The Mac in Film, Video, Animation

How Hollywood Works with the Macintosh: Pages 108 & 116

Clues to Buying a Database: Seven Products Compared

Database Showdown: Three Top Contenders

Making IBM Work for Your Mac

New! HyperCard Clones: SuperCard and Plus
For heavy users of the English language.

Anyone can create side-by-side paragraphs without having to worry about tabs. And you'll always find the right word—the thesaurus boasts 220,000 of them.

Documents 10,000 pages and longer won't intimidate Word. And Word Count gives authors an exact count of characters, words, lines and paragraphs.

Our formula typesetting feature can handle symbols and notations so you technical writers won't have to rely on a typesetter.

Absolute positioning of graphics and text is the absolute best if you're involved with page layout. The text wraps around any object as you type.
The expression that you can't please all of the people all of the time just got redefined.

In developing Microsoft® Word version 4.0, we took input from the over 400,000 Word users who made Word the best-selling Macintosh® product in history. Added startling, cutting-edge technology. And the result is a gracious, easy-to-use word processing program with features as dynamic and diverse as its users.

Unleash those features, and you push the envelope of word processing. You can set up tables automatically, without worrying about tabs. Reformat an entire document with one command. And choose from four editing views—including one that shows you exactly what your document looks like, so you can organize and revise your documents without any guesswork.

What's more, Word is completely customizable—any command can be placed on any menu or assigned any keyboard command. And, software fans, the best-selling word processing program for the Macintosh now comes with the best-selling paint and draw program for the Macintosh—SuperPaint by Silicon Beach Software.

And keep in mind Microsoft Word is part of an entire line of Microsoft products that work seamlessly together, so you can do more with your Macintosh.

Microsoft Word 4.0 can emphasize, articulate, clarify and organize your words. In fact, practically the only thing it can't do is think for you. Yet.

© 1988 Microsoft Corporation. Microsoft and the Microsoft logo are registered trademarks and Making it all make sense is a trademark of Microsoft Corporation. Macintosh is a registered trademark of Apple Computer, Inc. SuperPaint by Silicon Beach Software is a trademark of Silicon Beach Software, Inc. For more information call (800) 541-1261. Dept. 172. Customers in Canada call (604) 673-9851, outside North America, (206) 882-5610.
FEATURES

Move It! .................................................. 108
By Stuart Cudlitz / Create and play Mac animation in 2-D, 3-D, and HyperCard.
A roundup of the latest animation software for the Mac.

Star Quality ............................................. 116
By Stuart Cudlitz / The Mac breaks into filmmaking as a featured player in independent production companies. How it's being used in storyboarding, special effects, composite photography, and editing.

On Beyond HyperCard ................................ 124
By Suzanne Stefanac / HyperCard is no longer alone in its field. Two new products, SuperCard and Plus, create their own stacks, complete with color and multiple, resizable windows.

Choosing an Organizer ................................ 128
By David Pogue / What sets a good database apart from a poor one? Here are some surefire tips for finding a quality database that's easy to use.

Database Showdown .................................. 133
By David Pogue / Three of the top file managers—Panorama, Microsoft File, and FileMaker—battle their way through a true-to-life application.

Making IBM Work for Your Mac .................... 138
By Dave Koslowski / The Mac makes great connections with the IBM mainframe world.

REVIEWS

Wingz 1.0 .................................................. 148
Spreadsheet with 3-D graphics.

Aldus FreeHand 2.0 .................................. 150
Professional illustration program.

Matrix TT200 ......................................... 152
Thermal-transfer color printer.

HyperAnimator 1.5 ................................... 156
Toolkit for creating talking faces in HyperCard.

Aldus Persuasion 1.0 ................................ 156
Desktop presentation manager.

DAC-Easy Light 1.0 ................................ 161
Inexpensive, practical accounting.

Nemesis Go Master 3.0 .............................. 163
Go-playing program.

PC Tools Deluxe 1.0 ................................ 165
Disk maintenance and repair utilities.

Interfax 12/48 ......................................... 166
Fax modem with data modem.

Mean 18 Ultimate Golf and World Class Leader Board ..................... 168
Two golf games challenge MacGolf.

Vantage 1.0 .............................................. 170
Desk accessory text processor.

More II 2.0 ............................................. 172
Outliner with presentation graphics capabilities.

Database 1.11 ......................................... 177
Desk accessory database.

Lightspeed Pascal 2.0, TML Pascal 3.0 ............. 181
Pascal compiler and development system.

NetModern V2400 ....................................... 183
2400-baud modem with AppleTalk support.

Window shopping ..................................... 185
Empower. DiskExpress, MultiDisk, and others.
THE BEST TYPE BOOK MONEY CAN BUY.

This priceless professional tool is yours free. Simply mail the coupon below or call Adobe Systems toll-free at 800-83-FOENTS.

Adobe, developer of the Adobe Type Library and PostScript software, is the world's authority on electronic publishing.

This full-color, 11 x 15; 32-page Font & Function catalog is jam-packed with helpful tips and problem-solving advice from Adobe type and design experts. Plus, it's got samples, interviews and more than 300 high-quality Adobe typefaces for you to order. You'll see how easy it is to publish like a pro with your Macintosh or IBM PC computer, PostScript printer and a little help from Font & Function, the Adobe Type Catalog.

Get yours today, FREE. Just call 800-83-FOENTS. Or write Font & Function, P.O. Box 7900, Mountain View, CA 94039-7900.

To receive your free Font & Function Adobe Type Catalog, mail to: Font & Function, P.O. Box 7900, Mountain View, CA 94039-7900. Please allow 4 weeks for delivery.

I use: □ Macintosh □ IBM PC computer (Check appropriate boxes)

01-12-0212

FREE.

MACWORLD

Editor-in-Chief Jerry Borrell

EDITORIAL

Executive Editor David Ushijima
Managing Editor Charles Barrett
Senior Editor/Features Adrian Mello
Editorial Manager Jane Loges
Associate Editor/Departments Deborah Bronsbaum
Associate Editor/Features Joe Motozono
Associate Editor/News Tom Moran
Associate Editor/News Dan Litman
Associate Editor/Reviews Carol Person
Associate Editor/Features Cheryl Spencer
Associate Editor/Features Suzanne Stefanac
East Coast Editor/Features Britt Meng
Senior Production Editor Luis A. Camus
Senior Copy Editor Ruth Henrich
Assistant Editors Cathy E. Abes, Mark Hurlow,
Mary Margaret Lewis, Lisa Weinman
Production Editor Annie Jenkel
Copy Editors Marjorie Baer, Emily Bower,
Felicity O'Meara, Katherine L. Ulrich
Assistant Production Editor Barbara Tonnembaum
Editorial Assistant Pamela T. Creighton
Editorial Administrative Assistants
Joyce C. Ripp, Lyn Taylor
Assistant to the Editor-in-Chief Lisa Barnes
Editorial Intern Wendy Monroe
Contributing Editors Nancy L. Dunn,
Robert C. Eckhardt, Efrert Fenton, Danny Goodman,
Rob Hahn, Jim Held, Dave Kosier, Steven Levy, Lon Poole,
Charles Seiter, Franklin Tessler, Bruce F. Webster

ART AND DESIGN

Designer Dennis McLeod
Associate Art Director Joanne Hoffman
Assistant Art Director Nancy Paynter
Senior Design Associates Leslie Barton,
Andrew Faulkner, Arne Hurty
Design Associates Martha Katt, Hoe Yuon Kim

PRODUCTION

Senior Production Manager Anne Foley
Assistant Production Manager Claudia Down Smukler
Advertising Billing Coordinator So Fong Yip
Advertising Traffic Coordinator Annette Garcia

Publisher's statement can be found on page 10.
How to give Ethernet a run for the money.

Some people may think the way to rev up a LocalTalk network is to rip the whole thing out, lay some heavy cable, and send your computers out for an Ethernet implant. Spending big bucks in the process.

TOPS suggests a less traumatic alternative: FlashBox, the fast and easy LocalTalk upgrade.

For just $189 per node, FlashBox delivers fully 80% of Ethernet performance for just 20% of the cost. How? By turning your LocalTalk network into a high-speed freeway moving data at FlashTalk rates of 770 Kbps.

Installation won't slow you down either. FlashBox plugs right into the back of your Mac and runs over your existing twisted-pair wire. It's 100% compatible with your current applications. It communicates at FlashTalk rates with PCs using TOPS FlashCard. And, unlike Ethernet, it lets you continue printing to your LaserWriter® without buying a costly gateway.

Best of all, FlashBox is available now. So stop by your nearest TOPS dealer and find out how to rev up your network without overhauling your budget. Or call the TOPS Division of Sun Microsystems at 1-800-445-TOPS, extension 107 (from outside the U.S. and Canada, call 1-415-769-8700, ext. 107).
WE PUT PERSONAL SCANNING WITHIN YOUR REACH.

Announcing LightningScan, the new hand-held scanner for Macintosh. From Thunderware.

Now one quick pass is all you need to scan any image up to four inches wide. With resolution settings up to 400 dots per inch, LightningScan makes almost any scanning job easier to handle. And because LightningScan is controlled by the software that helped make ThunderScan famous, you have the powerful tools you need to enhance and edit your images. As for graphics compatibility, you name it: from PageMaker® and Illustrator® to ImageStudio® and Digital Darkroom.

At its suggested retail price of $549, LightningScan makes the benefits of personal scanning very easy to grasp.
"SUM, or to be more precise, Symantec Utilities for Macintosh, is the slickest and most important set of utilities you can get for your Mac. To have a hard disk and not have SUM is sheer folly."

Steven Bobker, Chief Scientist, MacUser Magazine, 9/88, 5 Mice, Highest Possible Rating

Strong language. But well founded. Because in addition to six other indispensable utilities, SUM features Guardian, the ultimate software for protecting your Mac's hard disk before a crash. Like an air bag, 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 it and recover it. In minutes.

Smart Mac users who want complete, yet effortless protection for their hard disk data should follow Steven Bobker's advice and "Get SUM." Today.

See your dealer or order today: (800) 228-4122 Ext. 675G

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.
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.
MultiDisk™  
The sensational new disk partitioning utility!

Hard disk makers recognize the need to partition a disk. As hard disks have increased in size, the need has become critical. However, the Macintosh File System is so complex and users are so demanding, no adequate utility has been offered. We challenged the Macintosh disk experts who created DiskExpress to deliver a solution. They succeeded with MultiDisk.

MultiDisk provides you with effortless partitioning. You can add or delete partitions at any time without having to erase your disk. MultiDisk has the exclusive ability to create partitions that occupy fragmented space (SUM and Hard Disk Partition need DiskExpress to defragment the free space). Another exclusive ability is the ability to enlarge a partition without having to recreate it. You can start with a small partition and then grow it as needed. This prevents the waste of your valuable disk space caused by other partitioning software. A third exclusive ability is the ability to create partitions within partitions. Plus, partitions you've created with SUM or Hard Disk Partition can be converted into fixed-sized MultiDisk partitions.

You can conveniently open partitions with a password or a disk password. You can also have MultiDisk automatically open the partitions of each disk as they appear on the desktop. Network users of AppleShare™ and TOPS™ can remotely access partitions opened on a server.

You can protect partitions with a password. For more security, you can assign automatic quick-encryption to each partition.

MultiDisk partitions your HFS disks on SCSI and non-SCSI drives and has the exclusive ability to work correctly with your removable disks.

Suggested Retail  $69.95
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, (800) 263-1405; in 1988 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.

WriteMove Portable Printer

GCC Technologies

Circle 177 on reader service card
QuarkStyle, PageMaker, 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 1-800-527-1950 ext. 84 for a brochure and name of your nearest Radius Authorized Dealer.

And get the most out of your Macintosh SE and its software. Today. And tomorrow.
No other hard drive stacks up to Jasmine.

Year after year, Jasmine has set the standards by which other hard disk drives are compared. Now, in 1989, we've raised those standards. With a new series of DirectDrives™ that are more reliable, affordable, and technologically advanced than ever.

DirectDrive 20 .............. $549
DirectDrive 40 .............. $699
DirectDrive 80 .............. $999
DirectDrive 100 .............. $1199
DirectDrive 140 .............. $1499
DirectDrive 300 .............. $2795

Of course, while continually pushing the boundaries of technology, we've never forgotten that there are some things technology alone can't provide. Like the joy of spending not a penny more than necessary to acquire the very best. Or the satisfaction of owning a hard-working, reliable piece of hardware. Or the feeling of confidence that comes from dealing with a company dedicated to customer service.

So it's only to be expected that this new series of external hard disk drives gives you more than more megabytes for your money. With each 1989 DirectDrive you also receive our exclusive, 30-day money-back guarantee and no-nonsense, two-year warranty.

But that's not all. Jasmine DirectDrives come bundled with over $500 worth of the most advanced utility software available—absolutely free. Including Symantec™ Utilities for Macintosh, which lets you recover data from a mistakenly-initialized hard disk. Redux™ from Microseed, perhaps the easiest, most powerful way to back up your data. DriveWare™ and DEScryptor™, our comprehensive operating and proprietary encryption tools. Plus DemoWare™ and over 5MB of Public Domain and Shareware software.

To order a new DirectDrive call 1-800-347-3228 in the U.S. or 1-415-282-1111 worldwide. Our knowledgeable staff is ready to answer your questions Monday through Friday from 8 am to 6 pm (Pacific Standard Time). MasterCard, Visa, or American Express cheerfully accepted.

© 1989 Jasmine Technologies, Inc. 1760 Army Street, San Francisco, CA 94124 Phone 1-415-282-1111. Fax 1-415-282-4287. DirectDrive, DriveWare, DEScryptor, and DemoWare are trademarks of Jasmine Technologies, Inc. Symantec is a registered trademark of Symantec Corporation. Mircoseeds is a registered trademark of Microseed, Inc. DriveWare and DemoWare are registered trademarks of Microseed, Inc.
INDUSTRY NOTES

Hard-Driving Lawsuits

Disk drive maker Jasmine Technologies has sued one current and several former Jasmine executives and Radime, Inc., charging that they conspired to lower the price of Jasmine stock to set the company up for a takeover. Jasmine, already embroiled in other lawsuits, claimed to have firm and compelling evidence of a conspiracy.

Novell to Acquire Excelan

Local area network vendor Novell, the developer of NetWare, has agreed to acquire Excelan in a stock swap valued at roughly $170 million. Excelan’s Kinetics division leads the AppleTalk-to-Ethernet market with its FastPath 4 gateway.

Networkers Collaborate

Novell and Sun Microsystems plan to integrate Sun’s TOPS and NFS protocols to provide connectivity between Novell’s NetWare, TOPS, and ONC/NFS networks. TOPS already allows Macintoshes and IBM PCs to share the same network, and Novell last year announced support for Mac on its popular NetWare LAN.

Microsoft Profits Down?

Microsoft Corporation reported that delays in shipping new versions of its word processors for the Mac and IBM PC would cause third-quarter earnings to be lower this year than in 1988. The surprise announcement sent its stock price down—along with chairman Bill Gates’s net worth.

Ashton-Tate Falls Short

Ashton-Tate reported a decline of 16.8 percent in pretax income, though its net income for the year rose 10.9 percent. Ashton-Tate expects unusual marketing and sales costs to reduce earnings in the first half of the current fiscal year.

Apple Releases Color QuickDraw

Apple will offer Mac owners a free upgrade that provides a standard way of displaying and saving 24- and 32-bit color graphics images. The Color Extensions release of QuickDraw consists of three files that work with System versions 6.0.3 or later. Contained in the release are a new Monitor CDEV that simplifies installing multiple-monitor systems, a new Color PICT file format that further compresses color files, and new routines that correctly translate color files to shades of gray.

The new Color QuickDraw will display a 24-bit color image correctly on a 1-, 2-, 4-, 8-, 16-, 24-, or 32-bit color or monochrome graphics-display system. Images created on a 24-bit color system can be dithered to provide an excellent likeness when displayed on a color or monochrome display using eight bits or fewer.

Apple will also ship a new version of the LaserWriter driver, version 6.0. The LaserWriter upgrade properly prints color PostScript output when working with color PostScript printers such as the QMS ColorScript 100 or Tektronix’s color PostScript printer. Color images are printed as halftone gray-scale images on a black-and-white PostScript laser printer.

Sreamer in the Wings—50MHz 68030

A 50MHz version of a 68030 microprocessor that will provide up to 12 MIPS of compute power was recently announced by Motorola’s Microprocessor Products Group. The CPU’s clock rate makes it faster than any available CISC or RISC processor, Motorola said. The new chip, which uses 1-micron fabrication technology, is already available in samples and is scheduled to ship in production quantities in the third quarter of 1989.

Apple Wins Round One in Lawsuit

In March, Apple won a crucial pretrial ruling in its lawsuit against Microsoft and Hewlett-Packard to protect the look-and-feel of Apple’s Macintosh from imitators. In the ruling, Judge William Schwarzer said Micro­soft’s 1985 licensing agreement with Apple did not completely cover the products challenged by the suit, notably Microsoft Windows version 2.03. Hewlett-Packard’s NewWave operating environment, which functions in conjunction with Windows, employs some concepts strikingly similar to the Macintosh desktop.

With the ruling out of the way, lawyers for Microsoft and HP lawyers will challenge Apple’s copyrights head on, claiming the Mac look-and-feel deserves no legal protection since its concepts were first developed elsewhere, mainly at Xerox Corporation.

New Excel Version to Address Full 8MB

Microsoft Corporation expects to ship in early May its latest Excel for the Mac, version 2.2. The new program will address 8MB of RAM, versus 1MB for the current version. It will also support 256 fonts per worksheet in six styles per font, and will offer variable row heights to suit different size fonts. Users can create warm links with Word 4.0 to create tables in Word from data in a spreadsheet.

At press time the company expected the product to retail for $395 to new buyers. Upgrades will cost $99 but will be free to those who purchased Excel 1.5 after April 1, 1989.

Anti-Viral Search and Destroy

Symantec Corporation has announced SAM (Symantec Antivirus for Macintosh) a utility that automatically detects and destroys viruses on hard disks and floppies. Slated to ship on May 1st, SAM is effective against the nVIR, Scores, INIT29, ANTI, and Hpat viruses, the company said. The program, which retails for $99.95, automatically scans floppy disks when you insert them. For more information, call Symantec at 415/964-6300.

(continues)
INDUSTRY NOTES

**Aldus Posts Record Profit**
Aldus Corporation announced 1988 revenues of $79 million, an increase of 100 percent over 1987 figures; net income increased by 87 percent. The company attributed the success to continued strong sales of PageMaker for the Mac and IBM PC and the release of Aldus Persuasion and Aldus FreeHand.

**Hughes to Buy Sytek**
Hughes Aircraft Company agreed to acquire Sytek, a LAN vendor that is among the companies supporting the Open Link Interface. Through OLI, a LAN can support TCP/IP, OSI, and AppleTalk through a network server.

**CASE Software Promotes Portability**
CodeCheck, a $5295 tool just announced for computer-aided software design in all major C languages, analyzes code for maintainability, style, and portability among MS-DOS, OS/2, UNIX, VMS, and Macintosh environments. From Abraxas Software, 503/244-5253.

**Power Up Buys FastForms**
Power Up Software Corporation of San Mateo, California, formerly known as Channelmark Corporation, recently acquired the product FastForms from the Shona Corporation, of Edmonton, Alberta. Expect increased distribution of FastForms in the United States and a major new release of the product by the end of this year.

**VDT Report**
NoRad Corporation, a company that makes radiation-blocking devices, has published a report about the legal ramifications of VDT health hazards. The company prepared the report for the Workers' Compensation and Employers' Liability Law Committee of the American Bar Association. For copies, contact NoRad Corp., 1549 11th St., Santa Monica, CA 90401; 213/395-0800.

**Letraset Buys Fred**
Letraset USA bought rights to market the Fred Font Machine font-design program from AB Vista Company. Letraset will rename Fred and integrate it into the company's line of graphic-design products for the Mac before Fred is released this summer.

**New ImageWriter LQs for Old**
Responding to criticism from customers, Apple Computer has introduced a quieter model of the ImageWriter LQ that also improves printing at the top and bottom of the page. The company offers free upgrades to people who purchased the 27-pin, $1399 dot matrix printer between August 11, 1987, and March 7, 1989. The improved ImageWriter LQ also includes ImageWriter LQ Printer Driver version 2.0 and a HyperCard help stack.

**RasterOps Ships Color Board for SE/30**
RasterOps Corporation has begun shipping the ColorBoard 108+/SE/30, a color video board for the Macintosh SE/30. The board generates up to 256 colors or shades of gray on 19-inch, 16-inch, or 13-inch monitors. Users can select from resolutions of 1024 by 768, 800 by 600, or 640 by 480, all at the standard 72 dots per inch.

The board offers panning and zooming in hardware, and supports an enlarged panning area, equal in size to a 19-inch monitor, for 13-inch and 16-inch displays. It operates in 1-, 2-, 4-, or 8-bit mode. The retail price of the ColorBoard 108+/SE/30 is $1895. For more information, call RasterOps at 408/446-4090.

**New EO Drive**
The GS6000 rewriteable,erasable optical (EO) drive from Macsetra Technologies International was demonstrated at Seybold Seminars in San Francisco. Designed for high-end corporate publishing, the GS6000 uses cache RAM and high-performance driver software to increase speed significantly (Macsetra says that the GS6000's seek, read, and write speed is comparable to that of a regular hard disk). The 600MB removable cartridges for the drive cost $249 each; the GS6000 itself lists at $4995. For more information, contact Macsetra Technologies at 306/955-0002.

**Dove Lowers RAM Prices**
Dove Computer reduced the price of its Mac SIMM memory upgrades in March due to a recent drop in cost of DRAM chips. At press time, Dove's suggested retail price for its 2MB upgrade, MacSnap 2S, is $729; the 4MB MacSnap 4S is $1459; the 8MB MacSnap 8S is $2919. Contact Dove Computer at 919/763-7918.

**Animation-Development Tool**
Responding to requests from users of HyperAnimator, Bright Star Technology has announced SuperAnimator, a color-animation-development tool based on Silicon Beach Software's SuperCard. Developers will be able to create talking-head characters using the 256 colors available in SuperCard; SuperAnimator also offers enhanced capabilities for synchronizing lip movements with digitized sound. SuperAnimator is scheduled for release in August; for more information, call Bright Star at 206/885-5446.

**Apple Slashes Prices in UK, Asia**
Citing the need to fit Macintosh llcx computers into price ranges for the existing Macs, Apple Europe and Apple Far East lowered prices. In the United Kingdom, reductions of up to 24 percent—concentrated on the entire Mac II family. A basic Mac II with 1MB of RAM and a 40MB hard disk now costs £3295 ($5655), compared with its previous price of £4095 ($7028); the top-of-the-line Mac Ilex 4/80 was lowered to £4720 ($8101) from £6195 ($10,633).

In Asia, price reductions of more than 20 percent were announced for the Mac SE and Ilex. An SE with two 800K drives now costs $2700; the price of a Mac SE with a 20MB hard disk is $3169. Similar configurations in the States are listed at $3169 and $3769, respectively. In the United States no price-reduction announcements were made after the Mac IIcx's introduction.

**Canon Adopts PostScript**
Canon, the Japanese maker of engines for many popular laser printers including Apple's LaserWriter, has licensed Adobe Systems' PostScript interpreter for use with its printers. Canon has not yet announced products that will include PostScript. Canon had been developing products based on PostScript interpreters from other sources, specifically Phoenix Technologies' Phoenix Page software, which works with the Bitstream type library but not Adobe's PostScript fonts.
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.
Compare and see how easy choosing a hard drive can be.

"Sure winner, the lightweight, silent and inexpensive Cirrus drives from La Cie come with first-rate utility software ... the cream of the crop."

MacWorld, May 1989

With so many hard drives available today, selecting the best one could be difficult. Luckily, Cirrus Drives from LaCie offer such an outstanding combination of speed, reliability and software power that your choice is quite simple.

But don't take our word for it — compare for yourself.

**Compare the Value**

<table>
<thead>
<tr>
<th>CAPACITY</th>
<th>SPEED</th>
<th>PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>32mb</td>
<td>40ms</td>
<td>$599</td>
</tr>
<tr>
<td>42mb</td>
<td>25ms</td>
<td>$699</td>
</tr>
<tr>
<td>70mb</td>
<td>25ms</td>
<td>$899</td>
</tr>
<tr>
<td>84mb</td>
<td>15ms</td>
<td>$1099</td>
</tr>
<tr>
<td>110mb</td>
<td>15ms</td>
<td>$1199</td>
</tr>
<tr>
<td>142mb</td>
<td>15ms</td>
<td>$1399</td>
</tr>
<tr>
<td>170mb</td>
<td>15ms</td>
<td>$1799</td>
</tr>
<tr>
<td><strong>NEW</strong> 610mb</td>
<td>15ms</td>
<td>$3199</td>
</tr>
<tr>
<td>45R Removable Disk</td>
<td>15ms</td>
<td>$1199</td>
</tr>
</tbody>
</table>

**Compare the Specs**

We use superior 3-1/2" SCSI drive technology with access times as low as 12ms. Drives include 2 SCSI ports, easy SCSI address selection, terminators and quiet, efficient half-speed fan. Drives measure just about $3 \times 6 \times 9$ and weigh in at 4-1/2 lbs. Drives are available in our award winning external case shown here or in easily installed internal models for Mac SE and II.

**Compare the Extras**

We include a rugged Cordura™ carrying case, our Silverylining high performance hard disk utilities and Silverserver software for local and remote hard disk sharing.

**We'll also throw in Silverplatter so you can share most serial devices on your LocalTalk network. In all a $185 value — free.**

So compare. You'll find there's really no comparison at all — just lots of great reasons to order your Cirrus drive today.

If you're still undecided, we'll even give you a money back guarantee so you can test drive a Cirrus for yourself.

Now what have you got to lose? Phone us today. Even the call is free:

**1-800-999-0143**

LaCie, Ltd. • 16285 SW 85th • No. 306
Tigard, OR 97224  •  (503) 684-0143

Prices shown are cash prices and do not include shipping. Add 3% for VISA or Mastercard, 5% for American Express. Add 7% for rush handling. Cirrus, LaCie, Silverlining, Silverserver and Silverplatter are trademarks of LaCie Ltd. Macintosh and LocalTalk are trademarks of Apple Computer. Prices and specifications shown are subject to change without notice.

Circle 145 on reader service card
The Macintosh Way

Or, How Guy Kawasaki came to write a book of vast import

by Jerry Borrell

Last March Business Week magazine published an article entitled "Is the Computer Business Maturing?" Its premise: that the computer market's growth rates are slowing. But midway through the article I found the buried lead of the piece—"Software is the major stumbling block."

At about the same time, I began reading the manuscript of Guy Kawasaki's forthcoming book, *The Macintosh Way* (Scott, Foresman & Company). The president of Acxiom (and former Apple evangelist) has produced an irreverent, acerbic, and all-too-rarely attempted look in the mirror for the software industry. Jean-Louis Gassée says in the foreword, "The Gentle Art of Verbal Self-Defense this book is not. The Macintosh Way is the take-no-prisoners guide to guerrilla marketing warfare."

I smiled a lot as I read, and occasionally laughed aloud, and then realized that Kawasaki's comments on the Macintosh software industry reflect the issues raised in the Business Week article and in a recently published book called *Fumbling the Future: How Xerox Invented, Then Ignored, the First Personal Computer*, by Douglas K. Smith and Robert C. Alexander (William Morrow and Company, 1988).

The book, which might as easily be entitled "How Xerox Lost the Photocopier Market," is a litany of the woes suffered by Xerox, one of America's fastest-growing companies in the 1960s, and an account of its lost bid for technical leadership. I found two passages particularly telling. The first deals with Xerox's failure to build a midline copier to compete with IBM and Kodak. "Originally conceived in 1972," write Smith and Alexander, "the project stalled repeatedly while marketing and finance people debated its features and economics." The all-but-completed project was killed, finally, in 1977, when it was too late to compete. The second passage may be too familiar to some companies. "It took one hundred eighty signatures on a product specification. Because the corporate staff had to sign off on everything, no single individual made a decision. Everyone was safe."

Kawasaki tells insider stories that are hauntingly similar to some themes in the Xerox book. But the message I received from The Macintosh Way is more hopeful. The book could be seen as an attempt to prevent a reenactment of Xerox's lost opportunities. Kawasaki raises issues through the saga of small Macintosh software companies that ask these days whether there is a place for them in the new scheme of things. Can they compete given the high cost of development, marketing, and support? Can they interpret all of the emanations from Cupertino? And even if they are successful, they wonder how they can afford to develop their next product. This raises for users the question I so often ask here—When I invest my money in a Macintosh, have I made the right decision?

The concerns of small software developers about larger software companies are also expressed in Kawasaki's book. Big companies design software by committee. They do not innovate, they make decisions based on spreadsheet analysis, they acquire technology rather than develop new products, they move slowly, they have long-term corporate goals in sight (or, alternatively, they have quarterly financial goals in sight), and they absorb Apple resources that might be dedicated (continues)
more usefully to small, innovative developers. Here is Kawasaki again, on the all-important process by which Apple decides whom to seed with prototype equipment. According to Kawasaki, the first developers to get the prototypes are "the companies that don't matter. Unfortunately, some prototypes go to the big-name MS-DOS companies because Apple thinks that they give Macintosh credibility. These units are wasted. Pearls before swine. All booster, no payload. Fortunately, these companies can be counted on one hand."

One must recognize that Microsoft, Claris, and Aldus dominate the Macintosh software industry, but there are other perspectives. Each of the industry leaders has such a large installed product base that they tend to shape and define the Mac industry. There are some products from the big three that we all love to hate, but they're so important that even Apple has on occasion deferred to their decisions.

"The only company that came close to successfully threatening Apple is Microsoft," writes Kawasaki. "In 1986 Bill Gates told Apple that he would consider stopping Macintosh development if Apple pursued a copyright infringement suit against Microsoft." Apple backed down because of the importance of Word and Excel to Macintosh. Temporarily, anyway. There is no doubt that Bill Gates can produce testosterone, and that's another reason that Microsoft is such a great company.

As many have come to recognize in the aftermath of Claris's founding, and Apple's subsequent lawsuit against both Microsoft and Hewlett-Packard, Apple probably came away from the face-off Kawasaki mentions determined to remedy the situation—that is, having to face the reality that Microsoft could wield so much influence. In March, a federal judge found that Apple's suit against Microsoft for copyright infringement had merit and could proceed. In light of that ruling, Apple's planners are beginning to look prescient.

Kawasaki's book is timely for two reasons. First, it is interesting to see someone write a book on the Mac environment from the inside. Second, industry analysts and the media are cranking up toward some dire predictions for the computer software industry at large, and the Macintosh could be in for a share of this.

Business Week's cover article on the computer business—rife with quotations from sagacious analysts, pundits, and gurus—is actually a well-written and well-researched piece. But the predictions included are all a little too pat, too predictable. I could have taken much of the same analysis and written a piece with an entirely different slant, entitled "Where Are the New Ideas?"

And that, I think, and not the fact, as the article points out, that "the business that made folk heroes of baby boomers named Steve Jobs, Mitch Kapor, and Bill Gates is approaching middle age," is at the heart of the issues faced by the software industry. OK, so those baby boomers are all more attuned now to the rules of politics, big business, and large bottom lines. My article would focus on who is going to make the next strategic product, like page composition software. Still, I don't write for an audience looking for tips on keeping their stock investments in the right place.

Kawasaki addresses the crux of the matter in his chapter on Jean-Louis Gassée when he advises software developers on how to interact with the president of Apple's Products Division. Gassée "uses metaphors—especially sexual and military ones. . . . Describe your product as a 'beautiful woman going to war' and he'll give you anything you want." Kawasaki is saying that people who really make a difference in shaping the future of personal computing understand products that are important. He is pointing out that important software is easily recognized, if not understood, by each of us.

Remember the feeling you had when you first started up PageMaker? You really had the power to fundamentally change your life, or at least the way you work. Word processors did that for many of us a decade ago, but there were a lot of products and machines involved. There was not such a sharp distinction between Then and Now with word processing as there was with desktop publishing.

The Macintosh Way has, in an indirect way, a great deal to do with preserving the spirit of the Macintosh environment. It is this that permeates the book, not, as I suspected, self-promotion (which does not). Kawasaki is not even above taking a shot at himself. While giving advice on public relations he notes, "An agency can provide valuable services like providing a sanity check on your marketing and controlling your ego (a full-time job for our agency)."

Kawasaki's book comes at a critical time for Apple. As we look out at the next two years and see a solid progression of products—a transportable model, enhanced versions of 68030-based Macintoshes, Ethernet speeds over LocalTalk—product plans are being finished and decisions made that will shape the company over the next ten years.

Apple is poised to introduce several products—32-bit QuickDraw, outline fonts, HyperTalk in system software, and more—that will raise a host of issues for users and third-party developers alike. Even more important questions are being asked about Apple's future. One example: Is QuickDraw the imaging model that will carry Apple into the 1990s?

But it is not a company's ability to raise the issues or recognize its shortcomings that count. Fumbling the Future makes it amply clear that Xerox was aware of the problems it faced. Rather, it is the spirit of people such as Kawasaki that imbues a company with the strength to deal with its future.

"The Macintosh Way" indirectly has a great deal to do with preserving the spirit of the Mac environment.
EVERYONE PROMISES TO TAKE FULL ADVANTAGE OF THE NEW MACINTOSH...
WE GIVE IT TO YOU

MUSICAL

MUSICAL

WE GIVE IT TO YOU

MUSICAL

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO You

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU

MUSICAL

WE GIVE IT TO YOU
The world of Macintosh word processing just got a lot more sophisticated. And a lot simpler.

