Illustrator vs. FreeHand

The Winner Is…

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The Mac’s Fifth Anniversary:
Back to the Future with the Mac Development Team
Spend seven years inside Apple and you learn a thing or two.

In 1981, Apple approached several major software developers with a radical vision of personal computing.

A vision, it turned out, too radical for most to even accept.

But one did.

To this day, over seven years later, we suspect the other developers are still kicking themselves.

We, on the other hand, are still pushing ourselves.

At Microsoft, we shared in Apple's vision to make Macintosh® the most corporately powerful, yet disarmingly friendly, business computer in history. To give Macintosh users all the functionality, flexibility and power to push productivity to unheard-of limits. And to do it with a combination of hardware and software that's somehow embarrassingly simple to use.

It happens to be a vision we still share. Passionately.

Which is why we've created Macintosh applications that have changed the way today's businesses do business.

Case in point: Microsoft® Word, quite literally the best-selling Macintosh application...
ever created. Now, with the new version 4.0, Word users can enjoy true WYSIWYG and even easier table generation.

Microsoft Write gives the casual user a great deal of word processing capabilities—for not a great deal of money.

And of course, there's Microsoft Excel. Right now, eight out of every ten Macintosh spreadsheet users are using Microsoft Excel. The simple truth is, for years it's actually been the most powerful argument for buying a Macintosh.

And speaking of power, until Microsoft PowerPoint® was created, desktop presentations didn't exist. Now the person making the presentation can actually generate it—from overheads to 35mm color slides. Best of all, only PowerPoint has built-in color schemes. For impact like you've never seen.

And with Microsoft File as your economical database, creating professional-quality business forms and mailing labels has never been faster. Or easier.

As for Microsoft Works, just think of it as the Swiss army knife of business software. Works integrates word processing, spreadsheet, a database, drawing, even a communications tool—all in one versatile package.

For the developing developer? We created Microsoft QuickBASIC, which basically gives you everything you need for quick, efficient programming, testing and execution.

All of which brings us to Microsoft Mail. Nobody sells more Macintosh applications than we do. And the only thing more impressive than using them alone, is using them together.

Right now, eight out of every ten Macintosh spreadsheet users are using Microsoft Excel. The simple truth is, for years it's actually been the most powerful argument for buying a Macintosh.

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All of which brings us to Microsoft Mail.
February 1989

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Need some animation ideas? You'll find a dazzling display of them on the Video-Works CD ROM—over 200MB of animation, clip art, sounds, and more (p. 145).
13 LIFETIME WARRANTY

1. 9" x 9" x 3" Padded Pocket for External Disk Drive, Modem, or Accessories.
2. Padded Compartment for Mouse and Cords.
3. Padded Compartment fits ANY Extended Keyboard.
4. Padded Flap separates Hard Disk from Computer.
5. 3/4" High Density Foam for Maximum Protection.
6. Navy Blue, Platinum Grey, Jet Black or Burgundy Cordura™ Nylon Outer Shell
7. Heavy Duty Metal Hardware Throughout.
8. Stress Points Cross and Box Stitched for Added Support.
10. 2" Stiff Nylon Webbing Maintains Shape.
11. Shoulder Strap with Slip Stop Pad.
12. Outer Handle to Assist in Shoulder Carrying.
13. LIFETIME WARRANTY
The $19.32 Modem.

Now everyone on even the biggest Macintosh network can have the power of modem communication for less per Mac than the cost of a box of floppy disks. Because the Hayes®-compatible NetModem™ V2400 can be shared, just like you share a LaserWriter®. So there’s no need for the cost or complexity of multiple modems and phone lines. The NetModem V2400 is easy to set up—just plug it in and turn it on. And it’s easy to use. You can hear the progress of your call, no matter where in your office the NetModem is, because it feeds familiar modem sounds back to your own Mac’s speaker. It also displays a modem front-panel icon, with ‘LED’ status lights, in your Mac’s menu bar.

If you’re away from the office, you can call in through any ordinary modem and the NetModem V2400 connects you to the office network. You can access files, use TOPS®, AppleShare®, electronic mail, printers or any other network resource, just as if you were sitting in front of your office Mac. Find out how the NetModem V2400 can make your Macintosh network more productive. Call 1-800-458-3550, or write Shiva, 155 Second Street, Cambridge, MA 02141.
Ii

ROFFMANN
LETTER

Special Report on
New Macintosh
Enhancements

THE

radius

radius

Macintosh SE

radius

Macintosh SE
FOR THE SOFTWARE THAT'S HERE.
AND THE SOFTWARE THAT'S COMING.

PageMaker, Microsoft Excel, Illustrator, MultiFinder, and 4th Dimension. The second generation of Macintosh software is here now. The third generation is already beginning to arrive.

Your Macintosh SE alone can't keep pace with the ever increasing sophistication of Macintosh software.

But it can with a productivity system from Radius.

Totally compatible with your Macintosh SE, from its aesthetics to its electronics, there's a Radius System designed for your particular working style.

Our Document Processing System consists of a 640 x 864 pixel Radius Full Page Display that lets you work on a virtually paper-like 8½" x 11" page.

Then we add our Radius Accelerator 16™ and quadruple the speed of all of your Macintosh applications from Ready, Set, Go! to HyperCard.

Our Professional Publishing System features a 1152 x 864 pixel Radius Two Page Display. Now you're working right across a double page spread or a full-scale B size drawing.

Then we add our Radius Accelerator 25™ and you're working at six times the speed of a Macintosh SE.

Which means our Accelerator 25 has you roaring along faster than a Macintosh II.

For Engineering and Design and intensive number crunching, we add something even a bit more powerful: the MC68881 mathematical coprocessor.

It aces floating point computations at one hundred times the speed of your Macintosh SE. Combined with the immense canvas of the Two Page Display and the speed of the Accelerator 25, it takes you to the very limits of programs like Excel and MacDraft.

Both Radius Accelerators offer our innovative MagicBus™ which allows you to configure your Macintosh with either our Full Page Display or Two Page Display. So, you can complete your Radius System all at once or add the components one at a time.

To see the most powerful and sophisticated Macintosh software run at its full potential on a Macintosh SE, try a hands-on demonstration of the Radius System that fits your personal working environment.

Call 1-408-434-1010 for a brochure and the name of the authorized Radius dealer nearest you.

And get the most out of your Macintosh SE and its software. Today. And tomorrow.
That's how you leave your hard disk without The NightWatch & MacSafe

Sorry to startle you, but the naked truth is that if you're not using The NightWatch & MacSafe to protect your hard disk files, anyone with access to your Macintosh can browse freely through your files — even changing them without your knowledge. It could be tonight!

With The NightWatch, you can shut down your hard disk securely when you leave the office. The NightWatch stands guard, preventing unauthorized access or erasure of your hard disk. The next morning, start up with The NightWatch user disk & enter your valid name and password. A simple & elegant security solution.

If you share your Mac during the day, MacSafe can help you restrict access to individual documents & applications. With MacSafe, you create folder-like safes and place the files in them you want to protect. It works much like the Finder, so you already know how to use it. With MacSafe’s true password protection system (no encryption required), no one can get into your safes without the correct password. Simple, familiar, & fast.

Join our satisfied customers from Fortune 100 companies, universities, and small businesses in protecting your valuable files with The NightWatch & MacSafe.

MacUser magazine said that with MacSafe “you can rest assured that your files are in safe territory — 4 mice!”


Come see FolderBOLT, our new password protection for folders, at the San Francisco MacWorld Expo in booth 931 at Moscone Center.

Call your dealer or Kent Marsh Ltd. 800-325-3587

Kent Marsh Ltd. Security Software You Can Count On
WHEN YOU’RE MORE PRODUCTIVE, IT SHOWS.

MORE II: PLANNING, WRITING AND DESKTOP PRESENTATIONS.

Being MORE productive means everything you plan, write, or present is MORE organized. And it shows in everything you do.

MORE II’s advanced outlining makes it easy to capture, plan, and organize ideas into clear, action-oriented information. Simply type in “To-Do” lists, project schedules, proposals, plans... everything. MORE II automatically creates the outline for you.

Outlines make MORE II productivity easier. Just click the mouse on any part of an outline and get charts and slides, instantly.

The outline makes the show.

Once you have an outline, your art work is done. Because with a double-click of the mouse, any outline becomes a perfectly spaced bullet or organization-type chart instantly. Complete with company logos or art pulled in from other programs. Print the charts and get overheads fast. Or turn them into even more graphics, click again and get every art tool imaginable. And because of MORE II’s outline, when you change the master slide, the rest change automatically. So making 1000 slides is as easy as making one.

Click on another outline, add a few paragraphs using MORE II’s full-power word processing and bingo. You’ve got a memo. Or a letter. Or a proposal. Add pages, pull in some charts and there’s a full-scale report or a board-room quality presentation... totally spell-checked, with text, graphics, fonts and styles to rival anything created on any other program.

Now go live. MORE II includes advanced, live-action meeting technology for slide shows (complete with video effects like dissolves, builds, wipes, and fades) on any MAC connected to virtually any projection device.

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For planning, writing, and presentations, MORE II shows results. It’s the only software that helps you master all three stages in the art of persuasion. Without becoming an artist.

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SYMANTEC. *MORE owners, upgrade to MORE II now and send $89 plus $10 for shipping/handling (check or money order) along with your MORE registration number to MORE II upgrade Symantec Corp., 30201 Torrey AVE., Cupertino, CA 95014 or call (408) 253-9600. Suggested retail price $395. MORE and MORE II are trademarks of Symantec Corp., 10201 Torrey AVE., Cupertino, CA 95014 (800) 228-4122 Ext. 747G.

Circle 215 on reader service card
Flat-out
If your monitor isn't sharp, even the best ideas look fuzzy. That's why you need to look into ColorMax and SilverView for your Mac II and PageView for your Mac SE. The new line of monitors from Sigma Designs.

Designed for engineering workstations, our 19" ColorMax delivers 16.8 million colors with knife-edge definition. Which means your blueprints will now be a lot more than just blue.

For art directors and designers, the 21" flat-screen SilverView extends your range with an exact scale two-page spread. And your palette with the entire gray scale's 256 different shades. So you'll never have to leave anything to the imagination again.

Priced less than $1000, our PageView 15" flat-screen monitor is clearly one of the most remarkable bargains in this industry. Ideal for desktop publishing and text handling it comes with something ingenious called Multimode. Enabling you to work in actual size or the full 8.5" x 11" page. A feature you won't find on monitors costing twice as much.

Whether you work with words, pictures, or words and pictures, find out how much more expressive you can be with the right screen. Call us at (415) 770-0100.

We're the difference between an idea that looks dull. And one that's brilliant.
FOR HARD DISK PROTECTION, CORPORATE AMERICA FINDS SAFETY IN NUMBERS.

Symantec Utilities for Macintosh (SUM) is Corporate America's #1 choice for fail-safe hard disk protection. Because in addition to six other indispensable utilities, SUM features Guardian, the ultimate software for protecting your Mac's hard disk before a crash. Just like an air bag in a car, Guardian stays out of sight, loading automatically every time you turn on your Mac. It protects invisibly by updating a "map" of your hard disk data. So that, in a crash, your data is safe. Because Guardian uses the "map" to locate and recover it. In minutes.

Seven smart utilities. 5 Mice, MacUser magazine's highest rating. Tens of thousands of satisfied customers in hundreds of companies. No wonder Corporate America is turning to SUM for hard disk safety ... in numbers.

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SEVEN INDISPENSABLE HARD DISK UTILITIES:

Guardian—protects and restores hard disk data and deleted files. Disk Clinic"—easy-to-use troubleshooting interface. Restores hard disk data in case you have a crash before you can install Guardian. Virus Protection—protects systems against "viruses." HD TuneUp"—optimizes hard disks. Symantec Tools—views and edits data and resource forks of a file or volume in HEX or ASCII. QuickCopy™—makes fast floppy copies. HD Partition—separates hard disks into separate volumes which can be encrypted.

Five Mice, MacUser magazine's Highest Rating

Circle 237 on reader service card
Jukebox on Mars

Micro Dynamics' MARS (Multiuser Archival and Retrieval System), a network-based turnkey data-storage-and-access system for use with the Macintosh, now supports the largest storage device ever to be connected to a Mac—the 160GB "jukebox" optical disk automatic changer from Sony. To get an idea of how big 160GB is, imagine two thousand 80MB hard disks—enough to store about 80 million pages of text. Micro Dynamics installed its first jukebox-equipped MARS system in October 1989.

The jukebox—also known as Writable Disk Autochanger model WDA-3000-10—has two optical disk drives and 50 optical disks, which are changed by a robot arm. In addition to the jukebox, MARS works with WORM optical disks; other components of the system include high-speed scanners, OCR text-recognition devices, local area networks, and laser printers. For more information, call Micro Dynamics at 301/589-6300.

FoxBase+/Mac Multi-User

FoxBase+/Mac, the fastest database-management software available for the Mac, is now available in a multiuser version. FoxBase+/Mac Multi-User provides full record- and file-locking on AppleShare and compatible LANs, including 3Com's 3+ and the soon-to-be-released Novell Netware version 2.15. Multi-User is completely compatible with Apple standards and with the methods and language syntax used in the PC multiuser versions of FoxBase+. Users on mixed PC and Macintosh networks can share the same data, index, format, and program files.

For further information, contact Fox Software at 419/874-8678.

Larger SE Screens for Less

Mobius Technologies believes it has a solution for SE users who long for larger screens but can't afford them. Mobius's MultiScreen, a video board with software, lets you attach a wide range of inexpensive high-resolution monitors to the SE.

MultiScreen can display multiple resolutions on the same screen—640 by 480, 720 by 540, or 800 by 560 pixels, all selectable from software—and draw the display on an external monitor up to 30 percent faster than the SE alone.

MultiScreen should allow users to see almost a full page lengthwise for half the cost of a typical full-page display.

For more information, contact Mobius Technologies at 415/654-0556.

New Accelerators

A line of accelerator boards from Irwin Magnetics, the XL, XL 20, and XL 25 Excelerator, boosts the processing speed of the Mac SE by up to eight times. The XL doubles the SE's speed by replacing its 8-MHz 68000 microprocessor with a 16-MHz 68000. The XL 20 and XL 25 accelerate the SE to more than three times faster than a Mac II, by replacing the 68000 with a 20-MHz or 25-MHz 68020, respectively.

Prices for the boards are $499 for the XL, $999 for the XL 20, and $1600 for the XL 25. For more information, call Irwin at 313/930-9000.
High-Capacity Hard Disks

Crate Technology has introduced the InnerCrate 600, a 600MB internal hard disk for the Mac II. Features include automatic head parking and a utility for remapping defective areas of the hard disk. The list price is $3845.

On the external hard disk front, NCL America Computer Products has introduced a line for the Mac II, SE, Plus, and 512KE. Capacities of these hard disks range from 30MB to 675MB, and they are available as the ExpressDrive Series, which fit under the Mac, or as the portable ExcelDrive Series. Both kinds have two SCSI ports so that you can daisy-chain multiple hard disks for even higher storage capacities.

List prices for the ExpressDrive series are $875 for 30MB, $1075 for 50MB, $1775 for 80MB; for the ExcelDrive series, $895 for 30MB, $1095 for 50MB, $1795 for 80MB, $2295 for 150MB, $4395 for 360MB, and $5195 for 675MB.

For more information, contact Crate Technology at 800/543-5808 (nationwide), or 800/323-9994 (in California), or NCL America Computer Products at 408/734-1006.

1280 by 1024 Resolution

Matrox Electronic Systems has developed the first graphics board for the Mac II that can display graphics and text at a resolution of 1280 by 1024 with a choice of 256 colors from a palette of 16.7 million. The NG-1281 board runs under Apple's 32-bit QuickDraw interface, and Matrox is now modifying the interface to take advantage of the NG-1281's on-board intelligence and graphics capabilities.

The board was designed to turn the Mac II into a cost-effective entry-level engineering workstation that can run CAD packages at top speeds. For further information, call Matrox at 514/685-2630.

New LAN Options

CBIX, producer of the LAN operating system Network-OS, has announced a Mac-to-PC LAN interface and a CD-ROM Delivery System that can be accessed by multiple users through CBIX's Network-OS LAN operating system.

Network-OS Mac-PC Connection lets Macintosh users run PC applications and share PC network resources, such as printers and storage devices.

The Network-OS CD-ROM Delivery System enables multiple users to access databases stored on CD ROM disks. For further information, contact CBIX at 404/446-1332.

Software Piracy Protection

Rainbow Technologies is shipping a Mac version of its Eve copy-protection system, which defends developers' software while letting users make unlimited backup copies. Eve consists of a hardware key and development software. Developers use the Eve software to set up a security system of "locks" inside their applications.

When an application is shipped, the hardware key is included. The end user plugs the key into the Apple Desktop Bus, where the key can open the locks embedded in the application. The hardware sends a "challenge" to the lock, which must reply or the application halts.

The backup copies also contain the software locks, so the backups work only when the key is installed, which prevents piracy. A user can transfer the key and software to any single Mac SE or Mac II.

Users who buy Eve-protected software from several developers can install hardware keys provided separately by each developer. Keys will not interfere with each other, the company says. The Eve system sells to developers for $45 each in lots of 500, or $55 in lots of 100. For more information contact Rainbow Technologies at 714/261-0228.

SBT Announces Mac Accounting Programs

Major dBase application developer SBT Corporation says it's shipping its first Macintosh programs, part of the new Series Six Plus/Mac portion of the SBT Database Accounting Library. Created in FoxBase+ for Mac and fully compatible with Database Accounting Library software running on IBM PCs and UNIX/XENIX systems, the first four Mac programs are dledger, dinvoice, dstatements, and dPayables. Single-user versions (scheduled for release before the end of 1988) cost $395, $295, $100, and $395, respectively. Multiuser versions, called MultiNet by SBT, will ship soon after the multiuser version of FoxBase.

A total of 15 programs, all FoxBase versions of existing SBT accounting products, are planned for Series Six Plus/Mac; all will have multiuser versions and will offer compatibility with the other major operating systems running SBT accounting software. For more information, call SBT Corporation at 415/331-9900.
PRESENTING THE WRITEMOVE PORTABLE PRINTER.

Most printers are sentenced by their own sheer bulk to lifelong confinement on a desktop.

But now GCC Technologies* has created a printer for the Macintosh® with considerably more freedom than that. It's called WriteMove*: the "biggest" printer ever to come in an incredibly small package.

WriteMove weighs a scant three pounds. It measures just 2"x6½" x10¾" (Any smaller and you couldn't get the paper in.)

But it's the only ink jet printer of any size that gives you almost unlimited freedom to reduce and enlarge type and documents. Because it's the only one with outline fonts—imaging software that provides functionality otherwise available only with laser printers.

As a result, you can use WriteMove to compose documents with word processing software like Microsoft® Word, or desktop publishing programs like PageMaker.® And then silently print them out at 192-DPI resolution. In other words, you get much higher print quality than the ImageWriter II, for not much more money.

Which could bring a whole new meaning to the phrase "freedom of the press."

To exercise that freedom, see your authorized GCC Technologies dealer for a WriteMove demonstration. For the one nearest you, call (617) 890-0880.*

* In Canada, (514) 263-1405. GCC Technologies, Inc. GCC Technologies and WriteMove are trademarks and the GCC Technologies logo is a registered trademark of GCC Technologies, Inc. Macintosh and ImageWriter are registered trademarks of Apple Computer, Inc. PageMaker is a registered trademark of Aldus Corp. Microsoft is a registered trademark of Microsoft Corp. Suggested manufacturer's retail price: $699.

INTRODUCING THE MOST INGENIOUS PORTABLE PRINTER SINCE THE PENCIL.
A recent tracking study performed by Numerical Understanding Methods Bureau, Inc. has determined that constant and prolonged exposure to spreadsheet output may result in cases of extreme drowsiness and lethargy. Contributing factors have been shown to be an emphasis on raw numbers with no context, lack of graphic elements, and limited abilities in the treatment of text.

**How Spreadsheets Communicate**

As seen in the Usage chart above, the NUBM study found increased instances of drowsiness in certain spreadsheet applications, particularly when used for data analysis or report generation. A lack of context and limited graphic elements may lead to decreased performance and increased drowsiness.

**User Category**

<table>
<thead>
<tr>
<th>User Category</th>
<th>WEST</th>
<th>SOUTHWEST</th>
<th>NORTH</th>
<th>EAST</th>
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<td>27</td>
<td>85</td>
</tr>
</tbody>
</table>

**Are Spreadsheets Effective?**

As seen in the Usage chart above, the NUBM study has shown that spreadsheets are frequently used in a data analysis or report generation context. The lack of context and limited graphic elements may lead to decreased performance and increased drowsiness.
It's the difference between merely analyzing something, and actually seeing what it means.

Introducing Full Impact from Ashton-Tate.

Full Impact is a spreadsheet program designed expressly for the Macintosh that goes beyond the basic number-crunching capabilities of Microsoft Excel: it gives you the ability to easily turn your work into clean, crisp—and understandable—documents.

How? By letting you take full advantage of the way you're already used to working on the Macintosh.

Start by simply entering your data. Then, select all or part of it, and instantly create a chart using those values—simply by clicking on the appropriate chart icon from the icon bar.

Need to write some text explaining your analysis? And highlight certain passages? Full Impact's text editor gives you plenty of fonts, sizes, and styles to choose from.

What if that block of text would look better somewhere else? Fine. Just click on it, and drag it there. You can even bring in art from other programs, then merge it with your text and data, all on the same page.

But lest you get the impression that Full Impact is merely a presentation program disguised as a spreadsheet, consider this: with over half a million usable cells (far more than any other Macintosh spreadsheet), Full Impact gives you more than enough room to handle even the largest projects. And more than enough speed to recalculate them quickly.

You can work with as many as eight spreadsheets simultaneously. And then link them all together. Or create powerful, time-saving macros, and even customizable icons to tie them to.

You can also exchange files with many other popular programs, including Excel and Microsoft Works, Lotus 1-2-3, all of Ashton-Tate's dBASE* products, and much more. So you won't lose your investment in your current data.

We'd like to make it easy for you to get the full impact of Full Impact. Just call 800 437-4329, ext. 3501, and we'll send you a full-capability product sampler.

What could be more impactful?
Order a drive now and receive: SilverServer™

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- Modem and disk server for use within your LAN.
- Remote disk server to share hard disks in another LAN or at home.
- Available separately for $149.95.

**also receive:**
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**Limited Time Offer**

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**SPEED**

**RELIABILITY**

**QUIET OPERATION**

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The Macintosh is five years old and, in the last year, it has become the central product line of the company. There is no need to ask if Apple will make it into the twenty-first century; the question now is what the company will look like. So rather than make this a paean to the Macintosh, I am taking one more opportunity to conjecture on Apple itself. Because of the frequency with which the company is reorganized, that is difficult—but perhaps change is the crux of the matter. Surely no other company in the Fortune 200 is in such a constant state of flux.

There is a joke at Apple that the company’s organization charts are kept in MacDraw because of the frequent changes. Recently the company’s reorgs reached the nadir when a new organization chart for marketing, labeled Step One, was produced with the admonition that it only represented areas of responsibility and did not constitute a true organization chart (or words to that effect). It’s getting mighty thick in Cupertino. Time for hip boots?

Many people have begun to ask whether the repeated reorganizations are a sign of the company’s ability to adapt in response to rapid growth, or the manifestation of a company subject to weak leadership, power plays, rapid staff turnover, and lack of overall direction. John Sculley sees the reorgs as the former: planned, directed, well-defined events that pave the company’s road toward the twenty-first century.

Third-party developers, many of whom understand the need for growing companies to change, have taken to throwing their hands up. They spend months establishing contacts within Apple, only to find that these valued sources of information or direction change overnight. Similarly, some Apple managers find themselves in new jobs overnight through executive fiat. But that may be preferable to the status of those who keep their old jobs—one manager told me he had seven bosses in two years. An asset to the company who has seen too much change, he is by turns either enthusiastic or burned out and cynical after five years at Apple.

Such rapid change raises several questions: not only whether Apple’s managers have the institutional memory to deal adequately with the company’s developers and customers (no, say many), but also whether the philosophy of change itself has become institutionalized at the company.

A Company of Opposites

Indeed, Apple is a company of opposites. For every superlative one can direct toward Apple, there is a negative counterpart. Those who work for the company find it a mecca of high salaries, good benefits, profit sharing, stock options, fast growth, stability (at least compared to a small developer), high energy. It offers young people tremendous opportunity. So it attracts them—and some of them realize their dreams. For others it is a sweet-scented trap. Once lured in, they are caught by the pay and benefits and the lifestyle those benefits engender, but they feel unable to bring their skills to bear in ways that can help the company or allow them to realize their potential. Many bright and capable people believe the system is set up to ensure failure.

Apple is run by consensus. Decisions are made at the top, to be certain. But the implementation is left to midlevel managers. Ambitious managers at Apple find their days given over to incessant meetings, forcing them to set aside their evenings for getting real work done. Meeting fever leads to wasted time, and to decisions that cater to the lowest common denominator. Witness the debate over who really controls the future of favorite projects such as multimedia. This project has nearly a dozen groups within the company, each with some claim to implementing it.

Consensus-building can lead to realistic goals, broadly understood and supported by groups within the company. But managers often find themselves at odds with their peers who have alternative ways to achieve the goals. A group works laboriously toward a consensus, only to have its decision second-guessed by others who couldn’t make the meeting. Or a dissident member effects a pocket veto by avoiding a crucial meeting and then announcing that the arrived-at decision cannot be implemented without consideration of other agendas.

Nor do these traits lead to a company that makes decisions well—for two years Apple did not formally recognize that the Macintosh sold into the home. The official explanation that Apple did not want the Mac to be seen as a home computer came at a time when 85 percent of our readers had Macintoshes at home. This monolithic approach, that “We’ll tell people what we want to be the truth because it matches our goals,” is out of place at a company supposedly in touch with its market. It was a sad irony juxtaposed with the lemming campaign. Even today, the company seems all too capable of marching to its dogma rather than to reality. At a time when many have begun to recognize that the future of the office is in the home, Apple promotes the idea that the Mac is a success in the business market. To its credit, the company once had a manager for the home-office market.

The ability of Apple to believe in itself, and its own perception of the truth, is legendary. Little wonder, then, that even its most acute critics seem to have a soft spot for the company. An Apple manager once said to me, “It’s amazing what you guys in the press let us get away with. We’ve made some really bad blunders, and no one calls
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us on it.” If that is a widely held perception within Apple, it’s no wonder that executives feel they can say what they want.

On the other hand, Apple will go to great lengths to please some groups—such as financial analysts. Last fall’s price hike, for example, is said to have been based on the need to keep Apple’s traditionally high profit margins of over 50 percent. Despite the price hike, and another increase in quarterly revenues, the price of the stock dropped to a year low. Was it worth it?

A Nimble Company?

Nor does Apple exhibit the suppleness of a young, ambitious company, if a $200 million dollar CPU backlog is any indicator. Lethargic might be a more appropriate term. Apple seems to be quietly waiting for IBM, which is preparing an onslaught against the desktop computer, engineering workstation, and personal computer markets. Not with OS/2, but with a machine based on Next’s model of unified printing and imaging (Postscript), AIX (IBM’s version of UNIX), and Next’s software architecture (NextStep). The great news for these markets is that UNIX will be friendly. Apple’s HFX utility is a strong, incremental step. But IBM will have the equivalent of a finder-level implementation of AIX on its machine.

Many remember the origins of Apple’s struggles with UNIX. Chris Espinosa (Apple employee number 9), a brilliant young contributor to the company, was given the task of heading product management for A/UX. Simultaneously he was the manager for HyperCard. This is an example of the company setting up some of its best to fail. Espinosa’s contribution to the company is one of public record. Setting him up to compete against the likes of Bill Joy and others who helped to develop UNIX is ludicrous. The slow development of A/UX at Apple reflects more upon management than upon the product managers.

Which raises another question. As the company grows, is it building mechanisms to allow it to make the right decisions? One of the company’s newest buildings houses its executive staff; John Sculley, Jean-Louis Gassée, Allan Loren, Del Yocam, Deborah Coleman, and a host of other VPs. Does this improve decision making by bringing together key managers who can share information more easily, or does it create an executive ghetto where upper management (continues)
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Commentary/Jerry Borrell

is isolated from midlevel managers? Two years ago you could see Scully having lunch in the cafeteria of the engineering building of the company. Does that still happen?

Until recently Apple had no plan to provide for the retirement of its employees. Scully’s position was that people don’t retire from Apple. “They come here and spend a few years and then go to other places,” he said. Such a theme would be anathema at organizations like 3M or IBM where the staff is seen as a company’s most precious resource. In late October Apple did announce a plan to begin contributing to the 401(k) plans of its employees. Some point out that this is only fair, as the company has become tightfisted with stock options.

Still, the point has to do with Apple’s willingness to invest in people—to train, to retrain, to relocate. On the one hand the company has Apple University for internal training courses, provides for reimbursement on outside coursework, has cooperative agreements leading to an MBA with a neighboring college, and has management-training sessions. Its unique sabbatical, the ReStart program, provides a six-week vacation to people who’ve been employed for five years.

On the other hand I most often hear about sabbaticals from people who say, “Well, if they’re going to reorg my position, then I might as well just take my sabbatical and find a new job when I get back.” There is also criticism that the company’s approach to management training is a mélange of pop, psycho-social fluff that imparts few skills outside of aerobics and supervisory techniques.

Farewell Developers?

Another trend at Apple, albeit unwitting, is that Apple appears to be devouring its third-party developers. “I had a programmer,” says one developer. “Key architect of my product. He just went to work for Apple. They doubled his salary. I couldn’t begin to compete with that.” This is a frequently heard story. But as the company employee count goes over 11,000, a good question is where can Apple find talented programmers and engineers if not among the developers who know Apple best. It could even be beneficial, as Apple absorbs engineers from companies that find themselves in a losing battle with the company. It gains people who know a great deal

(continues)
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Commentary/Jerry Borrell

about Apple's products and markets. Certainly as the company includes ever more in its System software or announces additional peripherals, some developers wonder what the future in third-party development really is.

At the same time Apple is creating a multitiered organization for its developers. With 8000-odd developers of some note, it has to find some way to help those who can help Apple the most. The evangelist group, the group most responsible for aiding Apple, is now directed by its third manager in little over a year. Nor is evangelism fully staffed. Such turnover is not likely to produce the stable, mature, and experienced management an organization needs.

Many gifted people are in charge of the evangelists—are they provided with the environment that will allow them to succeed? The complaints about Apple's infrastructure range from the global to the minute. The company is willing to provide great pay for its staff, but hires insufficient administrative staff or secretarial support to allow that talented staff to do its job.

Another internal group, Apple's Human Resources department, is the target of a love-hate relationship within the organization. On the one hand it's enlightened: recognized for its efforts in minority hiring, child-care facilities, forward-looking policies in areas such as maternity leave, and employee advocacy. On the other hand it's the bane of the organization. Rather than playing a support role, Apple's Human Resources staff is in many ways a second group of managers who focus on how the company is working.

Helpful in an organization run by consensus, HR often works behind the scenes to reconcile opposing groups' decisions. But the group can be troublesome in instances where its staff may second-guess front-line decision makers who are responsible for the outcome of decisions. Some managers find that the group disrupts supervisor/employee relationships that it understands little, effectively depriving managers of any real authority in a structure already lacking in ways to make things happen. Worse, the HR staff itself sometimes gets embroiled in its respective groups' bids for money, employees, or control.

(continues)
Rick Smolan

Age: Withheld upon request.

Profession: World class photographer, entrepreneur and inspirational force behind the now famous Day in the Life of Australia; Day in the Life of the Soviet Union; Day in the Life of America—you get the picture.

Hobbies: When he's not taking photos in exotic places like Bangkok, Nairobi or Cairo, Rick enjoys kicking back, relaxing, and possibly doing some serious scanning of articles related to one of his favorite subjects—Levitation as practiced by Tibetan monks.

His Page Recognition Software: OmniPage, of course. Why else would we have him in our ad? According to Rick: "Coordinating 100 photographers in the Soviet Union for a one day photo shoot is no easy task for a small group like ours—despite what you hear about glasnost. Especially when you have to put an entire book together in a matter of weeks. When we're on assignment each photographer turns in notes—about a given shot—in whatever language he or she speaks. You can imagine some of the type styles that we have to deal with. When do you guys think you'll be able to handle the Cyrillic alphabet?"

Favorite Quote: Jonathan Seybold summed it up best: "OmniPage is the first good reason to buy a scanner."

Things Disliked Most: "Scanner software that ever promises. Being able to scan any font in almost any column format really makes a difference. I wish that our photographers had the time to submit captions that are 999% accurate, or even as reliable as OmniPage."

Favorite Scan: "I'm developing a library of some of my favorite photography articles—serious professional stuff—and putting it into files that I can get to and use. That's my idea of a meaningful scan."

Future of Page Recognition: "The idea of making computers compatible with paper is long overdue. People like myself who are on the move need products like this to save time. Everyone could stand a few less key strokes. I also see some real possibilities for OmniPage in the area of desktop publishing. Being able to scan specific sections from general publications, even typed notes, provides a real benefit to anyone who has to quickly turn around a publication. Do you guys think OmniPage will ever be able to read my handwriting? Our staff would love that."
Marketing: Apple's Forte?
The marketing department at Apple is a moving target. I have known so many different directors and managers at Apple over the last three years, that it is truly a wonder that the company maintains any continuity at all within the group. The staff below the level of vice president never knows what is going on for longer than a few months. Even the vice presidents play office musical chairs. No other group in the company is so rife with rumors. No other group is so often affected by poor morale or left without clear goals, spending time interviewing for other jobs and speculating on who will be doing what, where, and when. There is always a reorg under way, with promises of more announcements later—heaven knows who thinks this is a responsible way to treat a large group of employees.

Apple segment marketing—education, engineering, business, consumer, and the home—are now said to be going away, to be replaced by regional marketing efforts. And the regions have recently multiplied from three to five. Is it growth, planning, or ill-communicated reshuffling? Apple does appear to be building stronger relationships with its value-added resellers. Still, I receive calls from resellers asking me for advice on who they should talk to at Apple, or complaining that Apple's policies regarding support, or the company's determination of who qualifies as a VAR, are grossly unfair. I patiently explain that I work for a consumer magazine, not the trade press, and suggest that they contact the appropriate group at Apple.

And the lesson of Apple's hubris in regard to its beliefs and goals applies to marketing efforts as well. I will never forget sitting in the audience in Tokyo as Apple unveiled its desktop publishing push for Japan. The Apple speaker was politely but firmly asked what made Apple believe that it would succeed in Japan with desktop publishing as it had in the United States, which was the contention of the speaker. The response was that, well, Apple had done it in the States, Apple would do well here. "The look on the face of the questioner said, 'Right. You and the rice farmers from Louisiana.'"

A few years ago, on the other side of the globe, Apple introduced an innovation into European marketing: the AppleCentre concept. Apple formed a partnership with strategic Apple dealers and funded expansions to their stores that provided a training and demonstration space for Apple and third party products. It looked good at first. European prices for the Macintosh are much higher than here in the United States, and the AppleCentres added a touch of class to the computer store in keeping with the high price tags. Now the owners I have talked to say the concept is winding down, becoming a financial burden, and no more support from Apple is forthcoming.

Sez Who?
It's pretty hard to argue with success, and Apple is definitely successful. It is also easy to criticize from the outside, but the company does have problems as it celebrates the Macintosh's fifth anniversary. Its ownership of the "computer for the rest of us" makes us want it to be the best possible company at a time when even a casual observer can see that some blemishes are showing up on the Apple.

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On Accounting
I was very disappointed with the superficial manner in which the accounting packages were reviewed in your September 1988 issue (“Who Keeps the Books?”). After reading this article, a novice would think that there were numerous accounting packages to choose from. As a practicing CPA, I can assure you that the current status of Macintosh accounting software is abominable.

Your review stated that a bookkeeper would love Insight. I will testify under penalty of perjury that bookkeepers hate this program. Because it saves only a summarized portion of a transaction—no detailed accounting information is stored on hard disk—bookkeepers must review paper printouts to find individual entries. No wonder the reviewer added that “the series will not begin to realize its full potential for a couple of years.”

David R. Satava
Oakland, California

Design Costs
Let me begin by applauding Macworld for two very well written and informative articles (“Is Desktop Publishing Worth It?” and “A Halftone Handbook,” October 1988) on the limitations and usefulness of desktop publishing and digital halftoning on the Mac. Both should go a long way toward clearing up the confusion and hype that currently surround those topics in some trade journals and computer magazines.

Here at ImageSet Design, we found the cost-comparative breakdown both interesting and informative, but we were struck—not by the relative cost savings that desktop publishing offers in terms of setting type—but by how inexpensive the designers’ quotes were for design and production costs. We wondered if Frank Lee’s comment in “Is Desktop Publishing Worth It?” that “some desktop publishers would earn more money mowing lawns” might not also be applicable to some of the designers who were quoted.

Mark U. Beale
Portland, Maine

Design costs vary widely and the rates quoted in the article were solicited from graphic designers. Electronic publishing

(continues)
Letters

sometimes blurs the distinction between tasks, however, and a clarification is in order. Although artists' fees were generally excluded in the comparisons between traditional and desktop costs, in the breakdown for the events calendar, Pittsburgh To Go, the $2530 fee for half-tones included the creation of original Illustrator art. The publisher of the calendar, Novus Graphic Communication, estimates the cost of the art alone at $2000, so desktop publishing actually saved about $800.—Ed.

To the Rescue

Do you know what it feels like to see the message "unrecoverable disk error" on a vital and (of course) unbacked-up Microsoft Word file? Where does the average Mac user go to get help? Your January 1988 article "HELP!" mentioned that Silicon Beach Software in San Diego takes tech-support calls for general Mac problems. Well, on two recent occasions, Silicon Beach was there for me. Ken Jones, among others, answers the phones, reassures the desperate, and is extraordinarily helpful. He even called back to check up on me. I feel Silicon Beach and its wonderful staff deserve public praise and thanks.

Carol Piston
Brooklyn, New York

Upgrade Questions

Our company has been using a seven-module, Mac-based TOPS system for about a year. All seven nodes are registered, but we have never received any communication or verification from TOPS.

Three weeks ago, having found our TOPS Spool to be incompatible with the latest LaserWriter print tool, I requested and subsequently received an upgrade disk. On the third install, I found garbage in the spooler dialog box. A call to TOPS produced the response that the new TOPS Spool is compatible only with TOPS 2.0 or later.

What 2.0? Despite our seven-module registrations, we've never received an upgrade notice. Furthermore, it turned out that the spooler is not compatible. It works just fine if you use the old dialog box button structure and ignore the garbage. You can even prep the LaserWriter by clicking on part of the Central Systems message that appears in place of the TOPS utility in the menu bar. What's going on?

(continues)
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Macworld helps you make the most of your Mac.
Danny Goodman

Age: 30 something.
It's hard to tell on guys with beards.


Hobbies: His idea of a good time is to scan the comprehensive quotes of the great Serbo-Croatian poets while enjoying a good glass of Chenin Blanc, Napa Valley, of course. He prefers non-computer keyboards, like the one on his Bechstein grand piano. A compulsive researcher!

His Page Recognition Software: OmniPage, of course. According to Danny: "In preparing a book, or working on a special project, I need to get at information quickly to avoid disturbing my work flow. With OmniPage, I can scan virtually any font, or font size, in any column format, and easily place it into an existing file. I'm building a library of articles, relevant to my work, on a variety of subjects."

Favorite Quote: From the New York Times:
"OmniPage has the potential to do for scanners what the Lotus 1-2-3 spreadsheet did for the sale of PC's."

Things Disliked Most: "Neil Simon plays done by actors from California and guys who claim to have met with beings from other planets. Most of whom also happen to come from California. No, seriously, what upsets me most is some of the over-promising in this industry, especially when it comes to page recognition software."

Favorite Scan: "I'm working on a library of articles from magazines and professional journals. You might call it the ultimate scan. I want to develop a HyperCard front end, and tie it all back to Focal Point II, which is really the center of my computing universe."

Future of Page Recognition: "I hate to type, that's why I develop HyperCard products that type for themselves. OmniPage helps to eliminate excessive keystrokes. I can relate to that: How else does my publisher expect me to get a book out in a matter of months? Being able to cut and paste between vast libraries of data, extrapolating ideas, is the very essence of page recognition. With OmniPage's versatility we're not just managing pages any longer, but entire blocks of thought. It's a product that delivers on the promise of the future—finally."
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01-12-022

Letters

TOPS is fortunate to have an exceptional product. I may even continue to recommend it to my clients and contacts—with suitable reservations, of course.

R. D. Keith Boddaert
Don Mills, Ontario, Canada

The garbage in the spooler dialog box was tracked down to an incompatibility with versions of Suitcase earlier than 1.3. The problem can be avoided by dragging Suitcase out of the System folder before installing the TOPS Spooler and dragging it back after installation. Future versions of TOPS Spooler will look for early versions of Suitcase. TOPS recommends upgrading to TOPS version 2.0 if users have installed System software 5.0 or higher, and the company will notify its entire user base when version 2.1 is available. (It should have been released by the time you read this.)—Ed.

Two-faced Tip
In Quick Tips (September 1988), there's a tip on how to simplify printing two copies of double-sided output. To achieve the desired result, however, you must put your first stack of assembled pages in the LaserWriter tray facedown, not facedown.

Phil Russell
Waldport, Oregon

Object Logo Praised
I enjoyed your October 1988 issue very much. Macworld is one of the few magazines of which I have a complete collection, and it is pleasant to observe that the quality of the writing has always remained high. I particularly liked the article "Getting Smart" by Dan Shafer, and I was happy to see the inclusion of software by Coral Software. I have used Coral's Object Logo for more than a year and can highly recommend it.

Object Logo is one of the most elegant implementations of object-oriented programming (besides being the most accessible and inexpensive). It's simple to use, offers nearly complete access to the Toolbox, and costs less than $150. In more than 12 months of heavy use, I've never had this program bomb, and have never found a programming task too complex for it to handle adequately. And, the few times I've called Coral to ask about future versions or particular implementation features, I've gotten quick, courteous, and—most important—informed and helpful responses.

(continues)
How an architect, an MBA, and an art director developed instant talent in precision drawing. While Koko developed a mild stomach ache.

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Like we said: go bananas. But do it soon. While we’re still throwing in Canvas 20 DA for free. It’s a special desk accessory version that puts some 80% of these features right under your Apple menu.

And if all this hasn’t convinced you that Canvas 20 is the drawing program you’ve been waiting for, send us $9.95 to receive a fully featured Demo Copy. With which you can finish convincing yourself.

After all, power like this can be very appealing.

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* The Index Program generated a BUY signal for the OEX for execution on 10/07/88, thus 100 OEX puts with a strike price of 255 were purchased on 10/07/88. The profits thru 10/20/88 are approximately $50,000.

Future results may vary.

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Letters

right away without having to wait for a return phone call.

Mark Warrian
Chicago, Illinois

Writing on the Wall

I'm an average, obsessed Macintosh devotee who got a Mac 128K in February 1984. It's been upgraded twice—to a 512K and to 1MB. I use it for writing music scores for films, letter writing, home accounting, BBSs, games, and educational programs.

We've stuck together, my Mac and I, but that doesn't mean that I'm happy with Apple. When Apple wanted $750 for an upgrade to 512K, I opened the computer myself, built a multiplexer circuit, and put in interchangeable sockets and a new chip, for a total cost of $45 and two hours time. I felt my friendship with Apple waning, but I pushed ahead in my holy trek toward the best Mac possible.

When Apple wanted $1100 to upgrade to a Mac Plus, I got it done for $450, SCSI port included. Although disillusioned with Apple, I continued to save my dollars for a Mac II, the ultimate computer. I thought I was close until I looked in the newspaper on September 17, 1988. Prices are up 29 percent when they should, in fact, be going down. My stomach is still doing flip-flops.

There's a lot of grumbling going on these days. Many of my fellow musicians are turning to Atari. Other users are turning to cheaper computers for tasks that the Macintosh should dominate.

Read the writing on the wall, Apple. It is the average folks who elect senators and presidents, and it's the average folks who make or break a computer company.

Michael N. Millard
San Francisco, California

For David Burnell's thoughts on the subject, check out his column in this issue.
—Ed.

Fruitless Logo Change

In your New Products section (October 1988), you ran an announcement for our new ribbon cartridge with a built-in reinker, then called Flying Apple. After sending you the information on the cartridge, I contacted Apple Computer's legal department and asked if they had any objections to our using the logo Flying Apple. They faxed me a reply within two hours saying that they will sue anyone who uses any piece of fruit (continues)
At the risk of seeming grandiloquent in our predilections, we simply see no reason for any Mac owner to settle for abject mediocrity masquerading as sublime perspicacity. Even if it does come from Microsoft.

It's quite simple, really.

All we're saying is that the limited scale spell checkers that come tacked onto today's word processing packages are, in a word, underpowered.

Oh, they work okay as long as everyone's content to use more or less the same words all the time. But then, sameness is not exactly a highly regarded concept amongst Macintosh users.

Thank goodness there's an alternative. A program designed to help you forge ahead into brave new worlds of verbal individuality. With Merriam-Webster at your side.

Spelling Coach Professional: A program applauded regularly over the years, by reviewers and users alike. Many felt Coach's powerful and cleverly interwoven spell checking, dictionary definition and thesaurus functions were unbeatable. Hypertext taken to the final frontier.

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Simply install Spelling Coach Professional as a desk accessory - for smooth use with over 95% of all Mac software including MultiFinder* and HyperCard* - or use it as the ultimate stand-alone batch checker, if you prefer.

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MacKern is a unique and useful utility for anyone involved with word processing or desktop publishing. With MacKern, you can alter the spacing of any pair of letters to any degree that suits you. You can then use that kerned font in most programs that allow kerning without ever having to change it again—unless you want to! MacKern makes your copy crisper, sharper, aesthetically pleasing—and increases readability. If you are at all concerned about the appearance of your final printout, MacKern can help you achieve professional looking results.

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Heck. Even Microsoft believed him enough to include a copy with their popular word processor.

Well.

All we can say is "Sorry, Bill." And "Sorry, Microsoft," too. Apparently even smart guys like you get fooled sometimes.

Because at 100,000 root words — and an utterly humongous 1.4 million combined synonyms, antonyms, related, compared and contrasted offerings — our BigThes weighs in at some 6 2/3 times the vocabulary power of that little program you're using.

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AutoCAD’s extensive set of drawing tools enhances your productivity. Its effectiveness is proven every day by over 175,000 architectural, civil, construction, aerospace, electrical, cartographic, facility, industrial, manufacturing and mechanical design professionals around the world.

AutoCAD has been refined through ten major upgrades. You get menus full of powerful, high-precision drawing and editing commands, numerous drawing entities, and a multitude of easy-to-use features. You can window, zoom, fillet, scale, layer, annotate and associatively dimension, hatch, stretch and scale. And a simple click can undo anything or everything.

AutoCAD on the Macintosh also supports the features that have made Apple the acknowledged leader in user interface design, offering pull-down, tear-off, and pop-up menus, complete support for Multifinder™ and the Mac windowing system, along with file dialog boxes to make access to your drawing files quick and easy. Clipboard support allows the transfer of AutoCAD drawings to a wide variety of Macintosh applications software.

A Better Perspective. AutoCAD is an advanced three-dimensional modeler that helps you solve design challenges on your Mac the way you would with physical prototypes. AutoCAD makes 3-D easy with user-defined construction planes, dynamic viewing and multiple viewports.

You can also model complex surfaces with AutoCAD using sophisticated tools such as tabulated cylinders, surfaces of revolution, ruled surfaces and Coons patches so you can represent surfaces accurately.

For even greater utility, AutoCAD provides entity handles that allow external applications to associate alphanumeric information, such as part numbers and capacity ratings, with graphical elements in the drawing. This associativity is creating an entirely new generation of useful third-party applications software.

A Reflection of You. AutoCAD is an open-architecture system including AutoLISP®, an embedded programming language that lets you program AutoCAD to reflect your way of doing things. Add your own menus to enter your own commands, write macros, develop custom symbols and drawing functions, or program standard procedures for document production and management.

Hundreds of third-party programmers have used AutoLISP to develop entire systems that make AutoCAD perfect for applications ranging from chemical engineering to technical publishing. Many of these programs run on the Mac II and more are on their way.

Maintain Your Standards. AutoCAD is the most extensively used, most broadly supported, widely taught design software in the world. AutoCAD is backed by over 1,400 highly-trained dealers and 150 Authorized Training Centers in 60 countries. We’ll make sure you get what you expect from your CAD investment. That’s what standards are all about.

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Rabbit News

I have been a Macworld subscriber since the premier issue came out in 1984. Indeed, I now receive two subscriptions, one at home and one at the office. That way I can generously loan one, knowing that the other remains safe. In recognition of such loyalty, I hope you will perform a small service for me.

Could you provide an address for Marinell and Robert Harriman, publishers of House Rabbit Journal? Their publication was featured in an article by Joe Matazzoni entitled “A Halftone Handbook” [October 1988]. My pet minilop rabbit, Dave, thought Lillian (with the black ears) was quite attractive. I expect that Dave will be as loyal a subscriber to House Rabbit Journal as I have been to Macworld.

Sandy Nelson
Tucson, Arizona

Macworld received a number of requests for information on the journal. To receive a sample copy and subscription information, write House Rabbit Journal, 1615 Encina Ave., Alameda, CA 94501.—Ed.

Slots, S'il Vous Plait

First of all, I've had a Mac since the Dark Ages back in 1984. The Macintosh is clearly superior to any text-based microcomputer. No doubts here, but the dream machine has yet to come.

A Mac II has been sitting on my desk for a year now and I love it. Still, despite its explosive duo of processors, it is sometimes terribly slow-o-ow, especially when doing operations like moving PixelPaint color pictures on the screen. What if we helped the Mac Toolbox (including QuickDraw) with another microprocessor dedicated to graphics? We have slots—why not use them? I've been watching Commodore's Amiga and its multiprocessing/multi-tasking system. Believe me, the animations are very fast and in color, s'il vous plait.

If Apple really wants to beat the competition, it's already got the solution. The magic letters are S-L-O-T-S.

Carlo Casaccia
Monte Carlo, Monaco

(continues)
Regis McKenna

Age: Old enough to remember the day that Intel Corporation was founded.

Profession: Chairman of Regis McKenna Inc., a major marketing company based in “Silicon Valley.” A general partner in the venture capital firm of Kleiner Perkins Caufield & Byers. Author of the Regis Touch and most recently, Who’s Afraid of Big Blue?*

Hobbies: Enjoys doing extensive research on innovative new technologies. He recently became involved in building and archiving an extensive database, using state-of-the-art page recognition software.

His Page Recognition Software: OmniPage of course. According to Regis: “OmniPage represents one of the most complete page recognition software products; providing incredible flexibility to customize data which can be easily accessed later. All of a sudden the cost of archiving and retrieving data has dropped significantly. The ‘Information Age’ is upon us and we have an exciting new tool.”

Favorite Quote: The New York Times: “OmniPage could be the most significant advance in personal computing this year.”

Things Disliked Most: “Technology that is not easily accessible or powerful enough to serve the needs of people.”

Favorite Scan: “I’m using OmniPage to build an extensive electronic library that pertains to the growth and evolution of technology over the past 25 years. Being able to scan literally any article, regardless of layout or column format, has suddenly made this all possible. It’s eliminated the labor intensive task of data entry. I’ll be able to share this information with employees, customers and colleagues over time. It’s an exciting collection of business case studies for future reference.”

Future of Page Recognition: “OmniPage has provided me with the customizable tool that I need. I can use the Partial Page feature to scan only that text which is relevant to my needs. Having a version that runs in MS-Windows should impress those who are committed to that environment. What we’re seeing here is the emergence of a new product category.”
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Your Mac can do astonishing things with graphics and text. But as you well know, those software applications, 3-D diagrams, and bloated data files are eating up storage megabytes by the bushel. In fact, they're probably dipping into your last MB right now. But there is a solution. The Bernoulli™ never-ending storage solution.

PERFORMANCE. Bernoulli offers high-performance, removable mass storage systems for the Mac. Unlimited primary storage systems with performance that compares to better hard disks (~40msec access time). And if you already have a hard disk, Bernoulli provides infinite extended storage capacity. So you can store and manage your projects on 20MB removable Disk Cartridges easily and inexpensively as you see fit. With increased on-line capacity plus never-ending additional storage at your fingertips.

BACKUP. Bernoulli also provides backup. Working backup that can give you an immediately usable, identical 20MB copy of your original in under 2 minutes. All in all, your Bernoulli system can function as your primary storage device and backup system all in one.

SECURITY. Bernoulli Technology™ is the one data storage technology that's virtually head-crash and disk-contamination free. As for durability, Bernoulli Disk Cartridges withstand over 1000Gs of shock. They're built to survive the trip across town, or across the world. Add to that the physical security Bernoulli provides. With Bernoulli removable Disk Cartridges, you can lock your data in a safe or desk drawer, or take
But while megabyte consumption by pigs has gone hog wild, a simple solution is putting users of our swine friends back in hog heaven. It's called Bernoulli. Bernoulli gives users endless capacity to safely store sows. And the more...

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**CONNECTIVITY.** Finally, there's one more Bernoulli benefit you should consider: Bernoulli Disk Cartridges are transferable between the Macintosh™ and PCs and PS/2s. So you can now exchange files with the IBM® world as much (or as little, for that matter) as you like. Bernoulli provides the missing link. What else would you expect from the number one company in removable mass storage? So roll your megabyte hogs and your other storage problems into one low-cost solution. Bernoulli Boxes for the Mac are available in three models, in 5¼" and 8" form factors. For more information, see your Iomega Authorized Reseller, or call 1-800-832-5511.

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**Letters**

**Full Impact Reprieve**
While I was pleased in general with *Macworld's* December 1988 review of Full Impact 1.0, your evaluation of Full Impact's precision compared to Excel 1.5 was inaccurate. We replicated Lawrence Stevens's test of taking the square root of 100, then squaring the result a large number of times, with the following outcome.

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<th>No. of times</th>
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<td>99.993236</td>
<td>90.01713</td>
</tr>
</tbody>
</table>

Full Impact is necessarily more accurate, since we have used the IEEE 10-byte extended-precision values, while Excel uses 8-byte double-precision values. Thus, to paraphrase Mr. Stevens, if you're using the spreadsheet in precision-oriented scientific or engineering applications, you might consider that in my text, Full Impact, not Excel, was more precise by three orders of magnitude.

*Lane W. Freestone*
*Ashton-Tate Macintosh Division*  
*Campbell, California*

We regret that our precision test was faulty. Mr. Freestone's figures are essentially correct.—Ed.

**Covering Your Basics**
Amazing! I paid in excess of $2000 for my Mac Plus, ImageWriter II, and a disk drive; and Apple did not see fit to include a set of dust covers. Buy a $9.95 calculator and a plastic dust cover is included.

My solution—a Radio Shack plastic bag for the Macintosh Plus, a "People Crackers" dog food cardboard box for the keyboard, and a used typewriter cover for the ImageWriter II.

*Tom Schmitt*
*Alexandria, Minnesota*

And disks can be carried and mailed in the flat tin boxes in which some cigars are packaged.—Ed.

**Required Reading**
J. E. Arceliana's October 1988 article, "Is Desktop Publishing Worth It?" was the best discussion I have seen on the value of desktop publishing. The author, by using examples of actual publications, has clearly illustrated the costs involved in undertaking the various composing chores that generate publications. The article should be required reading for everyone who is considering DTP.

*William H. Eccles*
*Columbia, South Carolina*

**True Value of DTP**
I enjoyed your article on desktop publishing (October 1988). However, the writer failed to explain the true value of desktop publishing.

The Albany Medical Center's annual report, which was previously produced by traditional methods, was desktop published this year. It was produced in less time, with more control over its production, and at nearly one-third the cost. The publication maintained its quality and recently received two national awards.

The true worth of desktop publishing (continues)
Step a Generation Ahead
Powerful new Macintosh™ software needs a new generation of hardware. Advanced graphics and engineering software now has the potential to make your Mac II or Mac IIx perform like a high-end workstation costing $25,000 or more. But software alone won’t get you the workstation you need — the DayStar™ 33/030 Accelerator II™ will upgrade your Mac II/IIx hardware into a powerhouse workstation, and at a fraction of the cost.

Take Your Mac Past Its Limits
Complex illustrating, drawing and CAD layout is no longer a drag, click and wait. With the DayStar 33/030 Accelerator II you can increase your Mac II/IIx speed from 16 MHz to a blazing fast 33 MHz.

A state-of-the-art 33 MHz 68030 processor adds the power that lets you fly — everything runs at well over twice the speed, and up to four times faster than your standard Mac II/IIx. Kick in the afterburner with the optional 33 MHz 68882 math coprocessor, or use your existing 16 MHz 68881.

Plug In and Take Off
Installation is easy, just like installing SIMMs. Simply unplug the 68020 processor and plug the 33/030 Accelerator II right in. Don’t change your SIMMs because the 33/030 runs at full speed with the memory that you have. It’s fully compatible with all standard Mac II/IIx software, including A/UX™

Now shipping! Call our toll-free hotline today to receive the name of the nearest DayStar dealer.

