmate**
Diagnostic utility and data-protection system for floppy drives. Comes with menu-driven diagnostic software and maintenance disk with cleaning brushes on either side. Includes a cleaning solution in a pen-like applicator. Software diagnoses key drive functions such as head condition and drive speed; manages cleaning routines. $34.95. Trackmate America, 408/356-0795.

**BOOKS**

**Campus Computing**
Reference guide for college students who are using personal computers or mainframes on a campus network. Covers desktop publishing for papers; electronic research with online library catalogs, abstracts, indexes, and other databases; and computer networks to contact professors and friends in remote locations. Offers advice on choosing the computer that best meets your needs, where to find free computer labs, and how to use school consulting services. Written by Helmut Kobler. $8.95. Lyceum Publishing, 415/841-7376.

**Inside Basic**
Technical journal for Macintosh BASIC programmers. Includes articles covering flickerless window updates; grafports; color grafports; regions (including animation with regions); and sending keystrokes to an edit field in a background window. Magazine focuses on teaching programming skills and techniques. One year $36.95; two years $69.95. Ariel, 509/223-2249.

**The Macintosh Bible, What Do I Do Now?**
Covers virtually every error message, explaining the problem that produced the error and discussing how to resolve it. Deals with such problems as wrong fonts appearing in printout and pointer not responding to mouse. 191 pages. Written by Charlie Rubin. $12. Goldstein & Blair, 415/524-4000.

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 the software) to New Products Editor, Macworld, 501 Second St., San Francisco, CA 94107.
Until now this age-old annual problem had two solutions.
You'd either pay someone lots of money to do your taxes. Or suffer through doing your taxes yourself, and end up wishing you'd paid someone to do them.
Introducing the third and better option.
TurboTax: The tax preparation software designed for your Macintosh, that's like having someone to help you, and hold your hand while you prepare your own taxes.

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It guides you through preparing a tax return step by step. More than 60 commonly used forms, schedules and worksheets are included.

If you run into tough tax terminology, TurboTax will use a hypertext format to translate it into easy English. It lets you try various tax scenarios to maximize your refund.

Declare a stock loss, for example. Depreciate income property. Or try a different W4 deduction for next year's return.

TurboTax guides you in categorizing and filing more than 90 types of expenses and income. Then proofs your return in over 250 areas to help ensure no mistakes in logic, calculation, or any missed savings opportunities slip through.

It'll even help you sleep at night.
Tables showing the percentage of the returns audited for the amounts you're claiming can be used as a safety check. So there's little worry that anything on your return might flag the IRS.

All the number crunching is done in under 5 seconds. Then, when you're finished, you can print out and mail in your return right off your computer.

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Now TurboTax has come to the Macintosh.

And, for even more people, thankfully, taxes will never be the same again.

Circle 147 on reader service card
When I heard "balance sheet," I broke into a sweat. I know type, advertising, printing. Now I was forced to do our books. No choice.

We were on our third part-time bookkeeper in eleven months, and she was called away suddenly. Sound familiar?

But I'm the boss and the buck stops with me. We had bills to pay, payroll checks to write, invoices to send, taxes to set aside.

And deadbeats to collect from—only I had no idea who owed us how much or for how long. Some suppliers may have even thought of us as deadbeats. I needed to know our cash flow, and get a handle on all this. But I didn't have a lot of time.

Step one: find an accounting program that feels as familiar as our Macs, that starts out easy, but has lots of reserve firepower for later on.

I found atOnce! The manual looked orderly. I dug in...

Numbers are my nemesis, but the tutorial was actually fun and got me comfortable. It takes you step by step through the program, and gives you some easy-to-swallow accounting basics so you're not reading a foreign language. There's context-sensitive help, just in case.

And while you learn, you can start to set up your books. So it doesn't come in a flash and you sweat a little. But you do it and you learn.

I started off light. Double-clicked on one of the default charts of accounts and my General Ledger was practically set up for me. Then entered a few client names in Accounts Receivable, to get an idea of what was coming in. Prepared six invoices—and atOnce! calculated sales tax. Nice. Printed the invoices which I redesigned in atOnce!—realigned a field here, change a font there. The usual.

Then ran a Customer Aging Report to identify the slow-payers (I had no idea such a terrific thing was even possible).

What I didn't know was costing my company

I discovered a key client who hadn't paid in two months. I called and collected and now he wants to know about atOnce! I wrote payroll checks for the staff, and sent our bank a balance sheet I printed out myself—no sweat.

From fear and loathing to passion.

Now I even study the management reports atOnce! generates.

I'm still an art director. But atOnce! helped me become a better businessman!

A hidden bonus that made my day

When our bookkeeper returned, I showed her atOnce! Now she's back doing the books, even makes sure my plants are green, and I can supervise like a boss should. Putting the books on the Mac gives me the numbers I need when I want them. It lets me take control of income and expenses.

Here's some free advice: Take control of your own business. Buy atOnce!

MacWorld: 1990 World Class Award
MacUser: 1989 Editor's Choice Award and 4.5 mice
30 days free support
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Quick Tips

Making Gray Text Readable, Developing Simple HyperCard Stacks, Settling Font Disagreements, and More

By Lon Poole

Several readers jumped on me for claiming last October that the blank space around the edges of the Mac screen is useless. Paul Velasco of Flossmoor, Illinois, for example, agreed that although most monitors are fuzzier toward the edges of the screen, this space can still be useful. For instance, you could use the space for the menu bar, scroll bars, tool palettes, and other noncritical items. So what if they are slightly blurry?

You can expand the display area on some Mac systems from 640 by 480 pixels to 704 by 512 pixels with the shareware utility MaxAppleZoom by Naoto Horii of Belgium. MaxAppleZoom is a startup document (INIT file) that reprograms the video board to display across the entire picture tube. Version 1.3 (the latest at this writing) works only with Apple’s Mac II video board on a Mac II, IIfx, IICx, or IIX. It doesn’t work with built-in video (on the LC, IIsi, or IICl), the latest Apple display boards (the 4*8 and 8*24), display boards made by other companies, or multiple-monitor configurations. It works best with Apple 13-inch RGB color monitors made in 1989 or later, though it may also work with an older Apple 13-inch monitor or a Sony CDP-1302. To see all of the larger display area, you may have to fiddle with the picture-size controls located behind a removable panel at the back of the monitor. You adjust the horizontal and vertical sizes separately, and keeping them congruent can be difficult. MaxAppleZoom is available from online information services including CompuServe (file MAZ13.SIT of library 6 in the Macintosh Productivity forum) and America Online (file MaxAppleZoom 1.3 in the Hardware library of the Computing & Software department’s Software Libraries).

Disk Waste

You shouldn’t blame invisible files such as the Desktop file for all lost disk space, as I did last September. Ben Benhoff of Scottsdale, Arizona, lost 20MB of space before discovering that some programs he uses were allocating temporary work space on the disk and then not releasing it properly. He learned from technical support at AllSoft, publisher of the disk-optimizing program DiskExpress, that Apple’s Disk First Aid program (which comes with the Macintosh system software) fixes this problem. Benhoff now uses Disk First Aid prophylactically at least three times a week.

He also passed along an easy way to find out if your disk has wasted space: Put the entire contents of the disk into a new folder and then compare its size shown in the Get Info window to the In Disk amount shown in the icon view of the disk window. The Get Info size doesn’t include invisible files, which legitimately account for between 7K and 300K, depending on the number of files on the disk.

Small files can also contribute to lost disk space, especially if there are many on a large hard drive, notes Adam Frix of Columbus, Ohio. For efficiency, the filing system allocates disk space by the block, not by the byte. Allocation block size is .5K for floppy disks but may be 1K, 1.5K, 2K, or more for hard drives (the larger the drive, the larger the block size). That’s why the Finder’s Get Info command tells you, for example, that a file containing 1218 bytes occupies 2K (two blocks) on your 80MB hard drive.

Power Answer

Here’s the missing answer to Scott Junk’s question from October, “Can I turn my Mac and peripherals on and off with the switch on my power strip, or should I use each device’s on/off switch?” Most systems work fine if you turn on the power to all devices at once. Some hard drive vendors recommend switching on the hard drive first and waiting 15 to 30 seconds so it’s ready when you switch on your Mac. But that can’t be done for systems with internal hard drives—and they work fine. An alternative is to use the power strip switch to turn on everything except the Mac, wait a few seconds, and then turn on the Mac. Before switching off the power, be (continues)
The Atlas folder contains an empty document for each program I use often. To open one of these programs, I double-click on its icon in the folder.

**TellTale Folder**

An empty folder set to View by Icon lets you see how much free disk space you have. (Bonus tip: The Atlas folder contains an empty document for each program I use often. To open one of these programs, I double-click on its icon in the folder.)

**Quick Tips**

**How To**

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**Know Disk Space Available**

Several Macworld editors like to work with their folder and disk windows in one of the Finder’s text views. They also want to keep track of the amount of disk space remaining, which the text views don’t report. So they create a new folder on each disk, open it, and position its window above and behind the disk window, as shown in “TellTale Folder.” It takes up little room there and always shows the amount of available disk space. By incorporating the disk name in the name of each of these empty folders, they know which disk each pertains to. (Although the editors thought they’d found a new tip, this golden oldie first ran in the May 1987 Quick Tips.)

**Dear Diary**

Is there a diary program available in which I can record information by date? I would like to record information I kept over a period of several years pertaining to my mother’s health until she finally succumbed to a fatal illness. My comments and observations, some of which are several pages long, were made on various unsorted papers and note pads. I would prefer not manually arranging all the bits of information in chronological order.

Bob Jew

Springfield, Virginia

You can easily create a diary using HyperCard. Follow these steps:

1. Install the HyperCard software as instructed in the HyperCard manuals.

2. Choose New Stack from HyperCard’s File menu. In the dialog box that appears, type a name for the diary and select a folder to save it in. Turn off the Copy Current Background option, and click OK. HyperCard creates a new stack with a completely white background for your diary.

3. Choose Background from the Edit menu. Hatch marks in the menu bar indicate that you are now working only on the background layer, which appears on multiple cards. You can now use the painting tools to decorate the background.

4. Choose New Field from the Objects menu. HyperCard creates and automatically selects a five-line text field in the middle of the card. This field will hold the date of each diary entry. Choose Field Info from the Objects menu. In the dialog box that appears, enter Date as the field name. Click the Font button and select the font, size, and style in which you want the date displayed, and click OK. Next drag the field to the upper-left corner of the card. Then drag the bottom-right corner of the field up to shrink the field until it’s one line deep. The
This was "independence day" in Boston. What firing of guns, and ringing of bells, and rejoicings of all sorts, in every part of our country! The ladies (who have not gone down to Nahant, for a breath of cool air, and sight of the ocean) walking the streets with parasols over their heads, and the densities in their white panikoon and silk stockings! What quantities of ice-cream have been eaten, and what quantities of ice brought into the city from a distance, and sold out by the lump and the pound! The smallest of the islands which we saw to-day would have made the fortune of poor Jack, if he had had it in Boston; and I saw why he would have had no objection to being there with it. This, to be sure, was no place to keep the fourth of July. To keep ourselves warm, and the ship out of the ice, was as much as we could do. Yet no one forgot the day; and many were the wishes, and conjectures, among all hands. The sun shone bright so long as it was up, only that a scud of black clouds was ever and anon driving across it. At noon we were in lat. 56° 27' S., and long. 85° 5' W.; having made a good deal of eating, but having lost in our latitude by the heaving of the wind. Between daylight and dark—that is between nine o'clock and three—we saw thirty-four ice islands, of various sizes; some no bigger than the hull of our vessel, and others apparently nearly as large as the one that we first saw through, as we went on, the islands became smaller and more numerous and, at sunset of this day, a man at the mast-head saw large fields of floating ice called

DIARY STACK You can quickly create a HyperCard stack for organizing information according to a single criterion. This is how the diary that R. H. Dana kept for his great book Two Years before the Mast might have looked if he'd written it in HyperCard.

This command does not correctly sort dates earlier than 1904 unless you use HyperCard 2.0 or a later version.

You could embellish this stack by adding buttons from the Button Ideas stack for moving forward and backward through the cards. You could also create a new button whose script sorts the cards so you don't have to type in the command above each time. "Diary Stack" shows how this stack might look.

Your first diary entry. Press Tab again to select the next field, and type in the diary entry. To create a new card for another entry, choose New Card from the Edit menu. You can go to other cards in the diary—or to the Home card—by using the Go menu. To sort the cards chronologically, choose Message from the Go menu to open the message box. In it type this command, and press Return:

sort ascending DateTime by field "Date"

Dotted horizontal line in the field shows the text baseline. Leave a little space below it for descenders. The field width isn't critical.

5. Use the New Field command again to create the field for diary entries. Double-click the new field to open the Field Info dialog box. In it, name the field anything you like, and set the Style option to Scrolling. Click the Font button to set the field's text font, size, and style. Then click OK.

Drag the field up to position it just below the date field, and then drag the bottom-right corner of the field down and to the right so the field takes up most of the card. Choose Background again from the Edit menu to bring back the foreground layer.

6. Choose the Browse tool (the pointing finger) from the Tools menu, and you have a functional diary with one card. Press the Tab key to select the date field, and type in the date of

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**Quick Tips**

**HOW TO**

**Single-Sided HFS Disks**

I have numerous MFS disks from when I had a 128K Mac. I now have a IIX. Is there a way to convert MFS disks to HFS disks?

Richard Moore

Chubbuck, Idaho

I assume your disks are 400K (single-sided) floppy disks. The Mac normally uses the Macintosh file system (MFS) on 400K disks, but you can convert these disks to the hierarchical file system (HFS). Then you’ll be able to see folders when you use the Open or Save commands, which don’t show folders of MFS disks.

Converting to HFS erases the MFS disk, so if you want to save the disk’s contents you must temporarily copy all its files and folders to a backup disk. Then choose Erase from the Finder’s Special menu and hold down the Option key as you click One-Sided in the dialog box that appears. For best results, hold down the Option key until the erase process finishes. If you saved the disk’s contents, copy them from the backup disk now. Don’t drag the backup disk’s icon over the initialized disk’s icon or the initialized disk may lose its HFS format.

**Font Agreement**

**TIP:** Even if everyone in your department uses Suitcase II to install the same set of fonts, you can still have font problems. For example, a document that your colleague typed in Garamond might display in Geneva on your Mac, even though you also have Garamond. To prevent font mismatches, use the Font Harmony program that comes with Suitcase II to create a master set of fonts for every Mac in the department. If everyone prepares a set individually, the sets may not be compatible.

Elisabeth S. Nelson

Greenville, South Carolina

This advice also applies to people who use MasterJuggler software (and its companion Resource Resolver utility) or even Apple’s Font/DA Mover program to install fonts. Font mismatches occur because most programs identify fonts by internal font numbers, not by name. Everyone who shares documents must have matching font numbers or fonts won’t match. For example, if I have Garamond with font number 156 and you have
Garamond with font number 128, we will not see Garamond in each other's documents. (A font's number is changed when you install it on your Mac if you already have an installed font using the same number. The Resource Resolver and Font Harmony utilities also renumber fonts.)—LP

**Light Bug**

**TIP:** A bug in the LaserWriter II firmware can keep the red manual-feed light on after printing ends. This can be annoying if you share the printer and need the light to tell you when to insert your paper. Or you could mistakenly interpret the light, since it can also indicate a paper jam. The light fails to shut off only if the manual-feed paper is in place before the light comes on. To work around the glitch, just don't insert the paper until the light comes on. If you're printing multiple pages, don't insert the last sheet until the red light comes on and the green light goes off. A different approach is to use the Mac's Print command to specify one extra copy without inserting the paper for it; after a minute the LaserWriter stops waiting for the paper and turns off the red light.

Eric Bear Albrecht
Taos, New Mexico

**Multiple Monitor Activity**

**TIP:** If you use any Macintosh with two or more monitors, you can disable any number of them by using ResEdit (instead of removing their video boards). Begin by making a copy of your System file and using ResEdit to open the copy. You'll see a window showing the resource types contained in the System file. Open the scrn resource type and then open the scrn resource whose ID is 0. This resource tells the system how your monitors are configured. The first item in the re-(continues)
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source specifies the number of monitors connected to the system. Following that is a set of information for each monitor. Scroll down to find the information for a monitor you want to disable. You can identify monitors by their screen sizes or by their NuBus slot numbers—higher numbers are further from the power supply. Scroll a bit more until you see the Is Active option for that monitor, as shown in “Disabled Monitor.” Setting that option to 0 disables the monitor, and setting it to 1 enables the monitor. After making changes, quit ReEdit, clicking on Yes when the program asks if you want to save changes.

Copy the original System file to a backup disk. Remove the original System file from the System Folder and replace it with the modified System file (which must be renamed System). Then restart the Mac. When you want to reactivate the deactivated monitor, exchange the two System files and restart the Mac.