Presenting FullWrite Professional™. It's the first word processor that fully utilizes the power of the new generation of Macintosh. Yet it's as intuitive as the Macintosh™ itself.

**IN WRITING: FullWrite.**

FullWrite gives you the power to create persuasive, hard-hitting communications in a lot less time. With a lot less effort.

How? With advanced page layout features that let you format a single page memo or a 400-page manual in seconds. And as you make changes, FullWrite updates the entire document immediately, re-wrapping text around illustrations and remembering things like page references and footnote numbering.

Best of all, you see your output on screen as you work. From indexes to hairline rules, from redline markups to kerning and leading control.

Layout, graphics, and outlining are all there when you need them.

But like the newest generation Macintosh, FullWrite is more than just the sum of its parts. It's a whole new way to communicate your ideas.

**Free FullWrite Sampler.**

Seeing is believing. Give us a call at 800-437-4329, ext. 2100; We'll send you a full-capability product sampler, absolutely free.

There. You've got it in writing.
WITH THE NUMBERS TO

Economic Review

THE MEDINA GROUP

Summary of Results

As you can see by the accompanying chart, the introduction of our patented Hydraulic Valve System (designed for middle- and large-sized tractors).

Close-Up on Government Spending

Entitlements have become increasingly burdensome as a percentage of total government outlays. As a result, funds for social services have been reduced.

Finance

<table>
<thead>
<tr>
<th>Year</th>
<th>Annual Deficit</th>
<th>Addenda</th>
<th>GNP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1985</td>
<td>-2.8%</td>
<td></td>
<td>990.2</td>
</tr>
<tr>
<td>1986</td>
<td>-7.3%</td>
<td></td>
<td>1052.1</td>
</tr>
<tr>
<td>1987</td>
<td>-7.7%</td>
<td></td>
<td>1151.2</td>
</tr>
<tr>
<td>1988</td>
<td>-14.3%</td>
<td></td>
<td>1255.5</td>
</tr>
<tr>
<td>1989</td>
<td>-6.2%</td>
<td></td>
<td>1417.0</td>
</tr>
<tr>
<td>1990</td>
<td>-53.2%</td>
<td></td>
<td>1523.5</td>
</tr>
<tr>
<td>1991</td>
<td>-73.3%</td>
<td></td>
<td>1699.6</td>
</tr>
<tr>
<td>1992</td>
<td>-53.6%</td>
<td></td>
<td>1935.8</td>
</tr>
<tr>
<td>1993</td>
<td>-2.7%</td>
<td></td>
<td>2173.4</td>
</tr>
</tbody>
</table>

1989 Outlays: $1,023 Billion

- Defense: 3.9%
- Entitlements: 15.6%
- Services: 32.6%
- Net Interest: 47.9%

1985 Outlays: $946 Billion

- Defense: 18.7%
- Entitlements: 13.7%
- Services: 28.2%
Spreadsheet software has taken a great leap forward.

Presenting Full Impact. It's the first spreadsheet to truly harness the power of the new generation of Macintosh computers. To convert the complexity of numbers into the power of communication.

BACK IT UP: FULL IMPACT.

Beginning, of course, with your numbers. Because now you can take them places they've never been before—quickly and intuitively. For example, create a chart—or several charts. Place them exactly where you'd like. Make your point clear with a paragraph of text. Then make it clearer by using different fonts. Or sizes. Or styles. Or all three. Sign your work with the company logo. And print it all on a single impressive page.

It's that powerful. And as easy as clicking on an icon.

Free Full Impact Sampler.

There's a lot more we could say. Like how we succeeded in inventing an intuitive way to create macros. Or how virtual memory lets you create the largest Macintosh spreadsheets ever. But we'd rather let Full Impact make its own first impression.

So give us a call at 800-437-4329, ext. 3600* and we'll send you a full-capability product sampler, absolutely free.

We think you'll be impressed with our numbers.
PROMOTE YOURSELF IN SECONDS.

Clean, professional-looking overheads give your ideas impact, and promote you in the process. With MORE II you get both, in seconds.

That's because MORE II does the sizing, centering and spacing for you. Just click the mouse on your text, print the overhead, and go.

And if you have more time, get creative with color, graphics, the works. You'll arrive totally prepared for your next meeting. With instant overheads, handsome handouts, even full color slides. All easily created from the same MORE II outline.

MORE II is the fastest, easiest way to go from idea to presentation. So get MORE II and promote yourself. In seconds.

SPECIAL TRIAL OFFER, (800) 228-4122 Ext. 748G

SYMANTEC
Symantec Corporation, 10201 Torre Avenue, Cupertino, CA 95014. 408/253-9600.

SIR" and MORE II are trademarks of Symantec Corporation. © 1989 Symantec Corporation

(Easily Create this Overhead, in Seconds.)
A Forum for Macworld Readers

FreeHand Fights Back
Your February cover story ["The Big Match: Illustrator 88 vs. FreeHand"] was a case of incredibly bad timing; if you had only waited another month or so, a comparison of Illustrator 88 to FreeHand 2.0 would have been a far more intelligent matchup.

I have had 2.0 in my studio for almost a month now. Every feature that 1.0 lacked in your comparison now exists in the new version, along with an extra few juicy goodies that are mentioned at the end of the article. Compared head to head, FreeHand 2.0 would win hands down. This article will serve to keep Adobe executives happy when it's the gang at Aldus who should be wearing the championship belt.

Peter P. Beach
Newburyport, Massachusetts

An Unfair Match
Finally someone had the guts to publicly say which program is better: FreeHand or Illustrator 88. For a long time I was a diehard FreeHand advocate. After overcoming that initial barrier, I began working with Illustrator 88, but I found the lack of easy integration between the two very disappointing. Unfortunately, your article came out right before the release of FreeHand 2.0. You should have waited until this release so that each program would have been on the same level. I think you might have counted out FreeHand before it even stepped into the ring.

Chris Hyatt
Pittsburgh, Pennsylvania

It's unfortunate that we weren't able to match up Illustrator 88 with the new version of FreeHand, but our editorial schedule did not permit us to wait for its release. However, we were able to preview FreeHand's new features in the sidebar to the article. Check the Reviews section in this issue for a review of FreeHand 2.0.—Ed.

The Economics of Apple's Price Hike
David Bunnell hits the nail on the head when he takes Apple's management to task for the recent price hike ["The Great Price Hike," February 1989], but he mistakenly places some of the blame on investment bankers and the market system. As a professor of finance who frequently consults with investment banks, I think Bunnell should place all the blame where it belongs—on John Sculley and his colleagues. Competition in the marketplace, more than "Apple culture," provides users with the hope that disasters such as the price hike will not be repeated.

If Apple destroys its relationship with its customers, expected future profits are sure to fall, bringing Apple's stock (continues)

Corrections

MacMainFrame (Reviews, February 1989) is Mac-to-mainframe hardware made by Avatar Corporation, 65 South St., Hopkinton, MA 01748, 800/289-2526, ext. 27.

The correct phone number for DataPak Software (New Products, April 1989), maker of Printer Interface III, is 800/327-6703.

Storage Dimensions (408/879-0300) manufactures WORM drives as well as hard drives ranging in capacity from 45MB to 630MB (Commentary, April 1989).

DPI offers a $269 upgrade for the SE, not the Mac Plus (Commentary, April 1989).
price down with them. When Bunnell says that supply and demand works for ordinary companies, but not for Apple, he's wrong.

What is demanded and supplied is not hardware but a relationship to provide computing services. If Apple is unwilling to develop lasting relationships with its customers by offering a continuing stream of improved products at competitive prices, then IBM, DEC, Sun, or Hewlett-Packard will. The market will see to that.

Bradford Cornell
Los Angeles, California

Betrayed by Apple

I completely agree with David Bunnell that Apple is pricing the little guy out of the market. After a long struggle, I convinced my company to buy Macintoshes. Thinking I could take some of my work home, I priced an SE for myself and discovered I cannot afford one, let alone a decent printer. I feel Apple has betrayed both the individual user and small companies who have grown accustomed to the Mac's user friendliness. You can bet that when our company expands its computer network and I look for a terminal for my home, we won't be looking toward Cupertino.

Jeff Widmer
Delaware Water Gap,
Pennsylvania

It Can't Be That Fast

Somebody's just a tad fuzzy minded. In Bruce Webster's article on the Next computer ["What's Next?" January 1989], he says that the refresh rate is 68kHz. That's just not conceivable, technically. Perhaps a minor attack of innumeracy?

Nicholas Bodley
Wellesley Hills, Massachusetts

It should have been 68Hz, not 68kHz.—Ed.

A Different Vision of Color Separation

I work with Scitex America's Mac-based design system, Visionary, and I've been listening to the concerns of designers for the last eight months. Most designers have little or no desire to learn the finer points of prepress production. They don't think in CMYK; they think in Pantone. I can see hosts of commercial printers tearing their hair out as they start getting separations from people who have read Steve Roth's article, "Color Separation Explained" [February 1989], and now know all they need to know about prepress. What designers want is a way to create fast, multiple iterations of color pages that they can output to high resolution films. They want more control over the finished product, but they don't want to take responsibility for the final output. So why not let them do what they do best, and leave the mechanics of the printing process to the printers and the prepress people. They can work hand in hand with designers—if only the designers will let them.

And the Mac is the perfect tool to allow this cooperation, if it is recognized for what it is. I love my Mac. But it isn't an Imager, and it never will be.

Laura Wamelink
Scitex America
Bedford, Massachusetts

INTRODUCING SYMANTEC ANTI-VIRUS FOR MACINTOSH (SAM).

A virus. It sneaks in on a floppy, by modem or over your network. At first, you see nothing. Or maybe a few glitches. Then it spreads, replicating in every file, in every folder. Destroying irreplaceable data. Permanently. Left unchecked, it could ruin all of your hard disk data. And shut down an entire network.

Protect yourself with SAM. SAM is the only virus protection that scans every floppy you insert, and every file you get electronically. It's the only way to eliminate viruses before they enter your system. Before they can do any harm.

SAM destroys the nVir, Scores, Hpat, INIT 29, and ANTI viruses. And with an advanced scanning algorithm that detects software variations, it keeps new, unnamed viruses from sneaking in. SAM checks
At Macworld we frequently separate Mac graphics on a Linotronic. Our designers love the short turnaround time; our production department takes the “responsibility”—just like they used to. And color correspondence is good. The point is, Mac separations are the only way most people can separate Macintosh graphics. Most of your comments apply to the separation of color photographs, which—as the article points out—is a new and perilous technology—Ed.

**Dot versus Line Resolution**
In Bruce Webster’s review of the Apple Scanner (Reviews, February 1989), he says, “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.” Macworld has performed a valuable service in imparting the sometimes painful lesson that printer dot resolution is not the same as halftone line resolution. You can’t get 300-dpi line resolution on a LaserWriter (53 is the default), nor even on a Linotronic. Webster may know the difference, but his comments are misleading at best, as they seem to imply a line resolution of 300 for halftones.

Cleve Callison
Winston-Salem, North Carolina

**Conflict of Interest?**
You are to be commended for informing your readers that David Pogue became a paid consultant for Codamusic Software after writing his review of Finale, which appeared in your February 1989 issue. But to me this still represents a clear conflict of interest.

Denis Winter
Conway, Arkansas

I, too, was pleased that the editors pointed my disclosure statement. Rest assured that the review was based solely on the program’s strengths and weaknesses and had nothing to do with any anticipation of employment. In any event, my future reviews for Macworld will not include music software.—David Pogue.

**An Oval Peg in a Round Hole**
Your article “Beyond Word Processing” in the February 1989 issue classifies our products Sonar and Sonar Professional as tools used to search a small number of documents on an occasional basis. This was, in effect, trying to squeeze an oval peg into a round hole. Both Sonar and Sonar Professional are aimed at the person doing frequent searches involving vast amounts of fairly static information, not small amounts of volatile information.

There are also two features of our product Roundup not mentioned in the article. Version 3 can search virtually any file type, even if it’s not directly supported, and it can move a found file to and from the desktop for easy access.

Philip Van Cleave
Virginia Systems
Midlothian, Virginia

**Shareware Has Its Price**
In your February 1989 issue (“Beyond Word Processing”) a table lists software, publisher, and price. The shareware program FIF4 has no price listed, furthering the false impression that shareware is free. If it’s free, it’s public domain; if it’s shareware, then pay fair. So what’s the price?

Tony Vazquez
Brooklyn, New York
(continues)
FastTrack Schedule™ 1.02

The Gantt chart scheduling program that replaces DRAW programs and CPM programs for creating Gantt charts quickly and easily. FastTrack Schedule™ allows you to draw charts like these right on screen. Your scale may be viewed in hours, days, weeks, months, quarters, years, or generic units; you may compress your colorful multi-level schedules as summaries; create your own palette of start points, end points, bars, and milestones; paste wrap-around text and graphics anywhere. You're in charge! Call your local dealer or call us directly at (800) 346-9413 or (301) 428-3694. Lists for $195.

AEC Management Systems, Inc. • (301) 428-3694

FID contains no documentation or dialog box that asks for payment. We should have listed it as freeware.—Ed.

Not a Grammar Checker

In your article about word processing tools for the Mac ("Beyond Word Processing"), you reviewed our product, MacProof, as a grammar checker. We have never advertised it as a grammar checker; only as a style, mechanics, and usage checker. Grammar checking is a sophisticated process encompassing parsing techniques and grammar that requires more RAM and disk storage than the basic Mac provides. We are currently working on solving the memory and parsing problems so that such capabilities might be implemented in later versions.

Susan Otberg
Lexpertise
Salt Lake City, Utah

Give Me MacMoney

Alan Slay does readers a disservice when he pays scant attention to MacMoney 3.0 ("Mac-sumizing Your Money," February 1989), and then only to point out a weakness that doesn't exist.

He's wrong when he says the program has no shortcut like the one in Dollars and Sense for entering category names. Typing the first character or characters of any category and pressing #F inserts the first of your preestablished categories beginning with those characters. No need to type the whole name. Repeating the command inserts the next item that matches. You can also use this enhanced search process in the Names box of any transaction. Other companies would be smart to use MacMoney as an ease-of-

use standard in developing their programs.

Frances Cierman
Santa Cruz, California

Mac-sumizing and Minimizing

As a licensed user of both MacMoney and Managing Your Money, I've found that MacMoney minimizes the data entry required for routine transactions but is very poor when it comes to ease of reporting and getting useful information about one's finances. Though Managing Your Money requires a little more data entry, it's infinitely more flexible for reporting, budget building, and maintaining transactions. These are precisely the types of strengths and weaknesses your articles should point out.

Charles D. Eckerson
Raleigh, North Carolina

MacDraw II Update

Recently Claris shipped a free updated version of MacDraw II (1.0v4) whose purpose was to provide better ImageWriter II printing of MacDraw II graphics and to provide better WYSIWYG between the Mac screen and the actual printed image. In the process of updating, the printing of rotated text by the Apple IISC Laser Printer was affected. Once text is tilted from the horizontal plane, it is bitmapped by the IISC printer and printed accordingly. Claris suggested using the earlier version of MacDraw II (1.0v1) for all rotated text activities. I was told that Claris intends to keep the printer alterations in future versions of MacDraw II because of the tremendous demand by ImageWriter II users for better ImageWriter II printing of (continues)
Two thumbs up!
ORACLE for Macintosh.
For only $199 until May 31.*

Finally, there's one thing these two guys can agree on: ORACLE® for Macintosh. That's because ORACLE for Macintosh now turns both HyperCard and 4th DIMENSION into full-function SQL databases. It also gives them transparent connectivity to over 80 different systems, including PCs, DEC VAXs and IBM mainframes—even IBM DB2 and SQL/DS databases.

No-Risk 30-Day Money-Back Guarantee
Whatever application you're currently using—HyperCard or 4th DIMENSION—ORACLE for Macintosh gives you industry-standard SQL. $199* delivers the first and only SQL database available for the Mac. An additional $199 lets you access ORACLE from 4th DIMENSION. Or for a limited time, $999** delivers all this, plus transparent access to remote ORACLE and IBM databases on your host systems. So call today. Our 30-day money-back guarantee is your assurance we'll deliver a four-star performance.

Dear Oracle Macintosh Direct Sales
20 Davis Dr. • Belmont, CA 94002 • 1-800-ORACLE1, ext. 7835

I have (check one) □ HyperCard 1.2 □ 4th DIMENSION Version 1.0.6 Enclosed is my □ check, or □ VISA □ MasterCard □ AmEx credit card authorization for:

$199 ORACLE for Macintosh Developer's Version (includes HyperCard Interface; $299 after May 31, 1989) □
$199 ORACLE for 4th DIMENSION Available June 1989 (Requires ORACLE for Macintosh and 4th DIMENSION) □
$999 ORACLE for Macintosh Networking Version (includes an unrestricted license of ORACLE for Macintosh, SQL-Net networking software and protocols for Macintosh and, for a limited time, ORACLE for 4th DIMENSION) □

Please add appropriate sales tax □ Shipping and handling □ Total (Offer valid only in USA) □

NAME ________________________________
COMPANY ________________________________
ADDRESS ________________________________
CITY _______ STATE _______ ZIP _______
PHONE ________________________________
CREDIT CARDS  □ VISA □ MASTERCARD □ AMERICAN EXPRESS □
SIGNATURE ________________________________
CARD EXPIRATION DATE ________________________________
SIGNATURE ________________________________
TODAY’S DATE ________________________________
MAC WORLD
Inspiration.
Monthly.
Now just $24 a year.

Almost 50% off the annual cover price!

Macworld gives you the know-how to try new applications. The courage to take on power upgrades. The insight to make informed buying decisions. Macworld gives you more, so you can get more from your Macintosh.

- News
- Previews
- Applications
- Short-cuts

Create your own Masterpiece.

Enter Macworld's Macintosh Masters art contest.

Our first grand-prize winner, April Grierman, took home a Macintosh II donated by Apple Computer, Inc. (see reverse for contest details)

3 ways to subscribe!

-Mail in the postage-paid card today.
-Telephone: 1-800-288-6848 ext. 4689
-Dial in: 1-800-950-9753

Subscribe on line with Electronic Mail.
At the login prompt, enter code: 4619
Modem settings: 1200 BAUD, 8-N-1

Be a Mac master.

-YES! Send me 12 issues of MACWORLD for $24. Save me almost 50% off the annual cover price of $47.40
-YES! YES! Send me 24 months of MACWORLD for $37.90

12 issues for $47.40
Now only $24.00

Name ____________________________________________
Company __________________________________________
Address ___________________________________________
City State Zip _______________________________________

Payment enclosed. Bill me later.

Basic subscription rate for Macworld is $30 for 12 issues. The annual cover price is $47.40 (12 issues). This rate limited to U.S.A. and its possessions. Please allow 6-8 weeks for delivery of your first issue.

MACWORLD
Macintosh Masters Art Contest

In 1988 Macworld launched the first-ever Macintosh Masters art contest. The response was enthusiastic—we received hundreds of creative submissions from Mac artists around the world. So we decided to hold the competition annually. This year's winners will be featured in the August 1989 issue of Macworld.

Enter your Masterpiece.

You have until March, 1990 to create your own Mac Masterpiece. The winners will choose from a top-notch assortment of hardware and software donated by contest sponsors. For more information on the Macintosh Masters Contest, write to: Macintosh Masters, MACWORLD, 501 Second Street, San Francisco, CA 94107.
CANVAS™ 2.0 BEATS MACDRAW™ II

MACDRAW II
LIST PRICE $395.00

Key Features:
• All the standard drawing tools
• Unlimited layers
• Ultra-fine hairlines
• Editable arrowheads
• Smooth polygons
• Object libraries
• ± 32x magnification/reduction
• Text rotation
• High precision
• 8 available colors
• Auto-dimensioning of lines

CANVAS 2.0
LIST PRICE $299.95

Key Features:
• All the standard drawing tools
• Unlimited layers
• Ultra-fine hairlines
• Editable arrowheads
• Smooth polygons
• Object libraries
• ± 32x magnification/reduction
• Text rotation
• Much higher precision
• 16.7 million available colors
• Auto-dimensioning of lines & arcs
• Join & split smooth curves
• PostScript® gray scales in 1° increments
• Continuous Bezier Curves
• Area & perimeter calculations
• Powerful Auto-Duplication options
• Central Object Control dialog
• Skew, perspective & distort effects
• Tear-away rulers
• Magnetic guide lines
• Complete set of bitmap editing tools
• Import & export of TIFF files
• Auto-tracing of imported bitmap images
• 72-2540 DPI, bitmap resolution
• PixelPaint™ compatible color palettes
• Editable, micro-adjustable airbrushes
• Full-feature DA version included.

CANVAS 2.0
DRAW YOUR OWN CONCLUSION.
BEFORE YOU JUMP TO ONE.

If you want to see the Canvas difference for yourself, send us $9.95 to receive a fully-featured Demonstration Copy.  

Circle 346 on reader service card
MacDraw II graphics.
Donald Fucci
Athens, Ohio

According to Steve Pollock, MacDraw product manager, the LaserWriter RSC printer driver provides different internal options, including a highest-quality option (which does not allow the user to set certain Page Setup options) and a default quality option. Due to many user requests to select these options, MacDraw II 1.0+4 uses the default quality option. Claris is considering making this user-selectable in the future.—Ed.

Getting the Fax Straight
I would like to clear up a few inconsistencies in Dave Kosiur's article on fax transmission ["Mac Fax: Not Ready for Prime Time," March 1989] and his BackFax review [Reviews, same issue]. The table on page 141 lists several programs as having background operation, but some offer this only under MultiFinder—virtually useless on a 1MB Mac. Of the fax programs available today, ours and Abaton's are the only ones able to perform background operation under the Finder.

You go on to say that BackFax cannot automatically assign cover pages (it does) but that it does have polling capabilities (it doesn't yet).

Finally, you state that BackFax is "difficult to recommend...if you're shopping for a fax system for the first time." What do you mean by "first time"? Who has the money for a second time?

Thomas K. Zeller
Solutions International
Williston, Vermont

We meant to say that BackFax does not allow you to assign different cover pages to the same fax addressed to various individuals.

BackFax is the program Apple should have released with its AppleFax Modem. Those still shopping for a fax modem should be aware that other hardware/software packages offer the proper functionality. However, if you've already purchased an AppleFax Modem, you'll need to buy BackFax to get the most out of it.—Ed.

APDA Updates
We appreciate Macworld's coverage of changes in APDA and other development-oriented topics (Macworld News, April 1989) but would like to clear up a few inaccuracies.

C++ is not yet available from APDA, not even in beta form. When it is, it will be posted in AppleLink and the APDAlog. MacApp 2.0 is currently available in beta only. SADE 1.0 is shipping as part of the MPW bundles and is also sold separately for $75. It is not part of the base MPW Development Environment product (though Projector is). APDA's GEnie address is A.DEVELOPER3.

Wendy Tajima
Apple Computer
Cupertino, California

We printed the information Apple provided us at the time; some of it has changed since then and may have changed again by the time you read this. Readers should check with APDA for updates on the availability of these products.—Ed.

Letters should be mailed to Letters, Macworld, 501 Second St., San Francisco, CA 94107, or sent electronically to CompuServe (70370,702) or MO Mail (addressed to Macworld). Include a return address. Due to the high volume of mail received, we regret that we're unable to respond personally to each letter. We reserve the right to edit all letters. All published letters become the property of Macworld.

---

Let us know what you think of AGFA MATRIX DIVISION. Our creative team is waiting to hear from you! Call 1-800-852-8533 or circle 460 on the reader service card.
Software Ventures presents the all new 1990 model:

MicroPhone II version 3.0
A "Stunning" Achievement in Software Engineering

The software that takes the hassle out of telecommunications. Like a finely crafted European touring sedan, MicroPhone II offers you unsurpassed power and allows you to communicate with style and agility.

Here are seven reasons why, if you're serious about telecommunications, you should consider owning MicroPhone II:

**Power train.** MicroPhone II is charged by the most powerful scripting engine for telecommunications, offering variables, string and math functions, arrays and file manipulation. You develop scripts with either the program's learn mode or its point-and-click script editor.

**Design.** Surprisingly, with all its unparalleled power, MicroPhone II is simple to use. Menus, dialog boxes and on-screen controls are well organized and pleasant to look at. Its "outstanding" manual is easy to read, clearly laid out and contains a thorough index.

**Speed.** Routinely clocked at 18,000 bits per second over ordinary telephone lines, MicroPhone II is the fastest telecom software around. Its file transfer protocols — XMODEM, 1K XMODEM, YMODEM, YMODEM-G, Kermit and ZMODEM — are all optimized to make your files fly across the country or around the world. The intelligent ZMODEM negotiates the most treacherous channels of a packet-switched network and resumes broken transfers with no loss of data.

**Color options.** MicroPhone II lets you assign color icons to your scripts, thus turning the icon bar, shown here, into your control panel. The icon bar can be scrolled, resized and placed vertically or horizontally anywhere on the screen, awaiting your next click. Choose icons from the large collection provided with the software, or create your own.

**Cruise control.** Flexible scripting means that MicroPhone II can run on automatic while you're taking care of other important business. Whether collecting your electronic mail in the background, or calling Paris at midnight to transmit the daily sales report in French, the program is always at your service, saving you time and money.

**Reliability.** Because Software Ventures' engineers value your time on-line, they spend countless hours applying the most rigorous testing procedures to ensure that the program is crash-resistant. In the words of *The Macintosh Buyer's Guide*, MicroPhone II is "the most reliable of all the telecom programs we tested."

**Test drive.** Software Ventures so firmly believes in its superior technology that it gives you an unprecedented chance to test drive MicroPhone II for 30 days risk free. If for any reason you wish to return the program, you may do so for a full refund of your purchase price directly from Software Ventures — no questions asked.

But enough talk. Start using MicroPhone II today and find out for yourself why Jim Seymour and John Dvorak are the great communicators. After all, having invested all this money in the best hardware in the world, don't you deserve the best software?

Jim Seymour:
"... arguably the best communications software ever written."

John Dvorak:
"... stunning. Fast, slick; it does everything except slice bread."

MicroPhone is a trademark of Software Ventures Corporation. Copyright © 1989 Software Ventures Corporation.
2907 Claremont Avenue Berkeley California 94705 (415) 644-3232

Circle 48 on reader service card
The essential Macintosh word processor.

Like its phenomenally successful predecessor, MacWrite II is uncomplicated, graphic and easy to understand.
Now has all the essentials.

MacWrite II turns your writing into publishing. With up to ten columns, adjustable line spacing and the ability to crop and scale graphics.

MacWrite II gives you font control you must see to believe (2 to 500 points). Plus footnotes that number themselves.

Mail merge makes it simple to send one personal letter to a million close friends. And create custom stationery templates to use over and over.

The only thing more impressive than our new HyperCard-style Claris Help feature is how seldom you'll need to use it.

Keep more than one document open. Edit and preview your pages before you print them. And import color graphics.

Add frequently used styles to your menus and turn them on and off with keyboard commands.

An amazingly fast 100,000-word dictionary checks and corrects your spelling in a flash. MacWrite II includes a desk-accessory thesaurus, too.

A good leader must be a good communicator. So MacWrite II reads and writes directly to all these word processing formats.

Introducing MacWrite II.

registered trademarks of Apple Computer Inc. For the name of the Claris dealer nearest you, call 800-ICLARIS, ext. 400. By the way, the upgrade is a real deal for MacWrite owners. Call 800-544-8554. In Canada, call 800-668-8948.
Laser Quality Under $1000*!

The Hewlett-Packard® DeskJet with the Grappler® LS interface offers 300 DPI at 1/3 the price.

You purchased a Macintosh for its ability to produce quality output. Problem is, you can't afford a laser printer. A $2000 and up, your only real alternatives have been dot matrix printers or regular trips to the local copy store.

Why settle for dot matrix output when you really need laser quality? The Grappler LS easily connects the DeskJet to your Macintosh, providing:

- 300 DPI resolution
- 14 pound portability
- Small footprint, smaller than an ImageWriter™ II
- Ink/inkjets for less than $20
- Compatibility with H.P. LaserJet, DeskJet, and LaserJet compatibles
- Only the Grappler LS provides full 300 DPI graphics (laser quality), and allows you to print both portraits and landscapes. With the standard Apple printer driver provided in the Grappler, you get complete WYSIWYG text and graphics because your printer acts the way your Macintosh expects it to. The Grappler LS is fully compatible with hundreds of popular software titles including Excel®, MS Word®, MacDraw II®, Powerpoint®, Super Paint®, and PageMaker®. And because the Grappler LS comes complete with cable, Apple driver, Installer, fonts and a powerful spooler, there is no need for additional purchases.

GRAPPLER LS list price: $149

The Panasonic® 1124 with the Grappler® LQ means Mac 24 Pin Printing Under $500!**

**Average total selling price. Printer suggested retail $529.95

© Orange Micro, Inc., 1989

The Panasonic® 1124 with the Grappler® LQ means Mac 24 Pin Printing Under $500!**

Circle 265 on reader service card
by Deborah Branscum

In this column we take a peek at the tools and the talent behind Macworld's graphics and discuss the techniques that make them possible.

**Artist:** Scott Baldwin's whimsical creations offer playful commentary on the subjects they illustrate. The artist became a full-time illustrator in 1985 after concentrating on graphic design and art direction for five years.

**Tools:** Mac Plus, video camera, monitor, MacVision digitizing hardware and software, and SuperPaint.

**How It Was Done:** For our feature on animation, Baldwin spent one evening shaping clay creatures. He needed four hours to digitize the tableau six times as he moved the horse into different positions. He checked the composition using the monitor (which was connected to an inexpensive security camera via an RF connector), digitized the images using MacVision, and then saved the files in MacPaint format.

Baldwin opened the files in SuperPaint and spent an additional four hours perfecting each image. Then he fine-tuned the sky. "With the lasso, I just picked up a piece of the rock that looked like a cloud and stuck it up there; that's the neat thing about SuperPaint," Baldwin says.

He used SuperPaint to create a black-and-white copy of the illustration for each color and specified a CMYK (cyan, magenta, yellow, black) percentage for each file. Then *Macworld* sent the files to a local service bureau, where they were combined into one color image and transferred to a Scitex system that generated color separations for printing.

**About the cover:** The illustration, based on a Mitchell NC movie camera, was modeled by Thomas Williams of The Analytic Sciences Corporation (TASC) using Alias modeling software and TASC code that creates an interface between Alias and PhotoRealistic RenderMan software. The image was then rendered and shaded by Michael Malione of Pixar using RenderMan. The film images were based on *Tin Toy*, Pixar's Oscar-winning animated short.

---

**Take this simple test to qualify for a great deal on MacWrite II.**

*Do you own Microsoft Word?* ☐ ☐
*Do you own Microsoft Works?* ☐ ☐
*Do you own Microsoft Write?* ☐ ☐
*Do you own FullWrite Professional?* ☐ ☐
*Do you own WriteNow?* ☐ ☐
*Do you own Word Perfect?* ☐ ☐
*Do you own MindWrite?* ☐ ☐
*Do you own any version of MacWrite?* ☐ ☐

If you answered yes to any of the above questions, you qualify (not exactly rocket science, was it?). And you can get MacWrite II (a $249 value) for only $75, or $65 for registered MacWrite 5.0 owners. To find out more, follow these simple steps: look at the number below, pick up your phone and dial.

**Trade-in hotline**

**800-544-8554.**

© 1989 Claris Corporation, 440 Clyde Avenue, Mountain View, California 94043, 415-962-8946. All programs are trademarks or registered trademarks of the companies that own them. Claris is a trademark and MacWrite is a registered trademark of Claris Corporation.
FREE OFFER

The brand new edition of the popular POWER USER'S TOOL KIT - Version 2.0 is now available. Seventeen great programs on one handy disk compiled by Steven Bobker. It includes a complete virus detection and repair kit. It is FREE with any purchase. You may only $15 for postage and handling if you want the disk. The programs are shareware, so you can try the software free of charge. If you wish to continue, some authors ask that you send them a small fee ($5-$25). Many of the programs are absolutely free. All of the details are explained on the disk, which is yours to keep anyway.

FREE CATALOG

You’ll also receive our brand new 1989 catalog. Hundreds of new products, product reviews and updates. Plus answers to all your questions about compatibility, copy protection and features. Take a look at the MacWarehouse specials and call us with your order to receive your free catalog and THE POWER USER'S TOOL KIT.

NEW 800K Drive (Cutting Edge)
The Cutting Edge 800K disk drive's attractive design, quick performance, and high-reliability make it our most popular floppy drive. The drive uses a head design to reduce the number of parts, increasing reliability and reducing weight. Features an LED to indicate disk access and a hinged door over the disk insertion slot to keep the mechanism clean. Uses standard Apple formatting routines and supports the Macintosh's standard software eject feature. Features manual eject mechanism also. One year warranty. (disk drives) $175.

MacWAREHOUSE CATALOG
1690 Oak Street
P. O. Box 1579
Lakewood, NJ 08701

Inquiries: 201-367-0440
Canada: 800-255-6447
FAX # 201-905-9279
MONDAY THRU FRIDAY
8 A.M. TO 11 P.M.
(Eastern Time)
SATURDAY 8 A.M. TO
8 P.M. (Eastern Time)
NOW OPEN SUNDAYS!
8 A.M. to 8 P.M.
(Eastern Time)

MacWAREHOUSE PRO (Cogitatio Technology)
Write smarter, work harder, with this new hypertext-based expert system tool. MacWAREHOUSE Professional provides full hypertext, database access, and computational power for diagnosing, designing and interpreting complex information quickly and simply. Features intuitive, graphical interface with color support on the Mac II and links to HyperCard stacks. Boost productivity by solving problems 10 times faster and save money by doing it right the first time. (business) $249.