1-800-962-2077
Novell presents a net even the pickiest

Macintosh owners have a reputation for being fanatical about their Macs. And rightfully so, when you consider the elegance of the Macintosh user interface.

So when Novell set out to network the Macintosh with PCs, it was with one clear caveat: preserve the Mac environment. Create network software that would feel right to the pickiest of all Macintosh users. And none are pickier than the ones at Apple.

**Full AppleTalk compatibility.** Working directly with Apple, Novell's programmers created a version of NetWare® that is compatible with the AppleTalk Filing Protocol (AFP). It's an achievement hailed by Apple President and CEO John Sculley as “a very significant event for the industry.” And it means that Mac users can now get all the power and flexibility of the number one local area network in the world, without sacrificing any Macintosh functionality.

AFP compatibility also means that NetWare for Macintosh will be fully compatible with future Macintosh hardware and operating system versions. So you can take advantage of new Macintosh product releases as soon as they become available.

**Freedom to choose.** NetWare for Macintosh lets you connect Macs with a
work made to satisfy Macintosh user.

myriad of PC, minicomputer and mainframe environments, including OS/2. So you can choose the workstation environment that best suits your needs while communicating easily between dissimilar operating systems and sharing files and peripherals.

You get all the performance, security, fault tolerance and functionality of NetWare without changing the way you work with your Macintosh. And you get the power to transparently connect to over two million NetWare users worldwide.

To satisfy your need for a powerful Macintosh network, plug into NetWare—the network that passed the ultimate Mac test drive. See your Gold Novell Authorized Reseller, or call 1-800-LANKIND.

For more information, call from your modem 1-800-444-4472 (8 bit, no parity, 1 stop bit) and enter the access code NVMC17.

For network solutions, you should be seeing red.
Letters

is found not in the somewhat slight savings of having an outside firm produce your publication. It is found in bringing the equipment and expertise in-house.

Richard A. Puff
Albany, New York

Printer Alternatives

I was very disappointed with "Printer Tools" in the November issue. I found the article heavily biased in favor of Apple's overpriced ImageWriters. When I purchased a printer for my home Mac system, I bought a Seiko SP-1000AP. It has a nine-pin printhead, as do the ImageWriters, and its print quality is better defined, with a more sharply chiseled quality. And it came with a warranty far superior to that offered by Apple.

At $299, my Epson-Seikosha was almost $200 cheaper than the best price I could find for the ImageWriter. It requires no special hookup, no special codes, and, in the year I have used it, it has never failed to accurately translate the code sent by my Mac Plus. The Seikosha is somewhat slower than the ImageWriter II, but with SuperSpool, I can continue to use my computer while it is printing.

You do your readers a disservice in not acknowledging this inexpensive, quality alternative to the ImageWriter.

Robert Greenstreet
Ada, Oklahoma

Orphan Scanners

Our office purchased the LoDown scanner in 1987 after we read about it in your magazine. Now that the company is out of business, we're faced with the frustrating problem of where to turn for upgrades to the very buggy software. Do you know of any other software that might work with our scanner (a Canon IX-12)?

Duane Wright
Seattle, Washington

MacScan Plus by New Image Technologies will solve your problem. Its interface/software package generally retails for $648, but as a special offer to LoDown scanner owners, the package is available for $500. The address is 9701 Philadelphia Ct., Lanham, MD 20706; 301/731-2000.—Ed.

Above and Beyond

A company that goes above and beyond deserves recognition. I would like to let
Never before has this level of Reliability and Durability been available in floppy disks. Introducing the new RD Series from Maxell. Twice the durability of the disks you're now using. Twice the resistance to dust and dirt. And the RD Series is ten times more reliable than conventional floppy disks. The Gold Standard has always meant maximum safety for your data. Now it means even more.
Solve Mac problems like an expert!

"1st Aid Kit" falls into that special category of "must-have" products (MACazine, April '87). It lets you handle every Mac problem from copying files, printing, and using AppleTalk networks, to recovering lost data from deleted or damaged files and unreadable disks.

The definitive product for troubleshooting on the Macintosh (MACworld, April '87). It stands head and shoulders above any other product like it. I can't recommend 1st Aid Kit strongly enough (MACazine, April '87).

We all know backups are necessary. Without them, you're pretty much hoping that your hard disk will never, ever crash.

But let's face it. Backups are not exactly fun. It's probably your 145th favorite chore, somewhere between regrouting the tile and dropping a bowling ball on your foot.

Which explains why our Redux backup program has become so popular these days. It's easy-to-use, flexible, and fast.
"Thanks for the memory."

Dean Gjivovich, Associate Director, Computer Systems
BBDO New York

Dean Gjivovich buys Macintosh memory modules for one of the world’s leading advertising agencies. And he buys a lot.

So who does he call? Who else, but the nation’s leading supplier of Macintosh memory — Microtech!

In fact, we supply SIMMs to hundreds of memory-hungry companies across the country and throughout the world. From Westinghouse and WordPerfect, to General Electric and the U.S. Department of Energy.

They know we’re ready to ship today — in quantity — straight from our inventory of 2 to 8 MB* SIMM kits for the Macintosh Plus, SE, and II.

We test, retest, then torture test each component we use. Once a Microtech SIMM leaves the factory, it never comes back.

Best of all, we price our SIMMs aggressively. As only the biggest independent suppliers of Macintosh memory components can. Which means you get the best price possible, every time.

So if you need memory for your Macintosh — and you need it now — do what more and more companies are doing every day. Call Microtech, where there’s no memory shortage at all.

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(203-488-7744 in CT)

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*8MB kits for Mac II only. Prices and availability subject to change without notice.

Circle 243 on reader service card
That’s what a recent nVIEW customer said upon seeing his Mac II screen projected on the wall at its full resolution and with true Grey-Scale color representation.

"It’s unbelievable!"

nVIEW introduced the world to LCD projection displays with the original PC-Magazine Editor’s Choice ViewFrame.

nVIEW has pushed the technology to its current peak with the ViewFrame II+2:

- Universal Compatibility for long term value:
  - Mac II, SE and Plus
  - PS/2 (VGA, EGA, CGA)
  - IBM-PC (VGA, EGA, CGA)
  - All cables provided
- Black on white characters and 20:1 contrast for crispness and clarity
- True Grey-Scale color representation for a life-like image
- 640x480 pixel resolution for superior graphics
- Active cooling system for fade-free presentations
Peel this Apple and get Macintosh performance without the Macintosh price.

On the surface, this Apple® appears to be a flawless, shiny Lisa™. But get under its skin and you'll discover Macintosh® Plus capabilities in all their glory. There's just one way this Apple doesn't measure up to a Macintosh. At $995*, the Lisa falls impressively short of a Macintosh price tag.

Meet the New Lisa with MacWorks™ Plus

We thought it looked like a perfect match: the highly efficient Lisa and the myriad of Macintosh software solutions. On the one hand, there was the Lisa, a professional business computer with an extra-large 12" screen, Macintosh graphic interface, familiar mouse, easy-to-reach internal components, space for an internal hard disk drive, three expansion slots, and a numeric keypad on the keyboard. Then there was the popularity of the Macintosh Plus, with its amazing capabilities, functionality and software applications.

What we did to bring the two together was develop a software program called MacWorks Plus. MacWorks Plus brings Macintosh functionality to the Lisa, plus compatibility with every application that runs on the Macintosh Plus. With MacWorks Plus, the Lisa can run HyperCard, MultiFinder, AppleShare, WordPerfect, Adobe Illustrator and Cricket Draw. (To name a few.)

How We Support Lisa and MacWorks Plus

We do a lot more than market the Lisa and MacWorks Plus. We offer a complete line of out-of-production, new and used Apple compatible products. And we are the only company authorized by Apple Computer Inc. to sell and service their out-of-production equipment. Because of this, we have invested sizeable resources in developing improvements for all of the out-of-production and reconditioned products we sell. Plus, every product that comes from us must pass rigorous Apple quality control tests. We also back our products with a 30- to 90-day money-back guarantee.

Call 1-800-821-3221 for your Apple Lisa

If you like the capabilities and compatibility of Macintosh, but don't like the price, pick the Lisa with MacWorks Plus. To order a Lisa, or get a copy of our product catalog, call 1-800-821-3221 and we'll send your order out today. All major credit cards accepted.
Stop the presses.

DirectPrint™ is here: $3495*

You have to see it to believe it.
Fast, efficient, and crystal clear. The DirectPrint non-impact page printer uses liquid crystal shutter technology to produce stunning results at an amazingly low price.

Covering both ends of the spectrum, DirectPrint gives you deep velvet blacks on graphic images as well as sharp readable text with clearly visible fine lines.

To stay ahead you have to run faster.
And we do. Depending on the document, our four-MIP RISC processor (backed by 3 megabytes of RAM) averages speeds five times faster than the competition. Without sacrificing precision quality.

DirectPrint is PostScript® compatible, giving you unlimited versatility in creating and manipulating text and graphics.

They do it with mirrors.
We don't.

Electro-photography with a liquid crystal shutter array enables the DirectPrint to produce exceptional resolution at 300 dots per inch.

Since we do not use rotating mirrors and lenses we don't suffer from scanning distortion. You can expect consistent quality from the middle of the page to the edges.

And with fewer mechanical parts than conventional laser printers, the DirectPrint offers greater reliability.

We won't weigh you down.
We wouldn't call it a portable, but at 35 pounds the DirectPrint is light enough to move easily. And with a price of only $3495, chances are your office is exactly where you will want to move it.

Worldwide doorstep delivery is just a phone call away.
It's easy to order a DirectPrint page printer. We welcome your MasterCard, Visa, and American Express. Dial 1-800-347-3228 in the U.S., 415-282-1111 worldwide.

Our knowledgeable sales staff is on duty Monday through Friday from 8am to 6pm (Pacific Standard Time).

Jasmine
The proof is in the printing.

Jasmine Technologies, Inc. 1740 Army Street, San Francisco, CA 94124
Phone: 415-282-1111 Worldwide. 1-800-347-3228 in U.S. Fax: 415-648-1625

*110 volt model only. 220 volt model slightly higher. © 1988 Jasmine Technologies, Inc. DirectPrint is a trademark of Jasmine Technologies. PostScript is a registered trademark of Adobe Systems, Inc.

Circle 102 on reader service card
We've recently seen the classic economic theory of supply and demand work against loyal Macintosh customers, many of whom have championed the Mac at their companies. Demand for Macintoshes, and in particular the Mac II, is at an all-time high. Estimates are that Apple has a $200 million backlog in orders for Macs. So what did Apple executives decide to do about it?

Raise prices and increase their profit margin, that's what. What's wrong with that in our capitalist society? (How much time do you have?)

The fact is Apple has never been-and hopefully will never become—just an ordinary computer manufacturer. Beginning with the Apple II, and continuing with its various Macintoshes, Apple inspired a fanaticism among its followers that's comparable to the fervor one finds at a revival meeting. Even in the normally staid corporate world, the Macintosh has always been more than just a computer—many people would rather be phoneless than Mac-less. It's obviously desirable for Apple to maintain this buyer loyalty and competitive advantage.

By discouraging the development of Macintosh clones and refusing to license its technology, Apple has been in the enviable yet risky position of being the sole supplier of Macintosh technology. Like IBM mainframe customers of old, Apple and Macintosh buyers have been a captive market. Having built their computer systems on a Macintosh base, they are totally dependent on Apple when it comes to upgrading or increasing the number of their desktop workstations. As long as the Mac maintains its edge, with easy-to-use, graphics-based software that can't be duplicated on the IBM platform, Apple can maintain the highest profit margin in the industry. It can demand, and get, more and more of your computing dollars.

It is particularly discouraging to see the 29 percent increase in the price of the basic Mac II, which has been Apple's chief weapon in its assault on the business market. Some people say Apple's move is justified by the escalating cost of RAM chips, but this just doesn't compute, since Apple's record-breaking profit margins continue to rise. Meanwhile, Apple representatives claim that the price hike is not expected to lead to a decrease in demand. Talk about having it both ways. Surely many SE and Plus users who were planning to upgrade to the Mac II will delay their purchases. Doubtless many first-timers who want to come over to the SE are going to have to wait while they save more money for the higher-priced machine. What else can they do?

In the short term, I don't expect that Apple will pay much attention to criticism from any of us about its business policies. Fourth-quarter earnings, announced in late October, were at an all-time high: $107.9 million, up 52 percent from the previous year, and, of course, Apple stock followed suit. You can hardly blame John Sculley and crew if they are feeling a little snug right now. But don't you wonder whether Apple has lost sight of its corporate mission? Has satisfying customers become secondary to ingratiating itself with Wall Street? This may be the age of high stakes and quick-profit investment banking, but I'm convinced that investor gains made at the expense of smaller customers has got to be a short-lived phenomenon.

Even though the Macintosh is unbelievably popular, the market reality is that for every Mac, there are ten DOS-based personal computers. This has to be an incredibly tempting market for Macintosh software developers. It's no wonder many of them are busily porting the most popular Macintosh applications to OS/2. With OS/2 just around the corner, now is the time for Apple to think about expanding its base. Unless this happens, applications that are now being pioneered on the Mac will debut on IBM PS/2s. The Mac will lose its technological edge and Apple will have to find new ways to survive—let alone thrive—in a very hostile competitive market.

Listen up, Apple: customer loyalty can be a fickle thing. You only have to look back to 1982 to see how the IBM PC knocked Apple out of the leadership role. At that time it looked as if Apple was going to have to start producing IBM clones if it wanted to survive.

In the coming months, IBM and its ally Microsoft will mount a serious challenge to the Mac's perceived technological edge by offering software vendors a much larger market. The Mac may suddenly start looking like an expensive secondary machine. Of course, Apple can always reverse itself and start lowering prices, but by then it may have lost the hearts, minds, and pocketbooks of many loyal customers.

Supply and demand may work for ordinary companies, but not for Apple. In the final analysis, we users and buyers are Apple's future. I'd rather trust us than an economic theory any day.
Now you can draw instead of your

SAVING MONEY NEVER LOOKED BETTER.
Killer graphics is one of the reasons you bought your Mac® in the first place, right? And just when you thought the price of a professional quality art package was going through the roof, along comes Drawing Table® from Brøderbund. A professional drawing program with a suggested retail price of only $129.95.

HIGH PERFORMANCE WITHOUT THE HIGH PRICE.
So what could you possibly expect for $129.95? Along with a standard set of Macintosh® drawing tools, you get an extensive collection of clip art libraries. Plus the ability to bind text to curves—a feature unheard of at this price.

WE'RE IN THE IMPORT/EXPORT BUSINESS IN A BIG WAY.
You can import PICT, EPS and Paint files, manipulate the art with Drawing Table and then export the images as PICT files to other programs.

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TypeStyler, a special effects program for font manipulation, is that rare software introduction that is being received with an industry-wide ‘wow’!
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With TypeStyler, you have an unprecedented level of creative power. And you can have it for only $199.95.
on your creativity bank account.

**DRAWING TABLE DOES WHAT NOBODY ELSE CAN DO. ESPECIALLY MacDraw II.**

Because of Drawing Table’s powerful features and powerfully low price, other drawing programs pale by comparison. Especially MacDraw II, which does not include clip art libraries, cannot import EPS files and certainly cannot bind text, but which does cost three times as much!

- Bound text previewed on-screen
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We’ve only begun to tell you about Drawing Table’s exciting features on these pages. Which is why you should visit your nearest Broderbund dealer soon and get the full story for yourself or call 800-527-6263 and order Drawing Table now. It will be well worth your time and your money.

**HOW TO GET A PHD IN DTP.**

DTP Advisor is exactly what the name implies. A guide to desktop publishing. A full time tutor. DTP Advisor teaches how to lay out a page for the best results. How to use type. It even includes a basic tutorial on print and print production techniques, and a glossary of related terms.

DTP Advisor also features a project management system that helps you to focus your work, stay on schedule and get the job done right the first time.

If you’re serious about desktop publishing, this is the best $79.95 you could ever spend.

**BRODERBUND IS MAKING DESKTOP PUBLISHING EASIER TO DO, EASIER TO AFFORD AND EASIER TO BUY.**

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1. Panorama’s drawing package is far superior for creating and revising forms. In fact, no other database even comes close to Panorama’s drawing capabilities. If you’ve ever struggled with FileMaker® to get a form to look just right, you’ll really love the Panorama difference.

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5. Outlines are an indispensable organizational tool you won’t find in any other database. Panorama organizes your data into an outline structure on command, then automatically calculates summaries for each outline level. You can expand the outline to show the detail, or collapse it to see the big picture.

6. Panorama’s built-in charts eliminate the hassle of transferring data to a separate charting program. Each chart is totally integrated with the data, and instantly updates to reflect any change.

7. Panorama’s exclusive Flash Art gallery revolutionizes the way databases handle pictures. Until now, using pictures in a database meant tediously pasting in one picture at a time. Panorama’s Flash Art avoids this time-consuming process by letting you key in pictures by name.

8. Panorama lets you work with both form and spreadsheet views of your data at the same time. Panorama’s row/column spreadsheet view is simple and intuitive to use.

9. Panorama can import your existing FileMaker® data in seconds (over 10,000 records per minute). As an extra bonus, your files will actually shrink by 40 to 90 percent when converted into Panorama. Panorama can also convert data from 4th Dimension®, Double Helix®, Excel®, Works®, and many more—all in seconds.

10. If the first nine reasons sound good, wait till you see how incredibly fast Panorama is. Like its predecessor OverVUE, Panorama establishes a quantum leap in database performance. Panorama out-searches, out-sorts, out-calculates, outperforms, and generally outclasses the competition.

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Circle 451 on reader service card
Throwing the Book at Apple

Yet another author tackles the mythology behind the Mac

This month the Macintosh is five years old. Apple Computer recently celebrated its eleventh birthday as a registered corporation. And yet another book is being released on the story of Apple.

It is called West of Eden, and its author is New York journalist Frank Rose. It chronicles the company beginning with the introduction of the Lisa computer (early 1983) and ending with the formation of a new company called Next by Apple's co-founder and former chairman, Steve Jobs (late 1985). Rose writes in classic new-journalism style—the subtitle is “The End of Innocence at Apple Computer,” but he could have alternatively used “Bonfire of the Techies.” He gives us the most thorough account we will probably ever have of those days of making Macintoshes and fighting battles in boardrooms. In fact, corporate infighting winds up in center ring here, as it did in John Sculley's Odyssey: Pepsi to Apple (Harper and Row, 1987) and the spotlight zeros in on the soured love affair between Jobs and Sculley—referred to by Apple insiders, we learn, as “the Steve and John Show.”

Obviously the result of painstaking research, West of Eden takes us to the corporate retreats, strategy sessions, and boardroom confrontations that decide the company's fate. The author's main interest is not really in computers. (Rose himself uses an Epson, which in the eyes of some disqualifies him from addressing this subject.) Instead he has written a bildungsroman. The protagonist is Apple itself, which he considers a "brilliant experiment...a technological manifestation of the sixties sensibility." The key evidence of this was Macintosh, the first computer that truly did its own thing. Rose suggests that the Mac team went too close to the edge. This is reflected by a scene in which a marketing person tells the computer's designers that Apple has a challenge ahead of it in selling the Mac. Everybody jumps on this poor fish: What do you mean? they retort. All we have to do is make them and everybody will want to buy them!

In Rose's view the Apple "experiment" failed: the quixotic attempt to merge the iconoclastic views of the sixties into a corporate atmosphere was just too much to pull off. Now Apple is less a symbol of irreverence and more a traditional, bottom-line business. "The reasons are related to a complex interaction," Rose says. "Steve's faults, the marketplace, John's faults...also, the Reagan years were a bad time to be preaching revolution of any sort." But Rose qualifies his judgment by saying that although the Apple of old has now "grown up" to be a mature company (and a wildly successful one), it still retains much of its previous luster.

Hit or Myth

West of Eden (Viking, 1989) is only the latest addition to a groaning Apple bookshelf. Other bulwarks include The Little Kingdom: The Private Story of Apple Computer (Morrow, 1984), by Michael Mor-
At last a full scale software package that can put you in control of your schedule and help you manage your time more effectively. Yes, Rendezvous is a PERSONAL TIME MANAGEMENT TOOL with all the features you need for now and always. You never need to order another refill for your diary or calendar. Complete with executive binder for $200. Plus $5 shipping.

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Circle 395 on reader service card

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POWER CONTROL REACHES A NEW HIGH.
Microvision introduces Powerbase, a combination of products from Kensington designed to elevate your Mac for more comfortable viewing while combining state-of-the-art surge protection.

The Powerbase is a must for any dedicated Macintosh, Macintosh Plus, or Macintosh SE owner at only $129.95. To place an order or for a free brochure, call today. 1-800-882-9199.

Circle 388 on reader service card

(continues)
WHEN APPLE AND DIGITAL WANTED TO TALK, THEY CAME TO US.

For good reason.

Because we make it simple for Apple Macintosh and Digital VAX systems to join the same network.

And open the lines of communications.

For instance, we utilize AppleTalk for VMS, the sole published standard platform for networking on the VAX. We're also the one company that offers complete solutions.

Such as AlisaTalk, which puts AppleTalk on the VAX. And includes AlisaShare, the only 100% AppleShare, VAX/VMS based, full-function file server.

TSSnet, a package for the Mac that lets it communicate over DECnet networks as a Phase IV end node.

And Sequelink, which allows Macs access to Digital system host SQL databases.

We can also hook you up with Kinetics FastPath, EtherPort II, EtherPort SE, EtherSC, and everything in between.

So when you want the right Mac-VAX connections, call or write to Alisa Systems. The talk of the computer industry.
Economy. Mirror's great looks in a zero-footprint design that brings mass storage within anyone's budget, yet includes - free of charge - all Mirror hard drives - Mirror's hard drive value package. And with Mirror Technologies' return policy and one-year warranty, you can't go wrong.

Our most popular drive. Enough storage for most personal applications at manufacturer-direct prices. Preformatted and easy to use - just plug in and play! Super reliable, and with all the extras at factory-direct prices. Includes Mirror Technologies' hard drive value package.

We set the standards for low-cost removable storage. This little drive packs 8 Mb (800K) of data on each 3½ disk! Mac World says of our RM.8, "So quiet it would be unobtrusive anywhere except a library on a Friday night." Try it for 30 days, and if you don't like it, we'll take it back. You won't find a similar brand-name product for less!

Quality is always a better value. Especially if it costs less.

Lost data can put you out of business. That's why Mirror Technologies uses only the best. And why we build in those extras that mean greater data security. When integrated with rugged power supplies and whisper-quiet cooling systems in our steel chassis, you can double-click "Save" with confidence.
You won't find a brand-name 60 Mb drive for less. And you still get Min'O/s EMI/RFI pl'Otection, heavy-duty power supply, AC convenience outlet, whisper-quiet cooling fan, rear-panel SCSI address, and other standard Mirror features. Compare. Then give us a call!

Includes Mirror Technologies' hard drive value package.

VisionScan 200
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Vision Scan 300
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---

Steven Levy

son, you identified with Burrell Smith and Andy Hertzfeld, hackers who wanted a computer to express their wishes. If you were a money-oriented capitalist, Apple appealed to you, too. The company managed to combine the goals and aspirations of the sixties with the [materialistic] desires of the late seventies and the eighties. Along with those powerful social currents, there were the two faces you could identify with—the two Steves, Jobs and Wozniak.”

**Not an Easy Jobs**

Writing about an institution, even one as exciting as Apple, can be terribly dry. When a writer is presented with a charismatic figure whose life parallels in some way the arc of the company's history, he or she clamps on like a pit bull. Especially such a weird guy as Steve Jobs. He seems to have gone through life leaving behind oodles of bizarre details, like Hansel and Gretel strewing crumbs in their wake. Mike Moritz in *The Little Kingdom* was the first to accumulate a bagful of those morsels. So we learned that when Steve got tense, he would often head to the men's room, stick his bare feet into the toilet bowl, and flush: instant foot massage. And then there was the time that Jobs, in his hippie years, became convinced that ingesting carrots was the way to holistic nirvana; as a result, the skin of the future multi-millionaire turned orange.

It's almost as if some sirensong kicks in when writers encounter Jobs: *Write about me... write about me.* Jeffrey Young, for instance, couldn't resist. He told me that originally his unauthorized Jobs biography was to be a chronicle of the Macintosh. But when he finished a draft, he found his work flat. Then he realized that the most interesting parts were the ones about—guess who. And so, while retaining much of the Macintosh material (which stands as the strongest part of his book), he shifted the focus, from the Mac to its maker.

It would have to be an unauthorized biography, to be sure. Jobs was not ready to give his imprimatur to anyone, particularly Young (who boasts of having a "unique position as ringside observer to the development of Macintosh"—a half-truth at best). It is a recurring Silicon Valley—and publisher's row—guessing game as to what Steve himself will do in the book business. Will it be a Sculley-style autobiography, a semifictional account by a big-name au-
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Circle 457 on reader service card
Yet we still yearn for Jobs’s voice. What does he think? West of Eden doesn’t tell us. Despite Rose’s terrific reporting, his book doesn’t really get inside Jobs’s head. (This isn’t the author’s fault—though Rose says he had one interview with Jobs, the cooperation ended soon afterward.)

But then again, we don’t really need Steve Jobs to plumb the depths of the Apple myth. The story speaks for itself. The company’s history, like its computers, is a springboard to dreams. To change the world, make millions of dollars, get famous, and have the greatest T-shirt collection in the annals of mankind—this is at the heart of human endeavor!

The texture thickens with each retelling. At some point, I imagine, we’ll say “enough” and refuse to listen to another word of the oft-told tales that begin with Steve and Steve pawning car and calculator to finance a run of Apple I’s. By then our eyes will glaze over at hearing once more how close Apple came to not running its famous 1984 commercial.

But we’re not at that point yet, so West of Eden is well worth a read.

If I may, I’d like to congratulate Apple Computer on the Macintosh’s fifth anniversary. Working with, playing on, and writing about the Mac have given me immeasurable pleasure...and have literally provided my living. In another section of this magazine I quote one of the Macintosh designers, Andy Hertzfeld, in a moment of reflection (see “Glory Days”). He wondered what the world would have been like without the Macintosh and, pessimistic for a moment, says that maybe the world would have produced it a year later. I don’t think so—the Mac pushed us much further, faster, than we would have gone without it. It was the boldness and ingenuity of a gutsy company that released the Macintosh in 1984, raising the stakes for what was to be considered an acceptable computer.

Five years from now, another computer may be the one that raises that standard further—but no matter how great that new machine is, I don’t think we’ll ever get the same thrill we got from the Mac. To everyone who conceived it, designed it, got it out the door, revived it in the marketplace, produced its successors, and generally made it great (but not to those who raised its price recently)—thanks. ☰
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<tr>
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<td>ReadySetShow</td>
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<td>Solutions</td>
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<td>Springboard</td>
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<td>Target Scoop</td>
<td>SPECIAL 189</td>
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### NETWORKING PRODUCTS

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<td>Parallon Timbuktu 2.0.1</td>
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<td>TOPS TOPS 2.0</td>
<td>Call.</td>
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<td>Fonts</td>
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<td>Olduvai</td>
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<td>Postcraft Laser FX</td>
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### GRAPHICS

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<td>Graphsoft MiniCAD 4.0</td>
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<td>MiniCAD Plus</td>
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<td>Innovative Data</td>
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<td>Dreams</td>
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### Statistical Analysis

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<tr>
<td>Abacus Concepts StatView II (mac, II, or Plus/SE w/68881 co-processor)</td>
<td>$369.</td>
</tr>
<tr>
<td>StatView SE+Graphics</td>
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<tr>
<td>BrainPower StatView 512+ (requires 512k)</td>
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<tr>
<td>D2 Software MacSpin 2.0</td>
<td>$189.</td>
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<tr>
<td>Odesta Data Desk Professional</td>
<td>$289.</td>
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<tr>
<td>Select Micro Systems, Inc.</td>
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<tr>
<td>Exstaxit Software for Recognition Technology MacEdge</td>
<td>$24.</td>
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CODE 301
Insights on HyperCard Animation

Liven any stack with simple but striking graphic effects

by Ronald Wartow

Recently, I used HyperTalk to program a fantasy adventure game that had scores of visual tricks. At first, all I could script were a few catchy effects with the visual effect and flash commands. But I wanted swords appearing and vanishing, game characters roaming a dynamic countryside, and wizards hurling lightning bolts. To my surprise, I found it easy to create concise scripts tapping HyperCard's powerful graphics and animation capabilities.

Startling visuals can enhance even serious stacks. Best of all, creating them requires no graphics or animation talent, only imagination and a casual familiarity with HyperCard and HyperTalk.

All of HyperCard's a Stage

The theater is a useful metaphor for helping HyperTalk shed its imposing veneer. In this theater, each card within a stack is a stage containing close-up and distant scenery, with 512 tiny steps (pixels) from stage left to stage right and 342 tiny steps from the fly loft to the proscenium. The card's buttons and fields are actors, and the HyperTalk scripts are stage directions expressed in plain English.

You direct a play by showing, hiding, altering, and moving HyperCard's thespians. Scripts are logically triggered by familiar events, like mouse clicks. The actors make their entrance when you include show [field or button] in a HyperTalk script; conversely, they disappear from the stage when you use hide [field or button]. It's equally simple to script time delays. Wait 60 [ticks] means delay 1 second between actions (a tick is equal to ⅓0 second). (Or, less grammatically, you can say wait 1 seconds.) Domenu followed by a HyperCard menu command (for example, select all) activates that command as if you had selected it with the mouse.

While scripting visuals requires exact HyperTalk syntax, the language fortunately recognizes synonyms and abbreviations (Version 1.2 Release Notes has a complete list of these). More important, the syntax is generally recognizable as standard Macintosh lingo (see "Taking Command of HyperTalk"). HyperCard's HyperTalk Help Stack lists the commands you'll need to become a sophisticated playwright. But to dabble in the drama of visual effects, simply follow the scripts below.

Ronald Wartow is an attorney who left his Washington, D.C., law practice to develop entertainment software for the Macintosh.

(continues)
How To/Insights

Taking Command of HyperTalk

HyperCard's Help Stack (top) and Version 1.2 Release Notes contain easy-to-follow information about HyperTalk. And the stacks bundled with HyperCard offer a wealth of scripts to explore.

Billboards and Ticker Tapes

Nothing attracts attention more than surprise movement in a stack. Let's simulate a moving billboard bearing an important message. Start by opening HyperCard 1.21, going to the User Preferences Card, and selecting Scripting under User Level. Create a new stack. Select New Field under the Objects menu and create a visible field. Select the browse tool under the Tools menu, click on the field, then type: There's no business like show business!

Now use the Objects menu to create a new button and drag it to the bottom of the screen. You can double-click on the resulting button to fetch the button info box, then click on Script to pull down the script box. Or use this shortcut: press Shift-Option and click on the button to go directly to the script box. Insert the following (without my parenthetical comments) between on mouseUp and end mouseUp in the script box:

```hypercard
show card field 1 at 75,171
```

(The field appears in the left center of the screen. The numbers 75,171 represent the location of the card field. Locations are points measured in pixels from the top-left corner of the card window. The first number is the horizontal coordinate; the second, the vertical one.)

repeat 10

put the location of card field 1 into it

(HyperCard puts field location into memory.)

add 30 to item 1 of it

(HyperCard adds 30 pixels to the horizontal coordinate of the field location.)

show card field 1 at it

(Field jumps 30 pixels to the right.)

end repeat

(The field stops at 375,171; right center of card.)

Press the tab key to make sure the script is aligned properly. Click on Okay, hit Shift-Tab to choose the browse tool, and press the new button. The field dances across the screen from left to right. (Now that we've walked through setting up an effect once, I'll use a bit of shorthand. The instruction script/click means that you should insert the script that follows in a button script box between on mouseUp and end mouseUp, click on Okay, choose the browse tool, then press the button for action.)

By cutting and pasting the script, you can alter or add desired variables, like the number of jumps or where the field begins its journey. Substitute 261,20 for 75,171 and substitute: add 30 to item 2 of it for add 30 to item 1 of it, and the field appears at the top center and takes 10 jumps down to the bottom center of the card. If you insert hide card field 1 and wait 60 before end repeat, the field disappears for a second after each jump. You must add show card field 1 after end repeat to make the card field reappear.

You can create a new card, button, and field for new scripts or simply delete the original script and experiment with one card. To paint a message on the screen in MacPaint, choose the text tool; set the font, style, and alignment; click at the desired insertion point; and type. HyperTalk commands easily automate the process. Script/click:

choose text tool
set textfont to venice (or any font you prefer)
set textsize to 14
set textstyle to bold
set textalign to left
(Font set to Venice 14 bold, text typed left to right.)

click at 75,271

(type "The rehearsal will break for 8 minutes." damenu revert
choose browse tool
(continues)
"Daddy says he owes his success to who he met in college, who he met in business and to Mommy who told him to save his information on Sony data cartridges."

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How To/Insights
The message scrolls from left to right at the bottom of the screen after you press the button. If you make domenu revert and choose browse tool the last two lines of scripts that use paint tools, the graphics will reset to a pre-mouse-click state after each script executes.

Using the same idea, but in a text field, let's imagine a bull market for high-tech stocks. Script/click

```
select line 1 of card field 1
type "APPLE 38.5 DEC 91 IBM 119.5"
wait 120
select line 1 of card field 1
type "APPLE 80 DEC 170 IBM 150"
wait 120
select line 1 of card field 1
type "MARKET TOPS 3000"
```

These three examples demonstrate not only the ease of effective visual scripting, but also the substantial control a scripter has over what appears on the screen.

Buttons and Fields
Rather than manually selecting one icon for a button, you can script a selection by using the number assigned to each icon. (You'll need to double the height of the button so the largest icon fits.) Script/click

```
repeat 5
set the icon of card button 1 to 6179
set the icon of card button 1 to 32650
set the icon of card button 1 to 29484
set the icon of card button 1 to 19162
end repeat
```

This displays four different hand icons in order from smallest to largest, an effective animated attention-getter.

Not all scripts have to be utilitarian. To playfully frustrate browsers, you can create a "run away" button that leaves home.

Script/click

```
show card button 1 at the clickH, the clickV + 70
```

(The button jumps down the card 70 pixels when it is pressed. Be careful—depending on where the button is placed, it may leap off the card.)

My fantasy game required lots of small graphics, but I'm no artist. Instead, I used graphics fonts; since fields hold text and graphics, HyperCard considers font charac-

(continues)
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How To/Insights

Using the lock and unlock screen commands causes HyperCard 1.2's visual effects to operate on fields and buttons. Please note that if you're using a Mac II, visual effects such as barn door, dissolve, wipe, and so on, won't work unless you set the monitor characteristics in the Control Panel to Black & White/Grays, and you set the number of Colors to 2.

For some nifty scripting footwork, script/click

repeat 5
set textsize of card field 1 to cairor
(or any graphic font)
set text of card field 1 to "cairo"
put "z" after character 6 of line 1 of card field 1
put "n" after character 13 of line 1 of card field 1
put "o" after character 4 of line 2 of card field 1
put "m" after character 15 of line 2 of card field 1
end repeat

With a few easily scriptable enhancements, you could make a card look like the Golden Gate Bridge at rush hour. For a little spice, heighten or widen the field by inserting anywhere in the above script:

set height of card field 1 to 120
and/or
set width of card field 1 to 250.

Hiding and showing fields and buttons is another simple way to create flashy visuals. Script/click

put "Hide and Seek" into card field 1
hide card field 1
lock screen
show card field 1
unlock screen with barn door open very slow
(or any visual command)

More Show and Tell

Let's display some dazzling animation combined with HyperCard's visual effects. Dazzling doesn't mean complicated, so long as you view the script as a mirror of what you would do manually. Place one graphic on a new card and another on the card's background by using the Import Paint command (or use HyperCard's paint tools to create the graphics). Script/click

hide card picture
hide background picture
wait 60
lock screen
show background picture
unlock screen with dissolve slow
wait 60
lock screen
hide background picture
show card picture
unlock screen with checkerboard!

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(continues)

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How To/Insights

graphic. Notice that the script is short and
logical, despite its visual impact.
Want to see your name up in lights? To
create a marquee effect, you can repeat-
edly execute the Trace Edges command
around a card. Use the text tool to type
your name on the card, then script/click
choose select tool
domenu select all
repeat 10
domenu trace edges
end repeat
domenu revert
choose browse tool
Try substituting other Paint Menu
goodies for Trace Edges or combine sev-
eral commands in the same script. Incorporate fresh card and background graphics
to experiment (see "Experimentation
Pays Off").

Experimentation Pays Off
You can build on simple scripts to create a vari-
y of graphics. You can use HyperTalk com-
mands to select a graphic, flip it (with the Flip
Horizontal command), and add a catchy line of
text at the press of a button.

Dissolve and Conquer
Do you find HyperTalk's slowest dis-
solve too fast? For an agonizingly slow
dissolve that will practically erase a card
(continues)
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How To/Insights

graph, script/click
choose select tool
domenu select all
repeat 50
domenu lighten (or domenu darken)
end repeat
domenu revert
choose browse tool

Drawing an oval (or a rectangle or a polygon) filled with a pattern should be second nature to you. Dragging the mouse from point A to point B on the Macintosh screen is also familiar action easily scripted. To automate both processes, script/click
choose oval tool
set filled to true
set pattern to 12

(Sets pattern to black.)
drag from 150,150 to 325,350
domenu revert
choose browse tool

You can even simulate a fast or slow drag by setting the dragspeed. Adding set dragspeed to 300 before the drag line slows down the action (300 is the number of pixels per second).

The Roar of the Greasepaint
It's fairly simple to dissect a graphic, make its parts float around the screen, and then reassemble it (see "Dark Shadows"). Create a menacing presence (could it be the Phantom of the Opera?) by script/clicking

hide card field 1
choose oval tool
set linesize to 4
set centered to true
set dragspeed to 60
set multiple to true
(Draws multiple ovals.)
set multispace to 1
(Sets spacing between ovals.)
set filled to false
drag from 261,171 to 520,520
(Black shadow looms closer.)
domenu select all
repeat 2

domenu flip horizontal
domenu flip vertical
end repeat

(creates a swirl effect.)
put "Sorry, all seats sold out," into card field 1
show card field 1
domenu revert
choose browse tool

Remember the movie jaws? Add sound to your animation to recreate the vil-

(continues)
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How To/Insights

Dark Shadows
Animated shadows and swirls are easy to create with simple HyperTalk scripts.

lain of the sea. Script/click
choose regular polygon tool
set polysides to 3
(Draws a fin.)
set pattern to random of 40
(The triangle fills with one of the 40 paint patterns picked at random.)
set filled to true
drag from 362,220 to 362,270
choose select tool
drag from 306,265 to 420,342
(Marquee selects the fin.)
domenu copy picture
set dragspeed to 200
play doing tempo 250 “cecececece”
(A little travelin’ music.)
drag from 378,213 to 100,213 with →
commandkey,optionkey
(The fin moves from bottom right of screen
to bottom left of screen, making multiple images of itself.)
domenu select all
domenu cut picture
domenu revert
choose browse tool
For a more menacing shark effect, set the pattern to 12 for solid black.

Future Productions
You can rewrite any of the above scripts by adding layers of variables. You can also set and reset the object properties, move objects around, and alter objects. You have a free hand in scripting your own HyperCard productions. But don’t let your thespians overact or stay on stage too long. A light touch with animation will win a standing ovation from your browsers on opening night.

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Colony's mysteries. Where are the human inhabitants of this once thriving settlement?

Marshall in the intergalactic forces, you must unravel The

What is the meaning of the strange prism-shaped pods?

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What is the origin of the endless army of hostile aliens that you must blow away with Power Armor technology?

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Quick Tips

Answers to your questions

by Lon Poole

As the Macintosh systematically becomes more complex, it seems that even the most general tips don't work with all applications. Take the advice that appeared in Quick Tips (September 1988) about typing the $key symbol, the Apple logo, and other hidden characters. On a Mac SE or Mac II using the Chicago font, you can press Control-Q for $, Control-R for :, Control-S for ¢, and Control-T for ©. Such a simple idea should work everywhere. But those keystrokes do nothing in MacWrite, reports Willis G. McMillan of Madison, Wisconsin. George E. Measel of Umatilla, Florida, also had poor luck. My subsequent investigation shows that the keystrokes do work with the majority of applications; notable exceptions include MacWrite, HyperCard, Cricket Draw, and MacCalc.

Mac 512K-Almost-E

Technically, you need at least a Mac 512K to start directly from a hard disk. But if you've ever had your Mac 512K's logic board replaced, you probably have the part of the 512KE that you need to start up from a hard disk. Jim Cobb of Virginia Beach, Virginia, says Apple puts the enhanced 128K ROM on the 512K logic boards it supplies for service swaps.

Tape Backup Benefits

Explain to me please why it is preferable to have a tape system as a backup instead of a second hard disk. It seems to me that with a two-hard-disk configuration, should something happen to drive 1, you could be up and running in a matter of minutes on drive 2. You can't do this with tape. Price is not a deciding factor, since tape drives and hard disks cost about the same.

Harrison L. Bowers
Abingdon, Maryland

A

One tape drive can back up any number of hard disks. Tape also allows you to make multiple backups. Should the most recent backup fail at the same time as the hard disk, you can use the next most recent backup. You can also keep a backup at a location away from your Mac in case the whole system is stolen or destroyed. However, many people do back up to a second hard disk for the reasons you cite. Perhaps the best compromise is a removable-media hard disk drive (see "Why Say No to Backup?" November 1988).

Random HyperTalk

Is there a way to get a random number in HyperTalk?

Adam Purcell
Wickliffe, Ohio

A

Use the Random function, as in the following example:

```
put the random of 12 into diceToss
if diceToss is 7 or diceToss is 11
then answer "Craps, you lose!" with "Phooey,"
```

(At this point, I could crassly plug my HyperTalk quick-reference book, HyperTalk, published by Microsoft Press [$5.95 at your bookstore], but I won't.)

A Tall-Adjusted Ruler

On my Mac Plus, the ruler in Microsoft Word is 6 inches wide, but on the Mac Plus in my office, the same ruler is 6½ inches wide. What causes the difference?

How can I get the wider ruler at home?

Ichiro Mori
Berkeley, California

A

I'll bet your Mac Plus at work is connected to a LaserWriter and your Mac Plus at home is connected to an ImageWriter. When you change printers, Word, MacWrite, WriteNow, and most other word processors adjust their formatting rulers according to the resolution, or dot spacing, of the current printer.

To see the 6½-inch ruler on your Mac at home, select the Tall Adjusted option in Word's Print dialog box, click OK, and immediately press $-Period several times to cancel printing. The Tall Adjusted option makes the ImageWriter's spacing match the LaserWriter's. Note that the Tall Adjusted option appears in the Page Setup dialog of most other applications, including version 4 of Microsoft Word (which should be out by the time you read this).

Alternatively, you can copy the LaserWriter driver from the System Folder of your Mac at work to the System Folder of your Mac at home. Then use the Chooser at home to select the LaserWriter, even though you don't have a LaserWriter there. With any application except Word version 3, you must also choose Page Setup (and click on OK) to effect the ruler change.

Quick Color Overhead

Tip: Have you ever needed an overhead transparency in a hurry—and in color? Hewlett-Packard's PaintJet transparency film in an ImageWriter II with a color ribbon produces good results. Although the ink smears a little, it adheres well enough to take fine patterns. Printing a color pie chart using Cricket Graph on a Mac SE took me 1 minute 20 seconds in

(continues)
How To/Quick Tips

Fast quality, 2 minutes 55 seconds in Best quality.

Michael Wilcox
Elkhart, Indiana

Bring Closest or Send Farthest
**Tip:** To send a HyperCard field or button behind all other fields and buttons in the same layer (card or background) and thereby set its number to 1, select the object and press ⌘-Shift+. To bring a field or button to the front of all other fields and buttons in the same layer and thereby assign to it the highest number of all similar objects, select the object and press ⌘-Shift-hyphen. With these shortcuts, you can reorder objects more easily than with the Bring Closer and Send Farther menu commands or their keystroke equivalents.

Claude Dazelor
Mârsûïles, France

Field Name Reminder
**Tip:** When designing a HyperCard stack, it's easy to forget field names or lose track of hidden fields. To refresh your memory, simply choose Print Report from the File menu. The field-selection scroll box lists the names of all fields in the current background. When you're finished reviewing, click on Cancel to abort the Print request.

Robert L. James
Fairport, New York

Broken Keyboard Crutch
**Tip:** If a key on your keyboard breaks, copy the character it types from another place in the document and paste it where you need it. If the character doesn't appear elsewhere, use the Key Caps desk accessory to generate it. In the Key Caps window, click the broken key (with the Shift and Option keys pressed, if necessary) to generate the needed character. Then copy the character from Key Caps and paste it to your document.

Luc Villeneuve
Saint-Gervais, Quebec, Canada

Contribution editor Erfert Fenton suggests using a utility such as MacKeyMelon by Avenue Software to reassign a broken key's characters to another keystroke.

Two Sides in PageMaker
**Tip:** I use PageMaker 3.0 all day and occasionally need double-sided copies. The method discussed in Quick Tips (September 1988) is OK, but I've developed a better method for PageMaker. First you print the even-numbered pages in reverse order, and then on their flip sides you print the odd-numbered pages in normal order. The result is collated correctly.

Choose Page Setup from the File menu and select the Double-Sided and Facing Pages options. On the master pages, set the ruler origin to the top left corner of the left page. Choose Print from the File menu, and select the Reverse Order and Manual Tile options. Click OK, and all the even-numbered pages print, with the last one on top. (On a LaserWriter II, you can accomplish the Reverse Order option manually by opening the exit door on the side.)

Still on the master pages, move the ruler origin to the top left corner of the right page. Place the stack of even-numbered pages face down in the paper tray, top edge nearest the printer. If the document has more odd-numbered pages than even-numbered pages, add a blank sheet of paper to the top of the paper tray.
Now print again, with the Reverse Order option off but with the Manual Tile option on.

_Brian Becksted_  
_Tucson, Arizona_

**Rubber Type**  
*Tip:* PageMaker lets you stretch or shrink graphics but not text. You could make text a graphic object by typing it in MacDraw and then cutting and pasting it into PageMaker. But MacDraw provides no control over kerning and less control over line spacing than PageMaker.

---

**Tropical Weather**

**Tropical Weather**

**Tropical Weather**

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**Elastic Text**

You can stretch and shrink text in PageMaker after converting it to a graphic. Select the text using the pointer tool, copy it to the Scrapbook, and then place the Scrapbook using the Place command.

---

But you can convert text to a graphic without leaving PageMaker. Select the text using PageMaker's arrow-shaped pointer tool, not its I-beam-shaped Text tool. Next copy the text and paste it into the Scrapbook. Then use PageMaker's Place command with the Scrapbook file, which is in the System Folder. When PageMaker places the Scrapbook file, the mouse pointer changes to a shape with a number that indicates how many items are in the Scrapbook. Clicking the mouse button places the next item from the Scrapbook into your document.

After placing the graphic version of your text, you can resize it by dragging the square black handles at its corners and sides (see "Elastic Text"). The PageMaker manuals have more information on resizing graphics and on placing the Scrapbook file.

**Alfred Giordiano, Jr.**  
_Brooklyn, New York_

**Flipped Over Bound Text**  
*Tip:* Cricket Draw 1.1 lets you bind text to a curved path (see "Bound and Reflected"). If the path to which you bind is reflected on the x-axis, the y-axis, or both, the bound text will be reflected the same way.

_Tom Poebnmann_  
_Canoga Park, California_

(continues)

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**Bound and Reflected**

Bound text in Cricket Draw 1.1 can be turned upside down and backwards using the Reflect On X and Reflect On Y commands from the Arrange menu.

---

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How To/Quick Tips

**Sharper Printed Graphics**

**Tip:** A LaserWriter IIIc prints bit-mapped graphics—MacPaint drawings, scanned images, rotated text in MacDraw, and so forth—at a jagged 72 dots per inch (dpi) instead of the 300 dpi at which it prints ordinary text and object-oriented graphics. You can double the print quality of bit-mapped graphics to 144 dpi by creating them double-size and printing them half-size. For example, draw an entire MacPaint or MacDraw document at twice its printed size and select the 50% Reduction option in the Page Setup dialog box before printing. If you copy a double-size bit-mapped graphic to a page-layout or word processing application that permits resizing of graphics, then downsize the graphic by half after pasting and print the document full-size.

---

**Tip:** The same technique works on other LaserWriter models, where you can specify any reduction factor. Terry Wilson of Mt. Holly, New Jersey, also recommends reducing to 50 percent. You can reduce to 24 percent for 300 dpi resolution, but your graphics may lose detail. At 300 dpi, white areas become partially filled by the natural diffusion of the black dots.

**Tip:** Even on an ImageWriter you can have double-printed resolution by printing a double-size graphic at 50 percent reduction. Andrew Wynn Rouse of Orlando, Florida, notes that the technique works with all graphics on an ImageWriter, even with Illustrator drawings. The results are so good he almost never resorts to renting time on a LaserWriter.

---

**Sum Easy Formula**

**Tip:** Excel's SUM function is very powerful but is tedious to enter. The following two-line macro relieves the tedium:

```
=FORMULA("="+SUM(R(-1):R(ROWS(SELECTION())-1)&"C:R(-1)C")

=RETURN()"
```

This macro builds a SUM formula that adds all cells in a one-column range except the last cell, and enters the formula in that last cell. After entering the macro on a macro sheet, name it and give it a keystroke shortcut using the Define Name command.

---

To use the macro, select the cell where you want the formula put and then extend the selection up to the first cell of the range to be summed. The macro only works if the active cell is the last one in the selection. After selecting the range to be summed, press the keystroke shortcut that you defined for the macro.

The same type of macro can be used to automate entry of other Excel functions that operate on a range of cells, such as AVERAGE, MAX, COUNT, MIN, VAR, and STDEV.

---

**Garry R. Burgess**

Winnipeg, Manitoba, Canada

---

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Getting Started with Electronic Mail

Electronic mail can help you communicate with the next cubicle or the next country. Here's how.

by Jim Heid

The telephone is to mail what the unexpected visit is to the appointment. A phone call is often an interruption, someone's way of saying, "Drop that and talk to me, now." The mail is more civilized. It's someone saying, "Read this when you can, and get back to me."

Of course, civility has its price. Businesses shouldn't have to wait days for a response to a yes-or-no question. Nor is letter-writing an ideal forum for long-distance brainstorming. Storms die down in a few days.

Personal computers have made possible a communications medium that combines the immediacy of the telephone with the civility of the mail. It's called electronic mail, or E-mail for short, and it involves sending and receiving anything from memos to manuals using phone lines or an AppleTalk network.

Businesses are discovering that E-mail is an excellent way for people to communicate quickly, without the interruptions of phone calls or the expense of express couriers. One major software developer requires its employees to use E-mail instead of the telephone whenever possible. It makes sense. People need privacy to work productively, but they also need to communicate and exchange ideas. Electronic mail helps you achieve that delicate balance.

Most E-mail concepts have equivalents in the world of paper mail. An E-mail system's post office is a mail server; it stores the mail you send and receive, and it provides storage areas called mailboxes for everyone who has an address.

This paper-mail metaphor extends to the message-sending process. You can send a carbon copy of an outgoing message to someone other than the primary recipient. You can request a return receipt—a message from the E-mail system telling you when the recipient received your note. With most E-mail systems, you can also send enclosures—spreadsheet files, word processor documents, page layouts, or pictures.

Jim Heid is a Macworld contributing editor who focuses each month on a different aspect of Mac fundamentals.

(continues)
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How To/Getting Started

Two Ways to Mail

Just as you can do your own payroll or send it out to a service, you can create a mail server on a computer in your office, or you can use an E-mail service provided by a commercial telecommunications service. Whether you create your own mail center or use someone else's depends on your needs. You might even want to combine the two. The E-mail world offers a great deal of flexibility, but tying everything together requires careful planning.

To create your own mail server, you put your Macintoshes on a network by linking them with Apple's LocalTalk cabling and connectors or by using LocalTalk-compatible cable kits from Parallon or TOPS. If you have a number of Macs sharing a LaserWriter, chances are you already have all the hardware you need. Once you've connected your Macs, you can add E-mail software that lets them communicate.

To use an external E-mail service, each Mac must be connected to a modem, a hardware add-on that translates outgoing data into screeching tones that phone lines can carry and turns incoming screeches back into data. If your Macs are on an AppleTalk network, you can reduce equipment costs by buying a network modem, such as Shiva's NetModem, that each Mac on the network can share.

Each user also needs a subscription to an information service or an E-mail service. The subscription gets you a unique user ID, which might be a contraction of your name (such as JHED) or a cryptic set of numbers (such as 76174,556). You also get a password (which you can and should change the first time you sign on to the system), a manual, and a list of phone numbers that will give you access to the service's mainframe computers. Completing the setup involves adding communications software, which lets you sign on to the service and helps you use it. (For background on telecommunications, see the Getting Started columns in the April and May 1987 issues of Macworld.)

The primary differences between a network-based E-mail system and a commercial E-mail service are the location of the mail server and the way you connect to it. With a network E-mail system, you're always connected to the mail server, and your E-mail software notifies you the mo-
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How To/Getting Started

This month we'll take an in-depth look at e-mail services. While most individuals use e-mail to communicate with someone outside their own organization, a growing number of businesses are finding that in-house communication via e-mail makes their lives easier, more efficient, and more fun. As a result, network e-mail systems are growing in popularity. Here’s what you’ll need to know to get started.

E-mail Basics

Simple or complex, every e-mail system has a message central to its operation. When a message arrives, it is delivered to the recipient’s mailbox; if that mailbox is empty, the message is left there until it is read. If the mailbox is full, the message is not delivered. The recipient can then use the e-mail system to retrieve the message from their mailbox.

Before you can begin communicating with e-mail, you must set up an account with your provider. This involves creating a user profile and defining your preferences. Once you have an account, you can begin sending and receiving messages using the e-mail software provided by your provider.

Network E-mail

Most businesses allow their employees to communicate with one another using network e-mail systems. This allows employees to communicate with one another quickly and easily, without having to wait for a phone call or meeting. Network e-mail systems can also be used to send documents, photos, and other files.

If you are interested in learning more about e-mail, please contact the editor at 1-800-MAC-HEP.

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Circle 283 on reader service card

How To/Getting Started

a few Macs can get by with a floppy disk-based mail server.

With early Mac E-mail products, you had to dedicate a Macintosh as a mail server—that is, you had to donate it to the network and use it exclusively for serving up mail. For offices with only a few Macs, that was an expensive proposition. Today's Mac E-mail packages—Microsoft Mail (formerly known as InterMail), Think Technologies' Inbox, and CE Software's QuickMail—are more flexible. These packages can run the mail server software in the background, freeing up the server Mac for other tasks. Still, using the server Mac for other purposes does slow the E-mail system's response time, so for large offices, a dedicated Mac is still the best approach.

Fortunately, you can make a dedicated Mac earn its keep by running Apple's AppleShare file server software along with the mail server software, allowing the Macs on the network to use the dedicated Mac's hard disk as a central storage area for documents and applications. (For details on file servers and network applications, see "Getting Started with Networking," Macworld, September 1987, and "Expanding the Conversation," Macworld, May 1988.)

Just as every post office needs a postmaster or postmistress, so every mail server needs an administrator—someone to set up the mail system and keep it in tune. The administrator's first job is to add users to the system by running a special administrator's program and typing each user's name (see "Server Setup"). After the initial setup, the administrator's job becomes custodial—adding and removing users as

<table>
<thead>
<tr>
<th>Names</th>
<th>Passwords</th>
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<tbody>
<tr>
<td>BobSmith</td>
<td>maryann</td>
</tr>
<tr>
<td>MaryJane</td>
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Server Setup
Part of an E-mail administrator's job involves setting up mailboxes for each member of the network. Here, mailboxes are being created for a Think Technologies InBox system. Remember that each user can—and should—change his or her password when signing on to the system for the first time.

(continues)
Something colorful is coming your way.

P.S. View Tek's complete family of color printing solutions at MACWORLD Expo in Booth #217.
How To/Getting Started

E-mail in Action
At Macworld, we use Microsoft Mail (formerly InterMail) running on a dedicated Mac Plus with an AST-4000 hard disk. The illustration shows the steps I take to submit a completed column. After dialing Macworld’s San Francisco offices using a Hayes Smartmodem 9600, I use the Chooser DA to select the mail server (a). Next, I open the Mail desk accessory and supply my password (b). After a few seconds, my message window appears, listing messages I've read but haven't deleted from the server (c). To create a message, I double-click on the Standard icon, then type the message's text; I address it by clicking the recipient's name in the To box, and use the File button to “enclose” the word processor document containing the column (d). Finally, I click the Send button to send the message to the mail server. In (e), a return receipt notification appears (denoted by the check-mark icon) along with a reply from my editor (signified by "RP:"). Unread messages appear in boldface type. Needed, helping users who have forgotten their passwords, and working to keep the mail moving.