Rajiv Manglani
Brooklyn, New York

Proofing Spot Color
TIP: Spot-color text can be hard to read on a black-and-white composite proof printed on a LaserWriter because the printer software reproduces colors as shades of gray. This is fine for checking color breaks but makes text hard to read (see “Coarse Text”). The QuarkXPress Print command offers the option of printing colors as black and white instead of grays, but this option has no effect on color EPS files placed on the page. The simple solution: specify a halftone screen frequency too high for the printer to reproduce, for example, 150 lpi for a LaserWriter. This method will turn almost every percentage tint in a document to solid black, so it will not work in situations where there are background tints, process colors, or tint builds. In QuarkXPress, you change the screen frequency by setting the Halftone Screen option of the Page Setup command (File menu).

Changing the screen frequency is more involved in PageMaker. You must open and edit the APD (Adobe Printer Description) file for the appropriate printer with a word processor. Search for the word Default ScreenFreq, and change the number that follows it in quotation marks to the new screen frequency (change 60 to 150 for a LaserWriter). Then search for the word ScreenFreq, and in the quotation marks that follow it, insert the new screen frequency (150 for a LaserWriter). Use the Save As command to save the altered APD file as a plain text file under a new name, such as LW IINTX composite.apd, so the original APD remains unchanged. Now to print colors in black, you select the altered APD file by name using PageMaker’s Print command (File menu).

Stephen R. Zenger
Buffalo, New York

You can also print colors in black and white from PageMaker by using the Apple LaserWriter driver software (version 6 0 or later) instead of the Aldus APD. You press the Option key while pulling down PageMaker’s File menu and choosing Print. You’ll see three dialog boxes in sequence, including the standard Page Setup and Print dialog boxes. In the third dialog box you see (the standard Print dialog box), select the Black & White option. However, this method doesn’t affect color or grayscale text within placed EPS graphics.

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Lon Poole answers readers’ questions and selects their tips for this monthly column. You’ll find all the best tips from six years of this column in his latest book, Amazing Mac Facts (Microsoft Press, 1991).
Why the power protection unit on the left is more expensive than the one on the right.

As you can see, the surge suppressor on the left costs a few hundred dollars less than the APC Uninterruptible Power Source (UPS) on the right. What you don't see is that it could end up costing you and your business thousands of dollars in hidden and unnecessary expenses. That's because surge suppressors protect against a disturbingly low percentage of total power disturbances.

According to Bell Labs, surges represent only 8% of the power problems that affect computers. What's more, the sags, brownouts and blackouts that make up the other 92% can be just as damaging to the hardware and software of your Macintosh as that first 8% - resulting in costly data loss, system downtime, and service costs.

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Anyone who has watched an hour's worth of unsaved work vanish into the black hole of a darkened screen knows how traumatic a power failure can be. One minute you're hard at work, and the next you're staring stupefied at a blank piece of glass. Mac Lesson Number One: The power to be your best only exists when there's power.

But of all the power problems that can occur, power failures constitute a relatively small percentage. A variety of gremlins lurk on the other side of a wall outlet, and some of them can turn a Mac's lights out for good. This month, we'll look at the kinds of mishaps you might encounter, and we'll see just how susceptible your system is to them. Finally, I'll describe some add-ons that ensure the Mac a healthy flow of juice.

Current Events
The electricity that powers the Mac's chips, video tube, and other components is quite different from the current you get from a wall outlet. Most of the Mac's electronic components require small amounts of voltage—between 5 and 12 volts—but a wall outlet supplies roughly 120 volts (in the United States and Canada, that is; in Europe, 220 or 240 volts is standard, and elsewhere you may find either 120- or 220-volt systems).

What's more, the Mac's components require direct current (DC), while a wall outlet supplies alternating current (AC). DC travels continuously, while AC reverses its direction at regular intervals—generally, 60 times per second with 120-volt systems and 50 times per second with 220-volt systems.

All Macs contain a power supply that turns AC voltage from the wall outlet into direct current at the voltage levels needed by the Mac's components. The power supply also contains filtering circuits that smooth variations in the original current.

It's those variations that can cause problems. The electricity a power company supplies may seem like pretty consistent stuff, but it isn't. Its voltage fluctuates—sometimes dramatically—and it's prone to various types of noise, or interference. "Power Problems" illustrates the most common types of power flaws:

- **Outages, or blackouts**, occur when the power goes out completely. An overloaded circuit can cause a localized blackout in part of a house or building, while storms and downed power lines usually cause prolonged, area-wide outages. Momentary blackouts can also occur when a utility company switches between various power-distribution circuits while isolating a problem in the lines. Although such blackouts usually last only a fraction of a second, they can go on for several seconds (on the rural northern California coast where I live, longer ones are more common).

- **Sags** occur when the voltage available at the wall outlet drops below roughly 105 volts. Also called brownouts, sags can occur when a...
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**Power Problems**

Sudden load is placed on a circuit—such as when an air conditioner or some other power gluton is turned on. Sags can also occur when an electric utility company lowers the voltage in order to reduce demands on its generating equipment during periods of peak usage, such as sweltering summer days and frigid winter nights. Sags generally won't damage the Mac, although a very large one could cause a system error.

- **Surges** occur when incoming voltage increases by astronomical amounts for a very brief period (on the order of a few milliseconds, or thousandths of a second). Surges, also called transients or spikes, can occur when lightning strikes in your vicinity or when the power comes back on after a blackout. Small surges (under 1000 volts) can be caused by the electric motor in a refrigerator or other appliance turning off and are more common than large surges. Large surges can damage anything that's connected to the circuit; a small one generally won't cause permanent damage but could produce a system error and some lost work. Surges as a whole are less common than sags.

- **Noise** covers a range of flaws that affect the quality, not the quantity, of power present. A large electric motor can transmit noise into wiring that can interfere with radio or television equipment on the same circuit. This kind of noise, called electromagnetic interference (EMI), generally doesn't affect computer equipment.

**The First Line of Defense**

How vulnerable is the Mac to blackouts, sags, and surges? Judging from the number of power conditioning products available—and by the alarmist advertising some manufacturers use—you might think it's a sitting duck, ready to be humbled by the first surge or sag that comes down the wire.

Not so. The power supplies in the Mac family are designed with sags and surges in mind. Apple's power supplies are designed to work with as little as 85 volts, so the Mac shouldn't blink during brownouts.
Mac power supplies can even provide enough juice to keep the machine running during a very brief blackout, the kind caused when utilities switch distribution networks. Apple's power supplies are designed to provide 20 milliseconds of current to a Mac running at full load—all floppy and hard drive motors on, keyboard and mouse in use, all expansion slots filled, the processor hard at work, and all rear-panel connectors in use at the same time. Because a Mac rarely operates at full load, the power supply can carry you through an outage of a second or two—depending on what's connected to your Mac and how it's being used when the outage occurs.

All Macs are designed to withstand surges of up to 5000 volts. Indeed, the power supplies in most computer equipment have at least some surge protection built in.

So the Mac's power supply tolerates low-voltage conditions and stands up to surges. Why, then, does an entire industry revolve around power protection? For one thing, no power supply provides enough juice to span an outage lasting more than a couple of seconds. Also, surge resistance varies from one piece of equipment to the next; your Mac may withstand a surge, but will your modem, external hard drive, monitor, and scanner? And many power-protection devices offer convenient features, such as a single switch that turns everything on and off, or separate front-panel switches for each item plugged in to the device. Finally, there's the chicken-soup factor—a second stage of power filtering and surge protection can't hurt, and it may well help.

Suppressing the Urge to Surge
The most popular power-protection device is the surge suppressor, which you install between the wall outlet and your computer gear. It reduces incoming surges to innocuous voltage levels. Surge suppressors don't help when the power sags, but they are the least-expensive power protectors.

When shopping for a surge suppressor, you'll face a barrage of jargon and a variety of features, some convenient, some essential. In the jargon department, the two most important specifications are clamping voltage and response time. The clamping voltage is the point at which the surge suppressor kicks in and starts suppressing; voltages below the clamping voltage are sent along to the equipment. Thus, the lower the clamping voltage, the better; a 340- to 400-volt clamping voltage is best.

Response time is the time required for the surge suppressor to close its electronic gate and prevent the surge from getting through. The faster the response time, the better, since it means less of the surge sneaks through to the computer. Look for a response time of about 10 nanoseconds or less.

You may also see an energy dissipation specification. This refers to how much juice the surge suppressor's circuitry can absorb before it fails and simply passes the surge on to ground, an event that won't harm your equipment but will blow out the surge suppressor. Energy dissipation is measured in joules; the higher the value, the more durable the surge suppressor. Inexpensive surge suppressors generally absorb about 50 joules, while heavy-duty suppressors can absorb 300 or more joules.

The easiest way to choose a good surge suppressor is to make sure it meets Underwriters Laboratory (UL) specification 1449. (UL 1449 refers to a battery of torture tests, themselves described in another cleverly named document, IEEE 587.) A suppressor that complies with IEEE 587 is desirable, but the UL 1449 designation is preferable, since it means an independent laboratory, not the suppressor manufacturer, tested the device. It isn't enough for a suppressor to simply be UL listed; look specifically for the UL 1449 designation.

Beyond tech specs, here are other factors you'll want to consider:
- Connections between hot, neutral, and ground. Inexpensive surge suppressors (in the $10 to $20 range) protect only between the hot (current-carrying) and the neutral wires of a wall outlet. For complete protection, you also need protection between the neutral wire and the ground wire (the round hole below the two rectangular ones on a wall outlet) and between hot and ground.

(continues)
wires. This scheme is often described as providing “three-way” protection.

- **Modem protection.** A lighting-induced surge can enter the phone lines and fry a modem. Some suppressors provide jacks for a modem or fax machine, a desirable feature for lightning-prone areas. Another UL designation, UL 497A, indicates that a suppressor can successfully protect such communications equipment.

- **Number of outlets.** Most surge suppressors provide several outlets, and must also provide a master power switch. Some also provide individual switches for each outlet. Some suppressors, such as Curtis Manufacturing Company’s Curtis Command Center, are designed to sit beneath a monitor, providing a swivel base for it, and they have a power switch for each outlet.

- **Failure alarm.** A surge suppressor can fail after absorbing too large a surge; better units provide an alarm that indicates when the suppressor circuit has failed. An alarm might consist of an indicator light (handy if the suppressor is close to your system), an audible buzzer (good if the suppressor is under your desk, out of eyeshot), or both (best).

**Complete Power Protectors**

For protection against sags and brief blackouts as well as surges, you’ll want a **standby power supply**, which installs between your equipment and the wall outlet and contains batteries that provide from 5 to 30 minutes of power. That’s more than enough power to span a brief outage or give you time to save and shut down during longer ones.

A standby power supply is often called an **uninterruptible power supply** (UPS), but in fact there’s a difference between the two. With a UPS, computer equipment runs continuously from the power supply’s batteries, which are constantly being recharged. By contrast, a standby power supply’s batteries don’t kick in until the power goes off (see “How Standby and Uninterruptible Power Supplies Work”). A standby power supply generally costs less than a true UPS and is just as reliable. A standby supply kicks in within milliseconds of an outage or sag, and as I mentioned earlier, the power supplies in your hardware will continue to provide power during that period.

The amount of power a standby supply can provide depends on what’s connected to it. The greater the load on the supply, the faster its batteries will discharge. What’s more, if you exceed a standby supply’s current rating, you’ll eventually blow a fuse in the supply. (Better-quality supplies have overload indicators that light when you’re drawing too much current.) Thus, it’s important to match the supply to your hardware.

Standby and uninterruptible power supplies are usually rated in **volt-amps**. A unit rated at approximately 100 volt-amps will power a typical Mac Plus or SE with a hard drive for at least 15 minutes (see “Current Requirements”). Such supplies generally cost between $200 and $400. For a Mac II-class machine with a 13-inch color monitor, you need a supply that provides 500 to 600 volt-amps, at a cost of $400 to $500. For a 19-inch monitor, make that at least 600 to 700 volt-amps and $500 to $700. Add another 100 volt-amps to include an external hard drive or tape backup device.

Don’t bother providing standby power to your laser printer—you’d need a supply rated at 1000 volt-amps or more, and they cost between $1000 and $2000. And given the fact that you won’t lose any work if the laser printer loses power anyway, it makes more sense to simply protect the printer from surges.

**Shopping for Standby Power**

Many of the shopping considerations behind surge suppressors apply to standby power supplies too. Some supplies provide only one rear-panel outlet, others provide several. Some
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(such as American Power Conversion’s UPS 110SE and UPS 370ci) can sit beneath a Mac or a monitor, while others (such as Emerson Electric Company’s Accupower Micro UPS series and Kensington Microware’s Power Backer series) are designed to sit on the floor. The better ones have several indicator lights that warn you when you’re overloading the supply, when your electrical wiring is faulty, and when you’re running on battery power.

More sophisticated supplies provide an interface connector that lets you attach the supply to the Mac’s modem or printer port so that the supply can convey status information to the Mac. Such a feature is most useful when you want standby power for a network file server.

If you want standby power for an AppleShare network file server, consider pairing American Power Conversion’s UPS 110SE or UPS 370ci with the company’s PowerChute software. These well-designed supplies provide interface connectors that can attach to the server Mac’s modem port. The PowerChute software monitors the status information; when the power fails and the power supply kicks in, PowerChute sends a warning to all Macs connected to the server telling them how long the server will remain available. If the power doesn’t return (continued)
### POWER PROTECTORS

<table>
<thead>
<tr>
<th>Company</th>
<th>Phone</th>
<th>Comments</th>
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<tr>
<td><strong>SURGE SUPPRESSORS</strong></td>
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<tr>
<td>Computer Accessories Corporation</td>
<td>619/457-5500</td>
<td>Numerous models; ProLine is UL 1449 rated; Proxime Power Director series has multiple power switches; Proxime Power Director Plus protects modem. $49.95-$159.95.</td>
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<tr>
<td>Curtis Manufacturing</td>
<td>602/532-4123</td>
<td>Numerous models, all UL 1449 rated. $6.95-$149.95.</td>
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<td>Intermatic</td>
<td>312/282-7300, 815/675-2321</td>
<td>Electro-Guard series UL 1449 rated. Numerous models, some with modern protection and front-panel switches. $39.95-$159.95.</td>
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<tr>
<td>Kensington Microware</td>
<td>212/475-5200, 800/535-4242</td>
<td>Numerous models; MasterPiece Mac II also protects modem and has monitor swivel and multiple front-panel power switches. $29.95-$159.95.</td>
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<td>Practical Solutions</td>
<td>602/322-6100</td>
<td>Strip Switch enables SEs to be turned on using keyboard power-on key. $89.95.</td>
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<tr>
<td><strong>STANDBY AND UNINTERRUPTIBLE POWER SUPPLIES</strong></td>
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<tr>
<td>American Power Conversion</td>
<td>401/789-5735, 800/541-8896</td>
<td>UPS 1105E and UPS 370Ci provide 110 and 370 volt-amps, UPS 1105E $299, UPS 370Ci $499; several less sophisticated models available, PowerChute software for AppleShare servers, $99.</td>
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<tr>
<td>CMS Enhancements</td>
<td>714/222-5000</td>
<td>UltraPower series provides 450-1500 volt-amps, UltraPower 800 and 1000 produce square wave outputs, others produce sine wave. $699-$2199.</td>
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<tr>
<td>Computer Accessories Corporation</td>
<td>619/457-5500, 800/582-2580</td>
<td>Proxima IPS 500+ fits under Mac II monitor and provides 430 volt-amps. $649.95.</td>
</tr>
<tr>
<td>Emerson Electric</td>
<td>714/269-1000</td>
<td>AccuPower Micro UPS series provides 150-1000 volt-amps. $189-$999.</td>
</tr>
<tr>
<td>General Power Corporation</td>
<td>714/966-9321, 800/854-3469</td>
<td>Heavy-duty Unistar series provides 1000-10,000 volt-amps. $2795-$14,025.</td>
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</tbody>
</table>

Before the standby power is exhausted, all users are safely logged off the server, which is then shut down normally. Of course, only users who weren’t victimized by the outage—or who have their own standby power supplies—will see the on-screen warning message, but the warning is only half the value of PowerChute anyway. What’s equally important is that the server is safely shut down for you.

Before buying any standby power supply, make sure it provides either sine wave or stepped-square wave output. Inexpensive standby supplies often provide square wave output, which causes considerable electrical stress to monitors and hard drives that could make them wear out faster. Sine-wave output is the most desirable, since that’s what wall outlets normally supply.

Finally, be aware that after several years, you’ll need to replace your standby power supply’s batteries, which can cost up to 30 percent of the supply’s original price. You may want to investigate replacement costs before picking a unit.

Standby power supplies provide more complete protection than surge suppressors but are far less popular. One reason is their cost; another is that they provide only a brief reprieve from darkness. Still, if your power is as unreliable as mine, that reprieve can be priceless. The glow of a Mac screen in an otherwise darkened room is a heartening sight—especially if you haven’t saved recently.