TimeMinder (Astrix Software)
Save time and money. Keep track of the time you spend on each project. TimeMinder lets you enter data manually and automatically updates the cost of materials and services. At the end of the month or billing period, it prints out reports and invoices in a variety of formats. If you work on retainer or on variable rates, TimeMinder takes care of all the details and lets you concentrate on the job. (business) $109.

CHOOSE MacWAREHOUSE.
For price, quality and service you won’t find a better source for your Mac needs. If you don’t see it here, give us a call. Most likely we’ll have it in stock. Our sales representatives are here to help!

I’m Kerry, call me at:

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

Name:
Address:
City:
State:
Zip:

MW9
FROM MacWAREHOUSE™

**Music Mouse 2.01**
Music Mouse is an automated improvisation program. To play, simply move the mouse and beautiful sounds come from your Mac. Tap a key and the sound changes instantly. Also, a fabulous alternative MIDI controller. (music) $49.

**FastLabel 1.2.1**
(Vertical Solutions)
End label hasses with FastLabel - the revolutionary way to print labels on the ImageWriter and LaserWriter. Pre-formatting instantly creates labels for letters, envelopes, file folders, audio and video cassettes, badges, computer disks and shipping containers. One step text loading makes FastLabel the simple solution for producing labels from any commercial database. Save hours of your valuable time! (business) $49.

**Trapeze 2.1**
(Release Technology)
An integrated presentation worksheet combines the power of spreadsheet with sophisticated, presentation-quality charts. Simple calculations or complex data analyses all on the same page. (business) $155.

**Mired Write 2.1**
Move freely from outlining to wordprocessing, then polish up your product with the built-in spelling checker and proofreader. Offers a Hide Picture option for faster scrolling. Acts and Pagemaker compatibility. (word processing) $85.

**망HE NETWORKING PRODUCTS**

**Connect Inc.**

- MacNet ............................ 43.
- Timbuktu 2.0.1 .......................... 65.

**TOPS**

- TOPS 2.1 .......................... 149.
- Full Line Available ................. Call.

**FastLabel 1.2.1**
(Vertical Solutions)
End label hasses with FastLabel - the revolutionary way to print labels on the ImageWriter and LaserWriter. Pre-formatting instantly creates labels for letters, envelopes, file folders, audio and video cassettes, badges, computer disks and shipping containers. One step text loading makes FastLabel the simple solution for producing labels from any commercial database. Save hours of your valuable time! (business) $49.

**Trapeze 2.1**
(Release Technology)
An integrated presentation worksheet combines the power of spreadsheet with sophisticated, presentation-quality charts. Simple calculations or complex data analyses all on the same page. (business) $155.

**Mired Write 2.1**
Move freely from outlining to wordprocessing, then polish up your product with the built-in spelling checker and proofreader. Offers a Hide Picture option for faster scrolling. Acts and Pagemaker compatibility. (word processing) $85.
<table>
<thead>
<tr>
<th>SOFTWARE VENTURES</th>
<th>BACKFX (req. Apple Fax modem)</th>
<th>127.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traveling Software</td>
<td>Lap-Link</td>
<td>83.</td>
</tr>
</tbody>
</table>

**DATABASE SOFTWARE**

<table>
<thead>
<tr>
<th>Acius 4th Dimension</th>
<th>399.</th>
</tr>
</thead>
<tbody>
<tr>
<td>AEG Management Systems</td>
<td>415.</td>
</tr>
<tr>
<td>Ashton-Tate eBase Mac</td>
<td>295.</td>
</tr>
<tr>
<td>Claris FileMaker II</td>
<td>229.</td>
</tr>
<tr>
<td>Fox Software FoxBASE+ Mac 1.1</td>
<td>205.</td>
</tr>
<tr>
<td>Odesta Double Helix II</td>
<td>339.</td>
</tr>
<tr>
<td>GeoQuery</td>
<td>199.</td>
</tr>
<tr>
<td>ProVUE Panarama</td>
<td>207.</td>
</tr>
</tbody>
</table>

**BUSINESS SOFTWARE**

<table>
<thead>
<tr>
<th>Access Technology</th>
<th>Traseeze 2.1</th>
<th>155.</th>
</tr>
</thead>
<tbody>
<tr>
<td>AEG Management Systems</td>
<td>FastTrack Schedule</td>
<td>415.</td>
</tr>
<tr>
<td>Aldus Persuasion 1.0</td>
<td>389.</td>
<td></td>
</tr>
<tr>
<td>Ashton-Tate Full Impact</td>
<td>249.</td>
<td></td>
</tr>
<tr>
<td>BreakThrough Productions</td>
<td>Market Master R/A</td>
<td>245.</td>
</tr>
<tr>
<td>Claris MacProject II</td>
<td>379.</td>
<td></td>
</tr>
<tr>
<td>SmartForm Designer w/Assistant</td>
<td>399.</td>
<td></td>
</tr>
</tbody>
</table>

**DATABASE SOFTWARE**

| GeoQuery | Location, Location, Location: The three most important things in any business. Where are your customers? ...branch offices? ...association members? And how do they relate? GeoQuery instantly transforms your address lists into interactive maps. Spot the trends that mean $100,000 to your business. Trends that you could never find with your database. (Database) $189. |
|----------|-----------------|-----|
| Cognition Technology | MacSMARTS PRO | 249. |
| Cricket Cricket Graph | 115. |
| Cricket Presents | 289. |
| HyperPress Publishing Intelligent Developer | Call. Informix WingZ | 275. |
| MetaConnect Accu-Weather Forecaster | 59. |
| Microsoft Excel 1.0 | 255. |
| PowerPoint 2.1 | 255. |
| Works 2.0 | 189. |
| NotePress For the Record | 29. |
| WordPerfect | 34. |
| Satori Bulk Mailer 3.3 | 79. |
| Shana Enterprises Fast/Formula Construction Kit | 89. |
| Softview FormSet | 55. |
| MacLine | 42. |
| Symantec More II | 255. |

**WORD PROCESSORS AND OUTLINERS**

<table>
<thead>
<tr>
<th>Access Technology, Inc.</th>
<th>MindWrite 2.1</th>
<th>95.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ashton-Tate FullWrite Professional</td>
<td>269.</td>
<td></td>
</tr>
<tr>
<td>Claris MacWrite 5.0</td>
<td>99.</td>
<td></td>
</tr>
<tr>
<td>Claris Word 4</td>
<td>255.</td>
<td></td>
</tr>
<tr>
<td>Claris Write 1.0</td>
<td>85.</td>
<td></td>
</tr>
<tr>
<td>Niles &amp; Associates End Note</td>
<td>82.</td>
<td></td>
</tr>
<tr>
<td>Symmetry Acts Advantage w/DA</td>
<td>65.</td>
<td></td>
</tr>
<tr>
<td>TMaker</td>
<td>19.</td>
<td></td>
</tr>
<tr>
<td>WordPerfect Corp.</td>
<td>185.</td>
<td></td>
</tr>
<tr>
<td>WordPerfect</td>
<td>29.</td>
<td></td>
</tr>
<tr>
<td>Working Software QuickWriter</td>
<td>75.</td>
<td></td>
</tr>
</tbody>
</table>

**SPELLING CHECKERS**

<table>
<thead>
<tr>
<th>Aegis Development, Inc.</th>
<th>Doug Clapp's Word Tools</th>
<th>42.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Densha Software BigThesaurus</td>
<td>54.</td>
<td></td>
</tr>
<tr>
<td>Spelling Coach Pro Electronic Arts</td>
<td>105.</td>
<td></td>
</tr>
<tr>
<td>Thunder II</td>
<td>52.</td>
<td></td>
</tr>
<tr>
<td>Microlytics WordFinder (synonym finder)</td>
<td>33.</td>
<td></td>
</tr>
<tr>
<td>Sensible Software BookEnds or Sensible Grammar ea 53.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**GRAPHICS**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Aegis Development, Inc.</td>
<td>Showcase FX</td>
<td>205.</td>
</tr>
</tbody>
</table>

**LIGHTNING SCAN**

<table>
<thead>
<tr>
<th>Adobe Illustrator 86</th>
<th>Streamline 249.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aldus Freehand 2.0</td>
<td>349.</td>
</tr>
<tr>
<td>Broderbund Drawing Table</td>
<td>76.</td>
</tr>
<tr>
<td>PosterMaker Plus</td>
<td>35.</td>
</tr>
<tr>
<td>VideoWorks II</td>
<td>175.</td>
</tr>
<tr>
<td>Claris MacDraw II 2.0</td>
<td>309.</td>
</tr>
<tr>
<td>MacPaint 2.0</td>
<td>99.</td>
</tr>
<tr>
<td>Cricket Cricket Color Paint</td>
<td>179.</td>
</tr>
<tr>
<td>Cricket Draw</td>
<td>169.</td>
</tr>
<tr>
<td>Cricket Paint</td>
<td>59.</td>
</tr>
<tr>
<td>Deneba Canvas 2.0</td>
<td>159.</td>
</tr>
<tr>
<td>DreamMaker Captures, Business Images</td>
<td>95.</td>
</tr>
<tr>
<td>MacGallery Electronic Arts Studio 8</td>
<td>319.</td>
</tr>
<tr>
<td>Miles MacTheKnife (All Volumes)</td>
<td>32.</td>
</tr>
<tr>
<td>Multi Ad Services ProArt, Bus, Sports or Holidays ea 95.</td>
<td></td>
</tr>
<tr>
<td>NuEquation NuPaint</td>
<td>99.</td>
</tr>
<tr>
<td>Olduvai Art Clips</td>
<td>69.</td>
</tr>
<tr>
<td>Paracomp Swivel 3D</td>
<td>249.</td>
</tr>
<tr>
<td>Silicon Beach Digital Darkroom or Super 3D 2.0 Call.</td>
<td>129.</td>
</tr>
<tr>
<td>SuperPaint 2.0</td>
<td>119.</td>
</tr>
<tr>
<td>SuperMac PixelPaint 2.0</td>
<td>199.</td>
</tr>
<tr>
<td>Symmetry PictureBase &amp; WetPaint</td>
<td>89.</td>
</tr>
<tr>
<td>Zedcor DesignPro 2.0</td>
<td>69.</td>
</tr>
</tbody>
</table>

**DESKTOP PUBLISHING PRODUCTS**

<table>
<thead>
<tr>
<th>Adobe Illustrator 86</th>
<th>Streamline 249.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aldus Freehand 2.0</td>
<td>349.</td>
</tr>
<tr>
<td>Broderbund Drawing Table</td>
<td>76.</td>
</tr>
<tr>
<td>PosterMaker Plus</td>
<td>35.</td>
</tr>
<tr>
<td>VideoWorks II</td>
<td>175.</td>
</tr>
<tr>
<td>Claris MacDraw II 2.0</td>
<td>309.</td>
</tr>
<tr>
<td>MacPaint 2.0</td>
<td>99.</td>
</tr>
<tr>
<td>Cricket Cricket Color Paint</td>
<td>179.</td>
</tr>
<tr>
<td>Cricket Draw</td>
<td>169.</td>
</tr>
<tr>
<td>Cricket Paint</td>
<td>59.</td>
</tr>
<tr>
<td>Deneba Canvas 2.0</td>
<td>159.</td>
</tr>
<tr>
<td>DreamMaker Captures, Business Images</td>
<td>95.</td>
</tr>
<tr>
<td>MacGallery Electronic Arts Studio 8</td>
<td>319.</td>
</tr>
<tr>
<td>Miles MacTheKnife (All Volumes)</td>
<td>32.</td>
</tr>
<tr>
<td>Multi Ad Services ProArt, Bus, Sports or Holidays ea 95.</td>
<td></td>
</tr>
<tr>
<td>NuEquation NuPaint</td>
<td>99.</td>
</tr>
<tr>
<td>Olduvai Art Clips</td>
<td>69.</td>
</tr>
<tr>
<td>Paracomp Swivel 3D</td>
<td>249.</td>
</tr>
<tr>
<td>Silicon Beach Digital Darkroom or Super 3D 2.0 Call.</td>
<td>129.</td>
</tr>
<tr>
<td>SuperPaint 2.0</td>
<td>119.</td>
</tr>
<tr>
<td>SuperMac PixelPaint 2.0</td>
<td>199.</td>
</tr>
<tr>
<td>Symmetry PictureBase &amp; WetPaint</td>
<td>89.</td>
</tr>
<tr>
<td>Zedcor DesignPro 2.0</td>
<td>69.</td>
</tr>
</tbody>
</table>

**SUPER STUDIO SESSION 2.0**

<table>
<thead>
<tr>
<th>IBM Press Write 2.0</th>
<th>$75.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MacMoney 3.02</td>
<td>$81.</td>
</tr>
</tbody>
</table>

**MacMoney 3.02**

Real accounting for the home budget. Tells you what's due when! Tracks expenses, credit cards, assets, liability, cash or income accounts. Create up to 250 named categories. (Finance) $81.

<table>
<thead>
<tr>
<th>Silver Screen</th>
<th>Organize your video tape collection. Instantly cross-references up to 2500 actors and actresses. Lists more than 650 movies with complete descriptions, ratings and running times. (Games) $42.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lap-Link Mac</td>
<td>Just connect the Lap-Link Mac and control your PC or Mac.</td>
</tr>
</tbody>
</table>
**OVERNIGHT DELIVERY ONLY $3.00**

<table>
<thead>
<tr>
<th>Application</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sierra On-Line Leisure Suit Larry</td>
<td>23</td>
</tr>
<tr>
<td>Spectrum Holobyte Falcon 2.0</td>
<td>32</td>
</tr>
<tr>
<td>PT109 or Gato</td>
<td>28</td>
</tr>
<tr>
<td>Solitaire Royale or Tetsis</td>
<td>20</td>
</tr>
<tr>
<td>The Software Toolworks Chessmaster 2100</td>
<td>32</td>
</tr>
<tr>
<td>Life &amp; Death</td>
<td>34</td>
</tr>
<tr>
<td>The Hunt for Red October</td>
<td>32</td>
</tr>
</tbody>
</table>

**DISK DRIVES / MEMORY UPGRADES**

<table>
<thead>
<tr>
<th>Type</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 MEG SIMMS</td>
<td>Call</td>
</tr>
<tr>
<td>1 MEG</td>
<td>Call</td>
</tr>
</tbody>
</table>

**Daily Double Horse Racing**
Spend the day at the track with a full card of 10 races. Handicap the races using histories of 180 horses and 12 jockeys. All types of bets are available. Play by yourself or with up to 3 other players. Races run in full action with 3D scrolling graphics! (games) $19.

**Fastback for the Mac**
Now you can take all your key files on your next business trip! Fastback is a high speed backup program that copies data from hard disk to standard floppy at a rate of 1Mb per minute (or better). Also features Error Correction Codes. (utilities) $54.

**MacEnvelope 4.0**
Take the drudgery out of addressing envelopes. MacEnvelope stores 1600 names and addresses and sorts alphabetically or by ZIP code. It even prints postal bar codes. Saves money on bulk mailing! (business) $59.

---

**EDUCATIONAL / PERSONAL**

<table>
<thead>
<tr>
<th>Application</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acce-Weather Forecaster (Meteoram) Software</td>
<td>Instant, convenient and reliable weather information direct from the nation's #1 weather service. Accu-Weather lets you quickly download national weather data by modem, then display it in easy-to-read maps, graphs, charts and forecasts. Hourly updates are available for every region of the country. Ideal for aversion, construction and travel. Automated telecommunication makes it easy to use! (business) $59.</td>
</tr>
<tr>
<td>Voice &amp; Video Instruction Videos HyperCard or Pagemaker 3.0</td>
<td>ea 35</td>
</tr>
<tr>
<td>Word 4.0 Video Tape</td>
<td>ea 35</td>
</tr>
<tr>
<td>ACCESSORIES</td>
<td></td>
</tr>
<tr>
<td>Access Software, Inc. World Class Leader Board</td>
<td>28</td>
</tr>
<tr>
<td>Artwork Daily Double Horse Racing</td>
<td>19</td>
</tr>
<tr>
<td>Broderbund Ancient Art of War At Sea</td>
<td>27</td>
</tr>
<tr>
<td>Shoofly Cate</td>
<td>24</td>
</tr>
<tr>
<td>Where in the World is Carmen</td>
<td>27</td>
</tr>
<tr>
<td>Bulls Eye Ferris Grand Prix or F51</td>
<td>ea 32</td>
</tr>
<tr>
<td>Centron Software, Inc. BlackJack or CrapsMaster</td>
<td>ea 27</td>
</tr>
<tr>
<td>CasinoMaster (5 pack)</td>
<td>ea 55</td>
</tr>
<tr>
<td>Discovery Software Arkenoid</td>
<td>ea 27</td>
</tr>
<tr>
<td>Electronic Arts Starfall I: The War Begins</td>
<td>ea 38</td>
</tr>
<tr>
<td>Chuck Yeager Adv, Flight Trainer</td>
<td>32</td>
</tr>
<tr>
<td>HyperPress Publishing Silver Screen</td>
<td>ea 42</td>
</tr>
<tr>
<td>Miles Computing Puzzle Gallery Mindscape</td>
<td>32</td>
</tr>
<tr>
<td>Balance of Power, Deja Vu</td>
<td>ea 30</td>
</tr>
<tr>
<td>Shadowside, Uninvited</td>
<td>ea 30</td>
</tr>
<tr>
<td>Nemesis</td>
<td>Go Master</td>
</tr>
<tr>
<td>Joeski Tutor</td>
<td>30</td>
</tr>
<tr>
<td>PCAI MacGolf 2.0</td>
<td>35</td>
</tr>
<tr>
<td>MacGolf Classic</td>
<td>ea 35</td>
</tr>
<tr>
<td>Road Racer</td>
<td>ea 39</td>
</tr>
</tbody>
</table>

---

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

SmartOne
2400/12000XMAC Modem
Receive electronic mail, check out stock portfolios or flight reservations. Features include Quicklink, MacNet, CompuServe, auto answer/ auto dial and a two year warranty. (modem) $169.

AlphaBits
NEW font upgrade for the Grappler LG and LS. Take advantage of the Mac's graphic capabilities. Includes 5 headline fonts and 3 complex font families to create documents from any application. (fonts) $67.

ResumeWriter Pro
Takes all the hard work out of creating your resume. You can customize it to include or exclude items depending on the job. (business) $75.

SuperCard
A "personal software toolkit" that gives you the power to create authentic Mac software. Powerful scripting environment with rich graphic creation capabilities ideal for creating anything from simple personal productivity stacks to full-color multimedia presentations. Intuitive programming language and on-line reference. A powerful graphics creation environment provides color painting and drawing, animation, TIFF and PICT import, and AutoTrace™. Imports HyperCard stacks and standard Mac resources. (hyperware) $145.

Mac-101 Keyboard (Data Desk)
Features 101 keys including a numeric keypad, a separate T-shaped cursor keypad, Cancel Key, Option and Command keys at both ends, definable function keys, plus scrolling, page control, and zooming keys. Comes with free macro software and manufacturer's two year warranty. (input/output) $145.

MODEMS
Abaton
InterFax12/48 ... 325.
Best Data Products
SmartOne 2400/1200 ... 169.
EPIC Technology
2400II Internal Modem ... 315.
Everex
EMAC 2400 ... 225.
Hayes
Smartmodem 1200 ... 299.
Smartmodem 2400 ... 449.
Smartmodem 9600 (V series) ... 965.
Prometheus
Promodem 2400 ... 309.
Promodem 2400M ... 199.
Supra
Supra Modem 2400 ... 149.
US Robotics
 Courier Modems ... Call.

BLANK MEDIA
B.A.S.F.
DS/DD (box of 10) ... 17.
Sony
DS/DD (box of 10) ... 18.

INPUT/OUTPUT
Cutting Edge
CE-105 ADB Keyboard ... 125.
DataDesk
Mac 101 Keyboards ... 145.
Kensington
New Turbo Mouse ... 119.
Koala
MacVision 2.0 ... 219.
Kraft
ADB Joystick Premium III (SE/II) ... 51.
Kurta
IS/ADB Tablet ... 259.

Marathon 030
(Dove)
Put a first running 68030 chip into your Mac II with the Marathon accelerator board. Features a 256K byte internal data cache, 256 bytes of instruction cache and a full 32 bit microprocessor operating at 33 MHz. Quick and easy to install. (drives) $999.

FastNet III
FastNet III launches you onto the Ethernet network and gives you access to today's most popular networking software products. You control the network file transfers, file access, program launching and task-to-task transactions by simple manipulation of desktop icons. It's the price performance choice for Ethernet connectivity. (drives) $375.

Cordless 4 Button Cursor ... 65.
LYNX Computer
Turbo Trackball (512/Plus or SE/I) ... 65.
Mouse Systems
A+ Mouse (512/Plus or SE/I) ... Call.
Seiko America
Seiko Mini Mouse (dot-matrix) ... 335.
SuperCard
Bit Pad Plus ... 325.
ThunderWare
LightningScan ... 409.
ThunderScan 5.0 ... 189.

ACCESSORIES
Avery
Labels (all sizes available) ... 41.
Computer Friends, Inc.
MacWriter (IV & IV II) ... 41.
Curtis
Computer Tool Set ... 19.
Disk Holder (holds 40) ... 9.
Surge Suppressors (full line) ... Call.
Goldstein & Blair
The Macintosh Bible ... 21.
I/O Designs
ImageWare II Carrying Case ... 49.
IV II Ribbons-Black or Color ... Call.
Macinware Mac II Carrying Case ... 89.
Macinware Plus Carrying Case ... 64.
Macinware SE Carrying Case ... 75.
Monitorware Apple RGB Case ... 79.
Kensington
Anti-glare Filter ... 33.
Apple Security Kit ... 34.
Mac II Stand w/Cable Kit ... 65.
MasterPiece Mac II ... 105.
PowerTree Surge Protectors ... 64.
Mobius Products
Orange Micro
Grappler L/D or LS ... Call.
Targus, Ltd.
Deluxe Plus/SE-XKB Case (black) ... 75.
ImageWriter II Case (black) ... 49.
Mac Plus/SE Case (black) ... 59.

OVERNIGHT DELIVERY: ONLY $3.
If you're already a MacWarehouse customer you know that nobody beats our service. Our helpful telephone staff is standing by, seven days a week. Place your order by 7:00 pm Eastern time (weekdays) and it's processed immediately for overnight delivery. Call us toll free right now.

I'm Kerry, call me at:

MacWAREHOUSE™
1-800-255-6227

INPUT/OUTPUT
Cutting Edge
CE-105 ADB Keyboard ... 125.
DataDesk
Mac 101 Keyboards ... 145.
Kensington
New Turbo Mouse ... 119.
Koala
MacVision 2.0 ... 219.
Kraft
ADB Joystick Premium III (SE/II) ... 51.
Kurta
IS/ADB Tablet ... 259.

Circle 78 on reader service card
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.

And then... Maxell created the RD Series.
n this day George Herbert Walker Bush was taking the oath of office. The climax of perhaps the most wearying, painstakingly covered presidential campaign in history. David Bohrman can tell you all about it. He was one of the senior producers at ABC News in charge of election coverage. He probably could tell you Richard Gephardt’s middle name and where Alexander Haig stood on Contraague. He feeds on such details like a catfish gobbling detritus from a creek bed—like many of his ilk, he is a political junkie.

So what the heck is Bohrman doing on Inauguration Day working the crowd, doing product demos at the Apple booth at the Macworld Expo in San Francisco?

It is a question that Bohrman is asking himself. “Eight years ago was one of the biggest days of my life,” he says, flashing back fondly to the news-worthy advent of the Reagan administration. “There was the inauguration and the hostage release. But as I watched Bush today, I said, ‘What am I doing here?’”

There is a simple answer to that question: Bohrman is demonstrating a product that combines HyperCard technology with laser disk video. A joint venture of ABC News and the Optical Data Corporation, it is called The '88 Vote: Campaign for the White House. Designed for educational use, The '88 Vote allows teachers and students to interactively find their way through the thicket of election events, using actual video clips.

There is also a more complex explanation. Bohrman’s story has its analogue in the tales of countless others who have been seduced by the Macintosh and have seen their lives changed by the computer’s charms. And it is the proliferation of stories like these that has allowed Apple Computer its success in penetrating hitherto impenetrable markets.

THE MAGNA CARTEL

I first suspected that Bohrman was a candidate for a Macintosh life change when I met him last spring, around the time of the Ohio primary. If Bohrman had been behaving like a normal senior producer for a network news operation, he would have been entirely too busy to talk to a reporter from a computer magazine about how he kept Peter Jennings, David Brinkley, and Sam Donaldson supplied with facts. Yet Bohrman seemed to have endless time to talk about what was obviously a pet project.

A fellow of pleasant girth who sports wire-rim aviator glasses and red suspenders, he ushered me into his election-unit sanctum, plunked himself behind a desk loaded with Apple equipment, and joyfully bent my ear about ABC News’ innovative use of HyperCard as the free-form filing system for election facts, figures, and graphics. For those who didn’t read my dispatch in Macworld News (September 1988), I’ll summarize briefly.

The MAGNA System (Macintosh ABC General News Almanac) was a series of HyperCard stacks that in many ways replaced the actual 5 by 8 cards that had previously been the unwieldy repositories of information. With the aid of Apple evangelist Larry Wood, Bohrman arranged the stacks so that by using HyperCard links, ABC reporters, producers, and even anchors could quickly access the facts they needed. Teamed with HyperCard in particular, the computer wielded powers far beyond those of paper cards. Interactive graphics, for instance, allowed a producer to scan the floor plan of the New Orleans Superdome, point to the location of a given delegation, and not only find out who led the delegation, but also get the relevant details on the leader, as well as the other delegates. That knowledge was quickly relayed to the field reporter. (That’s why Sam Donaldson seemed so smart.) Even the built-in calculation powers of HyperCard

(continues)
were exploited, as the system kept a dynamic count of delegates in hand for a given candidate and a running report on how many were required for nomination.

It was one of the more massive uses of HyperCard to date. But what impressed me was not so much its scope or the obvious advantage it gave to ABC over its news-reporting rivals but the meticulous, often delightful attention to detail. There was obviously careful thought given to even the most mundane graphic decisions. At every corner, someone was thinking not only, "How can I speed this information?" but also, "How can I do this in the niftiest possible HyperCard way?"

Though the demands of an election year seemed to call for quick-and-dirty stack-writing, it seemed that every one of the 5000-plus cards in the MAGNA system showed a contradictory approach. I sniffed a HyperCard hacker at work, and the fanatic in question was the man sitting across from me.

**TALES OF BOHRMAN**

In truth, the seeds of Bohrman's electronic addiction had long ago been planted. As a Stanford undergrad, he had pursued a complicated course of studies to prepare himself for science reporting. This did not require that he play with a computer, but he did a bit of programming anyway. After graduation in 1976, his computer interest lay dormant as he spent a year as a flight attendant (what better way to see the world?), another year getting a masters degree at the Columbia University Graduate School of Journalism, and then a stint as a producer for the CBS station in Los Angeles. From there he was hired to work for a new ABC show called "Nightline," and eventually became a senior producer for that show and later for the ABC World News. He notched credits working on stories ranging from a Mount Everest climb to the shooting of the pope. And, of course, the skirmishes in American politics.

But by then, despite having a wife and two children, he found time to play with an Apple II and pursue the domestic hacker's Holy Grail, the ultimate checkbook program. When Apple announced the Macintosh, he wanted one, but he wasn't ready to pay its premium price. With each iteration of the Macintosh, his desire grew. Finally, he could not contain himself. At the 1987 Mac Expo in Boston, he bought a Mac II color system for $6500.

"I just wanted to play with it," he says. "I had no idea what I was going to do with it, but I was going to do something."

"Something" turned out to be a HyperCard system that would be the nerve center for ABC's election coverage. "It didn't take a brain surgeon to think it up," he says. "We had been using 5 by 8 cards, and here was a card metaphor."

Getting his employers to accept the idea was not so simple. To the cheerless folks in ABC's MIS division, a personal computer was an IBM PC clone supplementing the mainframe. Even that was radical, and people were encouraged to do their writing on mainframes. As a result, ABC News had a computer system (continues)
"Although this category, unlike spreadsheets and word processors, had a lot of new players this year, one seemed to us to be the clear leader. 4th Dimension, the powerful first product from ACIUS, takes the kudos."

MacUser, February 1988

"Congratulations! InfoWorld's readers have chosen 4th Dimension as the Product of the Year in the Macintosh Database Systems category."

Jonathan Sacks, InfoWorld, April 1988

"I can't imagine a data-management problem that you won't be able to solve with 4th Dimension."

Steve Mann, Macintosh Today August 11, 1987

"Users with no experience or interest in programming can build a barebones database in 4D's 'Design Environment' just by pointing, clicking, and naming files and fields."

"For searches and sorts - database operations that are performed interactively - 4D's performance curve is probably the best of the four programs (Omnis 3 Plus, Double Helix II, dBASE Mac, and 4th Dimension)."

David Brandt, MacWEEK, January 19, 1988

"It will do everything you need, and then some, and will prove itself well worth the cost."

Jan L. Harrington, MacUser, November 1987

"I'm convinced that many users of other Mac databases and even PC databases will want to switch over to 4th Dimension."

Adam Green, Macworld, July 1987

"In general, Macintosh software is better than software for other personal computers... 4th Dimension redefines those high standards."


"4th Dimension from ACIUS, Inc. of Cupertino, California, outshines the other databases we tested both in number of features and in rich database development environment."

Don Crabb, InfoWorld, January 11, 1988

Want to try it out?

For $20, we'll send you a demo disk and comprehensive 50-page user's manual. Call today and find out what 4th Dimension can do for you.

- Relational database
- Multi-user
- Intuitive interface
- Graphics and pictures
- Automatic forms & reports

Yes you can!

$20 Demo Offer
1-800-952-6300 Ask for Dept. A22

Demo version bundled on all Jasmine Hard Disk Drives.
THE ICONOCLAST

on which its people couldn't write. Such is corporate inertia.

Bohrman bucked that inertia. In his ever-dwindling spare time, he crafted compelling demonstrations of what he could do. ABC reluctantly leased a bunch of Macs and laser printers. The project was a tremendous success. The fact that Bohrman was performing two jobs—keeper of the computer system and senior producer in charge of, among other things, floor coverage of the conventions—had a lot to do with that. Ask his wife and kids, whose rare sightings of Daddy were by the glow of a Mac II monitor.

SOUND BYTES

Then, a third job. "It was staring us in the face," says Bohrman. "I read that HyperCard could control a videodisk. We had all these events on video. Why not expand our system as an educational videodisk project?" Equally interested in the concept was ABC News vice president (and former Atari 800 hacker) William Lord. The two set out to see if it could be done.

At first they counted on support from what had promised to be a budding multimedia team at Apple Computer. "That support never came," says Bohrman. Finally an ABC engineer took pity on them and built a cable to connect their new videodisk player to a Mac II. With the help of some software tools crafted by The Voyager Company, Bohrman and Lord spent a weekend getting HyperCard to do some search-and-play functions, using the original King Kong as their source material. Once they could go instantly to Fay Wray's screams, it was a simple step to creating a search function that could call up, in an instant, Lloyd Bentsen saying to Dan Quayle, "You're no Jack Kennedy."

Bohrman and Lord did a prototype in a week. Then, of course, came many hours of work. Besides fine-tuning, they piled on features.

As a result The '88 Vote is much more than an interactive video replay of the election's greatest sound bytes. It gives viewers command of the election events. For instance, when watching a given clip, the viewer can choose to listen to the original sound or to commentary by pundit

(continues)
Tecmar Offers You The Best Tape Backup For Both

Regardless of what world you live in, Tecmar delivers the dependable, cost-effective tape backup systems you're seeking.

**Mac World**

Tecmar's QT-Mac80™ and QT-Mac40™ are the proven choice for SCSI tape backup for the pure Mac environment, with network support for effective backup and archiving under TOPS®, AppleShare® and Novell®. Including our exclusive QuickTurn™ Quality Service and two-year warranty, you couldn't ask for a better Mac tape backup solution.

**Applications Guide**

<table>
<thead>
<tr>
<th>Apple Macintosh®</th>
<th>IBM®/Compatible</th>
</tr>
</thead>
<tbody>
<tr>
<td>QT-Mac40</td>
<td>Apple Macintosh®</td>
</tr>
<tr>
<td>40MB SCSI</td>
<td>Apple Macintosh®</td>
</tr>
<tr>
<td>QT-Mac80</td>
<td>Apple Macintosh®</td>
</tr>
<tr>
<td>80MB SCSI</td>
<td>Apple Macintosh®</td>
</tr>
<tr>
<td>QT-Mac150*</td>
<td>Apple Macintosh®</td>
</tr>
<tr>
<td>Macintosh Plus</td>
<td>Apple Macintosh®</td>
</tr>
<tr>
<td>SE</td>
<td>Apple Macintosh®</td>
</tr>
<tr>
<td>II</td>
<td>Apple Macintosh®</td>
</tr>
<tr>
<td>IX</td>
<td>Apple Macintosh®</td>
</tr>
<tr>
<td>PC</td>
<td>Apple Macintosh®</td>
</tr>
<tr>
<td>PS/2*</td>
<td>Apple Macintosh®</td>
</tr>
</tbody>
</table>

*A bundled with NuLink for total Mac solutions, PC and PS/2 host adapter board also available. Call for details.

**Mixed World**

We've even bridged the gap between PC Bus, Micro Channel™ Bus and NuBus™ with our new QT-Mac150™ and NuLink™ interface board, which now, for the first time ever, give you a single-drive solution for mixed environments.