Setting up E-mail software on each Mac in the network usually involves running an installation program that copies the software to each Mac's start-up disk. The software itself often comprises an INIT file that loads the mail software into memory during start-up, and a desk accessory that each correspondent uses to write, send, and receive mail. After the software is installed, you restart each machine to load the INIT, and you're ready to go.

No Stamps to Lick
Thanks to the Mac's metaphorical nature, writing and sending E-mail is much like writing and sending paper mail. The first step is to write the message, using the text-editing window all E-mail products provide (see “E-mail in Action”). You can also use a word processor, and then import the text via the Clipboard. But unless you use Microsoft's Word and Mail duo, which I'll discuss shortly, your message can't contain different fonts and styles.

After you write a note, you address it. With InBox and Microsoft Mail, simply click on the recipient's name in the list of mailboxes. With QuickMail, drag the recipient's name to a box labeled Send To. While all three products let you send the same message to any number of mailboxes, QuickMail and InBox also provide a community mailbox called a bulletin board, which everyone can access.

After addressing the message, you click a Send button, and the E-mail software beams the communiqué across the network and stores it on the server, which sends a message to the recipient that he or she has mail. InBox's message scrolls across the menu bar like a Times Square marquee. With Microsoft Mail, a dialog box appears. With QuickMail, a small icon
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flashes over the Apple menu. All three packages can also notify you aurally.

Reading mail is as easy as opening the E-mail desk accessory and double-clicking on the message. You can reply to a message with a mouse click, forward it to someone else, delete it, or save it in your mailbox. All three E-mail products distinguish between opened and unopened mail, so you always know which messages you've read and which you haven't.

All three packages also let you create and send electronic "while you were out" phone-message forms. QuickMail goes a step further, providing a forms-design program that lets you create custom E-mail forms for your business. For example, a sales department might create an order-taking form to allow a secretary to take orders for salespeople who are away from their desks.

I mentioned earlier that only the Microsoft Word and Mail combination lets you create and send memos containing different fonts. Word 4.0's Send Mail and Receive Mail commands let you exchange formatted Word documents without having to summon the Mail desk accessory. Simply write or open the document, choose Send Mail, select the recipient, and Word sends the document. This makes Word and Mail a powerful duo for offices where documents are forwarded to several people for comments and revisions. Of course, you can send formatted word processor documents with InBox and QuickMail by "enclosing" them within messages, but that involves more steps.

Remote Control

But what about Fred in Flagstaff? If you equip your mail server with a modem, Fred can use his own modem to dial in and connect to the network. When the two modems establish a connection, Fred's Mac becomes a remote node. He then can perform any network task that the people in your office perform—printing on a LaserWriter, copying files to or from a file server, and exchanging E-mail. To learn what you need for remote network access, see "Networking from a Distance," Macworld, June 1988.

Because a remote node isn't always connected, it's up to Fred to dial in regularly and check his mail. There's an even bigger drawback: because a 1200-bits-per-second (bps)—and even a 2400-bps—modem transmits data far more slowly than a network does, remote E-mail can seem as slow as the Pony Express. With high-speed modems such as Hayes' Smartmodem 9600, however, performance is quite acceptable—not as fast as a local node, but fast enough so that electronic mail still seems electronic. I used to use a 1200-bps modem for connecting to Macworld's E-mail system (built around Microsoft Mail), but I switched to a Smartmodem 9600 after a few too many cobwebs formed between me and my Mac.

CE Software's QuickMail is particularly versatile, since it can talk to any computer with a modem. If you dial into a QuickMail server using a computer other than a Mac, QuickMail discards the Mac interface and presents special text menus for accessing the QuickMail system. Combine that capability with a $300 Radio Shack laptop computer, and you have an inexpensive way to keep in touch.

When to Go Commercial

Remote-node setups allow AppleTalk E-mail systems to span the miles, but commercial E-mail services still have their place. For starters, their multiline phone networks can accommodate thousands of callers at once. With remote-node access, only one person at a time can check his or her mail.

Commercial E-mail systems also offer additional mail-handling services. With MCI Mail, one of the largest E-mail services, you can send E-mail to someone without a computer. Supply the person's mailing address, and MCI Mail will print a hard copy of the letter at the service center closest to the recipient and then put it in the conventional mail, reducing the time your message will spend in the clutches of the Postal Service. You can also specify overnight, or even four-hour, delivery at prices lower than those most courier services charge.

The CompuServe Information Service provides its own E-mail system, called EasyPlex, and it also offers a gateway to MCI Mail that lets subscribers send mail to MCI Mail users. Other information services, including The Source, GEnie, and Delphi, also offer E-mail services that give you access to vast amounts of information, from online encyclopedias to airline flight schedules to megabytes of free or inexpen-
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How To/Getting Started

Because commercial E-mail services are designed to talk to any computer, don’t expect pull-down menus and dialog boxes. Text menus and prompts such as “Type/EXIT when done” are the norm. But recently, some clever programmers have constructed Macintosh facades for most services (see “A Friendlier Interface”). CompuServe’s Navigator streamlines CompuServe access. Dow Jones’s Desktop Express simplifies MCI Mail and the Dow Jones News Retrieval service. SuperMac Software’s Acknowledge communications package includes a sophisticated application that automatically sends and retrieves mail to and from any or all of several popular services—with a single mouse click.

All of these front-end programs work similarly. You compose outgoing messages using a text-editing window, then you ad...
Whatever Macintosh-PC setup you have, MacLinkPlus—at $195—provides the very best solution for transferring and translating files and documents between the two.

If you want to connect a single Mac to a PC or laptop, MacLinkPlus provides everything you need—a direct connect cable (you can use a Hayes or compatible modem if you prefer) and software, including translators, for both the Macintosh and the PC.

If you have a DOS disk drive, then the MacLinkPlus library of over 40 translators is the solution to accurate conversion of your files.

Formats and styles are retained during the conversion and there's no need to preconvert to ASCII or print files. This library also makes MacLinkPlus the perfect enhancement to Apple's new Apple File Exchange utility.

And if you have Macs and PCs on a network or AppleShare server, etc., the MacLinkPlus file translation capabilities are worth the price alone.

So, if you want to be really well connected, the size of your wallet really doesn't matter. Just call (203) 268-0030 for your nearest DataViz dealer. Because as Macintosh Today recently said, "MacLinkPlus was one of the first data translators and it remains the champ."

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Upgrade from Focal Point to Focal Point II (a $199.95 value) for just $39.95 before 1/31/89 ($89.95 thereafter). Send the first page of your Focal Point manual (originals only) along with your check or money order (add $4.50 shipping and handling) to: Focal Point II Upgrade, P.O. Box 8123, San Francisco, CA 94128.

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Circle 271 on reader service card
How To/Getting Started

dress your mail and choose a command or click a button. The front-end program then dials the service and sends it the appropriate commands. Because the program always knows exactly which commands to send, this approach not only tames an unfriendly interface, it reduces connect-time charges.

Another way to use commercial E-mail without discarding the Mac interface is to subscribe to MacNET, an all-Macintosh information service that provides E-mail services.

If you decide to combine AppleTalk E-mail and a commercial service, take a hard look at CE Software’s QuickMail. It’s the only AppleTalk E-mail product that can also talk to commercial services. You can instruct a QuickMail server to call any popular service at certain intervals so that members of the network can communicate with anyone using the service. Mail retrieved from a service appears in the recipient’s mailbox, just as if it came from someone else on the network.

Hanging Up
I’ve been talking about Mac-only offices here, but I’ve heard rumors that many people use other computers, as well. Mac E-mail products can accommodate them, too. Microsoft Mail and Think’s InBox have IBM PC counterparts that let PCs and Macs communicate, and all three companies are working on establishing links with VAX mini computers.

I tend to be conservative when it comes to recommending fancy technology, but not where E-mail is concerned. It’s a wonderful way to communicate, partly because it reduces phone interruptions, but also because it resurrects the dying art of written communication. E-mail forces you to think about what you want to say, and it lets you express opinions that you might hesitate to verbalize. It establishes a written record of a discussion or negotiation process. It even helps you deal with difficult personalities.

If you use an E-mail system in your office, drop me a line and let me know how it works for you. Better yet, send me an E-mail message. On MCI Mail, I’m JHEID. On CompuServe, they call me 76174,556. But please, no phone calls.

See Where to Buy for contact information.

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SuperStacks!

The second annual HyperCard application contest sponsored by Apple Computer, Bantam Books, and Macworld

Send us your best stackware by March 15, 1989. We'll award prizes to the most outstanding HyperCard applications and describe the winning SuperStacks in a feature article in the November 1989 issue of Macworld. Judging criteria will include creative and appropriate use of HyperCard, interface design (including use of graphics and sound), programming elegance, and success in meeting the goal of the program for the intended audience. We reserve the right to change an entry's category, if appropriate. Judges may elect not to make an award in each category.

Categories
COMMERCIAL Stacks distributed for a fee.
CUSTOM Stacks custom-made for a business, government agency, or non-profit organization.
EDUCATIONAL Curriculum, teacher-training, and teacher/administrator productivity materials, as well as training or self-instruction stacks for the general public.
NONCOMMERCIAL HyperCard applications available through noncommercial channels (shareware, freeware), plus stacks designed for personal use and not distributed at all.

How to Enter
Entries are due in our office on March 15, 1989. No more than two (2) entries per contestant. Each entry must include disks (clearly labeled with the stack name, your name, address, and phone numbers); documentation (if necessary); a $5 entry fee; and a one-page summary headed with the stack name, contest category (commercial, noncommercial, educational, or custom), and K-count, as well as your name, address, and phone numbers. In the summary, state the purpose and intended audience of your entry and note if it requires any special hardware (CD ROM drive, for example). Mention the list price or suggested shareware fee and explain how the stack is being distributed. You may also mention any special features you want to call to the attention of the judges. Sorry, disks will not be returned. Employees of the sponsors are not eligible to enter.

Winning stacks from the 1988 SuperStacks contest are not eligible. Make your check or money order payable to PCW Communications. Send entries to SuperStacks, Macworld, 501 Second St., San Francisco, CA 94107; Attn.: Macworld Editorial.

First Prize in Each Category: Macintosh SE
Runners-Up Prize: Jasmine DirectDrive 45

Plus, a special award of a 4MB memory upgrade from National Semiconductor for best HyperCard interface design, best HyperCard multimedia application, best HyperCard development tool, and best stack available for under $20.
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Macintosh Masters II
Art Contest

Categories
Fine Arts
Illustration
Graphic Design
Animation/Video
Technical Illustration
3-D/Image Synthesis
Architectural Rendering/Elevations
Business/Informational Graphics
Wild Card*

*Projects that don't fit into any of the other categories. Try us.

Prizes
Three grand-prize winners will take away a Macintosh II, a 32-bit NuVista color capture and display board, or a Tektronix color image printer. Winners in each contest category will choose one product from a selection of top programs, including Adobe Illustrator, Aldus FreeHand, PageMaker 3.0, ImageStudio, ReadySetGo, VideoWorks II, PowerPoint, SuperPaint, Digital Darkroom, and PixelPaint Professional. In addition, winners' work will be published in a Macworld feature article and in our 1990 graphics calendar. Grand-prize winners will also receive an expenses-paid trip to Macworld Expo Boston to claim their prizes.

Rules
Entries must be received no later than March 10, 1989, and must be accompanied by an entry form. Please include return postage and packaging. Animated entries may be on disk or half-inch videotape, as appropriate. Since work will be judged on technical innovation as well as aesthetic value, each piece should be accompanied by a detailed description of how it was produced. Please submit no more than four works (include an entry form for each). Macworld reserves the right to reproduce winning entries.

Entry Form
Send one entry form with each submission to Macintosh Masters, Macworld, 501 Second Street, San Francisco, CA 94107.

Name
Phone #(s)
Address
Title of work
Contest category
Submission format(s):
___ On disk ___ Hard copy ___ Slide ___ VHS video ___ Beta video

All submissions must be received by March 10, 1989

[art credits]
Dick Hodges [exec], ConceptCheck [in-house],
Brian E. Pru [dog], David C. Dekker [mountain],
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Granted, the name is a little unconventional. But the time and money Timbuktu saves will appeal to even the most conservative minds.

Install Timbuktu on each Macintosh, and everyone on the network can access other Macintoshes, share screens, and control the operation of each other's computers. In fact, you can access your own computer from another computer on the network. (Our companion product, Timbuktu/Remote, works the same way over modems.)

So, if you're the one who's always fixing things on the network, helping solve computer puzzles, and other office heroics, then leave your running shoes at home.

Now, you can identify problems on any Macintosh, reconfigure or update software, teach people new applications, or manage servers and other shared resources. Right from your own Macintosh. Or any other Macintosh, for that matter.

For those pressured with meeting the demand for more computing power, while justifying the cost to management, Timbuktu offers a profitable solution. And relief.

Timbuktu lets everyone access any workstation and its databases, FAX modems, print spoolers, servers, and mainframe connections. If you're concerned about security, the password protection feature will limit access to any device. You can also use Macintosh IIs as servers without buying keyboards, monitors, or video cards.

Timbuktu. What we're talking about is people working together, sharing resources, and helping each other get the job done. Only now you can do it over the network, with united stations. To find out more about Timbuktu and the rest of the PhoneNET System, call (415) 849-2331 for the Farallon dealer nearest you.

PhoneNET is a registered trademark, and Timbuktu and Timbuktu/Remote are trademarks of Farallon Computing, Inc. Macintosh and AppleTalk are registered trademarks of Apple Computer, Inc. © 1988 Farallon Computing, Inc.

Circle 150 on reader service card
3-D In Perspective

We've all grown accustomed to reading "Made in Japan" on much of our hardware, but few of us have ever used Japanese software. Now Osaka's Dyna-ware Corporation has entered the American market with DynaPerspective, a 3-D architectural package for solid modeling, designing, rendering, and presentation.

The Mac II product is based on earlier versions for IBM and NEC computers, but it has more power and takes full advantage of Mac color graphics and the Mac interface. It requires at least 2MB of RAM and an 8-bit gray-scale or color video card and monitor. It uses an accurate floating point database and has a limitless drawing area. With 2MB of RAM, its capacity is 75,000 vertices; with 8MB, 300,000.

DynaPerspective is so architecturally oriented that it won't be attractive to mechanical designers. But architects and engineers can create precise models of even the most complex architectural projects and then produce beautiful, color-shaded, perspective renderings.

To create or modify a design, you work with color wireframes in your choice of four windows: Top, Front, Side, and Perspective, or in all four at once. The interface is very intuitive, and 3-D program users will immediately recognize methods of image manipulation that first appeared in other Mac 3-D programs such as Mac3D, Swivel3D, and Pro3D. You can easily enter 14 three-dimensional elements including walls, roofs, circles, polygons, curved surfaces, cylinders, and stairs, and you can make them opaque or translucent, in any color. You can also store graphics entities in symbol libraries.

When you set up your own grid system, the program gives you extensive "snap-to" capabilities. United States architects may find decimals of a foot clumsy to work with, so the company may adapt the program to feet and inches in the future.

Once a design is complete, you ask the program to render the wire-frame images in shaded solid views. It does so at very high speed, and from all four views. You can then vary the viewpoint via rotation, zooming, panning, and other camera-like controls.

You can also create animation for walkthroughs. Film files allow direct viewing of a stored series of images, as well as output to VideoWorks II.

DynaPerspective is the only Mac color graphics program I've seen to date that produces shaded color renderings (via dithered color patterns) on both the CalComp PlotMaster and Hewlett-Packard PaintJet

(continues)
Send us the best design using **CG TYPE** and FontLiner. Win an Agfa Scanner.

Show off your creativity with CG TYPE and FontLiner. Enter the CG TYPE Excellence Contest. Send us your hottest design—logo, ad, headline, newsletter, or brochure. Take first place and win an Agfa Focus 800 Scanner! Get your design in print too. Photographs of the winning design and artist will appear in a future CG TYPE ad. You don’t have the right tools to be a winner? We’ll help you blow away the competition. Buy any CG TYPE volume for $149, and get a FontLiner utility FREE. A $129.95 value!

FontLiner, an exciting new program by Taylored Graphics, lets you convert CG TYPE characters into PostScript® artwork. Use that artwork instantly with either Adobe Illustrator™ or Aldus FreeHand™. Then let your typographic creativity loose with any project, from memos to logos.

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Win the Agfa Focus 800 Scanner, 800 dpi, 64 gray scale, complete with McView software. Worth $5495!

AGFA

Compugraphic
color printers. Other programs that support both of these devices allow for only eight colors. DynaPerspective also supports color pen-plotters and the LaserWriter. For further information, call DynaWare Corporation at its United States office in Foster City, California, at 415/349-5700. —David L. Peltz

Training at BellSouth

Over a century ago Benjamin Disraeli wrote "We cannot learn men from books." If he were alive today, he might write "We cannot learn programs from manuals." But what are the alternatives to trial and error or costly support calls?

With the opening of its Atlanta-based Microcomputer Training Center this past November, BellSouth Media Technologies thinks it has the answer. The Center touts a wide variety of courses ranging from Thinking-of-Purchasing-a-Mac Orientation to State-of-the-Art Desktop Publishing, teaching cutting-edge applications using cutting-edge research knowledge about how people learn.

The Center now has ten SEs to ten PCs; future plans call for six classrooms and the addition of 10 Mac IIs and 27 more SEs. One full-time instructor specializes in presentation graphics, another specializes in desktop publishing, and a third specializes in word processing. Seven training assistants contribute their expertise in graphic arts, database management, and other areas. Among the programs taught are PageMaker, Microsoft Word, Adobe Illustrator, PowerPoint, 4th Dimension, Microsoft Excel, Samson (BellSouth's advertising display software), and several paint packages.

Connectivity is another major focus, accounting for the presence of ten PCs in a training center designed to be Mac-oriented. The computers are not only networked together but also connected to outside phone lines for communications training.

The Microcomputer Training Center bolsters its educational repertoire with customer-site training for corporations and individualized tutoring in about 50 programs. The daylong classes cost between $17 and $43 an hour; a half-hour of individual instruction costs about $30. Various discount packages are available.

For further information contact BellSouth Media Technologies Microcomputer Training Center, 1100 Johnson Ferry Rd. NE, Atlanta, GA 30342; 800/521-9827 or 404/255-1690.

—Jeff Merron

News Graphics via Satellite

Do you ever wonder how newspapers produce the graphics to go with the avalanche of stories breaking every day of the week? The growing need for sophisticated graphics has overwhelmed the in-house efforts of all but the largest newspapers, and many smaller papers have come to rely on news services and syndicates, which now deal in graphics as well as in photos and dispatches.

New York's Independent Network Systems (INS), a satellite communications network serving the newspaper industry, now transmits graphics between Macs, via satellite. Its ArtExpress service enables newspaper groups and other generators of graphics to send art from one location to hundreds of newspapers in a single transmission.

To transmit, ArtExpress users dial their work into the INS operations center. The graphic is then beamed to every location coded to receive it. At the receiving newspaper, the graphic is automatically passed to a designated Macintosh via an AppleTalk port, and then automatically stored on its hard disk. Documents are received at 9600 baud; PICT, Glue, encapsulated PostScript, and TIFF (scanned) documents are automatically printed on a LaserWriter. What's more, the receiving software runs in the background on a Mac Plus, SE, or II, without interrupting anyone's work.

INS signed agreements with Infographics, the Newhouse newspaper group, to transmit graphics to 27 papers with a total circulation exceeding 4 million. For further information, call Independent Network Systems, in New York City, at 212/809-7921.—Phillippe Krakowsky

Retail Mac

The profusion of HyperCard stackware has generated so much Hyper-excitement that one salient fact is consistently overlooked: outside of custom applications, most HyperCard stacks offer limited practical value, especially for those the software was intended to benefit most—Macintosh novices. For some consumers, however, this situation is improving.

(continues)
Only Tecmar Can Back Up All Three With One Tape System.

It's what you told us you need. A single tape backup system to work with your PS/2s™ your classic-bus PCs and – here's the clincher – your Macintosh® IIs. Three very different architectures supported by one high-speed, high-capacity tape system.

Tecmar's not only done it, we've made it easy! Any external Tecmar QualityTape™ drive from 60-to-150MB capacity, including the ones you may already own, can now be shared between PCs, PS/2s and Mac IIs. The QT drives easily connect to a Tecmar host adapter board inside the computer – including the brand-new NuLink™ Host Adapter for Mac II. If you have more than one architecture, then this is the solution that makes sense! And only Tecmar has it.

More companies choose Tecmar tape systems than any others – for our speed, reliability and support. And now, one drive fits all. For more information, call Tecmar at (216) 349-1009 or (800) 624-8560. Or write Tecmar, Inc., 6225 Cochran Road, Solon, Ohio 44139-3377.

Circle 321 on reader service card
The idea for the product, however, did not come from video games. "We applied the principles used by banks in automated teller machines," explains Mark Safire, the Shopper's creator. "Our machine produces a valuable, easy-to-use service when sales personnel are not available to help the customer." Bloomingdale's seems sold on the idea—it plans to install the units in each of its 13 department stores, and has asked Safire to produce enhancements, such as a system that will incorporate diagrams of the store's layout and direct shoppers to the desired item. For further information, contact Mark Safire or Michael Spalter at Safire and Spalter, in New York, New York, at 212/529-0634.—Philippe Krakowsky

**OOPSLA News**

Supporting the Mac's user-friendly interface often entails complex programming on the part of developers, even with the Mac's Toolbox. Apple and other companies have been studying object-oriented programming as a means of simplifying the programmer's job. Also actively involved in this effort is the Association for Computing Machinery's Special Interest Group on Programming Languages, which organizes the OOPSLA (Object Oriented Programming Systems Languages and Applications) conference, an annual meeting on object-oriented languages.

OOPSLA includes not only workshops and presentations on object-oriented languages and databases, but also a small number of exhibits. This year, two exhibitors attracted a lot of attention because of their Mac-related products. One was DigitalTalk, with its Mac version of the SmallTalk language. SmallTalk/V Mac is a complete development environment, including complete access to the Mac's Toolbox routines, tools for organizing and browsing SmallTalk source code, and a source-level debugger. For novices, the manual includes a 12-chapter tutorial on object-oriented languages and SmallTalk programming.

The second Mac attraction was Gunakara Sun Systems' Prograph, a high-level pictorial programming language that supports the concepts of object-oriented programming. Some of the features of LISP, Prolog, and SmallTalk form the Prograph language, but everything is presented pictorially. Based on a system developed by Professor Tom Piotrzykowski of the Technical University of Nova Scotia, Prograph promises to be an excellent system for learning object-oriented programming. Later versions, which will include a compiler and perhaps code generators, could make Prograph a tool for developing stand-alone applications for the Mac. For further information, contact Digitalk, in Los Angeles, California, at 213/645-1082, or Gunakara Sun Systems in Halifax, Nova Scotia, Canada, at 902/429-5642.

—Dave Kostur

**Interactive Visionaries**

The book Interactive Multimedia (Microsoft Press, 1988) synthesizes the future as seen by the visionaries immersed in creating interactive computer education. Its chapters are annotated speeches and papers delivered by scientists, developers, media professionals, and educators at a 1986 Apple-sponsored conference called "Learning Tomorrow." The experiments the book describes have not previously been publicized outside of a small circle of scientists.

In one essay Thomas Anderson, a consultant with the New York public television station WNET, explains how he reused footage from the PBS broadcast "Creation of the Universe" to

(continues)
The Viking 2 is a finely-tuned, fully ergonomic design. It is Moniterm's second generation monitor. And its performance is marked by our publishing resolution for a "real page" environment. Flicker-free refresh for a tack-sharp, rock-steady display. Square pixels for precise imaging and characterization. Ultra-high efficiency phosphor for a paper-white, easy-on-the-eyes screen. And the beautiful finishing touch — OCL™.

Introducing the Viking 2

HEA glass-bonded anti-glare coating. No reflection on you—the Viking 2's appearance simply can't be matched. Moniterm provides software drivers for hundreds of programs with every monitor and every monitor is bundled with a matching controller for precise, high-speed performance with your computer.

The Viking 2 is part of Moniterm's family of 18 products. 19-to-24-inch monochrome, gray-scale and color monitors are available for Macintosh and IBM computers, and 19-inch monochrome for Commodore and Atari computers.

We wrote the book on monitors: How to Buy the Right Monitor. Call or write for your free copy today.
begin an interactive educational product prototype called Beyond Einstein. By putting the film and graphics on videodisk and designing a Macintosh-style interface, the WNET Learning Laboratory developed a new interface that offers five ways to interact—touring, browsing, connecting, asking questions, and changing conditions—with the graphics, photography, motion video, and narration of the original program.

Anderson laments that television tantalizes viewers instead of educating them. Why not reuse all that costly footage in a medium that allows viewers to control the pace of information and delve deeply into specific topics?

Many of those attending the conference stressed the need for new hardware and programming to support interactive media. Now, with the emergence of HyperTalk, and with interactive compact disks and digital laser disks, Mac users can get a glimpse of what education and entertainment have in store for us by reading Interactive Multimedia, which is available for $24.95 from Microsoft Press. —Barbara Tannenbaum

### Autotracing with FreeHand 2.0

Autotrace is an object-oriented tool that traces bitmapped images and creates a vectorized copy of a line drawing. It saves designers the time and effort required to hand-trace line art like maps and diagrams.

Adobe Systems offered autotrace in Illustrator 88, and now Aldus is getting into the act with a major upgrade of its FreeHand PostScript drawing package. Autotrace aficionados will note that FreeHand 2.0 offers a selection rectangle feature that lets you pinpoint only the parts of the drawing you want to autotrace. The FreeHand drawing tool also enables you to edit the FreeHand path as it is drawn. Other image-conversion features include import of TIFF images, TIFF-image editing for brightness and contrast, and PICT-to-PostScript conversion.

Like Adobe, Aldus has added support for the Pantone color-matching system and a blend tool for shapes and colors. In a nod toward ease of use, Aldus has made FreeHand's interface more like the PageMaker interface, particularly in the menu structure and dialog boxes. You can edit text on an arbitrary path and format multiple text blocks simultaneously. The program also includes a clip art library, a new knife tool in the toolbox, a new stroke command for adding variable outline weights to text, and up to 100 steps of Undo and Redo.

For further information, contact Aldus, in Seattle, at 206/622-5500. —Rusty Weston

### Mac Embroidery

It's not uncommon these days to see Enzan-Hoshigumi developers bent over their embroidery—but not with a needle and thread. Instead, they are bent on perfecting the company's latest innovation, a polished, compact desktop embroidery machine, driven by a Mac.

P.O.E.M., or Personal Original Embroidery Machine, garnered plenty of attention when it was introduced last year at the Macworld Expo in Boston, but for months afterward there were still only three machines in existence and nary a marketing plan in sight.

Now Qualitas Trading Company, which represents Enzan-Hoshigumi in the United States, says that's changing: a consumer-level version of P.O.E.M. is scheduled for release in the summer of 1989.

Reasons for the delay in bringing P.O.E.M. to market are varied. The major hurdle was deciding whether to target the consumer or the industrial market. Then safety features had to be built into the machine, and needles that would not break during stitching had to be made. And perfecting the software proved to be no small task.

P.O.E.M. was jointly developed by the Aisin Seiki Company (which designed the hardware) and Enzan-Hoshigumi.

(continues)
A new and advanced paint, editing and special effects program.

For the serious artist, with capabilities and speed beyond any other Macintosh paint software

CUSTOMIZING COLOR PALETTES  Create and save your own set of colors — one at a time with color picker, or a range of colors using RGB and/or HLS tables. Blend any range of colors from 2 to 256. Change palettes to change the color scheme of any illustration.
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Circle 149 on reader service card

Moving towards the speed of mind.
**Apple Grant**

As you enter the Exploratorium, San Francisco's science fun house, you see a video monitor prominently displayed under a sign that reads "Memory and Eyewitness Testimony." Every couple of minutes the monitor screens a short segment of the political suspense movie Z. What's immediately apparent is that the film clip depicts an attack on a man in a town square. What's less apparent is that the video display is in cahoots with a Macintosh SE running HyperCard at the rear of the complex. When visitors later walk up to the Mac, the HyperCard application tests their memories of the film clip with a series of questions. It asks every other person a misleading question that might actually change his or her memory of the film. The SE running HyperCard is thus helping the Exploratorium study the way we remember.

This little scientific investigation is just one of the ways the Exploratorium is using Apple's gift of 44 computers, networking hardware, 3 LaserWriter LiNT printers, a CD ROM player, and an AppleFax modem.

Another project is a version of "telephone," the children's storytelling game. A HyperCard application tells visitors a story. With the help of the MacRecorder, visitors then repeat the story and inevitably change it in the process. These versions of the original are accurate in a database, providing the Exploratorium with what is undoubtedly the longest ongoing version of this game ever played — and, perhaps, with a glimpse of the future of fiction as well.

Exploratorium educator Ron Hitschman is most excited about a HyperCard program that cross-references exhibits. Visitors choose a scientific concept, and the program then defines it, lists many of its practical applications, and directs them to exhibits where the applications can be seen in action. Hitschman uses VideoWorks on top of HyperCard to create animations that demonstrate various scientific concepts. Harmonic motion, for instance, is depicted as an oscillating sine wave issuing from a spinning circle; moiré patterns are produced with intersecting diagonal lines in constant motion.

The cross-referencing program is still in its infancy, but Hitschman foresees two centrally located reference pods with three Macs and a LaserWriter in each, all linked to an Exploratorium-wide network. Once these pods are in place, visitors to the Exploratorium will be able to use the Mac to plot a course through the universe of applied science.

For further information, contact Ron Hitschman at the Exploratorium, in San Francisco, at 415/561-0371. —William Freas

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**HyperCard**

**Hot Stacks**

HyperCard author Bill Atkinson has described his creation as a "software Erector set." Unfortunately, the flood of stacks in the public domain often reflects the same functionality as those children's toys. So far, HyperCard's magnificence is appreciated most by the people who build their own stacks.

In Neutrotour, you can click on parts of the brain for information about them.

As long as stacks are free or shareware, complaints about them are minimal. However, slow, sloppy, and disjointed commercial stacks selling for over $50 are drawing smirks and frowns.

The following Hot Stacks rise above this mediocrity in both cleverness and artfulness.

**Neutrotour** by Jim Ludtke.

This stack has been around a while, yet it remains one of the best demonstrations of HyperCard potential. You start with a handsome drawing of a brain. Clicking on particular parts of the brain reveals information about each part. Repeated clicking on a zoom button brings forth closer views, from neurons to cells to dendrites and beyond.

**ScriptView** by Eldon Benz and **Script Report** by Eric Alderman. Stacks that let you view the scripts of all other stacks contiguously. If you want to learn HyperTalk programming, these stacks (and others like them) will help.—Scott Kronick
Road Racer

The Ultimate Driving Simulation.

You score points for fast, skillful driving. Road Racer is high performance you won't forget.

Road Racer's detailed graphics and digitized sounds simulate driving conditions in 5 environments ranging from high-speed desert flats to twisting mountain roads. So convincing you'll actually find yourself trying to look over the hills and around the turns.

The trees, rocks, telephone poles, and other graphics fly past your 1965 Corvette at breakneck speeds. Hear its thundering 350-horsepower engine and screaming tires as you corner around wicked curves.

Steer and accelerate with the mouse, and use your keyboard for brakes and shifting.

Each level is tougher than the last with unpredictable road hazards and many courses to travel. You score points for fast, skillful driving. Road Racer is high performance you won't forget.

Lunar Rescue

A Strategic Space Adventure.

A heat-seeking missile has just slammed into your ship.

The year is 2059. Raiders have stolen five controlling crystals that maintain the defense and supply network for the moon's 26 cities. With key commodities cut off, the cities are doomed.

Your mission is to recover the fiendishly hidden crystals while transporting vitally needed goods between cities. Traverse dangerous terrain and combat relentless attacks with your arsenal of lasers, cannons, bombs and shields.

Prepare yourself for an odyssey of furious action and strategic high stakes trading.

Lunar Rescue is an addictive adventure that challenges your imagination and sets your adrenaline on fire.

MacGolf Classic

The Premier Graphic Golf Simulation.

A premium edition of the best selling Macintosh game in the world.

MacGolf Classic puts you into a full perspective 3-D simulation of realistic golf action. You match your skills against fairways, roughs, sand traps, water hazards and trees.

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MacGolf Classic gives you a player's eye view and an aerial overview of each hole with close up options. You have complete control of your position, ball placement, ball speed and direction, and selection of all 14 clubs. Spectacular digitized graphics and sounds add to the excitement.

MacGolf Classic is so close to the real thing it will improve your golf game. Every challenge should be this spectacular.
Broadcast Quality on a Mac II

How would you like to be able to create professional broadcast-quality television productions from your ergonomically designed, Mac II-based desktop video studio?

All you need is the interest, about $75,000, and perhaps the consultancy of Joan Tierney, a Washington, D.C., desktop video synthesist with a Ph.D. in multimedia design and development. Presently working on a PBS special called “The Silent Invaders,” Tierney has spent almost a year designing and using a truly functional broadcast-quality desktop video system. Her patented system can handle slide, video, and film input; graphics; maps; drawings; and computer animation—all output to broadcast-quality video tape.

Tierney is also working with the media labs of the Smithsonian Institution, Xerox Corporation, and the National Geographic Society on the design of their desktop video systems. She claims that cost savings for major television productions can be as high as 70 to 80 percent.

Tierney sees the three major markets for desktop video to be broadcast television, corporate training, and academics. The Mac II is her computer of choice because of the growing number of peripherals that give the computer more speed, graphics, and animation, and more video-editing capability. Besides the Mac II, her system also includes video components by Sony and the new professional ½-inch M-2 videotape format pioneered by JVC and Panasonic. Her immediate goal is a mobile, multipurpose system: you could put it in a truck, take it to a story site, create the production right there, and then hand the tape to the closest TV station.

For further information, Joan Tierney can be reached at 202/554-2020.—Allan Lundell

MacTemps

Are you looking for a stable relationship in a world where jobs, neighborhoods, marriages, markets, and stock prices all melt into air? Maybe you should make a commitment to the Macintosh operating system. As more and more businesses go Mac, click-and-drag skills become a better hedge against sudden unemployment. Mac-Temps, an employment agency specializing in Mac labor, recently expanded from its New York and Boston offices to outposts in San Francisco, Los Angeles, and Mountain View, California.

When employers call Mac-Temps, they explain their needs to personnel brokers who speak fluent Mac software-ese: You need a graphic designer who can lay out a 100-page manual with PageMaker and ReadySetGo? Two secretaries who can use WriteNow? An accounting whiz who can program a multiuser payroll system with Excel? Four Mac-Temps coming up.

As long as the Mac continues its march across corporate, national, and continental boundaries, the world is MacTemps’ market. The only smudge on its spreadsheet so far was a legal threat from MacDonald’s Corporation, ever watchful for those who seek to offer the world a fast new MacFood. MacDonald’s successfully sued to force both a hole-in-the-wall “MacSushi” bar and a “Mac-Dharma’s” health food cafe to abandon their names, but the burger colossus left MacTemps alone after being convinced that the agency was marketing fast workers instead of fast food.

It’s nice to know that the world still has room for one more MacEmpire. And that even if the Mac should lose its firm foothold in the global market, our Mac skills should give us all a head start on learning to use the Next machine.

For further information, call MacTemps, in Cambridge, Massachusetts, at 617/668-8200.

Desktop Planetarium

The view of Mars is good tonight, and nearly 400 amateur astronomers have hauled their telescopes up to California’s dusty Fremont Peak. Tom Mathis of Carina Software has also hauled up a couple of Macs. One will demonstrate Voyager, Carina’s desktop planetarium package that has wowed astronomers across the country. The other will run a customized version of the program. It’s here to drive a telescope at the click of a mouse.

Although easy enough for a child to operate, Voyager is packed with enough advanced features to excite even serious scientists.

The program is accurate to within one minute, and draws...
We wrote the award-winning StatView 512+ for the Macintosh. Please don't buy it.

The company that set the standard for statistical programs now exercises its right to raise it. With new features like color. Even more speed. And the expanded ability to create customized graphs and charts that let you make your point. Now called StatView SE+Graphics, it'll run on any Macintosh Plus or SE. And for those who want absolutely blazing speed and 16 million colors, we suggest StatView II for your Macintosh.

New features:
- Customize graphs with the text and drawing toolbox. Exploit the full color capabilities of your Macintosh to highlight your results. Circle key data points. Add legends and fancy type styles anywhere on your graph.
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star maps at a phenomenal two seconds per 1000 stars. You can scroll around the sky, and when you type in the name of a star, planet, or nebula, its location is instantly centered on the screen. You can select a planet or a star and click once for information; or with the customized version, click twice to slew the telescope into place.

But the program's real beauty lies in the way it piques the imagination. "It's unheard of," says Gordon Spear, who is incorporating the program into his astronomy classes at Sonoma State University in California. "You can scroll back to 510 A.D. in Mesopotamia and be there in an instant."

As if time travel weren't exciting enough, Voyager also lets you step entirely outside the solar system and then peer back in from any angle.

Astronomers have lauded the program's ability to track the movement of planets, give you a view of any area of the solar system from any other area, and let you input orbital data about our own solar system objects. And the database is expandable, in case you want to include your own data files.

The customized version of Voyager with a computer-controlled telescope mount is expected to sell for $12,000 to $15,000. But if you want to explore the universe from your desktop and you're looking for a price tag that won't make your bank balance look like it got sucked into a black hole, the Voyager desktop planetarium is available for $99.50, plus shipping and handling.

For further information, call Carina Software, in San Leandro, California, at 415/354-7328.

—Mary Margaret Lewis

Word Publishing

What do you get when you combine two of the best-selling office applications into one package? One of the year's hottest new office products, word publishing-software. The idea is that templates can bring that desktop publishing look to word processing.

Almost a year ago, Ashton-Tate introduced FullWrite Professional, a high-end word processor with advanced page-layout features such as multiple columns and drawing tools.

Quark has now followed suit with QuarkStyle, desktop publishing software with enhanced word-processing capabilities.

A $295 subset of QuarkXPress, QuarkStyle includes more than 70 template designs for common projects like newsletters, magazines, books, business cards, memos, letters, and purchase orders. QuarkStyle also offers complete text creation and editing capabilities such as spell-checking and automatic hyphenation.

Quark hired eight nationally prominent designers to create the templates, including Roger Black, a former chief art director at Newsweek, the New York Times, and Rolling Stone; and Marjorie Spiegelman, a major contributor to the original designs of Macworld, PC World, and Publish.

Meanwhile, two highly successful PC software vendors are expected to offer Macintosh products this spring with integrated word publishing capabilities. XyQuest is expected to finally roll out a Macintosh version of its highly customizable XyWrite word processor. The program's strengths in word publishing lie in its ability to snake text and easily merge graphics into documents.

And MicroPro is expected to offer Zeus, a Mac version of WordStar, with page layout features plus a rich set of PostScript drawing tools like those found in Adobe Illustrator 88.

For further information, contact Quark, in Denver, at 303/934-2211. —Rusty Weston
In the world of desktop publishing, no personal computer can match the power of a Macintosh®. It's the only choice. But when it comes to a page printer, you need to choose the one with performance to match. Now you can choose the power of the Qume CrystalPrint Publisher™.

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Let your Qume dealer show you the power of the CrystalPrint Publisher. Ask them to print this page on the Publisher and then on an Apple LaserWriter II. After that, the choice is yours. Choose the winner and you’ll choose CrystalPrint Publisher. With its speed, print quality and convenience, no other page printer can match the power of your Macintosh. CrystalPrint Publisher is the power to choose. For information or a demonstration, contact your nearest Qume dealer or distributor. Or contact Qume at (800) 223-2479.

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Macworld News

Andrew Bennett, ISU's Director of Computing, had only one evening to plan the network. Realizing that the students were of diverse nationalities, that some had never worked with computers, and that some spoke little English, he decided that the Macintosh was his only option.

The students used MacDraft, MGMStation, and CricketGraph for graphics. MacWrite 5.0 was their word processor of choice, and Microsoft Excel served as their number-crunching tool. In addition to the printed report, the group produced a 20-minute animated videotape using Silicon Beach Software's Super3D.

Despite time limitations, multilingual communications, some inexperienced computer users, and the complexity of the final multimedia output, the project proceeded smoothly. According to Bennett, ISU is hoping to get Apple to help put together a Macintosh network for next summer's ISU meeting in Europe.—Jeff Merron

Macs Serve the Avant-garde

Do you harbor a secret fear of reincarnation—of being sent back to exactly the life you deserve for the way you've lived this one? What comfortable, overfed American doesn't, at least for moments in between dreams of more food, cars, clothes, and appliances? That secret fear may be stirred by *Etiquette of the Undercaste*, Antenna Theater's interactive, walk-through theatrical installation. Antenna's members don't presume to tell you what you deserve, but they do slide you into a locker at the morgue, awaken you in heaven, and then send you back through a stylized life cycle as a member of the underclass. *Etiquette of the Undercaste* opened at San Francisco's SoMa Gallery in November and is now touring the United States.

What part does the Macintosh play in this theatrical experiment? To begin, Antenna's associate artistic director Ron Davis used a Mac with Siclone's MacDraft software to design a maze that leads through abusive home life, reform school, youth gangs, juvenile court, boxing rings, prostitution, jail, soup kitchens, street scenes, and a final icy night on a park bench. You walk through the maze wearing a Walkman and listening to a sound track edited with Mark of the Unicorn's Performer software. As you walk, you hear real voices telling stories of being homeless, as recorded in street interviews by Antenna director Chris Hardman and BBC and NPR journalist Duc Qui Nguyen. The interviews were transcribed in Microsoft Word on a Mac, and the search command was used to find passages containing key words, such as "home" and "streets." Antenna's members originally chose to use the Mac because of its possibilities for creating graphics and music. Now they find an added advantage in the Mac's popularity among other artists: collaborating is much easier when you can swap disks. A lighting designer, for example, uploaded Davis's MacDraft-designed floor plan to draw up a lighting plan.

What Hardman needs most from the Mac now is more memory. The use of taped interviews is one of Antenna's most innovative techniques, but at this point, only 15 minutes of digital audio is enough to fill a 40MB hard disk, and the half-hour sound track of *Etiquette of the Undercaste* was cut from 40 hours of taped interviews.

Memory or no, we can expect Antenna Theater to use whatever technology is available to create new forms of theatrical art. For further information, contact Antenna Theater, in Sausalito, California, at 415/332-4862.

A Multimedia Feast

You've seen the animation; you've heard the sound effects. Now from MacroMind, developer of Videoworks, comes the Videoworks CD ROM—a collection of over 200MB of Videoworks animations (color and black-and-white), Videoworks Accelerator documents, clip anima-
How I Discovered the
Ultimate Macintosh
Learning Experience

The true story of someone who wanted to learn how to use the Macintosh in business ... and how he almost went crazy doing it.

A few years ago I bought a new Porsche 911. As I was reading through the literature I came across an interesting statement. It said: “the only limitation this automobile has is the driver!”

I must admit that I felt the same way when I bought my Macintosh computer. I was like a lot of first time owners in that I never read the manuals. I simply popped in the disks and figured out the basics on my own. After having used an IBM for three years I was thrilled to be able to accomplish the Mac basics without taking a six month Lotus course!

Over the next few months I happily used my Mac for letters, simple spreadsheets, check books, a few graphics, and for games. But as a business owner, way in the back of my mind, I knew that there was a whole lot more the computer and the software could do if they just had someone else behind the mouse.

I realized I needed training to get the most out of my computer. I first tried reading the manuals. At some point in school they convinced me that I’m a fairly bright fellow. But after nights of reading manuals I simply didn’t understand what I was reading.

My next step was to visit my local Apple dealer for help. He was friendly enough, but made it fairly clear that his interest was in selling computers, not teaching me how to use them. He did mention however, that there was some training available at $75 per hour. I had already paid for one college education and didn’t really have the budget for another!

Next I subscribed to all of the Mac Magazines. Most (including this one) were very interesting. After a while though, I found myself reading the ads more than the articles. I wasn’t interested in advanced graphics, HyperCard stacks, or MS-Dos connectivity. It seemed like more and more of the articles were written to the advanced user - which was definitely not me.

My last resort was a Mac user group. These were great people who were extremely bright and could quote the electrical diagram of the Mac backwards and forwards. But the group was too advanced for me. I was stuck!

In marketing, you are taught to “find a need and fill it”. I definitely saw a need for good, practical instruction on the Mac for the rest of us. I decided to provide the answer for Mac users myself. In January we presented the very first MacAcademy. Since then we have had tremendous response. MacAcademy has many unique features: Instructors: Instead of sales people or programmers we feature only top business executives who use the Mac daily in their businesses. Format: Two full days of instruction on the Mac, Excel, Word, FileMaker, PageMaker, and HyperCard. Schedule: Attendees can design their own personalized schedule by choosing between 18 different, 2 hour workshops. Price: While others charge up to $1200 for workshops, we offer two full days for only $249. Location: MacAcademy is held in top hotels in business centers across the U.S. Emphasis: MacAcademy places training emphasis on techniques and business applications of the featured software.

The Results. Over 6,000 people have attended MacAcademy. On a scale of 1 to 5 they have given the experience a 4.6. Companies who have attended include General Electric, Kodak, G.T.E., M.I.T., Honeywell, N.A.S.A., Boeing, Citicorp, Kinko’s Graphics, Mobile Oil, Gillette, TRW and 500 additional corporations. Are they happy with MacAcademy? The City of Anaheim sent one employee to our first workshop and ten to our second. We have had over 400 people volunteer to be references for those considering attending.

What about you? I’d like to personally invite you to attend MacAcademy. This year we will present our dynamic 2 day workshop in over 65 cities in the U.S., Australia, Europe, and Canada. For a schedule of our upcoming workshops call (904) 677-1918. Profit from the Ultimate Macintosh Learning Experience.

estion, clip art, clip sounds, and interactive animation shells. It's a dazzling display of the Mac's potential as a multimedia playback device in conjunction with CD ROM.

Containing all of MacroMind's commercially available Chip Animation files and color animations, the VideoWorks CD ROM also features demonstrations and presentations created by MacroMind Productions for companies such as Apple, Microsoft, Aldus, Ashton-Tate, Bell-South, and Arthur Anderson & Company. Source files are included for the VideoWorks Accelerator documents. In addition, the CD ROM disk comes with an AppleShare file server driver so that several users can access the disk over an AppleTalk network.

You don't need a copy of VideoWorks II to view documents on the CD ROM; the interactive shell lets you see everything and move between groups of artwork and animation. The only exception to this rule is that accelerated documents do require the VideoWorks II Accelerator.

If you own VideoWorks, the disk can serve as a large data-base of animation, art, and sounds that you can incorporate into your own VideoWorks animations. If you've ever needed ideas for animation, this disk is full of them.

The $695 disk is compatible with any CD ROM player that supports the HFS file format—for example, Apple's CD SC and Laser Optical Technology's CD-ROM Drive. It is not compatible with the High Sierra CD ROM file format standard, which supports only textual CD ROM information, not graphics and animation. For more information, contact MacroMind, in Chicago, Illinois, at 312/871-0987.—Brita Meng

The VideoWorks CD ROM displays the Mac's potential as a multimedia playback device with CD ROM.

Hackers in Paradise

In 1984, when the first Hackers Conference was held in Marin County, California, everyone in attendance wandered around in a state of near-disbelief. It seemed like a human syzygy, a rare convergence where some of the world's best computer programmers, designers, and philosophers shared geographical coordinates for a weekend—the better to share information, swap obscure algorithms and jokes, and plot the future.

But now, as far as the hackers are concerned, syzygy happens once a year. Last October, they held their fourth gathering, Hackers 4.0, in a postseason summer camp in the foothills of Silicon Valley. The theme was connectivity, and there were the usual number of fascinating semiformal sessions: Nolan Bushnell leading the games conference; Todd Rundgren hosting an evening of computer graphics; Ted Nelson on hypertext; and John (Cap'n Crunch) Draper on object-oriented programming. And history was made during Stewart Brand's interactive media session, where for the first time, four competing CD formats duked it out in demos in one room.

Still, the main action took place during conversations outside the sessions, on the lawns and in the makeshift computer rooms, where the 238 participants networked. Macs were much in evidence, and at 4:00 a.m. you could wander into a cabin and see Stephen Wolfram showing off his Mathematica program on a Mac II, or MIT veteran David Levitt sneak-previewing Harmony Grid, his real-time Mac music program.

The only blot on an otherwise perfect weekend was the CBS News report filmed by a camera crew that dropped in on opening evening. The hackers hooted, and ultimately felt hurt by the network news's obstinate (and unfair) focus on the "dangerous" aspect of hacking—the viruses, break-ins, and other antisocial acts. To these exemplary citizens—people who had been instrumental in bringing wondrous technology to the world—this was a gratuitous slap. There was even some talk of holding a press conference attacking CBS. But by the next day tempers had cooled; people were having too much fun to be bothered by some outsiders' opinion.—Stephen Levy

HyperCard Book Roundup

Several books on HyperCard have appeared in the past few months, ranging from Apple's official treatise on the HyperTalk script language to a book aimed at entrepreneurs seeking to market stackware. Here, in no particular order, are rundown on five of them. You can (continues)
Whether you run a small business or your knowledge about computers happens to be less than monumental, the new Microsoft® Works 2.0 has you covered.

Microsoft Works 2.0 is actually five tools in one: word processing, spreadsheet, database, drawing and communications. But as far as you're concerned, it's one integrated program—so it's easy to move between the different tools and use them together.

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And you can count on the communications module to bring information to your desktop through a modem.

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No wonder Microsoft Works 2.0 is the best-selling application in its class. Aside from being a great value, Microsoft Works 2.0 is one program that can handle a myriad of business needs.

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Everything you see above was created using some combination of the five tools within Microsoft Works 2.0: word processing, spreadsheet, database, drawing and communication. As you can see, the real power of Microsoft Works 2.0 comes into play when all the tools are used together.
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*Applied HyperCard: Developing and Marketing Superior Stackware*, by Jerry Daniels and Mary Jane Mara (Brady Utility Software, 1988). The title handily describes this book-and-disk set, a comprehensive guide to creating salable stacks. The 462-page book covers stackware marketing, design, development, and distribution, and walks the reader through a stackware project. An interesting twist is that this book leans heavily on Buckminster Fuller's synergetics, also known as the science of structure. The 800K disk that's included is packed tightly (thanks to Raymond Lau's Stufflt compression program) with stackware and text files that include names and addresses of stackware publishers, press contacts, user groups, and so on.

*Mastering HyperTalk*, by Keith Weiskamp and Namir Shammas (John Wiley & Sons, 1988). Another weighty tome, this 506-page paperback is aimed at two groups: programmers coming to the Mac and HyperCard from other environments, and Macintosh users familiar with the basics of HyperCard and HyperTalk. The book explores HyperTalk in depth—both how to understand the language structure and components, and how to use it to build applications. It even delves into the basics of using Pascal to extend HyperTalk with XCMDs and XFCNs.

*Running HyperCard with HyperTalk*, by Barry Shell (MIS Press, 1988). Weighing in at 565 pages, this book seeks to help both new and advanced HyperCard users build stacks and design useful programs. Plenty of stackware projects are included: customer database, invoicing stack, mail merge, product catalog, and so forth. The book is generously illustrated with screen shots and contains numerous scripts; its clear, direct tone adds to its general accessibility.

*Using HyperCard: From Home to HyperTalk*, by Tay Vaughan (Que Corporation, 1988). A complete guide to HyperCard that even includes a Macintosh primer for beginners who have never used a mouse. After you've read about the evolution of databases, John Sculley, and Apple's vision for the future, and been taught how to use that mouse, you are introduced to HyperCard and in 700-odd pages taken all the way from your first explorations to advanced techniques like XCMDs, XFCNs, and using HyperCard on a network.

*HyperCard Script Language Guide: The HyperTalk Language*, by Apple Computer (Addison-Wesley, 1988). This handsomely produced hard-cover is the official Apple guide to HyperTalk, aimed at those who have already read Apple's *HyperCard User's Guide* and have a basic familiarity with the program. Probably indispensable for the serious HyperTalk programmer, not a hand-holding book for beginners.

—Felicity O'Meara

### Reader Survey: Printers

Of the 494 respondents to our survey on printers, mailed to 1000 randomly selected readers, 99 percent reported using printers with their personal computers. The printers used most often at work were the ImageWriter I and II (26.6 percent), the LaserWriter Plus (25.2 percent), the LaserWriter NT (5.9 percent), and the LaserWriter NTX (5.1 percent). The printers used most often at home were the ImageWriter I and II (66.3 percent) and the LaserWriter Plus (4.3 percent). Most respondents said they were either very satisfied or somewhat satisfied with their printers. At work, 46.2 percent were very satisfied with the ImageWriter I and II, 78 percent with the LaserWriter Plus, 89.7 percent with the LaserWriter NT, 100 percent with the LaserWriter NTX, and 58.4 percent with other printers. At home, 48.1 percent were very satisfied with the ImageWriter I and II, 57.1 percent with the LaserWriter Plus, and 64.4 percent with other printers.

When asked which printer feature would most improve printers at work, 26.2 percent picked higher resolution, 21.7 percent said faster first-page printing, and 10.2 percent opted for better paper-handling. Responses were similar when we asked which feature would most improve printers used at home: 39.3 percent said higher resolution, 10.2 percent said faster first-page printing, and 16.2 percent said better paper-handling.
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Glory Days

How can you follow an act like the Macintosh? A look at the Mac team five years after.

by Steven Levy

"It’s a wonderful, ecstatic feeling to create something and sort of put it back in the pool of human experience and knowledge. And we have this incredible chance to do that in the next five years. And then it’ll be over. By the end of this decade it’ll be all over and computers will be everywhere. We’ll have incredibly great ones and cheap ones, and you know people will be making them better and cheaper than I do. But going out of the eighties, you know there won’t be a Mac group. Burrell will be off in Oregon playing his guitar. Andy will be writing the next great American novel. Who knows what. But we’ll be scattered all over the globe doing other amazing stuff."

—Steve Jobs, before the introduction of the Macintosh

It was November of 1983 when I was ushered into Bandley 3 to see the future. Bandley 3, of course, was the building that housed the Mac team, the so-called pirate lair on the Apple campus, where the "insanely great" computer called Macintosh was then being rushed into production. As part of the well-orchestrated media blitz that was to accompany the Macin-
tosho's introduction, I was to document the machine’s creation for Rolling Stone, a publication that rarely devoted feature stories to such technologica as computer introductions.

But this was different. Not so much because this computer was reputed to be so revolutionary, but because of who was making it—a sassy young company called Apple, led by a brash young culture hero called Steve Jobs. Yes, the computer turned out to be more important than any of the creation legends it launched, but that winter something else impressed me just as much as the stocky little beige box that said “Welcome to Macintosh”: the team that had brought it to fruition.

They were young and energetic and ingenuous, almost falling over themselves with enthusiasm. Passion burned in their eyes. As they spoke, they gesticulated toward the bread box-size computer—sometimes they stroked it affectionately, as if it were a magic charm. Clearly, they believed they were on a crusade; their goal was no less than freeing the world from the evil forces of IBM-style computing. They would achieve this goal simply by creating the world’s greatest personal computer, which in their minds was synonymous with creating a computer that they themselves would like to own.

You hear a lot of promises in the corporate and scientific world. But this felt different. Stepping into the vortex of Mac development, you really felt as if you were standing at the nexus of history, that future generations would wonder what it was like, that you would be able to tell your grandchildren you were there. Remarkably, this sensation did not prove temporary. In fact, as we observe the fifth anniversary of the Macintosh, even some of the bolder promises made a half-decade ago by the cocky pirates have been fulfilled. True, not all the promises. And true, there was a time when it looked like the silicon love object to which they had devoted nearly all of their waking hours (a T-shirt they wore read “90 Hours a Week and Loving It”) would crash and burn in the marketplace. But today, the advocates of the Macintosh have been vindicated. It has changed the world.

The Mac team members have changed as well. The success of their offspring has been bittersweet. Their leader has been shunned by the organization he founded, and has begun a venture of his own; both events have created tumult among survivors of the Mac team, which itself was effectively disbanded by the time the computer was shipped. Many of them have had to come to terms with the new regime at Apple—a majority of the key players have left—but some now look dyspeptically upon the company they once proclaimed a beacon of light in a corporate Dark Age. Almost all suffered some degree of letdown after the triumphant unveiling of the Mac in January 1984. A few sunk into serious depression for a time. It is fair to say that now, five years after the fact, none have forgotten the exhilarating months spent creating the computer For The Rest Of Us. To the contrary, it stands not only as the best time of their young lives to date, but something that they had to come to terms with in order to reconstruct their lives after Macintosh.

Joanna Hoffman, who signed on to the team in 1982 as an international marketer, puts it succinctly:

Looking Back
Several key members of the Mac team in 1985 (from left to right) George Crow, Joanna Hoffman, Andy Hertzfeld, Barrell Smith (below), Bill Atkinson, and Jerry Manock.

Pirates
A gathering of the Mac's software artists from the early days: (left to right) Jerome Coonen, Dorn Demman, Andy Hertzfeld, Rony Sebok, Bruce Horn, Susan Kare, Bill Atkinson, Owen Den'smore, Steve Capps, Larry Kenyon, and Patti Kenyon with baby Tracie.
"It's hard to recapture that magic balance of a great product, great people, a great time—an electric buzz that went on for years. I don't think I realized how amazing it was when I was doing it." After it was over, she says, "nobody could go back to a job."