### More Power Tips

"Power Protectors" lists vendors of surge suppressors and standby power supplies. But neither device will help if your electrical wiring is faulty. Be sure your wall outlets’ third-wire ground holes are connected to a good earth ground. (Check the point where the electrical service enters your house; you should find a copper rod driven into the ground with a heavy wire connecting it to your wiring.) Also be sure that your hot and neutral lines are wired properly. You can check them yourself using an inexpensive line checker such as Radio Shack’s catalog number 22-101. (American Power Conversion’s standby supplies contain line-checking features.) To be extra sure, however, double-check with an electrician or your local utility company.

Also, avoid ground eliminators—those little adapters that let you plug a three-pronged power cord into the two-conductor outlets many older buildings have. Defeating the ground conductor makes the Mac more susceptible to power surges. Have an electrician install a properly grounded, three-conductor outlet.

The best way to protect equipment against lightning-induced power surges is to unplug the Mac and everything connected to it during a lightning storm. (Don’t forget to unplug the modem from the telephone lines.) A lightning bolt is the ultimate surge; don’t count on a surge suppressor to protect you from it.

In the end, one of the best ways to avoid losing work because of power problems is free. Simply follow the advice that Fred Parker, a power-supply veteran at Apple, passed along to me: Save often.

See Where to Buy under Power Protectors for contact information.

Contributing editor Jim Heid focuses on a different aspect of Mac fundamentals each month. He is currently working on a complete guide to the Macintosh, to be published this year by IDG Books Worldwide.
The Question Isn't Why Ehman Monitors Cost So Little... It's Why Apple And Radius Charge So Much.

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**Insights on QuarkXPress 3.0**

**TIPS FOR A SUPER-POWER PUBLISHING TOOL**

**BY DIANE BURNS**

QuarkXPress has had a reputation for being a powerful, yet difficult package. The release of 3.0, however, eliminated most of the quirks responsible for raising the frustration quotient. Plenty of new features have also been added, including a pasteboard, the ability to create spreads, and free rotation of text and graphics. Here are some of the most useful tricks and shortcuts.

**The Measurements Palette**

One of the new features that makes QuarkXPress 3.0 so easy to use is the Measurements palette, a long, narrow window that lets you interactively adjust specifications for text and graphics. Display the Measurements palette by selecting Show Measurements (View menu).

The content of the Measurements palette is determined by the type of item you have selected—selecting a text box, a picture box, a line, or a group of items changes the palette accordingly.

Click on any field in the palette to make an entry, or use the keyboard shortcut ⌘-Option-M to highlight the first field. You can then Tab forward to the next field, or Shift-Tab to highlight the previous field. To revert to original values in the Measurements palette, press ⌘-Z.

**Document Setup and Navigation**

The Document Layout palette is a powerful tool for setting up and navigating a document. Select Show Document Layout (View menu) to display the Document Layout palette, where master pages and document pages appear as small icons.

The Document palette is the only way to add new master pages (you can have up to 127 master pages in one document). Simply click on a single- or double-sided master-page icon at the top of the palette and drag it to the right. You can insert new pages in a document by dragging the appropriate master-page icon down into the document-page area. Add pages one at a time, or hold down the Option key before you drag the icon; the Insert Pages dialog box appears when you release the mouse button, allowing you to specify any number of pages to be added.

To change the starting page number of a document or section, first click on a document-page icon; the page number appears in the top area of the palette. Then click once on the page number to open the Section dialog box that allows you to change the numbering scheme.

The Document Layout palette offers one of the fastest ways to turn pages in a QuarkXPress document. You just double-click on the page icon to display that page on screen.

**From the Keyboard**

QuarkXPress supports a wide range of keyboard shortcuts, including a multitude of program-specific commands. Some of the most useful ones involve selecting tools and (continues)
There are many sources of high radiation emissions.

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Low-Emission at no extra cost — L-View Multi-Mode has it now for your Macintosh computer. L-View meets strict Swedish guidelines for electromagnetic emissions. This 19" monochrome display also delivers six resolutions, from an ultrahigh 120 dots per inch to an ultra-large 36 dpi. You select the view that’s perfect for your application.

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Circle 62 on reader service card
working with graphics (see "Tool-Selection Shortcuts" and "Graphics Shortcuts").

Reverse Type with Style

You can utilize QuarkXPress's Rules command, for placing rules above or below paragraphs, to create reverse type on a black (or any color or shade) rule. First apply a rule to text (which can also be any shade or color) by highlighting the text and selecting the Rules command from the Style menu. In the dialog box that appears, check Rule Above. Choose the color, shade, length, and width (up to 504 points) of the rule desired; then input a negative value in the Offset field. Since the default measurement unit for offset values displays as a percentage, be sure to enter the unit of measurement after you type in a value.

The nicest part of this feature is that you can set up the format described above via the Style Sheets command (Edit menu), thus making reverse type as simple as applying a style sheet (see "Type in Reverse").

Drop Caps the Easy Way

QuarkXPress now makes creating drop caps painless. Simply select Formats (Style menu) and in the Paragraph Formats dialog box that appears, click on Drop Caps, specifying the width (number of characters) and depth (number of lines) the drop cap should be. And since the drop cap is considered a paragraph format, it can be included as part of a style sheet.

This command allows a great deal of flexibility, including the ability to freely resize drop caps. There's even a way to create a hanging-indent drop cap. After you specify a drop cap, simply position the cursor to the right of the drop cap and enter the Indent Here character (§), which creates an automatic hanging indent.

The maximum depth you can specify for drop caps is 8 lines. If you need a drop cap that runs more than 8 lines deep next to or in a paragraph, make the drop cap an anchored text box within that paragraph.

Text Inside a Shape

You can use QuarkXPress's Runaround command to flow text inside any shape. Draw a picture box, and import a graphic that is roughly the shape you want the text to flow into. Select Runaround (Item menu) and set Mode to Manual Image, Text Outset to 0°, and check Invert.

The graphic will have an editable runaround polygon shape around it. Press delete to remove the graphic from the picture box while leaving its runaround polygon behind. You can edit the runaround polygon by dragging its handles. You can add handles to the polygon by holding down the § key as you click on the polygon outline. To remove handles, hold down the § key as you click on a handle. To prevent screen redraw while editing the polygon, hold down the Space bar, when you release it, the screen will redraw.

To get text to flow within the polygon, position the picture box containing the polygon over the box containing your text (choose Bring to Front from the Item menu to make sure the picture box is in front of the text box). Also make sure the text is justified so that it completely fills the polygon. You can adjust the way text flows by editing the polygon shape and by modifying the text's word and character spacing.

Type in Reverse You can use paragraph rules to create a box with reverse type that can be made part of a style sheet.
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If you prefer, you can have a computer store install your SIMMs for you. Their service technicians have the necessary tools and expertise. The total cost shouldn't exceed $50.

WHY MORE MEMORY?

Have you noticed that some of the latest software requires too much memory to run on your Mac? Would you like to run MultiFinder plus two or more programs—all at the same time? Are you tired of having to quit your word processor just to answer a question from a spreadsheet?

Well, added memory is a must! Join the thousands of Mac users who are taking advantage of low SIMMs prices right now.

And quite apart from the ability to do multi-tasking, added memory speeds up your disk access time and eliminates delay when selecting menu items.
The Mac Plus and Mac SE have four available slots on the motherboard, which originally contain four 256K SIMMs modules — totaling 1 megabyte (1MB) of memory. To upgrade, you can replace each 256K module with a 1MB module, but you must do this in pairs. Replace two 256K modules and you will have a total of 2.5MB of memory. (That’s the two new 1MB modules plus the original two 256K modules.) Replace all four modules and you’ll have 4MB. (You should save the 256K modules for later use if you want to pass your Mac on to someone else.)

**FAST, FASTER, FASTEST**

SIMMs come in different speeds and are calibrated in nanoseconds (ns) from 70ns to 120ns. Anything faster than 120ns doesn’t much help any Mac but the IIci. The system doesn’t respond any faster anyway. But you can always take your memory chips with you when you move on to a new Mac, so there may be an advantage to speed at a later date.

**QUALITY CONTROL**

MacWarehouse buyers and agents scour the world in search of top quality components for our SIMMs modules. They’re supplied only by top grade manufacturers like Samsung, Siemens, Texas Instruments, Micron, Fujitsu, Intel, etc. Each unit is tested for performance, quality and noise, in temperatures from freezing to 158°F.

The Mac II, Iix, IIcx and SE/30 each come with a total of eight slots. The standard configuration has four 256K SIMMs modules, or a total of 1MB. Here, memory must be upgraded in multiples of four. This allows for expansion from 1MB to 4MB, 5MB or 8MB.

Remove the four 256K modules and replace with 1MB modules and you have 4MB. Leave the original modules and add four 1MB modules and you get 5MB. Removing the original modules and adding eight new 1MB modules will bring you to 8MB of memory.

Install a MacWarehouse Memory Upgrade and working with your Mac will never be the same again! Call MacWarehouse now and we’ll help you select the right Memory Upgrade. We’ll ship overnight for just $3.

**FAST, FASTER, FASTEST**

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**THE MAC II, IIX, IIcx AND SE/30**

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**Qualifying combinations**

<table>
<thead>
<tr>
<th>SIMMs</th>
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</tr>
</thead>
<tbody>
<tr>
<td>1 Meg SIMMs • 100ns</td>
<td>$59</td>
</tr>
<tr>
<td>1 Meg SIMMs • 70ns</td>
<td>$79</td>
</tr>
</tbody>
</table>

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with the purchase of any two SIMMS modules.

*Check the chart for the number of modules you may need. Price and item availability are subject to change without notice.*

Circle 240 on reader service card
COLOR TRAPPING WITH QUARKXPRESS

Trapping is a technique for ensuring that when two adjacent colors are printed, they neither overlap excessively nor leave any white space between them that would allow the paper to show through. Many factors—such as the speed and accuracy of the press, the order in which inks are applied on the press, the absorbency of the paper, temperature, and humidity—must be considered in determining the type of trapping to be used.

QuarkXPress 3.0 offers a new feature—the Edit Trap command—which lets you control the way in which two adjacent colors print in relation to each other. In QuarkXPress 3.0, trapping is specified by the way an object color traps against its background color. Object color is applied to characters or to an item that's in front of another color, while background color is applied to the item that is behind another color item.

First select Colors from the Edit menu. In the Colors dialog box, choose the object color for which you're specifying trapping values. Click on Edit Trap to display the Trap Specifications dialog box, which lists the trapping values specified for the object color (shown in the dialog box title) and each of the colors in the Background color column. The Value column lists the trapping value specified for each background color. A value can be specified in one of three ways.

- **Automatic trapping** The object color knocks out the background color (this is the default setting in QuarkXPress). Version 3.0's conservative trapping method determines how much to spread (increase the size of) the object color or choke (reduce the knockout area of) the background color.
- **Overprint** The object color prints without knocking out the background color when you're printing color-separation plates. As a result, on an offset press the object color prints on top of the background color. QuarkXPress allows overprinting only when the overprinting color has a 95 percent or higher shade.

- **Trap** You enter a custom value (between -36 points and +36 points, in .001-point increments) for the trapping or overlap between the object color and the background color. Values are typically set very low, at about .25 of a point or less. After you enter a value, click on Trap to save the changes you've made. A negative value chokes the background color, a positive value spreads the object color against the background color. If you enter a value of zero, no choking or spreading occurs and the object is cut out from the background.

When an object is in front of more than one color, in front of certain color pictures, or if QuarkXPress is unable to identify the background color, the item traps to the setting you've specified for Indeterminate color.

Although each print job has different requirements, here are some general guidelines to follow. For spot-color printing of adjacent colors, you should generally set the lighter color to overlap the darker color—to compensate for the fact that darker inks cover lighter inks when they’re printed. With process-color printing, trapping is most crucial when two colors have none of the four process colors—cyan, yellow, magenta, black—in common. If you’re printing two adjacent colors that both contain some magenta, when magenta is printed the paper will not show through where the two colors meet unless the other colors are significantly off-register. If the colors share no cyan, magenta, yellow, or black ink, you may need to make some adjustments to avoid trapping problems.
**GRAPHICS SHORTCUTS**

<table>
<thead>
<tr>
<th>To accomplish this</th>
<th>Hold down</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enlarge or reduce graphics in 5 percent increments</td>
<td>Shift-Option-(-&gt;) or (&lt;)</td>
</tr>
<tr>
<td>Bring graphic to center of picture box</td>
<td>Shift-(_)M</td>
</tr>
<tr>
<td>Fit a graphic inside a picture box, while maintaining aspect ratio</td>
<td>Shift-Option-(_)-(F)</td>
</tr>
<tr>
<td>Visually resize a graphic and its picture box, while maintaining the aspect ratio of both</td>
<td>Shift-Option-(_) while dragging corner handle of picture box</td>
</tr>
</tbody>
</table>

**Special Font Shortcuts**

You can change to the Symbol font or Zapf Dingbats for one character using a simple keyboard command. Press Shift-\#-Q, and the next character you type will be in the Symbol font. After the one Symbol character, QuarkXPress returns to the font you were using. Use Shift-\#-Z to make the next character you type Zapf Dingbats.

**New-Line Character**

Sometimes called a soft carriage return (press Shift-Return), the new-line character starts a new line without starting a new paragraph. Use this character instead of a paragraph return to break headlines that are longer than one line; as a new paragraph the second line would take on all the formatting associated with the headline—such as extra space above it, resulting in too much space between each line of the headline. Another good use for this feature is in creating tables. End each line with the new-line character to make the entire table one paragraph. Then you've got a table that's much easier to format, since you can set tabs and other formats by clicking just once anywhere in the table, rather than having to select the whole table.

You can search for new-line characters just as you would any other invisible characters in QuarkXPress—such as paragraph returns, tabs, or spaces. To enter the new-line character in the Find/Change dialog box, hold down the Shift and \# keys and press Return. The characters \(\_\) appear in the dialog box.

**Selecting, Spacing, Nudging, and Grouping**

For working with items on the page, QuarkXPress 3.0 adds several commands and features that are more often found in drawing software than in page-layout programs. For example, you can select multiple items by surrounding them with a marquee (Shift-drag) or by Shift-clicking on each one. Once items are selected, you can use the Space/Align command (Item menu) to space or distribute them horizontally or vertically. You can also group the items (choose Group from the Item menu), which allows you to move or rotate them as a single unit. You can still perform many editing functions on any individual item within a group without ungrouping them first.

Use the arrow keys to nudge a selected item in 1-point increments; adding the Option key moves them in 1-point increments.

**Using the Library**

QuarkXPress 3.0's Library feature lets you store items in a separate QuarkXPress file, or Library, that holds up to 2000 individual items or groups of items. After creating a Library, you simply drag items from a document into the Library, where they show up in miniature. Drag an item out of the Library, and it appears on a document page. Applying labels to Library items makes it easy to display only those items you wish to view.

Although you cannot drag a page (continues)
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Protects against illegal copying
Prevents launching of unauthorized programs
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Specific Desk Accessory Control
Multiple encryption/ password options

A.M.E. is an integrated security program. Whether your concerns are managing a confidential government project, maintaining order on a Mac™ used by many people, or just preventing your child from destroying financial records, A.M.E. has a solution for you. It runs quietly in the background and is always there to protect you. The easy-to-use interface lets you set up the Mac with just the kind of security you require.

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Imagine never having to deal with font ID conflicts, never having to restart your system to install a Desk Accessory you need. Imagine spending your time creating instead of juggling fonts and DAs.

Imagine Suitcase II on your Macintosh...
Updates

Here's our list of some of the latest versions of Mac software that were announced 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. The first price is the upgrade cost for registered owners; the second is the current list price.

AgraType version 2.0 provides access to more than 1100 PostScript screen and printer fonts. Contains hundreds of new and original typefaces as well as the complete Adobe Type Library, including headline and display type. Agra

Compugraphic, 508/658-5600 ext. 2326. Free; $165 per font.

HandOff II version 1.1 has Desktop Manager support and increased speed; can be disabled while using some DAs that are more efficient when HandOff is not running. Software Innovations, 214/727-2329. Free; $79.95 new.

FileMaker Pro is now multuser-compatible and runs on basic Mac networks, with or without a file server. Features record locking, multiple levels of password protection, and the ability to create confidential layouts. Layout mode lets you change font, size, and style character-by-character in each field; offers oval, rounded rectangles, choice of line width, and pattern and shaded areas. Has 19 new text calculations to enable users to access and extract information by text location and content. New mathematical summary calculations include running total, running count, weighted average, fraction of total, and fraction of subtotal. Claris Corporation, 408/987-7000. Contact vendor for upgrade policy; $299 new.