So get the best for both worlds. For the name of your nearest dealer, call us today at (216) 349-1009 or toll-free at (800) 624-8560.

Tecmar, Inc., 6225 Cochran Road, Solon, Ohio 44139-3377.

All Tecmar products are trademarks or registered trademarks of Tecmar, Inc. Other brand and product names are trademarks or registered trademarks of their respective companies.

©Copyright Tecmar, Inc., a subsidiary of Rexon, Inc., 1989. All rights reserved.

Circle 321 on reader service card
Hal Bruno, or access a transcript of the candidate's own words. In addition, anchor Peter Jennings has taped new segments specifically for the videodisk, including one where he appears as sort of a video help screen (much like the bow-tied homunculus in John Sculley's imaginary Knowledge Navigator).

Perhaps the neatest feature is the "Documentary Maker." This allows you to actually create your own news lineup, using portions (fully editable by the user) of any of the hundreds of clips included on the disk. You can go from Gary Hart's denials of womanizing, to Robert Dole's grumbling about George Bush's lying, to Mike Dukakis grinning from the cockpit of a tank. For good measure you can throw in Paul Simon's acceptance speech and a mug shot of Willie Horton. (Right now The '88 Vote is valid as an educational project, but one day it will be the ultimate Trivial Pursuit set.)

When it looked like the project would be a go, ABC News hooked up with Optical Data, a New Jersey company experienced in laser disk publishing, to produce and distribute the $295 product. It includes the laser disk, a load of HyperCard stacks (a hard disk is required for this one), and a directory of the disk's contents. (Beginning next October the product will cost $395 and will be packaged with lesson plans for teachers.) How excited is ABC News about this development? Well, you can expect more stack-and-disk packages, beginning with a recap of the 1969 Apollo lunar mission. There are tons of ABC news tapes stored in a warehouse in New Jersey somewhere, enough to fill plenty of videodisks.

In fact, the network has created a separate division: ABC News Interactive. The goal is to release eight disks a year. Bill Lord is in charge; the executive producer is former news guy Dave Bohrman.

Bohrman's new office is bigger than the one he had in the election unit. And the Macintosh equipment is no longer leased but finally purchased by his employer. His enthusiasm for the Macintosh and his vision to see what could be done with it have been instrumental in opening a new business niche for Apple. All sorts of industry people, consultants, and just plain interested parties are coming by to see the project. While I was interviewing Bohrman, a casually dressed Ted Koppel walked in, ready for his personal demo.

David Bohrman still doesn't see much of his family, but he seems to be having plenty of fun. Even the all-nighters he's spent hacking the HyperCard system have invigorated him. But he says that his new status as a sort-of computer company executive won't be permanent. His first love is news, and one day he'll get back to producing. Computers, after all, aren't everything. He says he can walk away from his Macintosh with no regrets.

Sure, Dave. 

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

THE PROFESSIONAL INFORMATION MANAGER

THE ULTIMATE SALES, CONTACT, ACTIVITY, TIME, & RELATIONSHIP MANAGER

ALL STACKS: COMPLETELY LINKED
A COMMON INTERFACE FOR ALL ACTIVITIES

MAKES C.A.T.™ LOOK LIKE A MOUSE
MAKES FOCAL POINT™ LOOK DULL

THE MOST INCREDIBLE TOTALLY INTEGRATED HYPER RELATIONAL APPLICATION

PARTIAL FEATURE LIST

• All Code Written In HyperTalk™
• Automatic Indexing Of All: Associates, Clients, Companies, Documents, Letters, Memos, Notes, Personnel, Pictures, Pitches, Products, Prospects, Relationships, And More
• Automatic Monthly Sales Projections By: Client, Company & By Product Line
• Automatic Archiving Of Any Card: (Lead, Prospect, Client, Etc.)
• Automatic Bibliography And Note Links
• Automatic Conversation
• Timer & Posting To Client: Time Billing Order
• Automatic Formatting & Posting Of Letters
• Automatic Hierarchical Document, Notes, & Picture Classification
• Automatic Letter Generation & Maintenance Of A List Of Letter Recipients By Letter
• Automatic Day Activity Status Reporting Of: Yesterday's To Do, Today's To Do, Yesterday's Staff To Do, Today's Staff To Do, Daily Calendar
• Automatic Posting Of All Inquiries, Proposals, Sales Projections, & Sales
• Automatic Posting Of Personal & Staff To Do • Complete Client & Prospect History • Direct Mail Management • Export Tab Delimited Files • Find (Multiple Arguments), Find All, Find Conditional (EXTENSIVE BOOLEAN Searches)
• Global Data Insert
• Global Data & Person Searches • Import Tab or Comma Delimited Files • Mailmerge • Maps (Over 100 State, World, City & Highways)
• Mass Mailing Tracking • Merge Any Two Stacks By Field
• Mini Corporate Tree • Mini Outliner • Multiple Alarms: Audible & Physical, AnyWhere & Any Time • Multiple Field Searches
• Multiple Word Searches
• No Copy Protection
• On-Line Help (EXTENSIVE)
• Post All Calendar Events From Daily To Weekly To Monthly
• Sales Reports: Sorts On Any Field OR Any Combination AND/OR Number Of Fields Simultaneously
• Sticky Notes Any Time or Place • To Do & Staff To Do Posting By Date & Staff Member • User Extendable Without Limit • Write Only Once • AND MUCH MUCH MORE!!!

The Complete Personal, Office, & Sales Management System

Personal Productivity - Office Management - Direct Mail - Sales Tracking & Management Subsets

$94.50

ABSOLUTELY THE GREATEST VALUE EVER!!!

CALL NOW 1-800-888-HYPE

MULTI SOLUTIONS, INC.
123 Franklin Corner Rd.
Lawrenceville, NJ 08648
609-896-4100
Fax # 609-895-0072
Telex # 821073

And MANY MANY MORE

Requirements: Apple Macintosh™ Plus, or SE, or II, Hard Disk Recommended; HyperCard™ 1.2.2 Supplied with HYPER-ACTION™. HyperCard™ & HyperTalk™ & Macintosh™ are Trademarks of Apple Computer, Inc.; C.A.T.™ is a registered trademark of Chang Labs, Inc., FOCAL POINT™ is a trademark of Activision, Inc.

Circle 59 on reader service card
Aside from being a tad easier to install than a satellite, the Hayes Smartmodem 2400M™ for the Macintosh® II and Smartcom II® for the Apple® Macintosh make up the most advanced communications system you can put inside a Mac.

With this modem and software package, you can set up an extensive Macintosh computer work group system through a feature called HayesConnect™. It allows any Macintosh access to the Smartmodem 2400M across an AppleTalk® Network. Which means all Macintosh computers on the Network will be able to communicate with or without a modem of their own. This makes for extremely efficient office communications.

Then, to make them even more efficient, the system offers Smartcom II for the Macintosh. It's the only software designed to take full advantage of the power and graphics capabilities of all of the computers in the Macintosh family. For example, you can program your own on-screen buttons to create a personalized user interface. You also get features like moveable icons, custom color selection and full support of ImageWriter® and LaserWriter® for incredible graphics. You can even run the system unattended using an Autopilot feature. Of course, there is much more you can do with a few simple clicks on standard, easily identifiable icons.

By now it's probably clear that whether they're just used with the Macintosh II or shared by Mac computers on an AppleTalk Network, the Smartmodem 2400M and Smartcom II make a communications system that can't be beaten. At least not by anything on this planet.

THE ONLY COMMUNICATIONS SYSTEM MORE ADVANCED THAN OURS WON'T FIT INSIDE YOUR MAC.

For your nearest Hayes Advanced Systems Dealer, call 800-635-1225.

Hayes Microcomputer Products, Inc., PO Box 105203, Atlanta, GA 30348.

Apple, Macintosh, Mac, ImageWriter, LaserWriter and AppleTalk are registered trademarks of Apple Computer, Inc.

©1989 Hayes Microcomputer Products, Inc.

Circle 383 on reader service card
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's to get a form to look just right, you'll really love the Panorama difference.

2. Panorama dramatically improves data entry speed and accuracy. If you're not the best typist in the world (or even if you are) you'll appreciate our exclusive data entry short-cuts like Clairvoyance and Value Bars.

3. Recordable macros make anyone a power user. Customize your databases by adding macro buttons and menus.

4. Powerful mail merge does everything but lick the stamps. Panorama can organize and maintain accurate mailing lists, create and print customized form letters and mailing labels, and even calculate postage.

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.

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, 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 award-winning predecessor OverVue, Panorama establishes a quantum leap in database performance. Panorama out-searches, out-sorts, out-calculates, and generally outclasses the competition.
Desperately Seeking Service

Locating the right dealer takes perseverance

by Deborah Branscum

Finding a good computer dealer was important to Jim Felbab because his company will spend $30 million on personal-computer gear this year.

Last fall Jim Felbab, manager of customer services for Ameritech Applied Technologies in Wisconsin, ordered ten Mac systems from a major national chain. The orders included both hardware and software, and the Macs were supposed to be delivered “user-ready.”

“We had problems with every order they delivered,” says Felbab. Several orders arrived incomplete, missing either hardware or software or both. One Mac II refused to boot from its hard disk.

“The technician sent by the chain didn’t seem to know how to turn on the computer from the extended keyboard and kept looking for an on switch,” Felbab says. “He didn’t find that, but he did spot the floppy drive. The technician said, ‘There’s your problem right there.’ Then he pulled out a floppy disk with his long-nose pliers and ruined the drive in the process.”

Welcome to the real world, where ignorant louts are ready to take your money and break your heart. But by investing plenty of time and some common sense, you can find a dealer who’s willing and able to take care of your needs.

Advice from technicians, micro-managers, and consultants boils down to research, research, and more research.

- Know your needs. New York consultant Darryl Peck recommends that you ask friends for their opinions and read everything you can lay your hands on. “But be sure you have some idea of your needs before visiting a dealer, because Apple dealers often know very little about the products they sell.”

- Investigate retailers. “After doing your research, go into a few dealerships,” says Los Angeles–based consultant Tom Negrino. “Don’t look at a computer yet. Walk around and try to feel the mood of the store. Are you accosted by sales sharks, or do people politely ask if you need help?”

You should explain that you’re not going to buy today, but ask to see a machine anyway. Remember, if salespeople aren’t interested in investing some time in you for a potential sale, they won’t have time for you after you’ve made the purchase, either.

If the dealership passes this important test, you should ask for a demo and obtain some product literature. Go back to the store in a few days and get a price quote from the same person. Don’t forget to inquire about warranty, training, and service. Then ask the dealer for the name of the local Macintosh user group so you can ask the group about the dealership’s reputation. As Negrino says, “If other people are happy, chances are you will be too.”

“Going to a dealer is like going to a doctor. Get a second opinion,” says Jeff Chasick, a microcomputer manager at a large West Coast research facility. “You’ve got to be able to trust the salesman and the store.”

“If you want after-sales support for software and hardware, you need to qualify the salesperson and dealer,” says Robert Kinnin, a former service manager for a national chain based in New York who is now a network manager for Arthur Young. Find out, before you buy, if there are people dedicated to providing after-sales support.

“The Macintosh is mushrooming in a lot of corporations, but the quality of support people hasn’t kept pace,” says manager Felbab, who takes an interest in these matters because his company will spend some $30 million on personal-

(continues)
If you didn't make big profits during this rally, you need our software!

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

Not only is The Right Time™ the best decision support system ever devised for traders, it’s the only software that analyzes volume/price, support/demand, and global market trends - all at the same time.

Amazingly Precise.

The Right Time™ programs run on IBM (and compatible), Apple II and Macintosh personal computers. The software is easy to use, amazingly precise, and very, very clear in its signals. It’s also fast. You can update all of your stocks, commodities, indexes or mutual funds from Dow Jones in less than five minutes per day.

What's more, you can play “What If” games with individual stocks, commodities, indexes, funds or options with results in about one second.

Results: Winning Trades.

There are seven Right Time™ programs available to help you make the right decisions at the right time.

Stock Program: “The program is amazing. Profitable trades have developed out of nowhere!” M.C., brokerage firm vice president.

Index Program: “Computer whiz finds program for success. This program really works.” A.G., financial columnist.

Futures Program: “Very profitable with four out of five winners. Paid for itself the first trade.” B.L., investment advisor.

Mutual Funds Program: "Accurately picked my last seven profitable trades. I couldn't trade without it." L.S., individual investor.

For More Information.

Call (213) 312-0154 for our free twelve page brochure. Each program costs $449, any two $699, any three $999, any four $1,199 or all five for $1,499. We also have working demos for just $49 (each) includes manual.

Now Available - The Right Time-Day Trading Program/Futures and The Right Time-Day Trading Program/Indexes priced at $549 each or both for $899.

The Right Time™ computerized trading system was developed by an expert portfolio manager for his own personal use. Over the last nine years of in-market use the software has been perfected and made easy to use.

Now it’s available for any smart trader who wants to make quick profits from quick decisions.

Amazingly Precise.

The Right Time™ programs run on IBM (and compatible), Apple II and Macintosh personal computers. The software is easy to use, amazingly precise, and very, very clear in its signals.

It’s also fast. You can update all of your stocks, commodities, indexes or mutual funds from Dow Jones in less than five minutes per day.

What’s more, you can play “What If” games with individual stocks, commodities, indexes, funds or options with results in about one second.

Results: Winning Trades.

There are seven Right Time™ programs available to help you make the right decisions at the right time.

Stock Program: “The program is amazing. Profitable trades have developed out of nowhere!” M.C., brokerage firm vice president.

Index Program: “Computer whiz finds program for success. This program really works.” A.G., financial columnist.

Futures Program: “Very profitable with four out of five winners. Paid for itself the first trade.” B.L., investment advisor.

Mutual Funds Program: "Accurately picked my last seven profitable trades. I couldn't trade without it.” L.S., individual investor.

For More Information.

Call (213) 312-0154 for our free twelve page brochure. Each program costs $449, any two $699, any three $999, any four $1,199 or all five for $1,499. We also have working demos for just $49 (each) includes manual.

Now Available - The Right Time-Day Trading Program/Futures and The Right Time-Day Trading Program/Indexes priced at $549 each or both for $899.
Rodime Introduces the Standard for Hard Disk Technology.

COBRA DRIVES SET THE STANDARD. Cobra high performance internal and external hard drives are the finest drives available for your Mac. With capacities of 45MB, 70MB, 100MB, and 215MB, Cobra is the answer to all your storage needs. External Cobra drives come in a new, sleek low profile cabinet that fits neatly beneath your Mac Plus, Mac SE or Mac SE/30. Internal Cobra drives come with two mounting brackets. One, for installation in the Mac II or Mac IIX, and one for mounting in the Mac SE/30 or Mac SE which allows you to keep both floppy ports active.

FAST 18ms ACCESS TIME. Nothing is faster! With an average access time of 18ms Cobra is the fastest drive available on the market for the Macintosh line of computers. Cobra drives also come with a 16K Caching Buffer which allows even faster access to your data, (sub 18ms), by storing frequently used data in “instant access” RAM.

CONVENIENT SINGLE POWER SOURCE. With the external Cobra, the flip of one switch on the drive activates your CPU, printer and other peripherals, eliminating cumbersome cables.

LED'S THAT PUT YOU IN CONTROL. Now you can be aware of the status of the drive at all times, with power-on, drive activity and fault warning lights.

ONE YEAR WARRANTY. Rodime Systems offers the level of reliability, innovation and support only an original equipment manufacturer can provide.

FREE BACK-UP AND UTILITY SOFTWARE. Cobra drives come with a FREE copy of FASTBACK™ back-up software, a $99.00 value, as well as Rodime's Utility Software which allows partitioning (including A/UX), media verification, formatting and driver installation.

RODIME'S COMMITMENT TO QUALITY. At Rodime Systems, the craftsmanship built into every drive is our commitment to produce the finest, most reliable drives available. When you buy a Rodime Systems product, you are buying years of manufacturing experience, state of the art engineering and peace of mind that comes from knowing that more Mac users have chosen Rodime drives than any other.

HARD FACTS ON HARD DRIVES
Send for a FREE copy of our book designed to assist you with your purchase of disk storage for your computer. Mail requests to Rodime Systems, Boca Raton, Florida. Or call us at 407-994-5585.
A

Jan C. Lightstone of Flushing, New York, reports that he saw a demo of Course of Action at the Authorware booth at last year's Macworld Expo in Boston. The list price was $695, and it seemed to offer most of the features Lightstone needed. A more elaborate version called the Best Course of Action was also available, but well beyond his budget.

“My purpose required that the developed run-time and product make use of color,” he writes. “The displayed version was in color, so I bought Course of Action. When my package arrived, it worked in monochrome only. Apparently the color version was the more expensive one.”

Although Lightstone had “fallen in love” with the product, he planned to return it because he needed color. But after explaining the problem to Mike Allen, the man who sold him the program and its main designer, “I was surprised and delighted to be upgraded at no extra charge to the $2,500 version ‘as a matter of conscience.’

“This is what marketplace morality used to be, but rarely is today. There certainly are some good guys still out there in the computer software business.”

Frank C. Volow of Houston writes to commend Survivor Software for its update policy. “It’s very refreshing to discover a company that seems to buck the trend of charging its customers at every turn,” he writes. “Survivor Software decided to send an absolutely free update of MacMoney to all registered owners of version 3.0. The reason it was free, according to the developer, was that the update included a couple of program corrections. Thank you, Survivor Software!”

CORRESPONDENCE WOES

Carole Petrowsky wrote to Macworld last fall about unanswered letters to Ashton-Tate regarding one of its products. “Do they really have no one to correspond with customers?” she asks. “Is this standard procedure in the industry? Is anyone in charge of customer service?” Ashton-Tate did respond several months after she wrote the letters. But Petrowsky’s questions seem worth answering, so I called customer relations at Ashton-Tate to get the scoop.

Ashton-Tate’s policy is to respond within 72 hours of receiving a letter in customer relations, according to Judy Merrill, public relations manager. Ashton-Tate’s customer service department is broken into four areas: customer service, for updates, upgrades, and replacement disks; customer relations, for customer queries about policies and procedures; developer services, which maintains a developer registry and support program for VARs; and reseller relations, which handles, among other things, incoming product info calls from authorized dealers. Customers who have a problem should write to Customer Relations, Ashton-Tate, 20101 Hamilton Ave., Torrance, CA 90502, or call 213/538-7381. (You can call customer service at 213/329-9989.)

Not all companies have customer relations departments, and even those that do may not publicize them. Apple, for example, doesn’t list a telephone number or address specifically for its customer relations department in any of the material that accompanies its products. Claris, on the other hand, prints a customer relations telephone number on the first page of its Support Service & Registration booklet. The company notes that it has a customer relations staff to assist people with non-technical questions or problems and lists the hours you can reach the department by telephone.

SUPPORT STARS

In January, Apple Professional Exchange (APX) announced the results of its first annual user support awards. APX sur-
FORD'S NEW SIMULATOR

New graphics, new games, more information, all for $6.95
NEW PRODUCTS

Ford’s New Simulator
It mixes business with pleasure.

Terrific graphics show off the cars...and show how they work.
Ford Motor Company has come up with a great way to show you its cars and trucks. The 1989 version of the Ford Simulator is a major improvement over last year's popular introductory model. In fact, there's so much data, software simulation games, and such detailed graphics, this year's model needs two floppy disks to hold it all (the 3½” disk version for IBM and Macintosh is a single disk).

The new graphics are right out of a showroom brochure, and depict the cars in all their glory. And animated screens demonstrate various features of the cars. For example, you'll see heated windshields melt snow, air bags inflate, and supercharged engines propel automobiles down highways.

Exciting games put you in the driver's seat.
Don't get us wrong; this software isn't only information. This year, there are three exciting driving simulation games, each with three different scenarios, and each with three levels of driving expertise. Test Track offers a drag strip, a track inundated with tight turns, and an obstacle course littered with pylons. City Challenge lets you wind your way through traffic en route to your choice of the downtown area, a shopping mall or the airport. And Back Roads lets you decide whether to take an easy-going byway, a twisting blacktop, or a two-lane road that requires you to maneuver around slow-moving trucks.

Depending on which computer you have, you can play the games with a mouse or a keyboard.

An easy way to get the facts.
For 1989, the Ford Simulator menu contains almost every model produced by Ford Motor Company, from the Ford Festiva to the Lincoln Continental. For each, you'll see the manufacturer's suggested retail prices, passenger and cargo capacities, available models, engines and transmissions, estimated fuel economies and more.

A friendly spreadsheet helps you figure out the cost of your dream car.
Once you select the right car or truck for you, the Ford Simulator will let you see its manufacturer's suggested retail price. The "Buyer's Guide" shows you base price and standard equipment, then lets you add options. When you're done, you can use the "Spreadsheet" function to compute monthly payments.

In short, the 1989 Ford Simulator does just about everything but hand you the keys. And it costs just $6.95; at this price, the Ford Simulator may just be the best buy in the auto industry!

The Ford Simulator requires an IBM or compatible PC (with at least 512K and color graphics), or a Macintosh 512K. Plus or SE (800K).

Use the coupon below to order. Or, for VISA and MasterCard orders, call 1 800 462-4356, Monday–Friday, 9:00 AM–9:00 PM, EST.

Get the new 1989 Ford Simulator: Just $6.95

Mail to: The Ford Simulator
14310 Hamilton Avenue
Highland Park, MI 48203

[ ] Enclosed is my check or money order (ma de payable to The Ford Simulator) for

$____________________ for _______ Ford Simulator(s).
[ ] Bill my [ ] VISA [ ] MasterCard

Card No:________________________________________

Exp. Date:__________________________

Signature:_____________________________________

My computer is [ ] IBM or compatible
[ ] Macintosh

My disk drive size is [ ] 5¼” [ ] 3½”

Name_____________________________________

Address_____________________________________

City  State  Zip

Please allow 3–4 weeks for delivery.

We would appreciate it if you would provide the following information:
1. Please indicate what vehicle you are currently driving:

Year  Make  Model

2. When do you plan to buy your next new vehicle?

[ ] Within 3 months [ ] 4–6 months [ ] 7–12 months

[ ] 12 years [ ] No plans within 2 years


The table Apple would have designed, had they gone into the furniture business.

Any company with the vision to create a product as elegant and useful as the Macintosh would have hit it big in any industry.

Fortunately, Apple chose computers. We, on the other hand, chose to make furniture. More specifically, the MacTable.

Like the Macintosh itself, the MacTable was created to put information at your fingertips, quickly and easily. We accomplish this by thinking of the workspace not as an inflexible monolith, but as a network of individual surfaces onto which you can place each of your Mac components, like your printer, modem, external drive, mouse, even manuals. Everything with plenty of elbow room, easily within reach, and there when you need it.

Next, each surface tilts to optimize your eye-to-screen and hand-to-component efficiency. Rest assured that as your comfort increases, so does your productivity.

Finally, there's the overall design — sleek, contemporary, and mindful of the future of your computing needs. Because MacTable's surface panels can be arranged, your workspace can accommodate any model of Macintosh, from the Plus to the Mac II... to who knows what.

Surprisingly enough, all of this Mac-like versatility and European beechwood framing is more than affordable: only $289 for MacTable and $139 for the optional roll-away cabinet (doubles as a Laserwriter stand); $279 for the matching, ergonomically balanced chair; lateral file cabinet $239; bookshelves $119; and two-door cabinet $159.

MacTable. It's the workspace that organizes the tools that organize your life. And it's available by calling (800) 722-6263 which, by the way, is not Apple's phone number.

To order your MacTable or for more information call:
TOLL FREE (800) 722-6263 in WA state (206) 481-5434
Prices do not include U.P.S. shipping.

MacTable. The ultimate Mac peripheral.

ScanCo
P.O. Box 3217, Redmond, WA 98073-3217
When you combine Aldus PageMaker® with Aldus® FreeHand™, you have the power to create anything imaginable. And do it faster and easier than ever before.

Today's best-selling desktop publishing and advanced drawing programs give your Macintosh powerful capabilities. And they give you unequalled versatility, control, and productivity for serious desktop publishing.

With Aldus FreeHand, you can produce everything from simple graphics to sophisticated illustrations. Unlike other advanced drawing programs, it lets you see your changes on the monitor while you work. So it's easy to refine a shape or apply PANTONE® Colors without losing sight of the big picture.

And Aldus FreeHand gives you greater text handling capabilities than any other program. Which gives you total control over typography. Curve text on a path, rotate or stretch type, mix sizes, fonts, and colors. You'll spend less time running back and forth to the typesetter. And less money on type.

**PANTONE® is a registered trademark of Pantone Inc.**

*Pantone, Inc.'s check-standard trademark for color reproduction and color reproduction materials. **Offer good in U.S. and Canada only and expires 9/30/89. Aldus, the Aldus logo, and PageMaker are registered trademarks and Aldus FreeHand is a trademark of Aldus Corp. Macintosh is a registered trademark of Apple Computer Inc. PANTONE® is a registered trademark of Pantone, Inc. ©1989 Aldus Corp. All rights reserved.*
After you polish your graphics and display type in Aldus FreeHand, place them into PageMaker. And marvel at how well these powerful design tools work together.

Only PageMaker's unique combination of precision and grace can make page layout such a rewarding experience. For both short and long documents. Ruling, kerning, spot color, text flow, wraps. You name it. It's all there, in a familiar environment as natural as your drawing board.

When you combine Aldus FreeHand and PageMaker, you have more than today's most advanced illustration, design, typography, and page layout capabilities. You have a creative edge in business.

Discover today's powerful design team.

Call 1-800-333-2538, Department J-2, for your FREE copy of the Aldus Design Team information packet.** Or visit your nearest authorized Aldus dealer.

The Creative Edge in Business.
FontSizer™ takes the guesswork out of desktop publishing by creating accurate screen fonts from your PostScript® printer fonts.

FontSizer allows you to build a standard Font/DA Mover screen font from any PostScript printer font in any style (plain, bold, italic, or bold italic) at sizes up to 127 point.

**ACCURATE TYPE IMAGING**

Instead of the crudely scaled bit map produced by your Mac, FontSizer uses your printer to build a precision NFNT bitmap at the full Macintosh screen resolution.

**PRECISE CHARACTER SPACING**

With FontSizer built fonts you can fine tune headlines, drop caps, leading and kerning without repeatedly printing proofs.

96 Point ITC Avant Garde®

FontSizer works with resident and downloadable fonts and is compatible with popular font management utilities. For more information or dealer inquiries call (512) 339-0001.

**NOW SHIPPING $99.95 TO ORDER CALL TOLL FREE 1 (800) 552-7654.**

**CONSPICUOUS CONSUMER**

Surveyed its members and asked them to identify the developer who provided the best end-user support for products developed or acquired during calendar year 1988. The envelopes, please.

First place went to CE Software for QuickMail. CE Software also won second place for QuickKeys, in a three-way tie that included Acius for 4th Dimension and Claris for FileMaker 4. Honorable mentions were given to Working Software for SpellSwell, Microsoft for Power Point, and Shiva for NetModem. According to APX, "the winners were praised for their fast response to user problems, easy access to help lines, technical level of support staff, frequency of product updates and bug fixes." It's nice to see strong support rewarded.

**WASHINGTON'S READY TO DEAL**

Washington Apple Pi is holding its annual "garage sale" in June. This fund-raiser gives people a chance to liquidate equipment they've outgrown. Some 300 people are expected to attend the event, tentatively scheduled for June 24. Call 301/654-8060 for the location and information about renting a table if you've got merchandise to sell. General admission is $2.

**COMPUTING WITH A CONSCIENCE**

Computer Professionals for Social Responsibility is a national nonprofit organization with 18 chapters across the country. Founded in Palo Alto, California, in 1983, the 2500-member group is concerned about the impact of computer technology on society. The group's goal is to provide a forum for discussion about the critical applications of computer technology in many areas, including civil liberties, the workplace, and elections. Call 415/322-3778 for more information.

I love happy endings. Send your nominees for sainthood to Service Heroes, Macworld, 501 Second St., San Francisco, CA 94107 or via AppleLink (Macworld/1) or MacNet (Branscum). Conversely, drop me a line if a company is ignoring you. I will help solve your problem, if I can. If your user group is sponsoring an event, please get in touch. Attention Mac-only dealers: I'm compiling a list, so let me know you're out there.
Introducing the T16™ Color Display System from E-Machines. T16 features a custom 16" Sony Trinitron that displays a working area almost twice the size of the Mac II standard 13" screen. See full-page, high resolution images in 256 brilliant colors with 67Hz flicker free performance. All at a cost lower than any other large color screen.

We've been told by independent experts that the E-Machines T16 is the only color display sharper than Apple 13" system. That's no accident. Our engineers are leaders in color video display design. In fact, members of the T16 team developed one of the very first color CAD workstations.

The T16's ability to display full-page actual size color slides makes color presentations from your desktop a reality. Desktop publishers can select PMS colors for layout and reverse colored type over graduated tones. Architects and Interior Designers can now design color boards on screen.

We've brought down the high price of color, while giving you the working space to be more productive. And productivity is what it's all about. Our customers at FORTUNE 500 companies have shown a 20% increase for E-Machines large screen users. That's a very high payoff in anyone's business.

Call us today for more information and the E-Machines dealer near you.
MapMaker by Select Micro Systems

MapMaker is a complete business map making system. It can quickly uncover hidden relationships in geographic data, and demonstrate the findings with stunning presentation graphics. MapMaker includes population statistics for each of the United States, as well as 176 other countries. MapMaker is the definitive tool for market research, site analysis, sales force performance, etc. $215.

MODEMS

Abaton InterFax 12/48 325.
Anchor Automation MacPac 2400E w/software & cable 179.
Best Data Products SmartOne 2400/1200 w/software & cable Special 169.
CMS CMS 2400BMX 179.
Epic Epic 2400 Int. Mac SE Special 315.
Epic 2400 Int. Mac II Special 315.
Hayes Microcomputing Smartmodem 1200 299.
Smartmodem 2400 449.
Practical Peripherals Practical Modem Mini 1200SA 77.

Practical Modem 2400SA 179.
MacCommPack (2400SA w/microphone & cable) 225.
Prometheus Promodem 2400M Ext. Special 199.
Super Corporation Super Modem 2400 149.
Ven-tel 

Practical Modem Mini 1200SA 77. Mac2400E (Int. Mac II w/MS Works) 369.

Micro Planner 6.0 by Micro Planning

Micro Planner is the only project management package that truly combines power and ease of use. Critical Path Analysis (PERT) and powerful resource management capabilities allow managers to accomplish projects on time and on budget. $325.

NETWORKING SOFTWARE & HARDWARE

CE Software QuickMail 159.
Farrallion PhoneNet AppleTalk 9.
PhoneNet DTim B or D99 35.
Tminbuku 65.
TrafficWatch 139.
LaCie 69.
SilverServer Special 65.
Magnus FileMagic Special 65.
Microsoft Microsoft Mail 1-4 users 165.
Oldvrai Software ClipShare 109.
Font Sharer 149.
Shiva NetModem V2400 479.

Net Serial X232 289.
Net Bridge or TeleBridge 349.
SuperMac Software Acknowledge 329.
Multi User Super LaserSpool 199.
TOPS

TOPS T2.1 Mac, T2.5 Dos Special 149.
TOPS Flashbox Special 125.
TOPS Repeater 129.
TOPS FlashCard 169.
InBox MacConnection 45.
InBox Starter Kit Special 149.

TopsaTeleconnectors D9 or D89 39.

Expressionist 2.0 by Allan Bonadio Associates

Expressionist 2.0 is a powerful application and desk accessory that quickly and easily creates mathematical equations for your word processing, drawing, or page layout documents. A must for every scientist and engineer. $79.

PRINTERS & DIGITIZERS

Digital Vision Computer Eyes-Mac 209.
Kolta Technologies Corp. MacVision 2.0 (Digitizer) 219.
Mac Director 115.
Kuta IS A35 Tablet 255.
Cordless 4 Button Cursor 65.

Logitech ScanMan 359.
Sasha SP1000 (imagerwriter comp.) 356.
Summagraphics Bit Pld Plus 325.
ThunderWare ThunderScan 169.

Mac II Power Accessory 42.

EDUCATIONAL/CREATIVE SOFTWARE

Als Nova Practica Musica 2.1 Special 75.
Barron’s Barron’s SAT Bible Research The Word (KJV or NIV) 175.
Bogus Productions Studio Session 175.
String Quartet, Country or Heavy Metal 15.
Super Studio Session 75.
Boing Star Technology Alphabet Blocks 32.
Taking Ties 69.
Broderbund Expressionist or Black & Whites 30.
Sensei Geometry, Calculus or Physics 59.
Typography 20.
Where in the World is Carmen San Diego? 27.
Where in the USA is Carmen San Diego? 32.
Coda Mac Drums 32.
Perceive 52.
Davidson & Associates 36.
Math Blaster or Word Attack! 27.

Electronic Arts Mavis Beacon Typing 35.
Venture’s Business Simulator 47.
Deluxe Music Construction Set V2.5 45.
Fill a Byte 49.
Dinosaur Discovery Kit, Puzzle 27.
Storybook or Rhinoing NoteBook 27.
Mindscape Perfect Score SAT 26.
Crystal Paint 27.
Individual Typing Instructor Encore 26.
Learning Company Reader Rabbit 26.

Niles & Associates End Note 62.
Nordic 35.
MacKids Educational Prog. (ea) 28.
Simon & Schuster Typing Tutor IV 36.
Springboard Top Honors 59.
Family Matters or Atlas Explorer 28.

FASTAT by SYSTAT

FASTAT is a new statistics and graphics package for the Mac that is accurate and easy to use. Use it for graphics, tables, financial projections and surveys. FASTAT has more features and statistical routines than Mac stat packages costing over twice as much. Fast help, 3D scatterplots and surfaces, MactDraw-like tools, and color make FASTAT spectacular. $165.