Put in other terms, each member of the Mac team was faced with a baffling dilemma: what to do for an encore.

**Steve's Job**

My quest to reinterview some of the Mac wizards I had spoken with five years previous took me, of course, back to Silicon Valley. Coincidentally, the area was abuzz with speculation about the imminent introduction of another computer: Steve Jobs's Next machine. Jobs, preparing for the elaborate introduction of this new-generation education engine, was too consumed with his new company to chew sunflower seeds with me and talk Macintosh, but inevitably his shadow still hung over each interview I did.

Steve Jobs's banishment from Apple stands as a shorthand symbol for the disposition of the Mac team. With a few exceptions, like software artisans Larry Kenyon and Jerome Coonen, and documentation-leader-turned-marketer Chris Espinosa, the Mac team doesn't work there anymore. Jobs's shocking exit from the company was but a climax to a process of attrition already in motion when the Mac first shipped. Jobs himself has to shoulder some culpability for this. "There was so much fervor on the team in '83 that Steve would have had to make a real effort to get them charged up again," explains Bill Gates, the chairman of Microsoft who had worked closely with Apple during the Mac development. "Steve didn't pull them together in '84, and they started wandering off."

The irony is that many on the team were almost begging to be part of some revolutionary new project concocted from scratch. From Apple's point of view, though, their efforts could best be spent in continued work on the Macintosh, which for all its glories had some glaring flaws. So the intrepid creators of the Finder, Bruce Horn and Steve Capps, labored to do another release. Then Horn left, dissatisfied with what he considered unfair compensation and inadequate gratitude for the labors of himself and others. Capps continued on the Finder until he left in late 1984, intending to be a free man in Paris.

Capps now feels that the Mac itself suffered from not having its creators around to keep improving on it. "We bailed out too soon," he says. Capps and other Macintosh veterans now realize that some of the "religion" associated with the computer did not jibe with the needs of the marketplace. "In our efforts to change the world we were a little arrogant and unwilling to listen to reason—you have to give the customer what he needs," says Bill Atkinson. Capps reasons that if the team had stuck around longer, they might have improved the Macintosh in a manner more elegant than that of their replacements, who came up with the Mac SE and the Mac II. (Several critics on the Mac team regard those computers as necessary evolutions, but lacking the artistic flair of the original.)

Actually, some of the Mac team were trying to make something very much like the SE, back in late 1984. The so-called Turbo Mac, like the SE, would have had a hard disk, would have featured a gray-scale monitor, and would have run software faster than the origi-
nal. More important, the warren of cubicles dubbed TurboTown was seen as a refuge from what the Mac veterans considered the “bozo” style of engineering and marketing endemic to Apple. Ultimately, the Turbo Mac went into the land of discontinued products. For Burrell Smith—the hardware genius who had done the Mac’s digital board—that was the last straw for him and Apple Computer.

Andy Hertzfeld, the wizard of ROM who had done much of the Mac’s operating software, also felt that Apple was providing insufficient challenge and left the company in 1985. He loved Apple and loved its products, but thought that the company was on the wrong track. “For a month after I left, I cried myself to sleep,” he says.

So when the fire storm surrounding Steve Jobs’s departure broke in mid-1986, there was no Mac team to speak of. Some of the remaining key players in the Macintosh division, like top marketer Mike Murray and software chief Bob Belleville, left in the continuing turmoil. Since Jobs had a new project—one that would supposedly blow people away and change the world in the same spirit that the Mac did—Next stood as a possible sequel to the excitement of Macintosh. And Steve Jobs did some heavy recruiting of the Mac team.

Among his starting players were the original Mac software honcho Bud Tribble and the hardware designer George Crow, who’d done the Mac’s analog board. From there, Jobs began putting heavy pressure on people like Andy Hertzfeld, Steve Capps, Bill Atkinson, and other Mac vets, Joanna Hoffman and Susan Kare, the graphic artist who had worked on Mac icons and fonts, joined up (though both have now left). But some people were too burned out on Steve Jobs; others didn’t think an education-directed computer was the way to go. Jobs was not easily denied. The archetypically, possibly apocryphal story is of one programmer whom Next wooed furiously. When the prospect finally turned down the offer, Jobs huffed that “we really don’t want you anyway.”

**The Wizard of Mac**

As far as Andy Hertzfeld was concerned, Next was a temptation, but not enough for him to give up his status as the last Mac crusader. Andy’s continuing energy, creativity, and devotion to the cause have propelled him into the role of the conscience of the Mac team, the keeper of the flame. The compact, gregarious wizard, now in his mid-thirties, will bluntly state that the years he spent working on the computer were the best of his life, and that the bonds he forged with his colleagues are blood ties. “I would do anything for another member of the Mac team,” he says. And for years after leaving Apple, he would do anything for the computer he helped bring to market.

“Up until 1987, I always kept thinking, What can I do to help the Macintosh? What can I do to make it great?” he explains. “I had a certain responsibility.” In his view, the Mac’s potential to change the world was at stake. So after working on his software for the ThunderScanner, he spurned potentially lucrative projects so he could work—with no promise of compensation—on Servant, an alternative desktop program. Likewise, QuickDraw, his program to speed up color...
graphics on the Mac II, was executed primarily to make the Macintosh more attractive than its competitors.

Eventually, Hertzfeld came to realize that his efforts might better be expended in other areas. Lately he has embarked on a project commissioned by the Frogdesign Company to help design the ultimate home entertainment system. "I have to be realistic, not tilt at windmills," he says. To the point, he adds, "In the fall of ’87, it became very clear the Mac didn’t need me at all." He is of course delighted at the computer’s success, a vindication of the claims he and others made in 1984. But he finds it ironic that "a lot of people who are smug about the success the Mac is having are the same ones who hated it when it first appeared."

The years have given him a more temperate vision of how important the Mac has been in the scheme of things. And he realizes that his celebrity in the Mac community is to a large extent a function of luck—being in the right place at the right time. He asks himself questions: What would the Mac have been like if he hadn’t worked on the project? What would it have been like without Steve Jobs? What would Apple be like if the Mac hadn’t appeared? And what would the world be like if there weren’t an Apple Computer? The answers he comes up with reflect a candid maturity.

"Well, the world wouldn’t have been that different," he admits. "Maybe things would have happened a year later."

As for Steve Jobs’s off-the-cuff observation that Andy Hertzfeld would one day pen the Great American Novel, there is still hope for that. Hertzfeld is an avid reader (Vladimir Nabokov is his current passion), and he hopes one day to sit down at the computer and crunch fiction.

**Howard Hughes Approximately**

Burrell Smith’s path since leaving Apple has been eventful and puzzling. The diminutive blond hardware hacker has not, as Jobs predicted, gone off to Oregon to play guitar. Instead he has continued his digital design work, and since the Mac he has been responsible for significant contributions ranging from the LaserWriter to the Radius Full Page Display Monitor. The latter product was created after Smith left Apple, apparently under bitter circumstances. When I first met Smith, before the Mac unveiling, he spoke with affection about the company that had allowed him—an obscure engineer working in the repair department—the chance to design its major new computer. Now, he reportedly will not even drive his car in the vicinity of Apple headquarters.

Supporting the Mac was something else, and one day in April 1986 he asked former Mac teammate Mike Boich to come over to his house to hear about the full-page display. Boich, co-author of MacTerminal and the first Mac software evangelist, had also burned out on Apple. For a time he even left the computer field, hoping to vent his entrepreneurial urges in the real estate business. But after seeing Burrell Smith’s project, most of it spread out on Smith’s Ping-Pong table, he decided to get back into computers. Boich and Smith began Ra-
Randy Wigginton and Bill Atkinson wrote, respectively, MacWrite and MacPaint. In addition, Atkinson was the author of the QuickDraw routines—originally used in Mac's big sister, Lisa—that were at the heart of the Mac's graphics capabilities. When I first met them five years ago, both were exhausted from the effort they had expended on the Macintosh. But both were fiercely proud of what they and their colleagues had produced.

Wigginton, in particular, was pushing the boundaries of his energies, trying to make sure that the release version of MacWrite would not blow up, thus destroying thousands of term papers, memos, and reports. He was no stranger to historic personal computer efforts—as a teenager he had helped the nascent Apple Computer ship its first product, the fabled Apple II. But that was back in the days when buggy software was shrugged off by hobbyist users. The Mac had to work right; millions of dollars were at stake. So the pressure was on Wigginton, who had independently contracted with Apple to write the Mac word processor. A solid version of MacWrite went out on time, and it was Wigginton's triumph, as well as "my swan song as a hacker," he says. "I lost 15 pounds during that period."

But not long after the intro troubles began for Randy Wigginton. He immediately started work on a "virtual memory" version of his program, a version that would hold more than the inadequate ten-page-at-most files of the first release. He undertook this project less for financial reasons than from a desire to help the Macintosh—under the licensing agreement, he got no more money for writing a new version. But he says he did it to help the Mac.
By the time he had finished, though, the Fat Mac was out (increasing the document size of MacWrite). Microsoft Word was about to be shipped, and the need for the upgrade was questionable. Also, Wigginton had discovered that during the time he and his helpers were sweating to finish the original word processor, Apple, in a show of low confidence, had secretly commissioned another group to write a second program, just in case MacWrite failed. (Apple never released this other program, which later evolved into WriteNow.)

Wigginton began to ask himself what his herculean efforts had brought him. "The answer," he says, "came up short."

Things only got worse in 1985, as potential buyers perceived the flaws in the Macintosh and sales flattened. It was a humbling experience. "All the publicity said—and we believed—that we were on a mission from God," says Wigginton. "But afterwards, everybody realized that they were human—and it was hard."

For him, it was particularly hard. A period of "creative paralysis" ensued. Another word for it might be depression. For six months he did no programming and spent a lot of time sleeping and watching television. It was all too easy to fall into the trap of drugs. He alienated almost all of his friends, and this deepened his misery. "I was convinced I had done the best work of my life," he says of this period. "I had no desire to live."

With the aid of therapy, and the support of his wife, whom he'd married in 1984, he rekindled his desire. He came to realize that "I wasn't an OK person because of the work I did—I was an OK person because of who I am." He came to realize that the fast-track world of a Macintosh hero was much like that of a rising Hollywood actor—with the same dangerous pitfalls. Wigginton got involved in living again, and though he avoided hard-core programming, he was able to oversee the development of a program that was to become Ashton-Tate's Full Impact spreadsheet.

Now he is once again fit and energetic, and was recently hired by Ashton-Tate's Macintosh division as a senior scientist. "My goal is to help them come out with products on the leading edge," he says. "I'm sort of a practical visionary."

From Mac to HyperCard

Bill Atkinson's depression did not hit until almost a year after the Mac shipped. The guru of MacPaint and QuickDraw had immediately embarked on another project with the potential to change the world even more than the Macintosh. It was to be called Magic Slate, and besides animating some of Atkinson's most creative design ideas, it embodied some of the principles of Alan Kay's fabled Dynabook portable computer concept, as well as some of Jef Raskin's ideas about how a computer user should not have to worry about operating systems or applications: the user should just work, and the tools should appear as they are needed.

As Atkinson describes it today, Magic Slate seems like a dream computer. At 14 by 12 inches, it would be roughly the size of a tabloid newspaper—held vertically on the lap or desk—and would weigh no more than a pound or so, portable enough that no one would go anywhere without it. It would be made inexpensively enough "to figure that you would lose about six a year," he says. The memory would be sufficiently large that you could think of the information stored within it as "a notebook 80 feet thick." (Pages would be the units of storage here, much as note cards are in HyperCard.) Searching functions would be...
Five years later, Steve Jobs leans on another innovative computer:

lightning-quick and powerful. There would be no keyboard or mouse—instead the user would control the Slate with fingers and a metal stylus. You would, for instance, turn pages by simply brushing against the screen in a motion that would turn a page in a book. To input text you would use the stylus, simply jotting down what you want. Atkinson says that he devised some revolutionary new techniques for character recognition—when I showed him the chicken-scrawl in my notebook and asked whether a Magic Slate could read that, he didn't even blink before answering affirmatively.

The problem with the dream was that the technology—flat panels, cheap memory, and such—was out of reach. "Needless to say, Magic Slate wasn't the kind of thing that Apple could make in a couple of years," says Atkinson. "And back then, Apple wasn't into long-term research." That was it for Magic Slate, but the time wasn't wasted. "The way to get where you want is to dream it—pretend you're living in the world where it could happen," he explains.

Still, the realization that his project wouldn't happen was tough on Atkinson—"I wanted Magic Slate so bad I could taste it," he says. So he experienced a double letdown—the death of his new idea and the delayed postpartum blues from the Mac.

"It was a period of great depression," he recalls. "There was a time when I couldn't bear to sit at the computer."

The turning point for Bill Atkinson came one night when, unable to crunch the code he does so brilliantly, he took a late-night stroll in the hills near his home. Above him was a clear sky, the ultimate bitmap, dotted with stars too numerous for any Mac to count. It was a humbling sight for one of the stars of the Mac community. The proportions of his depression seemed absurdly puny compared to the celestial epic.

Far from being a daunting observation, this recharged his thinking. Wherever he stood—wherever we all stood—in the universe, it made sense to make do with what we are, with who we are. And Atkinson realized that he was not without a certain measure of ability to make this world better. He was in a position of leadership, he had an ability to think creatively, and he had the ear of John Sculley.

And soon he had an idea—some of the virtues of Magic Slate modified to run on a 512K Macintosh. Instead of an eight-foot-high stack of notebook pages, there were note cards. It was Wildcard—now known as HyperCard—and for the next few months he worked feverishly to prepare a software prototype. He had not been unaffected by the troubles and intrigues at Apple in 1985, and he had been personally offended that Apple was planning to discontinue the practice of including MacPaint with every Macintosh. To Atkinson, hell is creating a product that does not ship. So by the time he showed the Wildcard mock-up to John Sculley, Atkinson was fed up with Apple, about to leave. But Sculley was more than slightly impressed with Wildcard.

"What do you want?" he asked Atkinson.

"I want it to ship," said Bill.

So the agreement was made—Apple would either ship the program with every computer or give the program back to Atkinson to sell it elsewhere. Atkinson gathered a small team of programmers and documentation wizards to aid him and, keeping in mind the best of his Macintosh experience, ran his project with the same fanatic devotion to quality that had characterized the other project. The rest is Macintosh history.
It also represented a liberation from the shadow of Steve Jobs. Atkinson, of course, was one of those whom Jobs attempted to recruit for Next, but Bill's priority at that point was HyperCard. "It became easier for me to talk to Steve," he says. "It had been like father and son. Or apprentice and master. When I got HyperCard, it was like, 'Look, Dad, I succeeded—you trained me!'

At 37, Bill Atkinson is recognized as the creator of one of the most popular programs of all time. Yet an equally significant advance is the distance he has gone personally in the time between Macintosh and HyperCard, to which he is currently devoting a minimum of two years support. Part of the change is his daughter, four-year-old Laura; he takes fatherhood very seriously. And part is simple maturity, which has taught him that an artist need not have an "artistic temperament." "I used to think the world was out to get me," he says. "And now I realize the world is neutral. You can make what you can of it."

**Mac the Sequel**

That may well stand as a generalization for what the Mac team has learned in the five years after the glory days petered out. I suspect we would hear similar stories from, say, the 1984 Olympic hockey team, or from any group that has worked closely together for a common and worthy goal, and succeeded. The Mac team members enjoyed an extended period when their priorities and choices were made for them—their lives were centered around creating the computer for the rest of us. Now they are immersed in the more complicated world of making adult choices, and are faced with the challenge of making that achievement something more than nostalgia. And I think that for the most part they are doing just fine.

The Mac team is indeed, to use Steve Jobs's words, "scattered all over the globe doing amazing stuff." And perhaps most encouraging of all is a project now under way at, of all places, Apple Computer. Among the key team members are Mac veterans Larry Kenyon and Jerome Coonen—and Steve Capps, back at Apple again after returning from Paris and working on software projects like Studio Session and Sound Designer. Capps says that John Sculley himself got involved in recruiting him for the job. The project is a secret, but it must be something special because everyone who knows anything about it calls it the most exciting thing Apple has designed since, well, the Macintosh.

"In some ways this is a Mac-like experience," says Steve Capps. He is talking about reviving the idealism, the energy, the fanatic devotion to detail, and the disinclination to accept what others say isn't technologically possible. On the other hand, he says, "We're being careful not to repeat the not-so-pleasant aspects, like the pressure we were under." He says that, like Macintosh, the project will be something to be proud of. And just as significant, he reports that between the members of the team a familiar electricity is being generated.

In other words, there is life after Macintosh. It's comforting to know that as the computer has grown up and thrived, so have its designers.

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Steven Levy is a Macworld columnist and the author of *The Unicorn's Secret: Murder in the Age of Aquarius* (Prentice-Hall, 1988).

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**5 Years After**

*Hands held in a classic Steve Jobs pose, several Mac team members at a present-day gathering pay tribute to Jobs's legacy: (counterclockwise from the Mac) Larry Kenyon, Mike Bottch, Steve Capps, Andy Hertzfeld, Brian Howard, Bud Tribble, Patti Kenyon, and Joanna Hoffman (center).*
Recognizing text with a scanner and OCR software

The Reading Edge

Most people's desks are still covered with paper, and the much-heralded paperless office continues to be an elusive goal. Optical character recognition (OCR), however, does offer a workable alternative to retyping all that information into the Mac. Boasting recognition rates of up to 2500 characters per minute, OCR systems automatically convert hard copy into a text (ASCII) file, which can then be edited with word processors or imported into page layout programs, forms, spreadsheets, or databases.

To find out how accurate OCR is, I tested all eight OCR packages currently available for the Mac: Caere's OmniPage, CT's TextPert, Xerox Imaging Systems' MacOCR, Dest's Publish Pac, Olduvai's Read-It, Innovatic's ReadStar II Plus, Microtek's MacinText, and New Image Technology's TextScan. Using both a Mac SE with 2.5 megabytes of RAM and a Mac II with 5MB, I tried to read four different kinds of documents with each package. The degree of accuracy depended primarily on the type and print quality of document I tried to read. Some OCR programs couldn't recognize typeset documents or even many LaserWriter fonts. Other packages needed a substantial investment of training time before they could recognize characters. Finally, some OCR packages required very specific hardware configurations.

Hardware Demands

OCR programs use two basic techniques to recognize characters. In matrix matching, also called pattern matching or template matching, the software isolates individual characters in a scanned document. A graphic map of each character is formed, and then it is compared to a reference set, or template, in the Mac's memory. The other method, feature extraction, utilizes a reference shape table of several thousand character features—vertical lines, horizontal lines, loops, and so on—in place of a graphic map.

Matrix matching and feature extraction aren't mutually exclusive. In fact, many OCR programs use both to match characters. And it's not unusual for a program...
to use artificial intelligence (AI) rule-based logic in the process of character matching.

OCR is very computation- and memory-intensive, simply because each scanned character must be compared and matched to large tables and reference sets. As a result, you generally get faster results with a Mac II than with a Mac Plus, or with a 4MB SE than with a 1MB SE.

This doesn't mean that OCR accuracy is any better on a Mac II. Some programs, however, do require significantly larger hardware investments—most notably OmniPage, which needs a 68020-based Mac and 4MB of RAM just to run.

**Scanner Considerations**

OCR software matches bitmapped (black-and-white) graphics with reference sets; gray-scale scans contain too much information for OCR software to interpret. Since all Mac scanners can scan text as line art, the key consideration in choosing an OCR program becomes whether or not the package you're evaluating provides direct *driver* access to your particular scanner. In some cases, OCR software comes with separate driver files for various scanners; in others the software recognizes that a particular scanner driver is in the Mac's System Folder. Direct access allows you to scan images directly into the OCR program for recognition.

Although most packages can import TIFF files, doing so involves scanning pages in a separate applica-
tion, and then saving the images. Some scanners, such as Hewlett-Packard’s ScanJet, use a desk accessory to control scanning. While this solves the problem of switching between applications, you must still save the image to import it into the OCR program.

**Three Approaches to OCR**

The fonts, font sizes, and type styles in your text—even the printer that printed the text—make a big difference when you’re using OCR software. Each of the eight OCR packages for the Mac falls into one of three categories: **nontrainable**, **trainable**, and **automatic**. These categories reflect the software’s ability to read different kinds of text.

**Nontrainable**
Nontrainable programs have built-in font templates for the particular printers that they support; these templates define specific point sizes and pitches for the fonts the OCR system can read. Nontrainable systems are limited to those fonts and printers. MacintoshText, MacOCR, and Publish Pac are examples of nontrainable OCR software.

Nontrainable programs are fast, and you don’t have to do anything to the program to get it to start recognizing documents. However, the software probably won’t recognize text in a typeface that’s not supported.

At the very least, recognition errors cause the program to slow down significantly as it tries to make a match between its templates and your scanned text.

**Trainable**
With trainable programs, you build reference sets, templates, or type tables for the documents yourself, “teaching” the OCR software a particular typeface.

The four trainable programs currently available—Read-It, ReadStar II Plus, Textpert, and TextScan—differ in teaching methods but share the same basic concept. The software isolates a bitmap that it thinks is a character; you type the character the bitmap represents. Essentially, you’re building a template (like those used by nontrainable systems) against which the OCR program can compare scanned text.

Despite the shortcuts that some trainable systems offer (for example, Textpert allows you to base the type tables you create on fonts in the System file; Read-It comes with an assortment of type tables to get you started), you should start from scratch when building a template. It may take longer, but it offers the highest recognition accuracy.

The advantage of trainable systems over nontrainables is greater flexibility in what they can read—even typeset documents; you can customize a trainable OCR program for your documents, and create new templates at will. The disadvantage is that the training process can be painstakingly slow, depending on the quality of the original document and its fonts and type styles.

**Automatic**
OmniPage is the only automatic OCR system available for the Mac. As with nontrainable systems, you can use OmniPage right out of the box. Unlike nontrainable systems, however, OmniPage isn’t limited to certain type styles and printers—it recognizes a wide variety of printed text, even in one document.

However, should you come across a type style or page that the automatic system can’t read, or if the system makes too many errors, there’s nothing you can do to improve accuracy.

**A Question of Accuracy**

None of the OCR programs claim a 100 percent recognition rate. Specified accuracy rates are usually about 99.5 percent, or a little less than one wrong character per 100.

There is a very important distinction to be made when talking about errors. A recognition error occurs when the OCR software doesn’t recognize a character. The software inserts a place-holder like “*” or “•” to indicate that it doesn’t recognize the character.

Substitution errors, which are more critical than recognition errors, are not included in manufacturers’ error rate counts. When a substitution error occurs, it’s not that the OCR package doesn’t recognize the character at all; the software just misreads the character. As a result, you get the equivalent of a typo.

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**Teaching Times**

There’s a great variance in the times it takes to teach the four trainable OCR packages using each of the four test documents. Test Document #1 was a LaserWriter-printed document, Test #2 was a spreadsheeet document, Test #3 was a spreadsheet document, and Test #4 was two Macworld pages. I measured the training times on both the SE and the II.
Recognition Time
Here are the times it took to recognize each of the four test documents: a LaserWriter-printed document, a typewritten document, a spreadsheet, and two pages from Macworld. The Macworld pages could be recognized only by the trainable OCR packages.

<table>
<thead>
<tr>
<th>Single-Column LaserWriter Pages</th>
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</thead>
<tbody>
<tr>
<td>PROGRAM</td>
</tr>
<tr>
<td>TextScan</td>
</tr>
<tr>
<td>TextPort</td>
</tr>
<tr>
<td>ReadStar II Plus</td>
</tr>
<tr>
<td>Read II</td>
</tr>
<tr>
<td>OmniPage*</td>
</tr>
<tr>
<td>Publish Pac</td>
</tr>
<tr>
<td>MacOCR</td>
</tr>
<tr>
<td>MacText</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Multi-page Typewritten Document</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROGRAM</td>
</tr>
<tr>
<td>TextScan</td>
</tr>
<tr>
<td>TextPort</td>
</tr>
<tr>
<td>ReadStar II Plus</td>
</tr>
<tr>
<td>Read II</td>
</tr>
<tr>
<td>OmniPage*</td>
</tr>
<tr>
<td>Publish Pac</td>
</tr>
<tr>
<td>MacOCR</td>
</tr>
<tr>
<td>MacText</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Multi-page, Multicolumn Spreadsheet</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROGRAM</td>
</tr>
<tr>
<td>TextScan</td>
</tr>
<tr>
<td>TextPort</td>
</tr>
<tr>
<td>ReadStar II Plus</td>
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<tr>
<td>Read II</td>
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<tr>
<td>OmniPage*</td>
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<tr>
<td>Publish Pac</td>
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<tr>
<td>MacOCR</td>
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<td>MacText</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Multi-page, Multicolumn, Typeset Document</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROGRAM</td>
</tr>
<tr>
<td>TextScan</td>
</tr>
<tr>
<td>TextPort*</td>
</tr>
<tr>
<td>ReadStar II Plus</td>
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<tr>
<td>Read II</td>
</tr>
</tbody>
</table>

It's much more difficult to catch substitution errors. The best way is to carefully read the final document. You could use a spelling checker, but it can miss errors and isn't much use for checking numbers in a spreadsheet.

Comparing OCR Performance

I tried out four different types of documents with each of the non trainable programs. The first, Test #1, was a simple double-spaced LaserWriter document six pages long. Test #2 was a five-page typewritten law brief—more challenging because it was a dirty copy. Test #3 was two pages of a three-column Microsoft Excel spreadsheet, also printed with the LaserWriter. These three document types comprised the complete test suite for the non trainable OCR software.

For the trainable and automatic OCR programs, I added a fourth test—two pages from Macworld, typeset in Garamond typeface—to the previous three tests. Garamond was not a typeface supported by non trainable software, so Test #4 would have been infeasible with those programs. Each of the trainable programs as taught with the same training documents (six pages for Test #1, three for Test #2, two for Test #3, and three for Test #4). There was no need to train OmniPage.

MacinText

Microtek's MacinText is the least expensive OCR program, and you certainly get what you pay for. While the software provides a wealth of ways to scan and set up a document, its recognition capabilities fall far short of the other non trainable packages, except for use with very simple pages.

Even though MacinText works directly with only Microtek scanners, you can import TIFF files from other scanners into the program. You can set a scan's brightness and contrast, and use the prescan feature to set the overall scan area, define OCR text areas, even mask images and graphics on a page. However, you can't resize these windows once you define them. The program's filter, a feature designed to eliminate extraneous information, doesn't seem to help MacinText deal with scans resulting from dirty pages. Nor can MacinText handle underlined text in any form.

Options in the program let it recognize monospaced or proportionally spaced typewritten text, as well as multiple type sizes on a page (see "MacinText"). A menu selection called Vertical Format is supposed to maintain the line spacing of the original document in the recognized text file, but it didn't work very well—in fact, line spacing was more consistent without vertical format selected.

Finally, MacinText exhibits another strange quirk after you save a text file. For some reason, the saved file remains open and untitled on the desktop.
MacOCR

Xerox Imaging Systems' (formerly Datacopy) MacOCR functions only with Xerox Imaging scanners, but can import image files from other scanners in a wide variety of formats.

Unlike Publish Pac and MacinText, MacOCR requires that you manually load the fonts needed for page recognition. Luckily, the manual contains sample printouts of the typefaces MacOCR supports, to help you make the match.

You can clean up dirty scans with the program's Zoom Edit feature, which works much like MacPaint's FatBits. While the zoom is valuable, it would be better if weren't quite so close up; it's difficult to scroll through a full-page scan looking for stray bits.

MacOCR lets you frame text to read across multiple scans (see "MacOCR"). The variety of file formats to save to is very extensive: MacWrite, Microsoft Word, text with carriage returns, text with carriage returns and line feeds, and unformatted text. I did encounter some sporadic line spacing problems, primarily in the form of extra carriage returns in the resulting text file. The biggest problem I encountered with MacOCR was that, for some unknown reason, it completely skipped several lines in my spreadsheet test during recognition.

Publish Pac

Dest's nontrainable Publish Pac works very well on documents typed or printed with its specified type styles. Publish Pac works best on single-column documents, since it can scan and recognize only one text area at a time (see "Publish Pac"). The program handles underlined text impressively and has a nice tabbing feature. Other text formatting features include the ability to preserve margins, paragraph breaks, and page breaks. Unfortunately, Publish Pac operates only in conjunction with OCR hardware in one of Dest's own scanners. Therefore, unless the scanner was hooked up to my Mac, I wasn't able to import TIFF files into Publish Pac for recognition.

There are several zoom options, which help you to position the text window, but I found image scrolling and changing zoom views very slow on the SE.

Publish Pac lets you Scan Text—recognize text in one step—or Convert to Text—scan an image, then read it in a separate step. Convert to Text lets you clean up dirty scans with an eraser tool. The two-step process took 1 minute 57 seconds, while the total time for a text scan was only 51 seconds.

Read-It

Olduvai's Read-It is the first OCR program capable of background recognition with MultiFinder. Read-It can handle all types of text—as long as you take the time to teach it the typefaces. The only kind of text it couldn't recognize during my testing was underlined typewritten text, where the underscores are not joined to the characters.

Read-It takes longer to recognize text than other programs. This is primarily because the program does a lot of prerecognition analysis—isolating lines, isolating characters, checking for kerning and monospaced characters, averaging character sizes—before any recognition can take place. And the program has to go through this process for each text area. It took Read-It five minutes to analyze some text, but only four minutes to do the actual bitmap matching.

Before you can teach the program a typeface, you must set the parameters (monospaced, kerned, ligatures, and so on) of the page, as well as its line spacing. Otherwise, Read-It will not accurately perform its character segmentation tasks.
Read-It has three training modes: Learn, Learn and Recognize, and Easy-Learn. Learn takes the longest (see "Read-It"). Learn and Recognize asks you to identify only those characters that Read-It can't recognize within user-definable matching tolerances. Easy-Learn requires that you have a Mac text file that exactly duplicates the text of the scanned page (preferably one with all alphabetical characters on it), Read-It then sets up the type table using the character file.

You can frame several sections of text with resizable windows. Unfortunately, these text windows can't be moved. If you have multipage documents, you can save the positions of these windows in a selection template. To read multipage documents, which is only possible with saved image files on disk, you use the program's batch recognition capability.

I prefer a progressive training process; start with a short Learn session and then move to Recognize and Learn mode. You'll get the best results if you train for each typeface and font (italics, bold, and so on) separately, then load all of them for recognition. A very nice feature for fine-tuning lets you examine and edit Read-It's type tables to correct any mistakes made during training.

I noticed the response time of the program during training slowed noticeably as the type table grew—especially on the SE. Image scrolling while framing text was also much faster on the Mac II.

**ReadStar II Plus**

Inovatic's ReadStar II Plus is a fast-learning trainable OCR program. It's also the only copy-protected OCR program for the Mac. As far as recognition goes, ReadStar opts for the unrecognizable-character marker whenever it's unsure about a letter; thus, the program generates very few substitution errors in text files.

Training is accomplished in the program's Learning mode. This goes very quickly because ReadStar II Plus keeps recognizing characters while it's learning. You can actually see the rate of recognition climb as you teach the program more letters.

Although you can correct a typing mistake in the midst of the training session, ReadStar reflects the correction only when you start reading another document.

The program provides image zoom capabilities, multiple text-window selection, and a wonderful eraser for working with dirty documents (see "ReadStar II Plus"). Be careful: the eraser has no Undo command. Should you delete part of a character by mistake, you can either skip over it during training or rescans the page and start over.

ReadStar recognizes text in the order in which you position the text windows. They cannot be resized and moved about once you've positioned them, but they can be independently deleted. These windows can carryover across pages for scanning similarly formatted multipage documents.

Characters can be recognized in two ways. Automatic mode lets ReadStar recognize as best it can without your help. In Interactive mode, the program asks you to identify characters it can't match.

I had some problems with text formatting. De-selecting the word wrap (unjustified format) option kept the original document's format, with carriage returns after every line. But during recognition, the formatting occasionally switched from carriage returns...
## Setting Up for OCR

<table>
<thead>
<tr>
<th>Company</th>
<th>Microtek</th>
<th>Xerox Imaging Systems</th>
<th>Dest</th>
<th>Olduvai</th>
<th>Inovatic</th>
<th>CTA</th>
<th>New Image Technology</th>
<th>Caere</th>
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### Required Hardware

<table>
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<tr>
<th>Minimum Mac</th>
<th>Mac Plus</th>
<th>Mac Plus</th>
<th>Mac Plus</th>
<th>Mac Plus</th>
<th>Mac SE</th>
<th>Mac Plus</th>
<th>Mac Plus</th>
<th>Mac II&lt;sup&gt;1&lt;/sup&gt;</th>
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<td>2MB</td>
<td>1MB</td>
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<tr>
<td>Suggested memory size for MultiFinder</td>
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<td>32K</td>
<td>976K</td>
<td>1900K</td>
<td>384K</td>
<td>1171K</td>
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### Built-In Scanner Drivers

- Agfa
- Apple
- Dest
- Datacopy
- Hewlett-Packard
- Microtek
- New Image Technology
- Other

<table>
<thead>
<tr>
<th></th>
<th>ThunderScan&lt;sup&gt;2&lt;/sup&gt;</th>
<th>Abaton 300 SF</th>
<th>Abaton SCSI, Sharp</th>
<th>Princeton Graphic Systems, Spectrum Digital Systems, QMS, Sharp</th>
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</thead>
</table>

<sup>1</sup> Or Mac SE equipped with 68020 accelerator board.

<sup>2</sup> Separate version of Read-It for ThunderScan available for $149.

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to word wrap in the middle of a document. And I couldn’t get the program to save any changes I’d made while I was working in its internal editor.

### TextPert

CTAs TextPert was the most flexible program I found for setting up a page for recognition. This trainable program can define text windows on its own, or you can define them manually. You can select text in multiple windows, which can be resized and moved around. You delete individual windows simply by activating them and then hitting the Backspace key. Tabs in text areas can also be manually defined, which is handy for spreadsheet recognition and formatting.

Rather than opting for the “first window placed, first text recognized” approach, TextPert lets you change the order in which it reads the text. In addition, you can change the output format from text window to text window (see “TextPert”). Both output specifications and text windows remain the same from one scan to another. Like ReadStar, TextPert keeps recognizing characters it knows while you’re teaching it. But unlike ReadStar, it is fairly liberal in matching characters. The only thing TextPert doesn’t do is maintain exact original spacing and indentation.

In its regular Teach mode, TextPert doesn’t stop to let you correct mistakes. To keep the program from running rampant trying to match characters it can’t recognize, you can use the Complete mode, which forces the program to stop whenever it encounters user-specified characters.

You can activate two windows in addition to the recognized text window, during the program’s recognition process. The document window holds the entire document image, while the View window shows how TextPert is segmenting characters.
Read-It
The Learn mode asks you to identify every character in the selected text, making that mode useful for limited scans only. The Recognize and Learn mode lets you see the program’s progress by displaying recognized text during teaching.

ReadStar II Plus
All image manipulation is done with the program’s tool box; the Zoom window appears when you select the Frame Text icon. The statistical information is extremely useful for fine-tuning font templates and checking for recognition accuracy.

TextPert
You can ask the program to insert a return or another character after every line, a return or another character after a specific window area, or a character at the start of an area.

TextScan
Because character tables are included with the program, it won’t necessarily ask you to identify every letter in a text. However, when characters get blurred because of scanning (as happened here), you’ll have to help TextScan out.

I found that the speed of the program did slow from 1 minute 29 seconds to 1 minute 44 seconds in Test #1 when both windows were open. However, the document image window is especially useful during the teaching process because it lets you see the context of the character bitmap being questioned by TextPert—thus eliminating any confusion between upper and lowercase letters that tend to look the same in bitmap form (for example, s and S).

TextScan
New Image Technology’s TextScan wins the prize for the friendliest icon, but it’s definitely not the friendliest OCR software.

The only control you have over scan quality is to select a menu option for Normal, Dark, or Light. Unfortunately, there are no contrast settings. You can resize the scanning window, but there’s no prescan feature. And the program’s lack of a zoom facility hampered my ability to check scans.

You select the text to be read with a resizable, movable window, several of which can be positioned for multicolumn documents. TextScan doesn’t maintain these text frames for different scans, and deleting one frame can only be accomplished by deleting all the frames you’ve created.

TextScan has two read modes. In Noisy mode, the program asks you to identify any unknown characters as soon as it comes across them (see “TextScan”). In Quiet mode, TextScan recognizes characters the best it can. In Noisy mode, because the program is reading two lines ahead of what you see in the text window, it can be difficult to identify unknown characters by context. Strangely, both read modes use the same keyboard command. After reading text in either mode, you have the chance to correct errors.

TextScan can handle ligatures and proportionally spaced type, but due to a program memory-handling bug, I wasn’t able to get it to read pages from Macworld. In addition, version 1.3 of TextScan failed my spreadsheet test miserably, adding in extra spaces at random between numbers. According to New Image Technology, version 2.0 corrects these memory and spacing problems.

The program did reasonably well at reading plain text and underlined characters. And for the most part, errors were consistent across documents, making corrections easier within TextScan. But because you should correct errors immediately after the recognition process to achieve low error rates, TextScan requires more user interaction to work.

OmniPage
If you want a combination of immediate use and recognition flexibility, Caere’s easy-to-use OmniPage may be your best bet. However, it isn’t perfect, especially when automatically identifying text areas.
## OCR Software Compared

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<th>Scanner Controls</th>
<th>Import File Formats</th>
<th>Output File Formats</th>
<th>Built-in Text Editor</th>
<th>Halftone Image Scanning</th>
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<td>Micrtek</td>
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<td>Brightness</td>
<td>PICT</td>
<td>Text (ASCII)</td>
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<td>Xerox Imaging Systems</td>
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<td>TIFF</td>
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<td>Dest</td>
<td>10–12 point</td>
<td>Prescan</td>
<td>Other</td>
<td>Microsoft Word</td>
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<tr>
<td>Olduvai</td>
<td>8–72 point</td>
<td>Select text areas to scan</td>
<td>Datacopy, MacPaint, SuperPaint</td>
<td>Tab format</td>
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<tr>
<td>Inowatic</td>
<td>4–20 point</td>
<td>Mask graphics/image areas</td>
<td>MacPaint, ThunderScan, AppleFax, FAX stf</td>
<td></td>
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<tr>
<td>CTA</td>
<td>4–72 point</td>
<td>Filter</td>
<td>Foto</td>
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<tr>
<td>New Image Technology</td>
<td>10–24 point</td>
<td>Eraser/Fat-Bit editing</td>
<td>bitmap, Foto</td>
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<tr>
<td>Caere</td>
<td>8–72 point</td>
<td></td>
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</tr>
</tbody>
</table>

### Scanner Controls
- **Brightness**
- **Contrast**
- **Prescan**
- **Select text areas to scan**
- **Mask graphics/image areas**
- **Filter**
- **Eraser/Fat-Bit editing**

### Import File Formats
- **PICT**
- **TIFF**
- **Other**

### Output File Formats
- **Text (ASCII)**
- **MacWrite**
- **Microsoft Word**
- **Tab format**

### Built-in Text Editor
- **Text**: depends on scanner

### Halftone Image Scanning
- **Text**: depends on scanner

*1 LaserWriter Courier Title in 10–18 point.
*2 Only in version 2.0.
*3 Activated by settings: Low Quality, Medium Quality, High Quality.
*4 TIFF image files can be opened only if Dest scanner is attached to the Mac.
Once a scan is completed, OmniPage strips out all of the graphic elements on a page and outlines what it thinks are text blocks. The recognized text then appears in the program's text editor (see "OmniPage").

No cut-and-paste options are available in the editor while it is in MacWrite format. However, OmniPage will retain formatting information such as underlining and margins. Cut-and-paste functions do work if you recognize text as simple ASCII characters, but then OmniPage retains no formatting information. Another formatting option (not mentioned in the rather sparse manual) is an Excel-compatible file. That format recognizes spaces as tabs, so you can import recognized text into a spreadsheet.

OmniPage recognizes pages of all shapes and type of all sizes without problems. You can assign the order in which OmniPage reads multiple text blocks, as well as manually select areas to read.

One thing you can't adjust is how OmniPage identifies blocks of text. For example, the program sometimes frames a section of one column as part of the adjacent column. As a result, some lines from the first column wind up in the second column instead of where they belong. To correct the problem you must restart the recognition process for that particular page.

The most impressive thing about OmniPage is its remarkable skew tolerance. Even a page scanned at a 30-degree angle is recognized reasonably well. No other OCR program offers such dramatic skew tolerance.

### Sound Advice

The performance of OCR programs is determined by many factors, most of which you can control.

- **OmniPage**

  It's easy to get up and running. The program essentially makes two passes during the recognition phase, first isolating text blocks (left) and then doing the actual reading.

- **Do your documents come in all shapes, sizes, and varieties of type styles?** You should consider a trainable or automatic system. On the other hand, if your pages are primarily typewritten, you can probably get by with a less-expensive nontrainable package.

  - **If you are scanning complex pages, you might look for a prescan feature to help you set up a document before the recognition scan.** It's also nice to be able to check the placement and skew of the page prior to the recognition process.

  While all OCR software lets you select scanning dimensions for an original page, only some save scanning time by letting you isolate scans to text areas on the page.

  - **Different OCR packages handle mixtures of text and graphics on a page differently.** You can usually select noncontinuous text (like columns) by framing different areas of text in a document separately. This can get tiring when pages have multiple graphics scattered randomly.

  Several packages let you scan halftone images with the same scanner driver used for OCR line-art scans. This is nice if you dislike switching back and forth between applications.

  - **All OCR programs produce text files.** The question is, how much reformattting do you want to do to that file once you import it into a word processor. OmniPage does retain bold and underline type characteristics in its MacWrite format, but other programs offering Word or MacWrite formats just save files as text-only files for those word processors.

  Only OmniPage, TextPert, and Publish Pac read spreadsheets with tabs. Other programs may retain column and row formats, but as spaces, not tabs.

  Overall, OmniPage impressed me because it handled almost everything I threw at it with aplomb. However, its hardware requirements certainly put it in a higher price range. As far as nontrainable packages go, I was most pleased with Publish Pac, although its text selection capabilities limit its utility for complex pages, and it only works with Desq scanners. MacOCR has much broader image-import facilities.

  My choice for trainable OCR was a toss-up between three programs. TextPert is slower at recognizing, but faster to train, than Read-It. In addition, TextPert's text-selection capabilities are extensive. ReadStar II Plus was quick to train and quick at recognizing, but the program's nonworking Save Text command only saves in ASCII format. On the other hand, Read-It gets the job done for a lot less money.

  Due to errors in the scanning and recognition process and inherent limitations in OCR techniques, you just won't get 100 percent accuracy with any of these programs. So, although OCR can save you time, don't forget to keep those typing fingers limber.

See Where to Buy for contact information.
The Big Match: Illustrator 88

by Erfert Fenton

It's the day of the big match. You've got a special project to do. You need a PostScript graphics program. Which of the heavyweights do you choose—Adobe Illustrator 88 or Aldus FreeHand? The pat answer is: Buy both, because each program excels in certain areas. Besides being a cop-out, this answer doesn't do you much good if you don't have the requisite $700 or $800 to buy both programs. It's like a pro wrestling referee declaring, 'Well, Hulk Hogan excels at piledrivers, but André the Giant is better at body slams.' Who cares? You want to know who's going to wear the big gold belt with all the rhinestones.

It's true, each program does have different strengths. Depending on the kind of illustration or design you do, one of the programs may better serve your needs.
vs. FreeHand

Which PostScript graphics program should you buy?

The following observations should clarify each program’s strengths and deficiencies, helping you to decide which is right for you (for individual reviews of each program, see “A Big Hand for FreeHand,” Macworld, July 1988, and “Illustrator: This Year’s Model,” Macworld, October 1988). But in the end someone has to make a call. Rest assured, at the end of this article only one program will be awarded the gold belt.

To help me make the big calls, I relied on two referees: Simon Tuckett of Graphi­Com Design in Toronto, and David Smith of David Smith Design in Sausalito, California. Each is a professional artist who has worked extensively with both programs. For this article, Tuckett concentrated on FreeHand and Smith worked with Illustrator 88. Each artist shared his insights on what types of tasks each program is best
for. Of course, as head referee I had to make the final calls. I take full responsibility for what has happened here today.

The Overall View

Before every pro match-up you need some perspective (no pun intended). Sometimes they call it pregame hype. We'll avoid the hype, but here's the big picture to help you put these two PostScript-heavyweights into context.

The way a program approaches a task is as important as the tools it provides. In this case the task is drawing, and each program offers its own digital metaphor for an artist's studio. In FreeHand, for example, you set up a style sheet for each drawing, naming line styles and weights, colors, and so on. FreeHand provides control over an entire layout: features such as multiple layers, a cursor position readout, an Align Elements command, and a snap-to grid are reminiscent of drawing or CAD programs, giving you precise control over object placement. Illustrator 88 focuses on drawing precision rather than on overall layout. Many artists find Illustrator's pen and freehand tools more fluid than FreeHand's drawing tools, allowing a greater degree of control when drawing complex shapes.

Not just Tuckett and Smith, but many other artists I've talked with, concur that Illustrator is a superior tool for intricate drawings or tracings that require minute control over drawing and editing bezier curves. Says Smith, "If you're comparing the two as drawing programs, Illustrator wins hands-down, it wins in control, sophistication, and the intuitive way it draws." But drawing isn't everything, Tuckett observes, "For a more artistic type of drawing I'd choose Illustrator, but I use FreeHand if I need to create a highly structured image, such as an advertisement, where I have to shuffle many elements up and down through particular layers, align parts of the drawing, and perhaps incorporate text."

In addition to differing design philosophies, each program offers unique features. For example, FreeHand's text-manipulation capabilities outshine those of Illustrator, allowing designers to incorporate text and graphics in a single application, rather than pasting an illustration into a page-layout program. But while Illustrator is weak in the text department, it surpasses FreeHand in other areas. For example, Illustrator's inclusion of Pantone Matching System colors takes the guesswork out of matching on-screen colors to printed results.

To get a better idea of each program's strengths, let's look at several basic areas and see how each program performs. The match will take place over four rounds: tools, text, color, and miscellaneous features. Here are the rules: Each ref keeps an eye on one of the competitors. I keep an eye on the refs and give you the play-by-play. Then I call the round.

Round 1: Tools

Both programs share many basic drawing and shape-manipulation tools. Figure 1 gives a rundown of the two programs' tool palettes. The operation of some tools varies from one program to the other, and Illustrator has several tools that FreeHand doesn't offer.

Illustrator 88

Like FreeHand, Illustrator lets you import bitmapped or PICT images as templates for tracing. Illustrator offers an added bonus, a utility called DrawOver that converts MacDraw files to Illustrator format. You can also place TIFF images into an Illustrator drawing, a feature not found in FreeHand.

As I mentioned earlier, many artists consider Illustrator better for precision drawing. A subtle but noticeable difference in feedback from the pen and freehand tools gives Illustrator an edge. In addition, many people find Illustrator's single-pen tool easier to master and more intuitive to draw with than FreeHand's four basic drawing tools: curve, corner, connector, and combination.

Illustrator lets you adjust the sensitivity of its freehand tool, as well as back up and erase a section while you're drawing—both pluses over FreeHand's comparable tool.

Illustrator has two tools not found in FreeHand: the autotrace tool and the blend tool. The autotrace tool automatically traces template paths, saving you the time and tedium of tracing intricate shapes by hand. You can autotrace an entire template (if the number of points doesn't cause an out-of-memory error) or select two points and autotrace between them. Keep in mind that autotraced paths usually need to be touched up, but even so this tool can be a real time-saver.

Illustrator's blend tool lets you set up to 1008 increments between one shape or color and another, providing smooth transitions between objects. You provide the first and the final shape or color, specify the number of steps between them, and the program calculates the intermediate steps. The tool won't create a smooth blend between two vastly different shapes, of course, but it can create impressive effects at the click of a button.

Another point in Illustrator's favor is that it enables you to create fill patterns by
drawing them on screen. Although you can create patterns in FreeHand, you must write a PostScript routine to do so.

**FreeHand**

FreeHand also lets you paste in bit-mapped or PICT images to be traced as templates. Unlike Illustrator, FreeHand lets you edit a template—you can resize, rotate, or skew the image before tracing it. And although Illustrator won't open FreeHand documents, FreeHand can open Illustrator 1.1 documents and convert them into FreeHand format.

Unlike Illustrator, FreeHand lets you draw in Preview mode, seeing colors, line weights, and fills as you draw. Although this capability isn't practical for large drawings—where the screen redraw rate slows considerably—Tuckett finds the Preview mode handy for sketching out designs in color before starting on the actual illustration.

Although FreeHand's four drawing tools might be more difficult to master than Illustrator's single pen, they offer one distinct advantage. The curve, corner, and connector tools each lay down a different type of point indicated with a different symbol: a circle for the curve tool, a square for the corner tool, and a triangle for the connector. Unlike Illustrator, FreeHand lets you click on a point once a path is drawn and change the point's type, offering more flexibility in editing a shape or a path. While the sight of multiple tools in the tool palette may be initially confusing for beginners, keep in mind that the combination tool lets you combine curves and corners when drawing a shape.

FreeHand's shape tools operate in the traditional Mac way—you grab a handle and drag it to resize a rectangle or an oval. In Illustrator, you must select the scaling tool to resize a shape. Those accustomed to MacDraw or a similar Macintosh drawing program will find FreeHand's shape tools familiar and easy to learn. In addition, you can double-click on a FreeHand shape and view a dialog box that lets you type in new values to edit the object's shape, size, and screen position.

FreeHand's eight levels of Undo enhance its flexibility as a design tool. You can implement several steps of a design idea, view the drawing or print a proof, and backtrack if you don't like the results.

**Drawing Comparison**

To compare the two programs' drawing capabilities, I had each artist trace a map of the United States from the same MacPaint image (see Figure 2). In this test, I wanted to compare not only the precision of each program's drawing tools, but also to see if Illustrator's autotrace feature saved a substantial amount of time when tracing a complex shape. I asked the artists to print the map at a certain size, with a 1-point-wide outline and a 50 percent gray drop-shadow.

I asked each artist to time himself on the map. To my surprise, even with Illustrator's autotrace tool, it took Smith almost twice as long as Tuckett to complete the map. Although it took him only four and a half minutes to autotrace the country's outline and all of the states, Smith—a confessed perfectionist—used a combination of tools to touch up or redraw most of the states, taking a grand total of one hour and ten minutes to recreate the map. For example, if a state was made up of straight lines, Smith deleted the autotraced state and used the pen tool, since the autotrace tool often adds unnecessary control points or crooked patches to straight lines. For a state like California, which is made up of straight and crooked lines, he drew the outline by pressing the Control key to switch between the freehand tool and the pen. So that you can see how much detail was captured by the autotrace tool, Figure 2 shows two artists employed a combination of tools to draw these maps from an identical template: David Smith used the autotrace, pen, and freehand tools for the Illustrator 88 version, while Simon Tuckett used the freehand and combination drawing tools for the FreeHand drawing. Although autotrace helped rough out the map, Smith found himself redrawing many states to improve the level of detail. The untouched autotraced map is shown for comparison.
2 shows the raw, autotraced map alongside Smith's final version.

Tuckett set up a FreeHand style sheet for his map, with one name for the U.S. outline and another for the states' outlines. If I'd changed my mind and asked him to draw the states' outlines with dotted lines, for example, he could have done it in a flash by opening his States definition and changing the line style. Despite FreeHand's lack of an autotrace tool, Tuckett took just 36 minutes, using the combination tool (straight lines and curves) and occasionally the freehand tool, to complete his map.

The Call
Illustrator's autotrace tool can do some of the dirty work in tracing an image, but depending on your standards and the level of detail you need, you may spend considerable time touching up an autotraced image. Illustrator's pen tool and freehand tool offer more precise control than FreeHand's drawing tools, making Illustrator a better choice for intricate illustrations.

FreeHand's drawing tools lack the finesse of Illustrator's, but facilitate editing a path by allowing you to change a point's type. FreeHand's style-sheet approach makes it easy to specify global changes in line style or other drawing attributes.

Round 2: Text
For this exercise, I had each artist create a drawing that would show off his assigned program's text-handling capabilities (see Figure 3).

Illustrator 88
Unlike FreeHand, Illustrator lets you type text and then change its stroke width and fill pattern, making possible an almost unlimited variety of effects. Smith's decorative drop cap combines an O from Adobe's Bodoni Poster font with a background pattern. To create the inline effect, Smith first typed a 400-point O and assigned it a 24-point stroke in black. He then copied the letter and used the Paste in Front command to place the copy directly on top of the original O. He then assigned the copy an 11-point white stroke, then copied that version and selected Paste in Front. He then assigned the topmost letter a 5 percent fill and a 2.5-point black stroke. Finally, he applied a tiled pattern he'd created earlier to the background square.

In addition to modifying typed letters, with Illustrator you can apply effects to the letter outlines provided with Adobe's Collector's Edition, a collection of clip art in Illustrator format ($149).

FreeHand
FreeHand, too, excels at text manipulation, but in a different way than Illustrator does. While Illustrator lets you apply graphic effects to text, FreeHand concentrates on typographic features such as word spacing, letter spacing, and type styles. For example, unlike Illustrator, which provides only tracking (adding or subtracting space between all the letters in a word or a line of text), FreeHand offers precise kerning (adding or subtracting space between individual letters in a word) in increments as fine as 0.01 cm.

In addition, FreeHand lets you mix fonts, sizes, and styles (italic, bold, and so on) in a single block of text, allowing you to incorporate type into a design without entering a word processor or page-layout program. If you design ads, brochures, or other layouts that incorporate type and graphics, and you want to create the graphics and text in a single application, you'll want to seriously consider FreeHand.

An additional text feature lets you place a line of text on a path of any shape. While not all designers will find this capability essential, it's handy for maps, logos, and other applications where text must follow a shape or curve. Tuckett's example in Figure 3 employs FreeHand's text-on-a-path feature. To create the logo, Tuckett used the
Times font, kerning character pairs when necessary. He set the bullets between the letters in bold, and the letters themselves in the plain (or roman) style—a feat that couldn’t be accomplished in Illustrator. He scaled each line of type to fill the column width, and attached the word curve to an arched path above the circle.

The Call

FreeHand wins in the text-control category. It offers kerning, mixed fonts and styles in a block of text, and text on a path. Illustrator falls behind in treating text as text, but it does allow you to apply graphic effects to text with features such as Paste in Front and the ability to alter a character’s stroke and fill.

Round 3: Color

For this test, I asked each artist to duplicate a picture of the Arizona state flag, which is made up of four colors: dark blue, brown, red, and yellow (see Figure 4). The illustration itself was simple; what we wanted to show here was how each program deals with assigning colors and creating color separations.

Illustrator 88

Illustrator definitely has the advantage when it comes to assigning colors, since the creators of the program licensed the Pantone Matching System (PMS), a standard set of more than 700 colors that is widely used by graphic artists. In addition, Illustrator improves the correspondence between screen and printed colors with a utility that lets you adjust your monitor’s colors (screen and printer colors rarely match even with this aid, however).

For his version of the flag, Smith used a star from Adobe’s Collector’s Edition, adding the rays with the pen tool. He then consulted his Pantone color-sample book, found matches for the colors on the original flag, and typed the numeric values into his document. He didn’t bother to preview the flag, since the illuminated colors on the screen won’t match the reflective colors of the ink. He then converted the drawing to negatives, with the Adobe Separator utility, which accompanies Illustrator.

When you print an image, a thin white line may appear between adjoining sec-

or chart in order to match the colors of the original flag. He then set up a new color in FreeHand’s Color dialog box and selected Process Color from the menu. He keyed in the percentages of cyan, magenta, yellow, and black from his printer’s chart and named the color, which then became part of that document’s color library. Tuckett repeated this procedure for each color in the flag. FreeHand creates color separations from within the program, rather than with a separate utility.

Although it’s harder to predict printed results with FreeHand’s color assignment scheme than with Illustrator’s PMS colors, FreeHand’s approach does have an advantage. Let’s say you’ve set up a custom color library for a document, naming one of the
colors "bile green." When you print a proof of the drawing, you see that the green is not what you wanted at all. You can simply open that color, change it, rename it "lime green," and automatically replace all occurrences of the first green with the second one (unfortunately, you still have no guarantee that the on-screen color will match the printed one). In Illustrator, you'd have to select each area that was filled with the original green and then replace it with the modified color.

**The Call**

Illustrator is the clear winner in the color category. The inclusion of the PMS color library takes the guesswork out of assigning colors to be printed. FreeHand's style-sheet approach makes it easy to change all occurrences of a selected color, but this feature doesn't offset the lack of PMS colors.

**Round 4: Miscellaneous Features**

For a final demonstration, each artist created an illustration that would show off a unique capability of the program he was using (see Figure 5).