## PRODUCT UPDATES

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**Product Updates**

- **Bold** = first time the product is being listed.
- **Star** = minor update
- **Req.** = min. RAM and system software required.
- **Rev.** = last revision (past year) reviewed this or an earlier version
- **Price** = cost for update to registered owners.
- *** = contact your dealer for update policy**

### (continues)
## PRODUCT UPDATES

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highest rating (5/28/90) for
overall performance, quality of
Hayes compatibility, fax/data
transfer quality, ease of use, and
AppleTalk LAN compatibility.

Circle 317 on reader service card

Macintosh® software printer
drivers seen in this modified
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or Mac Daisy Link™. Together
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different laser, dot matrix, inkjet or
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overall performance, quality of
Hayes compatibility, fax/data
transfer quality, ease of use, and
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Macintosh® software printer
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### 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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296  
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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

601 3000 series Iris Graphics; 617/275-8777.
608 AgentDA Team Building Technologies, 514/279-5010.
610 A.M.E. Casady & Greene; 408/624-8716, 800/359-1920.
614 Analog Interface Digidesign; 415/688-0600, 800/335-2137.
615 Aperture Network & Resource Manager Aperture Technologies; 800/342-9022.
616 AppleShare Print Server, AppleTalk Internet Router Apple Computer; 408/996-1010.
619 Astrix Microseeds Publishing; 813/882-8635.
619 AudioEdit DIGIDE ign.

Reader Service

415/688-0600.
* AutoMac III Microsoft Corp.; 206/892-8080, 800/926-9490.
620 Avid/ Media Composer Avid Technology; 617/221-6789.
621 Bernoulli Transportable Iomega Corp.; 801/778-1000, 800/456-5522.
622 Business Laser Printer IIS (BIP) IIS GCC Technologies; 617/890-0880, 800/422-7777.
623 CalendarAir Pybnron Systems; 304/340-4260, 800/866-4260.
624 Cataloger Masters Publishing; 313/971-1118.
625 CHC-445 Mitsubishi International Corp.; 408/980-1100.
626 Classified Ad Tracking System Eclipse Services, a division of Quadrivium; 215/529-6882.
627 ClassManager Baseview Products; 313/426-5751.
628 ClickChange Dohl-Click Software; 818/700-9525, 800/359-9343.
629 Colorado Color Imaging Recorder Metrum Information Storage; 800/328-5111.
630 ColorBoard 200, ColorBoard 264, ColorBoard 364 RasterOps Corp.; 408/562-4200, 800/468-7600.
634 ColorCapture Data Translation; 508/481-5700.
635 Colormanate PS NEC Technologies; 508/264-8000, 800/632-4056.
636 ColorPoint PS Seiko; 408/922-5800, 800/873-4561.
637 ColorQuick Ink-Jet Printer Tektronix; 503/682-7377, 800/835-6100.
639 ColorSpace III, ColorSpace FX, ColorSpace Plus/SE MASS Microsystems; 408/522-1200, 800/522-7979.
640 Computer Eyez, Computer Eyez Professional Digital Vision; 617/329-5400.
645 DataShaper ElseWare Corp.; 206/547-9623.
646 DAT 8/2 Digital Interface Digidesign; 415/688-0600, 800/333-2137.
648 Deck Digitdesign; 415/688-0600, 800/333-2137.
651 Digital Video, Digital Video Color Aapp Corp.; 408/735-8590.
653 DisplayServer-TV Lapis Technologies; 415/748-1600.
654 Double Helix II Oclesta; 708/498-5615, 800/323-5423.
655 DU-Animaq Diaquest; 415/526-7167.
656 DTV979-80HZ Data Translation; 508/481-3700.
657 DVA-4000/Macintosh VideoLogic; 617/454-0530.
658 Edit Works Specialized Computer Systems; 707/539-9003.
659 EtherPepk Avant Garde Group; 415/937-7900.
660 Events Listing System Eclipse Services, a division of Quadrivium; 215/352-6800.
661 * EtherTalk Macintosh Corp.; 408/987-7000.
662 The Fool's Errand Miles Computing; 818/946-6900.
662 FrameGraber 32ANC RasterOps Corp.; 408/562-4200, 800/683-7600.
663 FrameMaker Frame Technology; 408/433-3311, 800/843-7263.
664 Freesies XTension Quark; 303/863-2211, 800/356-9363.
665 G370-10 Mitsubishi Electronics America; 215/515-3935.
666 Go Junior Toyo; 808/254-1166, 808/869-6469.
667 * HP PaintJet Color Graphics Printer, HP PaintJetXL Hewlett-Packard; 800/752-0990.
668 HyperCard VideoDisc Toolkit APDA-Apple Computer; 800/282-2732.
669 HyperMIDI Ear Level Engineering; 213/36-2939.
669 HyperMusic Passport Designs; 415/726-0280.
669 Image Capture Board Scion Image Systems; 301/845-4045.
670 IMTX 8000 Interactive Media Technologies; 602/443-3086.
671 Internet Manager Shiva Corp.; 617/252-6300, 800/459-3550.

(continues)
WHERE TO BUY

Reader Service

672 InterPoll Apple Computer; 408/996-1010.
673 Jam Session Brakerband Software; 415/492-3200, 800/521-6263.
674 Keyboard Shelf Kensington Microware; 212/475-5200, 800/533-4242.
675 KiwiFinder Extender Kiwi Software; 805/685-4031.
676 Kodak XL 7700 Eastman Kodak Co.; 415/946-1300, 800/445-6325.
677 LANalyzer Network Analyzer Novell; 801/379-5653, 800/243-8526.
678 LaserWriter font utility Bitstream; 617/497-6222, 800/522-3608.
679 Lettuck and PMTracker EdICO Services; 813/962-7800, 800/523-8975.
680 Light Checkbook Accounting for the Macintosh DacEasy; 214/248-0205, 800/877-8088.
681 Light Source Software for NEC PC-VCR NEC Professional Systems Division; 800/562-5200.
682 MacDraw II Claris Corp.; 408/987-7000.
683 The Macintosh Bible, Software Disks Goldstein & Blair; 415/524-4000.
684 Macintosh Display Card 4 +8, Macintosh Display Card 8+24 GC Apple Computer; 408/996-1010.
685 MacInUse SoftView; 805/385-5000, 800/622-6829.
686 MacProteus Digitsign; 415/688-0600, 800/333-2137.
687 MacRecorder Farallon Computing; 415/994-9109.
688 MacStorh Darima Technology Group; 714/994-7400, 800/541-0579.
689 MacToken EDI Communications; 408/996-1543.
690 MacVac MacVac-S Advanced Digital Imaging; 714/725-0154.
691 Mac Video Color Card VENT; 415/961-3671.
692 MacVision Koala Technologies; 408/287-6311.
693 Market Manager Plus Dow Jones & Company; 609/520-4000.
694 MasterJuggler ALSof; 713/553-4000.
695 MasterStrokes Datadesk International; 818/958-4200, 800/826-5398.
696 Microsoft Word, Microsoft Works Microsoft Corp.; 206/882-8080, 800/429-9400.
697 Microtech R50 Microtech International; 203/468-6223, 800/626-2476.
698 MicroTV Appas Corp.; 408/735-8550.
699 MIDI Hits Passport Designs; 415/726-0280.
700 MM1600SS Para Systems; 214/446-7633, 800/336-7272.
701 MultiGate Manager Network Resources Corp.; 408/263-8100.
702 Multimedia Toolkit Light Source; 415/352-3288.
703 Neotech Image Grabber Advent Computer Products; 619/942-8456.
705 NetControl International Business Software; 408/552-8000, 800/753-2822.
706 NetMap AEP; 305/944-7710, 800/446-2377, 800/289-2377 in California.
708 NetUpdater MDG Computer Services; 708/418-9991.
711 Norton Utilities for the Macintosh Symantec Corp.; 408/252-9600, 800/441-7234.
712 NTELnce Color Ccc Graphics; 415/964-7900, 800/545-5445.
713 PC-VCR NEC Technologies; 508/264-8000, 800/652-4655.
714 Personality Preferred Publishers; 901/683-3383.
715 Personal Vision Orange Micro; 714/779-2772, 800/223-8029.
716 Phaser PX Tektronix; 502/682-7377, 800/835-6100.
717 PhoneNet CheckNet Farallon Computing; 415/596-9100.
718 PixelGrabber Perceptics Corp.; 800/488-8544.
719 Playmaker Football Brakerband Software; 415/492-3200, 800/521-6263.
720 Plottergeist Palomar Software; 619/721-7000.
721 Power Protectors American Power Conversion; 401/789-5725, 800/541-8896.
722 ProVideo 32 RasterOps Corp.; 800/468-7600.
723 P5-410 QMS; 205/633-4300, 800/523-2096.
724 PServe Cooperative Printing Solutions; 404/840-0810.
725 QuarkXPress, QuarkXPress Quark; 303/334-2211, 800/956-5635.
726 QuickCapture Data Translation; 508/481-3700.
727 QuickImage 24 MASS Microsystems; 408/522-1200, 800/522-7979.
728 QuickView Studio E-Machines; 503/646-6699, 800/344-7274.
729 RadiusTV Radius; 408/434-1010, 800/227-2795.
730 ReStore Reho High Definition Studio; 212/597-8966.
731 RGB Videolink 60DA RGB Spectrum; 415/848-0180.
732 Rinal Microsofts Publishing; 813/862-0655.
733 Sharp InkJet Color Image Printer, Sharp JX 730 Sharp Electronics Corp.; 201/529-9600.
735 Sniffer Network Genera; 415/688-2700.
736 Sonar Books; Virginia Systems; 804/799-3200.
737 Sound Accelerator, Sound Design II, Sound Tools Digidesign; 415/688-0600, 800/333-2137.
738 Sound Apprentice, Sound (continues)

Reader Service

688/0600, 800/533-2137.
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Bodoni Roman, Century Schoolbook, Century Schoolbook Old Style, Century Schoolbook
Old Style Bold, Century Schoolbook Old Style Bold italic, Century Schoolbook Old Style
Roman, Century Schoolbook Old Style Bold, Century Schoolbook Old Style Bold italic,
Century Schoolbook Old Style Roman, Century Schoolbook Old Style Bold, Century Schoolbook
Old Style Bold italic, Century Schoolbook Old Style Roman, Century Schoolbook Old Style
Bold, Century Schoolbook Old Style Bold italic, Century Schoolbook Old Style Roman,
Century Schoolbook Old Style Bold, Century Schoolbook Old Style Bold italic, Century Schoolbook
Old Style Roman, Century Schoolbook Old Style Bold, Century Schoolbook Old Style Bold italic,
Century Schoolbook Old Style Roman, Century Schoolbook Old Style Bold, Century Schoolbook
Old Style Bold italic, Century Schoolbook Old Style Roman, Century Schoolbook Old Style
Bold, Century Schoolbook Old Style Bold italic, Century Schoolbook Old Style Roman,
Century Schoolbook Old Style Bold, Century Schoolbook Old Style Bold italic, Century Schoolbook
Old Style Roman, Century Schoolbook Old Style Bold, Century Schoolbook Old Style Bold italic,
Century Schoolbook Old Style Roman, Century Schoolbook Old Style Bold, Century Schoolbook
Old Style Bold italic, Century Schoolbook Old Style Roman, Century Schoolbook Old Style
Bold, Century Schoolbook Old Style Bold italic, Century Schoolbook Old Style Roman,
Century Schoolbook Old Style Bold, Century Schoolbook Old Style Bold italic, Century Schoolbook
Old Style Roman, Century Schoolbook Old Style Bold, Century Schoolbook Old Style Bold italic,
Century Schoolbook Old Style Roman, Century Schoolbook Old Style Bold, Century Schoolbook
Old Style Bold italic, Century Schoolbook Old Style Roman, Century Schoolbook Old Style
Bold, Century Schoolbook Old Style Bold italic, Century Schoolbook Old Style Roman,
Century Schoolbook Old Style Bold, Century Schoolbook Old Style Bold italic, Century Schoolbook
Old Style Roman, Century Schoolbook Old Style Bold, Century Schoolbook Old Style Bold italic,
Century Schoolbook Old Style Roman, Century Schoolbook Old Style Bold, Century Schoolbook
Old Style Bold italic, Century Schoolbook Old Style Roman, Century Schoolbook Old Style
Bold, Century Schoolbook Old Style Bold italic, Century Schoolbook Old Style Roman,
Century Schoolbook Old Style Bold, Century Schoolbook Old Style Bold italic, Century Schoolbook
Old Style Roman, Century Schoolbook Old Style Bold, Century Schoolbook Old Style Bold italic,
Century Schoolbook Old Style Roman, Century Schoolbook Old Style Bold, Century Schoolbook
Old Style Bold italic, Century Schoolbook Old Style Roman, Century Schoolbook Old Style
Bold, Century Schoolbook Old Style Bold italic, Century Schoolbook Old Style Roman,
Century Schoolbook Old Style Bold, Century Schoolbook Old Style Bold italic, Century Schoolbook
Old Style Roman, Century Schoolbook Old Style Bold, Century Schoolbook Old Style Bold italic,
Century Schoolbook Old Style Roman, Century Schoolbook Old Style Bold, Century Schoolbook
Old Style Bold italic, Century Schoolbook Old Style Roman, Century Schoolbook Old Style
Bold, Century Schoolbook Old Style Bold italic, Century Schoolbook Old Style Roman,
Century Schoolbook Old Style Bold, Century Schoolbook Old Style Bold italic, Century Schoolbook
Old Style Roman, Century Schoolbook Old Style Bold, Century Schoolbook Old Style Bold italic,
Century Schoolbook Old Style Roman, Century Schoolbook Old Style Bold, Century Schoolbook
Old Style Bold italic, Century Schoolbook Old Style Roman, Century Schoolbook Old Style
Bold, Century Schoolbook Old Style Bold italic, Century Schoolbook Old Style Roman,
Century Schoolbook Old Style Bold, Century Schoolbook Old Style Bold italic, Century Schoolbook
Old Style Roman, Century Schoolbook Old Style Bold, Century Schoolbook Old Style Bold italic,
Century Schoolbook Old Style Roman, Century Schoolbook Old Style Bold, Century Schoolbook
Old Style Bold italic, Century Schoolbook Old Style Roman, Century Schoolbook Old Style
Bold, Century Schoolbook Old Style Bold italic, Century Schoolbook Old Style Roman,
Century Schoolbook Old Style Bold, Century Schoolbook Old Style Bold italic, Century Schoolbook
Old Style Roman, Century Schoolbook Old Style Bold, Century Schoolbook Old Style Bold italic,
Century Schoolbook Old Style Roman, Century Schoolbook Old Style Bold, Century Schoolbook
Old Style Bold italic, Century Schoolbook Old Style Roman, Century Schoolbook Old Style
Bold, Century Schoolbook Old Style Bold italic, Century Schoolbook Old Style Roman,
Century Schoolbook Old Style Bold, Century Schoolbook Old Style Bold italic, Century Schoolbook
Old Style Roman, Century Schoolbook Old Style Bold, Century Schoolbook Old Style Bold italic,
Century Schoolbook Old Style Roman, Century Schoolbook Old Style Bold, Century Schoolbook
Old Style Bold italic, Century Schoolbook Old Style Roman, Century Schoolbook Old Style
Bold, Century Schoolbook Old Style Bold italic, Century Schoolbook Old Style Roman,
Century Schoolbook Old Style Bold, Century Schoolbook Old Style Bold italic, Century Schoolbook
Old Style Roman, Century Schoolbook Old Style Bold, Century Schoolbook Old Style Bold italic,
Century Schoolbook Old Style Roman, Century Schoolbook Old Style Bold, Century Schoolbook
Old Style Bold italic, Century Schoolbook Old Style Roman, Century Schoolbook Old Style
Bold, Century Schoolbook Old Style Bold italic, Century Schoolbook Old Style Roman,
Century Schoolbook Old Style Bold, Century Schoolbook Old Style Bold italic, Century Schoolbook
Old Style Roman, Century Schoolbook Old Style Bold, Century Schoolbook Old Style Bold italic,
Century Schoolbook Old Style Roman, Century Schoolbook Old Style Bold, Century Schoolbook
Old Style Bold italic, Century Schoolbook Old Style Roman, Century Schoolbook Old Style
Bold, Century Schoolbook Old Style Bold italic, Century Schoolbook Old Style Roman,
Century Schoolbook Old Style Bold, Century Schoolbook Old Style Bold italic, Century Schoolbook
Old Style Roman, Century Schoolbook Old Style Bold, Century Schoolbook Old Style Bold italic,
Century Schoolbook Old Style Roman, Century Schoolbook Old Style Bold, Century Schoolbook
Old Style Bold italic, Century Schoolbook Old Style Roman, Century Schoolbook Old Style
Bold, Century Schoolbook Old Style Bold italic, Century Schoolbook Old Style Roman,
Century Schoolbook Old Style Bold, Century Schoolbook Old Style Bold italic, Century Schoolbook
Old Style Roman, Century Schoolbook Old Style Bold, Century Schoolbook Old Style Bold italic,
Century Schoolbook Old Style Roman, Century Schoolbook Old Style Bold, Century Schoolbook
Old Style Bold italic, Century Schoolbook Old Style Roman, Century Schoolbook Old Style
Bold, Century Schoolbook Old Style Bold italic, Century Schoolbook Old Style Roman,
Century Schoolbook Old Style Bold, Century Schoolbook Old Style Bold italic, Century Schoolbook
Old Style Roman, Century Schoolbook Old Style Bold, Century Schoolbook Old Style Bold italic,
Century Schoolbook Old Style Roman, Century Schoolbook Old Style Bold, Century Schoolbook
Old Style Bold italic, Century Schoolbook Old Style Roman, Century Schoolbook Old Style
Bold, Century Schoolbook Old Style Bold italic, Century Schoolbook Old Style Roman,
Century Schoolbook Old Style Bold, Century Schoolbook Old Style Bold italic, Century Schoolbook
Old Style Roman, Century Schoolbook Old Style Bold, Century Schoolbook Old Style Bold italic,
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Old Style Bold italic, Century Schoolbook Old Style Roman, Century Schoolbook Old Style
Bold, Century Schoolbook Old Style Bold italic, Century Schoolbook Old Style Roman,
Century Schoolbook Old Style Bold, Century Schoolbook Old Style Bold italic, Century Schoolbook
Old Style Roman, Century Schoolbook Old Style Bold, Century Schoolbook Old Style Bold italic,
Century Schoolbook Old Style Roman, Century Schoolbook Old Style Bold, Century Schoolbook
Old Style Bold italic, Century Schoolbook Old Style Roman, Century Schoolbook Old Style
Bold, Century Schoolbook Old Style Bold italic, Century Schoolbook Old Style Roman,
Century Schoolbook Old Style Bold, Century Schoolbook Old Style Bold italic, Century Schoolbook
Old Style Roman, Century Schoolbook Old Style Bold, Century Schoolbook Old Style Bold italic,
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Old Style Bold italic, Century Schoolbook Old Style Roman, Century Schoolbook Old Style
Bold, Century Schoolbook Old Style Bold italic, Century Schoolbook Old Style Roman,
Century Schoolbook Old Style Bold, Century Schoolbook Old Style Bold italic, Century Schoolbook
Old Style Roman, Century Schoolbook Old Style Bold, Century Schoolbook Old Style Bold italic,
Century Schoolbook Old Style Roman, Century Schoolbook Old Style Bold, Century Schoolbook
Old Style Bold italic, Century Schoolbook Old Style Roman, Century Schoolbook Old Style
Bold, Century Schoolbook Old Style Bold italic, Century Schoolbook Old Style Roman,
Century Schoolbook Old Style Bold, Century Schoolbook Old Style Bold italic, Century Schoolbook
Old Style Roman, Century Schoolbook Old Style Bold, Century Schoolbook Old Style Bold italic,
Century Schoolbook Old Style Roman, Century Schoolbook Old Style Bold, Century Schoolbook
Old Style Bold italic, Century Schoolbook Old Style Roman, Century Schoolbook Old Style
Bold, Century Schoolbook Old Style Bold italic, Century Schoolbook Old Style Roman,
Century Schoolbook Old Style Bold, Century Schoolbook Old Style Bold italic, Century Schoolbook
Old Style Roman, Century Schoolbook Old Style Bold, Century Schoolbook Old Style Bold italic,
Century Schoolbook Old Style Roman, Century Schoolbook Old Style Bold, Century Schoolbook
Old Style Bold italic, Century Schoolbook Old Style Roman, Century Schoolbook Old Style
Bold, Century Schoolbook Old Style Bold italic, Century Schoolbook Old Style Roman,
Century Schoolbook Old Style Bold, Century Schoolbook Old Style Bold italic, Century Schoolbook
Old Style Roman, Century Schoolbook Old Style Bold, Century Schoolbook Old Style Bold italic,
Century Schoolbook Old Style Roman, Century Schoolbook Old Style Bold, Century Schoolbook
Old Style Bold italic, Century Schoolbook Old Style Roman, Century Schoolbook Old Style
Bold, Century Schoolbook Old Style Bold italic, Century Schoolbook Old Style Roman,
Century Schoolbook Old Style Bold, Century Schoolbook Old Style Bold italic, Century Schoolbook
Old Style Roman, Century Schoolbook Old Style Bold, Century Schoolbook Old Style Bold italic,
Century Schoolbook Old Style Roman, Century Schoolbook Old Style Bold, Century Schoolbook
Old Style Bold italic, Century Schoolbook Old Style Roman, Century Schoolbook Old Style
Bold, Century Schoolbook Old Style Bold italic, Century Schoolbook Old Style Roman,
Century Schoolbook Old Style Bold, Century Schoolbook Old Style Bold italic, Century Schoolbook
Old Style Roman, Century Schoolbook Old Style Bold, Century Schoolbook Old Style Bold italic,
Century Schoolbook Old Style Roman, Century Schoolbook Old Style Bold, Century Schoolbook
Old Style Bold italic, Century Schoolbook Old Style Roman, Century Schoolbook Old Style
Bold, Century Schoolbook Old Style Bold italic, Century Schoolbook Old Style Roman,
Century Schoolbook Old Style Bold, Century Schoolbook Old Style Bold italic, Century Schoolbook
Old Style Roman, Century Schoolbook Old Style Bold, Century Schoolbook Old Style Bold italic,
Century Schoolbook Old Style Roman, Century Schoolbook Old Style Bold, Century Schoolbook
Old Style Bold italic, Century Schoolbook Old Style Roman, Century Schoolbook Old Style
Bold, Century Schoolbook Old Style Bold italic, Century Schoolbook Old Style Roman,
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## PRODUCT INDEX