BUSINESS SOFTWARE

Abacon Concepts StatView II (Mac+, SE, II w/68000 & 68881) 339.
StatView SE+ Graphics 229.
Access Technology Trarpeze 2.1 149.
Ashton Tate Full Impact 249.
BrainPower ArchText 179.
StatView 512 Plus 175.
Math View Professional 139.
DataScan 118.
Bravo Technologies MacCalc 77.
Chang Laboratories C.A.T. Special 229.
Claris MacProject II 379.
Smartform Designer 309.
Individual 101 Macros For Excel 37.
Mainstay Capture 42.
Mac Flow 2.0 or Mac Schedule 115.
Meta Software MetaDesign 199.
Micro Planning International Micro Planner 5.0 Special 325.

Microsoft Works 2.0 189.
Microsoft Excel 1.5 255.
Nolo Press WillMaker 3.0 34.
For the Record 29.
Paracompa Milo 169.
Pro Plus WallStreet Investor V3.0 469.
Satori Software 19.
Bulk Maker 3.2 Special 78.
Bulk Maker Plus 195.
Sinha eins E 165.
Shana Corporation Fast Forms 89.
SoftView MacInUse 42.
Syntex Mac Envelope 4.0 Special 55.
Mac Invoice 29.
Syntex Systat 3.2 (Specify Mac Plus, SE or Mac II) 459.

Faster
SHOWCASE F/X by Aegis

Aegis' SHOWCASE F/X is the feature packed special effects and animation system for fonts and graphics. Enhance your graphic images with powerful, unique headlines by applying styles to any Macintosh font. Distort, rotate and rescale graphic images and fonts. Create animated text and play it back at 60 frames per second! For high impact presentations and desktop video, you can't beat Aegis' SHOWCASE F/X ............. $199.

SPELLING & GRAMMAR CHECKERS

Aegis Development

- Spellswell 2.0
- Deneba Software Comment 2.0
- Electronic Arts Thunderriff II

Lundeen & Associates

- WordFinder Spell It I
- Acrus Electronic Word Finder

Microlytics, Inc.

- MacProof 3.0
- Word Finder (Synonym Finder)

Sensible Software

- QuickKeys (Macro Program)
- Sensible Grammar or BookEnds

Electronic Arts

- Electronic Word Finder

THREE VOLUMES

- Practica Musica 2.1
- Practica Musica 2.1 adds a 190-page textbook and several new activities to his award-winning ear training and music theory program. Perfect for home or school. ... $75.

DESKTOP ACCESSORY PROGRAMS

Affinity Microsystems

- Tempo II
- Affinities
- Borland Sidekick 2.0

Casady & Greene, Inc

- QuickDex 1.4A
- CE Software DiskTop 3.0

Deneba Software

- Comment 2.0

Electronic Arts

- Disk Tools Plus
- Mainstay Think'n Time

Mainstay

- International

Super Glue

- Borland Reflex Plus
- CE Software

- Symmetry's HyperDA (要求32K)

Deneba Software

- Comment 2.0
- TENpointO OpenIt!

TENpointO

- FileMaker II

Fox Software

- FoxBase+ FocalPoint II

DATABASE MANAGEMENT

Acruis 4th Dimension

- Special 399.

Activation

- Special 69.

Apps on Hypercard

- Special 69.

Apple Computer

- HyperCard

Ashton Tate

- dBASE Mac 1.0

Borland

- Reflex Plus

Clara

- FileMaker II

Cutting Edge 800K Drive

by Cutting Edge

The Cutting Edge 800K floppy disk drive takes advantage of the newest technology to offer high speed, low noise, high reliability in a compact, stylish case. The Cutting Edge 800K floppy drive is compatible with all new ROM Macs including the Mac SE and Mac II. The Cutting Edge 800K would make an attractive addition to any Mac. ...................... $175.

UTILITY SOFTWARE

A.S.D. FileGuard

- Special 129.

Beyond Inc.

- Menu Fonts 2

Central Point Software

- Copy II Mac

ClipPackage Plus Utilities

- Special 20.

Faronic Computing

- Screen Recorder 135.

Fifth Generation Systems

- Suitcase II

Intel Insight Development

- MacPrint

MainStay AntiTox or ClickPaste

- Special 79.

OuicKeys (Macro Program)

- Special 80.

PC Tools Deluxe Mac v5

- SuperSpool 5.0

CE Software

- QuickKeys (Macro Program)

Microlytics, Inc.

- GOFer 44.

Microlytics, Inc.

- INITPicker 29.

Netcom Software

- MainClip 59.

PC Products

- Read-It! O.C.R. 2.0

PC Programs

- CE Software SuperlaserSpool 2.0

Redeemers

- MultiClip 59.

SuperMac Software

- SuperSpool 5.0

Aegis

- ScreenGems

The Cutting Edge BOOK

floppy disk drive takes advantage of the newest technology to offer high speed, low noise, high reliability in a compact, stylish case. The Cutting Edge 800K floppy drive is compatible with all new ROM Macs including the Mac SE and Mac II. The Cutting Edge 800K would make an attractive addition to any Mac. ...................... $175.

DESKTOP ACCESSORY PROGRAMS

Affinity Microsystems

- Tempo II
- Affinities
- Borland Sidekick 2.0

Casady & Greene, Inc

- QuickDex 1.4A
- CE Software DiskTop 3.0

Deneba Software

- Comment 2.0

Electronic Arts

- Disk Tools Plus
- Mainstay Think'n Time

Mainstay

- International

Super Glue

- Borland Reflex Plus
- CE Software

- Symmetry's HyperDA (要求32K)

Deneba Software

- Comment 2.0
- TENpointO OpenIt!

TENpointO

- FileMaker II

Fox Software

- FoxBase+ FocalPoint II

DATABASE MANAGEMENT

Acruis 4th Dimension

- Special 399.

Activation

- Special 69.

Apps on Hypercard

- Special 69.

Apple Computer

- HyperCard

Ashton Tate

- dBASE Mac 1.0

Borland

- Reflex Plus

Clara

- FileMaker II

Cutting Edge 800K Drive

by Cutting Edge

The Cutting Edge 800K floppy disk drive takes advantage of the newest technology to offer high speed, low noise, high reliability in a compact, stylish case. The Cutting Edge 800K floppy drive is compatible with all new ROM Macs including the Mac SE and Mac II. The Cutting Edge 800K would make an attractive addition to any Mac. ...................... $175.
# Programs Plus

**ACCOUNTING PACKAGES**

<table>
<thead>
<tr>
<th>Company</th>
<th>Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aatrix Software</td>
<td>Aatrix TimeMinder 109</td>
</tr>
<tr>
<td></td>
<td>Aatrix Payroll Plus 159</td>
</tr>
<tr>
<td>Bedford Software</td>
<td>Simply Accounting 219</td>
</tr>
<tr>
<td>Chang Labs</td>
<td>Rags to Riches Gen. 3-Pak 3.1 (GL/AR/AP) Special 289</td>
</tr>
<tr>
<td>Check Mark MultiLedge</td>
<td>Payroll 189, Cash Ledger 129, Dac Software 44</td>
</tr>
<tr>
<td></td>
<td>DacEasy Light 33 Intuit Quicken 61</td>
</tr>
</tbody>
</table>

**COMMUNICATION SOFTWARE**

<table>
<thead>
<tr>
<th>Company</th>
<th>Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compuserve</td>
<td>CompuServe Starter Kit 24</td>
</tr>
<tr>
<td></td>
<td>CompuServe Navigator 45</td>
</tr>
<tr>
<td>DateViz</td>
<td>MacLink Plus with Cable 139</td>
</tr>
<tr>
<td>Freesoft</td>
<td>Red Ryder V10.3 54</td>
</tr>
<tr>
<td>Hayes</td>
<td>Smartcom II 3.0 86</td>
</tr>
<tr>
<td></td>
<td>Insigna SoftPC 249</td>
</tr>
<tr>
<td></td>
<td>Software Ventures 45</td>
</tr>
<tr>
<td></td>
<td>Microphone II (Includes Glue) 225</td>
</tr>
<tr>
<td>Solutions, International</td>
<td>BackFax 127, Synergy Software VersaTerm 65</td>
</tr>
<tr>
<td></td>
<td>VersaTerm-Pro 159</td>
</tr>
<tr>
<td></td>
<td>Traveling Software 83</td>
</tr>
<tr>
<td></td>
<td>LAP-LINK 83</td>
</tr>
</tbody>
</table>

**GRAPHICS SOFTWARE**

<table>
<thead>
<tr>
<th>Company</th>
<th>Product</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3G Graphics 59</td>
</tr>
<tr>
<td></td>
<td>Images w/Impact Graphics &amp; Symbols 68</td>
</tr>
<tr>
<td></td>
<td>Images w/Impact Business 1</td>
</tr>
<tr>
<td>ABA Software</td>
<td>Draw II 2.0 Olaf Sam 79</td>
</tr>
<tr>
<td></td>
<td>Graphit II 2.05</td>
</tr>
<tr>
<td>Adobe Systems</td>
<td>Illustrator 8.0 369</td>
</tr>
<tr>
<td></td>
<td>Adobe Fonts (Various versions) 324</td>
</tr>
<tr>
<td></td>
<td>Call</td>
</tr>
<tr>
<td>Aldus Freehand</td>
<td>349</td>
</tr>
<tr>
<td></td>
<td>Micro Corp. 2.2</td>
</tr>
<tr>
<td></td>
<td>FONTastic Plus 2.0 or KeyMaster 52</td>
</tr>
<tr>
<td>Ashton Tate Fullpaint</td>
<td>69.</td>
</tr>
<tr>
<td></td>
<td>Print Shop or Clip Charts 76</td>
</tr>
<tr>
<td></td>
<td>Drawing Tables 76</td>
</tr>
<tr>
<td></td>
<td>Classic Pack (vol. 3-6, 13)</td>
</tr>
<tr>
<td></td>
<td>CE Software Calendar Maker 3.1 27.</td>
</tr>
</tbody>
</table>

**GRAPICS SOFTWARE**

<table>
<thead>
<tr>
<th>Company</th>
<th>Product</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Informix Wingz 275</td>
</tr>
<tr>
<td></td>
<td>Innovative Data Design 139</td>
</tr>
<tr>
<td></td>
<td>Dreams 279</td>
</tr>
<tr>
<td></td>
<td>MacDraft 1.2B 145</td>
</tr>
<tr>
<td></td>
<td>Laserwave Laserpaint Color II 359</td>
</tr>
<tr>
<td>Letraset</td>
<td>ImageStudio 2.1 275</td>
</tr>
<tr>
<td>MacroMind MicroMind</td>
<td>Director 445</td>
</tr>
<tr>
<td></td>
<td>Micro CAD/CAM 685</td>
</tr>
<tr>
<td></td>
<td>M2Station 85</td>
</tr>
<tr>
<td>Micro Illusions</td>
<td>Photon Paint 173</td>
</tr>
<tr>
<td></td>
<td>Microsoft 289</td>
</tr>
<tr>
<td></td>
<td>MacAtlas Hyper Atlas 64</td>
</tr>
<tr>
<td></td>
<td>MacAtlas Professional 129</td>
</tr>
<tr>
<td></td>
<td>(PCT/MacDraw Version) 129</td>
</tr>
<tr>
<td></td>
<td>MacDraft 3.0 (MacPaint Format) 45</td>
</tr>
<tr>
<td></td>
<td>MacAtlas Paint 2.0</td>
</tr>
<tr>
<td></td>
<td>MacDraw III 249</td>
</tr>
<tr>
<td></td>
<td>Microsoft PowerPaint 2.1</td>
</tr>
<tr>
<td></td>
<td>MacDraft 2.0 (MacDraw) 289</td>
</tr>
<tr>
<td></td>
<td>MacDraft 3.0 (MacDraw) 289</td>
</tr>
<tr>
<td></td>
<td>Mac the Ripper or Orchestra of Fonts 32</td>
</tr>
<tr>
<td></td>
<td>People, Places-Things or Talking 32</td>
</tr>
<tr>
<td></td>
<td>Care of Business 32</td>
</tr>
</tbody>
</table>

**GRAPHICS SOFTWARE**

<table>
<thead>
<tr>
<th>Company</th>
<th>Product</th>
</tr>
</thead>
</table>

**GRAPHICS SOFTWARE**

<table>
<thead>
<tr>
<th>Company</th>
<th>Product</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Casino Master Mac II 45</td>
</tr>
<tr>
<td></td>
<td>by Centron Software</td>
</tr>
</tbody>
</table>
With TOPS ($149) you can transform any Mac with at least 512K of memory into a TOPS Network station. InBox ($149) enables users to send and receive messages, memos, and files over a TOPS Network. With FlashBox ($125) you can speed up your AppleTalk network and allow your Mac to communicate at the Flash talk speed of 770K bits per second.

HYPERMEDIA & LANGUAGES

| Borland Turbo Pascal | 68. | Smithers & Barnes | 125. |
| Hyper Animator | 59. | Softworks Stack Cleaner | 135. |
| Consulair | 42. | Lightspeed Pascal | 95. |
| Hyper Press Script Screen | 119. | TENpoint FocalPoint II | 119. |
| Tansa | 42. | Antec C | 59. |
| Antec C + SDB | 42. | Antec C + MFP | 59. |
| Microsoft | 42. | Zedcore | 69. |
| Quick Basic | 99. | Z8 basic 5.0 | 99. |

Business Sense by Monogram

Business Sense is serious business software for the small to medium size business. It's easy to use and hard to outgrow. General Ledger, Accounts Receivable, Accounts Payable, Payroll, Invoicing and Budgeting functions are fully integrated in one powerful package. All this power is easy to use. If your business has what it takes, Business Sense from Monogram can take you all the way. ....... $279.

BLANK MEDIA

| Bulk (Sony) 3½" SS/DD Disks (10) | 18. | Sony 3½" DS/DD Disks (box of 10) | 18. |
| Sony 3½" SS/DD Disks (box of 10) | 18. | Fuji 3½" DS/DD Disks (box of 10) | 18. |
| Double Sided 3½" Diskettes | 18. | Maxell 3½" DS/DD Disks (box of 10) | 19. |
| Single Sided 3½" DS/DD (box of 10) | 20. | 3M 3½" DS/DD Disks (box of 10) | 19. |

Super/SuperLaserSpool by SuperMac Software

SuperSpool ($54) and SuperLaserSpool ($79) take control of printing in the background and return the Mac to your control in seconds. These best-selling print spoolers are the fastest available and include a special desk accessory that lets you delete documents from queue, re-order them, reroute documents to other printers (SLS) and preview or zoom in on documents.

Copy II Mac by Central Point Software

Copy II Mac makes back ups of nearly all protected Macintosh software. Even copies some popular programs from a 400K disk to an 800K disk. Copy II has great disk utilities including repairing damaged disks and undeleting files .......... $20.

WORD PROCESSORS & DESKTOP PUBLISHING

Access Technology Mind Writer 2.0 95. | Letra Studio 289. |
Aegis Showcase F/X Special 199. | Microsoft Word 4.0 255. |
Allan Bonadio Associates Special 189. | Prefered Publishers Special 189. |
Expressionist 2.0 Special 75. | Paragon Concepts News Special 189. |
Aldus Corporation | Vantage 59. |
PeachMaker 3.0 389. | Quark, Inc. 499. |
Ashion Tale 369. | QuarkXPress V2.0 499. |
FullWrite Professional 269. | QuarkStyle 199. |
Brodexford | Symantec More II 255. |
Corel/OmniPage 559. | T/Maker Company 199. |
Claro MacWrite 5.0 269. | WriteNow V2.0 99. |
Emerald City SmartArt 269. | Word Perfect Corporation Word Perfect 179. |
Lettresel | Working Software 179. |
Letra Studio 459. | QuickLettfe 75. |
Ready Set Go! 275. | Aegis Showcase F/X Special 199. |
Super/SuperlaserSpool by SuperMac Software

S.A.M. by Symantec

S.A.M. is the only comprehensive virus protection program for the Macintosh. It offers virus protection, detection, and elimination. By tracking suspicious activity caused by viruses, S.A.M. will stop all known and unknown viruses from infecting your Macintosh. With all this protection it is virtually impossible for a virus to infect your computer ......... $69.

SPECIALS GOOD THROUGH JUNE 30, 1989

NOW TOLL-FREE IN CANADA 1-800-344-7753

MONDAY THRU FRIDAY 9 A.M. - 9 P.M. (EASTERN TIME)
SATURDAY 9 A.M. - 6 P.M. (EASTERN TIME)
Epic 2400 II Modem by Epic Technology

The Epic 2400 II internal modem is a fully featured Hayes compatible modem for the Apple Macintosh II and IIx. The Epic 2400 II modem features 2400/1200/300 baud modulation, multi-port switching with Epics exclusive ReArm software, tone or pulse dialing, auto & manual answer, built-in test modes and a software controllable speaker. $315.

DiskExpress by AlSoft

DiskExpress removes all the disk fragmentation that slows you down and optimizes your hard disk for top speed. Plus, DiskExpress will detect potential problem areas on your hard disk. Reclaim missing disk space. Rearrange your files to reduce future problems. Safely prevent unwanted file recovery. Quickly unfragment your files and display disk free space. $49.
MacPrint
by Insight Development

Introducing MacPrint. An easy-to-use software utility that lets you use virtually any Mac application on virtually any printer. including HP LaserJet II and ID. MacPrint displays all your priner's fonts for true WYSIWYG performance. After a simple installation, it's completely transparent in operation. It's the most cost-effective print option for your Macintosh. ............. $79.

DISK DRIVES/HARD DISKS/UPGRADES

1 Meg SIMMS Call MacSnap Plus 2 (MacPlus) to 3MB Non Expandable 439.
Mac 86 Co-Processor 419.
Mac 286 Co-Processor (Mac II) 1069.
CMS SD Ser. MacStack SD20 (Mac/SE/III) 569.
SD Ser. MacStack SD30 (Mac/SE/III) 615.
SD Ser. MacStack SD43 (Mac/SE/III) 789.
Cutting Edge Platinum Color Optional Built-In Modems. 175.
Cutting Edge楔子 XL 30 Special 539.
Plus SCSI Hard Drive Plus SCSI Hard Drive 669.
Cutting Edge楔子 XL 45 Special 689.
Cutting Edge楔子 30 Internal Hard Drive 439.

MacEnvelope 4.0 by Synex


FileMagic by Magnus

FileMagic is a network user's best friend. By personalizing the Open and Save commands of virtually every application, FileMagic gives you instant access to open files and folders, regardless of their location on the network. You can create standard configurations to give even novice users expert access to the network. Order now and get WindowMagic and MultiMagic, absolutely free! ....... $65.

ENTERTAINMENT SOFTWARE

Access MicroPro Pirates 32.
Accolade Hard Ball or Mean 18 4th & Inches 28.
Acclaim Universal Military Simulator or Manhole 26.
Magic & Magic 28.
Artwork Bridge 5.0 28.
Brodereaden Ancient Art of War or At Sea 27.
ShuttlePuck Cafe Poster Maker Plus 27.
Busyrise Software Call MacBottom HD-21 Special 55.
PS1 Mustang or Ferrari Grand Prix 26.
Cassy & Greene, Inc. Crystal Quest Crystal Quest w/Cricket Editor 26.
Centron Crapsmaster Roulette master or BlackJack Ace 25.
Mobilus Technologies MacPrint 24.
Cutting Edge Wedge 800k Drive Special 175.
Cutting Edge Wedge XL 30 539.
Cutting Edge Wedge XL 45 669.
Cutting Edge Wedge HD-32 689.
Cutting Edge Wedge Hard Drive HD-32 699.

ProModem 2400M by Prometheus

The ProModem 2400M includes a 2400 baud modem, Red Ryder communications software, Version 10.3 plus a Mac cable. Everything you need for telecommunications is contained in this one convenient package. ............. $199.

Smart One 2400XMAC by Best Data Products

The Smart One 2400XMAC — a complete package for the Mac. Includes free communication software, free cable assembly, free access to Compuserve and Con-nect Professional Information Network, 100% Hayes compatible. Two year warranty ........... $169.
Our new Mac II modem has great inner strength.

From the moment you slip Ven-Tel's new Mac2400E™ internal modem into your Mac® II, you'll see that it's quite a bright performer.

Using MNP™ Level 5 data compression to send and receive at a sharp 4800 bps, the Mac2400E greatly reduces telephone time. Which, of course, nicely reduces telephone bills.

Plus, the Mac2400E supports both X.PC and MNP Level 5 error correction protocols. So you can rest assured that the integrity of your data won't be dimmed.

In the unlikely event the Mac2400E doesn't perform, it's covered by our free, five-year warranty. However, before it comes to that, just call our 800 Help Line. Ven-Tel's technical staff can probably shine a little light on the problem and get you going again quickly.

So don't just put any modem in your Mac II. Go with the one that outshines all the rest.

For complete details about our new Mac2400E internal modem, call 800-538-5121.

MNP is a trademark of Microcom, Inc.
The Mac2400E is a trademark of Ven-Tel, Inc.
Mac II is a registered trademark of Apple Computer, Inc.

Circle 469 on reader service card
The first computer I built, 13 years ago, had 16K of memory. That was considered a lot. Today I regularly use a computer with 8MB of memory, and it is barely enough. There’s an old programmer’s maxim that says, “Programs expand to take up all the memory that is made available.” Sure seems like that’s the case, doesn’t it?

Today’s topic, in case you haven’t already guessed, is memory. As I write this, memory is perhaps the hottest hardware topic affecting the Macintosh. Yes, DMA (direct memory access), optical disks, multitasking, 24-bit color, and dozens of other options are being bandied about as the latest and greatest thing, but memory is something that affects all of us, and there’s good news a-brewin’.

THE DATA EXPLOSION
But before I get into the news about new memory products, let me deal with the number one question I get asked concerning memory: “Why is it that a program like Illustrator 88 shows in the Finder as being 453K in size but requires a minimum partition size of 2048K?”

A good question, and it gets right to the root of why 8MB is barely enough memory for some of us Macintosh users. You see, the simple answer is that the Mac II opened up a floodgate of new uses for the Mac, and every one of those uses gobbles up memory for the data it needs. Consider color, for example. Where before programs didn’t have to keep any particular information about the color of an object, now they must allocate a minimum of 6 bytes (the size of an RGB Color data structure). That’s for each object. Worse still is the case where you’ve scanned an image that has graduated colors (in TIFF format, for example). While the entire scan may consist of one object, say a box, that doesn’t do us any good if the box changes color from edge to edge. How do we keep track of that change? Do we allocate a new object for each miniscule change in color? Or how about a program that scans a page image at 300 dots per inch—that’s 8.4 million potential dots in black and white, and adding color information is certainly going to raise that number significantly, no matter how efficient the program.

Today’s Mac programmers are facing tough questions and, more often than not, taking the easy path to fame by using more memory. I’m not particularly trying to pick on Adobe and its Illustrator program, but I do often wonder why Aldus FreeHand, which has virtually the same feature set, works just fine in half the memory Illustrator uses.

I guess I’m trying to make two basic points: First, we’re demanding more sophisticated applications, and these applications are dealing with larger sets of data, which obviously means they’ll take up more memory. Second, watch carefully for programs that are more efficient than others. Even though most programs are getting more complex and larger, some programmers are quite obviously more efficient coders than others.

So before you go running off in search of more memory and then grumble about the price, consider first whether you’re asking more of your machine, and whether you’ve taken a close look at how efficient the programs you use are. You might be surprised. It wasn’t until I started trying to draw and manipulate color graphics that I found my computer’s memory inadequate, and after taking a closer look at the programs I was using, I found others that did everything I needed in less memory.

THE 8MB BOUNDARY
You need one more piece of information before I can tell you about the new memory products. It didn’t seem significant back when the 128K Macintosh was introduced in February 1984, but the designers...
We need someone with the confidence of a surgeon, the dedication of a marathoner and the courage of an explorer.

We need someone to fill a unique job opening. Someone to spend two years in another country. To live and work in another culture. To learn a new language and acquire new skills.

We need someone who wants to help improve other people's lives. Who's anxious to build lasting friendships. To gain memories and experience that will last a lifetime. And a sense of fulfillment few jobs can match.

We need a Peace Corps volunteer. Interested? The first step is easy. Call 1-800-424-8580, Ext. 93.

Peace Corps.
The toughest job you'll ever love.

built into the Macintosh a memory limitation. The limitation came about because they decided to use some of the address lines for things other than RAM (and they used only 24 address lines anyway, which is 8 fewer than the current 68020/68030 processors can handle). The result was that the Macintosh was set up to address only 8MB of memory, maximum (the original had 18 address lines plus a device select line for RAM). At the time, none of us techies really questioned the decision, especially since Mac software allowed for swapping pieces of a program in and out of memory as needed.

Well, that innocence lasted less than four years. When the Mac II was introduced, it came with eight SIMM sockets, and you could stick 1MB SIMMs into each. But the wiser among us realized two things: that the Mac II's processor was capable of putting out 32-bit addresses (which can address up to 4 gigabytes of memory), and that 4MB RAM chips were just on the horizon. Could the Mac II handle additional memory? And if so, when?

As I write this, the only operating system available for a Mac that uses 32-bit addressing is A/UX. So if you're running A/UX on your Mac II or IIX, you can break the 8MB memory barrier with abandon. You'll get stuck at 32MB, however, since the Mac II has reserved some of the addressing space for things like NuBus, additional peripherals, SCSI, and so on. And for the rest of us, we'll have to wait for Apple to rewrite the Finder and System to understand 32-bit addresses.

Apple has promised 32-bit addressing (and more) for System 7.0, although it has given no clear indication of when that version will become reality. Moreover, the changeover may not be very smooth. Mac OS-based programs that today cannot run under A/UX are not going to run under System 7.0, either. And the switchover looks like it will be every bit as problematic as the one many of us made when we traded in our Pluses for IIs. So look for a huge round of software upgrades shortly after System 7.0 appears. But cheer up. There are a few developments on the hardware end that portend great things.

(continues)
We challenge the competition to match our five year warranty. We'll even give them the plans!

Other manufacturers offer you a one, maybe two year warranty on their hard disk drives. Which probably tells you something about the way they make them.

Only Microtech gives you a five year limited warranty. And that says a lot about the way we make ours.

In fact, when you buy a Microtech internal or external hard disk drive for your Macintosh, you're getting the product of superior design. Top of the line components. Excruciating quality control. And the most dedicated service and support staff in the business.

Size for size, you're also getting the fastest drives available. Each one bundled with MacTREE Plus, the hard disk management system, and DS BACKUP. And all for the most competitive pricing around.

So for quality, economy, and five full years of unmatched performance, insist on a Microtech hard disk drive.

For the rest of you guys, it's back to the drawing board.

Call now to place your order or for more information.

Microtech International, Inc.
29 Business Park Drive, Branford, CT 06405
1-800-325-1895 (203-488-7744 in CT)

© 1989 Microtech International, Inc. All product names are trademarks or registered trademarks of their respective owners.

Terms and conditions of the 5 year warranty are available upon request. Prices and specifications subject to change without notice.

MasterCard and Visa accepted at no extra charge.
A premium edition of the best selling Macintosh game in the world.

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

MacGolf's two courses are together with the four MacCourses, for a total of 108 holes, all in vivid full screen color on the Macintosh II.

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.

### Potential Memory Sizes

<table>
<thead>
<tr>
<th>Bank A SIMM Size</th>
<th>Bank B SIMM Size</th>
<th>Total Memory</th>
</tr>
</thead>
<tbody>
<tr>
<td>256K</td>
<td>none</td>
<td>1MB</td>
</tr>
<tr>
<td>256K</td>
<td>256K</td>
<td>2MB</td>
</tr>
<tr>
<td>1MB</td>
<td>none</td>
<td>4MB</td>
</tr>
<tr>
<td>1MB</td>
<td>256K</td>
<td>5MB</td>
</tr>
<tr>
<td>1MB</td>
<td>1MB</td>
<td>8MB</td>
</tr>
<tr>
<td>4MB</td>
<td>none</td>
<td>16MB</td>
</tr>
<tr>
<td>4MB</td>
<td>256K</td>
<td>17MB</td>
</tr>
<tr>
<td>4MB</td>
<td>1MB</td>
<td>20MB</td>
</tr>
<tr>
<td>4MB</td>
<td>4MB</td>
<td>32MB</td>
</tr>
</tbody>
</table>

Banks A and B refer to the two SIMM sections on the system boards of the Mac SE/30 and all Mac II models. You must add SIMMs in groups of four. The Total Memory column shows the results of all possible SIMM combinations. If your Mac II has four 256K RAM chips in Bank A, for example, and no chips in Bank B, your machine's total memory is 1MB.

### Fatter SIMMs

For example, it looks like we'll be well provided with options to expand our machines from 8MB to 32MB, when the time to do so comes around. I've seen three different methods recently that will help expand memory. And for you A/UX users, these options can help you out today, so pay attention.

The first newfangled option is simply SIMMs with higher-density memory chips on them. The current 1MB SIMMs use eight (or nine) 1-megabit dynamic RAM chips. A few Japanese suppliers are now shipping small quantities of 4-megabit chips, and substituting these quadruples the memory on a single SIMM. Thus, option one in the memory-upgrade department is to sell off your 1MB SIMMs and replace them with 4MB SIMMs. You'll still have eight SIMMs in your machine, but you'll have the full 32MB of memory available (again, assuming you've got A/UX or System 7.0). One company already offering such an option is Micron Technology. This option has some advantages over using higher-density chips, among them lower cost (currently).

Finally, another option is to find one of the piggyback SIMM modules now being offered. ComputerCare was the first company to offer this option, but others are coming. They're currently available as 768K SIMMs, but I expect we'll also see 3MB versions in the future. The way it works is this: The new SIMM module you buy comes with 768K of memory on it, and it has a socket for you to plug your old 256K SIMM into. The combined unit then plugs into one of the sockets on the system board and acts as if it were a single, 1MB SIMM. This option is especially useful for people who have 2MB of memory in their Mac II right now, but want to upgrade to 5MB without sacrificing any of the SIMMs they already own.

Of course, you don't have to replace all eight SIMMs at once, but remember that the Mac II requires that you replace or add SIMMs in multiples of four (see "Potential Memory Sizes").

### Virtual Memory

But none of these memory products is the exciting breakthrough you're probably looking for. After all, the majority of Mac II users have less than the full complement of memory as it is. Fortunately, there's a product recently introduced that just may get you to upgrade to 8MB in a hurry. It's called Virtual, and it's from a new company named Connectix. What it consists of is a 10K INIT and a Motorola PMMU chip to plug into the II's system board. Mac II users can get Virtual as I write this, while Mac Ilx and SE/30 users may have to wait a bit.

Perhaps you've heard about the 68851—otherwise known as the Motorola PMMU—before. PMMU stands for Paged Memory Management Unit, which is a fancy way of saying that it's a traffic cop for memory. The PMMU sits there and (continues)
Our removable hard disk isn't the only thing you'll put in your pocket.

Like the best removable hard disk drives on the market, ours gives you 42 megabytes capacity on each disk cartridge. So you get unlimited storage, and unprecedented portability and security, just as you'd expect. It delivers super-fast 25 ms access speed, for the finest performance money can buy. It comes with the MacTREE Plus hard disk management system and DS BACKUP software, plus all the cables and terminators you need. Which is more than you get with a lot of the others.

What's the big difference? Simple. Buy ours and you'll save several hundred dollars. Plus you'll get the only two year limited warranty in the high-capacity removable disk drive business. And a full year on our cartridges.

So when you think about it, the real question is not why our removable drive costs so little. But why do theirs cost so much? Call now to place your order, or for more information.

© 1989 Microtech International, Inc. All product names are trademarks or registered trademarks of their respective owners. The two year limited warranty is offered on the subsystem only. Microtech hard disk cartridges come with a one year warranty. Pricing and specifications are subject to change.

MasterCard and Visa accepted at no extra charge.

Circle 458 on reader service card
If you want to videotape the output of your MAC™II, then don't get led down a path of misintentions. Consider what you truly need for desktop video: an easy, complete, available solution. You need one that includes real-time video capture and NTSC-compatible output. You need Truevision's NuVista™ 1M videographics card and VID/O™ Box.

The NuVista 1M, with its high-speed video memory, real-time capture, fully-integrated genlock, and broadcast-quality display, is ideal for desktop video production. With the NuVista card, you can capture, store, manipulate and display images from a standard video source. The NuVista 1M also functions as your regular Mac II video card and will run all QuickDraw™ based applications, today and tomorrow. And it only takes up one slot in your Mac II or Mac IIx.

directs memory that contains information, but that isn't being used, to go sit on a disk until it's needed. The PMMIC then instructs memory that is needed to come back from the disk and sit in memory where the CPU can get to it. This scheme has existed for years on mainframe and larger computers, but because of its complexity took some time to work down to the microcomputer.

With a PMMU in your Mac II and the Virtual INIT loaded at boot time, your Mac II works as if it has 8MB of RAM (you will need 8MB of free hard disk space, however, to set aside for the inactive portions of memory). Virtual is apparently somewhat smart about when and how things are paged into and out of memory. Under MultiFinder, for example, it appears that Virtual takes advantage of the fact that only one application is running in the foreground, so Virtual makes sure that what memory you do have is filled with as much of that program as possible. This means that on a 2MB to 5MB machine, you get slight delays when you context-switch between applications, but normally not while you're using a single program. This is not usually possible on a 1MB Mac II running MultiFinder, since the System, MultiFinder, and the application being run usually amount to more than 1MB. Nevertheless, there is only a small sacrifice in performance for a big increase in memory. (For the techies, Virtual uses a 2K page-swap scheme with a least-recently-used buffer algorithm.)