**Illustrator 88**

For his illustration, Smith chose to use Illustrator's blend tool. He drew a flying bird with wings spread wide, then another bird with wings upraised. He assigned a different color to each bird, positioned each one on the screen, then selected the blend tool and chose to place five intermediate shapes between the starting and ending bird shapes. Illustrator did the rest, automatically calculating the shapes and colors of the blend. For a final touch, Smith applied a blend from one color to another in the background.

**FreeHand**

For his final drawing, Tuckett created a logo consisting of three floppy disks, the top one made up of thin lines, the middle one of medium lines, and the bottom one of thick lines. Since the screen's limited resolution doesn't match that of the LaserWriter, much less that of a high-resolution printing device such as a Linotronic imagesetter, Tuckett needed to be able to make numerous changes to the drawing as he printed out proofs.

Unlike Illustrator, FreeHand allows you to define angled dot or line screens for halftone effects. Tuckett first drew the disks' outlines, aligning them with the grid, then applied a fill of 15 lines per inch at an angle of 90 degrees to the bottom disk. He applied the lines in Preview mode so he could get at least a rough idea of how the final output would look. He then defined lines of different weights for the top disk, sending each weight to a different drawing layer and saving it as a style sheet.

Next, he cloned a layer and modified the line weights to produce the middle disk, saving each in a style sheet in case it had to be changed later. Finally, he repeated this process for the bottom disk, typed the company name and positioned it beneath the disks, and printed the results. As you can see, this drawing takes advantage of several of FreeHand's unique features: the adjustable grid, line screens, layers, and style sheets—Tuckett even kerned several letter pairs in the text.

**The Call**

There's no winner in this category, since the intent of the exercise was to show off unique aspects of each program. Illustrator's blend tool is an impressive feature not offered by FreeHand; it can be used to create smooth blends with no color banding, transitions from one graphic element to another, or even sequences that can be pasted into an animation program like VideoWorks.

FreeHand's line-and-dot halftone screens, a feature not found in Illustrator 88, can also be used to create striking
the freehand tool

- variable text stroke and fill
- customizable patterns
- the ability to include TIFF images in an illustration
- the ability to edit TIFF images (brightness, contrast, and so forth)
- 100 levels of Undo
- PICT to PostScript conversion
- a clip art library
- a knife tool for cutting paths
- an erase option with the freehand tool

A rematch may be in order when the new version of FreeHand appears (see "FreeHand 2.0"), since the new version will add many of the features that now set Illustrator apart. And while Adobe has yet to announce any plans for an Illustrator 89, I doubt that the company will be content to let Illustrator 88 rest on its beziers. Ideally, Adobe and Aldus will continue to spur each other on in the quest to create the ideal PostScript graphics program.

See Where to Buy for contact information.

Erfert Fen ton was editing computer publications when computers that now fit on your thumbnail filled entire rooms. She is a Macworld contributing editor and the author of The Macintosh Font Book, forthcoming from Peachpit Press.
Recently, I tackled a major writing project. Before starting, I had to choose a word processor—preferably one that had a variety of writing tools. Well, I looked at MacWrite, but it can't open more than one document at a time. Microsoft Word's outline view doesn't let you change styles for any of the headings. WordPerfect doesn't automatically create bibliographies in a specific style. FullWrite has lots of nice features, but its file format is incompatible with just about everything, and besides, I wasn't sure I'd always have a Mac with 2 megabytes at hand.

Sooner or later, you'll run up against the limits of your word processor too. The best solution is to use one or more products specifically designed to do the jobs your word processor can't. Most of these add-on tools work with MacWrite, Word, Write, WriteNow, MindWrite, Microsoft Works, and text-only files. Hardly any work with FullWrite because of its complex file format; only a few work with WordPerfect because it is a relatively new product. Some of the products are so useful that you might be willing to save your word-processing files as text-only in order to use them. Others are so mediocre that a word processor's corresponding function may perform an equal, or better, job.

Outliners
Poor outliners. Second only to HyperCard in the Products We Just Don't Know What To Do With category, outliners can be flexible tools or sheer aggravation. You see, outliners can (and should) be used for much more than outlining—just as HyperCard should be used as more than a Rolodex substitute. If you can deal with an outliner's constraints (many people use HyperCard productively in spite of the one-card-per-screen limit), then you'll have a tool you can use even when you're not writing.

At the most basic level, outliners enable you to create headings arranged in a hierarchy. You can then rearrange, expand, hide, move, and sort the headings, and add text and graphics underneath them. Some outliners even calculate numbers, create a table of contents, and dial the phone. You
Although outliners are flexible enough to be used for more than just outlining, they still have some restrictions. Think Tank, like most outliners, won't let you move two headings without moving everything between them. Can use outliners to plan projects, create presentations, store addresses, manage to-do lists, take notes, and just plain brainstorm. Two outliners, ThinkTank and More, even include templates for customer order entries, area codes and time zones, and performance reviews.

An outliner's basic structure is that of a list maker. Added features, no matter how flexible, are still constrained by this structure. Outliners force you to stay within the proper outline format. For example, in most outliners you can't select two headings without selecting everything between them. This forces you to keep groups together and prevents your outline from containing headings that are out of order hierarchically. Only MindWrite lets you select any combination of noncontiguous topics and cut, copy, or move them.

The key to using an outliner successfully is to take advantage of its limits in creative ways. Many programs have special features that extend their power. More, for example, can automatically turn outlines into bullet charts or organizational charts. A beta version of More II includes a slew of more advanced slide-making features, and a beta version of Acta Advantage includes a stand-alone program with new features such as Page Preview and Search and Replace.

Even if an outline doesn't have snazzy slide-making features, you can use it for creating informal handouts or overhead presentations—if it supports text styling, that is. Most outlines can be exported in text format to a word processor for styling, but you lose graphics included in the outline. Besides, who wants to move work from program to program? ThinkTank enables you to select a style for each heading level, but you must use one font and one size for the entire outline. Acta is more flexible, letting you assign typefaces, styles, and sizes to individual headings, to all headings on a level, or to the whole outline. (Both More II and Acta Advantage let you format individual characters any way you want, but most word processors are already that flexible.)

Even if you don't care about stylish outlines, you may care about how the program handles text entry. Many programs force you to keep notes separate from the main outline, usually in a special note box. Although this method works well, it isn't very interactive. For instance, if you have a brainstorm, you have to stop typing in the outline, call up a text box, and then try to remember your great idea. Acta lets you type an unlimited amount of text into each heading; you can display all of the text or just the first line of it.

Outliners should offer a variety of numbering styles, such as military (1.2.2), numeric (1.2), bullets, and Harvard (1.A.2). If you write scientific or legal papers in which accuracy is vital, you'll want to see the numbering on screen. Only a few outliners support this feature. In addition, you should be able to print portions of the outline. Some programs let you use headers and footers, create a table of contents, and print different levels in different colors.

Although outliners share the same working style, two offer a twist. Inspiration, a MacDraw-like application, lets you create a visual outline by drawing symbols, connecting them, and adding text in a pop-up box. The program transforms your drawing into a conventional text outline that you can edit. Changes to the outline are reflected in the drawing. Unfortunately, it's easy to add more headings than the diagram can handle, requiring you to break the outline into two sections.

Think 'n Time offers a more general (and more useful) approach to visual outlining than Inspiration does. Unlike typical outliners, Think 'n Time places file icons in a tree structure. The file that corresponds to each icon holds up to 32K of text. Like an outline, Think 'n Time lets you move files from one level to another, provides search features and some rudimentary text editing, generates a calendar, and performs arithmetic. Think 'n Time provides an efficient way to organize files of thoughts, rather than organizing just the thoughts themselves. It's an excellent personal orga-
nizer, but because of the icon structure it's not the program you want for public presentations.

Spelling Checkers and Thesauruses
Although most word processors include their own spelling checkers, you may be tempted to purchase a separate package that promises additional features. None of the spelling checkers, whether stand-alone or built-in, offers anything truly distinguishing. For instance, the most important feature in a spelling checker is the size of the dictionary. Strangely, most vendors seem unaware of that fact—no dictionary offers more than 126,000 words. The figure includes not only root words, but every possible form of the word: move, moving, movement, and moveable are each considered a separate word. Compare that with a paperback dictionary that you might find on any office desk, such as the New York Times Everyday Dictionary (Times Books, 1982), which holds over 85,000 entries, not including plurals or other suffix forms. A comprehensive dictionary such as the Random House Dictionary of the English Language (Random House, 1987), whose second unabridged edition holds 315,000 entries—again, not including various forms of a root word—provides an even more striking comparison. In addition, traditional, book-form dictionaries provide definitions and some information on word derivation and usage, while spelling checkers provide only a list of words to compare documents against. Only one spelling checker, Spell Coach Professional, provides some definitions.

Some vendors justify small dictionaries because they use less disk space and because you can add words to them. Still, creating your own dictionary slows your work since the checker stops frequently to question words you've used, but that you haven't yet added to the dictionary. In addition, spelling checkers frequently question words with common pre-fixes such as predefine or plural such as duplicates because the dictionary is not large enough to contain all forms of a root word. If you are a bad speller, you may need to look up words in a traditional dictionary to find out if they are indeed misspelled. For a truly irritating time, try spelling-checking a document with lots of proper nouns, such as people's names. A spelling checker stumbles on every occurrence. Only Thunder includes an option to ignore all capitalized words.

Spelling checkers also can't pinpoint improper word usage. You can set up Spellwell to find all possible misuses of homonyms (words that sound alike but are...
spelled differently, such as *two*, *too*, *to*). But this is only worthwhile if you consistently confuse homonyms. I didn't realize how many homonyms there are until I used this feature. Spellswell found 44 different homonyms so far in this article, including common words such as *so*, *the*, *do*, *or*, *in*, *you*, *but*, and *can't*.

Ironically, good spellers profit the most from a spelling checker because they can easily discern whether a word is misspelled or just not included in the word list. Since the spelling checker in any word processor works well enough to catch typos, good spellers should purchase another product only if it offers a special feature or is much easier to use. Lookup, a handy desk accessory that can supplement a built-in spelling checker, lets you look up individual words instead of spell-checking a whole document. Thus, the product works like a traditional dictionary, enabling you to look up words you really don't know how to spell.

If you still think you need a spelling checker, consider the program's dictionary size and its ability to create a personal dictionary. Any worthwhile spelling checker also lets you edit the problem word in the spelling checker window, suggests correct spellings, and lets you skip or replace a word. Most spelling checkers are compatible with text-only documents, but you don't want to convert every document to text in order to check it for misspellings, so make sure the program works with your word processor. Also make sure that the spelling checker maintains formatting on checked sections of your document.

Beware of any spelling checker that bases its misspelling criteria on the root word plus suffixes or prefixes. Programs that use that type of logic will bypass obvious misspellings or gross grammatical errors. For instance, Spelling Champion assumes that any word ending with *-ing*, *-er*, *-ment*, or *-ness* can be pluralized. So, the program accepts all sorts of oddities such as *accompanyings*. What's worse is that some words commonly used in speech that are not standard English can be accepted. You might say "comings and goings" but you shouldn't write that way.

Check for flexibility in the program. For instance, if it offers an interactive mode (which checks spelling as you type), it should be optional—you won't always want your thought processes interrupted just because you made a typo. Also, some programs ignore hyphens and check the two parts of a hyphenated word separately, while others check the whole hyphenated word. For example, if the word is *man-day*, some programs check both *man* and *day* for misspellings, and others look in the dictionary for *man-day* as one word. A flexible program lets you choose.

Thesaurus programs pose fewer problems than spelling checkers. Although the word lists are smaller than those in their paper counterparts, thesauruses don't need to include every form of a word. Probably the biggest problem you'll have is learning to use a thesaurus properly—if you need to replace a word because it occurs too frequently in your text, then chances are you need to do some rewrit-
A Clear Choice

Some types of products such as spelling checkers and outliners may present several good choices. Your final decision will be based on personal preference or price. For other types of products, the choice is clear. Here's our list of clear winners and losers.

Grammar Checkers

<table>
<thead>
<tr>
<th>Grammar Checkers</th>
<th>Company</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doug Clapp's Word Tools 1.02</td>
<td>Aegis Development</td>
<td>$79.95</td>
</tr>
<tr>
<td>MacProof 3.0</td>
<td>Lexpertise, U.S.A.</td>
<td>$195</td>
</tr>
<tr>
<td>Sensible Grammar 1.1d</td>
<td>Sensible Software</td>
<td>$99.95</td>
</tr>
</tbody>
</table>

None of these programs lives up to its promises. Just don't bother.

Bibliographic Databases

<table>
<thead>
<tr>
<th>Bibliographic Databases</th>
<th>Company</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Publish or Perish 2.52</td>
<td>Park Row</td>
<td>$49.95</td>
</tr>
<tr>
<td>EndNote 1.0</td>
<td>Niles &amp; Associates</td>
<td>$129</td>
</tr>
<tr>
<td>Pro-Cite</td>
<td>Personal Bibliographic Software</td>
<td>$395</td>
</tr>
</tbody>
</table>

Well, we liked everything in this category—all for different reasons. Get Publish or Perish for the high school set; it's easy, cheap, and provides the basics. EndNote and Pro-Cite go nose-to-nose for the professional researcher crowd. EndNote is easier, works well with some word processors, and supports superscripts and subscripts. Pro-Cite has more high-end data sorting and author handling capabilities, but is harder to learn and use.

String Search

<table>
<thead>
<tr>
<th>String Search</th>
<th>Company</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gopher</td>
<td>Microlytics</td>
<td>$79.95</td>
</tr>
<tr>
<td>RoundUp 3.0</td>
<td>Virginia Systems</td>
<td>$49.95</td>
</tr>
<tr>
<td>Sonar 4.7</td>
<td>Virginia Systems</td>
<td>$295</td>
</tr>
<tr>
<td>Sonar Professional 1.0</td>
<td>Virginia Systems</td>
<td>$79.95</td>
</tr>
</tbody>
</table>

Gopher gets our vote—it's a DA, and it searches as much or as little as you like without requiring irksome setup procedures. What's more, it's a heck of a lot cheaper than any other such product except the underpowered RoundUp.

Mathematical Expression Editors

<table>
<thead>
<tr>
<th>Mathematical Expression Editors</th>
<th>Company</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expressionist 2.0</td>
<td>Allan Bonadio Associates</td>
<td>$129.95</td>
</tr>
<tr>
<td>MacEqn 2.03</td>
<td>Software for Recognition Technologies</td>
<td>$49.95</td>
</tr>
<tr>
<td>MathType 1.53</td>
<td>Design Science</td>
<td>$149</td>
</tr>
</tbody>
</table>

For a long time, all of these products had major shortcomings. The Expressionist upgrade, however, has left the others in the dust.

Goodies You Can't Be Without

<table>
<thead>
<tr>
<th>Goodies You Can't Be Without</th>
<th>Company</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comment 2.0</td>
<td>Deneba</td>
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<tr>
<td>Macro Programs</td>
<td>Affinity Microsystems</td>
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<td>Tempo II</td>
<td>CE Software</td>
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<tr>
<td>QuickKeys</td>
<td>Genesis Micro Software</td>
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<td>AutoMac II</td>
<td>Lundeen &amp; Associates</td>
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</tr>
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<td>WorksPlus Command</td>
<td>Included in Apple System 6.0 shareware</td>
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<tr>
<td>MacroMaker</td>
<td>Preferred Software</td>
<td>$30</td>
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<tr>
<td>FIF4</td>
<td>Cortland Computer</td>
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<tr>
<td>McSInk 4.4</td>
<td>EnterSet</td>
<td>$149.95</td>
</tr>
</tbody>
</table>

If you need the capabilities these programs provide, then look no further—these are as good as it gets.
# Spelling Checkers

<table>
<thead>
<tr>
<th>Product</th>
<th>Graham Speller 1.1</th>
<th>Liberty Spell II</th>
<th>Lookup 1.0c</th>
<th>Spell Coach Professional 3.1</th>
<th>Spelling Champion 5</th>
<th>Spellswell 2.0</th>
<th>Thunder 1.1</th>
<th>WorksPlus Spell 1.1A3</th>
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</thead>
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<tr>
<td>Company</td>
<td>Graham Software</td>
<td>DataPak Software</td>
<td>Working</td>
<td>Dennea Software</td>
<td>Champion Software</td>
<td>Working</td>
<td>Electronic Arts</td>
<td>Lunds &amp; Associates</td>
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<tr>
<td>Price</td>
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<tr>
<td>View main dictionary</td>
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</tr>
<tr>
<td>Interactive mode</td>
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<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
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</tr>
</tbody>
</table>

| Checks          | •                  | •                | one word    | •                             | •                  | optional      | •                      | •                    |
| whole document  | •                  | •                | •           | •                             | •                  | optional      | •                      | •                    |
| selected sections | •                | •                | •           | •                             | •                  | optional      | •                      | •                    |
| punctuation      | •                  | •                | •           | •                             | •                  | optional      | •                      | •                    |
| capitalization  | •                  | •                | •           | •                             | •                  | optional      | •                      | •                    |
| doubled words    | •                  | •                | •           | •                             | •                  | optional      | •                      | •                    |
| spacing          | •                  | •                | •           | •                             | •                  | optional      | •                      | •                    |
| suggests alternate | •            | •                | •           | •                             | •                  | optional      | •                      | •                    |
| skips word       | •                  | •                | •           | •                             | •                  | optional      | •                      | •                    |
| replaces         | •                  | •                | •           | •                             | •                  | optional      | •                      | •                    |
| edits word in checker | •        | •                | •           | •                             | •                  | optional      | •                      | •                    |
| Shows word in context | •     | •                | •           | •                             | •                  | •             | •                      | •                    |
| Wildcard guess   | •                  | •                | •           | •                             | •                  | •             | •                      | •                    |
| Includes thesaurus | •               | •                | •           | •                             | •                  | •             | •                      | •                    |
| Saves formatting/caps | •     | •                | •           | •                             | •                  | •             | •                      | •                    |
| Treats hyphens as spaces | • | •                | •           | •                             | •                  | •             | •                      | •                    |
| Global skip      | •                  | •                | •           | •                             | •                  | •             | •                      | •                    |
| Global replace   | all major word processors | all major word processors | all major word processors | all major word processors | all major word processors | all major word processors | all major word processors | all major word processors |
| Compatible software | all major word processes | all major word processes | all major word processes | all major word processes | all major word processes | all major word processes | all major word processes | all major word processes |
| Auxiliary dictionaries | • | •                | •           | •                             | •                  | •             | •                      | •                    |

1 105,000-word dictionary: $14.95.
2 Includes medical, legal, and technical modules.

In short, take a basic writing class—your time and money will be better spent.

**Bibliographic Databases**

If your research frequently requires you to accurately track references, a bibliographic program is the best investment you can make. These programs come with predefined fields for entering information about each resource you use and for entering lengthy notes. When you are ready to create a bibliography, you choose a style and the program automatically formats the reference information.

Like general database management programs, bibliographic databases vary in the amount of control they provide over data entry and output. A simple program such as Publish or Perish comes with only 2 predefined styles and offers only 12 information fields, plus a note field. When customizing a style, you can only rearrange the order in which the fields appear. A high-end program such as Pro-Cite supports 20 predefined styles, lets you custom-create 6, and includes 45 different information fields. The program handles complex formatting such as listings for a chapter written by one author that is contained in a book edited by another.

The more complex the program, the more true database capabilities it provides, such as multilevel sorts, searches, and date and author management. Publish or Perish displays author names as you type them. If you enter Alfred J. Robertson and Jane Sommers in the author field, you cannot force the program to format the names as Robertson, A.J. and J. Sommers. EndNote
can take an entry and format it as you type it, with first-name initials, with the last name first or the first name first, or any combination of ways (for a more detailed look at EndNote, see Reviews in this issue). Pro-Cite goes one step further by enabling you to give each author a type (compiler, editor, translator, programmer), a descriptor (inventor, actor), and an affiliation (department or division). You can then apply different formatting rules to each type of author.

This may sound very simple, but it can quickly get tricky. With EndNote, if you enter an author's last name first but forget to use a comma to separate it from the first name, EndNote treats the last name as though it were the first name. Pro-Cite can be even trickier since it punctuates data as it formats it. If you want to enter information into the Edition field, you must enter 3rd in order to get “3rd ed.” If you enter 3rd ed. you'll get “3rd ed. ed.” on the printout.

Although all of the programs can create text-only files, only EndNote works directly with MacWrite, WriteNow, and Word. You place references in the text as you write, and EndNote creates a bibliography based on the references. Pro-Cite requires you to work on the bibliography separately from the paper. Fortunately, both products let you change fonts and add styling such as boldface or underlining.

A couple of other features can make or break a product for a professional researcher. Someone who refers to a lot of scientific papers needs subscripts and superscripts. Researchers who use online databases such as Dialog will want to download references either directly into the bibliographic database or into another package that can transfer the information into the database. By doing this, the researcher can format the bibliographic information so that it is easy to read (for instance, getting rid of online communications garbage and sorting references to eliminate duplicates).

Even with these programs, you must proofread the bibliography to catch data entry goofs. Still, bibliographic databases offer huge improvements over manually formatting references. Research data is stored in one place and the bibliographic formatting is consistent. Just be sure the program you use offers the right amount of complexity. Programs with limited data entry and output options work fine for high school term papers, but professional researchers need more flexibility and database functions.

String Search

Mass storage usually means mass disorganization. Several programs can help you sort through your hard disk sectors to find strings of text buried deep within documents. These programs work like the search feature in a word processor, except they can search across multiple documents for a single word, a phrase, or a set of characters. They all claim to be accurate and fast, and so they are, but only if you measure accuracy by the number of words found in a particular search, and speed by how quickly the program buzzes through a document.

All the programs search text quickly. For instance, Gofer searches most files at 1MB per minute; Sonar flies through them at 15,000 pages a minute on a Mac II. But a program's ability to narrow a search determines how much time it takes to pinpoint a file. Gofer lets you start a search in any specific file or folder and searches from that point down to the bottom of the hierarchy. You can further narrow the search by choosing folders and files to search based on their name, size, kind, or date. In contrast, RoundUp forces you to search files even if you know the text you want is not in them. You select a file within a folder and RoundUp searches the file, its folder, and all of that folder's subfolders. And, although Gofer lets you search for any text string on your disk, Sonar and RoundUp support only eight file formats (mostly word processor formats) as well as text-only.

The more complex the search is, the more accurate it will be. Gofer and Sonar can do complex searches using “and/or/not” and can specify that certain words must be found within a certain number of words or lines of each other. Instead of searching for all occurrences of computer, you can search for all occurrences of computer and Macintosh but not of IBM in order to find documents that deal solely with the Mac. Compound searches are tough to master, but eliminate a lot of false leads.

It doesn't matter how fast or flexible a program is, however, if it can't display or save the results in a useful way. All programs display the strings that are found in context, along with a listing of the text's folder location. Gofer lets you write the resulting strings to a text file that includes the name of the file the text was found in, the folder hierarchy, and the line number location of the find. Sonar prints its results and can create an index either of all the words in a document or of words that appear in a specified percentage of paragraphs. Both programs also let you add text to the Clipboard without erasing previously added text. RoundUp doesn't let you do anything with finds other than view them.

Although Sonar and Gofer offer many identical features, Sonar has special abilities that let you search for several phrases at once and also trace indirect relationships between files. But Gofer still comes up the
## Mathematical Expression Editors

It'll be a dark day in San Diego before word processors handle specialized mathematical needs. If you frequently use equations in your writing, you'll find that expression editors provide a fast, easy way to create properly positioned symbols and that learning all the commands is more efficient than proofreading typeset notation. Expression editors provide a way to edit a specialized graphic—that is, the equation—and then insert it into word processor documents.

Of the three programs available for creating expressions, Expressionist 2.0 is exemplary. A desk accessory, Expressionist offers a large library of symbols ranging from Greek symbols to horizontal braces and double vertical bars. You place these symbols into the DA, position them precisely, and then cut and paste the expression into a word processor document. Later you can move the expression back into Expressionist for editing.

Expressionist has other features that make creating expressions very convenient. A group of characters, such as a number and its subscript, is called a composite. Expressionist outlines each composite, making it easier to view the structure of a complex expression. The program also includes forms, which are similar to templates, for creating structures such as tensor notation and tree nodes. Another handy feature lets you save expression structures in a library for later use.
and scientific fonts, offer very specific capa-

ble of These list is a $30 shareware desk acces-

Some rate a place in every Mac's

memory. Others, such as foreign language

the creators took the generic approach for

this little program lets you

at the beginning of sentences, indent or

unindent paragraph s, reverse lower- and

upper-case, convert tabs to spaces or

spaces to tabs, add or strip line numbers

and line feeds, and count the number of

words, lines, and paragraphs. That's only a

partial list.

Now for the bad news. You'll lose the

formatting in any edited selection. Because

I have simple formatting needs, however,

it's much quicker for me to redo lost for-

matting than it is to spend time, say,

changing an article that was typed in all upper-

case letters to the standard lowercase/up-

percase mixture. Although you might

not use McSink every day, it's cheap and

the one time you need it, you'll be glad

it's there.

Comment, a desk accessory I use

more frequently than McSink, functions

like an electronic pad of Post-it notes (see

Reviews in this issue for a more in-depth

analysis of Comment). You use it to attach

notes to any word, phrase, sentence, para-

graph, or to an entire document. The notes

stay hidden until you scroll through a docu-

ment, holding down the Option key. When

you stop scrolling, all notes attached to any

visible text appear. This particular feature is

handy for making notes to yourself, for in-

stance, to check a fact or tell someone about

an event—this use is really like an interactive
to-do list.

Although Comment can be used for

group editing—for instance, allowing several

people to comment on a document—I've

found that face-to-face communication or

paper notes work better. One company,

Mainstay, plans to release a product called

Mark Up that is specifically designed for

group editing. The product, which contains

many more features for group editing than

Comment, has generated a lot of excitement.

Still, just how far Mark Up can go in replac-

ing traditional methods remains to be seen.

A few other small but handy products

include word-count and statistics programs

that you can get from online services or your

local user group. TopDesk contains a hodge-
podge of utilities including one that lets you

view up to eight MacWrite documents at a

time. You can't edit these documents but you

can cut and paste them into an already open
document. Another utility in TopDesk lets

you assign abbreviations to represent strings

of text up to 255 characters long. When you

type the abbreviation, the program imme-

diately substitutes the complete phrase. A
different program, QuickWord, also creates

a glossary of abbreviations.

Most of these products work with soft-

ware other than just a word processor. Like-

wise, you can find numerous general-use

products that make your text chores more ef-

ficient, including macro programs such as

Tempo, QuicKeys, or the MacroMaker in

System 6.0. Many jobs, however, require

electronic equivalents of traditional writing

tools, such as dictionaries, grammar and

style guides, and note cards. While word

processors can substitute for typewriters,

most can't take on additional duties. Some

add-on tools, such as outliners and bibli-

ographic databases, are ready for the electron-
ic age. Others, such as spelling and grammar

checkers, have yet to prove more valuable

than a ninth-grade English book.

See Where to Buy for contact information.

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| Only a few rate a place in every Mac's memory. Others, such as foreign language and scientific fonts, offer very specific capabili-
| ties for not-so-typical users. | |
| At the top of the Everyone Needs One of These list is a $30 shareware desk accessory called McSink (yes, it's spelled right—the creators took the generic approach for some odd reason). Appropriately named, this little program lets you fix almost any formatting problem a document, or a portion of a document, may have. For instance, McSink can capitalize all words that appear at the beginning of sentences, indent or unindent paragraphs, reverse lower- and upper-case, convert tabs to spaces or spaces to tabs, add or strip line numbers and line feeds, and count the number of words, lines, and paragraphs. That's only a partial list. | |
| Now for the bad news. You'll lose the formatting in any edited selection. Because I have simple formatting needs, however, it's much quicker for me to redo lost formatting than it is to spend time, say, changing an article that was typed in all uppercase letters to the standard lowercase/upercase mixture. Although you might not use McSink every day, it's cheap and the one time you need it, you'll be glad it's there. | |
| Comment, a desk accessory I use more frequently than McSink, functions like an electronic pad of Post-it notes (see Reviews in this issue for a more in-depth analysis of Comment). You use it to attach notes to any word, phrase, sentence, paragraph, or to an entire document. The notes stay hidden until you scroll through a document, holding down the Option key. When you stop scrolling, all notes attached to any visible text appear. This particular feature is handy for making notes to yourself, for instance, to check a fact or tell someone about an event—this use is really like an interactive to-do list. | |
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Needles in a Haystack

String search utilities can help you find the latest revision of an article or collect all files that contain information on a certain subject. Gofer lets you define simple searches (search for Gofer in all files) or complex searches (search for Gofer but not Mac in all Word files in the Editing folder). The program then displays the strings it finds and lists the location of files containing the strings.
Color Separation Explained

The ABCs of CMYK:
Part one of a two-part series.

When the Macintosh II arrived on the scene, print publishers took a look, goggled with everyone else at the glorious color screen images, and asked the obvious question: How do I get those colors into print? Along came color printers, which were great for some things but no help at all for publishing. The problem of reproducing screen colors in the real world of publishing—on offset presses—remained.

Color print publishers want the same things from the Macintosh that black-and-white desktop publishers have already achieved: flexibility, control, and economy. They want to be able to see color documents on screen, modify them, and output the results on high-quality devices, ready for the printer. Since the price of color publishing is high, the possible economies are great. Color publishers have anxiously awaited the day when they can pay $50 for four pieces of Linotronic film, instead of $200 to $300 to have a color separator separate a color image.

For some color publishers, that day is here. Software tools available right now—Illustrator 88, Aldus FreeHand, LaserPaint Color II, and several color paint programs—do a creditable job of separating full-color...

Steve Roth is the editor of Real World PostScript (Addison-Wesley, 1988) and the former editor of Personal Publishing Magazine.
With QuarkXPress 2.0, you can even build full-color pages and produce output that a printer can use as is to print a color publication. Using these programs you can bypass several steps traditionally relegated to specialists.

Not surprisingly, you can also make a mess of things. Those specialists are there for a reason, and bypassing them puts all the responsibility on your shoulders. The same is true with black-and-white publishing, but color adds a layer of complexity that many will find daunting.

As is so often the case when the computer moves into a new application, taking advantage of the Mac's color separation capabilities requires that users acquire a whole new body of knowledge. You need to know quite a bit about the printing process to use color publishing tools effectively; there is a vocabulary to learn, and there are a number of distinctions to understand.

**Separations and Overlays**

One of the biggest distinctions is between color **separations** and **overlays**.

Publishers typically use overlays when they require only one or two colors. For example, if you want red headlines and subheads in an otherwise black document, you can achieve this by creating two pieces of film for each page—one overlay for the red elements, and one for the black ones. Your printer (the person) will turn the film into separate printing plates, one each for red and black ink.

When you're working with this type of color, it doesn't matter what colors you see on screen, since the overlays you print out from your laser printer or phototypesetting machine will all be black. You choose the colors you want by number from a book of Pantone Matching System (PMS) inks, and the colors make their appearance only on press.

When you want more than a few colors, you need to use process color separations. The process color inks are cyan, magenta, yellow, and black (CMYK). By **screening** the process colors—turning them into halftones—and overlaying the screens, you can produce virtually any color you want (aside from those that require special inks, such as gold and silver). If you look under a magnifying glass at any of the color photographs in this magazine, you'll see that the process color dots are grouped in small clusters. To create these **rosettes**, it's necessary that each of the process color halftones have its dots arranged at a different, precisely calculated angle. If the halftone dots aren't angled properly in each layer, the layers won't combine correctly, and distracting patterns known as **moire** will result. (For a more detailed introduction to basic process color theory, see "Beyond Black and White," *Macworld*, November 1987.)

Several programs on the market state that they produce color separations when all they really produce is overlays. The program vendors can get away with this claim because printing terminology in this area is confusing. Overlays are often called **spot color** or **mechanical** separations. For the purpose of this article, I'll try to avoid those terms.

**Separations and Tint Builds**

Given that you can create this incredible variety of colors from the four printers' inks, the next question is, how to go about it? What types of color images can you separate with Macintosh software, and how do you do it?

As is always the case, the Mac graphics world is split into two camps, **bitmaps** and **objects**. Bitmapped images exist in the computer as patterns of dots. Images created with **paint** programs are bitmaps, as are images captured with scanners. Bitmaps can be black and white, as with the venerable MacPaint, or each dot can have a color or gray value, like the images produced by PixelPaint or ImageStudio.

Object-oriented art, on the other hand, is made up of (surprise, surprise) objects—circles, squares, curves, polygons. When you draw with an object-oriented program, the software uses mathematical descriptions, not dot locations, to record your designs. You create object-oriented images with **drawing**, as opposed to painting, programs. MacDraw is the original Mac drawing program, but the most popular color drawing programs now are Adobe Illustrator 88 and Aldus FreeHand.
It's possible right now to get very good results separating object-oriented graphics. That's because the colors in object graphics are, in printing parlance, *tint builds*. A tint build is simply a color that's been "built" by combining percentages of two or more process colors (see Figure 1). In Illustrator or FreeHand, for example, you would build purple by specifying a fill that combines 40 percent cyan and 100 percent magenta (40C/100M).

Separating a tint-built image is relatively straightforward because the software has little to do except print out the separate layers. You, the human, have already done most of the work, specifying the process color percentages for all of the colors you want in your drawing.

In addition to Illustrator and FreeHand, the other players in this field are QuarkXPress 2.0 and LaserPaint Color II. XPress isn't a drawing program, but it does enable you to color type and import black-and-white bitmap graphics, and to draw and color lines, boxes, and other simple elements. The program can import Illustrator graphics and separate an entire color page at once. Laserware's LaserPaint is constantly derided for its obtuse interface, but nevertheless its ability to separate a wide variety of color files, including PICT2 color images—both objects and bitmaps—is outstanding.

**Bitmaps and Scanned Images**

When you get into color bitmaps, separations aren't so easy. LaserPaint, SuperMac's PixelPaint Professional, and Computer Friends' Modern Artist 2.0 can separate paint images and screen shots with relatively good results, although the colors that come out are often different from what you expected. The results when using these programs to separate scanned photographs, however, are far less satisfactory. The final prints are not as sharp or as vivid as separations created with high-end, dedicated color-separation systems. They may be useful for some purposes, but not for high-quality publications. Because of the nature of bitmapped images, separated color scans are also more prone to moiré patterns than object-oriented images are.

As I write this, a new generation of programs is coming to market with features designed to provide high-quality separations of color scans. Part II of this article (next month) will include tests made with pre-release versions of Avalon Software's PhotoMac and Prepress Technologies' SpectrePrint.

**Color Correspondence**

When you are specifying and viewing colors on the Macintosh, it's important to remember that the colors you see on screen are different from those that will come off the printing press. Even with Illustrator 88, which lets you adjust screen colors to more closely match the printed results, it's impossible to get real color correspondence. The screen simply can't produce the colors that an offset press can, and vice versa. If you are blessed with a 24-bit display board, your on-screen and printed colors will match more closely, but they still won't be the same.

Given this, how do you know what the printed image will look like? The first answer is that you must spec all your colors from a printed color chart. Most printers will provide you with one, or you can pick up a book like *Graphics Master 4* (Dean Lem Associates, 1988), which includes charts of process color combinations printed on coated and uncoated stocks. You choose your color from the chart, key in the CMYK specifications, and the color that shows on screen simply serves to remind you of what color you've put where.

Since the on-screen colors aren't the same as the printed colors anyway, it's possible to create color object graphics on a black-and-white display. In black-and-white mode, most programs use patterns to represent the different colors you've specified. A color display does help you visualize color images, however.

The second step to ensuring that colors print properly is to have a color proofing copy of the separations made before going to press. There are various proofing systems—Cromalin and Matchprints are two popular ones. The color correspondence between proofs and printed results is still not perfect, but proofs are much more accurate than screen images. Color printers—even the QMS ColorScript color PostScript printer—are unacceptable for color proofing.

**Figure 2**

Several color swatches created with Illustrator 88 and separated with Adobe Separator. The swatches in which moiré are apparent are those that contain a significant percentage of black.
ally generated color proofs are useful for catching screen, first and foremost are moirés—the inter­
get rid of them if they do show up. Moirés most of­

As for black, the rule is simple: avoid it. Since black is
printed color separations.

• in areas that include a significant percentage
• in areas of graduated color (fountains, or ramps);
• in scanned images; and
• in areas that include a significant percentage

of black.

Among the little devils that may crop up in a
printed image but that don’t appear on your Mac
screen, first and foremost are moirés—the inter­ference patterns that result from improperly over­lapping halftone screens (see Figures 2 and 3).

While moirés can appear just about anywhere,
there are some things you can do to avoid them, or to
get rid of them if they do show up. Moirés most often
make an appearance

In addition to letting you check colors, profession­ally generated color proofs are useful for catching
many of the demons that love to find their way into
printed color separations.

Moiré Is Not Better

Fountains and Banding

Whatever you call them—fountains, ramps, or
gradients—one of the most difficult things to separate
properly is a smooth change from one color to another,
as in a rainbow. The more intermediate steps you have
between colors, the smoother the effect. If you have
only a few intermediate colors, the result is distinct
banding as you move from one color to the next—like
the rainbow decals in people’s car windows, instead of
the real thing (see Figure 5).

Because of the way digital printing devices make
halftones, the coarser your screen and the more reso­lution your printing device has, the more shades a half­tone can represent (see “Shades of Gray,” Macworld,
January 1988, for a good explanation of why this is
true). The more shades you have, the smoother your

If you do run into moirés, the most likely culprit is
your output device. It’s a little-known fact that digital
printing devices don’t always deliver halftones at the
angle and frequency specified by the user. Some com­binations simply aren’t mathematically possible. The
higher the resolution of the device, the more likely you
are to get your request, but even a $2540$-dots-per-inch
(dpi) Linotronic 300 frequently makes substitutions.

When a PostScript output device does substitute,
it simply tries for the best approximation of your angle/
frequency request. Since each of the layers in a separa­tion has a different angle, you can end up with separa­tions of varying frequencies—not good at all. (Shifting
frequencies is a faster route to moirés than the slight
angle shifts that also occur.)

So what can you do? To maximize your chances
of getting good halftones the first time, always output
on a Linotronic 300, and stick to coarser halftone
screens—$120$ lines per inch (lpi) or less. Table 1 shows
a representative sample of frequency/angle combina­tions on a Linotronic 300 at $2540$ dpi, at some typical
halftone frequencies. By using these figures, you can
avoid impossible frequency/angle combinations that
cause PostScript to improvise. For a PostScript pro­gram that will determine the possible combinations
for PostScript devices at any resolution, see Chapter 10
of Real World PostScript (Addison-Wesley, 1988).

If you follow the advice in this article, many—
maybe even most—of your separations will come out
without moirés the first time. If you do get patterning,
try shifting the angles for all four colors by $5$ degrees,
though it’s possible this might just shift the moirés to
other areas of your graphic.
And, once again, avoid black. Since it is the darkest color, it makes any banding more apparent.

**Caught in a Trap**

One problem that won’t show up on screen or on a proof is the result of misregistration of the process layers. No press is perfect, so the four process colors may not be perfectly overlaid. When two colors are supposed to butt up against each other, slight misalignments may produce a thin white line between them.

The solution is to *trap* that white area by overlapping the two adjoining colors. Here’s a simple example of how you can create traps in object-oriented drawings (see Figure 6). If you have a yellow circle (50Y) lying on top of a cyan square (50C), specify a one-point stroke for the circle with both yellow and cyan (50Y/50C). While that one-point circle will come off press as green, it will be almost invisible. A white line, on the other hand, is visible at a glance.

In more complicated illustrations, trapping gets more difficult. Suppose your yellow circle overlaps the cyan box by only half. To use Illustrator 88 terminology, you need to “mask” the trap stroke so that it only appears inside the cyan square. This requires that you create a separate object for the stroke, and mask it (or *clip* it, in PostScript terminology). You can achieve the same effect with FreeHand using the Paste Inside feature.

If this example seems complicated, it is. Manually trapping complex images is no fun. Few designers will want to take the time or go through the mental gymnastics. Though software developers are working on automatic trapping, the current crop of programs forces you either to do it yourself, or to skip it.

Bear in mind that you don’t have to create traps if abutting objects share some significant percentage (about 20 percent) of a process color. If you are working in QuarkXPress, for instance, and want to place a purple sidebar (100M/50C) on top of your pink page (50M), you don’t need to trap the sidebar box, because both colors have magenta in them. Any misregistration will result in a magenta area between the two objects—far less of a problem than a white line.

And speaking of white lines, what about white lines that you do want? The answer: forget it unless they’re at least one point in width. If you try for less, any misregistration on press will result in a line that is cyan, magenta, yellow, or gray—not white.

Registration is also important when you work with colored or white (*knocked-out*) type on a colored background. With Illustrator, you can trap the colored type on a colored background by specifying the color and width of the type outline stroke, but this works well only for large type. With small type, a wide outline stroke will fill in all the gaps in the letters—the hole, for instance, in the lowercase *a*.

Small type in general requires special handling, but fine, serif faces suffer the most when you’re working with process color. Slight misregistrations can make those serifs fuzzy. Try sticking to one solid color, or use a large percentage of a dominant color—cyan or magenta—with a smaller percentage of one other. And keep the background color light—30 percent or less. As usual, watch out for black mixed with other colors, since it makes misregistration more apparent.

If you want knocked-out white type on a colored background, go for large percentages (70 percent or more) of a single dominant color, perhaps with a small

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percentage of one other color, and avoid small type with fine serifs.

If you are creating spot color overlays and printing with PMS inks, you can use a technique called overprinting and avoid the trapping issue by paying your printer to do it. FreeHand lets you specify that any spot color should overprint, which means that "underlapping" areas of PMS-colored objects won't be knocked out. Every object in that color will print in its entirety. You can give the color overlays to your printer and let him or her do the knockouts, creating the traps photographically as appropriate for the press. With the Illustrator/Separator combination, you can achieve the same effect by specifying overprint for every fill or stroke.

Separator offers one more feature that makes it easy to trap black-outline, comic book-type art: it automatically overprints any solid black object. If Separator finds 100 percent black areas, it will print the black ink right over the top of any underlying inks.

Is Black Black?

This overprinting of black raises another point: not all blacks are the same. Black printed with 100 percent black ink alone looks different than black that's mixed with the other colors. The plain black is not as rich or glossy. If a 100 percent black object partially overlaps a colored object and overprints, it will be glossy where it overprints, and dull where it prints by itself.

To solve the problem of uneven blacks, add a bit of the other three colors to black areas. Try using 30C/50Y/30M/100K. Some people just add 30C to their blacks, which avoids the problem of too much ink on the page. With thin black lines, it's not as important to add the extra colors, but with large black areas, it makes a big difference. You do have to be careful, though, to avoid specifying too much color.

Too Much Color

Yes, you heard right—too much color. Macintosh users who have suffered for years with black and white may think there's no such thing, but when you're printing offset, there definitely is. If you specify 100 percent of all four colors in an area, you end up with some very wet paper on press. Ink from one printing cylinder can be transferred to the next one, the later-printed inks may have trouble adhering to the wet paper, the job may not dry properly, and there's a good chance the press will tear the work. If you give your printer separations with too much color in an area, he or she will probably refuse to print the job.

The maximum color percentage allowed varies with the press and the type of paper. The recommended standard, Specifications Web Offset Publications (SWOP), created by a printing industry committee, specifies that the total percentage for any spot should not exceed 300 percent, and that only one color should print solid (this is usually black). For newsprint the total percentage allowed is much lower.

There's no reason to specify even a 300 percent color mix, because the result is just black. But when you are producing color separations from scanned photographs or other bitmaps, you don't have the control that you have over total color percentages in drawing programs. You may have an excessively high color percentage in a given area and not even know it. Or if you are using Illustrator 8's Separator utility (which automatically overprints black objects), a black object on top of a colored object may result in an excessive amount of ink in a given area.

The solution to these problems is a process called undercolor removal (UCR). This technique removes a certain percentage of the three nonblack colors from areas with too much ink, theoretically resulting in con-
consistent blacks throughout an image. UCR is a common function on high-end separation systems, but it's still in its infancy on the Mac.

LaserPaint implements UCR when creating separations, as do the separation utilities included with PixelPaint Professional and Modern Artist. UCR is also implemented in color correction and photo-retouching programs like Avalon's PhotoMac and Prepress Technologies' SpectrePrint. Separator, FreeHand, and XPress do not provide undercolor removal. You have to specify your colors carefully, especially when using

Figure 5
You can stroke objects in a drawing to create traps. Traps solve the problem of white areas appearing due to misregistration of colors on press. These strokes are three points wide, rather than the usual one point, for the sake of clarity. Using LaserPaint's or Illustrator 88's masking feature, or FreeHand's Paste Inside, you can limit the stroke to the areas that need to be trapped. As illustrations get more complex, however, the complexity and difficulty of the trapping increases as well. This illustration was created and separated with FreeHand.

Figure 6
When you overprint black areas on top of colors, the appearance of the black can change. The top bar is 100 percent black (0C/0M/0Y/100K). The bottom bar is 30C/30M/30Y/100K. The underlying bars are 100 percent cyan, magenta, and yellow. Notice how the bottom black bar has a consistent appearance all the way across. Adobe Separator, which was used to create these separations, automatically overprints 100 percent black objects.

overprinting, to avoid excessive amounts of ink in a given area. If you're using Separator, be sure to check the percentages wherever black overlaps a dark color.

Another color correction technique, gray component replacement (GCR, also referred to as gray component reduction and gray component enhancement), gives the same consistency to gray areas that UCR provides for blacks. It removes a given amount of cyan, magenta, and/or yellow from gray areas that are produced by combining these three colors, and adds black in their place. Black ink results in a much more consistent gray on press than a combination of the other three colors.

So much for theory. Next month we'll take a look at the Macintosh software on the market for producing color separations from both object-oriented and bit-mapped graphics. We'll also get into the nitty-gritty of pulling separations from Linotronics. The number of programs that produce separations seems to grow daily, so stay tuned for the latest and greatest.

See Where to Buy for contact information.
Use IRS label. Otherwise, please print or type.

Filing Status
Check only one box.

Exemptions
(See Instructions on page 7.)
If more than 7 dependents, see Instructions on...
If you can manage your money with a paper-based system, then you'll appreciate the conveniences that financial-management programs offer.

by Alan L. Slay

About 15 years ago, my wife and I were very unhappy that we "weren't getting anywhere" financially. Our credit cards were out of control; we were finishing each month in the red; and our economic life was a constant battle to keep from falling off the edge.

After reading a few books on personal-finance management, we created a system for managing our finances as though we were running a business. We kept ledgers and tracked all our expenditures, such as credit card purchases. Before long we were budgeting and planning for savings and investments. Our former economic chaos settled into a routine of writing most checks once a month and keeping our finances under control. Finally, we learned to handle money systematically.

From Paper to Personal Computer

Once you establish a financial routine, you're a natural candidate for automating your personal finances. If you write just a few checks each month, and you receive your income from one source (along with some interest and dividend payments), you have
Writing Checks and Deposits

When you write a check or make a deposit in Easy Checks (top), you cannot assign the amount to a category such as rent or auto loan. You can, however, add a memo to the register below the entry form. MacMoney (bottom) allows you to display your check-writing form as well as your check register and category list. MacMoney’s screen is similar to those in Dollars and Sense and Managing Your Money.

no great need to automate. If, however, you have two or more checking accounts; three or four credit cards; several investments; you write many checks to pay bills; and you transfer money between checking, savings, and other accounts, you will be able to handle your financial chores more easily with a financial-management program.

When I decided to move my books from paper to a personal computer about five years ago, I had some concerns: could I refer to my electronic check register as easily as I could to my manual one? Could I reconcile my checkbook as easily? Could the liability segment of a program replace my People We Owe binder?

My fears were unfounded. Working with an electronic register is almost the same as working with a checkbook. Tracking credit card purchases and reconciling checks is much easier to do with a computer program than it is to do manually. Assigning expenses to the categories I predefine is much, much easier than manual tracking. And, most important, I can use recurring transactions to automatically write checks to myself (to deposit in my savings account, children’s education fund, and investment funds).

I have reduced the amount of time I spend on my personal finances by using a personal computer. I’m always in control, and I always have a complete picture of my financial situation. Since the software lets me keep information in a central database, at tax preparation time I can print my tax-deductible expenses, saving considerable information-gathering time.

One caution (you’ve heard this before): Back up your financial data. Once you become dependent on electronic management of your personal finances, you should always be prepared for database damage. Although not an every-day occurrence, it will happen. Don’t, however, consider a damaged data disk any worse than the harm that can come to manual records (your check register makes a nice doodling pad for a youngster with a crayon). In the past five years I have survived the few disasters that occurred—even when I had problems using my backups. On the whole, the programs themselves contain numerous safeguards, and the vendors I’ve dealt with provide excellent technical support.

Three Types of Finance Management

Most personal finance-management programs let you write checks and track how you earn and spend your money. For instance, you can figure out how much you spend on clothing or groceries each month, or how much you owe on different charge cards. You’ll learn about managing personal assets, loans and credit, and whether or not your family has a profit or loss for the year. One program, Managing Your Money, goes beyond money management, helping you (under the humorous but enlightening guidance of Andrew Tobias) to start tax, investment, and insurance planning. Many personal finance programs can even replace accounting programs for managing a small business.

Investment programs, such as Wall Street Investor and Profits, help you sort through a variety of options so that you get the best returns in accordance with the risks you take. Unlike general accounting programs, investment programs are dedicated to specific areas such as stocks, bonds, or real estate. If you don’t have a basic knowledge of the stock market, you should take a community college class that covers the fundamentals before you use one of these programs. The programs will help you apply these fundamentals to your own investment plans, and they can give you much of the information available to professional investors and money managers. (Remember where you got your start, please, and send me 5 percent of your first million.)

Tax preparation programs calculate income tax, some even print forms that you can submit directly to the IRS. As adjuncts to tax preparation programs, tax planning programs help you plan your finances so that you keep the legal maximum (and the IRS gets the legal minimum) of your hard-earned dollars. These programs can save you a considerable amount of time—possibly halving the time you spend preparing your tax return—and can help you to be more accurate in preparing your taxes.
## Personal Finance Packages

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1. Available only in Dow Jones database.
2. Includes funds, options, short sales, margin.
3. Simulates appraisals, depreciation, loans, mortgages.
Personal Finance-Management Programs

Easy Checks, one of the simplest personal-finance programs, offers little more than a checkbook in a desk accessory. But it's a great program if you want to churn out a bunch of checks quickly and easily, and you don't need to keep many financial records. You will, however, spend time loading checks into the printer (it's unlikely you'll dedicate a printer to check printing).

Two programs, Personal Accountant and Quicken, occupy the middle ground between Easy Checks and the high-end programs. Quicken tracks the areas (or categories) where your money is spent and earned, but it doesn't go beyond that. Personal Accountant, on the other hand, provides a wide range of features, but does not let you write checks. (Softsync, Personal Accountant's manufacturer, plans to add this and other features to an upcoming version.)

To get an idea of what these programs do, take a look at Quicken. The program assigns a distinctive file name to your main account (for instance, Personal Checking Account) and then prompts you to define various income and expense categories, such as rent, auto expenses, or dividends. When you create a check or enter a deposit, you must assign the dollar amount to one of these categories. You can also split a transaction between several categories. For instance, if you write a check that must be split between your principal and mortgage interest accounts, you may subtract the appropriate amount from each of the two categories when you create the check. So long as you don't demand too much sophistication (like tracking investments or moving money between accounts—remember, each account is a separate file), Quicken does an excellent job of providing accurate, detailed information with a minimum of effort.

Three sophisticated general personal-finance packages—MacMoney, Dollars and Sense, and Managing Your Money—go beyond Quicken's income, expense, and budgeting options, allowing you to include assets (such as a home or auto) and liabilities (like loans, credit cards, mortgage) in a single file. They also offer various features for forecasting such items as loan costs and savings goals.

Monogram's Dollars and Sense is considered the "old reliable" by many MS-DOS users; the Mac version, however, does not offer portfolio management nor does it allow you to do tax planning. But when it comes to managing assets, liabilities, income, and expense, Dollars and Sense is nothing short of excellent.

Using Dollars and Sense, you can set up a fairly sophisticated accounting system. For instance, you can move money between various categories (say from a checking account to a savings account) and Dollars and Sense automatically updates the totals. You can also track credit purchases and reconcile all the appropriate categories, including credit cards and bank accounts.

With the release of version 3.0, MacMoney enters the high-end category of personal finance programs. The newest version has features comparable to Dollars and Sense but offers fewer keyboard shortcuts. For example, Dollars and Sense offers a shortcut for select-
Banking by Mac

About a year and a half ago, I investigated banking by home computer. I expected to pay for the service, since I would save on postage and gain the convenience of banking directly from my computer. No more writing checks by hand, folding papers, addressing envelopes. I would also have electronic access to my bank records, so I wouldn't have to go through the monthly ritual of reconciling my checking account. One disadvantage: I'd lose my float in case it. But by using electronic transmissions, I wouldn't have to send my payments until I was good and ready. How much was this worth to me? Perhaps $5 a month, maybe a few bucks more.

I sent away for information from a few of the banks on CompuServe who offer this service. When I calculated how much I would have to pay, I was surprised. The cost came to around $10 per week. Since I had a free checking account, I figured so much for home banking.

Recently, I examined Monogram's Moneylink program and caught the home-banking bug again. Using Moneylink with Dollars and Sense, I could do my home banking through Citibank. Had prices dropped in the past 18 months? The software lists for $179.95, but maybe, with this cost amortized over a five-year period (which nets to about $3 per month), electronic banking wouldn't be a bad deal.

To get details on Citibank's charges, I tried calling Citicorp/Citibank branches in South Dakota, in my home state of Missouri, and in Illinois. I was finally referred to someone in the New York office. The good news: the service is available for a flat charge of $10 per month to authorized accounts. The bad news: to become an authorized account, you have to live within 50 miles of New York. So much for Moneylink. [Editor's note: Both Citibank and Monogram have updated their software, unfortunately making the electronic banking connection currently incompatible.]

Checkfree Technologies to the Rescue

But then Checkfree Technologies came to the rescue. According to information the company sent me, Checkfree offers an electronic banking service that costs peanuts and is available nationally. Here's the deal.

Starting around January 1989, Checkfree will offer electronic banking for the Mac. After purchase of a start-up kit (price unknown as I write this), the service costs only $9 per month, for which I can write up to 20 checks. Above 20 checks, the charge is $5 for each additional batch of 10 or fewer transactions. Since I write about 30 checks per month, my monthly cost would be $12. Telephone connection charges would also be nominal.

Do I have to sign up with a participating bank? No, I can keep my account at my regular bank, since Checkfree works through the Federal Reserve. Of course, I have to figure in my bank's charge for this service, but it should be minimal. Since I normally spend around $7.50 per month for postage, I still might come close to the $5 or so charge I was willing to pay.

How about recurring transactions? With Checkfree I can write out electronic checks for recurring expenses in advance and send them on specified days. For example, I could designate that my mortgage payment be made on the fifth of each month, and it would be.

What if I need a copy of a cleared check? If I can't use my statement as proof, I can get a printed copy of the electronic check for $2. From all indications, Checkfree can do for home banking on the Mac what Henry Ford did for the automobile—bring it within reach of everyone (providing the start-up kit is reasonably priced). And when I merge Checkfree with my personal finance software, so I can do budgeting and planning too—look out, 21st century, here I come.
ing category names. To charge a check to a category simply type the first few letters instead of the full name; Dollars and Sense displays the first category that begins with those letters on its alphabetized list of existing categories. In MacMoney, you must type the category name precisely (no substituting \textit{rents} for \textit{rent}), or else select the category with the mouse from a scroll box. MacMoney's screen font is also harder to read. The program offers minimal features for loan, retirement, and goal planning.

Another successful MS-DOS program brought over to the Mac, Managing Your Money, does everything a sophisticated personal (or small business) money manager needs, including helping you to maximize investment return and minimize taxes. The program strongly emphasizes the management of personal finances with a business focus, so you can handle finances just like the big guys at corporate headquarters. The program embraces tax, college, and retirement planning; insurance coverage; investment analysis; loan analysis; annuities; and all the usual corporate planning that increases bottom-line net worth. The program has some fun touches: for instance, a small light bulb sits in the lower-left corner of the main screen. When you click on it, the program brings up a bit of humorous financial wisdom. I find this lighter side (pun intended) really appealing.

**Investment Management Programs**

Investment programs for the Mac offer a wide variety of features and run a gamut of prices. One category includes programs that track securities (for example, stocks, bonds, funds, options). Although none of these programs requires a modem, you'll want one in order to use a powerful feature—the ability to access and download information from a financial database. With a modem, you can access a variety of historical and performance indicators that cover stocks, bonds, and mutual funds.

Wall Street Investor, one of the most popular and powerful programs, allows you to set up criteria for the securities you would like to consider. You can then search the I. P. Sharp database to extract investment opportunities meeting these criteria. The program also offers online trading through Fidelity Discount Brokerage Service.

A less powerful—and less expensive—program, the Investor, accesses the Dow Jones News/Retrieval Service to obtain current quotes (it does not, however, download data). Its portfolio-management reports and charts make it a good value for the money. An even less expensive securities program, Financial Decisions, runs as an Excel template and prepares a number of reports on a potential securities investments. It also simulates loans, mortgages, and depreciation based on different conditions such as interest rates or amortization methods. You have to key in the data, however.