### Software

<table>
<thead>
<tr>
<th>Category</th>
<th>Name</th>
<th>Page(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business</td>
<td>Abra MacData, 108B</td>
<td>190</td>
</tr>
<tr>
<td></td>
<td>Adler, 297</td>
<td>118</td>
</tr>
<tr>
<td></td>
<td>Banner Blue Software, 76</td>
<td>57</td>
</tr>
<tr>
<td></td>
<td>Casady &amp; Greene, Inc., 290</td>
<td>116</td>
</tr>
<tr>
<td></td>
<td>ChipSoft, 260-261</td>
<td>157</td>
</tr>
<tr>
<td></td>
<td>- Clark, 80-81, 219</td>
<td>120</td>
</tr>
<tr>
<td></td>
<td>Computer Associates, 298</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Generic Software, 203</td>
<td>157</td>
</tr>
<tr>
<td></td>
<td>Innovative Data Design, 82</td>
<td>380</td>
</tr>
<tr>
<td></td>
<td>KeySoft, 8</td>
<td>187</td>
</tr>
<tr>
<td></td>
<td>Meier, 55</td>
<td>57</td>
</tr>
<tr>
<td></td>
<td>Microsoft, 294</td>
<td>117</td>
</tr>
<tr>
<td></td>
<td>Microsoft, IP-1</td>
<td>162</td>
</tr>
<tr>
<td></td>
<td>Odyssey, 279</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Peachesoft Software, 262</td>
<td>356</td>
</tr>
<tr>
<td></td>
<td>Printz, 75</td>
<td>356</td>
</tr>
<tr>
<td></td>
<td>Reference Software, 74</td>
<td>111</td>
</tr>
<tr>
<td></td>
<td>- SNA, Inc., 106, 279</td>
<td>94</td>
</tr>
<tr>
<td></td>
<td>SelfSync/ILOC Publishing, 91</td>
<td>201</td>
</tr>
<tr>
<td></td>
<td>SofTech, 11-10</td>
<td>210</td>
</tr>
<tr>
<td></td>
<td>SPSS, Inc., 107</td>
<td>216</td>
</tr>
<tr>
<td></td>
<td>Symantec, 36</td>
<td>257</td>
</tr>
<tr>
<td></td>
<td>- Symantec, 265</td>
<td>141</td>
</tr>
<tr>
<td></td>
<td>Symantec/Peter Norman, 201</td>
<td>286</td>
</tr>
<tr>
<td></td>
<td>Symmetrix Software, 106</td>
<td>172</td>
</tr>
<tr>
<td></td>
<td>Synth, Inc., 269</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>TBSIP, 32</td>
<td>76</td>
</tr>
<tr>
<td></td>
<td>Teleware, 227</td>
<td>47</td>
</tr>
<tr>
<td></td>
<td>Trendsetter Software, 306</td>
<td>55</td>
</tr>
<tr>
<td></td>
<td>Zedcor, 28</td>
<td>55</td>
</tr>
<tr>
<td>Vertical</td>
<td>Abra MacData, 108B</td>
<td>190</td>
</tr>
<tr>
<td></td>
<td>- Adobe Systems, 69</td>
<td>233</td>
</tr>
<tr>
<td></td>
<td>- Bimiliereum, 14-15</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>- Engineering Software, 266</td>
<td>177</td>
</tr>
<tr>
<td></td>
<td>Graphscape, Inc., 68</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Peachtree Software, 262</td>
<td>347</td>
</tr>
<tr>
<td></td>
<td>SelfSync/ILOC Publishing, 91</td>
<td>186</td>
</tr>
<tr>
<td></td>
<td>- T3-4 Microsystems, 307</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>TBSIP, 32</td>
<td>59</td>
</tr>
<tr>
<td></td>
<td>Virtus Corp., 12</td>
<td>59</td>
</tr>
<tr>
<td>Data Management</td>
<td>Odessa, 41</td>
<td>238</td>
</tr>
<tr>
<td></td>
<td>Software Discoveries, 78</td>
<td>128</td>
</tr>
<tr>
<td></td>
<td>Zedcor, 28</td>
<td>55</td>
</tr>
<tr>
<td>Word Processing</td>
<td>Deneba Software, 25</td>
<td>346</td>
</tr>
<tr>
<td></td>
<td>KeySoft, 8</td>
<td>187</td>
</tr>
<tr>
<td></td>
<td>Paragon Concepts, 67</td>
<td>253</td>
</tr>
<tr>
<td></td>
<td>Reference Software, 74</td>
<td>111</td>
</tr>
<tr>
<td></td>
<td>Sensible Software, 24</td>
<td>396</td>
</tr>
<tr>
<td></td>
<td>TiaMaker Company, 26</td>
<td>392</td>
</tr>
<tr>
<td></td>
<td>Tactic Software, 276</td>
<td>248</td>
</tr>
<tr>
<td></td>
<td>Zedcor, 28</td>
<td>55</td>
</tr>
<tr>
<td>CAD/CAM</td>
<td>Design CAD, Inc., 116</td>
<td>336</td>
</tr>
<tr>
<td></td>
<td>Design CAD, Inc., 116</td>
<td>337</td>
</tr>
<tr>
<td></td>
<td>- Engineered Software, 266</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>- Generic Software, 253</td>
<td>157</td>
</tr>
<tr>
<td></td>
<td>Graphsoft, Inc., 68</td>
<td>187</td>
</tr>
<tr>
<td></td>
<td>Innovative Design Software, 82</td>
<td>380</td>
</tr>
<tr>
<td></td>
<td>MacHyper, 106</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>Virtus Corp., 12</td>
<td>59</td>
</tr>
<tr>
<td>Communication</td>
<td>Add-On America, 295</td>
<td>340</td>
</tr>
<tr>
<td></td>
<td>Casady &amp; Greene, Inc., 290</td>
<td>116</td>
</tr>
<tr>
<td></td>
<td>Davit, 87</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td>- Pinnacle Micro, 93</td>
<td>286</td>
</tr>
<tr>
<td></td>
<td>Synergy Software, 106</td>
<td>286</td>
</tr>
</tbody>
</table>

### Hardware

<table>
<thead>
<tr>
<th>Category</th>
<th>Name</th>
<th>Page(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer Systems</td>
<td>CDA Computer Systems</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>- Hardware Express, 205</td>
<td>377</td>
</tr>
<tr>
<td></td>
<td>MacFriends, 104</td>
<td>339</td>
</tr>
<tr>
<td></td>
<td>MacFriends, 277</td>
<td>58</td>
</tr>
<tr>
<td></td>
<td>MacFriends, 289</td>
<td>345</td>
</tr>
<tr>
<td>Printers</td>
<td>- Agfa-Compugraphic, 88-89</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>- Hewlett-Packard, 252-259</td>
<td>577</td>
</tr>
<tr>
<td></td>
<td>Kodak, 199</td>
<td>112</td>
</tr>
<tr>
<td></td>
<td>Macintosh Color 4, 221</td>
<td>234</td>
</tr>
<tr>
<td></td>
<td>MGI, 215</td>
<td>342</td>
</tr>
<tr>
<td></td>
<td>- NEC Technologies, 130</td>
<td>257</td>
</tr>
<tr>
<td></td>
<td>- Newgen, 235</td>
<td>244</td>
</tr>
<tr>
<td></td>
<td>- Pacific Data Products, 257</td>
<td>246</td>
</tr>
<tr>
<td></td>
<td>- Texas Instruments, 22</td>
<td>211</td>
</tr>
<tr>
<td></td>
<td>207 Mass Micro Systems, 274A</td>
<td>207</td>
</tr>
<tr>
<td></td>
<td>- Microware Technologies, 105</td>
<td>161</td>
</tr>
<tr>
<td></td>
<td>- Procom Technologies, 109C</td>
<td>265</td>
</tr>
<tr>
<td></td>
<td>- PSI Integration, Inc., 212</td>
<td>169</td>
</tr>
<tr>
<td></td>
<td>- SatelliteOpt, 20-21</td>
<td>191</td>
</tr>
<tr>
<td></td>
<td>214 Total Systems, 108D</td>
<td>214</td>
</tr>
<tr>
<td>Displays</td>
<td>- All American, 295</td>
<td>540</td>
</tr>
<tr>
<td></td>
<td>- Hay Microcomputer, 228</td>
<td>583</td>
</tr>
<tr>
<td></td>
<td>- Sharp Corp., 5, 9</td>
<td>81</td>
</tr>
<tr>
<td>Handheld Computer</td>
<td>Contemporary Cybercomputers, 282</td>
<td>188</td>
</tr>
<tr>
<td></td>
<td>- Delicat Systems, 108B</td>
<td>97</td>
</tr>
<tr>
<td></td>
<td>- Ehrman, Inc., 128</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>- Ehrman, Inc., 281</td>
<td>144</td>
</tr>
<tr>
<td></td>
<td>- Finger Generation Systems, 202</td>
<td>364</td>
</tr>
<tr>
<td></td>
<td>- Pacific Data Products, 257</td>
<td>216</td>
</tr>
<tr>
<td></td>
<td>- Texas Instruments, 22</td>
<td>211</td>
</tr>
<tr>
<td></td>
<td>- 205-210</td>
<td>269</td>
</tr>
<tr>
<td></td>
<td>- 272-275</td>
<td>269</td>
</tr>
<tr>
<td></td>
<td>- 318-319</td>
<td>142</td>
</tr>
<tr>
<td></td>
<td>- 319-320</td>
<td>116</td>
</tr>
<tr>
<td></td>
<td>- Microtech International, 225</td>
<td>90</td>
</tr>
<tr>
<td></td>
<td>- Pinnacle Micro, 93</td>
<td>266</td>
</tr>
<tr>
<td></td>
<td>- Pinnacle Technologies, 120-121</td>
<td>133</td>
</tr>
<tr>
<td></td>
<td>- 109C</td>
<td>265</td>
</tr>
<tr>
<td></td>
<td>- Raindrop Systems, Inc., 214</td>
<td>149</td>
</tr>
<tr>
<td></td>
<td>- Storage Dimensions, 291</td>
<td>127</td>
</tr>
<tr>
<td></td>
<td>- Storage Dimensions, 291</td>
<td>176</td>
</tr>
<tr>
<td>Video</td>
<td>Generation Systems, 122</td>
<td>170</td>
</tr>
<tr>
<td></td>
<td>Intelligent Resources, 250</td>
<td>135</td>
</tr>
<tr>
<td></td>
<td>Mass Micro Systems, 274A</td>
<td>207</td>
</tr>
<tr>
<td></td>
<td>- Microware Technologies, 105</td>
<td>161</td>
</tr>
<tr>
<td></td>
<td>- PSI Integration, Inc., 212</td>
<td>169</td>
</tr>
<tr>
<td></td>
<td>214 Total Systems, 108D</td>
<td>214</td>
</tr>
<tr>
<td>Software Security Devices</td>
<td>Kensington Microscope, 27</td>
<td>140</td>
</tr>
<tr>
<td></td>
<td>- SecureIt, 70</td>
<td>239</td>
</tr>
<tr>
<td>Input Devices</td>
<td>- DigiTel, 254</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>- Kurstman Manufacturing, 16</td>
<td>255</td>
</tr>
<tr>
<td></td>
<td>- Microware Technologies, 105</td>
<td>161</td>
</tr>
<tr>
<td></td>
<td>- Mouse Touch Systems, 44</td>
<td>105</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>- Aurora Systems, 110</td>
<td>120</td>
</tr>
<tr>
<td></td>
<td>- In-Focus, 118</td>
<td>63</td>
</tr>
<tr>
<td></td>
<td>- Pacific Data Products, 257</td>
<td>337</td>
</tr>
</tbody>
</table>