Installing Virtual is simple, at least if you have a clean, well-organized hard disk. You must have 8MB of contiguous hard disk space. If you've been using your hard disk for some time and haven’t used an optimizer like Disk Express, you might find that you have the right amount of free space on the disk but it isn't all in one connected hunk. That means it may take some time to actually install Virtual, since you'll need to reorganize your disk. I'd suggest that you bite the bullet and go ahead and houseclean anyway. In fact, here's the way I'd do it: (1) back up your hard disk in your usual manner; (2) completely erase and reinitialize the disk; (3) put your System Folder back onto the disk; (4) install Virtual; (5) restore your
files, but do so by putting all applications on first, then your data files. If you follow this simple process, you'll not only get Virtual installed correctly, but you'll have optimized both it and your hard disk for the very best performance they are capable of.

Virtual is not without its problems. In its initial release, most debuggers (TM01, MacBug, MacNosy) won't work with Virtual, so programmer types won't be likely purchasing candidates at this time. A more subtle problem comes with products that do direct SCSI I/O (that is, bypass the Mac's system software routines). Most scanners do this, for example, and there's some question as to which other devices do and don't work. (Remember, most tape backup units, optical drives, and film printers, and some laser printers, are SCSI devices—whether they will work or not is dependent upon how their driver was written. Contact Connectix at 415/324-0727 if you need more advice.) Virtual also has problems with any device that attempts DMA transfers, like the recently introduced Surfboard from Jets Cybernetics. If you need to run one of these programs or devices, you can always restart the computer and disable the INIT by holding down the Escape key.

Here's the best part: a PMMU chip is a lot cheaper than a RAM upgrade. Connectix lists the PMMU/Software combination for $695, and the software only (for those of you who already have the PMMU) for $295. That's by far the best deal you're going to get for an upgrade to 8MB, no matter how much SIMM prices have fallen since I wrote this ($269 a megabyte is the best I see today). So, if you've got 8MB of free hard disk space on your Mac II and $695 sitting in your checking account, you're probably already frantically dialing Connectix. Can't say that I blame you—Virtual is the best memory news Mac II users have heard in a long time.

Thom Hogan is president of Macreations, (a Macintosh software developer), and publisher of The Macintosh II Report. His reference book, Programmer's Macintosh Sourcebook, was recently published by Microsoft Press.
The fastest way to get here.

Claris CAD can reduce the huge number of two-dimensional drawings it takes to get a plane off the ground. But it makes them a lot easier to do.

Claris CAD supports ANSI Y14.5 and other drawing standards. So those who design parts can share with those who design wholes.

Accurately drawing graceful curves like these becomes a simple matter of point and click.

Claris CAD is the epitome of "less is more." Less time learning. More time creating.

With the ability to draw in layers, you can hide essential details like wiring and plumbing just a click beneath an elegant exterior.

Draw the lines of fine design as finely as you wish. From 1.5 inches to .0001 mm.

© 1989 Claris Corporation. 440 Corte Avenue, Mountain View, California 94043; 415-962-8946. Starter Kit includes demonstration software, tutorial workbook and video. Offer expires September 30, 1989. A special...
Claris CAD is the first professional 2-D design and drafting tool to fully utilize the intuitive Macintosh way of working. So it takes hours to learn, not days.

Fillets, tangents, keyboard entry, double lines and automatic dimensioning turn your ideas into realities with exacting precision.

Customizable pens, dashed lines, hatch patterns and dimension appearance give you a new level of versatility.

Claris CAD makes it easier to sell your inspirations. Plot your plans, concept sketches, schematics and working drawings exactly as you see them, turn them into slides or overheads, or cut and paste them into proposals and reports.

Keeping the vision in your revisions is easy. Because you don’t have to redraw from scratch.

Claris CAD integrates with other CAD software via optional IGES and DXF conversion programs. So you can move them to larger CAD/CAM systems for 3-D modeling and prototyping.

Here’s the next step: order the Claris CAD Starter Kit, just $29.95 (refundable when you buy the complete program). To order call 800-628-2100. And see how intelligent design begets intelligent design.

Introducing Claris CAD.
"I asked my Farallon dealer for a networking product that'll integrate voice, data, and graphics with AppleTalk networks—and manage the whole operation. I bought all nine of them."

"The PhoneNET System Connector uses ordinary phone wire to create an AppleTalk network. I got one for every computer."

"To make it easy to manage my network and support the users, I'm installing Timbuktu on all the Macintoshes. That way, everyone can share information and access each other's computers."

"Timbuktu/Remote lets me share screens, just like with Timbuktu, over modems or ISDN links."

"I bought PhoneNET CheckNET because it shows me who's on the network and helps me track down problems."

"I also got ScreenRecorder because it makes a tape of screen activity. I'll add sound with MacRecorder to make training lessons, presentations, you name it."

"I got a PhoneNET Repeater so I can easily extend my network to all the buildings I'll own someday."

"I bought the PhoneNET StarController because it expands my network and has valuable network management functions, too."

"TrafficWatch tells me who's talking to whom and how much, and what kinds of errors are occurring on the network. 'Add it to the pile, I said.'"

"I bought the MacRecorder Sound System to add sound to on-screen presentations. It records, edits, and plays back live or prerecorded voice or sound. Wow!"
Why Wait for the Apple Laptop?

Few people recognize a Colby Walkmac laptop as a Mac, and even fewer realize what a power-packed machine it can be with an SE/30 system board, 4MB of RAM, a 40MB hard disk, a 2400-baud modem, a SuperDrive, a SuperCard slot, a port for a color monitor, and batteries that allow about four hours of continuous use. The keyboard, which is molded into the case, is adapted from an actual Apple extended keyboard. The LCD screen is super twist, blue on white, and backlit.

The unit can run off house current worldwide, and an accessory allows it to run from a car's cigarette lighter. The internal dry-cell battery pack is the same as that used with a video camera, and you can recharge it while using the machine. Additional external battery packs can be used in lieu of recharging the internal batteries. The minimal unit weighs about 12 pounds, with batteries adding 4 more.

Colby Systems sells the Walkmac to dealers only, and only as a kit. The dealer is expected to install a system board and floppy drive, presumably scavenged from an actual Mac SE or SE/30. The basic SE unit retails for $5499. An SE/30 system board, together with selections from Colby's list of over two dozen options, can drive the price to over $15,000. The Walkmac accessories list contains everything from a cordless mouse to a 21-inch monitor. A color board, 100 percent compatible with the same hardware and software as the Mac SE/30, can also be installed to work with 19-inch color monitors. Colby will also soon offer a 2400-baud modem that works with cellular phones.

For further information, contact Colby Systems Corporation in Fresno, California, at 209/222-4985.
—Scott Beamer

Sharing Supercomputer Power

A number of companies are marketing RISC-based (reduced instruction set computer) co-processor boards that further empower the Mac II, but it still has never been a match for much more expensive workstations in shading 3-D images and calculating complex financial models. Now, however, Human Devices has announced a network server that allows any Mac on an AppleTalk network to share the computing power of a supercomputer-class, parallel processor-based machine.

Human Devices' ComputeServer, a dedicated AppleTalk or FlashTalk network server, contains from 1 to 16 INMOS T800 Transputers—floating-point processors—running in parallel. Whereas the RISC-based coprocessor boards from Tektronix (Motor (continues)
Warning: You do not have a Seagate drive in your computer.

Don't take chances. Ask for Seagate.
roto 88000), YARC (AMD Am29000), Levco (INMOS Transputers), and Mercury (Weitek processors) plug into the NuBus and allow only one Mac to utilize this processing power, the ComputeServer allows any number of Macs on an AppleTalk network to share the computing resources of the hardware.

The key to sharing the ComputeServer’s power is the Linda parallel-programming software developed by David Gelertner at Yale University. With Human Devices’ implementation of Linda for the Mac, developers can modify their applications slightly and then use them with the ComputeServer; they do not have to work in a dedicated environment, as they would if using RISC-based coprocessing boards. This way developers simply add Linda statements to existing C code to route parallel processes to the network server. The ComputeServer maintains a shared database of objects, the *tuple space*, to coordinate the parallel computing activities of the ComputeServer’s processors.

ComputeServer allows programmers to adapt existing C applications using Apple’s Macintosh Programmer’s Workshop (MPW). Human Devices is now working on FORTRAN and Pascal versions of the Linda software. Commercial applications currently being adapted for the ComputeServer include MacroMind’s 3D Works and RenderWorks, Market Engineering’s Crystal Ball forecasting and simulation software, and Visual Information’s RayTrace Dimensions.

The entry-level Chorus ComputeServer with a single floating-point processor, AppleTalk and FlashTalk ports, and system software sells for $970; the Chorus 4 ComputeServer with four floating-point processors costs $25,500. For further information, contact Human Devices in New York, New York, at 212/925-1715.

—David Ushijima

### New Light on Data

When Steve Jobs’s Next computer was released last fall, its most innovative feature was the bundled erasable optical (EO) disk storage. Most industry watchers, already familiar with write-once optical storage and bored with CD-ROM, found the erasable disk impressively futuristic by comparison.

However, with vendors already shipping them with list prices as low as Sumo’s quoted $3495, EO drives have simply become another storage option for the Mac. Because all the drives to date feature a standard 600MB (300MB per side) optical data cartridge pioneered by Sony and basic drive subsystems from Sony or Ricoh, they all perform comparably. Although characterized as being somewhere less than a slower hard disk,” they are nonetheless faster than traditional backup systems.

The technology itself, actually a combination of optical and magnetic recording techniques, accounts for both the high capacity and the less-than-hard-disk speed. To write on an EO disk, the drive first uses a laser to heat-activate tiny spots of the disk’s special magnetic material to record the information. The data spots are then read optically, again with a laser, because the magnetic charge of the spots causes a change in the way a laser beam is reflected when it strikes a spot. This opto-magnetic recording trades data-density advantages for a modest speed penalty.

Makers of WORM (write-once, read-many) drives claim not to be concerned about competition from the new erasable optical systems, citing the widespread need for permanent archival storage. But the larger potential market for erasable storage may push prices of these new drives and cartridges lower within a few years, making this formerly exotic alternative a backup standard.

For further information, contact Racet Computers in Brea, California, at 714/579-1725; Personal Computer Peripherals Corporation in Tampa, Florida, at 813/884-5092; Jasmine Technologies in San Francisco, California, at 415/282-1111; Sumo (Storage Plus) in San Jose, California, at 408/286-5744; Pinnacle Micro in Mission Viejo, California, at 714/472-0100; ALOT in Santa Cruz, California, at 408/426-7171; Colby Systems in Fresno, California, at 209/222-4985; Giga Cell Systems in Santa Clara, California, at 408/727-1049; or Storage Technologies in San Jose, California, at 408/879-0300.

—Charles Seiter

### Color Printing Takes Off

Several new color printers are available to Macintosh users, and some are even downright affordable. Hewlett-Packard is offering a $125 Mac-interface kit for its $1395 PaintJet color ink-jet printer. The interface kit includes serial cable, printer driver, and four bitmapped fonts (Times, Helvetica, Courier, and Symbol). The driver, which also provides a page-preview option, effectively turns the PaintJet into a (continues)
Fast Statistics.

Because you don't have time to waste.

You don't have time to read a 1000 page manual, to play games, to wade through a pile of confusing menus.

You have lots of data. You need graphs, tables, financial projections, surveys. The report is due tomorrow and the stat package you thought had everything can't do the job.

Now you can do it. The company that brought professionals "the best statistics package on the Macintosh"* introduces the easiest: FASTAT. Designed just for the Macintosh, FASTAT makes high-powered, accurate statistics easy.

You can do dependent and independent t-tests, time series analyses, factor analysis, two-way and n-way tables, correlations, nonparametric tests, regressions, analysis of variance and covariance, exploratory data analysis — even if you've never done them before.

You can also create full-featured graphics such as X-Y plots, bubble plots, line plots, histograms, box-plots, stem-and-leaf diagrams, autocorrelation and time series plots, as well as state-of-the-art displays, like scatterplot matrices.

Some of the graphs are only a click away. Click on a variable name, and you get a histogram or a box plot of the variable. Click on a regression output or a cell in a correlation matrix, and you get a scatterplot of the variables.

Need to customize a graph? With FASTAT's MacDraw-like tools you can color, draw, add text, and move things.

Need help understanding a statistic? FASTAT's "pop-up tutor" tells you what the numbers mean.

Need reports? FASTAT's built-in text editor lets you scroll through results, cut and paste, change fonts, add explanatory notes, and save your work.

For $195, you can stop wasting time.

Systat. Intelligent software.

Call or write for further information:
SYSTAT, Inc.
1800 Sherman Avenue, Evanston, IL 60201
312 864.5670 FAX 312 492.3567

System requirements: 1 megabyte of memory and hard drive. Mac II version available. Unlimited free technical support.

Dealers circle 492 on reader service card
End users circle 491 on reader service card

*MacWeek September 13, 1988
**Suggested Retail Price
Tektronix’s $2495 ColorQuick color ink-jet printer comes with 11 LaserWriter fonts and plugs into a SCSI port.

QuickDraw printer similar to Apple’s ImageWriter LQ: it produces 180-dots-per-inch text by reducing a larger font by 250 percent. The printer produces a page of text in about a minute and a half; a full-page graphic takes between three and six minutes.

Tektronix may have stolen HP’s thunder, however, with its $2495 ColorQuick ink-jet printer, which provides 216-dpi resolution and includes the LaserWriter Plus’s 11 bit-mapped font families. The ColorQuick’s SCSI interface doesn’t tie up a modem or printer port, and its maximum paper size of 12 by 18 inches allows graphic designers to bleed images off the edges of tabloid-size pages. Neither the PaintJet nor the ColorQuick can be shared on a network.

Tektronix and Schlumberger Technologies also entered the high-end color printer arena by introducing 300-dpi, thermal wax-transfer printers. Tektronix’s $15,995 Phaser CP uses a 68020-based controller containing 8MB of RAM and a proprietary PostScript-compatible interpreter (see Macworld News, March 1989). Schlumberger’s 5232 Color PostScript Printer is built around Adobe’s 68020-based Atlas controller. The A-size (maximum paper size: 8½ by 11 inches) model sells for $16,900; its B-size (11 by 17) brother retails for $22,900.

Not to be outdone, QMS has introduced the $16,995 ColorScript 100 Model 20, an A-size version of the pioneering ColorScript 100 Model 30. A $5995, field-installable upgrade kit turns a Model 20 into a Model 30.

Straddling the fence between the low end and the high end, and between QuickDraw and PostScript, is Howtek. It has announced both QuickDraw and PostScript compatibility for its $7500 Pixelmaster, a 240-dpi, plain-paper ink-jet printer that works with the Mac II only. Howtek’s QuickDraw driver supports 24-bit color and provides 35 fonts that, unlike those of most QuickDraw printers, can be rotated and scaled to any size. The PostScript driver uses a PostScript-compatible interpreter developed by Custom Applications of Billerica, Massachusetts.

Each of these low-end offerings is aimed at the desktop presentations market, while publishing professionals and CAD users are being targeted for the high-end units. The proliferation of color printers will make choosing a printer more complicated, but in the end both markets will benefit from a wider selection of printing technologies and imaging models.

For further information, contact Hewlett-Packard in Cupertino, California, at 800/752-0900; Schlumberger Technologies in Mountain View, California, at 415/964-7900; QMS in Mobile, Alabama, at 205/653-4300; or Howtek in Hudson, New Hampshire, at 603/882-5200.

—Jim Heid

New Network Technology

Although local area networks may well have ushered in a new era for Mac users, in some instances laying cables for networks remains virtually impossible because of site layout or the need for portability on a particular job. Fortunately, the wireless network has come to the rescue.

Wireless communication, although widely used in the military for quite some time now, has only recently become available for Mac users with the advent of two new products. Nexsys has introduced a wireless modem based on FM radio frequency that connects two Macs separated by up to five miles. It plugs into the Mac’s AppleTalk port and transmits at 230K bits per second (bps). Once it receives FCC approval, the company will release an AppleTalk-compatible network version. The wireless FM modem lists for $1000; the network version will go for $300 per node.

DataSpace has introduced the Arlan/TeleNode for communicating over frequencies much higher than FM radio at 19.2K bps, and is planning a version that will run at full AppleTalk speed of 230K bps. The product, priced at $4800, is useful for professionals who move around a lot while they work.

DataSpace’s Arlan/TeleNode wireless-network products let a network connect to a solitary Mac. Future technology will allow two networks to connect in the same way.
The Experts Agree:

FoxBASE +/Mac's New Version 1.10 is the Ultimate Relational Database Management System for the Macintosh!

Don Crabb, InfoWorld, July 11, 1988:
"FoxBASE +/Mac proved to be as easy to use as any Mac relational database we've tested."

Macworld, September, 1988:
"FoxBASE +/Mac deserves serious consideration as both a stand-alone database product and a connectivity solution."

Richard Skrinde, MacUser, September, 1988:
"FoxBASE +/Mac is a racehorse that will outrun the other Macintosh databases."

Arthur Fuller, Computing Canada, June 9, 1988:
"So phenomenally great that it justifies the purchase of a Macintosh just to run it!"

Michael Masterson, MacWEEK, June 7, 1988:
"FoxBASE +/Mac proves beyond a doubt that the Mac is a suitable platform for supporting fast database operations."

BYTE, September, 1988:
"FoxBASE +/Mac combines dBASE compatibility with a strong list of features and a work environment with which Mac users will feel comfortable."

Charles Seiter, Macworld, October, 1988:
"It's the fastest general purpose Mac database, often ten to a hundred times faster than its competitors."

FoxBASE +/Mac Version 1.10 includes everything you love about the original FoxBASE +/Mac PLUS a new form generator, an outstanding application generator and a complete template language system—all designed to save you time and effort! Now you can develop complete database applications in just minutes!

And now Fox Software introduces FoxBASE +/Mac Multi-User, leading the industry with the ultimate in data sharing—concurrent data access! For the first time, networked Macs and PCs can simultaneously share the same data files!* In addition, FoxBASE +/Mac Multi-User supports an unlimited number of users on your network.

Even with all these enhancements, Version 1.10 doesn't cost any more — it's still only $395! And our new Multi-User is just $595!

FoxBASE +/Mac earned an exceptional 7.0 rating on InfoWorld's Software Review, and a 4.5 rating on MacUser's scale. It's the one Mac database system that has it all!

Join the experts NOW! Contact your local quality software dealer, or order your copy of FoxBASE +/Mac by calling (419) 874-0162, Ext. 650. Free demo package available.

Why be a follower when you can go with the leader!
FM networks have always had major drawbacks, and not all of them have been solved with these new products. Nexsys's FM modem cannot operate between glass buildings coated with reflective material, for example. To solve the security problems associated with FM technology by encrypting the packets and shifting the frequency over a range. For further information, contact Nexsys in New York, New York, at 212/995-2224, or DataSpace in Markham, Ontario, Canada, at 416/474-0113.
—Laurie Flynn

32-bit Color Boards

By supporting 32 bits per pixel instead of only 8 bits, Apple's new Color QuickDraw software permits you to display photographic-quality images, providing you have the necessary equipment. It enables you to display up to 16.7 million colors at any one time and gives you smooth transitions between colors without dithering (required in the 8-bit world).

With 32-bit QuickDraw, however, it's important to note that only 24 bits are reserved for color—8 bits each for red, green, and blue. This leaves 8 bits available for third-party vendors to use for other purposes, or for Apple to define in the future.

To use Color QuickDraw, you'll need an add-in video board that supports it. RasterOps has unveiled three such boards and will also continue to sell the 24-bit boards it designed before the Apple standard was established. The company's $5195 ColorBoard 224 supports 16- and 19-inch monitors at three resolutions, including 1024 by 768 pixels. The ColorBoard 232, priced at $3995, works with 13-inch monitors to achieve 640-by-480-pixel resolution, and sup-
easily upgraded to the 24-bit model.

SuperMac Technology is offering the Spectrum/24 board, available in 1-, 2-, 4-, 8-, and 24-bit modes. The $4999 board supports resolutions of up to 1024 by 768 on 13- to 19-inch monitors. The Spectrum/24 board's Virtual Desktop technology enables users working in 1-, 2-, or 4-bit mode to have desktops larger than their actual screens. The MacroColor board from Micron Technology supports 640-by-480-pixel resolution and lists for $2395.

Another new product, the MacPrint utility from Insight Development, lets a Macintosh print directly to the popular Hewlett-Packard family of printers. MacPrint is also PC network-compatible. Able to run on the Mac Plus, SE, and II, it is simple to install and opens from the Chooser, where you have the option of selecting individual features, depending on the HP printer. Print-tray selection, duplex printing, margin bonding, and envelope support on the Laserjet IID, for example, are a matter of simple mouse clicks.

In the future MacPrint will support HP's color PaintJet, all HP cartridge fonts, soft font downloading, and even (continues)
CompuServe is offering inside information on these companies.

MICROSOFT • BORLAND • FOX • ADOBE
WORDPERFECT • SYMANTEC • CLARIS
NANTUCKET • AUTODESK • MAINSTAY
CE SOFTWARE • SUN MICROSYSTEMS
BRODERBUND • MEDIAGENIC • NOVELL
T/MAKER • FIFTH GENERATION • JASIK
MICRO SEEDS • SURVIVOR SOFTWARE
BEAGLE BROTHERS • DENEBA • ACIUS
STONE EDGE • ALDUS • AND MANY MORE

Product support for your Mac.

Access CompuServe's forums, and you'll find invaluable product support maintained by all these companies. Often, company decision makers are online to discuss the next generation of products, or to put software updates on CompuServe before they hit the market.

When you run into a problem, there's a good chance you can quickly find the solution online in one of CompuServe's many forums. Or, you can leave a message. You'll get answers fast, often from the person who actually developed the product you are using. Either way, you save yourself time and frustration finding the answers you need when you need them.

To join CompuServe, see your computer dealer. To order direct or for more information, call 800 848-8199.

CompuServe®

Circle 371 on reader service card
Twenty vendors at the Macworld Expo in San Francisco teamed up to demonstrate a Mac network that linked the two show halls and four out-of-state locations.

Outline fonts. Insight Development promises upgrades at every Macworld Expo. MacPrint lists for $149.

For more information on the Hurder-CPI and parallel interface boards for the II, the IIX, and the new Macs shown at Macworld Expo in January, contact Creative Solutions, at 800/367-8465 or 301/984-0262. For more information on MacPrint, contact Insight Development Corporation, in Moraga, California, at 415/376-9500.

—Amacker Bullwinkle

The Network Is the News

Macworld Expo has always featured show-wide AppleTalk networking, but last January's Expo added a new twist. Twenty vendors, including Apple, banded together to establish—and publicize—the Expo network, called ShowNet. ShowNet wasn't restricted just to the expo sites in San Francisco, either—AT&T maintained a link to its office in New Jersey, while other companies had links to Utah, Oregon, and Canada. The point? To prove that a fully functional AppleTalk network with LocalTalk, PhoneNet, Ethernet, and phone lines could be set up and maintained in two days.

Network wiring, or at times, the lack of it, was on many people's minds at Expo. Farallon announced its intention to offer a version of its StarController for use with twisted-pair Ethernet, providing an upgrade path from the 230,000-bits-per-second LocalTalk to the 10,000,000-bits-per-second Ethernet. DataSpace demonstrated a radio-frequency link that could be used to connect two networks up to 6 miles apart. DataSpace and at least one other company hope to offer indoor wireless LANs, probably using infrared technology, before the year is through.

Shiva showed off its DOS Dial-In, software for phoning home while on the road with your MS-DOS laptop. Coupled with Shiva's new half-bridge, the Telebridge, DOS Dial-In joins a laptop to an AppleTalk network through a modem, just as though it were a Mac.

Three companies exhibited software for converting a PC into an AppleShare-compatible file server for a network. If your firm has switched to Macs and you want a use for retired PC/ATs, you might consider turning them into file servers with Dayna Communications' DaynaNet, DayStar Digital's FS100, or Miramar's MacLAN Connect.

—Dave Kosiur

Oh-la-la Online

Oh-la-la, what an image library: blonde, brunette, and redheaded models of various shapes and sizes with disks full of clothing, accessories, and even makeup for dressing them up. No, this is not a Barbie Doll game—it's state-of-the-art CAD for the rag trade. ModaCAD is a system of modules for computerizing every step of clothing production.

A design module includes all the usual pens, pencils, brushes, and so forth, plus fabric-simulation tools for stretching material, altering perspective, or adding pleats and folds. A draping module simulates the drape of fabric over a form, and a weaving module allows users to create weave patterns on screen.

Ready-made online images include a multitude of fashions, past and present, which designers can delve into for inspiration, knock-off ideas, or outright raiding with cut-and-paste tools. Designers can call up a model's image, adorn him or her in fashion classics, and then add their own new twists. Designers inclined to currently fashionable eclecticism can quickly combine Victorian underthings with Gothic leggings, Wild West skirts, high-top sneakers, or whatever they choose.

All this is pretty devilish, but alone it would only add up to a more sleek, stream-
External Hard Drives from

$527

M30 30Mb External $597
M40 40Mb External $687
M60 60Mb External $757
M80 80Mb External $947
M100 100Mb External $1197

Numbers. A good place to start your comparisons. But then take a look at the details that make ours the strongest, fastest, most reliable hard drives available.

We're Mac fanatics, and we've set out to complement the Mac's quality, look, and feel with products that make a great computer even better.

Look again. We insist on embedded SCSI technology with external address selectors, EMI/RFI filtering, AC convenience outlet, heavy-duty power supply, whisper-quiet cooling fan, Hard Driver" formatting and diagnostics, backup, and numerous other utilities. We throw in ten Mb of public domain software for you to explore. And our price includes cables.

Need even greater speed? Our "Plus" drives scream along as fast as 19ns!

All Mirror drives ship preformatted, plug-and-play ready, and protected by our one year limited warranty. Two years on "Plus" drives.

RM20 20Mb Removable Media Drive

$897

Infinite storage. A removable disk you can take home with you — in your pocket. A backup miracle. An archive classic.

The RM20 brings you many advantages. A separate disk for each client or project. Your entire accounting files on a single disk. Or a huge mailing list that slips neatly into an overnight envelope.

Our RM20 uses removable disks developed by Kodak and Verbatim that are guaranteed for life. $100 less than the competition, and you still get all of Mirror's utility software.

RM8 .8Mb Floppy $167

What else can we say? It's economical. 800K on a 3¼" disk. We've sold thousands since 1984. "A best buy."

THE RIGHT N

1-800-654
Internal Hard Drives from

$497

30Mb Internal $497
40Mb Internal $577
80Mb Internal “Plus” $977
100Mb Internal $1147

It took us a while, but we came up with a better way to mount a hard drive in your Macintosh. Using our design, a drive can be added to an SE already containing two floppies or a floppy and hard drive. Imagine up to 200Mb in addition to your existing storage!

Mac II users can add two of our drives for up to 400Mb of internal storage.

We'll send you Hard Driver™ formatting and diagnostics, backup, and numerous other utilities, 10Mb of public domain software, and cover you with our one year limited warranty. Free!

VS300 300 dpi Scanner

$797

Eyes for the Macintosh. With a VS300 scanner, you've an unlimited supply of art and graphics. Scan in illustrations, photos, templates and more.

Hypercard™ users - add fresh images to your stacks. Illustrator™ or Freehand™ users - scan in original templates. Because the VS300 saves files in all standard formats, it's the perfect "front end" for any Macintosh OCR (Optical Character Recognition) software. And because it can operate as a Desk Accessory, you needn't exit your primary application to use the scanner.

Couple our scanner with a Mac and a faxmodem and voila... a fax machine!

Mirror Technologies Visionscan scanners cost half as much as competing scanners because its design eliminates needless moving parts. "If it were my money, I'd buy the Mirror Technologies Visionscan. Its price-performance ratio is unequaled." - Byte

VS200 200 dpi Scanner $597

RISK-FREE - “Love it or Return it! 30 day risk-free trial”

GUARANTEE - All Mirror drives carry our one year limited warranty. “Plus” drives, two years.

DELIVERY - Optional express shipping means you could be computing by noon tomorrow!

SUPPORT - Our Mac experts are hand-picked and trained to answer your questions.

COMMITMENT - Mirror is the oldest manufacturer-direct company exclusively serving Mac users.

Mirror Technologies
2944 Patton Road, Roseville, MN 55113
Phone: 612-623-1550 Fax: 612-623-1336
Hours: Mon.-Fri. 8 a.m.-6 p.m. CST

Circle Reader Service Card Numbers
424 Mass Media 43 Scanners 58 Removables
About two dozen accounting packages run on the Macintosh®. How can you be sure you're choosing the one that's just right for you?

Monogram Business Sense® makes it simple. Buy it. Try it. If you're not completely satisfied, return it to us within 60 days and we'll exchange it for any accounting program of equal value. Any accounting program. We're that confident.

Business Sense is a fully-integrated, full-featured program that's exceptionally easy to learn and use. There simply isn't a better accounting package for small businesses.

![Image of Business Sense interface]

Nearly every aspect of your financial situation can be reported in tabular or graphic format.

This extraordinary ease of use comes from the fact that Business Sense was designed for the Macintosh from scratch.

You won't find any of the balkiness of programs designed for other computers.

It's a bargain at under $500.

And it's from Monogram, publishers of Dollars and Sense®, the world's best-selling personal financial management program.

So now your choice is easy. Business Sense. The best accounting program for your business. We guarantee it.

Business Sense helps you anticipate your cash flow needs by aging forwards as well as backwards.

It's ideal for companies of one to 50 employees; up to 500 vendors and 2,000 customers. It handles checks up to a trillion dollars. It's powerful enough for a CFO, but accessible enough for a CEO.

Other accounting software can be difficult to use—even user-hostile.

Business Sense is easy to use—

Even for non-accounting personnel. Instead of dealing with "integratable modules," you have one program disk with all the functions built in: General Ledger, Accounts Payable, Accounts Receivable, Payroll, Invoicing and Budgeting. They all work alike. Moving from one to another is as easy as pulling down a menu.

General Ledger • Manages multiple companies, up to 2,000 accounts, five bank accounts, 99 departments or profit centers; unlimited transactions. • Handles checks to $1 trillion. • Automates recurring entries. • Distributes data automatically on posting. • Transactions can be reversed. • Provides multiple open months. • Imports Dollars and Sense files.

Invoicing • Easy to use. • Fully integrated into AR and GL.

Accounts Receivable • Provides detailed history and analysis for up to 2,000 customers, with credit limit warning and automatic credit memos. • Calculates and applies finance charges and discounts. • Handles partial payments. • Tracks commissions. • Produces aging reports.

Accounts Payable • Manages up to 500 vendors. • Tracks invoice date, due date and discount date. • Details aging for cash flow analysis. • Allows partial payments. • Prints 1099 forms. • Provides vendor analysis.

Payroll • Manages up to 100 employees; 10 withholding and wage categories plus tips and fringes. • Prints W-2 forms and checks and handles federal and state taxes.

Budgeting • Sophisticated and flexible, reporting on departments, divisions and projects for any time period.

See your dealer or call Monogram for a brochure with a complete feature list.

Monogram
531 Van Ness Avenue, Torrance, CA 90501
(213) 533-5120 FAX: (213) 533-1365

Guarantee: Purchase Business Sense Version 1.2 between January 1, 1989 and June 30, 1989. If for any reason you are dissatisfied with it, return the complete package to us within 60 days of the purchase date and indicate which software program you would like in exchange. You may choose any Macintosh accounting program generally available at retail, regardless of publisher, with a publisher's suggested retail list price up to the $495 suggested retail list price of Business Sense. If you wish to trade for a more expensive program, you must make up the retail price difference. No cash refunds.

Circle 87 on reader service card
lined version of CAD. Moda-
CAD, however, offers more
than just design tools; it also
promises to take the sweat
out of the sweatshop by
driving machinery for knitted,
weaving, embroidering, pattern plotting, and fabric
cutting. Until now, clothing-
manufacturing machinery has
required dedicated computer
systems beyond the budget of
most small companies. Moda-
CAD is a less costly alterna-
tive that can be adapted to
drive most variations of the
machinery available to the
industry. The package also
includes a module for sched-
uling production, tracking
costs, keeping inventories and
supplier lists, and anticipating
the effects of any bottlenecks
occurring between the sketch
and the sale.

The ModaCAD modules
are usually sold in hardware/
software packages (including
the Mac II) averaging $30,000.
Separately, the modules
sell for between $5000 and
$10,000. For further informa-
tion, contact ModaCAD in Los
Angeles, California, at 213/
271-7704.

—Ann Garrison

FullWrite
Professional Explanation

Macworld contributing
editor Robert
Eckhardt has a pen-
chant for turning the gist of
what he learns from long
hours at the Mac into books—
eminently readable, highly in-
formative books.

Last year Brady Books
published Eckhardt's The
Fully Powered Mac, a volume
of strategies for making the
dex, you can find solutions to
just about any problem you
might encounter in FullWrite
Professional. And it will help
you puzzle out FullWrite's
manual, too, which is at times
frustratingly opaque and
inadequate.

Eckhardt has leavened his
book with sound advice on
publication design (not some-
thing you expect from books
on word processors), and he's
devised a fold-out map that
lists all of FullWrite's menus,
dialog boxes, and keyboard
commands. The FullWrite
Professional Handbook adds
more value to the software it
describes than its $29.95 price
begins to suggest.

—William Freitas

Help for FullWrite fans who find fault with the manual.