A few specialized investment packages also exist. The Options-BOA Advanced Stock Option Analyzer works exclusively with stock options and offers "what-if" simulations. Another type of investment program, Real Estate Investment Analysis, deals exclusively with investments in real property. Since this program is an Excel template, you must fill in spreadsheet with information about an actual or a potential real estate investment. The program analyzes the information and prepares a ten-year projection of investment potential.

Real Estate Investment Analysis calculations include the different tax, depreciation, and amortization options available to you as an investor, so you can choose the options that best meet your needs.

Add-on programs for Real Estate Investment Analysis handle mortgages, residential and commercial/industrial applications, appraisals, and loan qualifications. These add-ons range in price from around $100 for commercial/industrial applications to around $700 for a complete residential listing system.
## Tax Time

<table>
<thead>
<tr>
<th>Company</th>
<th>List price</th>
<th>Type program</th>
<th>W-2 form</th>
<th>IRS forms—personal:</th>
<th>Schedules:</th>
<th>Client letter</th>
<th>Help/Info available</th>
<th>Cross reference of entries</th>
<th>1065 (IRS Partnership form)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EZTax-Prep 1040</td>
<td>$99.95</td>
<td>EZWare Multiplan, Excel template</td>
<td>•</td>
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<td>EZTax-Prep 1065</td>
<td>$250</td>
<td>EZWare Excel template</td>
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<tr>
<td>MacInTax</td>
<td>$119</td>
<td>SoftView stand-alone</td>
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<tr>
<td>TaxMaster 1988 Preparer</td>
<td>$90</td>
<td>Island Computer Services Excel, Works template</td>
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<tr>
<td>TaxMaster Pro</td>
<td>$49.95</td>
<td>Chesapeake Software Excel, Multiplan template</td>
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<td>E</td>
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</table>

W-2 form:
- **•** indicates the form is included.

IRS forms—personal:
- **•** indicates the form is included.

Schedules:
- **•** indicates the schedule is included.

Client letter:
- • indicates the client letter is available.

Help/Info available:
- • indicates help/Info is available.

Cross reference of entries:
- • indicates cross reference is available.

1065 (IRS Partnership form):
- • indicates the form is included.

*Includes Schedules A, D, E, H, K, L, M, 4502, 4797, 6252.*
Tax-Preparation and Planning Programs

When preparing a tax return on the Mac, don't expect to just answer a few questions and then print all the information the IRS needs in a few minutes. First, you have to gather the same information you would need to prepare a return manually. Tax-preparation programs start to show their value once you have assembled all your information and keyed it into the program. High-end programs not only perform all the tedious calculations but also automatically fill in other forms that are affected by your initial entries. Many people who have prepared taxes on a Mac say they would never go back to the manual method (some say they never could go back).

As ideal as this sounds, there are still a few things you should know:

- A program's results will be no better than the information you put in; remember the old saw, "Garbage in—garbage out." If you enter the wrong information in the forms, the IRS will come to you for answers, not to your Macintosh or to the program's publisher.
- A tax-preparation program is no substitute for knowing what is allowable and what is not. MacInTax provides help screens that give you (often word-for-word) IRS rules and regulations. But if you don't know when or how to use these help screens, you can still make mistakes. It's a good idea to buy a tax guidebook, or request a copy of the expanded IRS tax-preparation booklet. (This free booklet is excellent; you will find instructions for ordering a copy in the gift packet you get from the IRS right after Christmas.)
- Unless you live in California or New York (or some other state where a lot of people are buying tax-preparation programs), you'll have a tough time finding a program that prepares both federal and state returns. Software publishers often add new state programs every year, so check with your dealer or the publisher to find out which states are supported by your program of choice for the 1988 tax year.
- Tax-preparation programs for anything other than personal returns are rare. The only program available for partnerships is EZTax-Prep 1065, from EZWare. Currently no programs exist for a small business operating under a corporate structure.
- You must purchase a new tax program every year, the same way you have to order new forms every year. Many companies offer you up to half off on updates after you have purchased your first program.

When choosing a tax program, find out what forms it supplies, and then use your last return as a guide to what forms you'll need. Don't worry if no program offers all the forms you need—it's a lot easier to prepare one or two forms manually than it is to write out all of them. You may, however, need to order some of the lesser-used paper forms from the IRS.

Some tax preparation programs can use information exported directly from a tax planner. TaxView Planner, an adjunct to MacInTax, can also import data from many of the personal finance programs. Other programs work with general finance packages that don't include tax planning features; as a result, some tax planning programs have been designed to work with finance packages. Managing Your Money includes a tax planner that isn't high-end, but it performs reasonably well.

Financial Form

Whether you're interested in personal finance, investment, or tax preparation and planning, you'll find a wide range of Macintosh products from which to choose. Features and prices vary enough to fit almost every need and every budget. Currently, the only link missing is tax-preparation programs for state taxes.

Don't worry about the learning curve when moving your finances onto the Mac. Unlike many kinds of software, financial programs tend to follow standard rules and formats, so if you're accustomed to paper-based systems you'll quickly feel comfortable using financial-planning software. You may even find that once you get used to these programs you'll wonder how you've managed for so many years without them.

See Where to Buy for contact information.

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Alan L. Slay is a freelance writer based in St. Louis, specializes in financial and accounting software.
Macworld is proud to offer you an opportunity to cast your vote for excellence in computing—and perhaps win the ultimate Macintosh hardware and software system. Each year we invite all of our readers to voice their opinions and pick the best Macintosh products in 42 categories.

Usually we give you our opinions on the latest Mac products, but now, with the World-Class Macintosh Contest, we want to hear what you think. Which Mac products do you find significant? Which have served you well during the last year? Which would you recommend to a friend? By voting for the Mac products of your choice on the attached contest-entry form, you can both reward the hard work of your favorite product developers and help keep Macworld's editorial coverage on track.

You also earn a chance to win hardware and software worth thousands of dollars. To show you our appreciation for taking the time to participate in this contest, we will pick three winners at random from among the World-Class entry forms. The lucky grand-prize winner will receive most of the top-voted hardware and software products. A copy of each winning software package will go to the runner-up, and the third-place winner will receive a selection of the winning software programs.

Entries must be received no later than March 15, 1989; we will announce the results in our September issue. To accurately reflect readers' preferences, we'll publish figures for all significant vote-getters in each category. The following explanations define product categories that are not self-evident, to help you cast your votes appropriately.
CONTEST RULES

Each person may enter the contest only once. Entries must be printed by hand or typed on the form included in Macworld or on a reasonable facsimile. Your entry must include at least one product vote, plus your name, address, and daytime phone number. Entries must be received no later than March 15, 1989. Employees of PCW Communications are not eligible. Thank you and good luck!

Name ________________________________________________________________

Company ____________________________________________________________

Address ____________________________________________________________

City _____________________________ State ________________________________

Zip _____________________________ Daytime phone _______________________

Send Entries to: 1989 World-Class Macintosh Contest, Macworld, 501 Second St., San Francisco, CA 94107.
1989 World-Class Macintosh Entry Form

Please use this entry form to vote for products you are familiar with and would recommend, based on their performance and value. Choose one product per category; you need not vote in all categories. Eligible products must be compatible with the Macintosh computer and commercially available as of February 1, 1989. To ensure accuracy, we will not count a vote unless the following three items are provided: (1) correct product name, (2) manufacturer name, and (3) model number (for hardware only). Version numbers of software products are not required. Please print or type your entry; it must be received by March 15, 1989.

<table>
<thead>
<tr>
<th>HARDWARE</th>
<th>PRODUCT</th>
<th>MANUFACTURER/MODEL</th>
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<tr>
<td>Alternative Mass Storage</td>
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<td>Display—Black-and-White</td>
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<td>Display—Color</td>
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<td>Communications Board</td>
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<td>CPU Upgrade</td>
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<tr>
<td>Digitizer/Scanner</td>
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<td>Graphics Board</td>
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<td>Hard Disk (80MB or less)</td>
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<td>Hard Disk (above 80MB)</td>
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<td>Input Device</td>
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<td>Modem</td>
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<td>Most Promising Newcomer</td>
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<td>Plotter</td>
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<td>Printer—Dot Matrix</td>
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<td>Printer—Laser</td>
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<td>Printer—Color</td>
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<th>SOFTWARE</th>
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<tr>
<td>Black-and-White Paint</td>
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<tr>
<td>Business Accounting</td>
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<tr>
<td>Business Presentation Graphics</td>
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<tr>
<td>Color Paint</td>
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<td>Communications—General</td>
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<td>Computer-aided Design</td>
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<td>Database Management</td>
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<td>Desk Accessory</td>
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<td>Desktop Publishing</td>
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<tr>
<td>Drawing/Illustration/Animation</td>
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<td>Education/Training</td>
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<td>File Server</td>
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<td>Game</td>
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<td>Integrated Package</td>
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<td>Micro-to-Mainframe Communications</td>
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<td>Most Promising Newcomer</td>
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<tr>
<td>Music</td>
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<tr>
<td>Personal Finance/Taxes</td>
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<td>Programming Language</td>
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<td>Project Management</td>
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<td>Outline Processing</td>
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<td>Spreadsheet</td>
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<td>Statistics/Math</td>
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<td>Utility—Disk and File</td>
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<td>Utility—Programming</td>
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<tr>
<td>Word Processor</td>
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### Hardware

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alternative Mass Storage</td>
<td>All types of mass storage devices except hard disks. Examples include external floppy drives, removable cartridge drives, and tape backup units.</td>
</tr>
<tr>
<td>Communications Board</td>
<td>Add-in boards that help the Mac communicate with other Macs and other computers. Examples include Ethernet boards, and 8086 and 80286 coprocessor boards.</td>
</tr>
<tr>
<td>CPU Upgrade</td>
<td>Products that increase the Mac's processing capability, either by using faster 68000s, 68080, 68020, or 68030 devices.</td>
</tr>
<tr>
<td>Display—Black-and-White</td>
<td>Monochrome or gray-scale monitors that serve either as a component of the Mac II or as an alternative to the standard display provided by other Macintosh systems.</td>
</tr>
<tr>
<td>Graphics Board</td>
<td>Add-in boards that let the Mac display color or gray scale images.</td>
</tr>
<tr>
<td>Input Device</td>
<td>Mice, trackballs, graphics tablets, keyboards, joysticks—everything but digitizers and scanners.</td>
</tr>
<tr>
<td>Printer—Color</td>
<td>Any printing device, other than a dot matrix printer or plotter, that produces color output. Examples include thermal printers and ink-jet printers.</td>
</tr>
</tbody>
</table>

### Software

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business Accounting</td>
<td>A series or an integrated package rather than a single module (such as a ledger). You can choose a modular package or an all-in-one program as long as it is designed for serious business use.</td>
</tr>
<tr>
<td>Business Presentation</td>
<td>Packages that produce or lay out text; pie, bar, or line charts; or other graphics used by businesspeople to present information.</td>
</tr>
<tr>
<td>Computer-aided Design</td>
<td>Computer-aided design includes products that offer two- and three-dimensional capabilities for working with geometry, especially for applications in mechanical, architectural, and electrical engineering.</td>
</tr>
<tr>
<td>Desk Accessory</td>
<td>Any programs that install under the Apple menu and that don't fit in any other category. Examples include calculators, notepads, schedulers, calendars, and phone dialers.</td>
</tr>
<tr>
<td>Education/Training</td>
<td>Training programs provide tutorials on such subjects as typing or computer applications. Education software includes courseware, examination-preparation programs, and learning aids for children.</td>
</tr>
<tr>
<td>File Server</td>
<td>Products that enable multiple network users to share one storage device.</td>
</tr>
<tr>
<td>Integrated Package</td>
<td>Products that include several applications—such as word processor, spreadsheet, charting program, and data manager—that share data and a command structure. The applications may be on one disk or in separate modules.</td>
</tr>
<tr>
<td>Micro-to-Mainframe</td>
<td>Programs that perform terminal emulation and data conversion for mainframes and minicomputers.</td>
</tr>
<tr>
<td>Communications Outline</td>
<td>Stand-alone programs or desk accessories that organize ideas and notes in outline form.</td>
</tr>
<tr>
<td>Personal Finance/Taxes</td>
<td>Programs that help you retrieve and handle stock information; that perform portfolio management; that assist in fundamental or technical analysis; and that help you plan or prepare your taxes.</td>
</tr>
<tr>
<td>Project Management</td>
<td>Programs that manage resources and scheduling, usually for large, complicated tasks.</td>
</tr>
<tr>
<td>Utility</td>
<td>Programs that perform a wide variety of housekeeping chores, such as file conversion, file recovery, disk backup, and keyboard enhancement.</td>
</tr>
</tbody>
</table>

### Most Promising Newcomer

Which new products—in both the hardware and software categories—are making an impact? (You may vote for a product you've cited in another classification.) For our purposes, "new" products are those released within the last six months.
Apple Scanner


Information flow from a computer is varied: text, graphics, printed output, sound, and slides, with new forms constantly under development. However, despite the diversity of data that you would like to be able to input, the information going into the computer has largely been limited to the data you can type on a keyboard. It would be a lot like taking a nicely prepared meal and pushing it through a strainer. And because the Macintosh is also a graphics machine, being limited to text-oriented input is doubly frustrating.

No wonder scanners have become increasingly popular over the last few years, especially for the Mac. You can think of a scanner as half of a copy machine: it scans the document, but doesn't produce an actual physical copy. Instead, it sends the scanned image, encoded as digital values, to a computer. Once the image information is there, you can save it, convert it to various formats, cut and paste it into other documents, or send it to a printer. In fact, the combination of a scanner, a Macintosh, and a laser printer is functionally equivalent to a copy machine, albeit a very expensive one.

Apple Enters the Market

Apple considers this market important (and lucrative) enough that it has introduced its own product, the Apple Scanner. This scanner is a low (4-inch), narrow (13 1/4-inch) unit that's relatively deep (20 1/2 inches, with additional clearance needed for the cables in back). It also requires a sufficient amount of overhead clearance; the lid, when fully open, is 19 inches high in the back. The glass surface under the lid is 8 1/2 by 14 inches, and a thin moving bar within the unit does the scanning. The attractive grooved design and platinum color coordinate with current Macintosh styles.

Cables and switches are minimal: a power cord, an extra SCSI cable or two (if you're chaining to other SCSI devices), and an on/off switch. There are no other switches or buttons; you control the unit entirely from the Mac. This doesn't mean the Apple Scanner lacks functionality: The unit scans at several resolutions (75, 100, 125, 150, 200, and 300 dots per inch [dpi]); it performs multiple levels of scaling (from 25 to 400 percent, depending on resolution); and it accepts various settings for contrast, brightness, threshold, and gray map, allowing you to choose from several predefined halftone patterns, as well as to define your own.

Even so, scanner hardware by itself is useless; you need some kind of software to control the scanner, read the data from it, and convert that data to appropriate formats. Apple provides two major software packages with the unit: AppleScan and HyperScan.

AppleScan is a stand-alone application that gives you full control over the scanner. It lets you do a preview scan of a document, then use the results to set various options and levels, including what portion of the document you actually want to scan, and whether the document should be treated as line art, halftones, or a gray-scale image. When you're satisfied with the settings, you ask for a full scan, which is copied into an empty window. Much of this scanned image is stored on disk. You need...
to have several megabytes of free space before you start scanning. You can display an image at several levels: Actual Size, Reduced to Fit, Dot for Dot, Chubbybits, Fatbits, and so on. The standard Mac display is around 72 dpi, so an image scanned at 300 dpi will be greatly enlarged when viewed in dot-for-dot mode (and even more so in the Chubby- and Fatbits modes).

Once you have scanned the image, AppleScan allows you to do limited editing, using the lasso, crop, and eraser tools. You can also do pixel-level twiddling with a pencil tool for line art and halftone images (but not for gray-scale images). All types of images can be saved as either PICT or TIFF files; line art and halftone images can also be saved as MacPaint documents. You can even cut and paste to combine images. The Apple Scanner allows you to produce a test strip of images using a range of contrast and brightness or a variety of halftone patterns. Halftone patterns include Spiral, Bayer, Straight Line, and 2 by 2. You cannot, however, save a test strip file; the test must be sent directly to an output device.

HyperScan is like AppleScan but is designed to operate under HyperCard. It enables you to scan images and text for incorporation into HyperCard stacks.

The 280-page Apple Scanner manual is complete and has a strong tutorial orientation. It goes to great pains to show you—step-by-step—how to perform most tasks, what the various options and tools are, and when to use them. In some cases, the forest gets obscured by the trees, and you complete a section unsure about what you have just learned. Still, that minor error is preferable to the major failing of many other manuals: documenting features without teaching how to use them. And just to help out the terminally confused, a Guided Tour of the Scanner program (complete with animation) shows you just how the whole system works.

**Drawbacks**

So, what's the output like? On an ImageWriter II, it's OK but not great. Line art scans come out the best, especially at 300 dpi. Halftone scans aren't terribly good, and you can't print gray-scale scans on the ImageWriter.

And other drawbacks? First, the Apple Scanner supports only 16 levels of gray scale, brightness, and threshold; 8 levels of contrast; and 3 different gray maps. This means that you must do a fair amount of tweaking to get an acceptable scan. Even then you might not be able to do it.

Second, the top resolution is 300 dpi—fine, if you're using a LaserWriter, but not so fine if your destination is a 600 (or 1200) dpi typesetting system.

Third, AppleScan demands more disk space than it actually needs. When I attempted a 300-dpi gray-scale scan of an 8-by-10-inch photograph, AppleScan indicated that there wasn't enough disk space, even though there were 6.5MB available on the hard disk. I was finally able to free enough space to satisfy AppleScan; the resulting image file, however, was only a bit over 1MB in size.

Even with these limitations, the Apple Scanner could be valuable to you if you need a clean, easy method of entering graphics. Combined with packages such as Silicon Beach's Digital Darkroom and SuperMac's PixelPaint, the Apple Scanner and its software can greatly increase the flow of information into your computer.

—Bruce Webster

See Where to Buy for contact information.
Finale

Integrated music sequencing, transcription, and notation program. Pros: Generates any notation: ancient, standard, or avant-garde; outstanding laser-printer output; customizable macros, defaults, and spacing algorithms; extensive MIDI implementation. Cons: Some music software. List price: $1000. Requires: Integrated music sequencing, transcription, and notation program. Pros: Generates Finale departs from Mac interface; runs slowly on macros, defaults, and spacing algorithms; extensively you can also edit them, of course. When you transpose your music—a quick and easy process—the chord symbols transpose, too.

Making Overtures

There are several ways to get music into Finale: clicking on the staff, striking notes on a synthesizer and rhythmic values on the keyboard (step time), and importing MIDI files from a sequencer. Quickest of all, however, is using HyperScribe. The heart of Finale, HyperScribe is an impressive real-time transcription tool. As you play the synthesizer with both hands, your performance appears on screen, fully noted, lagging a measure or two behind you. It's an amazing sight, akin to watching a word processor write out anything you say into a microphone.

To provide Finale with a metrical reference, you tap your foot on the synthesizer pedal in time with your playing; thus you're free to speed up, slow down, or even stop in the middle of a performance, and the music will still appear in standard readable notation. HyperScribe's sophisticated algorithms smoothly eliminate the problems with quantization, triplets, and enharmonics that have plagued other programs. Very complex music with crossing hands and inner voices doesn't reproduce well in this mode, but it's safe to say that Finale transcribes music more intelligently than any existing system.

Cleaning Up Your Entracté

Once the music is on screen, editing is fast. Using the Mac keyboard, you can zip around the score, changing pitches, rhythms, ties, and beams without touching the mouse. You can create lyrics in Finale or import them from a word processor; then, with binding speed, the program automatically distributes and attaches the lyrics to the notes in the music, interpreting spaces and hyphens as syllable dividers.

Finale's orchestration aid includes intelligent part extraction, flexible measure numbering, and superb handling of transposing instruments. You can condense music from several staves onto one, or explode it from one staff onto many. You can cut, copy, or paste any combination of 30 musical elements such as notes, lyrics, or dynamics; for example, you could paste the articulation marks from Trumpet 1 onto the notes of Trumpets 2 and 3, eliminating the drudgery of reentering them.

To list all of Finale's editing capabilities would take pages. Suffice it to say that you can move and resize literally every object in Finale, including notes, stems, beams, slurs, accidentals, clefs, lyrics, bar lines, measures, systems, pages, and so on. This is a vast improvement over existing music programs, which often make illogical and permanent decisions concerning the placement of musical symbols.

Almost as powerful as these notational tools is Finale's MIDI implementation, which goes far beyond simple playback. Each staff can send musical information over a different MIDI channel; if you have enough synthesizers, Finale can play a complete orchestration. The performance of a score will be very musical, too, because symbols and markings in Finale can convey MIDI information: an accent makes a note play back louder, a staccato mark shortens a note, and so on. Thus crescendos, ritards, trills, and even text expressions like Swinging affect the score's playback. You could, for instance, create a marking named Barry Manilow, which, when inserted into the score, makes the music transpose a half-step when it plays back.

Any company with the money and the talent to develop a new program, so the reasoning goes, would be foolish to lavish them on a vertical market like music. General-interest applications like word processing or spreadsheets, of course, sell many more copies.

For years, this has been the unhappy scenario for Macintosh musicians who have had to tolerate buggy programs with severe limitations. So when Coda Music Software announced its new package, which took three years and over $1 million to develop, musicians had reason to hope.

The program, Finale, lives up to those hopes. It's an enormous, precise, intelligent music processing environment. Some of its tools are more elegant than others, but all are powerful and allow you to transcribe, edit, arrange, play back, and print music in myriad ways.
Finale Ultimo

If there is a price to pay for this power and elegance, it's a result of the program's size and scope. Finale is a rich environment, with its miniprograms for word processing, graphics creation, page layout, and sequencing. In squeezing the program onto an 800K disk, the developers have taken a few liberties with the Mac interface. You seldom use the four menus, for example; instead, you have to master the 32 tools and 300 dialog boxes. The learning curve isn't steep, but it's long. And the manual, while well organized, is often dry and technical, and it doesn't offer many examples. Finale comes with a videocassette, too; unfortunately, Coda has inexplicably filled the tape with a 25-minute Finale advertisement instead of a tutorial.

Remember, too, that Finale pushes the Mac to the utter limits of its processing power. If you're using a Mac II or an accelerated SE, you'll be in composer's heaven; but on a Mac Plus, an orchestral score in reduced full-page view can take 30 seconds to redraw after each tweak you make. Under those circumstances, an accelerator board would help.

For $1000, you get five Finale disks, a 550-page manual, free (and toll-free) phone support, and a well-constructed music laser font. What is priceless, however, is the integrity of Finale's data; even in its initial release, it's far stabler and more bug-free than current versions of its older competitors. For Mac musicians, the days of rogue slurs slashing across the score, inexplicably corrupted files, and superimposed music symbols are over.

Finale, with its hundreds of features designed for maximum efficiency and power, seems destined to become the industry standard in music processing and publishing. If you've been going from program to program in hopes of finding an intelligent, flexible music processor, the switch to Finale may well be your final movement.

—David Pogue

See Where to Buy for contact information.

Since writing this review in September 1988, David Pogue has become a paid consultant for Coda Music Software.

Digital Darkroom 1.0

Graphics program for enhancing scanned gray-scale images for output as halftones. Pros: Extensive list of effects; supports eight file formats; informative manual. Cons: Slow; memory intensive; tiny, imprecise controls. Company: Silicon Beach Software. List price: $395. Requires: 1MB; System 6.0 or later version; Mac II and gray-scale monitor recommended.

If you deal with images professionally, Digital Darkroom should be on your shelf. The program enables you to edit many kinds of graphics: scanned gray-scale images, images captured from a video camera, simple black-and-white line art, images scanned at 256 gray levels and 300 dots per inch (dpi). The program outputs halftones for PostScript and non-PostScript devices. Digital Darkroom is a serviceable replacement for the airbrush and provides low-cost electronic photo retouching.

The program's closest competitor is Letraset's ImageStudio. There are two main differences: ImageStudio currently supports fewer gray scales (64 versus Digital Darkroom's 256); and ImageStudio provides better tools for gray-scale drawing à la MacPaint, while Darkroom provides more and better special effects.

Four Kinds of Features

Digital Darkroom's features fall into four categories: cut and paste, autotrace, transformation, and gray-scale painting.

Pasting—the feature that lets you place a high-contrast cloudscape in an otherwise bland sky—is the heart of Digital Darkroom. ImageStudio has no pasting feature. The concept takes some getting used to, because it is a two-step method. For example, before you paste the cloudscape into your target image, you select which gray from the source image you want to apply to the target image, and you must select the gray in the target image that you want to change. You can also control whether the source image replaces, blends with, lightens, or darkens the target image. Art professionals claim that the pasting feature alone makes Darkroom worth the price.

Digital Darkroom's autotrace feature is similar to the tracing feature in Adobe Illustrator except that with Darkroom you can trace gray-scale images too. Autotrace converts bitmapped graphics to object-oriented graphics (paint images to draw images) and creates PostScript bezier curves. You then load the Darkroom traces into an object-oriented drawing program for editing. If you work with line images created from scanned art, Darkroom fits together nicely with Illustrator or Aldus Freehand.

Autotrace can actually create an individual path that has more points than PostScript can print. If the trace path is too complex, you can simplify it by removing points with the smoothing controls, but this is a trial-and-error task—since the drawing changes in the process. The job is not made any easier by having to slide imprecise-looking scale-indicator icons. (Another approach to simplifying a tracing is to save the file, open it in Illustrator, and use the scissors tool to cut the path into shorter segments.)

The set of transformations available in Darkroom is familiar: you can scale an image by a given percentage, rotate it, and flip it. In addition, you can stretch, distort, and slant. You can also change the perspective, which is useful when working with photo images.

Digital Darkroom's gray-scale painting feature falls short of ImageStudio's. Darkroom allows you to use a paintbrush and (continues)
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Control Panel
Tiny sliding scales in Digital Darkroom’s control panels are particularly hard to manipulate. It’s difficult to make 1 or 2 percent adjustments. Some scales have no digital readout at all—you have to guess in order to reproduce an effect.

an airbrush with a selection of brush sizes. ImageStudio provides brushes in several shapes and allows you to create new shapes. Darkroom has one advantage, the lighten/darken capability its brushes provide. You can brush across a particular area and change the gray shades.

Darkroom reads and writes eight file formats: PICT, PICT2, TIFF, Thunderscan, MacPaint, EPS, Illustrator, and its own Arch file (compressed) file format.

Output options include standard halftone and Darkroom’s own Advanced Halftone, which works best with 300 dpi laser printers that do not use PostScript (Apple LaserWriter SC or General Computing’s Personal Laser Printer, for example).

The manual is excellent and includes an entire chapter on halftones—how digital halftones differ from true photographic halftones and how best to compensate for those differences (more memory and better output devices, such as a Linotronic phototypesetter).

Cavets
This package is the Jaws of software, however, when it comes to memory. It’s not that the program is large, but images can be large. And image manipulation is memory intensive. Silicon Beach estimates that an 8-by-10-inch image scanned at 150 dpi and at 256 levels of gray, can claim 1.75 megabytes for the base image alone. For speed, Digital Darkroom works exclusively in memory, and a transformation can require up to twice the memory of the base image. Add memory for Undo and the image maps Digital Darkroom uses to avoid altering the base image, and memory needs quickly mount up. On a Mac II with 5 megabytes of memory, running MultiFinder and no other software, Digital Darkroom did not have sufficient memory to perform more than one transformation (rotate) on the four-by-two-inch Tower of Pisa demo image that comes with the package.

For all its power and memory-hunger, Digital Darkroom is not particularly fast. Its algorithms may be highly efficient, but on the SMB Mac II, it took 25 seconds to straighten the Leaning Tower of Pisa. In all fairness, Darkroom is moving a lot of information. But on a really large image, you may find yourself drumming your fingers.

Another problem is Darkroom’s tiny control panel and cramped sliding scales. We found it difficult to pick up the indicators with the mouse for accurate settings, especially when blending a paste, an operation that requires great accuracy. The sliding scales are short; 1 or 2 percent movements are difficult to manage—and almost impossible to repeat exactly. The graphic interface seems to have been miniaturized to fit the 9-inch screen of the Plus and SE (the software runs on those computers, but not efficiently).

All in all, any problem with Digital Darkroom is overshadowed by its assemblage of features. It is more than equal to the current generation of scanners. Although Digital Darkroom is fun to play with and easy to learn, it’s really a product for the art and photographic professional—who is also more likely to have the strongly recommended Mac II, a grayscale monitor, and beauteous memory.
—Jeff Walden with David Smith

See Where to Buy for contact information.

Reviews

High-End Data Acquisition

MacLab

IDAC1000

MacAdios II SE
Pros: 125-kHz maximum acquisition rate, FORTRAN, BASIC, C, and Pascal interfaces included. Cons: Effective use requires extensive programming. Company: GW Instruments. List price: $1890 (includes BASIC software only). Requires: 1MB; runs only on Macintosh SE.

Computer data acquisition has many possible functions. A physiologist may want to replace a battery of chart recorders with a single computer and a printer. An electrical engineer may want to use a computer as a high-speed storage oscilloscope. A plant manager may need to control arrays of switches and valves in response to data from industrial sensors.

One sign that the Macintosh has finally arrived as a serious instrument for science and industry is that data acquisition systems tailored to many different markets are now available. Each of the three systems reviewed here works best in a particular range of applications. Each also represents more power (and expense) than the systems examined last month.

MacLab for Simplicity
MacLab is a straightforward box, with highly evolved, convenient software. The front panel has four pairs of BNC connectors for differential analog inputs, a pair for analog output, and a pair for an external trigger. The software lets you use MacLab as a single-channel general-purpose oscilloscope, or as a set of four chart recorders (see “Charting Your Course”). MacLab

(continues)
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Circle 297 on reader service card
uses a 12-bit, 40-kHz converter and connects to the Mac modem port.

This doesn't sound like much for $3000. In fact, it's a bargain if you want a trouble-free system that requires relatively little engineering or programming effort on your part. It took me 15 minutes to set up MacLab as a two-channel chromatography recorder, and that includes opening the box and scanning the relevant parts of the manual. The difference between this and the typical data acquisition experience is that it worked perfectly the first time.

Simple editing commands, used with MacLab's Data Pad, enable you to transfer data from charts or scope windows to Excel. You can easily zoom and scale on-screen data and drag-select pairs of regions in charts for x-y display. You can also vary colors and pen patterns in plots.

Although MacLab has no digital control lines, its software lets you use the single output port as a programmable signal generator. Other electrical niceties include 13 steps of programmable gain, independently specifiable for each channel, and a software-selectable high-pass filter. You might want extensions, such as more input or output channels or different front-end connectors, but you couldn't ask for an easier system to use.

IDAC for Control

The IDAC/1000 is an impressive design—a slender, uncluttered, flat box with no obvious inputs or outputs. Removing the top back panel reveals a set of screw-terminal blocks to support the system's superior facilities as a low-cost controller: 16 digital I/O channels. With a 12-bit converter running at a leisurely 3600 conversions per second (it uses the modem port for Mac connection), the IDAC/1000 would not be my first choice for bench-testing electronics parts, but for strain gauges, thermocouples, and pressure sensors it's certainly adequate.

IDAC features an inexpensive HyperCard interface (see "Dealing with Cards") that allows it to perform basic data acquisition chores and limited digital I/O. For advanced applications, you may want to consider the company's specialized software (an $895 chromatography package called IDAC-Chrome, for example) or its main product, Maccontrol. In Maccontrol each channel of the IDAC/1000 board corresponds to a row in a predefined spreadsheet application template so that programming information is placed in appropriate columns to produce output in spreadsheet form in Excel or Multiplan. Maccontrol requires low-level programming (most of the commands you place in the programming spreadsheet are in hex notation), but the documentation provides some examples.

This approach has some advantages: for mixed Mac/PC labs an exactly analogous program called Icontrol works with Lotus 1-2-3, so different computers can share this unit (the other units reviewed here are Mac-specific). Its main disadvantage is that since data appears in spreadsheet form only in Maccontrol, you can't view the data in real time. If you want to see chartlike output you have to graph it separately. If you are programming a system to turn on cooling units when the fluid in vats A and B goes above 30 degrees Fahrenheit, using Maccontrol is the most flexible and efficient one. If you're trying to adjust a stimulation sequence to observe an evoked potential in a lobster nerve, it's nearly useless. IDAC clearly recognizes the industrial-control strengths of its system, and most examples in the documentation discuss applications with thermocouples and photocells.

MacAdios for Speed

The MacAdios system is for advanced users, physicists or electrical engineers, for example. Not only does MacAdios II SE use the fastest converter in this group (12 bit, 125 kHz), but it offers piggyback board options with 16-bit resolution or a super-fast 833-kHz converter. This is a higher data rate than an SE can support, but gives an idea of the range of MacAdios possibilities. The device itself is basically a Mac II board with its own interface and power supply, adapted for use in an SE. It includes two analog outputs, eight digital I/O lines, and three independent counter/timers. MacAdios also uses a separate board that takes up the SE's slot—at 125 kHz the modem port is no longer fast enough.

MacAdios II SE provides the most extensive documentation of the systems tested, and you're going to need it. The set of applications included in the four disks of software is unlikely to satisfy serious users. To take advantage of MacAdios's capabilities, you'll want to program it; GW Instruments, therefore, provides I/O libraries and
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Dealing with Cards

HyperCard interfaces are used in data acquisition this year, and IDAC’s system is adequate for basic applications. This straightforward screen is used to configure ranges for input channels.

data manipulation libraries for six common variants of FORTRAN, BASIC, Pascal, and C. The libraries cover all types of I/O channel management, including highest-speed operations; transformations through scaling; basic statistics; and fast Fourier transform. For total control, the MacAdios manual includes a discussion of the SE memory map and assembly language control of data acquisition and control functions. If you need to generate a well-defined 20-kHz sawtooth wave, MacAdios is your best bet.

Recognizing that inexperienced programmers may be put off by the responsibilities of power, GW also sells a version of LabView (National Instruments’ icon-driven programming system) that includes custom drivers for the MacAdios board. This makes managing the system simpler, at an additional cost of about $2000.

Conclusion

It’s obvious from the hardware capabilities and the examples given in the manuals that these products reflect their developers’ specific backgrounds. MacLab was probably designed by biologists or biochemists, IDAC was set up to solve industrial-control problems, and MacAdios was developed for general-purpose, high-speed engineering uses. In principle, any one of these systems could work for a wide range of applications, but in practice you will find it easier to use a system designed with your application in mind. With the current set of possibilities (five closed-box systems and almost as many boards now on the market for the SE), that should be no problem.—Charles Seiter

See Where to Buy for contact information.

NEC SilentWriter

LC890


Among the dozens of PostScript-compatible laser printers available, the NEC SilentWriter LC890 is something of a renegade. Unlike most PostScript printers in its class, it doesn’t contain the Canon or Ricoh printing engine (the actual printing mechanism); instead, it’s equipped with a proprietary engine that employs several new technologies. Heavy and squat, it won’t win any awards for good looks. But its designers seem to have gone out of their way to create an extremely functional, quick, and sturdy machine.

LED the Way

The most unusual aspect of the SilentWriter is that it’s not really a laser printer at all. All other PostScript printers use a laser beam bounced off of a moving mirror to etch the printed image onto a drum. NEC, however, has replaced the laser-and-mirror system with a row of tiny light-emitting diodes (LEDs). The 300-dots-per-inch output is the same as that of a laser printer, yet the absence of the laser apparatus, according to the manufacturer, means that there are fewer moving parts to wear out.

The SilentWriter compares favorably with other PostScript printers in its price range, including Apple’s middle-of-the-line LaserWriter II NT. The SilentWriter comes with a megabyte more memory than the II NT, meaning you can download more fonts and more complex images. It has a paper feed capacity of 500 sheets, compared to the LaserWriter’s 200 sheets. In addition, the SilentWriter’s one-year warranty is four times longer than Apple’s and includes 90 days of on-site service. The NEC engine’s 600,000-page life expectancy is twice as long as the II NT’s and that of almost every other PostScript printer in its price range.

The SilentWriter’s most dramatic improvement over its rivals is its 2-line LCD front panel, which constantly tells you what’s happening inside. As your document is printed, the display says, in turn, Online, Processing, Printing, and finally Idle. Clear messages alert you if the paper jams, the toner runs out, or the cover isn’t quite closed. The front panel has a 30-character readout with hierarchical menus that let you disable the start-up page, run a printer self-test, and select the paper feed and emulation mode (Diablo 360, HP LaserJet, or PostScript). This readout makes the SilentWriter much more communicative than its blinking-light-only rivals.

NEC’s engineers seem to have put great care into making the SilentWriter convenient to use. The paper feeds are vertical slots on top of the printer, instead of removable paper trays; adding a stack of paper is much like dropping a slice of rye into a toaster. There are two 250-page hoppers, so you can put a different size of paper in each. The SilentWriter’s stubby shape provides a short and accessible paper path. When you pop the lid open, the entire course traversed by the sheet is visible, making paper jams easy to clear.

After 3000 pages, you need to replace the toner through a slot on the printer body; after 7000 pages, you need a new developer drum, which clicks solidly into place. Apple’s LaserWriter and most other printers, on the other hand, combine toner and drum into a single cartridge. The two-in-one method is convenient, since there’s only one item to replace, but it has a disad-
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vantage: you have to replace the entire cartridge if either the toner or the drum is exhausted, which means you waste what is left of the remaining component.

**Finicky Eater**

The SilentWriter’s only significant drawback is its fussiness about paper. Although it's a thoroughbred performer when fed its preferred diet of 16-to-20-pound smooth paper, it chokes on anything lighter. If you use much paper with rag content you will eventually have to clean the printer’s innards of particles the paper leaves behind. And you can’t print envelopes without an extra-cost manual-feed hopper; even then you have to babysit while printing to make sure the envelope goes into the printer straight.

What the SilentWriter does accept, however, falls into the output tray with crisp, nicely black images. The extra RAM means you rarely run out of memory for downloading fonts, and the easy-to-read front panel keeps you constantly apprised of the SilentWriter’s status. If you can get by without printing a lot of envelopes, this 68-pound ugly duckling will perform as gracefully as a swan. —David Pogue

See Where to Buy for contact information.

### Generic CADD Level 1

**2-D CAD program.** Pros: Mac Plus/SE and Mac II versions; symbol libraries; layering; proprietary fonts and font editor; named views; 16-decimal floating-point database; MultiFinder-compatible. Cons: No fills or color; no line-width choices or arrowheads; no plotter support; no import/export facility; no autodimensions; no tangents, fillets, or chamfers; deviates somewhat from standard Mac drawing interface. **Company:** Generic Software. **List price:** $99.95. **Requires:** 1MB; hard disk or external drive recommended; math coprocessor recommended.

Generic’s CADD, for the PC, has been a phenomenal success, competing toe-to-toe with AutoCAD for market leadership in terms of units sold. But since Generic’s base price is $99.95 and AutoCAD’s is nearly $3000, the lion’s share of both revenue and attention has gone to AutoCAD.

Now that leading DOS CAD packages such as AutoCAD and VersaCAD have gotten serious about the Mac, it should be no surprise that Generic too is stepping into the fray. Generic CADD Level 1 is the first of several programs Generic has planned for the Mac. It does a decent job of following the standard Mac interface without getting too far away from its DOS roots.

CADD Level 1 has some important and well-crafted features, including basic commands for layering, symbol libraries, and named views of a drawing, as well as support of a math coprocessor. However, there are major omissions: no plotting ability, no drawing import or export except through the Clipboard or Scrapbook, no color, no autodimensions, no fills or cross-hatching, and no fillets or chamfers. It doesn’t even sport arrowheads for lines. CADD Level 2, which is scheduled for release in the second quarter, will give you some of these features, including color and autodimensions. (A coupon for a $99 upgrade is included with the CADD Level 1 package. The list price of CADD Level 2 has already been set at $199.95.) With the proposed features Level 2 will be an inexpensive, but serious, CAD package. You can only consider CADD Level 1 as a sketching pad with a surprisingly precise underlying database (16-decimal floating-point if you choose), or as a training tool until you can get Level 2.

CADD Level 1 comes in two versions, both packed onto the same floppy: The Plus/SE version does not support a math coprocessor; the II version demands one (and will run on any Mac that has one).

That’s the only difference. In timed trials on a Mac II, the II version redraws 25 to 100 percent faster. Although CADD Level 1 uses a precise, 16-decimal-place floating-point database, it doesn’t have to deal with dimensions, fills, or other sophisticated features on a drawing. For that reason, and because there is no provision for translating files into DXF, IGES, or some other standard CAD format, you can’t really compare the speed of CADD Level 1 to that of other CAD programs. CADD Level 1 itself requires a minimum of 512K RAM to run, and works better with at least 750K; the more memory you use, the larger the drawing file you can work on and the faster your work will run.

**Hybrid Interface**

Just like the PC version, CADD Level 1 for the Mac can be manipulated by keyboard or mouse, in much the same way as AutoCAD is driven. You either click on menu commands and then point and click on the screen to direct those commands, or you type abbreviated names for the commands and then enter the appropriate coordinates (with mouse or keyboard). Commands sit under typical Macintosh pull-down menus that have secondary pull-down menus and dialog boxes for lower-level options and commands. Extra “palettes,” or windows, on the screen contain drawing tool icons, status information on the cursor position and current command, layer information, and available symbols. CADD Level 1 asks you to choose a command and then an object to act upon, instead of the other way around, and to (continues)
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choose points without dragging the mouse. This is different from standard Mac CAD practice, but not too hard to get used to. And since CADD for the PC uses the same approach, switching from PC to Mac is easy. There are some touches, such as holding the Shift key to constrain to vertical or horizontal, and holding the Option key to snap to a near point, that make drawing easier.

The drawing tools comprise the basics: circles, arcs, freehand, lines, and text. You can choose the number of sides in a polygon and enter coordinates in absolute or relative, Cartesian, or polar modes. You can manipulate objects using move, rotate, scale, and mirror. The standard Macintosh Cut and Paste commands are where they should be. There is an adjustable grid and a Snap to Grid command, and you can work in English or metric units. You can also draw bezier and spline curves, as well as measure distance, angle, or area by clicking on chosen points of a drawing.

The Bright Side

Not only can you zoom in or out on a drawing and jump back to a previous zoom, but you can also name specific views that will then appear on a menu, and automatically go directly back to them. Panning can be accomplished only by selecting a new center for a drawing; there are no scroll bars.

Generic CADD Level 1 doesn't use standard Macintosh text fonts. Instead it comes with three of its own that can be slanted, sized, rotated, and otherwise positioned on a drawing. CADD Level 1 also has a built-in font editor for creating and saving your own character sets by using the same drawing tools that you use for general work in CADD Level 1.

Symbol libraries are one of the strongest features of CADD Level 1. A separate window lists the symbols available and lets you load new symbols from disk, save your symbols to the library, and scale symbols for placement on a drawing. The symbols are listed by name, not shown graphically, but are easy to locate and use. Generic Software sells specialized symbol libraries for use with its CADD programs. Each one holds about 100 symbols and costs $49.95.

Not many inexpensive drawing packages have the layering facility of CADD Level 1. A separate palette shows you the names of layers and which ones are displayed. You can create and shuffle up to 256 layers per drawing, displaying and printing the set you prefer.

The Dark Side

It's easy to summarize the shortcomings of CADD Level 1: mainly, the problem is a lack of features that are common in CAD. Besides the major omissions mentioned earlier, lines are drawn with only one thickness and most of the drawing tools lack versatility. Circles, for instance, can be drawn only by specifying the center and a perimeter point, not by using three points or by other methods. Although you may break lines or objects and choose which part to throw away, there are no chamfer, fillet, draw-tangent, or extend commands. You can only snap to the grid, not to other objects or endpoints. There is no way to enter dimensions for an object other than to type some text on the drawing.

Once you have completed a drawing, you can select the part of the drawing you want to print on a standard Mac output device, but there is no plotting utility or option, and no export command for translation to DXF, IGES, or other standard format. You can move objects to another program through the Clipboard or Scrapbook, but that defeats the purpose of a highly precise CAD drawing database. Generic says that a translator for moving between Generic PC and Generic Mac CADD files is on the way.

Forget the Second D

You'll probably get up to speed on CADD Level 1 in less than an hour, because it fits reasonably well to the Mac interface, has a HyperCard Help stack, and comes with a clear, deftly written, and lengthy manual. However, you may experience some frustration with the ways the interface deviates from Mac standards—such as no scroll bars. You'll be even more frustrated if you expect this to be anything more than a drawing tool. Sure, there are the symbol libraries, named views, and 256 layers. That's not bad for a simple sketching program—and the price is reasonable when you think of it that way. But even simple work often calls for fills and color. Without the ability to import/export to standard formats, without fills or fillets, without different line widths, CADD Level 1 can't be considered a true drafting tool. Calling it one is CAD—computer-aided dreaming. Perhaps Level 2 will change that. —Phillip Robinson

See Where to Buy for contact information.

QuickCapture 1.0

Video frame grabber hardware and software. Pros: Accepts up to four video inputs; clearly written manual. Cons: Need to change jumpers to reconfigure board, can't convert Macintosh images to video output. Company: Data Translation. List price: $1595. Requires: Macintosh II with extended video card, 20MB hard disk; 1MB.

Data Translation's QuickCapture is one of the first products designed to satisfy the Mac II's appetite for gray-scale images. Also known as a frame grabber, the board accepts pictures from any standard video source (a camera or VCR) and converts them into 480-by-640-pixel gray-scale images.

Playing the Slots

You can slip the QuickCapture board into any free expansion slot, with the help of its clear, step-by-step documentation, which also includes a section on how to write programs that access the board. The only tricky part of installation involves inserting or removing five tiny, hard-to-handle plastic jumpers to configure the card for your particular video setup. Once the jumpers are in place, though, you'll rarely have to change them.

QuickCapture comes with a cable that has eight BNC "push and turn" type connectors on one end. With this cable, you can attach up to four different video sources to the board, but only one can be active at a time. Another of the connectors
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is for connecting a trigger device to initiate image capture in response to an external event. The other three connectors are used for monitoring the video signal, and for video synchronization.

Grab It
The QuickCapture application lets you capture and edit images, but doesn’t provide a way to convert Macintosh images into video form. Select Live Video from the Image menu, and whatever is on the currently selected input channel appears on the screen in an Untitled window. You can display live video in more than one window at a time, but each new window you open slows the overall update rate. Even with only one window open, the board can’t quite keep up with rapidly changing scenes.

When you see a picture that you want to save, a mouse click anywhere in the active window stops the action so you can save the image. The program allows you to alter the gray scale of incoming images before they're frozen. You can select from 2, 16, 64, and 256 shades of gray in either Positive or Reverse mode. If the image picture is too dark or too light, you can multiply or divide all the gray levels by a factor of 2 or 4. QuickCapture can export images as PICT, TIFF, RIFF, or EPS files, as well as in Data Translation’s proprietary IRIS format. Only IRIS files can be opened, though.

You can also use the software to manipulate saved or captured images. The program includes filters for sharpening, smoothing, edge detection, and vertical and horizontal line accentuation. QuickCapture’s Image Calculator is an unusual feature that looks and works like the Calculator desk accessory. It lets you add to and subtract from an image’s pixel values or add, subtract, and perform Boolean operations on pairs of images.

The results you get with QuickCapture depend on the quality of the pictures you feed it. I was able to obtain excellent gray-scale images with both an older video camera and a VCR. The program’s image processing functions are a bonus, but don’t expect them to substitute for a fully functional application like Digital Darkroom. If you need to import black-and-white video images into your Mac II, QuickCapture is an excellent choice.—Franklin Tessler

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The WorkManager" System. For people who need workstations as advanced as their computers—from the people at MicroComputer Accessories, Inc.
In the past there were a variety of projects in which demand for resources is greater than the supply (the red bars indicate demands that exceed supply) so that users can determine the best use of specific resources given time and budget constraints.

“Finish Sheet Rock.” The program automatically adds up the duration of the events within the hammock activity. You can access reports that include just hammock activities, and you can also use hammock activities in allocating resources.

Another advantage of Micro Planner is that it lets you consider resources such as employees, machinery, and supplies when determining the start and finish dates of activities. For each task you can specify two types of resources. Normal resources—for example, bulldozers or people—are available each day. Pool resources—such as plywood sheets—are consumed. Each normal resource can have its own calendar. You can specify that a bulldozer is only available for this project on Monday through Wednesday, or that a painter can only work in the office on weekends when no one else is there. The program also keeps a running total of pool resources, taking into account how much will be used at each activity and when new resources are expected to arrive.

Once you input the resources, the time each activity is expected to take, and the sequence of activities, Micro Planner can do either a Forward Pass, which specifies the earliest day the project can be completed given a specific start date, or a Backward Pass, which gives the latest day the project must be started if it is to be completed by a given deadline.

The program can generate a number of reports and diagrams. The Network Diagram is a graphical representation of all the activities; the Bar Chart shows activities along a time scale; the Activity Listing shows all activities, along with their stop and start dates; and the Progress Report compares the actual performance with projected performance.

Micro Planner is MultiFinder compatible and can be used on an AppleShare network. It also allows transparent file transfer with its IBM PC version.

Steep Learning Curve
Because project management is a complicated discipline, it is natural that a program like Micro Planner is not easy to learn. It could be made easier by providing a more familiar user interface. For example, when you input data, you can only scroll over a limited part of the document using the scroll bar. Then you have to click at the side of the screen to move the data and get more room to scroll. Also, some boxes do not have Close or Cancel buttons.

Critical Path Method (CPM)
Micro Planner’s color-coded CPM lets you determine which tasks must be completed immediately if a given deadline is to be met (red), which ones have been completed (blue), and which ones can be delayed without affecting the deadline (extra days are indicated by boxes outlined in green).

And to enter data from an options list, you cannot just double-click; you must select the data and press enter.

Steep as it is, the learning curve on Micro Planner doesn’t look so bad when compared with the majority of project managers running on PCs, DEC minis, and IBM mainframes. As Micro Planner can compete with any other system in terms of versatility and power—Laurence Stevens

See Where to Buy for contact information.

Microsoft
QuickBASIC 1.0

Integrated BASIC compiler and interpreter. Pros: Good integration of compiler and interpreter; provides access to Macintosh Toolbox routines; can generate 68020 code; quick runtime performance. Cons: Compiling an application is slow; poor index in manual. Company: Microsoft. List price: $99. Requires: 1MB.
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Suggested Retail Price: $395
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Circle 419 on reader service card
all this automatic so that the developer can concentrate on ideas, rather than getting lost in typical Macintosh housekeeping details. A routine named ToolBox lets you access toolbox routines based on the trap address and other parameters. QuickBASIC also enables you to create and access libraries. Another powerful feature is the ability to call routines written in other languages (such as LightSpeedC, assembly language, or any language that can generate pure code resources) to fine-tune the QuickBASIC application.

In the Search menu you can find, search, and replace text (there is no wrap-around option). You can also get information about specific QuickBASIC reserved words by placing the cursor on the desired line and selecting Get Info. You can change this stored information with the Set Info option to suit your programming style. The final touch is the Bookmark option, which lets you mark lines of your program that you want to return to quickly. Using the Next Bookmark option you can easily traverse the bookmarks you have set.

The Compiler

QuickBASIC comes with two compilers, one for the BCD format and another for the IEEE format. These compilers offer many options: compiling the run-time code directly into a program, generating code for the 68020 processor or the 68881 coprocessor, generating static arrays, creating an error list, and many more (see "Compiling Options").

I did a simple benchmark on the speed of the QuickBASIC compiler and interpreter, using the Sieve of Eratosthenes. To perform the tests I used QuickBASIC's binary (IEEE) compiler on a standard Mac II with 1 megabyte of memory.

The interpreter took 28 seconds to execute the Sieve. QuickBASIC's compile time (22 seconds) is not as fast as that of other languages. It took 4.2 seconds to execute; with the 68020 and 68881 options enabled, however, this time was reduced to 2.3 seconds. I also ran the Sieve under Symantec's LightSpeedC and found that although that language compiled machine code much faster than QuickBASIC did, it executed the Sieve in a comparable amount of time.

Quick and Basic

Microsoft has listened to its users and modified the language it helped spawn into a powerful product. This new version of QuickBASIC bridges the gap between a serious development tool and an easy-to-use learning tool. From its quick run-time performance to its inherent ease of programming, QuickBASIC will surely entice some of those disenfranchised programmers.

—David J. Rudolph

See Where to Buy for contact information.

AppleShare-Compatible File Servers

AlisaShare 1.0. Pros: Enables transparent access to Mac files on VAX server; allows VAX users to share files with Mac users; supports all features of Apple's AppleTalk Filing Protocol. Cons: Best performance cannot be achieved while providing AlisaTalk's other services unless second EtherTalk controller is installed in VAX. Company: Alisa Systems. List price: Version 1.1 running on MicroVAX 2000 $4700, for larger VAXes up to $21,000. Requires: DEC VAX, Mac 512KE; LocalTalk with EtherTalk gateway or EtherTalk.

PacerShare 1.0. Pros: Enables transparent access to Mac files on VAX server; allows VAX users to share files with Mac users. Cons: Does not support AppleShare's Guest login or drop folders. Company: Pacer Software. List price: For 5 users $2400, for 500 users $45,000. Requires: DEC VAX; Mac 512KE; LocalTalk with EtherTalk gateway or EtherTalk.

While we wait for Apple and Digital Equipment Corporation (DEC) to determine how their two systems and networks will interact, third-party developers are filling the connectivity gaps. AlisaShare and PacerShare now provide the AppleShare file server interface to Mac users connected to VAX computers running the VMS operating system. With either package you can benefit both from the larger disks usually found on VAXes and from the regular backups from VAX system operators. You can even exchange files with your VAX cousins.

AlisaShare and PacerShare are but a part of the VAX-based networking packages offered by their respective companies. Alisa Systems' AlisaTalk includes network virtual-terminal support as well as print services for PostScript printers on AppleTalk or connected directly to VAXes, in addition to the new AlisaShare file services. Pacer Software's PacerLink supports virtual disks and print servers for VAXes as well as terminal emulation with multiple session capability. AlisaShare and PacerShare can both be installed and operated independently of the rest of the VAX software from the two companies.

(continues)


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“The Implications of this Product are Staggering… This is a Great Product!”
Ezra Shapiro, Consulting Editor
BYTE Magazine, Feb., '88

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Choosing the Right Grappler
The Grapplers are computing devices and software that work like translators, modifying ImageWriter print output so your printer can understand it. The Grappler C/Mac/GS makes 9 pin printers work like the ImageWriter II. The Grappler LQ drives 24 pin and parallel HP compatible laser printers as if they were ImageWriter LQ. And the Grappler LS connects serial HP compatible printers, including the 300 DPI Hewlett Packard DeskJet, to your Macintosh. All you do is set the Grappler for your printer, plug it in and start printing. Your Mac thinks it’s talking to an ImageWriter, so all your software will continue to operate as usual.

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Circle 575 on reader service card
Moving Along

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Launch Application

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Moving Along

Different sizes and types of files were transferred between a Mac SE with an internal 20MB hard disk and a MicroVAX 2000 running either AlisaShare or PacerShare. The SE was connected to Ethernet with a Kinetics EtherPort SE card. Times are also shown for launching various applications from the server. All times are in seconds and are averages of three transfers. Alisa (B) is AlisaShare with the AppleTalk for VMS bridge, Alisa (- B) bypasses the bridge, Pacer is PacerShare.

AlisaShare and PacerShare are designed to provide AppleShare-like services to Macintosh workstations connected to a VAX. The Mac workstations must have some type of Ethernet link, either directly (for example, using an Ethernet interface board in an SE or a II) or via a LocalTalk-Ethernet gateway (for example, using the Kinetics FastPath). AlisaShare supports two types of software access to the VAX’s Ethernet controller: you can use either the bridging software that’s a part of AppleTalk for VMS (which AlisaTalk also uses), or you can bypass the bridging software and access the controller directly. PacerShare currently accesses the Ethernet controller directly, but you can run PacerShare alongside AppleTalk for VMS by replacing a module within AppleTalk for VMS with one provided by Pacer.

Is It Really AppleShare?

Since the Macintosh and VAX/VMS do not implement the same style of file security (while the Mac has no security, AppleShare software provides security on server volumes), Alisa and Pacer were faced with the problem of satisfying the security requirements of both systems. The diametrically opposed routes the two companies took may satisfy either the Mac or VAX user, but not necessarily both at the same time.

Alisa’s approach is to be completely compatible with Apple’s AppleTalk Filing Protocol (AFP) specifications that form the basis of AppleShare. In doing so, Alisa ensures that AlisaShare supports all of the AppleShare features, such as drop folders (write-only folders) and guest accounts. Thus, although a Mac user must have a VMS account to use AlisaShare, AppleShare supports Guest logons with guest accounts on the VAX. Files and See Folders are two different levels of access under AFP, but they are represented as a single level of protection under VMS. AlisaShare maintains information within a special VMS catalog file to offer this distinction to the Mac user.