### Services

<table>
<thead>
<tr>
<th>Category</th>
<th>Name</th>
<th>Page(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>On-line Services</td>
<td>CompuServe, 216</td>
<td>319</td>
</tr>
<tr>
<td></td>
<td>GNE Information Services, 250</td>
<td>359</td>
</tr>
<tr>
<td>Training</td>
<td>MacAcademy, 54-55</td>
<td>167</td>
</tr>
<tr>
<td></td>
<td>- Personal Training Systems, 25</td>
<td>167</td>
</tr>
<tr>
<td>Accessories</td>
<td>Floppy Disk Drivers</td>
<td>263</td>
</tr>
<tr>
<td></td>
<td>- SM Data Storage, 72</td>
<td>319</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>Avery, 285</td>
<td>108</td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>Accelerators</th>
<th>Monitor Systems</th>
<th>Printers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Special</strong></td>
<td><strong>Special</strong></td>
<td><strong>Hewlett Packard</strong></td>
</tr>
<tr>
<td>DayStar Digital</td>
<td>Magnavox</td>
<td>DeskWriter</td>
</tr>
<tr>
<td>Fast Cache IIc</td>
<td>TWO YEAR WARRANTY</td>
<td>Kodak</td>
</tr>
<tr>
<td><strong>Disk Duplexing</strong></td>
<td>14&quot; Color Monitor with Video</td>
<td>Diconix 150</td>
</tr>
<tr>
<td><strong>Special</strong></td>
<td>Interface Mac II family</td>
<td>Diconix Color 4 Printer</td>
</tr>
<tr>
<td><strong>Disk Twin</strong></td>
<td>SE/30</td>
<td></td>
</tr>
<tr>
<td>$799</td>
<td><strong>Special</strong></td>
<td><strong>QMS</strong></td>
</tr>
<tr>
<td><strong>Fax Modems</strong></td>
<td>RasterOps</td>
<td><strong>QMS PS410 PostScript</strong></td>
</tr>
<tr>
<td><strong>Special</strong></td>
<td>New Business Color System</td>
<td></td>
</tr>
<tr>
<td>Abaton</td>
<td>ClearVue SE and Mac II</td>
<td>Qume</td>
</tr>
<tr>
<td>Interfax Modem 24/96</td>
<td>ClearVue GreyScale</td>
<td>CrystalPrint Publisher I</td>
</tr>
<tr>
<td>Dove</td>
<td>ColorBoard 208, 264 and 364</td>
<td>CrystalPrint Publisher II</td>
</tr>
<tr>
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<tr>
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</tr>
<tr>
<td><strong>Hard Disk Drives</strong></td>
<td>Samsung</td>
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<td><strong>Special</strong></td>
<td>15&quot; Full Page Monitor with</td>
<td><strong>Texas Instruments</strong></td>
</tr>
<tr>
<td>Imprimis</td>
<td>Video Interface</td>
<td>PS17 Microlaser</td>
</tr>
<tr>
<td>MacWren 300</td>
<td><strong>Network Solutions</strong></td>
<td>with interface</td>
</tr>
<tr>
<td>329/1,399</td>
<td><strong>Special</strong></td>
<td><strong>PS35 Microlaser</strong></td>
</tr>
<tr>
<td>MacWren 330</td>
<td>Asante</td>
<td><strong>Scanners</strong></td>
</tr>
<tr>
<td>Runner</td>
<td>Maccon SE30E</td>
<td></td>
</tr>
<tr>
<td>$1,479/1,579</td>
<td>Maccon SE30E 64</td>
<td><strong>Microtek</strong></td>
</tr>
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<td>MacWren 600</td>
<td>Maccon SEE</td>
<td>300GS</td>
</tr>
<tr>
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<td>Maccon SE ET</td>
<td>300ZS</td>
</tr>
<tr>
<td>MacWren 1.2 Giga</td>
<td>Maccon II ET</td>
<td>Hewlett Packard</td>
</tr>
<tr>
<td>$3,099/$3,199</td>
<td>Maccon II ET 64</td>
<td>ScanJet Plus w/interface</td>
</tr>
<tr>
<td><strong>Special</strong></td>
<td><strong>Special</strong></td>
<td></td>
</tr>
<tr>
<td>Quantum</td>
<td>Farallon</td>
<td></td>
</tr>
<tr>
<td>TWO YEAR WARRANTY</td>
<td>Ethernet Card Mac II</td>
<td></td>
</tr>
<tr>
<td>Quantum 40</td>
<td>$399</td>
<td></td>
</tr>
<tr>
<td>$329/$399</td>
<td>Ethernet Card SE30</td>
<td></td>
</tr>
<tr>
<td>Quantum 80</td>
<td>StarController EN Series 300</td>
<td></td>
</tr>
<tr>
<td>$459/$539</td>
<td>$819</td>
<td></td>
</tr>
<tr>
<td>Quantum 105</td>
<td>StarController EN</td>
<td></td>
</tr>
<tr>
<td>$499/$599</td>
<td>Series 500</td>
<td></td>
</tr>
<tr>
<td>Quantum 120</td>
<td>$1,575</td>
<td></td>
</tr>
<tr>
<td>$639/$699</td>
<td><strong>Optical Hard Drives</strong></td>
<td></td>
</tr>
<tr>
<td>Quantum 170</td>
<td>Nuvotech</td>
<td></td>
</tr>
<tr>
<td>$749/$829</td>
<td>TurboStar</td>
<td></td>
</tr>
<tr>
<td>Quantum 210</td>
<td>Shiva</td>
<td></td>
</tr>
</tbody>
</table>
Software

ABRACADATA Design your own Home Landscape, Architecture or Interiors ....... 58
ADDOBE SYSTEMS Adobe Illustrator 3.0 .................. 339
Adobe Type Manager ....... 55
Adobe Typekit 1 or 2 ....... 52
Adobe Type Align ....... 68
Adobe StyleGuide ....... 227
Photoshop ....... 489
Fonts Please Call
ANDROMEDA Master Toner ....... 55

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ALDUS PageMaker ....... 489
Freeware 2.9 ....... 319
Peruision ....... 319
ALLWIN Shortcut 1.5 ....... 45
ASCII FileGuard 2.5 ....... 127
ASHLAR AshlarVault ....... 655
ASHTON TATE FullWrite ....... 135
Full Impact ....... 135
AVERY MacLabelPro ....... 47
Labels Available, CALL
BRODERBUND TypeStyler ....... 112
Where in the World is Carmen Sandiego? 29
CAE 3 DesignPage ....... 499
CENTRAL POINT PageTools Deluxe ....... 72
CEES Inspiration ....... 115
CE SOFTWARE QuickMail 10 User ....... 28
QuickKeys ....... 96
DiskTop 4.0 ....... 64
CHIPCO TurboTax Personal/1040 ....... 52
CLARIS MacWrite II ....... 139
FinderMaker Pro ....... 209
MacDraw (including ATM) ....... 275
ClariaCad ....... 625
SmartFrame Designer ....... 279
CUSTOM APPLICATIONS Freedom of Press ....... 249

MacWrite III/4 ....... 118
MACINFORMEDEX Communications Software ....... 254

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FRESOFT White Knight ....... 81
HYPERPRESS PictureInk ....... 219
ICOM SIMULATIONS OnAir ....... 34
TIMON ....... 85
HYPERTOON ....... 56
INNOVATIVE DATA DESIGN Dreams ....... 315
MacDraft ....... 185
INSIGHT DEVELOPMENT MacPrint ....... 69
INSIGNIA Soft PC ....... 242
INTL BUSINESS SOFTWARE DataClub ....... 175
LANGUAGE SYSTEMS Portrait with MPW ....... 398
WildText ....... 118
LAYERED SOFTWARE Adobe ....... 275
Insight Expert per module ....... 415
EXPERTISE MacProof ....... 104
MACROMACROM acromind Director ....... 435
Accelerator ....... 125
MACRON Empower II ....... 119
EMPOWER II ....... 119
MANAPRO General Ledger ....... 460
MICROCOM Carbon Copy Mac ....... 115
Vire Vista ....... 65
Vire 10 Pack ....... 345
MICROSOFT MICRONET Enhancement ....... 229

MICROLYTICS Inside Information ....... 63
Gerber ....... 52
Woodstock ....... 34
MICHABON Word 4.0 ....... 243
Excel ....... 243
Help for Excel with Excel purchase ....... 25
Power Point ....... 143
Microsoft Office ....... 522

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NOW SOFTWARE Software Now Utilities ....... 86
OGETA CORPORATION Double Helix ....... 365
Data Desk ....... 465
OLDVUAI Videopaint ....... 245
ON TECHNOLOGY On Location ....... 71
PANTONE Process Color Imaging Guide ....... 46
PARACOMP Model Shop ....... 369
Swivel 3D Professional ....... 289
Swivel 3D Professional ....... 359
PARAGON Nissus ....... 238

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Now fonts on a network can be shared. Downloadable Laser fonts residing in any network file server. Imagine the disk space, not to mention the money, you save by not needing a dedicated hard disk for your workstations or printers. Compatible with virtually all 386, and includes 37 fonts and the N-FONT utility.

POWER UP Address Book Plus ....... 51
Address Book Plus with Binder ....... 75
Address Book Plus with Organizer ....... 75
Fast Forms ....... 104
PREFERRED PUBLISHING Database ....... 65
Exposure Pro ....... 65
Electronic Publishing ....... 49
PRE-PRESS TECHNOLOGIES Quark/Quarkmaker ....... 195
SpectreScan ....... 299
QLMS ....... 114
QUARK QuarkXPress ....... 509
QuarkXPress ....... 166
REALTECHNOLOGIES WealthBuilder ....... 148

MACINTAX $56
The best selling tax product for the Macintosh. The award-winning MacTAX II will help you gather the resources and expert tax assistance available for your taxes—ready for submission to the IRS. Loaded with new features for 1990!

SALIENT DiskDoubler ....... 42
SERUS CORP.集装ic Serial Programmer ....... 104
Siris Developer ....... 324
SITKA Network Bundle for MAC ....... 149
Network Bundle for DOS ....... 149
SOFTWARE VIEW FX Fonts Designer ....... 64
Business Expense Reports ....... 47
MacTax ....... 56
Personal Tax Analyst ....... 46
Quarterly Payroll Tax ....... 64
Call for available, GAIL
SOFTWARE DISCOVERIES WriteRite Plus ....... 78
SOLUTIONS INTERNATIONAL Smartrac ....... 46
SuperGlimpse ....... 46
The Curator ....... 69

PRESENTER PROFESSIONAL WITH MACRENDERMAN ....... $1175
This MacRendeman gives you the fastest and most intuitive way to illustrate and present ideas. It includes freeware 3D Beizer illustration, Photoshop-like rendering, Path/Object animation, and Raytracing.

STRATA Shadefx Vision 3D ....... 348
STUDIOGRAPHICS Coloffice ....... 209
SUPERVISION Pixel Paint Professional ....... 385
PixelPaint ....... 226
SYMANTEC Norton Utilities ....... 79
SAM ....... 104
SYMWOOD Evolution 4.0 ....... 159
SYSTEMS COMPATIBILITY Software Bridge ....... 75
TACTIC SOFTWARE Magic Topi ....... 45
Topi ....... 45
Sound Clips ....... 45
ArtFonts ....... 45
FontShare ....... 125
TELETYPESETTING Topi ....... 104
TIMEWORKS Publish It! ....... 219
Publish It! Easy ....... 199
T-MAKER WriteNow ....... 115
ClickArt ....... 33
VERTICAL SOLUTIONS FastLaser ....... 86
FastEnvelope ....... 46
VISUAL INFO DEVELOPMENT Presenter Plus & MacRenderman ....... 1715
WORDPERFECT CORPORATION WordPerfect ....... 208
ZEROGRAPHICS Desk ....... 209
**Hardware**

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Earn more. Invest wisely and save effectively with Wealth Builder, your complete personal planning and investment system. Take objective input up to 1200 mutual funds and 10,000 stocks and bonds.

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- Interweave Fax/Modem 24/96 \$358
- PostScript Laser Printer \$1935
- ABCOM
- Extended Carry Case for SE $75
- Carry Case for Mac iiX/ Imagewriter 7E
- ANIMAS
- True Color Hand Scanner \$562
- CAERE
- The Trisled \$495
- CAYMANSYSTEMS
- Gstarbox \$180
- GstarCard E/F for Mac II \$432
- COMPATIBLE SYSTEMS
- Ether Route \$1045
- Ether Plus \$395
- Ether II \$318

**RECOGNIZE** $475

- Benovell II Transportable 44 Meg CALL
- Benovell II Dual 44 Meg CALL
- I-PROTEC
- iManifold Shield for SE/Plus \$89
- Radiation Shield for MAC II \$75
- KENDON
- Turbo Mouse \$106
- Mac II Stand & Cables \$62
- Masterpiece Mac II \$101
- KEYTRONICS
- MacPro Plus \$129

**KINETICS**

- Ether Port II \$484
- FASTPATH 4 (now by Shiva) \$1975
- KOOSIN
- Econo M150 Portable Printer \$499
- Color Proprinter \$999
- MARSTEK
- Mac 105 incl. DesktopWriter \$329
- Mac 800 incl. DesktopWriter \$399
- Mass Micro
- ColorSpace CALL
- Data Fax \$779
- QuickImage \$1172
- MEGA GRAPHICS
- 19" Viking System, SE/SE-30, II \$1085
- 19" Sony Color II, ICS \$3959
- MICROTEK
- FULL LINE AVAILABLE CALL

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- Complete with all Macintosh® computer, the enhanced 105-key layout includes Period/Comma lock capability, and interchangeable Caps Lock/Function Keys. Connecting cable also included and a free offer for Tempo III keyboard macro package, 3-year warranty and unlimited toll-free product support.

**MICROTCH**

- Nova (full line) \$175
- MICRO TOUCH \$179
- NEC
- MacSync \$499
- CDROM Portable CD Rom \$495
- CDR77 Interact External CD Rom \$395
- ColorMate PS \$79
- Silent Writer 2 290 \$1795
- NEC TECH
- ImageGrabber \$1295
- NEWGEN
- Turbo PS 400 \$3999
- Turbo PS 480 \$5549
- ORCHESTRA
- MacSpirit II \$209
- MacStar/Model 9600 Baud \$439
- LPI (PERIPHERAL LAND)
- 400 Near Zero Cabling HARD DriveCALL
- 1280 Baud Baud CALL
- 600 Baud Baud CALL
- 3840 Baud Baud CALL
- 1200 Baud Baud CALL
- 2400 Baud Baud CALL
- 9600 Baud Baud CALL
- 4800 Baud Baud CALL
- 2400 Baud Baud CALL
- 14400 Baud Baud CALL
- TOTAL SYSTEMS
- Gemini 020/030 16MHz \$620
- Gemini 020/030 16MHz \$881
- Gemini 020/030 24MHz \$178
- Gemini 020/030 24MHz \$861
- Gemini 020/030 32MHz \$1179
- Gemini 020/030 32MHz \$331
- UMAX
- UC300 2400 Baud External Modem \$109
- TOTAL SYSTEMS
- Gemini 020/030 16MHz \$620
- Gemini 020/030 16MHz \$881
- Gemini 020/030 24MHz \$178
- Gemini 020/030 24MHz \$861
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- Gemini 020/030 32MHz \$331
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- Gemini 020/030 16MHz \$881
- Gemini 020/030 24MHz \$178
- Gemini 020/030 24MHz \$861
- Gemini 020/030 32MHz \$1179
- Gemini 020/030 32MHz \$331

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- California residents add 6.75% sales tax.
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- Presales call for a R. A. number before return.
- Restock fees may apply.

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Circle 368 on reader service card

**Internat'l Reseller Program**

- We ship regularly to 45 countries worldwide.
- Call for our special pricing.
RailGun ‘030’ Accelerator

With new accelerated SCSI access!
We can give your original Mac new speed and performance with our Magic RailGun ‘030’ Accelerator for the Plus, SE, & Classic.