Mac faster and more efficient
that did not suggest taking out
a second mortgage to upgrade
hardware. This year Brady has
assembled Eckhardt's Mac
know-how into The FullWrite
Professional Handbook, a de-
tailed account of what hap-
pens when a word processor
and a page layout program
form a 773K hybrid and settle
down in the Mac's RAM.

The best way to avail your-
self of this handbook might be
to sit down with FullWrite
up and running and read the
book from cover to cover,
trying things out as you go
along (give yourself a week
or so; it's roughly 650 pages).
The first five sections of the
book are designed to take
you step-by-step through the
construction of a document,
from entering text to printing
pages with more columns,
fonts, and graphics than you
ever thought you'd finagle out
of a word processor. The rest
of the book covers FullWrite's
built-in graphics environment,
its mail merge capabilities,
and the many odds and ends
unique to the program.

But you can also use
Eckhardt's book as a refer-
cence work for troubleshooting.
With its extensive table of
contents and exhaustive in-

Graphics Lumena ry

Lumena—a 32-bit paint and 2-D animation
program with
an installed IBM PC user base that includes
architects, medical
illustrators, and corporate
design studios—is being port-
ed to the Mac II, where it will
have a more elegant interface
and be able to perform many
tasks more rapidly.

Requiring 5MB of RAM,
Lumena incorporates high-
resolution images and addres-

controller, or film recorder
drivers. Time Arts hopes to
release Lumena as well as
Crystal 3D, a sophisticated
solids-modeling and anima-
tion program, in September. A
24-bit version of Lumena is
slated for release shortly
thereafter.

For further information,
contact Time Arts in Santa
Rosa, California, at 707/
576-7722.

—Joost Romeu

(continues)
Introducing Tape Backup
With The Attributes Of All Three.

What does the MaxStream™ have in common with the Concorde, a supertanker and the Golden Gate Bridge? Plenty, when you're talking about performance. With speeds up to 6.75 megabytes per minute, it's the fastest tape backup available. It quickly reduces even the longest, most mundane backup chore into a simple, effortless task.

But don't think that means you give up accuracy for speed. Built-in error correction and data verification guarantee that the data you put on tape will be exactly the same when you restore it—all 150 megabytes.

That's right. MaxStream packs a whopping 150 megabytes on a single industry-standard DC600™ 1/4” cartridge. With that kind of capacity, it's like a supertanker for data. (There's also a 60 megabytes version for smaller applications.)

Either one is perfect for backing up high-end applications like graphics, imaging, database or CAD programs.

And of course, MaxStream works with every popular network. It's the one drive you can trust for backing up all the valuable data on a server.

LAN administrators will also appreciate MaxStream's software. It lets you back up an entire network at pre-programmed times, instead of having to rely on users to back up their data individually.

Even if you're not on a network you'll like our full array of backup and restore features as well as scripting, which allows for automatic, unattended backups. You can run an entire backup at night, or while you're at lunch.

MaxStream also bridges the gap between Macs and IBM PCs® by letting you use the same DC600 cartridge with both systems. With Archive's Universal Tape Format,™ a tape from one of Archive's tape subsystems can be read and used by the other and vice versa.

MaxStream works with the Mac Plus, SE, II and IIx®. It plugs into the standard SCSI port, and comes with everything you need—cables, software, DC600 cartridge and manual.

Just as important, when you go with MaxStream, you're getting backup and support from the company that pioneered streaming tape technology back in 1980. Today, there are over one-million Archive tape drives in use throughout the world.

If you're looking for backup that combines speed, capacity and connectivity, it's time to look into MaxStream. For complete information call 1-800-237-4929. Or write Archive Corporation, Data Storage Division, 1650 Sunflower Ave., Costa Mesa, California 92626.

Why trust your data to anyone else?™

Archive is a registered trademark and MaxStream, Universal Tape Format and Why trust your data to anyone else? are trademarks of Archive Corporation. Macintosh Plus, SE, II and IIx are registered trademarks of Apple Computer, Inc. IBM PC is a registered trademark of International Business Machines. DC 600 is a registered trademark of 3M Corp.
**Museum Macs**

Visitors to the Art Gallery of Ontario (AGO) spend three times as long at exhibitions that offer interactive education aids, such as audio tapes and computer programs, according to museum studies. When three Apple-donated Mac Plus computers were set up, 96 percent of the gallery's visitors used at least one of them.

Other museums—including New York's Metropolitan Museum of Art and Washington, D.C.'s Smithsonian Institution—are keeping an eye on the AGO's research and conducting some experiments of their own. Already it's clear that interactive guidance makes exhibits more accessible to the public.

The AGO wanted the Mac for its icon-driven graphic interface and for HyperCard, which make short work of creating new visitor aids. Apple Canada is supporting the effort with a representative on AGO's committee on interactive education.

In January, the AGO opened a new exhibition that features a full range of interactive aids including Mac Plus computers running HyperCard stacks. The exhibition shows landscapes by the Group of Seven, who crisscrossed the Canadian wilderness during the 1920s and captured it on canvas, arguing that its intensity and moods were a major force in forming the Canadian identity. Their bold use of color and defiance of European academic traditions drew both praise and disdain, and the artists often replied to their critics in passionate words. The exhibit includes audio re-plays of the arguments that surrounded the works at the time. A HyperCard stack draws visitors into the debate by questioning them about their reactions to various artworks and responding with other viewpoints. Another stack presents a map of Canada, and a mouse click on any area produces a province map marked to indicate where each artist painted. Other stacks provide information on the painters' lives and their artistic and literary backgrounds and help the viewer compare artworks.

For further information, contact the Art Gallery of Ontario in Toronto, Ontario, Canada, 416/977-0414.

—Ann Garrison

**Mac Video**

Of the unprecedented number of new Mac video products that have already debuted in 1989, most are Mac II video boards. Real-time video frame-grabbing is the hot new capability of many boards, including the ColorSpaceFX by Mass Microsystems, FrameGrabber 324 by RasterOps, ColorCapture by Data Translation, NuView by AST, and the Truevision NuVista board. Real-time frame grabbers let you capture any image instantly (that is, at 30 frames per second) from a moving videotape or live video camera.

Micrologic's Genius has generated a lot of excitement with Midas, a video character generator that performs many dedicated video character generator functions like multiple fonts, variable-speed scrolling, and color characters.

Illusion Software has introduced Genius, a package that translates any Mac II application into broadcast-quality videotape without the need of a special video board. Genius uses the gigaPix 2616 tape drive backup system to store digital video images on 8mm videotape, which can then be transferred to any videotape format for video post-production.

Julian Systems is offering The Worx, a Mac II-based, integrated video-production system that incorporates video editing, digital audio, and computer graphics animation. The company is also offering an RGB decoder for converting standard NTSC composite video signals from a camcorder or VCR to higher-quality RGB video signals. This enables you to create 16-bit images on the Mac II from video sources, with the standard 8-bit technology.

Computer Friends has also demonstrated a complete video-production system, incorporating Computer Friends' new video board. The Sharp JX 450 color scanner, complemented by ChromaScan software by Imagenesis and Letraset's ColorStudio image processing program, are the new star performers for scanning in photographic quality, 24-bit, (continues)
Tools of the Trade

QuarkXPress—electronic publishing software is a complete publication design and production environment. It combines all the tools you need to create truly professional-quality publications on the desktop.

MacUser magazine calls QuarkXPress “the most powerful page layout package for the Macintosh.” And for good reason. No other program offers such precise control over type and graphics.

Set line leading with 1/1000-point accuracy. Control word and character spacing to within 1/200 em space. Or, take advantage of automatic features and let QuarkXPress set the type for you.

Because serious page composition means complete control over the graphic elements, QuarkXPress gives you the tools you need to import, place, and modify graphics in most of the industry-standard formats.

And with QuarkXPress you can bring your publications to life with color. Select from a 16 million-color palette. Or, choose one from the PANTONE MATCHING SYSTEM®. When it’s time to print, use QuarkXPress to produce camera-ready spot and process color separations.

Best of all, QuarkXPress is true to the Macintosh® interface—so using it becomes second nature in no time!

To find out more about QuarkXPress, and where to reach an authorized dealer near you, call toll-free: (800) 356-9363.

Circle 295 on reader service card

Quark and QuarkXPress are trademarks of Quark, Inc.

PANTONE® is a registered trademark of Pantone, Inc. "Pantone, Inc.’s check-standard trademark for color reproduction and color reproduction materials. Process color reproduction may not match PANTONE®-identified solid color standards. Refer to current PANTONE® Color Publications for accurate color.

Quark, Inc. • 300 South Jackson, Suite 100 • Denver, Colorado 80209
still-frame color images for video production. The scanner is the most elegant device for incorporating still art, offering far more control than inputting images with a video camera.

For further information, contact Mass Microsystems in Sunnyvale, California, at 408/522-1200; RasterOps in Cupertino, California, at 408/446-4090; Data Translation in Marlborough, Massachusetts, at 508/481-3700; AST Research in Irvine, California, at 714/863-1333; Truevision in Indianapolis, Indiana, at 317/841-0332; Micrologics in Cameron, Arizona, at 602/325-8794; Illusion Software Systems in Santa Monica, California, at 213/829-5409; Julian Systems in Concord, California, at 415/686-4400; Computer Friends in Portland, Oregon, at 503/626-2291; Sharp in Mahwah, New Jersey, at 800/526-0264; and Letraset in Paramus, New Jersey, at 201/845-6100.

—Allan Lundell

The ABCs of Mac Fonts

Well, someone has finally written the book on Macintosh typefaces. Erfert Fenton's The Macintosh Font Book, from Peachpit Press, is a wonderful resource for those of you who wish to exhaustively explore the wonderful world of PostScript faces.

The font-management chapter tells you how to set up a font library of your own—no small task if your resources and disk space are limited. Fenton explains how to copy screen fonts to your system and cope with font identity crises—when typefaces that print perfectly at home wind up as alien glyphs from space at your favorite service bureau. Especially useful is the introduction to utilities for displaying character sets and downloading, renaming, renumbering, and juggling fonts.

Word spacing, kerning, leading, and tracking—terms often not fully understood by those who purchase desktop publishing systems—are carefully explained, with some good recommendations for copyfitting and fine-tuning kerning pairs.

Fenton devotes a whole chapter to creating and customizing PostScript fonts. The appendixes include a comprehensive list of purchasable PostScript fonts, software and hardware, vendors, and a list of service bureaus by region. A glossary defines terminology that every polished publisher needs to know. So, if you can't tell your Egyptians from your Romans, or your drop caps have fallen below the baseline, or your diacritical marks are critical, Erfert Fenton comes to the rescue. I'd like the book even if the author weren't one of Macworld's contributing editors.

For further information, contact Peachpit Press in Berkeley, California, at 415/527-8555.

—Amacker Bullwinkle

Reader Survey: Next

This month's survey, which was mailed to 1000 subscribers, focuses on readers' reactions to the Next system announcement. In answer to the question of whether they would consider buying a Next machine, 63 percent of our 407 respondents said yes, 35 percent said no, and 2 percent did not answer. Of the 87 percent of those answering who were not college students, 15 percent said they would enroll in a college or university just to purchase the system.

Our survey also asked readers about what Next system features appealed to them. Of the readers who wanted Next features, 60 percent desired 256MB removable erasable optical disk drive, 43 percent identified Display PostScript, 52 percent chose 8MB of RAM, 34 percent indicated the digital signal processor (DSP), 38 percent picked CD-quality sound processing, and 36 percent selected an object-oriented programming environment.

Fifty-seven percent thought that Apple should move more PostScript into the Mac in the interest of lower-cost printers, 77 percent believed that Apple should include support for fax, modem, and other DSP-generated functions, and 38 percent thought that Apple should include Ethernet network hardware with its computers.
Hold on to your hats! Hold on to your feet! And hold on to your original packaging and documentation! Because, MacConnection is now offering 30 and 60 day money-back guarantees on products from selected companies. (Look for the companies which are marked with a ★ and listed in red.) If you are dissatisfied with your purchase of these products for any reason, just call for a hassle-free return authorization.

We only carry the latest versions of products. Version numbers in our ads are current at press time. Also, all of the software we sell is not copy-protected, unless indicated otherwise by (CP).

The four-digit number next to each product is the product's ITEM NUMBER. Please refer to this number when ordering. Thank you.

<table>
<thead>
<tr>
<th>ACCOUNTING &amp; FINANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>★ Aatrix Software ... 30 day MBG</td>
</tr>
<tr>
<td>3976 Aatrix Payroll 3.05 ... 99.</td>
</tr>
<tr>
<td>4021 Aatrix TimeCard 2.0 ... 109.</td>
</tr>
<tr>
<td>4020 Aatrix TimeMinder 2.0 ... 159.</td>
</tr>
<tr>
<td>3958 Aatrix Payroll PLUS 3.0 ... 159.</td>
</tr>
<tr>
<td>★ Bedford Software</td>
</tr>
<tr>
<td>Ashton-Tate</td>
</tr>
<tr>
<td>4977 Simply Accounting 1.04 ... 219.</td>
</tr>
<tr>
<td>★ Chang Labs ... 60 day MBG</td>
</tr>
<tr>
<td>1613 Rags to Riches Ledger 3.1 ... 119.</td>
</tr>
<tr>
<td>1614 Rags to Riches Payables 3.1 ... 119.</td>
</tr>
<tr>
<td>1617 Rags to Riches Receivables 3.1 ... 119.</td>
</tr>
<tr>
<td>1622 Rags to Riches 3-Pak ... 269.</td>
</tr>
<tr>
<td>1612 Inventory Control 2.6 ... 239.</td>
</tr>
<tr>
<td>1615 Professional Billing 2.9 ... 239.</td>
</tr>
<tr>
<td>1616 Professional 3-Pak ... 359.</td>
</tr>
<tr>
<td>1618 Retail Business 3-Pak ... 359.</td>
</tr>
<tr>
<td>★ Dac Software</td>
</tr>
<tr>
<td>Dac-Easy Light 1.0 ... 42.</td>
</tr>
<tr>
<td>Informix</td>
</tr>
<tr>
<td>4956 Wingz 1.0 ... 269.</td>
</tr>
<tr>
<td>★ Intuit ... 30 day MBG</td>
</tr>
<tr>
<td>2425 Quicken 1.01 ... 32.</td>
</tr>
<tr>
<td>★ MECA ... 60 day MBG</td>
</tr>
<tr>
<td>2796 Managing Your Money 2.0 ... 125.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NUMBERS &amp; DATABASES</th>
</tr>
</thead>
<tbody>
<tr>
<td>★ Abacus Concepts ... 60 day MBG</td>
</tr>
<tr>
<td>4482 StatView SE + Graphics 1.03 ... 229.</td>
</tr>
<tr>
<td>4481 StatView II 1.03 ... 339.</td>
</tr>
<tr>
<td>★ Access Technology ... 60 day MBG</td>
</tr>
<tr>
<td>1346 Trapeze 2.1 ... 149.</td>
</tr>
<tr>
<td>★ Acius ... 30 day MBG</td>
</tr>
<tr>
<td>1010 4th Dimension 1.06 ... 389.</td>
</tr>
<tr>
<td>4024 4th Dimension Runtime 1.06 ... 229.</td>
</tr>
<tr>
<td>★ Ashton-Tate</td>
</tr>
<tr>
<td>4098 Full Impact 1.0 ... 249.</td>
</tr>
<tr>
<td>★ Byth Software</td>
</tr>
<tr>
<td>4318 Omnir 3 Plus/Express 3.3 ... 399.</td>
</tr>
<tr>
<td>★ Borland International</td>
</tr>
<tr>
<td>1508 Reflex Plus 1.01 ... 189.</td>
</tr>
<tr>
<td>★ BrainPower ... 60 day MBG</td>
</tr>
<tr>
<td>1532 DataScan 1.0 ... 115.</td>
</tr>
<tr>
<td>1535 DesignScope 1.5 ... 152.</td>
</tr>
<tr>
<td>1534 MathView Professional 1.1 ... 139.</td>
</tr>
<tr>
<td>1537 StatView 512+ 2.1 ... 152.</td>
</tr>
<tr>
<td>3960 ArchText 1.03 ... 179.</td>
</tr>
<tr>
<td>4066 The Analyzer Bundle (includes DataScan, DesignScope, and StatView 512+) ... 319.</td>
</tr>
<tr>
<td>★ Bravo Technologies ... 30 day MBG</td>
</tr>
<tr>
<td>1539 MacCalc 1.2D ... 77.</td>
</tr>
<tr>
<td>★ Chang Labs ... 60 day MBG</td>
</tr>
<tr>
<td>1611 C.A.T. 2.0 ... 229.</td>
</tr>
</tbody>
</table>

| Mathematica |

<table>
<thead>
<tr>
<th>GRAPHICS &amp; DESIGN</th>
</tr>
</thead>
<tbody>
<tr>
<td>★ Aegis Development ... 60 day MBG</td>
</tr>
<tr>
<td>4956 Showcase F/X 1.0 ... 205.</td>
</tr>
<tr>
<td>★ Altsys ... 30 day MBG</td>
</tr>
<tr>
<td>4830 KeyMast er 1.0 ... 52.</td>
</tr>
<tr>
<td>1194 FONTastic Plus 2.02 ... 52.</td>
</tr>
<tr>
<td>★ Bright Star Tech ... 30 day MBG</td>
</tr>
<tr>
<td>3962 HyperAnimator 1.5 ... 99.</td>
</tr>
<tr>
<td>★ Broderbund Software</td>
</tr>
<tr>
<td>4064 PosterMaker Plus 2.5 ... 35.</td>
</tr>
<tr>
<td>1427 Print Shop 1.3 ... 35.</td>
</tr>
<tr>
<td>4401 Drawing Table 1.0 ... 76.</td>
</tr>
</tbody>
</table>
night's dream.

Fox Software ... 30 day MBG
FoxBASE+/Mac 4.1—1989 MacUser Editors' Choice Award for Best New Relational Database. "It's blindingly fast and has much of the Mac look and feel grafted onto its DOS roots!" $205.

★ Casady & Greene ... 60 day MBG
1575 Fluent Fonts 2.0 27.
4835 Fluent Fonts/SC ITC Garamond 39.

★ Challenger ... 30 day MBG
1610 Mac3D 2.1 119.
1123 MacPaint II 2.0 99.
1117 MacDraw II 1.0 309.
4815 Smart Form Designer 309.
4814 Claris CAD 629.

Cricket Software
4346 Cricket Paint 1.0 99.
1697 Cricket Draw 1.1 168.
5036 Cricket ColorPaint 1.0 179.

★ Deneba Software ... 30 day MBG
1769 Canvas 2.0 159.

★ DreamMaker ... 60 day MBG
4088 MacGallery (MacPaint format) 27.

Dubl-Click Software
3972 LaserType Vol. 1-6 each 45.
3973 World-Class Fonts! The Stylish (3-4) 45.
3974 World-Class Fonts! The Giants (5-6) 45.
3954 WetPaint Classic Clip-Art (1-2) 45.
3955 WetPaint For Publishing (3-4) 45.
3966 WetPaint Animal Kingdom (5-6) 45.
3967 WetPaint Special Occasions (7-8) 45.
3968 WetPaint Printer's Helper (9-10) 45.
3998 WetPaint Industrial Revolution (11-12) 45.
3970 WetPaint Old Earth Almanac (13-14) 45.
3971 WetPaint Island Life (15-16) 45.
4940 WetPaint All the People (17-18) 45.

Electronic Arts
4315 Studio/8 1.0 309.

★ Enabling Technologies ... 30 day MBG
1871 Pro3D 285.
5020 Clip 3D Fonts 57.
5019 Clip 3D Accents 57.
5022 Clip 3D Geography 57.
5023 Clip 3D Messages 57.

5024 Clip 3D People 57.
5025 Clip 3D Reception 57.
5027 Clip 3D Lifestyle 57.
5026 Clip 3D Business 57.

Enzan-Hoshigumi USA
1879 MacCalligraphy 2.0 99.

★ Foundation Publishing ... 60 day MBG
2384 Comic Strip Factory 1.6 42.
2395 Comic People 1.0 24.

★ Generic Software ... 60 day MBG
4319 Generic CADD Level 1 1.1 89.

★ Graphsoft ... 30 day MBG
4993 MiniCad+ 519.
2272 Crystal Paint 1.0 27.

Innovative Data Design
2417 MacDraft 1.2B 145.
4707 Dreams 1.0 275.

★ MacroMind ... 30 day MBG
4953 VideoWorks II 2.0 special 150.
4952 VideoWorks II HyperCard Driver 1.2 60.
4954 VideoWorks II Accelerator 1.1 115.

Miles Computing
4847 Mac the Knife Vols. 3,4,5 69.

Olduvai Software
4667 Art Clips 51.
4850 Art Fonts 1 55.
4851 Art Fonts 2 55.

★ Paracomp ... 30 day MBG
4597 Swivel 3D 1.0 249.
5026 Model Shop 1.0 376.

★ Silicon Beach ... 60 day MBG
3504 Silicon Press 1.1 52.
3506 SuperPaint 2.0 129.
3570 Super3D 2.0 325.
3980 Digital Darkroom 1.0 195.

★ Solutions, Intl. ... 60 day MBG
3446 The Curator 1.05 75.

★ SuperMac Software ... 60 day MBG
3380 PixelPaint 2.0 199.

Symmetry ... 30 day MBG
4160 PictureBase 1.2-WetPaint Bundle 89.

★ T/Maker ... 30 day MBG
3633 Christian images 35.

★ 3G Graphics ... 30 day MBG
3942 Images with Impact: Graphics 1 59.
4563 Images with Impact: Business 1 69.

★ Zedcor ... 60 day MBG
3986 DeskPaint & DeskDraw 2.0 69.

CE Software ... 60 day MBG

PUBLISHING & PRESENTATIONS

Adobe Systems
1138 The Collector's Edition 79.
4816 The Collector's Edition II 139.
5001 StreamLine 239.
1142 Newsletters/Publishing Pack 1 249.
4565 Forms and Schedules Pack 2 299.
4566 Presentations Pack 3 299.
1137 Adobe Illustrator 9.5 1.6 299.
MacConnection carries the entire Adobe Type Library (volumes 1-82). Listed below are Adobe's newest typefaces at press time.

4577 67 ITC Clearance 245.
4578 68 Americana 125.
4579 69 ITC Serif Gothic 182.
4817 70 Century Expanded 95.
4818 71 Serifa 182.
4819 72 Caslon Open Face 63.
4820 73 Frutiger 245.
4821 74 Centennial 245.
4822 75 Stempel Garamond 125.
4823 76 Weiss 125.
4824 77 Garamond 3 125.
4825 78 Universal News Com/Greek 95.
4826 79 Avenir 1 182.
4827 80 Avenir 2 182.

1-800/622-5472

MacConnection, 14 Mill Street, Marlboro, NH 03456 1-800/622-5472 603/446-7711 FAX 603/446-7791
The fastest shipping

PROGRAMMING & HYPERMEDIA

**Beacon Technology** ... 30 day MBG
4967 HyperBible (King James) .... $159.
4966 HyperBible (New International) ... 195.

**Borland International**
1511 Turbo Pascal 1.1 ............... 68.

**DreamMaker** ... 60 day MBG
4115 MacGallery (HyperCard format) ...... 27.

**Hyperpress Publish.** ... 30 day MBG
4233 Icon Factory 1.0 .............. 29.
5069 Script Library 1.0 ............. 29.
5090 Silver Screen 1.0 ............... 42.
4203 Script Expert 1.0 ............... 46.

**Ideaform**
2418 HyperBook Maker 1.0 .......... 31.

**Individual Software**
4719 101 Scripts & Buttons for Hypercard... 37.

**Manx Software** ... 60 day MBG
4068 Aztec C 3.6B .................. 65.
4317 Aztec SDB 1.0 .................. 65.
4316 Aztec C UniTools ............... 65.
4069 Aztec C MPW ................... 99.
4075 Aztec C + SDB 3.6B ............. 99.

**Microsoft** ... 30 day MBG
4471 QuickBasic 1.0 ................. 65.
3082 Guide 2.0 ...................... 99.

**SmethersBarnes** ... 30 day MBG
1478 Prototyper 1.0 .................. 25.

**Softworks**
1478 Prototyper # 1.0 ................ 25.

**Symantec** ... 30 day MBG
4644 Just Enough Pascal 1.0 ........ 49.
3421 Lightspeed Pascal 2.0 .......... 85.
3420 Lightspeed C 3.01 .............. 149.

**TENpoint**
1388 Reportall 1.2 ................... 69.
4636 Focal Point 1.0 .................. 119.

**TML Systems** ... 30 day MBG
3548 TML Source Code Library II 1.1 . 42.
4989 TML Pascal II 3.0 (w/o MPW 3.0) .... 35.
3549 TML Pascal II 3.0 (w/MPW 3.0) ..... 115.

**True BASIC, Inc.**
3587 True BASIC 2.01 ................. 59.

**Zedcor** ... 60 day MBG
3985 ZBASIC 5.0 ..................... 99.

UTILITIES

**Affinity Microsystems** ... 60 day MBG
1014 Affinifile 1.1 .................. 46.
1016 Tempo II 1.0 .................... 69.

**Berkeley System** ... 30 day MBG
1541 Stepping Out II 2.01 ............ 52.

**Beyond, Inc.**
4203 MenuFonts 2.02 ................ 29.

**Casady & Greene** ... 60 day MBG
2269 QuickDex 1.4A .................. 32.

**CE Software** ... 60 day MBG
1727 CalendarMaker 3.0 .............. 27.
1726 DeskTop 3.0 ..................... 27.
4659 MockPackage Plus Utilities 4.4 .... 24.
1729 QuickKeys 1.1 .................... 52.

**Central Point**
5040 Copy II Mac 7.2 ................. 20.
5041 PC Tools Deluxe Mac 1.1 ......... 42.

**Dubi-Click Software**
1824 Calculator Construction Set 1.04 ... 35.

**Electronic Arts**
1943 Disk Tools Plus 1.01 ............ 31.

**Fifth Generation** ... 60 day MBG
4287 PYROI 3.3 (screen saver) ....... 15.
3954 PowerStation 2.5 ................. 32.
3955 Suite II 1.2.2 ................... 45.
3956 FastBack Mac 1.3 ................ 54.

**FWB Software** ... 30 day MBG
2232 Hard Disk Partition 2.0 .......... 41.
4663 Hard Disk Deadbolt 1.0 ........ 53.

**HJC Software** ... 30 day MBG
4803 Virex 1.3 ....................... 69.

**ICOm Simuations**
4084 On Cue 1.3 ...................... 36.

**Ideaform**
2419 DiskQuick 2.10 ................... 27.
2420 MacLabeller Plus 3.0 ............ 42.

**Kent Marsh Ltd.** ... 30 day MBG
2591 The NightWatch 1.02 ............ 87.
2592 MacSafe 3.0 ..................... 87.

**Lundeen & Assoc.** ... 60 day MBG
2683 WorksPlus Command 2.0 .......... 57.

**MEDIAGENIC**
4591 Open It! 1.0 ..................... 49.

**Softworks, Inc.**
Each package includes 16 development tools.

**HyperTools # 1.0-2** For stack design, icon editing, and alignment (incl. HyperCard) ... $59.

**HyperTools # 2.0-3** For enhancing stances, data entry, and formatting (incl. HyperCard) ... 59.
you've ever seen.

**Microlytics ... 60 day MBG**
2732 G0fer 1.0 .......................... $43.
2733 myDiskLabeler w/Color 2.9.11 ...... 31.
3783 myDiskLabeler w/LaserWriter 2.9.11.1I .34.
4976 Sticky Business 1.0.4 .... 99.
**Working Software**
3788 Findswell 2.0 .......................... 36.

**Access Technology ... 60 day MBG**
3959 MindWrite 2.1 ................................ 95.
4109 MindWriteExpress 2.1 ................. 139.

**Microseeds Pub. ... 60 day MBG**
4848 INITPicker .............................. 29.
4210 Screen Gems 1.0 ................. 47.
2913 Redux 1.5 ............................ 59.

**Oldulasa Software**
4503 MultiClip 1.0 .......................... 35.
3031 Icon-lt 1.1 ............................. 39.
5030 ClipShare 1.0 .......................... 99.
3030 FontShare 1.1 .......................... 149.

**PCPC ... 30 day MBG**
3175 HFS Backup 3.0 .......................... 54.
**Solutions, Intnl. ... 60 day MBG**
3448 SmartScrip & The Clipper 2.0 .... 46.
3449 SuperGlue 1.05 .......................... 50.
**SuperMac Software ... 60 day MBG**
3383 SuperSpool 5.0 .......................... 53.
3382 SuperLaserSpool 2.0 .................. 79.
3378 Multi-User SuperLaserSpool 2.0 .... 199.
3377 Diskit 1.5 ............................ 53.
3379 Network Diskit 1.5 .......................... 199.
3381 Sentinel 2.0 ............................. 89.
**Symantec ... 30 day MBG**
4728 MacQZ 1.51 ................................ 52.
4729 S.U.M. 1.1 .............................. 65.
**Symmetry ... 30 day MBG**
3318 HyperDA 1.1 .......................... 35.

**Lamir ... 30 day MBG**
Acknowledgement 1.0—1989 MacUser Editors' Choice Award for Best New Telecommunications Product. "We salute it for offering us a glimpse of what telecommunications might be like in the near future." .............................................. $329.

**Williams & Macias ... 30 day MBG**
3783 myDiskLabeler w/Color 2.9.11 ...... 31.
3784 myDiskLabeler w/LaserWriter 2.9.11.1I .34.
4976 Sticky Business 1.0.4 .... 99.
**Working Software**
3788 Findswell 2.0 .......................... 36.

**Word Processing**
3959 MindWrite 2.1 ................................ 95.
4109 MindWriteExpress 2.1 ................. 139.

You've ever seen.

**Microlytics ... 60 day MBG**
2732 G0fer 1.0 .............................. $43.
2733 myDiskLabeler w/Color 2.9.11 ...... 31.
3783 myDiskLabeler w/LaserWriter 2.9.11.1I .34.
4976 Sticky Business 1.0.4 .... 99.
**Working Software**
3788 Findswell 2.0 .......................... 36.

**Access Technology ... 60 day MBG**
3959 MindWrite 2.1 ................................ 95.
4109 MindWriteExpress 2.1 ................. 139.

**Microseeds Pub. ... 60 day MBG**
4848 INITPicker .............................. 29.
4210 Screen Gems 1.0 ................. 47.
2913 Redux 1.5 ............................ 59.

**Oldulasa Software**
4503 MultiClip 1.0 .......................... 35.
3031 Icon-lt 1.1 ............................. 39.
5030 ClipShare 1.0 .......................... 99.
3030 FontShare 1.1 .......................... 149.

**PCPC ... 30 day MBG**
3175 HFS Backup 3.0 .......................... 54.
**Solutions, Intnl. ... 60 day MBG**
3448 SmartScrip & The Clipper 2.0 .... 46.
3449 SuperGlue 1.05 .......................... 50.
**SuperMac Software ... 60 day MBG**
3383 SuperSpool 5.0 .......................... 53.
3382 SuperLaserSpool 2.0 .................. 79.
3378 Multi-User SuperLaserSpool 2.0 .... 199.
3377 Diskit 1.5 ............................ 53.
3379 Network Diskit 1.5 .......................... 199.
3381 Sentinel 2.0 ............................. 89.
**Symantec ... 30 day MBG**
4728 MacQZ 1.51 ................................ 52.
4729 S.U.M. 1.1 .............................. 65.
**Symmetry ... 30 day MBG**
3318 HyperDA 1.1 .......................... 35.

**Lamir ... 30 day MBG**
Acknowledgement 1.0—1989 MacUser Editors' Choice Award for Best New Telecommunications Product. "We salute it for offering us a glimpse of what telecommunications might be like in the near future." .............................................. $329.

**Williams & Macias ... 30 day MBG**
3783 myDiskLabeler w/Color 2.9.11 ...... 31.
3784 myDiskLabeler w/LaserWriter 2.9.11.1I .34.
4976 Sticky Business 1.0.4 .... 99.
**Working Software**
3788 Findswell 2.0 .......................... 36.

**Word Processing**
3959 MindWrite 2.1 ................................ 95.
4109 MindWriteExpress 2.1 ................. 139.

You've ever seen.

**Microlytics ... 60 day MBG**
2732 G0fer 1.0 .............................. $43.
2733 myDiskLabeler w/Color 2.9.11 ...... 31.
3783 myDiskLabeler w/LaserWriter 2.9.11.1I .34.
4976 Sticky Business 1.0.4 .... 99.
**Working Software**
3788 Findswell 2.0 .......................... 36.

**Access Technology ... 60 day MBG**
3959 MindWrite 2.1 ................................ 95.
4109 MindWriteExpress 2.1 ................. 139.

You've ever seen.

**Microlytics ... 60 day MBG**
2732 G0fer 1.0 .............................. $43.
2733 myDiskLabeler w/Color 2.9.11 ...... 31.
3783 myDiskLabeler w/LaserWriter 2.9.11.1I .34.
4976 Sticky Business 1.0.4 .... 99.
**Working Software**
3788 Findswell 2.0 .......................... 36.

**Access Technology ... 60 day MBG**
3959 MindWrite 2.1 ................................ 95.
4109 MindWriteExpress 2.1 ................. 139.

You've ever seen.
This is for real:

**Personal Training Sys. ... 60 day MBG**
MacConnection carries the entire PTS collection. A partial listing follows.
4946 Manhole (beginner level) ... $29.
4954 Page Tutor (beginner level) ... $39.
4987 LearnWord (beginner level) ... $39.

**Primera Software**
5003 Different Drummer ... $59.
5015 Simon & Schuster ... 60 day MBG
3305 Typing Tutor IV 1.2 ... $35.
*Spinmaker ... 30 day MBG
2329 SAT Score Improvement 1.0 (CP) ... 57.