On the other hand, PacerShare supports only those aspects of AFP that can be implemented through VMS, using privileges that a user would normally have. For example, since VMS operations that require write access also require read access, the AppleShare concept of drop folders is not mirrored by VMS and is not implemented by PacerShare. Also, Pacer has decided not to allow any AppleShare Guest logons, even though a VAX administrator could create a special guest account.

Both servers have incorporated some of the features of VAX/VMS account security. VMS users who are restricted to logging on at certain times of the day, for example, will be able to use AlisaShare or PacerShare only in that restricted time period. Other factors—such as network access, user privileges, and disk quotas—also may have a bearing on server access.

Handling Files

On the Mac, each file has a data fork and a resource fork, as well as added information that’s used by the Finder (such as Creator and Type). A VAX/VMS file is a singular entity. For each Mac file both Alisa and Pacer create an extra VAX file that stores the resource fork of a Mac file when the file is copied to the server volume on the VAX. In addition, the VAX directory maintains a special information file to store Finder-related information. These extra files are not visible to the Mac user but are used by AlisaShare and PacerShare to provide compatibility between the two computers.

The presence of these extra files in the VAX directories that represent the AppleShare folders poses a special problem for the VAX operator. First, the VAX operator must be sure to back up both the data file and resource file for each Mac file, as well as the extra file that contains the Finder-related information. If this is not done, a restore operation will not recreate the original Mac file and the restored file may prove to be unusable. On the Mac side, no such problems occur, as both AlisaShare and PacerShare create the entire Mac file when it’s copied to a device on the user’s Mac.

(continues)
We've got a new concept in Optical Character Recognition for the Mac. It's called TextPert. We'll show you five good reasons that make TextPert the most intelligent OCR purchase you can make.

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Fast on Its Feet?

While a VAX may offer more storage space for files, it won't necessarily become a faster server for your network—especially if you're already hooked up to an AppleShare server via Ethernet. It takes about the same amount of time for a single user to transfer files between a Mac SE and a MicroVAX 2000-based server as it does between a Mac SE–based AppleShare server on Ethernet and the VAX (see "Moving Along").

When you run AlisaShare through an AppleTalk for VMS bridge, you can also use AlisaTalk's print services, but AlisaShare runs slower than PacerShare. To get the same performance from AlisaShare as from PacerShare, you must link directly to the Ethernet controller, which prevents AppleTalk for VMS from running through the same controller. On the other hand, adding another Ethernet controller to the VAX allows you to use both AppleTalk for VMS and the faster configuration of AlisaShare; this is not an unusual solution, as many larger VAXes have two different buses and often have an Ethernet controller on each bus.

The Bottom Line

Using a low-end MicroVAX as a server is not necessarily a better choice than using a Mac II running AppleShare (the minimum MicroVAX would sell for around $10,000, while a Mac II with a large disk might cost $6000). On the other hand, better performance can be achieved with Digital's larger, faster VAXes—an option that would certainly be appealing to companies already using such machines.

The choice of AlisaShare or PacerShare depends on your needs. If your Mac

Users already know AppleShare and work with drop folders and Guest logons, then AlisaShare should be your choice. And if you expect to use mail or multuser applications that depend on AFP's guest logons or drop boxes to operate properly, then again, you'll want AlisaShare.

While both systems utilize standard VMS security for the VAX-resident files, PacerShare offers the added capability of Access Control Lists (ACLs) for security as well as resource accounting. If you need this type of security then you'll prefer PacerShare. —Dave Kosior

See Where to Buy for contact information.

Early Reading Software

Reader Rabbit  Pros: Challenging, varied games for a wide range of reading levels; customizable difficulty and speed levels; excellent documentation.


Structured Practice

To provide cumulative learning, words missed in one round disappear in the next, along with new words of a similar level of difficulty. The program thus provides children with a structured practice of specific reading skills, building on strengths while working to improve weaknesses. Although Reader Rabbit succeeds admirably at getting and keeping a child's attention, educators clearly designed it to complement a school program and provide parents with a tool for reinforcing reading skills at home. Parents or teachers can adjust the speed, level of difficulty, and vocabulary using pull-down menus, providing an added level of control.

The documentation outlines the skills covered by each game and comes with word lists and follow-up activities. It includes over 200 three-letter words and

(continues)
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SIZE (MB) | Access Time | Internal | External
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Nova 30 | 28 | $479.00 | $569.00
Nova 40 | 19* | $599.00 | $679.00
Nova 80 | 19* | $949.00 | $1039.00
Nova 120 | 28 | $1229.00* | $1279.00

Volume pricing available. *Internal drives available for the Macintosh SE and II only.*120MB internal drive available for Macintosh II only.

*Quantum's DisCache allows access times to drop as low as 12 milliseconds.

To order, call us today. MasterCard and Visa accepted with no extra charge.

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Circle 458 on reader service card
The Sorter Game
Children practice letter-recognition skills by selecting words that match a given pattern. New words emerge from the left side of the Sorter machine. The player must select those that match the pattern. If the player is too slow or decides that the word doesn't match, the word falls into the trash can.

Newfangled Phonics
Alphabet Blocks is designed to teach phonics to children three to eight years old. Although it claims to be an integrated product using revolutionary technology to teach traditional phonics, it fails for an old-fashioned reason: it doesn't capture the short attention span of its intended audience.

The elf presides over a pile of old-fashioned alphabet blocks and a toy soldier. By clicking on a light bulb hanging from the ceiling, a child can hear the elf pronounce either the letters' names or their sounds. Clicking on the toy soldier causes him to stand up or sit down, making the letters on the blocks alternate between upper- and lowercase. Click on the elf, and he asks you to identify a given letter or sound. When the child selects the block, a picture that illustrates the sound being taught flashes, matching a book of alphabet pictures that comes with the program.

Unlike Reader Rabbit, Alphabet Blocks is repetitive to hear and static to watch. Using a proprietary system of HyperAnimation that synchronizes voice and motion, the program was designed to have the elf say the names and sounds of the letters in the most natural manner possible. Unfortunately, the elf speaks in a monotone and says virtually the same thing every time.

The elf has a limited set of facial expressions, and his movements are confined to a small frame in the upper-left corner of the screen. Besides smiling at correct responses, the elf's only other trick is to fall asleep after the mouse has been inactive for 30 seconds. An appropriate response. Any child I know would probably be off in another room playing with something else long before the elf nods off.

Patient, or Unimaginative?
Touted as an endlessly patient tutor, Alphabet Blocks is actually a rather unimaginative teacher. The program's repetitive cycle asks a question and then waits a full 15 seconds before repeating it. During the waiting period the elf's eyes roll, nothing else moves, and there is no sound. The first time I ran the program I was sure it was stuck or broken. What would a five-year-old think?

Worse, Alphabet Blocks seems to encourage the kind of rote memorization and blind guessing that take the fun and magic out of learning to read. Rather than presenting the child with a variety of questions and ways to answer them, the program asks the same questions and gives the same hints every time. Because children learn in different ways, such repetition reduces the possibility for learning—if a child doesn't understand the question, repeating it won't help.

Alphabet Blocks doesn't successfully justify its cost. There is nothing about the program that is more interesting, more challenging, or more motivating than traditional methods of teaching phonics to young children. Songs, stories, puppets, and wooden alphabet blocks would be a better investment of parents' time and money and would provide far better memories a few years down the line.

—Liza Weinman

See Where to Buy for contact information.

Statistical Analysis Software

StatView SE+ Graphics 1.02

Systat 3.2

The field of statistical analysis presents two challenges to microcomputers: memory and graphics. Currently, only the Macintosh can meet these challenges successfully. That's why the Mac has developed a following among statisticians. This review looks at upgrades of two market leaders. StatView SE+ Graphics is aimed at statistics users who need advanced presentation graphics; Systat 3.2 is targeted more toward research and academic users who require a range of analyses.

A View of the Stats
StatView SE+ Graphics is the latest result of the continuing evolution of StatView 512+, the perennial favorite in Macworld's
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World-Class competition. Abacus Concepts licensed StatView 512+ to Brainpower several years ago, but has developed advanced variants of the program to distribute on its own.

The main distinction between StatView SE+ Graphics and StatView 512+ is, as the name suggests, the integration of presentation graphics. The list of statistical tests in both programs is the same, and the StatView SE+ Graphics package includes the StatView 512+ manual. StatView II, Abacus's other product, is similar to StatView SE+ Graphics but includes math co-processor support and full color graphics (StatView SE+ Graphics offers only eight QuickDraw colors).

Thus the Graph menu contains most of the new features of StatView SE+ Graphics. The original StatView already provided a respectable assortment of graph types, from the usual scattergrams and line charts through box plots and several styles of handling data-point overlap (see "It's Showtime for StatView"). Now you also have detailed control, through hierarchical menus, of point type, line width and texture, chart scaling, and fill patterns. You can overlay legends and other text, for example, arrows connecting text to points of interest in a plot), and include tables directly as inserts in a graph. The organizing principle for chart modification is the separation of each graphic into four superimposed planes: Background, Statistics, Drawing, and Legend. In StatView SE+ Graphics, you can control the artwork on each plane to style a data presentation for maximum impact.

The developers at Abacus claim that 90 percent of the users of the original StatView requested better graphics and easier data-file exchange, rather than a wider range of tests. Thus, besides adding presentation charting, Abacus has enhanced the Import command under the File menu with a background program that intelligently evaluates the data in an imported file. In practice this means that you can bring an Excel file, for example, into StatView, and find that the program has properly distinguished variables from categories and assigned correct variable names. It's exceptionally convenient.

Systat Systematics
While StatView provides ease of use and visual impact, Systat provides completeness. Every statistical test found in standard undergraduate textbooks occurs in some module of Systat. If you need a test that somehow is not provided (Cochran's Q? Mantel-Haenszel statistic?), Systat includes its own version of BASIC for programming that function. This completeness is the reason for buying Systat. Despite a wonderful manual, the program is not easy to use and retains much of the command-line style of the original non-Mac program. Version 3.2, however, introduces two significant advancements toward an improved Mac interface. First, Systat now features a data-management system that provides the usual cut, copy, and paste features. You can cut data from a table in Excel, for example, and paste it into Systat's own spreadsheet-like data entry template. Second, a View window now enables you to plot a set of graphs and page through them on screen. The extensive facilities (including excellent 3-D plotting) offered piecemeal in earlier versions are now more usable with the addition of the View window.

The graphs can now be saved to PICT files for further editing. While this doesn't mean that Systat now competes with StatView's lush editing facilities, it means that you're no longer stuck with minimal chart labeling in Systat's austere proprietary font. New graphing features also include varieties of exponential and contour smoothing, step smoothing, and spline functions.

The remarkable inclusion in the new version is the $5 demo program (you can order all the copies you want, but it only holds 50 records per file) called Mystat. This program has a complete, interactive Macintosh interface (see "Systat Looks Ahead"), with nearly complete graphing features, icon menu choices, and a basic assortment of statistics. The challenge facing Systat's developers is to integrate all 4 megabytes of statistics module code in a program that is as easy to use as Mystat. It's not clear how to do this, given the memory and disk size limitations of the mainstream Macintosh market, but the resulting program would have no competitors.

Let Your Purpose Be Your Guide
Systat is shipped on five disks. It includes program modules for descriptive statistics; factor analysis; nonlinear and multivariate linear modeling; nonparametric statistics; and cluster, correlation, and series analysis. Other included modules handle graphing, construction of tables, and data scaling. In contrast, StatView SE+ Graphics fits on one disk, offering standard descriptive and comparative (ANOVA) statistics, factor analysis, nonparametrics, and presentation graphics that rival the best stand-alone packages (for example, Cricket Graph). Although their markets overlap, the upgrades of StatView and Systat mainly enhance StatView's position as a business package and Systat's position as a research standard.—Charles Seiter

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Turbo SE


Accelerator boards for the Mac SE have become popular lately. However, the high price of the 68020 accelerators keep them beyond the reach of many SE owners. Turbo SE, a 16-MHz 68000 accelerator, offers an excellent compromise between price and performance.

One problem with the newer 68020 is that it will not run some older applications properly, or, in some cases, will not run them at all. As a result, the 68000 remains a popular processor, with an installed base that is far greater than that of the newer 68020. Turbo SE squeezes the 68000 for extra speed and performance, while preserving its functional characteristics.

Turbo SE uses its own 16-MHz 68000 processor—twice as fast as the Mac SE's standard processor—to increase performance. However, the Turbo SE is not simply a double-time accelerator: it uses innovative methods to tweak extra performance.

A chip's speed is determined by its clock crystal, not by some internal speed setting. By installing the Mac SE's ROM chips on the Turbo SE board, you can make them run with the Turbo's clock crystal. The result is that the Mac ROM runs twice as fast as before. The processor doesn't need to wait as long for certain instructions, and you can do your job faster.

The Turbo SE also performs some tricks with the Mac SE's RAM. It provides 128K of dedicated RAM to displaying work on the SE's screen. To take advantage of the video RAM, remove the memory from the Mac's system board and place it on the Turbo SE. The 128K of video RAM then replaces the main RAM on the Mac's system board. If you have extrafast memory (below 120ns) you're out of luck—the Turbo SE can't handle it.

When removing your SE's ROM, be careful not to bend or break the pins. The ROM chips are securely inserted into their sockets on the Mac's system board and are likely to pop out quickly when you begin to pull on them.

Turbo SE Benchmarks

<table>
<thead>
<tr>
<th>Set 1</th>
<th>Mac II</th>
<th>SE Control</th>
<th>Turbo SE</th>
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<tr>
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Set 1 measures general CPU performance, including integer calculations. Set 2 focuses on the 68881 chip, which performs floating-point calculations. The values for Steve, Fibonacci, and Float show how quickly the task was completed, so the smaller the values, the better. On the other hand, the values for Whetstone, Savage, and Transcendental indicate how much work was done within a fixed amount of time, so the larger the value, the better.

Cooperation Is the Key

The 68020 is designed to work automatically with the 68881 math coprocessor. Applications compiled for the 68020 will automatically route all floating-point math to the 68881.

The Turbo SE 68000, on the other hand, was not designed to work automatically with the 68881. To get them to work together, Turbo SE uses some ingenious hardware and software. The hardware provides a pipeline from the 68000 to the 68881 on the Turbo SE board. The software, called 68881 INIT, provides an alternative numeric environment to SANE. Specifically, the 68881 INIT intercepts math routines that are amenable to the coprocessor and sends them along for quick floating-point treatment.

While the Turbo SE gets the 68000 and the 68881 chips to work together, you should be aware of a couple of problems.

First, in order to work properly, the 68881 must be rated at 16 MHz—the same speed as the 68000 that comes with the Turbo SE. If you buy the 68881 from Siclone along with your Turbo SE, you will not have a problem. However, if you already have a 68881, or are planning to purchase it separately, be certain to specify one rated at 16 MHz.

Second, because the 68881 INIT is an alternative numeric environment to SANE, some custom advanced math applications may not perform predictably with the Turbo SE and the 68881. Or the results may differ in precision from those obtained when using SANE. This problem should affect only a small percentage of Turbo SE users. Off-the-shelf software should not be affected negatively by the 68881 INIT.

Of course, the 68881 is entirely optional—you can leave its socket empty and run all the software you ran before you installed the Turbo SE.

Performance Is the Key

While the Turbo SE processes information twice as fast as a standard Mac SE, the system's throughput will not double when it is installed. System throughput is dependent upon several factors, such as I/O, storage speed, and the speed of primary memory; processing speed is only one factor among many.

With the well-engineered, reliable Turbo SE, you should enjoy a pleasant but not dramatic increase in the Mac SE's performance. We recommend it.—Michael Day and Steven Phillips of Savant Labs

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Specifications
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INTERNATIONAL KITS FOR MAC II ONLY

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These complete internal drive kits include the drive, UniMac™ formatting & partitioning software, hardware mounting kit, all necessary cabling, and How-To manual.

EXTERNAL DRIVES FOR MACINTOSH PLUS, SE & II

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Reviews

Solitaire Games

**Solitaire Royale 1.0**  
Pros: Colorful, excellent manual and online help; wide variety of games; fast.  
Cons: Scoring lacks imagination; forces you to play by one set of rules.  
Company: Spectrum HoloByte.  
List price: $34.95.  
Requires: Mac II. (Version 1.1 requires only 512K).

**Klondike 3.6, Canfield 3.1, Golf 1.1**  
Pros: Clear scoring, flexible playing rules; addicting, shareware.  
Cons: Simple coloring scheme; redraw not as fast as in older, noncolor versions.  
Company: Unison Software.  
List price: $10 each.  
Requires: 128K.

**The Solitaire Desk Accessory 1.0**  
Pros: Desk accessory; fast; flexible playing rules; includes three games.  
Cons: No scoring; simple coloring.  
Company: Softstream International.  
List price: $35.95.  
Requires: 128K.

There are a lot of very nice things about Solitaire Royale for the Mac II. It offers eight types of solitaire plus three children’s games; it is colorful, with vivid cards on a bright blue background; and redraw is fast and responsive. You can choose from several decks of playing cards, so face cards can be anything from vampires to jungle animals. And you can move cards either by dragging them or by clicking on them.

Yet, in spite of Solitaire Royale’s slick look and feel—and the convenience of having several games in one program—I enjoy Unison Software’s shareware solitaire games much more. The clever way points accumulate in the Unison Software games makes Solitaire Royale’s scoring method seem very simplistic—its points are awarded based on the number of cards played to the foundation (the stacks where all the cards should end up), with most cards worth one point.

Unison’s programs offer much more complex and addictive scoring and play: You get 5 points added to your score for each card you play to the tableau (the playing area) and 10 points for each card added to the foundation. To make things really interesting, the games also subtract points from your score. For instance, in one game you lose 2 points for every 15 seconds that lapses between plays while the game window is active, 5 points for moving a top card from the foundation to the tableau, 5 points for moving a single card from one stack to another when there are faceup cards under it, and a whopping 20 points for using the Show Aces function to find facedown aces in the tableau. Since the scoring encourages you to play fast and avoid mistakes, skill, and not just luck, becomes a factor in your final score. All-time high scores are recorded on a scorecard that has room for four different players’ names.

Solitaire Royale offers two games that are supposed to thrill competitive players. The challenge is mainly trying to beat a previous score—in other words, simply trying to get more cards on the foundation. Tour lets you play each game in the collection and records your score for each game as well as a total score for the set. The game also tracks the top five scores for each completed Tour. The other game, Tournament, simply tracks the top five scores for each game.

In addition to more challenging scoring, Unison’s programs offer you more flexibility in playing the game. Solitaire Royale forces you to play by the rules in Hoyle’s *Rules of Games* (NAL Penguin, 1946). Often Hoyle’s rules differed drastically from the way I had been taught to play solitaire. Take, for instance, the most common solitaire game, Klondike. According to Hoyle’s rules, you can move only the top faceup card from one column to another. I had always played that you could move a whole column of faceup cards at once. Unison’s version of Klondike lets me continue to play by my own rules, while Solitaire Royale (frustratingly) forced me to “play fair.”

Unison’s programs aren’t perfect either, however. First, only three games are currently available—Canfield, Klondike, and Golf. And, although $10 each seems inexpensive, Solitaire Royale’s set of eight games costs only $34.95. Second, face cards are redrawn slowly in the newer versions that support color hearts and diamonds. Older versions of the programs (such as Canfield 1.1+ and Klondike 2.1) do not support color but are more responsive, and, therefore, more compelling.

You do have one other choice for a solitaire program—Softstream’s *The Solitaire Desk Accessory.* Like Unison’s games, the program runs on all Macs, lets you move columns of faceup cards, and includes basic black and red coloring. Like Solitaire Royale, the program includes a set of games—Klondike, Boston, and Pyramid—and redraws quickly. But it doesn’t record your scores, and the only real reason to choose it over one of the other games is to have the convenience of a DA.

If you want a challenging, competitive game and you don’t care about slick design, by all means download one or all of Unison’s shareware games from a bulletin board or get them from a user group. If you decide later that you want a little more pizzazz or variety, you can still buy Solitaire Royale. But when it comes time to play serious cards, you’ll return to Unison’s products.—Cheryl Spencer

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For the last step, you have to quit your word processor and launch the EndNote application. EndNote first scans through a document, matching each citation marker to a source in the library. (The current version is compatible with Microsoft Word 3.0, MacWrite, WriteNow, and text-only files.) Next, choose a bibliographic style that matches the publication to which you will submit your work. Finally, EndNote reformats the document according to the style you've chosen, building a bibliography at the end. As a safeguard, EndNote saves the new version of the file under a different name. If one journal rejects the article, it's simple to reformat it for another.

EndNote's most glaring omission is the lack of error checking on data entry. I'd also prefer a more comprehensive search function. And the lack of a horizontal scroll bar or word wrap in the reference list window is annoying. But aside from these minor faults, the program is worth its weight in gold to those of us in the desktop-publishing or-perish set. EndNote won't guarantee acceptance of your next paper, but it'll make preparing it a whole lot simpler.

—Franklin Tessler

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throughout North America and Europe, M.M. Inc. is the leader in providing
custom products for the computer
industry. As sales continue to grow, we will reach (cont. pg. 4)

Our History

<table>
<thead>
<tr>
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Back in 1968, in a small garage outside Bakersfield, California,
Marshall Manufacturing was formed. Mitch Marshall perceived a
growing market demand for electronic component boards for the
up-and-coming electronics and computer field. His perception proved
to be correct. Marshall Manufacturing, Inc., began operations with
a lean staff of 12. Today, with plants throughout North America and
Europe, M.M. Inc. is the leader in providing hardware for the com-
puter industry. As sales continue to grow, we will reach (cont. pg. 4)

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MacMainFrame

Mac SE and Mac II terminal emulation for IBM 3278 and 3279 terminals. Pros: Easy to install; includes file-transfer utilities; special character option for file downloading simplifies importing data in other programs; handles color display on Mac II; emulator’s cursor can be controlled by mouse. Cons: 900-character maximum record length prevents transfer of some files to mainframe; does not include graphics support. Company: Avatar Technologies. List price: MacMainFrame SE $795, MacMainFrame II $995 (both include MacMainFrame 3270 version 2.0 software).

Avatar has now expanded its line of IBM terminal emulator hardware for Macs to include both the Mac SE and the Mac II. MacMainFrame SE and MacMainFrame II are boards that fit into the SE and II, respectively, and work with MacMainFrame 3270 version 2.0 software to emulate IBM 3278 and 3279 terminals over standard IBM coaxial cables. Plug one of these boards into your Mac and you can exchange files with IBM mainframes.

If You Can Read This...

The MacMainFrame 3270 software can be used with either board and provides color support for the Mac II. If you have a Mac II with a color monitor, you can choose to use either a default color palette (of eight colors) or a palette of your own. MacMainFrame is also the first program to offer the choice of a white or black background for 3278/79 emulation. I found using color characters on a black background provided better contrast and resulted in less eyestrain. The IBM screen font included in the program is one of the better-designed fonts for mimicking IBM terminals, and it looks good on the Mac’s screen.

Depending on your monitor size, you’ll have to reach some compromise between character size and screen size. Since MacMainFrame 3270 supports 3278 Models 2 (24 lines by 80 characters), 3 (33 by 80), 4 (44 by 80), and 5 (28 by 132), you’ll find that the default 12-point font size doesn’t allow you to see a full screen on a Mac SE (only the Mac II can show a full screen of a Model 2). Models 3, 4, and 5 expect a screen larger than 12 inches. Scroll bars do appear when the monitor is too small, an inconvenience if you’re continually moving between a command line on the bottom of the screen and the results shown at the top. You can choose a font size as small as 7-point, but that’s pushing readability. MacMainFrame 3270 lets you select a different font and font size for printing screens.

If you’re working with large screen sizes and move the IBM cursor around much of the screen, you’ll appreciate Avatar’s use of the mouse to control cursor movement. Standard movement of the cursor is accomplished using the cursor keys and some IBM-defined function keys. If you use your mouse and option-click a character on the screen, MacMainFrame 3270 automatically generates the required cursor-key strokes to move the screen’s cursor to that position.

Pick a File, Any File

MacMainFrame 3270 supports two types of file-transfer software for exchanging files between the Mac and an IBM mainframe. One is Avatar’s own HFT (Host File Transfer) software, which must be purchased separately; the other is IBM’s IND $ FILE, which is found on many IBM mainframes. You store the file-transfer software as part of your terminal-specifications file created by MacMainFrame 3270.

You can exchange three types of files with a mainframe: text, binary, and document. If an ASCII text file is uploaded from the Mac, MacMainFrame 3270 automatically translates the ASCII characters to IBM’s EBCDIC coding (and the reverse when you download a text file). Binary files contain only the data fork of a Mac file; document files contain the resource fork as well. You can use the binary format to transfer files that can be used by PCs or some mainframe programs, while the document format is good for archiving Mac files for future downloading and reuse. MacMainFrame 3270 limited me to record lengths of 500 characters, which prevented transferring word processor files in IBM’s Document Content Architecture (DCA) format to the mainframe for use by one of its word processing programs.

Avatar includes two very useful features in MacMainFrame 3270’s file-transfer capabilities. First, if you’re downloading a text file, MacMainFrame 3270 can insert special characters as the file is downloaded. You can instruct your mainframe’s database to generate a report with VT as a column separator, for example, and when the file is downloaded, MacMainFrame 3270’s Mac file will have tabs in the right places. You could then load that file into any Mac program, such as a database manager or a page-layout program, with the tabs preserved.

Second, MacMainFrame 3270 supports batch-mode file transfers. It’s particularly easy to start MacMainFrame 3270 without logging onto the mainframe and to select a series of Mac files to upload to the mainframe. Then you can log on, start the batch-file transfer, and walk away to do other things. Or, if you’re running under MultiFinder, you can start another program and let the files transfer in the background.

Roll Your Own

Avatar has published the specifications of an API (Application Programming Interface) for the MacMainFrame family of products. As part of the API, Avatar includes XFCNs (external functions) for HyperCard so that users can create custom interfaces to IBM mainframes.

The MacMainFrame boards and software provide the standard features for emulating an IBM 3278/79 terminal with the Mac. Even though the MacMainFrame series has yet to support multiple mainframe sessions (like Novell’s PCOX board and TriData’s Netway 1000) or mainframe graphics displays, MacMainFrame’s added features (such as mouse control of the cursor, special character insertions, batch file transfers) make it the most powerful IBM 3278/79 emulator for the Mac.

—Dave Koslur

See Where to Buy for contact information.
The Colony


This ground-breaking sci-fi adventure game from Mindscape employs a new solid-model animation technique that lets you move through buildings, around corners, and behind objects in a convincing three-dimensional world. Combined with futuristic digitized sounds and freakish aliens, this realism is enough to give you the creeps.

Dark Star
Throughout the game you’ll recognize thematic devices that border on clichés, from a number of movies and games. You awake groggily in a dark room, unable to see until you find the light switch (homage to Hitchhiker’s Guide to the Galaxy); it turns out you’re on the bridge of your spaceship, which has just crash-landed on planet 5-Delta-5, a remote scientific colony whose inhabitants have all perished in a mysterious alien attack (homage to Aliens).

Before you leave your ship, you are fitted with a super-duper space suit, complete with weapons, armor, and a set of cross hairs in the visor (homage to Robocop). The trick is to keep the high-tech outfit’s batteries from running down (whereupon you perish, and the Mac emits a digitized scream). You renew your suit’s energy by gobbling little eggs strewn along the corridors of the deserted space colony (homage to Pac Man).

Your mission is to find out how a group of evil aliens were accidentally teleported to the colony from another dimension, to learn how they can be destroyed, and to carry the cryogenically frozen children of the colonists back to the safety of your ship. As you wander the halls and rooms of the colony in search of answers, you must avoid the bizarre, pyramidal, one-eyed aliens that seek to destroy you with a burst of noisy static (see “Alien to Me”).

Planet of the Shapes
What makes The Colony a delight to play is its three-dimensional environment. At first you’ll be a bit unsteady, careening drunkenly into walls and wildly overcompensating for sudden moves; but as your mouse hand gets steadier, you’ll love the feeling. Walls, furniture, and aliens fly by as you move past them; you tiptoe cautiously around corners, ready to retreat if an alien lies lurking; and you can escape observation by ducking into a stairwell or closet. As is usual with 3-D simulations, objects in The Colony are represented by simple, geometric, straight-line figures. Yet in this deserted outpost in space, that sparseness is completely convincing.

What makes The Colony frustrating is that it’s fiendishly difficult to play. Certain inconsistencies and convolutions seem to have been thrown into the story just to make it harder. For example, most players will be utterly baffled as to why they die when they attempt to step out of the spaceship. I was, too; only a call to Mindscape revealed that you must close the inner airlock door behind you. Unlike other doors in The Colony, this one doesn’t shut automatically.

Furthermore, there are seven floors in the colony’s building complex, nine types of aliens, and dozens of red herrings and dead ends; there’s even a room from which there is no escape (the Dave Bowman suite —homage to 2001: A Space Odyssey). If you can stick with it, this game will keep you occupied—or perhaps frustrated—for weeks on end.

Although not technically copy protected, the game is occasionally interrupted by the intrusion of “security panels” (ostensibly part of the futuristic decor), which require that you type in a six-digit, ever-changing code. You arrive at the correct numbers by consulting a cardboard slide-rule, included with the game, which is not unlike the secret spy decoders that used to come in boxes of breakfast cereal. Without this difficult-to-photocopy item, the game is unplayable, and thus piracy of the program is ingeniously defeated. But having to look up the correct code can be bothersome.

The Last Frontier
The Colony is worth exploring, though. Despite its rehashed sci-fi storyline, its realistic 3-D environment will have you poking into corners, rooting through drawers, and dodging aliens with gusto. There are plenty of witty touches (can you find the chattering false teeth in the doctor’s office?) as well as chilling ones (read the final journal entry of the now-vaporized Dr. Schneider, in which she insists that the dangerous teleporter experiments proceed).

If you plan to undertake the journey, though, three words to the wise: First, get a set of colony maps from CompuServe or one of the other online services; they’ll spare you hours of meandering in featureless hallways trying to get your bearings. Second, remember that there’s no shame in calling Mindscape for hints; The Colony’s realistic world isn’t always a fair one. And third, playing it alone late at night may result in 3-D nightmares. —David Pogue

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Comment 2.0

Post-it-type note DA. Pros: Provides a variety of useful notes; Time Notes act as an alarm clock. Cons: Not completely compatible with all applications; bug in zoom box can crash Macintosh.

Company: Deneba Software. List price: $99.95. Requires: 512KE.

They're everywhere—small, sticky, pastel-colored squares of note paper. The concept is so simple, yet it has completely changed the way we handle paper documents. Enter Comment from Deneba Software. Inspired by the success of its paper counterpart, Comment 2.0 brings the convenience of Post-it notes to the Macintosh by providing an almost unlimited supply of electronic notes that you can attach to everything from individual spreadsheet cells to entire documents. Comment can even help you manage time by having a note automatically appear on screen at a set time.

Comment is similar to the Macintosh Note Pad—both are desk accessories (DAs) that enable you to jot down a note without interrupting the main application. Comment, however, gives you the ability to create and manage different types of notes.

Different Notes for Different Folks

Comment offers four note types: Note, Window Note, Time Note, and Scratch Note. You can attach a Note to a particular location in a document. For example, you can append an explanation to a specific cell in a spreadsheet. Or, someone reviewing a desktop publishing document can attach a comment to a particular passage of text or to a graphic.

The Window Note, as its name implies, is attached to a window rather than to a particular place in a file. A Window Note is handy for making general comments about a document, or for making a routing slip for document approval.

The Scratch Note, which is similar to the Macintosh Note Pad, is a free-floating note that enables you to capture a fleeting thought or jot down phone messages.

The most useful note is probably the Time Note. It enables you to enter a message in a note window and preset a time for Comment to display it. You can even set Comment to display a warning message in advance of the Time Note. Another option is to set a Time Note to repeat itself at certain intervals. Normally, when a Time Note appears, the Mac beeps once; however, you can elect to have a Time Note beep constantly until you shut it off. Just try overlooking that appointment.

What's on the Menu?

You can set Comment to automatically load into memory whenever you start up the Mac. Or you can load Comment manually from the Apple menu. Once Comment is loaded, it remains in standby mode until you select Quit from Comment's menu. While Comment is active, an asterisk (*) appears on the far right of the menu bar. Clicking on the asterisk displays a menu that lists many of Comment's commands. The most important item in the menu is the Note Manager, the control center for all Comment activities. From the Note Manager you can view a list of active notes, as well as search, import and export, and delete notes.

Take Note

While Comment has the potential to become as indispensable as Post-it notes, there are some annoying problems that make me wary of relying on it completely. For one, Comment doesn't work smoothly with all applications. In MacDraw II, for example, Comment will not attach a note to an object, and the location of Comment's asterisk menu moves around within MacDraw II's menu bar. Comment also exhibits problems in FullWrite Professional and in Microsoft Works.

And an annoying bug surfaces when I attempt to enlarge a note window on my color monitor by clicking on its zoom box. Instead of opening the note window to the full size of the display, this makes the note disappear altogether, sometimes freezing the Mac II and requiring that I restart it. (Deneba Software has informed me that a fix is forthcoming.)

In spite of its drawbacks, Comment could easily become an indispensable member of my DA collection. It is a convenient way to annotate cells, words, or entire documents. Its Scratch Notes provide a means for instantly jotting down random ideas. And finally, its Time Notes are perfect for keeping on top of deadlines and appointments.

But despite Comment's convenience, until Deneba Software fixes the bug that can crash my Mac, I'll have to rely on yellow Post-it notes a while longer.—**Keith Thompson**

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Window Shopping

Getting organized with two HyperCard stacks, a HyperCard utility, and FormSet

by Lawrence Stevens

The value of most commercial HyperCard stacks is usually not the information they contain—that's almost always available elsewhere for less money—but the organization of the cards. This month I review two products that help you organize your stacks, plus a HyperCard utility that helps organize your ideas, and a forms package.

Client

Client by Softworks ($195) is a HyperCard stack that maintains a list of your clients or customers along with their product or service interest, as well as financial and contact information. It strikes a perfect balance by providing enough links to make negotiating around the cards easy without confusing you with too many buttons and functions.

The title card is an attractive graphic of the cover to a Personal Directory with alphabetic index tabs along the side. You can access a specific customer card by clicking on the correct letter tab and then using the forward arrow. You can also search the cards by a word or a phrase.

The main client card contains fields such as client's name, address, and phone number. You can change any of the field names. For reporting purposes, you can specify that the program sort by the first field only; by the first, then the second field; or by the first, second, and then the third field.

Linked to the main client card are three preset cards: Client Interest, Financial Information, and Contact Information. You can change the titles of these cards if you wish, and you can add as many cards as you want. You can also customize each of the field names on the cards, and you can specifically that a field accept only a number or a date, or lock a field from further data entry.

You can set a variety of parameters for searching through your Client file. You can search by word, phrase, client name, or other parameters you define—upper and lower numeric limits, for example. You can locate clients who purchased products costing between $20,000 and $40,000 in 1988, or clients you haven't visited for three months, or clients who have expressed an interest in a particular product.

The search function is not tied into the reporting facility. You can print lists that contain information, but you can't set parameters for those lists. This is the weakest aspect of Client. The program does enable you to export the data as text to another application such as a spreadsheet or a database.

Aside from its reporting limitations, Client is comprehensive enough for any small business. It's easy to learn and well organized—one of those programs that has the potential of changing the way you do business.

Wordwise

Few HyperCard stacks have indexes. The hierarchical structure of HyperCard seems to lend itself to sinuous searching rather than to straightforward chapter- and page-indexing. Still there may be times when you wish you had an overall index for an entire stack. Wordwise ($29.95), by HyperAnnex, can create that index, and given the difficulties involved, do a creditable job of it.

In order to be useful, an index should include only meaningful words, words that point to useful information. If the index is cluttered with trivial words, such as prepositions and articles, it will be unwieldy. As Wordwise processes a stack, its filter removes words that should not be listed in the index. The filter, which contains about 1000 words, is not long enough. After filtering, the index is still diluted with hundreds of useless entries—me, met, and every, for example. You have to eliminate these unimportant words as well as alternate forms

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defined them, and it leaves out important pieces of information. For example, to return to the main stack from the Help stack, you Shift-click. But the manual doesn't tell you which of the 19 buttons to use (it's not the Help button). In another case, the manual doesn't explain how to return to the main stack from a function card, forcing a beginner to turn off the computer in order to escape.

When the functions are good, like appending cards, linking cards, and defining key terms, they are very, very good, but when they are bad, they are horrid. In the search function, for example, you can search by single word only, not by phrase. But at least that function works; some others do not. The Move Card button does not, despite the documentation's promises, allow you to relocate a card to any number in sequence or to trade a card with an adjacent card.

If you need a card file system, and you're willing to do some learning and puching and maybe spend time on the phone with the author (his name and number are included with the stack), HyperDraft may be worth the $25 price tag. But the program is definitely not for the HyperCard beginner.

FormSet

If you haven't computerized your company's forms on a spreadsheet or word processor yet, you may not have to. FormSet ($95) from Sofriviv has 68 forms in five categories: general business, accounting, payable, personnel, and sales. There is a form for almost every business activity: Job Estimate, Message with Reply, Daily Cash Report, Ledger Sheet (two to four columns), Purchase Order, Employee Application, Employee Warning Notice, Bill of Lading, and so on. Even if you don't have enough Macintoshes to go around, so that the forms have to be filled out by hand, it still may be more convenient to be able to print the forms when you need them rather than buying and shelving them.

When you input the data to complete the forms, FormSet does any necessary calculations for you. And when two or more forms are linked, the data is automatically carried from one form to the others.

The forms are well organized. The fields are crafted so that numeric fields will not accept nonnumeric data; fields that are automatically calculated won't accept an input entry. You can get specific instruction on how to complete many of the fields by double-clicking on them. You can enter the letter e after an entry to indicate that it is an estimate, or a question mark (?) to indicate that you do not yet know the amount. The program will do the calculations, inserting est or ??? after the result. You can type an itemized list for each data field (for example, the cost of the parts in a job estimate), which does not get printed on the form.

FormSet has six linked sets of forms: Inventory Records, Invoices, Sales Orders, Petty Cash, Payroll, and Payment Due Notices. The Payroll set, for example, consists of a personnel record; a payroll record, which contains year-to-date salary information; and a weekly time sheet. The personnel record data, including name, employee number, and number of dependents, is automatically posted to the other two forms. The data from the weekly time sheet determines the salary on the payroll record. Linked forms can be saved as a single file, so that all employee information is kept together.

There are only two problems with FormSet. First, the forms are not customizable. Second, although it can import text data, it cannot export data to a spreadsheet. Those objections will mean a lot to some companies. If your company needs custom forms, or if you want to be able to manipulate data on forms, your best option is to create your own forms on a spreadsheet. Other companies, however, can save days of development time using FormSet.

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<td>Olevideo Software Clip Share</td>
<td>$109</td>
</tr>
<tr>
<td>Font Sharer</td>
<td>$145</td>
</tr>
</tbody>
</table>

Table: Desk Accessory Programs

<table>
<thead>
<tr>
<th>Software</th>
<th>Price</th>
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<tbody>
<tr>
<td>Apple Microsystems Tempo II</td>
<td>$69</td>
</tr>
<tr>
<td>Affelis</td>
<td>$46</td>
</tr>
<tr>
<td>Beyond Inc. Menu Fonts 2</td>
<td>$35</td>
</tr>
<tr>
<td>Bondfend SlideKick V.0</td>
<td>$61</td>
</tr>
<tr>
<td>Cesalaxy &amp; Greene, Inc.</td>
<td>$29</td>
</tr>
<tr>
<td>HyperDialer</td>
<td>$26</td>
</tr>
<tr>
<td>QuickNet 1.4A</td>
<td>$32</td>
</tr>
<tr>
<td>CE Software DiskTop 3.0</td>
<td>$27</td>
</tr>
<tr>
<td>Denovia Software</td>
<td>$54</td>
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<tr>
<td>Comment 2.0</td>
<td>$91</td>
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<tr>
<td>Electronic Arts Desk Tools Plus</td>
<td>$31</td>
</tr>
<tr>
<td>Exodus Software Retrieve</td>
<td>$59</td>
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Table: Word Processors & Desktop Publishing

<table>
<thead>
<tr>
<th>Software</th>
<th>Price</th>
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<tbody>
<tr>
<td>Access Technology MindWrite 2.0</td>
<td>$145</td>
</tr>
<tr>
<td>WordWrite Express</td>
<td>$79</td>
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<tr>
<td>Adobe Corporation</td>
<td>$195</td>
</tr>
<tr>
<td>PageMaker 3.0</td>
<td>$399</td>
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<tr>
<td>Ashen Talk</td>
<td>$269</td>
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<tr>
<td>FullWrite Professional</td>
<td>$569</td>
</tr>
<tr>
<td>Broderbund ODP Advisor</td>
<td>$165</td>
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<tr>
<td>Citlale MacWrite 5.0</td>
<td>$165</td>
</tr>
<tr>
<td>Letraset</td>
<td>$278</td>
</tr>
<tr>
<td>Letter Shop</td>
<td>$369</td>
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<tr>
<td>Letra Fonts (Various Vol. 1-45 ea)</td>
<td>$69</td>
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Images With Impact! Business 1 by 3G Graphics

Managing Your Money

Spelling & Grammar Checkers

Aegis Development

<table>
<thead>
<tr>
<th>Software</th>
<th>Price</th>
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<tbody>
<tr>
<td>Aegis Clary's Word Tools 2nd Edition</td>
<td>$42</td>
</tr>
<tr>
<td>A.L.P. Systems MacProof 3.0</td>
<td>$115</td>
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</tbody>
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Deneba Software

<table>
<thead>
<tr>
<th>Software</th>
<th>Price</th>
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</thead>
<tbody>
<tr>
<td>Coach Macintosh Webster's Thesaurus 2.0</td>
<td>$35</td>
</tr>
<tr>
<td>Spelling Coach 3.0 (Webster's Medical/Legal/Hyphenation)</td>
<td>$54</td>
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Accounting Packages

Aristech Software

<table>
<thead>
<tr>
<th>Software</th>
<th>Price</th>
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<tbody>
<tr>
<td>Arix TimeMinder</td>
<td>$109</td>
</tr>
<tr>
<td>Arix Payroll Plus</td>
<td>$159</td>
</tr>
<tr>
<td>Bedford Software</td>
<td>$219</td>
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Screenwriter

<table>
<thead>
<tr>
<th>Software</th>
<th>Price</th>
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<tbody>
<tr>
<td>Chicago Legal Bank/ADR</td>
<td>$84</td>
</tr>
<tr>
<td>Peachtree Back To Basics Professional</td>
<td>$159</td>
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</tbody>
</table>

Survivor Software

<table>
<thead>
<tr>
<th>Software</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>MacMoney 3.0 (Enhanced Version)</td>
<td>$62</td>
</tr>
</tbody>
</table>

MetaDesign by Meta Software Corp.
## Game Software

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access World Class Leader Board Golf</td>
<td>34.00</td>
</tr>
<tr>
<td>Acceleboard Hard Ball or Mean 18</td>
<td>23.00</td>
</tr>
<tr>
<td>Activision Video Games</td>
<td>24.00</td>
</tr>
<tr>
<td>Airplane Bridge 5.0</td>
<td>22.00</td>
</tr>
<tr>
<td>Avalon Hill Mac Pro Football</td>
<td>28.00</td>
</tr>
<tr>
<td>Broderbund Ancient Art of War or Sea</td>
<td>27.00</td>
</tr>
<tr>
<td>ShufflePuck Caille or Ultima III</td>
<td>24.00</td>
</tr>
<tr>
<td>Poster Maker Plus</td>
<td>26.00</td>
</tr>
<tr>
<td>Bullseye Software</td>
<td>24.00</td>
</tr>
<tr>
<td>PSI Mustang or Ferrari Grand Prix</td>
<td>32.00</td>
</tr>
<tr>
<td>Cassidy &amp; Greene, Inc. Crystal Quest</td>
<td>26.00</td>
</tr>
<tr>
<td>Crystal Quest or 26.00</td>
<td></td>
</tr>
<tr>
<td>Center Cricketmaster</td>
<td>29.00</td>
</tr>
<tr>
<td>Roullettestar or Blackjack Ace</td>
<td>27.00</td>
</tr>
<tr>
<td>Discovery Software Airheart</td>
<td>27.00</td>
</tr>
<tr>
<td>Electronic Arts ChessMaster 2000</td>
<td>23.00</td>
</tr>
<tr>
<td>Chuck Yeager Flight Simulator</td>
<td>27.00</td>
</tr>
<tr>
<td>or Life &amp; Death</td>
<td>32.00</td>
</tr>
<tr>
<td>Startfleet</td>
<td>37.00</td>
</tr>
<tr>
<td>Scrabble</td>
<td>26.00</td>
</tr>
<tr>
<td>One-Digit Pinball Construction Set</td>
<td>26.00</td>
</tr>
<tr>
<td>or Pinball or Cannon</td>
<td>15.00</td>
</tr>
<tr>
<td>EPYX Sub Battle Simulator (or Mac or MacII)</td>
<td>29.00</td>
</tr>
<tr>
<td>Hayden Software Saturn IV</td>
<td>29.00</td>
</tr>
<tr>
<td>Infinity Software, LTD.</td>
<td>27.00</td>
</tr>
<tr>
<td>Go or Grand Slam Tennis</td>
<td>20.00</td>
</tr>
<tr>
<td>In-Dependent Ledger Goddesses of Photos or Hitchiker's Guide</td>
<td>15.00</td>
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<tr>
<td>Beyond Zork, Zork Trilogy or Quarterslaff</td>
<td>30.00</td>
</tr>
<tr>
<td>Zork Zero</td>
<td>30.00</td>
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<tr>
<td>Microsoft Flight Simulator 1.02</td>
<td>32.00</td>
</tr>
<tr>
<td>Micro Sports MSFL Pro Draft</td>
<td>26.00</td>
</tr>
<tr>
<td>MSFL Pro League Football</td>
<td>52.00</td>
</tr>
<tr>
<td>or 500 Great Teams</td>
<td>32.00</td>
</tr>
<tr>
<td>Miles Computing Inc. Down Hill Racer</td>
<td>24.00</td>
</tr>
<tr>
<td>or The Fool's Errand</td>
<td>27.00</td>
</tr>
<tr>
<td>Mindscape Balance of Power 1990, Crossword Magic or Distel</td>
<td>30.00</td>
</tr>
<tr>
<td>Deja Vu: A Nightmare Comes True</td>
<td>30.00</td>
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<tr>
<td>King Of Chicago, Shadowgate or Joker Poker</td>
<td>30.00</td>
</tr>
<tr>
<td>Defender of the Crown, Colony</td>
<td>30.00</td>
</tr>
<tr>
<td>or The Uninvited</td>
<td>30.00</td>
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<tr>
<td>Practical Computer Applications</td>
<td>30.00</td>
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<tr>
<td>MacGolf or Lunar Rescue</td>
<td>25.00</td>
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<tr>
<td>MacCourses</td>
<td>25.00</td>
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<tr>
<td>Road Racer</td>
<td>45.00</td>
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<tr>
<td>Mac Golf Classics</td>
<td>35.00</td>
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<tr>
<td>Primers Smash Hit Racquetball II</td>
<td>21.00</td>
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<tr>
<td>Sierra On-Line Leisure Sport</td>
<td>23.00</td>
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<tr>
<td>Space Quest or Space Quest II</td>
<td>23.00</td>
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<tr>
<td>Police Quest</td>
<td>29.00</td>
</tr>
<tr>
<td>Silicon Beach Software</td>
<td>29.00</td>
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<tr>
<td>Dark Castle or Apache Strike</td>
<td>30.00</td>
</tr>
<tr>
<td>Beyond Dark Castle</td>
<td>37.00</td>
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<tr>
<td>Star Trek Mac Wizardry</td>
<td>35.00</td>
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<tr>
<td>SoftStream, Inc. Color Billiards</td>
<td>35.00</td>
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<tr>
<td>Mac Man or Solitaire DA</td>
<td>24.00</td>
</tr>
<tr>
<td>Solitaire Replays (Mac or MacII)</td>
<td>32.00</td>
</tr>
<tr>
<td>Sphere, Inc. Tetris</td>
<td>20.00</td>
</tr>
<tr>
<td>GATO, Oriber or Pl-109</td>
<td>26.00</td>
</tr>
<tr>
<td>Solitaire Replays (Mac or MacII)</td>
<td>32.00</td>
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<tr>
<td>Falcon 2.0</td>
<td>29.00</td>
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<tr>
<td>Studio Zero Orbital Mech</td>
<td>29.00</td>
</tr>
<tr>
<td>XOR Software NFL Challenge</td>
<td>39.00</td>
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<tr>
<td>Pro Challenge or Basketball Challenge</td>
<td>39.00</td>
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## Modems

<table>
<thead>
<tr>
<th>Modem</th>
<th>Price</th>
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<tbody>
<tr>
<td>Abateis IntexFax 12/48</td>
<td>345.00</td>
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<tr>
<td>Anchor Automation</td>
<td>179.00</td>
</tr>
<tr>
<td>MacPac 2400E w/soft &amp; cable</td>
<td>315.00</td>
</tr>
<tr>
<td>Epic</td>
<td>315.00</td>
</tr>
<tr>
<td>Epic 2400 Int. SE</td>
<td>315.00</td>
</tr>
<tr>
<td>Epic 2400 Int. Mac II</td>
<td>315.00</td>
</tr>
<tr>
<td>Epic 2400 Mini Ext. (Hayes Compatible)</td>
<td>155.00</td>
</tr>
<tr>
<td>Everest Econ 2400 Baud</td>
<td>225.00</td>
</tr>
<tr>
<td>Hayes Microcomputing</td>
<td>299.00</td>
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<tr>
<td>Smallmodem 2400</td>
<td>189.00</td>
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<tr>
<td>Smallmodem 2400</td>
<td>449.00</td>
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<tr>
<td>Miteos Comlink 2400</td>
<td>169.00</td>
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<tr>
<td>Miteos Pocket Modem</td>
<td>115.00</td>
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<tr>
<td>Novation Novation Parrot 2400</td>
<td>115.00</td>
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<tr>
<td>Practical Peripherals</td>
<td>240.00</td>
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<tr>
<td>Practical Modem Mini 1200SA</td>
<td>79.00</td>
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<tr>
<td>Practical Modem 1200SA</td>
<td>109.00</td>
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<tr>
<td>Practical Modem 2400SA</td>
<td>181.00</td>
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<tr>
<td>MacCommpack</td>
<td>199.00</td>
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<tr>
<td>(2400SA w/Microphone II &amp; Cable)</td>
<td>229.00</td>
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<tr>
<td>Promosystems</td>
<td>302.00</td>
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<tr>
<td>Promodem 2400M Ext. (Software &amp; Cable)</td>
<td>302.00</td>
</tr>
<tr>
<td>Promodem 2400 (Hayes Compatible)</td>
<td>302.00</td>
</tr>
<tr>
<td>Super Corporation Supra Modem 2400</td>
<td>149.00</td>
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<tr>
<td>U.S. Robotics</td>
<td>150.00</td>
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<tr>
<td>Courier 1200 (Hayes Compatible)</td>
<td>189.00</td>
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<tr>
<td>Courier 1200 (Hayes Compatible)</td>
<td>189.00</td>
</tr>
<tr>
<td>Courier 2400E (Hayes Compatible)</td>
<td>379.00</td>
</tr>
<tr>
<td>Courier 2400E (Hayes Compatible)</td>
<td>379.00</td>
</tr>
<tr>
<td>Courier HST 9600 (Hayes Compatible)</td>
<td>689.00</td>
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</table>

### Rags to Riches ‘3-Pack’ by Chang Labs

Rags to Riches is the flexible and powerful modular accounting system that’s winning praise from accountants and reviewers nationwide. No, Chang Labs offers its popular *Rags to Riches ‘3-Packs’* at a special price and with a special bonus! Each ‘3-Pack’ offers the user flexible reporting, batch totals for any time period, user definable accounting cycles, and impressive speed. When you need to analyze, graph or present your accounting information, just export it to your favorite program! As a special bonus, if you choose the ‘3-Pack’ that suits your needs before February 28th, 1989, *Programs Plus* will send you an Aatrix Payroll program, absolutely FREE!!

**Rags to Riches ‘General 3-Pack’** (G/L, A/R, A/P) ............... 289.

**Rags to Riches ‘Pro 3-Pack’** (G/L, Pro. Bill., A/P) ............... 359.

**Rags to Riches ‘Retail 3-Pack’** (G/L, Inventory, A/P) ............... 359.
Utility Software

Kurta IS ADB Tablet 255. ThunderScan V4.0 with Power Port 199.
Cordless 4 Button Cursor 95. Mac II Power Accessory 42.
Koala Technologies Corp. Summagraphics Bit Pad Plus 329.
ScreenGems 49. Findswell 2.0
Font/DA Juggler Plus 42. Read-W TS
TMON 89. Williams &Macias
Fitth Generation Systems Suitcase II 44. SuperlaserSpool 2.0 82.
surrounds vour machine with a
Mlcrolytics, Inc. GOler 45. myDisklabeler w/ LaserWriter Option
lcom Simulations On Cue
The
one compact unit. All stress
full half-inch of high-density
Made by 1/0 Design

Printers & Digitizers

Digital Vision Computer Eyes-Mac 209.
Kosta Technologies Corp.
Macvision 2.0 (Digitizer) 225.
K10 I/O 208. ThunderWare
CorelDraw 4 Button Cursor 95. Mac II Power Accessory 42.

Frontline Software

Macinware SE Ext. Carrying Case
by I/O Design

The Macinware SE Ext. Carrying Case protects your Mac SE, Plus, or 512K and its extended keyboard in safety and style. It’s made of rugged 1000 Denier Dupont Cordura nylon, and surrounds your machine with a full half-inch of high-density foam padding. There’s room for an external hard drive, a mouse, cords, and disks, so your complete system travels with you in one compact unit. All stress points are cross-box stitched for added safety. A convenient shoulder strap is included, and you can choose platinum grey or navy blue colors.

DataBase Management

Moinware SE Ext. Carrying Case

SE Carrying Case

Educational/creative Software

Arts Nova Practice Music
Barron’s Barron’s SAT
Bible Research The Word (KV1 or NVI)
Bogus Productions Studio Session
Shunt Quantity, Country or Heavy Metal
Super Studio Session
Bright Star Technology Alphabet Blocks
talking Tiles
Brodbender Clip Sounds
Jam Session or Black & White Movies
Sensei Geometry. Calculus or Physics
Type!
Where in the World is Carmen San Diego?
Coda Mac Drums
Passive
Active
Davidson & Associates Speed Reader II
Matt Blaster or Word Attack!

Electronic Arts Mavs Beacon Typing
Venture’s Business Simulator
Deluxe Music Construction Set VLS
1st Byte Electronic Arts Kid Talk Speller
Bee. First Shapes, or Math Talk
Great Wave Software KidsTime
Number Maze
Individual Typing Instructor Encore
Learning Company Reader Rabbit
Mindscope Perfect Score SAT
Niles & Associates End Note
Nordic MacKids Educational Programs
Springboard Top Honors
Family Matters or Atlas Explorer

Sensible Grammar by Sensible Software

Sensible Grammar takes the drudgery out of proofreading your documents, so you can devote your time to creating perfect documents. It’s simple to check your documents for thousands of common grammar and style errors. Informal, overly formal, vague, wordy, chichi and sexist are detected. So are punctuation, capitalization, verb tense, verb agreement, and many other types of errors. All are displayed on screen, along with suggested corrections, and an editing window so you can make corrections quickly. Sensible Grammar also allows you to customize its checking so you can adapt it to your needs with just a few keystrokes. Make the sensible choice in proofreading software, Sensible Grammar.

Disk Drives/Hard Disks/Upgrades

Applied Engineering MacRAMS
(1 MB SIMM Mac+, SE, II) 489.
MacSnap Plus 2 (MacPlus to 2MB Non Expandable) 439.
AST Research
Mac286 Co-Processor (Mac II) 489.
Mac386 Co-Processor (Mac II) 489.
Compact Series 3SCD (Mac+/SE+/4)
Compact Series 3SCD (Mac+II/512)
Serial MacStack Scre200 (Mac+/SE+/4)
Serial MacStack Scre200 (Mac+II/512)
Cutting Edge Cutting Edge 500K Drive
Cutting Edge WD 50
Plus SCSI Hard Drive
Cutting Edge WD 45
Cutting Edge WD 45
Plus SCSI Hard Drive
Cutting Edge WD 30 Internal Hard Drive
Cutting Edge WD 45 Internal Hard Drive
Dove Computer Corporation
Marathon 802 Accelerator
Marathon 16 Mhz
Marathon 2 (16 Mhz w/ 1MB) Special (568)
Marathon 3 (16 Mhz w/ Math Co-processor) 779
Marathon 4 (16 Mhz w/ 1MB + Math Chip) 685
MacSnap 524 (512K to 1MB) 315
MacSnap 524 (512K to 1MB) 315
MacSnap 524 (512K to 2MB) 450
MacSnap 524 (512K to 2MB) 450

Marathon MSE-2 by Dove Computer

Marathon MSE-2 is the accelerator and memory expansion board that brings speed and power to your Macintosh SE. Because the Marathon MSE-2 features a 68020 32-bit 16 MHz microprocessor, your favorite programs will run up to 400% faster! And the 1 Megabyte onboard memory expands the existing memory, so you’ll be able to run MultiFinder and many other memory-hungry applications! The software programmable on-board CMOS LCA controller chip, on-board expansion slot, and optional 68861 math co-processor option allow future expansion and ensure compatibility. When productivity and flexibility are important, go the distance with Dove’s Marathon MSE-2!
Virex by HJC Software

Virex is the solution to the threat of Macintosh computer viruses. Virex is the only program that detects and repairs infected programs and system files! If you need to eradicate an existing virus from your infected system, or want to protect your system from future infection, Virex is the safe, effective product that does the job. Its icon driven approach and on-line help make it easy to learn and use. Virex combats all known Macintosh viruses and HJC Software plans to update the program to combat new viruses. Registered users will be notified of updates and can subscribe to HJC’s inexpensive upgrade service.