System Specials

<table>
<thead>
<tr>
<th>Product</th>
<th>Price</th>
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<tbody>
<tr>
<td>Mac Classic</td>
<td>$849</td>
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<tr>
<td>Mac Classic 2/40</td>
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<tr>
<td>Mac II 5/80</td>
<td>$3399</td>
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<tr>
<td>Mac IIci</td>
<td>$4399</td>
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<td>Mac IIx</td>
<td>$6299</td>
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</table>

Scanners

MagicScan 256 8-bit 300 DPI grayscale scanner with ImageStudio Software ........................................... $1099
Microtek 300ZS 200 DPI single pass color scanner with ColorStudio/ImageStudio ............................... $1699

Video Solutions

MagicView 19” B&W with card .............................................. $899
MagicView 19” B&W Plus version with card ..................... $999
Magic 8-bit color card II/SE ........................................... $239/$329
Magic 24-bit color card 13” or 14” ............................... $349
Magic 19” 8-bit color card for II .................................. $499

14” NEC MacSync with tilt/swivel ................................ $449
8-bit card & 14” NEC MacSync ........................................ $718
24-bit card & 14” NEC MacSync ....................................... $798
8-bit card & 19” Trinitron .............................................. $2799
24-bit card & 19” Trinitron ............................................ $1595

Magic 45 Removable

Portable, fast, & affordable removable media. Syquest mechanism, Mac & DOS compatible. 2 year warranty.
45 MB removable drive .................................................. $499
Syquest cartridge ....................................................... w/ purchase of drive $67

Hardware

Accelerators

Railgun 030 Accelerator for Classic/Plus/SE ........................................... $499

NEC MacSync

Includes tilt/swivel stand .............................................. $449

Practical Peripherals

9600 Baud V.32/42 bis MNP-5 ....................................... $499

Display/Video Systems

Kodak Impero 2400 mower ................................. $999

Modems / Communication

Magic Modem 56K Modem ................................. $999

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MacProducts USA
Modems, Networking, Printers, Scanners, Video Solutions, and Much Much More...

### Hard Drives

**A/UX comp, Disk Manager Mac, 10MB software, backup, & 1 yr warranty, surge protect, Ext SCSI**

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Internal</th>
<th>External</th>
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<tbody>
<tr>
<td>40 MB hard drive</td>
<td>$279</td>
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<tr>
<td>52 MB low profile HD</td>
<td>$299</td>
<td>$419</td>
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<tr>
<td>80 MB hard drive</td>
<td>$408</td>
<td>$569</td>
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<tr>
<td>105 MB hard drive</td>
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<td>$529</td>
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<td>170 MB hard drive</td>
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<td>$859</td>
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<tr>
<td>240 MB hard drive</td>
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<td>$999</td>
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<tr>
<td>300 MB GDC hard drive</td>
<td>na</td>
<td>$1890</td>
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<tr>
<td>300 MB WernerTurner</td>
<td>na</td>
<td>$1999</td>
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<tr>
<td>600 MB hard drive</td>
<td>na</td>
<td>$2250</td>
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<tr>
<td>1.2 gig hard drive</td>
<td>na</td>
<td>$2795</td>
</tr>
</tbody>
</table>

**1 MB SIMMs**

**$39**

- 70, 80 ns. lifetime guarantee
- 1 MB fx SIMMs .......... $43
- 4 MB SIMMs .......... $225
- 4 MB fx SIMMs .......... $225
- 3 MB Portable RAM
- Portable RAM 14 MB...call
- 4 MB Classic upgrade...$199

### Magic Modems

**Magic Modems**

Magic Modems include a two year warranty and are all 100% Hayes compatible.

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- MagicNet $18

**V.42 bis MNP-5 Modem**

- 2400 baud, send and receive up to 9600 baud. LAPM & MNP error correction, asynchronous operation, auto adaptive equalization. Two year warranty.
- V.42 bis MNP-5 Modem .......... $199

### Magic Fax Modems

**Two year warranty. 100% Hayes & Group 3 compatible**

- 2400/14400 SendFax/Modem .......... $99
- 2400/9600 SendFax/Modem .......... $139
- 2400/9600 Send & Receive .......... $179

### Magic Fax Modems

**How To Order**

- To Order Call: 1-800-622-3215
- Dell Quality Service: 1-800-543-4747
- MacNet: 1-800-543-4747
- Fax Line: 512-334-4841
- Int. Orders: 1-512-339-5909

**Shipping**

We ship Federal Express, overnight shipping available. Domestic orders over $250.00 ship free by ground and returns subject to a 20% restocking fee. International orders subject to a 20% restocking fee. All products except money carry a 30 day money back guarantee for defective products.

**Returns**

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---

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LOWEST PRICES!

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MAKE THESE MONITORS THE FIRST CHOICE OF KNOWLEDGEABLE BUYERS.
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- 75 Dpi WYSIWYG
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NEW

This versatile and full-featured scanner can handle 24-bit color, grayscale, line art and text at a great price. Comes with interface kit and Adobe PhotoShop.

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NEW

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DE LUXE MAC SE/Ext.KB. $60
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15" Trinitron display with 24-bit color card, hardware Zoom and Pan, cable and tilt/swivel stand. Multiple resolution and flicker-free.

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Seiko 1445

TrackBall ADD & Plus versions $69
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Mouse Systems

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• 640 x 480 resolution
• Works with 24-bit cards
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Only $599

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MICROTECH

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MICROTECH 60MB EXT HD $685.00
MICROTECH 100MB EXT HD $759.00
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$75

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MICROTECH HARD DRIVES

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MICROTECH CD-ROM PLYR $710.00
MICROTECH 50MB REMOV. $899.00
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MICROTECH 200MB EXT HD $1128.00
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- **Payment:** All payments must be in advance. We accept checks, money orders, major credit cards, and cash. We do not accept COD's. 

### PROGRAMMING/UTILITIES

<table>
<thead>
<tr>
<th>Product</th>
<th>Price</th>
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<tbody>
<tr>
<td>COPY II MAC V7.2</td>
<td>29.99</td>
</tr>
<tr>
<td>DISK TOP</td>
<td>50.00</td>
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<tr>
<td>DISKIT 1.5</td>
<td>59.00</td>
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<td>DISKLOCK</td>
<td>60.00</td>
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<td>FASTBAK</td>
<td>108.00</td>
</tr>
<tr>
<td>FREEDOM OF PRESS</td>
<td>90.00</td>
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<td>MACLINK PLUS</td>
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<td>PROTOTYPER</td>
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<tr>
<td>PYRO V 4.0</td>
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<td>QUICK KEY 2 USER</td>
<td>23.99</td>
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<td>QUICKMAIL/10 USER</td>
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<tr>
<td>S.A.M.</td>
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<td>S.C.O.N.</td>
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<td>S.E.G.</td>
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<tr>
<td>SMARTSCRAP &amp; CLIPPER</td>
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<td>SOFTPC V1.3</td>
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<td>SUITCASE V1.1.5</td>
<td>23.99</td>
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<tr>
<td>SUPERGLUE</td>
<td>60.00</td>
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<td>SUPER LASER SPOOL V2.02</td>
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<td>THINK'S C 4.0</td>
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<td>TIMBUKTU-REMOTE</td>
<td>109.00</td>
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<td>TOPS</td>
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<td>TURBO PASCAL TUTOR</td>
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<td>TURBO PASCAL V1.1</td>
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<td>VIREX</td>
<td>59.00</td>
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</table>

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### HP PaintWriter XL
- Up to 16.7 million colors
- Supports AppleTalk
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- Mac and PC compatible
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<table>
<thead>
<tr>
<th>Size</th>
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<td>20MB</td>
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<td>30MB</td>
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<td>$2200</td>
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<td>600MB</td>
<td>$3500</td>
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- **MAC WINGZ:** $240.00
- **MAC WORKPERF V1.0:** $219.00
- **MAC WRITENOW V2.0:** $119.00

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- **DISKLOCK:** $60.00
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- **FASTBAK:** $108.00
- **FREEDOM OF PRESS:** $90.00
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- **MACLINK PLUS TRANSLAT:** $90.00
- **MACPRINT:** $109.00
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- **PROTOTYPER:** $175.00
- **PYRO V 4.0:** $55.00
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- **QUICKMAIL/10 USER:** $35.00
- **S.A.M.:** $75.00
- **S.C.O.N.:** $75.00
- **S.E.G.:** $75.00
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- **TOPS:** $169.00
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- **MAC WINGZ:** $240.00
- **MAC WORKPERF V1.0:** $219.00
- **MAC WRITENOW V2.0:** $119.00

### SOFTWARE PRICING
- **MACPROOF:** $99.00
- **MACSCHEDULE:** $119.00
- **MAC DROPPED V. 3.0:** $279.00
- **MAC ICONS:** $25.00
- **MAC REFLEX PLUS:** $165.00
- **MAC SOFTWARE:** $199.00
- **MAC TIMESLIPS III:** $185.00
- **MAC ULTRASPECT MAC:** $112.00
- **MAC WINGZ:** $240.00
- **MAC WORKPERF V1.0:** $219.00
- **MAC WRITENOW V2.0:** $119.00

### SOFTWARE OFFERINGS
- **MACPROOF:** $99.00
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- **MAC TIMESLIPS III:** $185.00
- **MAC ULTRASPECT MAC:** $112.00
- **MAC WINGZ:** $240.00
- **MAC WORKPERF V1.0:** $219.00
- **MAC WRITENOW V2.0:** $119.00

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- **FM WAVES:** Now only $499
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- **MAC SCHEDULE:** $119.00
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2.3 GB Exabyte Backup
Opticals to 1GB
Single/Dual Syquest Combination Drives
Teac Tape Backup

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First Class Storage Subsystems

Quantum

<table>
<thead>
<tr>
<th>Internal</th>
<th>Standard External</th>
<th>Premium External</th>
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<tbody>
<tr>
<td>40</td>
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<td>52</td>
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<td>60</td>
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<td>70</td>
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<td>210</td>
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Seagate MacWren

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<td>330</td>
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<td>330</td>
<td>11ms Runner</td>
<td>599</td>
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<tr>
<td>425</td>
<td>16ms 1/2 Ht.</td>
<td>699</td>
</tr>
<tr>
<td>650</td>
<td>16.5ms</td>
<td>969</td>
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Syquest, Tape, DAT, Optical

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<tr>
<td>45DR</td>
<td>(Dual Syquest)</td>
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<tr>
<td>601</td>
<td>(Teac) with Retrospect</td>
<td>599</td>
</tr>
<tr>
<td>156T</td>
<td>(Teac) with Retrospect</td>
<td>599</td>
</tr>
<tr>
<td>DATdrive™ 1.3GB WangDAT, with Retrospect</td>
<td>2049</td>
<td></td>
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<tr>
<td>Optidisk 650™ (Sony) w/Ret. &amp; Retrospect</td>
<td>Call</td>
<td></td>
</tr>
<tr>
<td>2.3GB 8mm Tape (Exabyte) w/Ret. &amp; Retrospect</td>
<td>Call</td>
<td></td>
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</tbody>
</table>

Media

| Teac CT600H | 17 |
| Teac CT600N | 24 |
| Syquest SQ-400 | 78 |
| 4mm DAT Tape | 19 |
| Sony Opt. Cart. | 225 |

Why Third Wave?

Third Wave uses only the highest quality, fastest, most reliable fixed drive mechanisms on the market. Some of our competitors ship untested, unformatted drives or ship inferior user manuals. Third Wave, on the other hand, has strict drive test procedures and every drive is formatted and includes over 200mb of software. And when drives fail we provide one-day turnaround.

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DayStar Accelerators Call
68851 PMMU w/Virtual 189
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Sony 1304 14" Call
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Third Wave is in its sixth year of serving the Macintosh community. We strive to provide the best technical support possible. We are authorized resellers of every product we sell, including Apple, RasterOps, Radius, SuperMac, etc. We ship Federal Express for the best shipping, too.

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IIfi, 5MB RAM, 105 MB Quantum, Apple RGB 13" Color Monitor, 8-Bit Color, Keytronic 105 Keyboard

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$115/mo.

MAC IIfi
IIfi, 3MB RAM, 105 MB Quantum, RasterOps 24" Color Monitor, 24-Bit Color, Keytronic 105 Keyboard

$9,299
$209/mo.

MAC IIIfi
IIIfi, 5MB RAM, 80 MB Quantum, Apple RGB 13" Color Monitor, 8-Bit Color, Keytronic 105 Keyboard

$3,997
$90/mo.

MAC Classic*
Classic, 2MB RAM, 40 MB Hard Drive, FDHD, Classic Keyboard  subject to availability

$1,259

PRINTERs
OMS PS-410/610 call
OMS ColorScript 100 $769
Howlett Packard DeskWriter $699
Kodak Diconix Ink Jet Printer $480
Kodak Diconix Color 4 $1169
NEC Silentwriter 2 290 $2899
NEC Silentwriter 2 60 $1825
SeikoShiba ImageWriter II clone $159
Ome Crystal Print Publisher II $2599
Ome Crystal Print Express $3499
Ti MicroCorder PS 17/35 $1729/1950

SCANNERS
MicroTek 300 25 (w/ ColorStudio) $1675
MicroTek 300GS $1529
MicroTek 400GS $2639
AppliScan/Color (24-bit color with Color Mac Kit) $1364

MONITORS
NEC MacSync 14" $439
RasterOps 264/364 ColorCard $459/$934
RasterOps IL 19" w/ 8-bit color $4279
RasterOps 21" w/ 24-bit color $5159
Keyaki CS-20 19" 8-bit color $2579
Kejaki CS-20 19" 24-bit color $2579
Hitachi CT-20 Trinitron 19" 8-bit color $2579
Hitachi 14 MVX 14" Hi-Res Monitor $539

HARD DRIVES
Quantum ProSeries INT. EXT.
40 MB $399 $378
105 MB $499 $538
210 MB $749 $849
4Ills $999
I $52 MB $599
105MB $599
Special Apple 40 mb Internal $225

PRINTERS

OEM PS-410/610 call
OMS ColorScript 100 $769
Howlett Packard DeskWriter $699
Kodak Diconix Ink Jet Printer $480
Kodak Diconix Color 4 $1169
NEC Silentwriter 2 290 $2899
NEC Silentwriter 2 60 $1825
SeikoShiba ImageWriter II clone $159
Ome Crystal Print Publisher II $2599
Ome Crystal Print Express $3499
Ti MicroCorder PS 17/35 $1729/1950

Texas Residents Add 8%. All products shipped UPS unless otherwise specified. *All products returned & subject to a substantial restocking fee. Returns must be in original condition and package. Seal must not be opened on software products. No returns on opened software.宣传活动 will not be accepted without Return Merchandise Authorization number. All prices subject to change without notice.

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## Index Memory Modules

<table>
<thead>
<tr>
<th>Memory Modules</th>
<th>Price</th>
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<tbody>
<tr>
<td>FX/NTX 1Mb SIMMs 70/80ns</td>
<td>$40.00</td>
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<tr>
<td>1Mb SIMMs</td>
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<tr>
<td>4Mb Surface Mount/Low Profile (80ns)</td>
<td>$209.00</td>
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<tr>
<td>4Mb Mac IIx SIMMs</td>
<td>$219.00</td>
</tr>
</tbody>
</table>

* Maxima Software FREE with every set of four 4Mb SIMMs sold.

**Lifetime Warranty • Gold Contacts and Traces • Surface Mount/Low Profile**

## Index Hard Drives

### INDEX™ Elite Series

<table>
<thead>
<tr>
<th>Quantum 3.5&quot; ProDrive HD</th>
<th>Internal</th>
<th>External</th>
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<td>40Mb 12ms</td>
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<tr>
<td>170Mb 12ms</td>
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<td>$919</td>
</tr>
<tr>
<td>210Mb 12ms</td>
<td>$949</td>
<td>$1039</td>
</tr>
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### Imprimis 5.25" Wren Half-Height Drives

- 180Mb 15ms $979* $1069
- 425Mb 15ms $1799* $1889

### Imprimis 5.25" Wren Series HD

- 300Mb 16ms $1469* $1569
- 320Mb 16ms $1499* $1599
- 330Mb 10.7ms $1699* $1799
- 600Mb 16ms $1899* $1999
- 640Mb 16ms $1999* $2099
- 1Gig 16ms $3099* $3199

---

* Fits only Mac II, IIx and IIcx. *Equipped with a Universal Input Power Supply, which allows worldwide adaptability. BackMan and Autosave are registered trademarks of Magic Software, Inc.