Virex

Graphics Software

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Virex

Graphics Software

3G Graphics Images With Impact 59.
Images With Impact Business 1 Special 75.
ABA Software Draw II Again Sam 2.0 79.
Graphix Paint II 289.
Adobe Systems Adobe Illustrator 89.
Adobe Fonts (Various fonts and volumes) 291.
Adlus Freehand 347.
Alleys Corp. FONTastic Plus 2.0 54.
Fontographer 2.3 235.
Ashton Tate Full Paint 68.
Broderbund Print Shop or Cliparts 36.
Drawing Tables 79.
CF Software Calendar Maker 3.1 27.
Claris MacPaint II 105.
MacDraw II 309.
Olivetti Software 20.
CricSoft Software CricSoft Draw 169.
CricSoft Print or Pictograph 99.
CricSoft Graph 119.
CricSoft Presents 289.
Deneba Software Canvas DA 1.0 56.
Canvas 2.0 (Includes Data-Accessory) 169.
Dream Maker 28.
MacGazer (Hypercard or Paint) 97.
Captures

Dubl-Click Software

Word Quest Fonts: Various Vol. 1-6 (ea) 45.
WordQuest: Various Vol. 1-16 (ea) 45.
Electronic Arts Studio 8 (Mac) 18.
Enzio-Heusmann USA 17.
MacCalligraphy 2.0 97.
Japanese Clip Art 25.
Four Seasons Publishing Comic People 54.
GraphisPlus (Various fonts and volumes) 44.
Genetic Software Genetic CADD 35.
GraphisPaint (Various fonts and volumes) 29.
Innovative Data DesignDreams 315.
MacDraw 1.2B 149.
Mainstay Capture 115.
Mac Flow 2.0 or Mac Scheduler 123.
Meta Software MetaDesign Special 193.
Microsoft Planning Software 325.
Microsoft Software Works Series 189.
Microsoft Excel 1.5 249.
Satori Software 119.
Select Micro Systems, Inc. 389.
Syntex Mac Envelope 4.0 59.
Synavyl 248.
Syntax Systal 3.2 (Specify MacPlus, SE or Mac II) 459.

cardboard

Business Software

Abacus Concepts StatView II (Mac Plus, SE) 349.
StatView SE+ Graphics 123.
Access Technology Tripeze 2.1 159.
Ashton Tate Full Impact 249.
Borland Eurekal The Solver 162.
BrainPower ArchiText 175.
Math View Professional 145.
DataScan 118.
Bravo Technologies MacCalc 79.
Chung Laboratories 199.
C.A.T. Contacts•Activities•Time 229.
C.A.T. Contacts with Activities 229.
Cognitron Technology MacSMARTS 135.
D2 Software MacSpin 2.0 189.
Individual 101 Macros For Excel 37.
Legistat WillMaker 3.0 35.
Mainstay Capture 115.
Mac Flow 2.0 or Mac Scheduler 123.
Meta Software MetaDesign Special 193.
Microsoft Planning Software 325.
Microsoft Software Works Series 189.
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3G Graphics Images With Impact 59.
Images With Impact Business 1 Special 75.
ABA Software Draw II Again Sam 2.0 79.
Graphix Paint II 289.
Adobe Systems Adobe Illustrator 89.
Adobe Fonts (Various fonts and volumes) 291.
Adlus Freehand 347.
Alleys Corp. FONTastic Plus 2.0 54.
Fontographer 2.3 235.
Ashton Tate Full Paint 68.
Broderbund Print Shop or Cliparts 36.
Drawing Tables 79.
CF Software Calendar Maker 3.1 27.
Claris MacPaint II 105.
MacDraw II 309.
Olivetti Software 20.
CricSoft Software CricSoft Draw 169.
CricSoft Print or Pictograph 99.
CricSoft Graph 119.
CricSoft Presents 289.
Deneba Software Canvas DA 1.0 56.
Canvas 2.0 (Includes Data-Accessory) 169.
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GraphisPaint (Various fonts and volumes) 29.
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If you need to eradicate an existing virus from your infected system, or want to protect your system from future infection, Virex is the safe, effective product that does the job. Its icon driven approach and on-line help make it easy to learn and use. Virex combats all known Macintosh viruses and HJC Software plans to update the program to combat new viruses. Registered users will be notified of updates and can subscribe to HJC’s inexpensive upgrade service.

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Circle 401 on reader service card
New Products
Information on the Mac's latest hardware, software, and accessories

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

Cable Scanner Cable tester for LAN cabling systems. Pinpoints location of any cable faults in LAN cabling system. Supports variety of network configurations including AppleTalk, TOPS, and twisted-pair. Includes AC battery charger, cable adapters, cable tracer, and troubleshooting guide. $1495. Microtest, 602/971-6464.

FT-60 Bus-Link Bus-Link subsystem lets one computer access the memory of another. Links to Mac II NuBus card for memory sharing between Mac II and any other computer with VMBus, Multibus I, Unibus, Qbus, SELbus, or Lbus architecture. $13,900 to $19,900. Flavors Technology, 603/882-8404.

GigaTape Mac subsystem backs up 2.3 gigabytes on an 8mm tape cartridge in less than 7 hours. Available in configurations ranging from 2 gigabytes to 1 terabyte. Designed for 5½-inch form factor. Sustained data rate of 246K per second. $4995, includes SCSI interface and proprietary back-up software. Summus Computer Systems, 713/492-6611.

Mac Data Display (Model A342) Three-pound LCD projection panel that displays Mac-generated images on a large screen or wall via overhead projector. Works with all Mac models. Fits on top of any standard overhead projector and connects to video port of the Mac. Comes with power supply, plug-in board, and video cable. $1499; custom carrying case $69.95. Computer Accessories Corporation, 619/457-5500.

MacinStor i Series Internal hard disk subsystems for the SE, Mac II, and Mac IIx. Comes with disk management software including formatter, diagnostics, partitioning, backup and restore, disk optimization, data encryption, and data recovery. $999 to $7999. Storage Dimensions, 408/879-0800.

Macintosh Communications Package Includes 2400-baud SA modem in platinum color, cable for use with any Mac, and MicroPhone communications software version 1.1. $299. Practical Peripherals, 818/991-8200.

Maclvoy Symbolic processor board with standard Mac II desktop system for delivery of AI applications. Developers can use standard platform to deliver applications developed on Symbolics' 3600 workstation and XL400 system. Integrates with applications in commercial, industrial, and military computing environments, and accesses existing Mac applications. Starting price for system $21,900; board $10,800. Symbolics, 617/621-7500.

MACPIO-24 Interface Board High-current, 24-bit, parallel digital I/O board for the Mac II. Interfaces with variety of instruments, displays, and user-defined systems and equipment. Handles digital I/O through standard 37-pin, D-type connector. 18-inch ribbon connector cable available. $200; cable $25. MetraByte, 508/880-3000.

Magic45 Removable Removable 45MB tape cartridge for data storage. Fits under the Mac and includes four-switch power center on front panel. Units are preformatted and configured for immediate use. $1795. MacProducts USA, 512/343-9441.


RGB-Videolink Free-standing scan converter, about the size of a VCR, converts signal from a Mac II to NTSC (television) signal or low-resolution RGB signal. Lets you use images from Mac II for videotaping, video projection, and video transmission. $9900. RGB Technology, 415/848-0180.

Spectrum/8 Series II Color video board with custom gate array replaces more than 40 components used on previous card. Produces up to an 8-square-foot desktop. Centers objects and makes panning adjustments from dialog box. $1895. SuperMac Technology, 415/962-2900.

(continues)
SSH-4 Accessory Board  Four-channel, simultaneous sample-and-hold accessory board for MetaByte's DAS-20, and VMECAI-16 and VMEAI-16 analog interface boards. Allows analog input data to be acquired from two, three, or four inputs with less than 30 nanoseconds channel-to-channel sample time uncertainty. $425. MetaByte, 617/880-3000.


ViewFrame 11+2 LCD  Overhead large-screen projection panel compatible with all Macs. Gives simultaneous projection of the monitor's image on an overhead screen or wall when placed on standard overhead projector. B&W display with eight shades of gray. $1850. Nview Corporation, 804/873-1354.

SOFTWARE

Accountant, Inc.  Professional accounting package that adapts to the existing accounting system of small to medium-size companies. Accounts receivable module addresses customer accounts, sales, and cash receipts journals. Accounts payable section covers vendor accounts, purchases and cash payments journals. 1MB min. memory. $595. Softsync, 212/685-2080.

AE Operator  Marketing information system that temporarily holds data before sending it to spreadsheets, word processors, and other Mac applications. Acts as a cache to record telephone and written correspondence. Auto phone dialing. 1MB min. memory. $125. Archaic Engineering, 512/345-0860.


Bottomline  Tax templates for Excel or Multiplan. Short and long forms and associated schedules for most personal and business tax returns. Corporate, partnership, sole proprietorship, farm income and expenses,
social security tax, IRA, and deductible home mortgage interest computation included. 512K min. memory. $49.95. ComputerCraft, 303/791-2077.

**BPlan** Stand-alone business-plan software. Prompts you with series of worksheet questions; your responses produce a business plan. Includes word processor and modeling capability. Works with a variety of word processors and spreadsheets. 1MB min. memory. $195. Palo Alto Software, 415/325-3190.

**Bridge Dealer** Bridge program that generates playing hands to your specifications; lets you restrict any or all of the four hand positions via the Dialog Box. Generates hands for tournament play, bidding or play evaluation, and bidding practice. Synchronizes multiple computers to deal the same hands in the same order so you can practice bidding over the telephone. Mac II-compatible. 512KE min. memory. $50. Gonzo Systems, 501/895-1354.

**Business MacBuilders and Laser MacLabels** Business MacBuilders maintains lists, performs mail merges, and acts as a direct mail processor without programming. Simple MacSoftware will customize for you; some changes made at no charge. Laser MacLabels creates three-column labels on an ImageWriter or laser printer. Maintains lists; lets you select sections for mailing. Laser MacLabels and Business MacBuilders bundled together. 1MB min. memory. $100 combined. Simple MacSoftware, 415/331-4862.

**Cause** Personal programming software for nontechnical users and programmers. Automatically documents programs as they are written. Licenses developers to market unlimited number of application programs. 512KE min. memory. Personal version $495; professional version for developers $595. Maxem Corporation, 602/827-8181.

**Clip3D** Ten-volume image library of pre-drawn 3-D images for production of camera-ready graphics. Rotates, shades, and illuminates 3-D objects from the library; Clip3D software included with each volume. 512KE min. memory. Each volume $99. Enabling Technologies, 312/427-0386.

**Crapsmaster** Simulates the game of casino craps with realistic display of game table and mouse-controlled bet placement. 512K min. memory. $39. Centron Software, 407/241-1022.

**Dashboard** Graphic communications software that gives automatic access to electronic information services, such as Dow Jones News/Retrieval, Genie, CompuServe, and MCI Mail. Based on standard Mac interface and HyperCard. 1MB min. memory. Under $400. TenPointO, 415/329-0500.

**Data** Decision analysis software that identifies sequence and linkage of events in a tree structure. Helps you evaluate intermediate points of the decision tree to identify sequence of events and probable outcomes of a particular action. 512K min. memory. $495. TreeAge Software, 617/426-5819.

(continues)
**Desktop Specs** Specification database for architects. Primarily for light-commercial, health-care, and residential projects. You can edit disk for specific projects or create your own specifications using the database as guideline. 512K min. memory. $220. Patrick Manley Architects, 614/469-9906.

**Diskworld for the Macintosh** Monthly Macintosh software subscription. 800k disks deliver a variety of software including games, desk accessories, fonts, and HyperCard stacks. 512KE min. memory. One issue $9.95; three-month trial subscription $19.95. Softdisk, 318/221-8718.

**Facelt** Stand-alone set of code resources to add Mac interface to programs written in BASIC, C, FORTRAN, Modula-2, and Pascal. One manual works with all languages and compilers; multiple programs run simultaneously using a single copy of Facelt on disk. 512KE min. memory. With sample programs for one compiler $50; with sample programs for ten compilers $100. FaceWare, 217/328-5842.

**FastLabel** Labeling software for mailing lists, disk labels, envelopes, and price tags. Program reads name of floppy disk in drive, stores name, and prints it as a label. You can insert many disks in succession, thereby creating a list of disk names to make into labels. Prints to standard label sheet. Formats text as it is imported. 512K min. memory. $49.95. Vertical Solutions, 206/352-2097, 800/942-4008.


**Hyper-Action** Compilation of more than 45 non-copy-protected common-background stacks to help you manage daily sales, business, and personal activities. Stores documents hierarchically; sorts scanned-in graphics hierarchically. Includes daily calendar, notes, maps, and mini corporate tree for identifying key people in decision process for sales prospects. 1MB min. memory. $94.50. Multi Solutions, 609/896-4100.

**MaeBaby Math** Teaches children ages six months and up numbers from 1 through 100, and teaches the basic math concepts of addition, subtraction, and basic arithmetic.
addition, subtraction, multiplication, and division. 128K min. memory. $39.95. KAR Enterprises, 408/739-9517.

**MacInteriors** 3-D interior design tool for designing room layouts. Gives view and print elevations, plans, and perspectives. Places up to 64 stored library units in direct position within a room plan, and lets you view perspectives from any angle or height. 1MB min. memory. $295. ComServCo, 504/649-0484.

**MacSmarts Professional** Inference server on TOPS or other PC/Mac network. Links databases and spreadsheets, HyperCard stacks, MacPaint and PICT images, and text files. Performs calculations and logical operations on variables and data, uses built-in functions and equations. Handles up to 4000 rules per knowledge base and 1000 examples per rule. 1MB min. memory. $495. Cognition Technology Corporation, 617/492-0246, 800/622-2829.

**Metro ImageBase** Fourteen categorized volumes of 300-dpi digitized artwork; volume consists of 100 images on 5 to 8 floppy disks. Subjects include business graphics, newsletter and report makers, and more. Works with most page layout software. 512K min. memory. Each volume $145. Metro ImageBase, 818/881-1997.

**Minicad Plus** 3-D software to be used within 2-D document. Write your own routines with the spreadsheet and programmable macro language. New 2-D features include complex duplication with arrays, and ability to move objects by precise measurements. 1MB min. memory. $695. Graphsoft, 301/461-9488.

**OvalTune** Synchronizes graphics from any Mac graphics program with music. Saves graphics in PICT format or in clipboard; saves music as MIDI files. Saves combination of graphics and music in OvalTune videotape file. Proprietary library of 128...

**Perfect Timing**   Calendar- and schedule-management system for Mac networks. Network users can schedule and confirm group meetings, and individuals can use on-screen calendar and datebook functions. 1MB min. memory. Starter kit $295, includes server, accommodates up to three workstations; three additional workstations $150. Imagine Software, 415/453-3944.

**Police Quest** Hand out a traffic ticket, get tangled in red tape, bring a racketeer to justice, or go undercover to infiltrate the Death Angel's gang, when you take on the role of cop in this adventure game. 3-D graphics let you move around objects; optional joystick control. 512K min. memory. $49.95. Sierra On-Line, 209/663-4468.

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Space Quest II Sludge Vohaul unleashes the invasion of the insurance salespeople on planet Earth. You don the guise of Roger Wilco, sanitation engineer, along with your sanitary space mittens, to prepare for the onslaught that Vohaul has prepared. Includes 3-D graphics, multiple solutions, variety of scoring options, and optional joystick control. 512K min. memory. $49.95. Sierra On-Line, 209/683-4468.

Tax Stacks HyperCard income tax preparation program with computer-generated, IRS-approved forms and schedules you can print and return to the IRS. Displays only information you need to see based on your responses to Tax Questionnaire. Tax jokes included. 1MB min. memory. $69.95. StackWorks, 217/328-5257.

Timbuktu Remote Long-distance version of Timbuktu screen-sharing application for Macs over asynchronous lines. Operates at standard modem data rates. Chat window allows guest and host users to exchange messages. File transfer utility moves files from host to guest computer. 512KE min. memory. $295. Farallon Computing, 415/849-2331.

VideoWorks Professional Color animation software with color paint program, color palette control, and online help. Creates animated charts and graphs, and slides with pop-up menus, radio buttons, and text fields. Animates borders and marquees; makes text shimmer, sparkle, or scroll. 1MB min. memory. $695; upgrade from VideoWorks II $250. MacroMind, 312/871-0987.
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Why be a follower when you can go with the leader!

* Requires a copy of FoxBASE +/LAN our PC multi-user software, on the network file server.
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Macintosh SE Super System

Complete System Includes:
- Macintosh SE Computer w/ 2 Internal 500K Drives
- 3 Megabytes of Memory
- ImageWriter II Printer
- Floppy Drive Software
- Disket-Box of 10
- System Saver II
- Mouse Pad

Sugg. list $3980 CDA $3099
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Save over $870

Macintosh II/45 Color System

Same as the SE/20 Super System except includes two 800K floppy drives and an 11 Meg. (22ms) internal hard drive.

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Macintosh II/80 Color System

Same as the Mac II/40 color system but includes the 80 Megabyte Apple hard drive and 4 megabytes of RAM Memory.

Sugg list $10,537 CDA $8095
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Updates

This list brings you the highlights of software updates recently received but not yet tested. The first price is the upgrade cost for registered owners; the second is the current list price.

**Canvas** version 2.0 converts bitmap graphics to line art with Auto Trace feature, draws unlimited multipoint Bezier curves and smooth polygons, has capacity for unlimited layers, a choice of 16.7 million colors, gray scales in 1-degree increments, hairlines as small as 1/1000 inch and a zoom capacity ranging from 3 percent to 3200 percent of the original image. Deneba Software, 7855 N.W. 12th St., #202, Miami, FL 33126; 305/594-6965, 800/665-4665. Free; $299.95 new.

**Financial Analysis** version 4.0 combines the applications of version 3.0 with all the models formerly sold under the title Residential Real Estate. New features include amortization schedules for loans paid on a biweekly basis, a financial calculator, financial ratios, lease-versus-buy feature, and statistical estimates on the value of a home. RealData, 78 N. Main St., South Norwalk, CT 06854; 203/255-2732. $30 for registered owners of earlier versions of either Financial Analysis or Residential Real Estate, $5 for registered owners of both; $195 new.


**Hellenic Keyboard** version 2.0 remaps the keyboard, adding 11 diacritical keys, and allowing access to the 256 extended characters. When you use it with a Hellenic font, you can produce any letter/accent combination in the Greek language. Works with System 4.1 or later versions, and Finder 5.5 or later. Metasoft, P.O. Box 482, Osseo, MN 55369; 612/559-4927. $5 with serial number from original master disk; $45 new.

**HFS Backup** version 3.0 lets single or multiple users logged on to an AppleShare network archive data. The program also restores AppleShare user privileges. Archives any mountable volume, including other hard disks, WORM drives, and desktop-accessible tape drives. Stores data in HFS Backup or Finder format, including files larger than 800K. Can overwrite old files to save space, and will do incremental backups. Personal Computer Peripherals Corp., 4710 Eisenhower Blvd., Bldg. A, Tampa, FL 33634; 800/622-2888. $35; $99 new.

**ImageStudio** version 1.5 has a virtual memory management system that lets images larger than the available memory be opened and worked on transparently. Lets you specify the amount of RAM that a particular ImageStudio file should use, as well as the amount of memory that can be used for Undo. Lets you back up a large file to several disks and reconstruct the file on another system. Letraset USA, 40 Eisenhower Dr., Paramus, NJ 07653; 201/845-6100. Free; $495 new.

**MacEnvelope** version 4.0 creates and saves layouts, and is compatible with MacEnvelope version 3.0. Does zip code plus 4-digit bar coding, has OCR font, color, message fields, and graphics, and saves addresses to disk. Will do bulk printing and alphabetize or sort by zip code. Imports and exports lists, and prints in any fonts available on the system. Synex, 692 Tenth St., Brooklyn, NY 11215-4502; 718/499-6295. $25 with original disk if purchased before August 1988, $5 with original disk if purchased after August 1988; $89.95 new.

(continues)
Register early for MACWORLD Expo/Washington.
And save fifteen Washingtons.

This is your chance to pre-register for MACWORLD Expo/Washington, D.C., April 26-28, 1989, at the Washington, D.C. Convention Center. Please choose your package and fill out this form completely. Incomplete forms will be returned. **Use one form per person.** And make photocopies to register additional people. Then send the completed form(s) along with your payment to: MACWORLD Expo, P.O. Box 67, Westwood, MA 02090. Registration coupons must be received by March 24. And registration fees are non-refundable. For further information, call Mitch Hall Associates at 617-326-9955. U.S. and Canadian attendees will be mailed their badges on or around April 5. All other badges will be held at the Pre-registration Counter at the Washington, D.C. Convention Center for pick up beginning Tuesday, April 25, 1989. Registration coupons received after March 24 will be returned to you.

**Please register me for:**

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<th>Package One $65 Conference sessions and exhibits. Pre-register by March 24, $80 at door.</th>
<th>Package Two $20 Admission to exhibits only. Pre-register by March 24.</th>
<th>Please rush me detailed information (including pricing) about the Mac Masters Series.</th>
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**Please send my badge and further information to:**

**Please check one:**

- Home Address
- Company Address

**Last Name**

**First Name**

**Mailing Address**

**City, State, Zip**

**Telephone**

**If mailing to company address:**

**Title**

**Company**

**Check enclosed (make payable to MACWORLD Exposition)**

**Amount $**

**MasterCard**

**Visa**

**American Express**

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**Account Number**

**Expiration Date**

**Cardholder Signature**

(Signature necessary to be valid.)

**If cardholder is other than registrant, please print name below:**

**Last Name**

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**Cash only at the door. After March 24, you must register at the show.**

**Please check the appropriate boxes:**

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*All conference sessions are on a first-come, first-served basis with no guaranteed seating.*

Please fill out this form completely and send it along with your check or money order to: MACWORLD Expo, P.O. Box 67, Westwood, MA 02090.
Here's a sound business deal for anyone who appreciates the value of a dollar.


That means you pay just $65, instead of $80 at the door, for three-day admission to the original Macintosh computer show at the Washington, D.C. Convention Center. This one low fee allows you to attend all conference sessions* and visit all exhibits.

Meet and talk with more than 300 exhibitors spread over 200,000 square feet of space. And take part in dynamic seminars and workshops run by the biggest names in the Macintosh industry, people like John Sculley, Bill Atkinson, and Jerry Gorrell. Plus you'll hear from the gurus of the Macintosh in the federal government, C. Lloyd Mahaffey, Dave Lavery, and Steven Wotl.

There's something for everyone in business or government.

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MACWORLD Expo/Washington will feature a series of private, limited-attendance, no-nonsense seminars on the subjects executive users want to hear about most—networking, spreadsheets, databases, desktop publishing and presentations, HyperCard, telecommunications and more.

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Save on airfare and hotels.

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If you want to attend the exhibits only, admission is $20. And if you're a student, the pre-registration cost is just $15. But you must send us a copy of your student I.D. with your registration form to qualify. We encourage you to register now and avoid long lines at the door.

If the registration form is missing from this ad, please call Mitch Hall Associates at 617-326-9955. We'll be happy to send you one.

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MiniDraw version 2.0 draws text in point sizes of 1 to 127, rotates text in 90 degree increments, and rotates lines, rectangles, and polygons at any angle. Program reduces and enlarges from 3 percent to 1600 percent and offers B-spline polygon smoothing, and polygon editing. Has color objects and online help. Software for Recognition Technologies, 55 Academy Dr., Rochester, NY 14623; 716/359-3024. $15 plus $2 s/h; $44.95 new.

Ominis 3 Plus/Express version 3.3 executes most sequences two to three times faster. Supports color reports, Page Preview, new style characters, horizontal and vertical scrolling, and disk-based reports. Supports AFP and EtherTalk, and is MultiFinder compatible. Stores 16MB libraries, and 60 files in the Data File. Executes routines written in C, Pascal, or other languages that produce code resources. Has built-in support for Apple's CL/1 language. Blyth Software, 1065 E. Hillsdale Blvd., #300, Foster City, CA 94404; 415/571-0222. $225 for single-to-multiuser upgrade; call company for details on pricing scale if buying new.

PageMaker version 3.01 no longer misnames TIFF files transferred from the PC to the Mac. Works with System 6.0's enhanced font support and is compatible with MacDraw II capabilities, including rotated text and graphics, dashed lines, and additional line widths. Performs full screen redraws after print job cancellations, and copies style information for text passed between documents via the Clipboard. Aldus Corp., 411 First Ave. S, #200, Seattle, WA 98104; 206/622-5500. $75 plus $15 s/h if purchased before November 2, 1987; free if purchased after; $595 new.

Perfectstudy version 2.0 links files so that study questions are asked in random order as opposed to sequentially. Provides windows to revise files and offers the ability to append a file. Works with all Mac-compatible printers. Powerware Systems, 755 W, Orem, UT 84057; 801/224-5058. Free; $79.95 new.

Stepping Out II version 2.01 fixes the problems that version 2.0 had with a small number of programs, especially in the feature that allows the virtual big screen to be turned on and off at any time. A demo version is free to dealers. Others can get it free via bulletin board, or for $2 by mail. Berkeley System Design Inc., 1700 Shattuck Ave., Berkeley, CA 94709; 415/540-5535. Free with original disk; $95 new. ☐

To have products listed in this section, send upgraded software, an outline of major changes since the previous release, upgrade price, suggested retail price, company name, mailing address, and phone number to Updates, Macworld, 501 Second St., San Francisco, CA 94107.
I'm always working under deadline. But with the help of my Mac and Tempo II, I get a lot more work done in a lot less time.

I just record any repetitive work once with Tempo II, then I can play it all back as a single command. And that's a macro!

**Zap, you're Zapfed**

For example, I've got a huge list of fonts in a long hierarchical menu, but a single keystroke selects Zapf from it. I select a line, hit a key, it's Zapf.

**Pow, it's greeked**

When I need some text to greek in, a keystroke plays an Autopaste macro that simply pops in my text. It looks good and works fast!

Another example? This odd-sized page layout I'm constantly creating. A Tempo II macro simply sets it up for me—uneven columns, different page size, none of my usual defaults. One keystroke.

**1 keystroke = 375 steps**

Some jobs are the same thing every week. Like updating a sales map. Tempo II grabs a text file of numbers and pastes each one into its spot on the map. Altogether, that's more than 375 steps. But for me it's one keystroke.

Now that's productivity!

**My Mac works, I create**

Tempo II can't have my ideas for me. But it can free me from the drudgery, speed up the boring parts, and give me more time for the fun stuff.

That's how Tempo II and I never miss a deadline. Well, hardly ever.

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Macintosh
Users Unite!

This year Macintosh users like you came together on GEnie™ to get their MAC questions answered by experts, their MAC games won, their MAC systems updated and their online MAC opinions confirmed, researched, and applauded 2,019,096 times.

Join the Revolution.
This index covers the 12 issues of Macworld published during 1988. It lists most products alphabetically as well as under appropriate subject headings. For example, Stuffit appears under its own name and under Data Compression, File Compression, and Utilities. Boldface page numbers indicate a major reference, for example, an item that is being reviewed or featured.

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Each WetPaint volume contains an extensive collection of useful pictures, icons, borders, maps and patterns—in a wide variety of styles, designed for both home and business use.

WetPaint files can be read and printed with programs like FullPaint, MacPaint, SuperPaint, and applications like PageMaker. WetPaint is also available in PictureBase format at an additional $50 per volume.

Even if you don't own a painting program, you can still copy pictures directly from WetPaint files using our ArtRoundup desk accessory—all new for every WetPaint volume! And ArtRoundup's new Slideshow tool is a great way to scan hundreds of images in minutes.
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Pop Quiz. Stop. This is a test. For the next 60 seconds, we will be conducting a quiz about Macintosh II Videographics. Do not turn the page until you have looked at the visual clue and answered all the questions.

Which Macintosh II graphics card offers the widest range of capture and display resolutions—NTSC, PAL, Apple Monitor, hi-res, interlaced, non-interlaced and other modes?

a) NuVista 2M  b) NuVista 4M  c) All of the above

Name the only videographics card which provides true-color, real-time capture and broadcast-quality display while occupying only a single slot in a Macintosh II.

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752 Adobe Illustrator 88. Adobe Systems, Inc., P.O. Box 7000, Mountain View, CA 94039-7900; 415/901-4400, 800/833-6687.


754 AlisaShare. Alisa Systems, Inc., 221 E. Walnut St., #175, Pasadena, CA 91101; 818/792-9474.

755 Apple Scanner. Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014; 408/996-1010.


758 Canfield. Unison Software, 415 Clyde Ave., Mountain View, CA 94043; 415/968-7511.

759 Checkfree. Checkfree Technologies, 720 Greencrest Dr., Westerville, OH 43081; 614/898-6000, 800/882-5280.

760 Client. Softworks, Inc., P.O. Box 2285, Huntington, CT 06484; 203/926-1116.


* Color Map. Shareware on CompuServe.

761 Comment. Deneba Software, 3305 N.W. 74th Ave., Miami, FL 33122; 305/594-0665, 800/622-6827.

762 CompuServe Navigator. CompuServe, P.O. Box 20212, Columbus, OH 43220; 614/457-8600, 800/848-8199.

763 Desktop Express. Dow Jones Software, Inc., P.O. Box 300, Princeton, NJ 08543; 609/520-4641, 609/520-4642.


765 Digital Darkroom. Silicon Beach Software, Inc., P.O. Box 261430, San Diego, CA 92126; 619/695-6956.


768 Easy Checks. Par Software, Inc., P.O. Box 1309, Vancouver, WA 98666; 206/694-1539.


771 EZTax-Plan Business Edition. EZWare Corp., P.O. Box 620, Bala Cynwyd, PA 19004; 215/667-4064.

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773 EZTax-Prep 1040. EZWare Corp., P.O. Box 620, Bala Cynwyd, PA 19004; 215/667-4064.


* FIF4. Shareware on CompuServe.


778 FullWrite. Ashton-Tate, 20101 Hamilton Ave., Torrance, CA 90502-1319; 213/329-8000.

* GEnie. GEnie, 401 N. Washington St., Rockville, MD 20850; 301/340-4494, 800/638-9636.


780 Golf. Unison Software, 415 Clyde Ave., Mountain View, CA 94043; 415/968-7511.


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HyperCard. Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014; 408/996-1010.

HyperDraft. Heizer Software, 1941 Oak Park Blvd., #30, Pleasant Hill, CA 94523; 415/943-7667.

DAC/1000. International Data Acquisition and Control, The Meeting Place, Rte. 101, P.O. Box 397, Amherst, NH 03031; 603/673-0765.

ImageStudio. Letraset USA, 40 Eisenhower Dr., Paramus, NJ 07653; 201/845-6100, 800/526-9703.

Inbox Personal Connection. TOPS, A Sun Microsystems Company, 950 Marina Village Pkwy., Alameda, CA 94501; 415/769-9669, 800/445-8677.

Inbox Starter Kit. TOPS, A Sun Microsystems Company, 950 Marina Village Pkwy., Alameda, CA 94501; 415/769-9669, 800/445-8677.


The Investor. P3, Inc., 216 Nottingham Ave., Glenview, IL 60025; 312/729-2555.

Klondike. Unison Software, 415 Clyde Ave., Mountain View, CA 94043; 415/968-7511.

LaserPaint Color II. LaserWare, Inc., P.O. Box 668, San Rafael, CA 94903; 415/453-9500, 800/367-6898.


LookUp. Working Software, Inc., P.O. Box 1844, Santa Cruz, CA 95061-1844; 408/423-5696, 800/331-4321.

MacAdios II SE. GW Instruments, Inc., 35 Medford St., Somerville, MA 02143; 617/625-4096.


MacInText. Microtek Lab., Inc., 16901 S. Western Ave., Gardena, CA 90247; 213/321-2121, 800/654-4160.

MacLabs. World Precision Instruments, Inc., 375 Quinnipiac Ave., New Haven, CT 06515; 203/469-8281.

MacMoney. Survivor Software Ltd., 11222 La Genega Blvd., #450, Inglewood, CA 90304; 213/410-9527.

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QuarkXPress. Quark, Inc., 300 S. Jackson, #100, Denver, CO 80209; 303/934-2211; 800/356-9363.

QuickBASIC. Microsoft Corp., 16011 N.E. 36th Way, Box 97017, Redmond, WA 98073-9717; 206/882-8080, 800/426-9400.

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QuickKeys. CE Software, P.O. Box 65580, West Des Moines, IA 50265; 515/224-1995, 800/523-7638.

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65 Megabyte SE rear ...$899
80 Megabyte SE rear ...$1199
100 Megabyte SE rear ...$1489
40 Megabyte Mac II ...$549
60 Megabyte Mac II ...$699
80 Megabyte Mac II ...$1145
150 Megabyte Mac II ...$1879
300 Megabyte Mac II ...$2749
Cutting Edge
800K External Drive ...$175
Wedge XL30 ...$625
Wedge XL45 ...$825
Everex/EMAC
External 20D ...$499
External 20 Zero Footprint ...$549
Impact 40 ...$549
Impact 40 plus ...$849
Impact 60 ...$999
Impact 80 ...$1349
Internal Mac II 20 Megabyte ...$445
Internal Mac II 91 Megabyte ...$1395
Micro Net Technology
External 300 Megabyte ...$2995
External 620 Megabyte ...$3995

Epson Printers
FX-850, FX-1050, LQ-500
Grappler C/Mac
Epson LQ-500
9 pin, 180 cps ...$199
Grappler LS ...$79
Epson LX-800
24 pin, 180 cps ...$369
Seikosha
SP 1000 AP ...$215
Imagewriter Compatible

General Computer
PLP Laser ...$1598
PLP Plus ...$1698
Business Laser Plus ...$3298

GCC Write Move
Portable ink-jet printer ...$529

E-Machines
Big Picture 17" Monochrome ...$1298
Big Picture T-16 Color ...$2698
Big Picture T-19 Color ...$4498

Monitors
E-Machines
Big Picture 17" Monochrome ...$1298
Big Picture T-16 Color ...$2698
Big Picture T-19 Color ...$4498

Monitors
E-Machines
Big Picture 17" Monochrome ...$1298
Big Picture T-16 Color ...$2698
Big Picture T-19 Color ...$4498

Sigma Design
Pageview Plus/SE 15" ...$988
Silverview 21" ...$1528
Silverview 256 Gray Shades ...$2398
Colormax 19" ...$3898

Scanners
Hewlett Packard ScanJet ...$1395
Microtek
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300QS 64 gray levels ...$1949
300G 256 gray levels ...$2749
400G 256 gray levels 400 dpi ...$3349
All Scanners bundled w/Software.
Please call for competitive system pricing.
Hard Drive $449

AST
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Limited quantity

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External 1200 Baud ............. $99
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Epic Technology
Internal 2400 Mac II ........... $319

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Emac External 2400 ........... $219

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U.S. Robotics
External 2400 .................. $169

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Mac Irma-Mac II or SE ....... $795

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MacSnap Tool Kit ............... $15
MacSnap Plus 2 ................. Call
MacSnap 2 SE .................. Call
MacSnap 524S .................. Call
MacSnap 548S .................. Call
Marathon 020 Accelerator .... $549
Co-Processor 68861 ........... $249

Call for SIMM prices

GCC Technologies
Hypercharger 020 Accelerator, $679

Tape Back-up Systems
CMS 60 Megabyte External . $729

Micro Net Technology
150 Megabyte External ....... $1499

Software
Aldus Pagemaker ............... $389
Microsoft Excel ............... $239
Microsoft Word ............... $239
Microsoft Works ............... $189

Abaton
Propoint ........................ $98

CH Products
Flightstick .................... $48
Mach IV Joystick ............. $48
Mirage ........................ $38

Cutting Edge
Mac 105 ADB Keyboard ..... $129

Datadesk Keyboard
Mac 101 or ADB version .... $129
Hyperdialer .................... $25

Dust Covers/Carrying Cases
Mac/Plus/SE .................... $15
Keyboard (specify type) ........ $9
Mac II CPU only ............... $12
Mac II with Mono Monitor .... $19
Mac II with Color Monitor .... $19
Imagewriter II Printer ........ $9
Imagewriter LQ Printer ...... $14
Laserwriter Printer .......... $24

Imagewriter II Carrying Case . $59
Mac Plus/SE Carrying Case . $59
Mac SE w/Ext. Keyboard .... $69

Ergotron
MacTilt ........................ $68
Muzzle ........................ $58

Farallon
MacRecorder Sound System .. $129

OUR POLICY
- Plain and simple. Hardware: your satisfaction guaranteed or your money back.
- Software: defective software will be replaced immediately. Manufacturers policies prohibit us from offering refunds on opened software.
- We accept most major credit cards with no surcharge added.
- Your credit card is not charged until we ship.
- Please allow 10 days for personal and company checks to clear.
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- We gladly accept purchase orders from most major institutions.
- International orders accepted.
- California, Texas, Georgia and Arizona residents please add the appropriate local sales tax.
- To Place orders call Monday thru Friday
  7AM to 6PM P.S.T.
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Printer Stand 132 column .... $19
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Kensington
Superbase ...................... $33
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System Saver SE .............. $52
Security System .............. $34
Mac II System Stand ......... $19
Masterpiece Mac II .......... $105
Keyboard Extention Kit ..... $33
MacTilt & Swivel .......... $22
Turbo Mouse ................ $118
Turbo Mouse ADB ........... $118

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MacTrac Trackball ........... $78

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Fanny Mac QT ................ $58
SE Silencer ................... $39

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A+ Mouse ...................... $65
A+ ADB Mouse .............. $79

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**UTILITIES**

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**GAMES**

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**GRAPHICS & FONTS**

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**EDUCATION & MUSIC**

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**DESKTOP PUBLISHING & WORD PROCESSING**

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**LANGUAGES**

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**BUSINESS**

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**SPELL CHECKERS**

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**Spelling Checker**

- VISA and MASTERCARD accepted with no additional charge.
- Your credit card will not be charged until we ship your order.
- Iowa residents add 4% sales tax.
- A $4.00 shipping charge will be added to all orders.

Prices subject to change without notice.

Call Toll Free 1-800-541-4620
Customer Service (515) 497-5270

Symantec Utilities T.1 (Symantec) - Utility software for protecting fleck, partitioning, and restoring your hard drive without losing your important data. $43.00
### SOFTWARE

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### FIFTH GENERATION

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### FIFTH GENERATION

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### HARDWARE

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<td>WORDPERFECT CORP.</td>
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</tbody>
</table>

### DR. MAC WELCOMES CORPORATE AND EDUCATIONAL ACCOUNTS

Circle 368 on reader service card
The Lowest Prices with Technical Support, Too!

**WARNING:** Beware of money-back offers on hardware! MacLand sells only NEW, NEVER USED merchandise. We will not send you re-packaged, slightly-used hard disks.

### External Hard Drives

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Drive Type</th>
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<td>Giga Cell 20</td>
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<td>Crate 20</td>
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### Drives over 150 Meg Call for Price

### Internal Hard Drives for the SE

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### Mac II Internal Hard Drives

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### Removable Drives

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<td>44 Cartridge Drive</td>
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### Tape Back-Ups

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<td>Irwin 80</td>
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<td>MicroNet 150</td>
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### Hardware Accessories

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<td>Phone Net Connector</td>
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<td>Radius 16 + Accelerator</td>
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<td>Radius 25 Accelerator</td>
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<td>Full Page Display</td>
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<td>Two Page Display</td>
<td>$1,425.</td>
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<tr>
<td>Radius Color Monitor</td>
<td>$1,949.</td>
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### Memory

**SIMMS IN STOCK**

All hard disk drives carry a manufacturers one year warranty except for the Crate & Quantum drives which have a manufacturers Two Year Warranty.

### Contact Information

*For Ordering and Technical Support Call 1-800-333-3353*

Visa, MasterCard, and American Express accepted NO surcharge. Your Credit Card will not be charged until your order is shipped. We accept COD orders, additional $5.00 charge. AZ residents add 6%. All shipments made by Federal Express Standard Air which in 1 to 2 day service. COD’s shipped by UPS 2 day air. Call for shipping costs. Products purchased in error are subject to a 20% restocking fee. All prices subject to change without notice. All products subject to availability.

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OME 100i- 100 Megabytes CALL
OME 140i- 140 Megabytes CALL

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One Year Warranty

FREE STACKWARE & Microsoft Excel Templates by Helzer Software.

They're Fast!
They're Reliable!
They're Inexpensive!

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- Reliable!
- Available!
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YES! We've Got It! Guaranteed!

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Ram II+II - Cost Effective CALL
4 Megabytes RAM, 120ns, CMOS.

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Expands to 2.5 Megabytes RAM, SE & Plus

For Macintosh Plus
RamPlus 2 - Cost Effective CALL
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RamPlus 4 - CALL
Expands to 4 Megabytes RAM. Plus Only

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Connects your Macintosh II to NTSC video.
Record your Macintosh images to video tape, or use for live presentations. Compatible with Apple & Spectrum Video Cards.

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(Sorry, not TV!)

Circle 45 on reader service card
You've known us as AppleCrate. We are now Crate Technology. So, just say Crate!

We offer a great line of external disk drives now known as MacCrate ranging from 20MB to our performance driven 80MB model all using Seagate quality disk drives.

We have expanded our product line to include InnerCrate: our solution for your Mac SE and Mac II internal disk drive needs. InnerCrates range from 30MB to our high performance 300MB model.

Introducing TapeCrate, our high speed quality backup system. TapeCrate's high speed data transfer rate, protects 60MB of your valuable information in just 12 minutes. TapeCrate comes with a 60MB data cartridge and is ready for "Plug and Play" operation.

### InnerCrate

<table>
<thead>
<tr>
<th>Model</th>
<th>Capacity</th>
<th>Transfer Rate</th>
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### MacCrate

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<th>Model</th>
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<th>Transfer Rate</th>
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<td>20MB</td>
<td></td>
<td>65ms</td>
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<td>28ms</td>
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### TapeCrate

- 60MB tape backup sys. $739

---

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Nationwide
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For the best Macintosh buys, scroll through *The Macworld Catalog*.
<table>
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<tr>
<th>Accessories</th>
<th>Software</th>
<th>Miscellaneous</th>
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<td>Fund Raising</td>
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### Advertising Rates & Information

**The Macworld Catalog** section is a monthly link-up for advertisers and volume purchasers of Macintosh-related products and services. The Catalog offers advertisers a low-cost marketing opportunity and provides readers with a timely, easy-to-use menu for product buying.

- Display ads are sold by column inches (2" minimum).
- Standard red is available as a second color. Text-only listings are available for a minimum of three issues at $322 per issue ($966 total).

For more information, space closings, and material deadlines, please call toll-free 800/888-8622.

**Instant Link:**
Macintosh Products, Manufacturers, Services

**The Macworld Catalog**
501 Second Street
San Francisco, CA 94107
800/888-8622

**Account Managers**
- Niki Stranz, Western U.S.
- Carol Felde, Eastern U.S.

For your ad to appear on The Macworld Catalog screen, call 800/888-8622.
**Furniture**

**The Macworld Catalog**

**MACINTOSH SCREEN TO BIG SCREEN from $1095**
KODAK & APOLLO Projection Pads available for ALL Macintosh and IBM PCs & Computers • 1 year parts & labor warranty • 30 day money-back guarantee • Factory service.

**BOXLIGHT CORPORATION**
415/892-4744
MC, Visa, American Express, COD
CIRCLE 724 ON READER SERVICE CARD

**TURBO MOUSE**
Now you can own the Winner of the 1988 Turbo Mouse Race, for less than half the retail price!! Our Turbo Mouse has been named Top Input Device for '87 & '88 by the readers of Macworld. The '88 Macworld standings for Hardware Top Input Device: • TURBO MOUSE* • Abaton Mouse Trackball-Point • Apple Expanded Keyboard • Mac-101 Enhanced Keyboard • Mouse Systems A+ Mouse. Also Turbo Mouse ADB at low, low prices!
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**Company Logo Specialist**
Grey, Green & Red Pads
Size: 9½" x 8" x 3½" • 12 pads $9.50 w/logo • 36 pads $8.50 w/logo • 72 pads $6.90 w/logo • 144 pads $4.70 w/logo • 500 pads $4.14 w/logo • 1000 pads $4.02 w/logo

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A leather mouse pad for the rugged and rational. Your mouse will ride cleaner, faster, smoother on a Chesapeake Leather Works cowhide mousepad. Each pad is carefully handmade with specially tanned leather stitched to a rubber base. The ultimate pad.
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**Gloves**
Hand Made 14K Pendant, Tie Tac or Charm
Computer & Fruit of 14K yellow Gold Monitor is patinated fine Sterling Silver
$99.95 enhancements (gem added, engraving, etc.) extra
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CIRCLE 671 ON READER SERVICE CARD

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MacProducts, 2023 San Gabriel Valley Dr., Walnut, CA 91789, 714/595-4838

**MOUSE PADS**
Custom Printing Available Cloth: Blue, Gray, Burgundy, Red, Brown, Green, Black, Navy & Platinum
Size: 8 x 7½, 8 x 9½, 8½ x 11
12 Pads 3.25 3.50 3.75
72 3.00 3.25 3.50
144 2.85 3.10 3.35

**Supplies**

**Macscreens for less.**
3.5 DS/DD
Blue & Gray 5 Color Labels
White Box
Shrink Wrapped
No minimum.
(In 6 colors $1.33)
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Shrink Wrapped
No minimum.
(In 6 colors $1.28)

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2½" x 2½" - 1 across - 2500 . . . $12.00/M

**Security Kits/Cust Cables**

**Gifts**

**Hardware**

**Mouse Pads**

**Supplies**

**Macscreens for less.**
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White Box
Shrink Wrapped
No minimum.
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**Gifts**

**Hardware**

**Mouse Pads**

**Supplies**
Supplies

Manual Diskette Ejector
Get rid of that tacky paperclip! Add class and style to your Mac or Apple 3.5 drive. Uses Manufacturer’s ejector hole: Platinum color Tool and Mount (with adhesive) High strength, electrically insulated, ABS plastic and chrome steel. QUALITY $4.95. Check, MC, VISA + $1 s/h. DEALERS—Christmas special. P&J Enterprise, Inc., 1818 Manor Hill, St. Louis, MO 63131, 314-821-1415

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3 1/2” DS-DD 100% Certified Lifetime Warranty Major Mg. $99 ea. $11.95 ea. $11.95 ea. $69 ea. $69 ea. $69 ea. Shipping $5 per 100 diskettes. Order by phone or send your check to:
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(800) 288-8025
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Mounts on the top front edge of your MAC... Eliminates desk clutter, glare, visual discomfort and fatigue... Precise optical mirror control of tungsten halogen light properly illuminates paper information to the left and right of the computer... OPTIMAC does the work of two desk lamps... Please tell us type of MAC and/or monitor $155 includes shipping within continental U.S. by UPS, add 6% sales tax in California... Check Visa or MasterCard
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37 Commercial Boulevard
Novato, California 94945
(415) 382-7618
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LEATHER PAD
8” x 10” black top-grain leather, neoprene backed. Great gifts, 5 year warranty. Send only $9, for either (includes S/H) to:
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VISA/MC (215) 647-8534
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800/342-5808
FAX=212/941-9765

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nylon webbing, padded leather shoulder strap, quick-release buckle, lock, and organization, keyboard, mouse, cables attach with straps included
£55 shipping & handling
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Available only in NY
(412) 653-1082

PACK YOUR MAC IN SECONDS!
Cordura case has internal padded pockets for mouse, keyboard and drive. Available in six colors. Extended Keyboard version also available. For a dealer near you call toll free
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CONTEMPORARY COMPUTERWEAR
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San Francisco 94112
CIRCLE 729 ON READER SERVICE CARD

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Discount Macintosh

Macintosh Plus $Call
Macintosh SE 2 800k drive $Call
Macintosh SE 30mb internal $2695
Macintosh SE 40mb internal $2895
Macintosh II 40mb internal $3995
Macintosh II 60mb internal $4150
Apple keyboard for SE or II $100
Datadesk 101 keyboard $140
Apple 13" color monitor $750
Mac II 8 bit video card $495
Imagewriter II w/cable $450
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General Computer P.L.P. Plus $1595
C.M.S. external hard drives $Call
SIMM chips in stock $Call

New !! Accelerator Cards
- Upgrade Your RAM to 4Mb
- New Larger Hard Disks
- MacWorks™ Plus
- 80K Drives

MACsimize YourLisa/Mac XL

Data Acquisition

Hardware Bar Code

Discount MACINTOSH

MACINTOSH DUST COVERS
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Macintosh SE 40mb internal $2895
Macintosh II 40mb internal $3995
Macintosh II 60mb internal $4150
Apple keyboard for SE or II $100
Datadesk 101 keyboard $140
Apple 13" color monitor $750
Mac II 8 bit video card $495
Imagewriter II w/cable $450
Imagewriter LQ w/cable $995
Apple laserwriter II NT $3695
General Computer P.L.P. Plus $1595
C.M.S. external hard drives $Call
SIMM chips in stock $Call

New !! Accelerator Cards
- Upgrade Your RAM to 4Mb
- New Larger Hard Disks
- MacWorks™ Plus
- 80K Drives

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An Apple //e computer...all in software!

Emulators

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**Expansion Chassis for the MACINTOSH**

Open up your Macintosh Plus, SE or II with an expansion chassis system from Second Wave, Inc. ExpansSE Plus, ExpansSE, and Expanss II allow you to customize configure your Macintosh with a variety of option boards:
- Accelerators
- Monitors
- MS-DOS Communications
- Data Acquisition
- Industrial Control
- Transputers

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Austin, TX 78759
(512) 343-9661

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For the Mac Plus/SE and Mac II

**SOFTSTEP III**
Computer Care’s latest addition to its SOFTSTEP family. This new product has no onboard memory. SOFTSTEP III allows you to place 4-256K SIMMs on the SOFTSTEP to give you a 1 Meg SIMM. Use your surplus 256K SIMMs to build 1 Meg SIMMs for the Mac II.

**SOFTSTEP I**
Upgrade your Mac Plus/SE from 1 Meg to 2 Megs by using your existing 256K SIMMs.

**SOFTSTEP II**
Upgrade your Mac from 1 Meg to 4 Megs or from 2 Megs to 5 or 8 Megs using your existing 256K SIMMs.

ORDERS & INFO
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In MN (612) 920-CARE (2273)

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100% MAC II COMPATIBLE
1 MG X 8 x 100NS
$360.00 PER UNIT

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One megabyte SIMM modules in stock for your Mac Plus, SE, or Mac II.
Immediate delivery. Fully guaranteed.

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TRONIX
Cupertino, CA 95014

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**HARD DRIVES**
LIFETIME WARRANTY

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<td>160 Meg</td>
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For SE+Mac II with 2 drives:
- 20 Meg Internal $399
- 20 Meg External $489
- 48 Meg Internal $519
- 48 Meg External $619
- 80 Meg Internal $689
- 80 Meg External $859

Seagate-Miniscribe-Quantum WESTCOM COMPUTER
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800-422-6591-919-746-4961

CIRCLE 614 ON READER SERVICE CARD

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Memory Expansion SIMM Kits for Macintosh™ Plus, SE and Macintosh™ II

Easy to install, plug-in modules that let you add 2 to 8MB of memory. Ideal for "memory-gobbling" software applications and the new Multi-Finder multitasking environment.

Guaranteed Same Day Shipment
Orders received by 3:00 p.m. (CST) for 1MB SIMMs are shipped same day, or we pay freight.

We manufacture these high and low profile SIMMs in volume for immediate shipment.

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<td>High &amp; Low Profile</td>
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We buy and sell 256K SIMMs.

CALL FOR PRICES AND DISCOUNTS
1-800-678-DRAM (678-3726)

PSI has the one megabyte SIMMS that will give you the extra memory you need to get the maximum performance out of your Macintosh Plus, Macintosh SE, or Macintosh II. Call now!

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The Macworld Catalog

Memory Upgrade

**CDC HARD DRIVES**
- 90 Meg 18 ms $1,150
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- 190 Meg 18 ms full ht. $1,735
- 300 Meg 18 ms full ht. $2,406
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- 638 Meg 18 ms full ht. $3,445
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Are you looking for a easy & low cost way to network all your Apple computers & peripherals?...

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Kinetics provides Ethernet hardware & software for all Macintosh® computers. Products include:
- FastPath: AppleTalk Ethernet gateway
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- EtherSE: Internal Ethernet card for the Mac SE
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Exchange data files between your Macintosh and any mainframe or mini-computer using IBM compatible 1600 or 6250 BPI 9-track tape. Unit can also be used for disk backup. Transfer rate is up to 1 megabyte per minute via your SCI interface. Subsystem includes, tape drive, software, and complete documentation. For more information, call us today!

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Explore the claims of Astrology.
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(408) 275-8356

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PO Box 6316
San Jose CA 95150
(408) 275-8356

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HyperTools™ #1: Icon Editor, Alignment & Array Creation Tools, Scan Cards, Script & Font Tools, XCMD tools, Button Tools and more. 16 Tools in all for stack design! $99.95

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Stack Cleaner™: Complete menu creation & editing facility for stacks. A script cleaner to reduce the size of scripts by using standard abbreviations. Plus utilities to merge, split, and clone stacks. $49.95

Learn HyperTalk™ HyperFast.

Even if you've never programmed before, you'll learn the HyperTalk language for HyperCard™ fast and easy with HyperTutor™ Guaranteed.

- Quickly learn how to write scripts and modify the stackware you buy.
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- 30-day money-back guarantee

Only $49.95. Order Now!!!

Call (800) 851-2917 Ext. W600

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MacRecorder™ Sound Sys.

When graphic & text are not enough, give presentations a dramatic dimension—narration & sound. MacRecorder Sound System is an audio workshop. Record, edit, playback live or pre-recorded sound. Includes: Digitizer & Sound-Edit™ allows you to add voice, music & sound effects to HyperCard™, Video Works™, StudioSession™, JamSession™, & more; & Hypersound™ lets you record & work w/sound within HyperCard. Combine MacRecorder w/your ScreenRecorder™ (avail. separately) to create multi-media presentations.

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24 Hour Turn Around
1,400 Type Fonts
PC, Macintosh or Postscript Files

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- Linotronic imagesetting
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- Whether keyboard, disk, or modem

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### Business Software

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- **Microsoft Word** Microsoft
- **Microsoft Excel** Microsoft
- **Microsoft Works** Microsoft
- **PageMaker** Aldus
- **MacWrite** Claris
- **WordPerfect for the Macintosh** WordPerfect
- **Adobe Illustrator** Adobe Systems
- **MacDraw** Claris
- **FileMaker Plus** Claris
- **MacPaint** Claris

### Education Software

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- **Math Blaster** Davidson & Associates
- **Reader Rabbit** The Learning Company
- **Typing Tutor** Simon & Schuster Computer Software
- **KidsTime** Great Wave Software
- **Word Attack** Davidson & Associates

### Entertainment Software

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- **Flight Simulator** Microsoft
- **MacGolf** PCAI
- **Dark Castle** Silicon Beach Software
- **Falcon** Spectrum Holobyte
- **Beyond Dark Castle** Silicon Beach Software

### Networking/Data Communications

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- **TOPS** TOPS
- **AppleShare** Apple Computer
- **LocalTalk** Apple Computer
- **PhoneNet** Farallon Computing
- **Red Ryder** FreeSoft

### Hard Disks*

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- **Macstack SD 30 CMS Enhancements**
- **PRO30-SE CMS Enhancements**
- **FX20 General Computer**
- **Rodime 450 RX Rodime Systems**
- **EMAC 20 External Everex**

### Add-In Boards

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- **Radius Accelerator** Radius
- **Radius Interface Display** Radius
- **Macintosh II Video Card** Apple Computer
- **Micro Snap Memory Expansion Kit** Microtech International
- **Video Board/Large Screen** Ryad

### Product Watch

Editors’ choice: other recent or forthcoming products of particular interest.

- **DayStar 33/030 Accelerator II**
  DayStar 33.3MHz accelerator for Mac II and IIX
- **MarkUp** Mainstay group document editing and review application
- **ColorQuick** Tektronix ink-jet printer

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