## INDEX™ Economy Series

<table>
<thead>
<tr>
<th>Quantum 3.5&quot; ProDrive HD</th>
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<td>105Mb Slimline</td>
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<tr>
<td>170Mb 12ms</td>
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<td>$869</td>
</tr>
<tr>
<td>210Mb 12ms</td>
<td>$869</td>
<td>$949</td>
</tr>
</tbody>
</table>

### Imprimis 5.25" Wren Half-Height Drives

- 180Mb 15ms $989 $1079
- 425Mb 15ms $1699 $1809

### Imprimis 5.25" Wren Series HD

- 300Mb 16ms $1249* $1449
- 320Mb 16ms $1259* $1459
- 330Mb 10.7ms $1619* $1719
- 600Mb 16ms $1819* $1919
- 640Mb 16ms $1859* $1959
- 1Gig 16ms $2999* $3099

---

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## INDEX™ Extended Keyboard ADB

<table>
<thead>
<tr>
<th>Language</th>
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<td>English</td>
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<tr>
<td>German</td>
<td>$118</td>
</tr>
<tr>
<td>NEW! French</td>
<td>$118</td>
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</table>

## 256K SIMM SALE! Call for prices on PC/DOS Memory.

- 80 ns $299
- 100 ns $299
- 120 ns $299
- 150 ns $299

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* All drives include BackMan, AutoSave and 14MB of Public Domain Software.
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10T Hub for Twisted Pair Networks $1148
Ethernet Card for the SE $239
Ethernet Card for the SE/30 $379
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33MHz PowerCard 030 for the Mac IIcx $1467
40MHz PowerCard 030 for the Mac II/IIX $1467
40MHz PowerCard 030 for the Mac IIcx $1467
Fast Cache for the Mac ICI $729
50MHz PowerCard II, IICx, IIC $729

Microtek Scanners
MSF 300GS Incl. Cables & Software $1995
MSF 300Z Incl. Cables & Software $1989
MSF 400GS $1995

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Drive 1200/Read 1200K MS-DOS disks $289
Drive 360/IBM Compatibility $289
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Data + Fax Modem (External) $299
MaxFax $998
ProModem $2400M $1995
ProModem $2400SE Plus $229
ProModem $2400M Plus $1998
"[Pro Modem is...the ultimate in speedy data and fax" MacUser, December 1990.

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Color Board 208 $299
384 Video Card $998
8L/24L Systems $380
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12x25 Tablet/Standard Surface $4205
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15x15 Tablet/Electrostatic Surface $998
15x15 Tablet/Template Menu $998
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LQ-850, LQ-950, LQ-1050, LQ-2550 Call
EPSON Printer Software $125

Kodak InkJet Printers
PortoMate M150 $479
Color 4 Printer $1098
Canon BJ116 BubbleJet $399
High Speed Mac Interface $228

Hewlett Packard Deskwriter
300 d.p.i...AppleTalk compatible $688

Laser Printer
GCC Technologies Business Laser. (Demo) $1498
Hewlett Packard LaserJet IIIP Laser $995
Hewlett Packard LaserJet III Laser $1698
OkI Laser 840-2 MB Postscript $1898
QMS PS-410 $2088
Qume Scripten $2008
Panasonic P4455 $2208
Ti MicroLaser PS-35 with AppleTalk $2048
New EPSON EPL-7500 Call

Hard Drives
CMS External
MacStack 20 Megabyte...32 ms $328
MacStack 30 Megabyte...28 ms $378
MacStack 40 Megabyte...25 ms $428
MacStack 45 Megabyte...23 ms $468
MacStack 60 Megabyte...38 ms $528
MacStack 80 Megabyte...28 ms $598
MacStack 100 Megabyte...25 ms $798
45 Megabyte Removable $598
CMS Internal Hard Drives Available...Call

NEC CD ROM
CDR-3S $398

Tape Back-up Systems
CMS TS-60...60 Megabyte $648
CMS TS-150...150 Megabyte $798

ABATON Scanner $98
With SCSI Interface and Software

Scanner
ABATON 300CS $1198
Complete PC/Sheet Fed $748
EPSON ES-300C (600 dpi) $1598
Hewlett Packard ScanJet Plus $1598
Caire Typist $498
Microtek Series $429

Modems
External 2400 Baud $499
Internal 2400 Baud $599

Dove
Dove FAX $275
MacSnap Plus 2 $498
MacSnap 2/SE $499
Marathon 030 upgrade $448

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**DayStar 50 MHz PowerCache I1c** CALL!
**$1000 Trade-In on Fast Cache I1c Cards!!**

**DayStar 25 MHz PowerCard** $995
- DayStar 33, 40 & 50 MHz PowerCard Call!
- Total Systems SE 20 MHz 030 $755
- Total Systems SE 25 MHz 030 $995

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**E-Machines T16** $1995
- call for other E-Machines
- MegaGraphics Rival 19" $1095
- NEC MacSync $455
- Seiko 14" w/RasterOps 208 $883
- Seiko 14" w/RasterOps 264 $980
- RasterOps 208 $295
- RasterOps 264 $395
- SuperMac Call!

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- lifetime warranty

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Kodak Diconix Color 4 Call!
- Nikon CP3000 Call!
- Seiko ColorPoint PS Best Price!

**SYQUEST**

Mass Micro DataPak $695
- PLI Infinity Turbo 40 $695
- Syquest Cartridge (In Stock!!!) $72

**DATA MODEMS**

Challenger VP2400 $69
- Challenger VP2400 V.42 bis $195
- MacUser #1 2400 BPS Modem (4.5 Mics)

Hayes V-Series Ultra 9600 $795
- Practical Peripherals 9600ASA V.32, V.42, V.42 bis $529
- Prometheus 9600 Plus V.32, V.42, V.42 bis $695
- US Robotics 9600 HST Dual Std V.32, V.42, V.42 bis $895

**HARD DRIVES**

Quantum 105 Int/Ext $499/$599
- 210 Int/Ext $875/$959
- MacWren 300 (350M) Int/Ext $1245/$1495
- 330 (Runner) Int/Ext $1495/$1695
- 600 (702M) Int/Ext $1785/$1875
- 630 (766M) Int/Ext $2049/$2129
- 1 Gig (1200M) Int/Ext $2999/$3195

**CD-ROM**

NEC Portable $395
- Toshiba $745
- PLI (Sony) $795
- Pioneer DRM-600 Call!
- Minichanger

**CD-ROM**

FWB HammerDisk 600S $4950
- Pinnacle Micro Call!
- Storage Dimensions Call!
- SuperMac LaserFrame Call!

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**SCANNERS**

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- Free Color Studio & Image Studio
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- UMax UG80 (256 Grey Scale) $995

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2. RasterOps 264 & 364 Video Boards
   24-bit Color Video Cards
   $395 / $849

3. PLI Infinity 45
   Removable HD
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   $699

4. HP DeskWriter
   300 DPI Inkjet Printer
   $669

5. NEC MacSync HC
   640 x 480 High Res Color Monitor
   $420

6. TI MicroLaser PS35
   300 DPI Postscript Laser Printer
   $1699

7. Claris FileMaker Pro
   The Latest Winner in the Claris Line-Up
   $181

8. Macromind Director 2.0
   The Multimedia Standard
   $333

9. Quark XPress 3.0
   The Premiere DTP Software
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---

...And for Those Who Need More Convincing, Here's 148 More Reasons.

---

**Systems**

<table>
<thead>
<tr>
<th>Product</th>
<th>Price</th>
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<tbody>
<tr>
<td>Mac Classic</td>
<td>825</td>
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<td>Mac II</td>
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<td>Macintosh Portable</td>
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**Hardware**

<table>
<thead>
<tr>
<th>Product</th>
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<tbody>
<tr>
<td>RasterOps 264/464</td>
<td>445/1249</td>
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</table>

All RasterOps products available at lowest prices Call

**SIMMs: all types/best prices**

<table>
<thead>
<tr>
<th>Product</th>
<th>Price</th>
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<tbody>
<tr>
<td>Apple 13&quot; High Res RGB</td>
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<td>Abalon Interface 2x46</td>
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<td>Big picture 221 II</td>
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<td>ColorSpace II</td>
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<td>Dove Fax 2400</td>
<td>263</td>
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<tr>
<td>Dove MacSnap All Models</td>
<td>Call</td>
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<tr>
<td>E-Machines T16</td>
<td>1995</td>
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<tr>
<td>E-Machines T19</td>
<td>4100</td>
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<tr>
<td>GCC Products</td>
<td>Call</td>
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<tr>
<td>Hayes Smart Modular 24000</td>
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<tr>
<td>Hewlett Packard Laser Writer</td>
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<td>Hewlett Packard DeskWriter</td>
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<tr>
<td>Jetfill HP DeskWriter Recharge</td>
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<tr>
<td>Logtech ScanMan 32</td>
<td>313</td>
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<tr>
<td>Mac 266</td>
<td>995</td>
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<td>Mac IIfx</td>
<td>684</td>
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<td>Mac Recorder Digitizer Only</td>
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<td>Magnavox 14&quot; Color</td>
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**Drives & Tapes**

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<td>TI MicroLaser PS717</td>
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**Drives & Tapes**

**Software**

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<td>57</td>
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<tr>
<td>Canvas 2.1</td>
<td>172</td>
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</tbody>
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---

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---

**Internal/External Drive Kit**

<table>
<thead>
<tr>
<th>Capacity</th>
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**Software**

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<td>Canvas 2.1</td>
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POWERDrive are

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<table>
<thead>
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<th>Mbytes</th>
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<td>14</td>
<td>NA</td>
<td>$3299</td>
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</tbody>
</table>

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## Hardware
- Financial ............................................. 340
- Fonts .................................................. 340
- Bar Code .............................................. 328
- CD Rom .................................................. 328
- Computer Systems ................................. 328
- Data Acquisition .................................... 332
- Emulators .............................................. 322
- Hard Drives .......................................... 322
- Memory Upgrade ..................................... 322
- Monitors .............................................. 334
- Peripherals .......................................... 334
- Printers .............................................. 336
- RAM ..................................................... 303367

## Software
- Astrology ............................................. 337
- Bar Code .............................................. 337
- Business .............................................. 337
- CAD/CAM .............................................. 337
- Children's .......................................... 338
- Clip Art .............................................. 338
- Data Base ............................................ 338
- Desktop Publishing ............................... 338
- Duplicator .......................................... 339
- Educational ......................................... 339
- Engineering ........................................ 340
- Entertainment ...................................... 340

## Services
- Computer Repair .................................... 344
- Data Conversion .................................... 345
- Desktop Publishing ............................... 345
- Disk Duplication .................................. 345
- Laser Recharge .................................... 345
- Multimedia .......................................... 345

## Accessories
- Furniture ............................................. 346
- Gifts .................................................... 346
- Mouse Pads ......................................... 346
- Supplies .............................................. 346

## Miscellaneous
- Business Opportunities .......................... 348

---

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MAC IIci 4/80 4595
MAC IIIFX 4MB, 40MB 6565
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Extended Key Board 175
Data Desk Key Board 169

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PLP III 1750
G.C.C. POST SCRIPT
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B.L.P. II S 8 Ppm 2850
NEC 90 6 Ppm 1750
Write Impact 24pin 675
Write Move 3 Lb. 575
QMS 410 / 47 Fonts, 2MB 2195
Diconix 150 475
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## Quantum 12ms Access

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<tr>
<th>Capacity</th>
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<td>120</td>
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<td>739</td>
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<tr>
<td>170</td>
<td>759</td>
<td>859</td>
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<td>210</td>
<td>959</td>
<td>1059</td>
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### WREN Drives

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Half Height</th>
<th>Full Height</th>
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<tbody>
<tr>
<td>173</td>
<td>999</td>
<td>1099</td>
</tr>
<tr>
<td>300</td>
<td>1449</td>
<td>1599</td>
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<tr>
<td>300</td>
<td>1249</td>
<td>1499</td>
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<tr>
<td>330 mb</td>
<td>1499</td>
<td>1699</td>
</tr>
<tr>
<td>425</td>
<td>1899</td>
<td>1999</td>
</tr>
<tr>
<td>600</td>
<td>1849</td>
<td>2049</td>
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<td>630</td>
<td>2199</td>
<td>2399</td>
</tr>
<tr>
<td>1 Gig</td>
<td>2999</td>
<td>3399</td>
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### Maxtor 200 mb

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Internal</th>
<th>External</th>
</tr>
</thead>
<tbody>
<tr>
<td>859</td>
<td>959</td>
<td>959</td>
</tr>
</tbody>
</table>

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Memory Upgrades for your Macintosh

<table>
<thead>
<tr>
<th>MAC II</th>
<th>MAC SE/30</th>
<th>MAC IIX, IICX, IICl</th>
</tr>
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<tbody>
<tr>
<td>4 MEG KIT</td>
<td>56.</td>
<td>1 MEG KIT</td>
</tr>
<tr>
<td>16 MEG KIT</td>
<td>114.</td>
<td>2 MEG KIT</td>
</tr>
<tr>
<td>32 MEG KIT</td>
<td>224.</td>
<td>4 MEG KIT</td>
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<tr>
<td>64 MEG KIT</td>
<td>440.</td>
<td>8 MEG KIT</td>
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<tr>
<td>MAC PLUS OR SE</td>
<td></td>
<td>MAC II 1/8 NTX</td>
</tr>
<tr>
<td>2 MEG KIT</td>
<td>114.</td>
<td>1 MEG KIT</td>
</tr>
<tr>
<td>4 MEG KIT</td>
<td>224.</td>
<td>2 MEG KIT</td>
</tr>
</tbody>
</table>

Upgrading your Apple is easy and inexpensive!

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<thead>
<tr>
<th>Capacity</th>
<th>Price</th>
<th>Includes One Cartridge?</th>
<th>Warranty</th>
</tr>
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<tbody>
<tr>
<td>44MB</td>
<td>$29.00</td>
<td>Yes</td>
<td>1 Year Warranty, 100,000 Hours MTBF*</td>
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### WREN! Drive Prices

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>300MB</td>
<td>$1248</td>
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<tr>
<td>300MB</td>
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<tr>
<td>337MB</td>
<td>$1495</td>
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<tr>
<td>404MB</td>
<td>$2248</td>
</tr>
<tr>
<td>600MB</td>
<td>$1795</td>
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### Quantum Drive Prices

<table>
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<tr>
<th>Capacity</th>
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<tbody>
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<td>40MB</td>
<td>$297</td>
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<tr>
<td>40MB</td>
<td>$297</td>
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<tr>
<td>105MB</td>
<td>$498</td>
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<tr>
<td>120MB</td>
<td>$615</td>
</tr>
<tr>
<td>170MB</td>
<td>$727</td>
</tr>
</tbody>
</table>

### Fujitsu Drive Prices

- **Fujitsu 3.5" Drives**
  - 45MB: $294
  - 90MB: $458
  - 135MB: $548
  - 185MB: $728

- **Fujitsu 5.25" Drives**
  - 357MB: $525
  - 680MB: $525
  - 1200MB: $525

### CD ROM Drive Prices

- **Ginsler's Encyclopaedia**
  - Internal: $256
  - External: $275

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### ChiDi Books

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- **Fujitsu 3.5" Drives**
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  - Price: $1248

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**Quantum Drives**

- **40MB**
  - Price: $297

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**Fujitsu 3.5" Drives**

- **Price**
  - 45MB: $294
  - 90MB: $458
  - 135MB: $548
  - 185MB: $728

---

**Fujitsu 5.25" Drives**

- **Price**
  - 357MB: $525
  - 680MB: $525
  - 1200MB: $525

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**CD ROM Drives**

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**CD ROM Technology Prices**

- **Price**
  - $256

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- **Electronic: Who's Eating Chicago: San Francisco: The Pizza Collector:**
- **Price**
  - Internal: $224

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**CD ROM Technology Prices**

- **Price**
  - Internal: $256

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- **300MB**
  - Price: $1248

---

**Quantum Drives**

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- **Price**
  - Internal: $256
  - External: $275

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**CD ROM Technology Prices**

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**Fujitsu 5.25" Drives**

- **Price**
  - 357MB: $525
  - 680MB: $525
  - 1200MB: $525
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<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canon 8ppm, 300x300dpi</td>
<td>2 meg RAM expandable to 3, 35 Adobe Postscript fonts</td>
<td>$2495</td>
</tr>
</tbody>
</table>

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cable and card for SE/20 or NuBus .... $395
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Use the Reader Service Card to request free information about the products you see in *The Macworld Catalog*.

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### EDUCATION SOFTWARE

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### ENTERTAINMENT SOFTWARE

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### NETWORK/DATA COMMUNICATIONS

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### MASS STORAGE*

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### ADD-IN BOARDS/MEMORY

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### PRODUCT WATCH

Recent or forthcoming products of particular interest.

- **Interleaf 5** *Interleaf*
  
  Family of electronic publishing products

- **HappyBlaster** *Pacific Rim Data Sciences*
  
  Hardware device that enables non-PostScript printers to print PostScript files

- **Ray Dream Designer** *Ray Dream*
  
  3-D modeling package

Source: Exclusive InfoCorp survey of more than 250 Macintosh retailers and selected mail-order vendors. Covers sales during October 1990.

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One button transmits a normal mouse command. The other locks the button in the down position for extended selection and graphic applications. You decide which button performs what function. Press both buttons simultaneously, and our time-saving chording feature executes one of seven useful commands such as "save," "print," "quit," or "undo."

Navigating the screen is easy. A comfortable ball position makes the cursor easy to move. And a smooth ball movement means no jumping or sticking.
What's more, Turbo Mouse has unique software that lets you adjust both acceleration and double-click speed to exactly match the way you work. Move the ball slowly and the cursor moves pixel-by-pixel. Move it fast and it speeds across even the biggest screen.

The next time you read another claim for a trackball, remember the one that has earned all the acclaims. Turbo Mouse.


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