**Springboard**
4493 Atlas Explorer (CP) ... $28.
*Think Educational ... 60 day MBG
3615 MacEdge 111.0 ... $27.

**Entertainment**

**Access Software**
4655 World Class Leader Board Golf ... $28.
1184 Hardball (CP) ... $23.
4484 Mean 18 (CP) ... $23.
4485 4th and Inches (CP) ... $27.

**Acclaim Software**
4775 Where is Carmen Sandiego? (CP) ... $27.
4965 Auto Duel (CP) ... $27.
4966 SimCity (CP) ... $27.
1421 Ancient Art of War (CP) ... $27.
4540 Ancient Art of War at Sea (CP) ... $27.

**Broderbund Software**
4099 Shuttlepuck Cafe (CP, air hockey) ... $24.
4111 Moebius (CP, adventure & arcade) ... $24.
4229 Crystal Quest w/Critter Editor 2.2C ... $27.

**Cassady & Greene**
2268 Crystal Quest 2.2C ... $26.
4119 Crystal Quest w/Critter Editor 2.2C ... $27.

**Discover Software**
3408 Arkano id ... $27.

**Electronic Arts**
1842 Chessmaster 2000 (CP) ... $28.
4064 Chuck Yeager Flight Simulator (CP) ... $32.
4659 Life & Death (CP, surgery simulation) ... $32.
4945 The Hunt for Red October (CP) ... $32.
4981 Starfleet: The War Begins ... $36.

**Epyx**
2037 Sub Battle Simulator ... $29.
4660 Sub Battle Simulator for Mac II ... $29.

**MicroProse**
4997 Pirates! ... 32.

**Microsoft**
2868 Flight Simulator (CP) ... $33.

**Miles Computing**
2767 Harrier Strike Mission II (CP) special ... 27.
2765 Foo'd's Rarran (CP) special ... 27.

**Mindshare**
4833 Balance of Power 1990 (CP) ... $30.
3987 Colony (CP) ... $30.
4596 Deja Vu II (CP) ... $30.

**PBI Software**
3110 Strategic Conquest Plus 2.0 ... $35.
4933 Net Trek—The Real Version ... $35.

**PCAI**
3144 MacGolf 2.0 (CP) ... $35.

**Silicon Beach**
60 day MBG
Digital Darkroom 1.0—1989 MacUser Editors’ Choice Award for Best New Image-Processing Software (B & W). “Offering the tools of digital photo retouching it should become a part of every scanner user’s arsenal!” ... $195.

**Sierrina On-Line**
3501 Apache Strike ... $27.
3503 Dark Castle ... $27.
3502 Beyond Dark Castle ... $27.
3508 World Builder ... $41.

**Spinmaker**
4320 MacGolf Classic (CP) ... $54.
4321 Lunar Rescue (CP) ... $34.
4517 Road Racer (CP) ... $39.

**Sirock On-Line**
3397 Leisure Suit Larry (CP) ... $23.
3398 King’s Quest III (CP) ... $29.
3399 Silicon Beach ... 60 day MBG
3501 Apache Strike ... $27.
3503 Dark Castle ... $27.
3502 Beyond Dark Castle ... $27.
3508 World Builder ... $41.

**Simon & Schuster**
3303 Star Trek Kobayashi Alternative (CP) ... $24.

**Sir-Tech**
3347 Mac Wizardry (CP) ... $35.
*Softstream Int.’l, Inc. ... 60 day MBG
4071 Mac•Man (w/adapter) ... $24.
4072 The Solitaire DA ... $24.
4073 Colour Billiards ... $35.
4955 Cribbage Tutor ... $27.

**Spectrum Holobyte**
3475 Solitaire Royale (for Mac SE) ... $20.
3464 Tetris ... $20.

**Softstream Int.'l, Inc.**
4071 Mac•Man (w/adapter) ... $24.
4072 The Solitaire DA ... $24.
4073 Colour Billiards ... $35.
4955 Cribbage Tutor ... $27.

**Virex**
3737—The first comprehensive solution to the threat of Mac computer viruses. Virex both detects their presence & repairs infected programs on files, disks & servers. Combats all known viruses ... $69.

<table>
<thead>
<tr>
<th>Company</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electronic Arts</td>
<td>Chessmaster 2000 (CP)</td>
<td>$28</td>
</tr>
<tr>
<td></td>
<td>Chuck Yeager Flight Simulator (CP)</td>
<td>$32</td>
</tr>
<tr>
<td></td>
<td>Life &amp; Death (CP, surgery simulation)</td>
<td>$32</td>
</tr>
<tr>
<td></td>
<td>The Hunt for Red October (CP)</td>
<td>$32</td>
</tr>
<tr>
<td></td>
<td>Starfleet: The War Begins</td>
<td>$36</td>
</tr>
<tr>
<td>Epyx</td>
<td>Sub Battle Simulator</td>
<td>$29</td>
</tr>
<tr>
<td>MicroProse</td>
<td>Pirates!</td>
<td>$33</td>
</tr>
<tr>
<td>Microsoft</td>
<td>Flight Simulator (CP)</td>
<td>$33</td>
</tr>
<tr>
<td>Miles Computing</td>
<td>Harrier Strike Mission II (CP) special</td>
<td>$27</td>
</tr>
<tr>
<td></td>
<td>Foo'd's Rarran (CP) special</td>
<td>$27</td>
</tr>
<tr>
<td>Mindshare</td>
<td>Balance of Power 1990 (CP)</td>
<td>$30</td>
</tr>
<tr>
<td></td>
<td>Colony (CP)</td>
<td>$30</td>
</tr>
<tr>
<td></td>
<td>Deja Vu II (CP)</td>
<td>$30</td>
</tr>
<tr>
<td>PBI Software</td>
<td>Strategic Conquest Plus 2.0</td>
<td>$35</td>
</tr>
<tr>
<td></td>
<td>Net Trek—The Real Version</td>
<td>$35</td>
</tr>
<tr>
<td>Sierra On-Line</td>
<td>Apache Strike</td>
<td>$27</td>
</tr>
<tr>
<td></td>
<td>Dark Castle</td>
<td>$27</td>
</tr>
<tr>
<td></td>
<td>Beyond Dark Castle</td>
<td>$27</td>
</tr>
<tr>
<td></td>
<td>World Builder</td>
<td>$41</td>
</tr>
<tr>
<td>Simon &amp; Schuster</td>
<td>Star Trek Kobayashi Alternative (CP)</td>
<td>$24</td>
</tr>
<tr>
<td>Sir-Tech</td>
<td>Mac Wizardry (CP)</td>
<td>$35</td>
</tr>
<tr>
<td></td>
<td>Softstream Int.’l, Inc.</td>
<td>60 day MBG</td>
</tr>
<tr>
<td>Virex</td>
<td>Mac•Man (w/adapter)</td>
<td>$24</td>
</tr>
<tr>
<td></td>
<td>The Solitaire DA</td>
<td>$24</td>
</tr>
<tr>
<td></td>
<td>Colour Billiards</td>
<td>$35</td>
</tr>
<tr>
<td></td>
<td>Cribbage Tutor</td>
<td>$27</td>
</tr>
<tr>
<td>Spectrum Holobyte</td>
<td>Solitaire Royale (for Mac SE)</td>
<td>$20</td>
</tr>
<tr>
<td></td>
<td>Tetriss</td>
<td>$20</td>
</tr>
<tr>
<td>Softstream Int.’l, Inc</td>
<td>Softstream Int.’l, Inc.</td>
<td>60 day MBG</td>
</tr>
</tbody>
</table>

**Abaton**
30 day MBG
4585 InterFAX Modern ... $325.

**CE Software**
60 day MBG
3963 QuickMail 2.0 ... $205.

**CompuServe**
60 day MBG
1676 CompuServe Information Service ... $24.
1673 CompuServe Navigator 2.0 ... $45.
1674 Standard Service/Navigator Bundle ... $59.

**DataViz**
60 day MBG
1823 MacLink Plus 3.0 ... $139.
4842 MacLink Plus/Translators ... $119.

**Dove Computer**
60 day MBG
4939 FastNet III ... $450.
4938 FastNet SE ... $450.
4937 FastNet SCSI ... $925.

**FastNet**
60 day MBG
4208 Timbuktu 2.0 ... $65.
4866 Timbuktu Remote 1.0 ... $195.
4867 Timbuktu 33-Pack ... $139.
2201 TrafficWatch 1.0 ... $139.
2202 PhoneNET-AppleTalk 120 adapter ... $9.
2203 PhoneNET PLUS (DIN-8) ... $35.
2204 PhoneNET PLUS (DB-9) ... $35.
2205 PhoneNET PLUS Punch Down Block ... $69.
4869 PhoneNET Connector 10-Pack ... $225.
4868 PhoneNET Repeater ... $325.
2206 PhoneNET StarController ... $119.

**Fastsoft**
60 day MBG
2219 Red Ryder 10.3 ... $54.

**Hayes**
2300 Smartcom II 3.0B ... $88.
2307 Smartmodem 2400 ... $429.

**HJC Software**
30 day MBG
Virex 1.3—The first comprehensive solution to the threat of Mac computer viruses. Virex both detects their presence & repairs infected programs on files, disks & servers. Combats all known viruses ... $69.
Dear MacConnection,
I had to get a quote for a surgical laser to a surgeon before noon tomorrow. I had already missed FedEx and I hadn't even done the proposal yet. Then it hit me. What if I called MacConnection, ordered a fax board, and faxed the quote before the meeting? Was I dreaming or what?

I made the call at 7:58 PM. I prepared my quotation. The fax board arrived the next morning at 9:00 AM. By 10:30 AM I sent the quote, and even discussed it with the good doctor before the meeting. It's a good thing I was too late to call FedEx—the quote might not have made it in time.

I love it! What a company!

Mark Trigsted
Advanced Laser Systems, Inc.
Allentown, PA

"Was I dreaming or what?"
**ACCESORIES**

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mac SE Std. Keyboard Cover</td>
<td>$26.99</td>
</tr>
<tr>
<td>Mac SE Ext. Keyboard Cover Set</td>
<td>$10.00</td>
</tr>
<tr>
<td>Mac SE CF Ext. Keyboard Cover</td>
<td>$12.99</td>
</tr>
<tr>
<td>Mac SE Keyboard Wrist Rest</td>
<td>$19.99</td>
</tr>
<tr>
<td>Mac SE Keyboard Wrist Rest Kit</td>
<td>$24.99</td>
</tr>
<tr>
<td>Mac SE Keyboard Wrist Rest Kit w/ wrist pad</td>
<td>$29.99</td>
</tr>
<tr>
<td>Mac SE Keyboard Wrist Rest Kit w/ wrist pad &amp; wrist pad set</td>
<td>$34.99</td>
</tr>
<tr>
<td>Mac SE Keyboard Wrist Rest Kit w/ wrist pad &amp; wrist pad set &amp; wrist pad</td>
<td>$39.99</td>
</tr>
<tr>
<td>Mac SE Keyboard Wrist Rest Kit w/ wrist pad &amp; wrist pad set &amp; wrist pad &amp; wrist pad</td>
<td>$44.99</td>
</tr>
<tr>
<td>Mac SE Keyboard Wrist Rest Kit w/ wrist pad &amp; wrist pad set &amp; wrist pad &amp; wrist pad &amp; wrist pad</td>
<td>$49.99</td>
</tr>
<tr>
<td>Mac SE Keyboard Wrist Rest Kit w/ wrist pad &amp; wrist pad set &amp; wrist pad &amp; wrist pad &amp; wrist pad &amp; wrist pad</td>
<td>$54.99</td>
</tr>
<tr>
<td>Mac SE Keyboard Wrist Rest Kit w/ wrist pad &amp; wrist pad set &amp; wrist pad &amp; wrist pad &amp; wrist pad &amp; wrist pad &amp; wrist pad</td>
<td>$59.99</td>
</tr>
<tr>
<td>Mac SE Keyboard Wrist Rest Kit w/ wrist pad &amp; wrist pad set &amp; wrist pad &amp; wrist pad &amp; wrist pad &amp; wrist pad &amp; wrist pad &amp; wrist pad</td>
<td>$64.99</td>
</tr>
<tr>
<td>Mac SE Keyboard Wrist Rest Kit w/ wrist pad &amp; wrist pad set &amp; wrist pad &amp; wrist pad &amp; wrist pad &amp; wrist pad &amp; wrist pad &amp; wrist pad &amp; wrist pad</td>
<td>$69.99</td>
</tr>
<tr>
<td>Mac SE Keyboard Wrist Rest Kit w/ wrist pad &amp; wrist pad set &amp; wrist pad &amp; wrist pad &amp; wrist pad &amp; wrist pad &amp; wrist pad &amp; wrist pad &amp; wrist pad &amp; wrist pad</td>
<td>$74.99</td>
</tr>
<tr>
<td>Mac SE Keyboard Wrist Rest Kit w/ wrist pad &amp; wrist pad set &amp; wrist pad &amp; wrist pad &amp; wrist pad &amp; wrist pad &amp; wrist pad &amp; wrist pad &amp; wrist pad &amp; wrist pad &amp; wrist pad</td>
<td>$79.99</td>
</tr>
<tr>
<td>Mac SE Keyboard Wrist Rest Kit w/ wrist pad &amp; wrist pad set &amp; wrist pad &amp; wrist pad &amp; wrist pad &amp; wrist pad &amp; wrist pad &amp; wrist pad &amp; wrist pad &amp; wrist pad &amp; wrist pad &amp; wrist pad</td>
<td>$84.99</td>
</tr>
<tr>
<td>Mac SE Keyboard Wrist Rest Kit w/ wrist pad &amp; wrist pad set &amp; wrist pad &amp; wrist pad &amp; wrist pad &amp; wrist pad &amp; wrist pad &amp; wrist pad &amp; wrist pad &amp; wrist pad &amp; wrist pad &amp; wrist pad &amp; wrist pad</td>
<td>$89.99</td>
</tr>
<tr>
<td>Mac SE Keyboard Wrist Rest Kit w/ wrist pad &amp; wrist pad set &amp; wrist pad &amp; wrist pad &amp; wrist pad &amp; wrist pad &amp; wrist pad &amp; wrist pad &amp; wrist pad &amp; wrist pad &amp; wrist pad &amp; wrist pad &amp; wrist pad &amp; wrist pad</td>
<td>$94.99</td>
</tr>
<tr>
<td>Mac SE Keyboard Wrist Rest Kit w/ wrist pad &amp; wrist pad set &amp; wrist pad &amp; wrist pad &amp; wrist pad &amp; wrist pad &amp; wrist pad &amp; wrist pad &amp; wrist pad &amp; wrist pad &amp; wrist pad &amp; wrist pad &amp; wrist pad &amp; wrist pad &amp; wrist pad</td>
<td>$99.99</td>
</tr>
</tbody>
</table>

**SHIPPING**

- Continental US: Barring massive computer failures and other natural or unnatural catastrophes, all credit card orders placed with MacConnection by 8 P.M. EST will ship Airborne the same night for next-day delivery, except for those within UPS Ground Zone 1 (which is also an overnight service). The total freight charge on any order placed with MacConnection is now $3. Backorders will also ship Airborne overnight at no additional charge. Some areas require an additional day delivery. Hawaii, Alaska, and Outside Continental US: Call 603/446-7711 for information.
A no-questions-asked...

Insignia Solutions
4089 SoftPC 1.3 ................................ $249.
*LaCie, Ltd.  ... 30 day MBG
4975 LaCie Utilities 1.0 (Includes SilverLining, SilverPlatter, and SilverServer) .... 89.
*Lamir  ... 30 day MBG
4984 Acknowledge 1.0 ................................ 329.
*Microsoft  ... 30 day MBG
2875 Microsoft Mail 1.36 (1-4 users) .... 195.
2872 Microsoft Mail 1.36 (5-10 users) .... 325.
*Nuvotech  ... 60 day MBG
3000 TurboNet ST (DIN-8) 30.
3001 TurboNet ST (DB-9) 30.
*Practical Peripherals  ... 30 day MBG
3100 1200 Baud External Modem 77.
3102 2400 Baud External Modem 179.
3089 Mac Communications Pack 225.
*Shiva  ... 30 day MBG
3444 NetSerial X232 289.
3437 NetBridge 349.
3492 TeleBridge 349.
3443 NetModern V2400 479.
*Software Ventures  ... 30 day MBG
3454 Microphone 1.5 119.
3455 Microphone II 2.0 225.
*Synergy  ... 30 day MBG
3130 VersaTerm 3.20 65.
3131 VersaTerm-Pro 3.0 189.
*TOPS  ... 30 day MBG
3723 TOPS Mac 2.1 149.
3726 TOPS for DOS 2.1 119.
3724 NetPrint 2.0 119.
4715 InBox Connection Mac 2.2 75.
4714 InBox Starter Kit 2.2 199.
4888 TOPS Teleconnector (DIN-8) 39.
4889 TOPS Teleconnector (DB-9) 39.
4598 TOPS FlashBox 125.
3725 TOPS Repeater 169.
3720 TOPS FlashCard 169.
*Swivel 3D  ... 60 day MBG
3729 LAP-LINK Mac 2.0 83.

INPUT/OUTPUT
*Abaton  ... 30 day MBG
1188 ProPoint ADB 89.

Paracomp  ... 30 day MBG
Swivel 3D 1.0—Honorable mention—1989 MacUser Editors' Choice Award for Science & Engineering. Features full color shading & innovative linking for realistic movement. Earned a 4.5 mice rating from MacUser ........................................... $249.

Caere
4476 OmniPage 1.0 ................................ $559.
*Cutting Edge  ... 30 day MBG
3988 CE 105ADB Keyboard w/QuickKeys 145.
*Datadisk  ... 30 day MBG
1819 MAC-101 Keyboard (beige) 145.
1820 MAC-101 Keyboard (platinum) 145.
1821 MAC-101 Keyboard (ADB) 145.
*Ex Machina  ... 30 day MBG
4843 WristMac 149.
5018 WristMac Executive 199.
*Kensington  ... 30 day MBG
2576 Turbo Mouse for Mac Plus 109.
2574 Turbo Mouse ADB 109.
2593 MacVision 2.0 219.
*Kraft Systems  ... 60 day MBG
2800 3-Button QuickStick 39.
4082 3-Button QuickStick ADB 51.
*Kurta
2804 IS ADB Tablet 255.
2805 Cordless 4 Button Cursor 65.

Fifth Generation  ... 60 day MBG
Suitcase II 1.2,2—Honorable mention—1989 MacUser Editors' Choice Award for Utilities and Desk Accessories. Unlimited number of fonts & DA's without having to install them in your system ........................................... $45.

*LYNX Computer  ... 30 day MBG
1211 LYNX Trackball 65.
1212 LYNX Trackball ADB 65.
*Mobile Technologies  ... 60 day MBG
4846 MultiScreen 349.
*Mouse Systems  ... 30 day MBG
2808 A + Mouse 65.
2809 A + Mouse ADB 85.
*Nutmeg Systems  ... 30 day MBG
2992 15" Monitor for Mac PLUS 999.
2994 15" Monitor for Mac SE 999.
2993 15" Monitor for Mac II 999.
4002 19" Monitor for Mac PLUS 1349.
4006 19" Monitor for Mac SE 1349.
4007 19" Monitor for Mac II 1449.
4849 LCD Interface (Kodak DataShow) 399.
*Olduvair Software
3035 Read-It! OCR Personal 99.
3034 Read-It! OCR 2.0 249.
*Orange Micro  ... 30 day MBG
4488 Grappler Spooler 39.
3036 Grappler CMAC/GS 79.
4076 Grappler LQ 103.
4487 Grappler LS 103.

*PCPP  ... 30 day MBG
5005 SHADOWGRAPH Monitor (gray scale, incl. CGC/2 Card) 2895.
5004 CGC/2 Graphics Card 1495.
*PTI/DataShield  ... 30 day MBG
4845 MacDirector 115.
*SoftStyle
3282 Printworks (Dot Matrix) 43.
3283 Printworks (HP Laser) 85.
*Summographics
4298 BitPad Plus ADB 325.
*Thunderware  ... 30 day MBG
3648 ThunderScan 5.0 with PowerPort 189.
4994 LightningScan 409.

MEMORY & DRIVES
1107 1 Meg SIMMs .......................... call
4666 Mac B6 429.
1229 Mac B26 1079.
*Cutting Edge  ... 30 day MBG
3999 600k External Disk Drive 175.
3990 The Wedge XL 30 + SCSI 559.
3991 The Wedge XL 45 + SCSI 689.
*Dove Computer  ... 60 day MBG
1801 SCSI Interface/Port 109.
1807 MacSnap 5245 269.
1809 MacSnap 524S 373.
1811 MacSnap 546 499.
1812 MacSnap 546S 589.
1800 MacSnap 2SE 439.
1797 MacSnap Plus 2 439.
1804 MacSnap 2S 439.
1805 MacSnap 4S 439.
1793 MaraThon 020 MSE1 565.
1794 MaraThon 020 MSE2 (1 Meg) 979.
1795 MaraThon 020 MSE3 (2 Meg) 779.
1796 MaraThon 020 MSE4 (3 Meg) 1159.
4231 MaraThon 020 MSE4x4 2095.
4663 MaraThon 030 Accelerator 32 Mhz 999.
*LaCie, Ltd.  ... 30 day MBG
4983 Maxio Internal Drive Kit 59.
(w/ Epson 40 Meg, 25ms) 509.
(w/ Epson 70 Meg, 25ms) 659.
1984 Maxio External Drive Kit 189.
(w/ Epson 40 Meg, 25ms) 625.
(w/ Epson 70 Meg, 25ms) 775.

North Edge Software  ... 30 day MBG
Timeslips II 1-1999 MacUser Editors' Choice Award for Best New Professional Financial Package. “By far the best program we've seen for tracking time spent on client's accounts.” $117.

*Olduvair Software
3035 Read-It! OCR Personal 99.
3034 Read-It! OCR 2.0 249.
*Orange Micro  ... 30 day MBG
4488 Grappler Spooler 39.
3036 Grappler CMAC/GS 79.
4076 Grappler LQ 103.
4487 Grappler LS 103.
Animation is an illusion. Take a series of static images, display them in rapid succession, and you create the impression of continuous motion. The slowest display possible before movements appear jerky is about 16 images per second. The Mac II with an Apple color card can display 66 noninterlaced frames per second—that's plenty for making Mac-created animations look believable.

Animators today are taking advantage of that potential to do everything from building better video games to creating moving storyboards for motion pictures, walk-throughs of architectural models, and even complete short pieces. But if you want to create animations on the Mac, there are decisions you must make.

One of the first decisions will be what type of software you will use to create and view your graphics. Three-dimensional software provides you with a wide range of choices for designing realistic models and creating simulations with real-world properties. Two-dimensional programs, which display sequences of paint object graphics screens, enable you to simulate traditional frame-by-frame animation. Some 2-D products, such as those from MacroMind, also provide editing tools and facilities for compositing, or layering,
Whether you do traditional cell animation or real-time 3-D simulations, there's a Mac animation program for your purpose.

multiple animating images. Then there are HyperCard-based applications, which provide an interactive mechanism for displaying animations. The important thing is to select software with animation features that will economically give you the look you're after.

3-D: Adding Time to Space

Depending on the complexity of your 3-D design and the sort of motion you want, you have a fair number of software offerings to choose from on the Mac. Three-dimensional programs are typically object oriented; you draw or construct a 3-D object and then animate it by manipulating its position relative to the camera point of view. Some 3-D programs can play back sequences of frames; others force you to export frames to another program for display.

Three-dimensional products from Abvent, Dynaware, Paracomp, Visual Information Development, Inc. (VIDI), and Silicon Beach can automatically interpolate a sequence of frames to show the motion of an object between a selected start frame and end frame (the keyframes). This ability is called in-betweening or tweening. Three-dimensional programs also offer features for animating objects by rotating part of an object or the whole object, moving the camera relative to the object, or moving the 3-D world of camera and object (see "3-D in Perspective," Macworld, December 1988, for an introduction to basic 3-D terms and features).

• Swivel 3/D, from Paracomp, is a creative tool for generating objects quickly. You drag anchor points on a default object—a cube—or sketch freehand using polygon-creation tools. You can establish linked parent/child relationships between objects, so that when one moves the other moves in any of a number of specified ways. The relationship can be locked, as in a ball joint, or free as in a model of the
earth and moon. These features make Swivel ideal for creating objects with multiple animating elements (see "Attitude Check").

Swivel's Tween function enables you to create a specified number of images by placing objects at their beginning and end positions. You can animate linked or separate objects. The sequential tweens can be saved to the Scrapbook or as PICT files, in either Paint or Draw format. You can preview animations in real time as wireframe objects, but to run the rendered animations you must export them to an animation program like VideoWorks II.

Swivel provides a wide range of graphic looks. It has a rendered look, with hidden lines to give shaded solid images. If you find the vector lines appealing, you can colorize a wire frame and view it without hidden lines. There is also a texture-mapping option, which allows you to map a digitized graphic or text to an object, the texture then moves with the 3-D object.

A new version of Swivel, 1.1, includes some significant improvements and should be out by the time you read this. I'll mention only a few of the upgraded animation features. You can now position models along multiple keyframes to create complex motions, and you can smooth the motion path with a bezier function, for more fluid flight paths. An ease-in, ease-out control is available for giving apparent inertia to objects. Swivel's tweening now works with special effects such as antialiasing, and you can export animations to a greater number of formats, including Illustrator 88.

**Super 3D**, from Silicon Beach, was designed by CAD/CAM people and offers powerful modeling and animation features. Its use and appearance are closer to those of a more traditional 3-D design program than Swivel. You can precisely draw a 2-D shape, via numeric input, and then extrude or revolve that shape into a 3-D object. The look of objects can vary from wire-frame to shaded gray-scale or colored surfaces with up to four light sources. Super 3D enables you to precisely place the camera relative to an object in its 3-D space and easily move the point of view.

The animation capabilities are quite good. You have the choice of creating each frame separately by manually recording a particular position or by using a translation command to automatically in-between. These animations are saved as Movies that play at up to 60 frames per second.

Super 3D is great for constructing accurate objects, but the creative individual might prefer the Swivel look. It's a question of artistic preference.

**SpaceEdit**, from Abvent, is a complex 2-D and 3-D CAD program that's probably best suited for technical illustration and industrial design. Working in up to four windows, you start with a 2-D drawing and assign height and depth to create an object in plan view. This process will seem most natural to people like architects and industrial designers, but it has some interesting applications for animation, particularly for designing detailed 3-D logos for use in motion graphics.

What SpaceEdit does well is allow you to move around a complex object. You can create a series of points in 3-D space and, in effect, walk the camera through them. This process is great for designing very accurate fly-throughs, but awkward...
for animation, because the program doesn’t automatically interpolate from key frames. You really build the moves yourself. To run these moves as animations you need to export the image files to another program, such as VideoWorks or Abvent’s Action.

For motion graphic design, SpaceEdit’s advantage is accuracy. By LaserPrinting a series of plan views from SpaceEdit, you can end up with a series of pictures accurate enough to serve as CAD/CAM models for input and rendering in high-end raster systems.

- DynaPerspective, from Dynaware, offers interesting possibilities for constructing architecturally accurate models and then moving around and through them. You can extrude or revolve rough 3-D drawings into objects or quickly build complex forms out of wire-frame geometric primitives.

Camera controls enable you to change the perceived focal length, as if you were changing a camera lens from wide angle to telephoto; and you can zoom, rotate, and pan relative to a model. DynaPerspective offers key-frame selection and tweening and can display up to 20 frames per second. Rendered drawings and objects can also be exported as PICT files to VideoWorks for animation, display and layering with other animation elements.

- Dimensions Presenter, from VIDII, is noteworthy because it enables you to bridge the gaps between high- and low-end 3-D packages, and even between 2-D and 3-D. The program’s name tells its story: instead of being a 3-D-creation package, Presenter is designed to put graphics created in other programs in their best light. It currently imports Super 3D files and any file in DXF format (primarily used by CAD programs at present); VIDII plans to add more file formats.

Once you’ve got a graphic into the program, Presenter enables you to give it flat, colored shading using any combination of up to 1024 light sources. If you have Dimensions RayTrace, you can add surfaces and transparency. Presenter also does animation based on key frames, allowing you to move objects along straight or curved paths. You can do flybys, walkthroughs, and independent-object anima-

- Points of View

2-D: Paint on Parade

Two-dimensional animation programs are paint oriented (with some object or draw features). Such programs usually display animations by screen replacement; MacMovies, for example, shows full-screen MacPaint images sequentially at up to 30 frames per second. Creating artwork screen by screen using graphics software is a time-consuming process. The advantage is that because the frames are bitmaps, any part of any image can be easily edited.

- Studio/1, from Electronic Arts, is an innovation in paint-based animation. The black-and-white program offers two animating techniques. The first, dubbed AnimPainting, works in two ways. You can define any selection—a painting of a crescent moon, say—as a brush and then simply draw the path you want your selection to follow. The program automatically generates the frames required to move that moon across a starry sky. A more interesting variation allows you to define a short sequence of animation as a brush. If you had, for example, a runner that took ten frames to take two strides, you could define that sequence as a brush and then simply drag it along its course.

The second type of animation is called Animoving, and represents a hybrid 2-D/3-D approach. You select a portion of a painting or a piece of text, call up the Animove dialog box, and specify numerically the path you want the selection to follow. The program maps the 2-D drawing into a 3-D database. Thus you can specify that a logo appear on the horizon and spin its way into the foreground. One of the good things about Studio/1 is that it saves animations very efficiently by saving only the differences between frames.

Despite these innovations, the model approach to 2-D animation has been and remains VideoWorks, from MacroMind. VideoWorks II handles 2-D animations as composited paint-and-draw images, enabling you to place multiple sprites in layers. (A sprite is a simple animating image within a larger static or moving background.) This ability to layer multiple animating elements enables VideoWorks to provide the closest thing to traditional cell animation available.
**MACROMIND**

Macromind's VideoWorks line has always dominated Mac animation, and the company continues to set the pace with its new Macromind Director, originally announced as VideoWorks Professional. Like the earlier Macromind products, Director is based on traditional animation techniques. You create artwork in the supplied paint program, or import it as a graphic from other Macintosh 2-D or 3-D applications. VideoWorks now accepts the PICS format, which enables you to import entire animated sequences from programs that export PICS, instead of having to import the frames one at a time.

The program lets you work with 24 animation channels at one time. Each of these, known as a Cast Member, represents a different event or element in an animation—an animating object or character, a background, or music, for example. There are also 4 channels for effects, such as wipes and dissolves. You correlate these events in time by arranging them in the Score window. The score reads from left to right, like a piece of music (see "How VideoWorks Works").

In the past, one of the common practices of conventional animation that the Mac couldn't duplicate was flipping. Flipping drawings and seeing through layers is fundamental to traditional animation,

 recreating computer-generated images that look more like photographs than lessons in solid geometry has been the goal of many a computer artist. But producing realistic images has up until now required that designers work on high-powered graphics workstations. Now a Macintosh II or IIX equipped with Levco's parallel processing board and RenderMan software licensed from Pixar can

produce images that rival those created on dedicated graphics machines costing three to four times as much.

In September San Diego-based Levco plans to deliver the first Macintosh implementation of Pixar's RenderMan Interface version 3.0 and the RenderMan Shading Language. RenderMan for the Mac allows a three-dimensional modeling or animation program to describe a complex scene with a series of commands called the RenderMan Interface Protocol, or RIP.

What makes RenderMan scenes so striking is the degree of detail in the shading of surfaces. In RenderMan objects are specified by their geometry and by procedures called shaders which describe the attributes of light sources, the surface properties of objects, and the characteristics of local conditions, such as fog. Designers can map the properties of standard materials like metal, plastic, or wood onto any surface; wrap scanned images around objects; warp or distort surfaces; or design their own custom materials and light sources using the RenderMan Shading Language.

Companies reported to be working on incorporating RIP into their programs include Silicon Beach, Macromind, and VIDI. The modeling program can store ASCII or binary RIP commands in a file or send the commands directly to another software module called a renderer. Levco's renderer divides up a scene into pieces and distributes the pieces to the various Transputer processors for rendering.

The beauty of the Levco solution is the speed with which the Transputers transform a scene from its description into the final highly detailed image. Scenes that would normally take hours to complete finish in only minutes. Furthermore, the Transputers run independently from the Mac's CPU, so an artist can be working on a new design, while the Transputers render a scene in the background.

—David Ushijima

---

**Scans What Animate**

Stuart Sharpe, designer at Macromind, created this animation sequence by scanning photos into a Mac II using a How-Tek scanner. Using the system palette for gray scale, he combined the elements into layers using VideoWorks II and VideoWorks Accelerator. The shadows were created by animating QuickDraw primitives.
and for good reason. By flipping through drawings an animator can immediately see his or her work moving at speed and make adjustments. Director offers a feature similar to flipping, enabling you to align all the panels and easels and use a button to flip through them.

Director includes some other great new features, including an autotransform capability similar to the Blend tool in Adobe Illustrator. You specify a start shape and end shape for an object and the number of frames it takes to get from one to the other; the program interpolates the transformation between the two. There are also new limited-animation features for autoanimating charts and text with zoom, title crawl, and various other effects. All of this adds to the power of MacroMind’s products to create and composite graphics, text, and sound. But it’s these capabilities in conjunction with 3DWorks that make the Director package a unique animation tool.

I recently saw a beta version of Director and its companion programs, 3DWorks and RenderWorks. MacroMind’s Director with 3DWorks offers an exciting way to do complex 3-D animation. It also allows you to exchange files between any 3-D programs, so that you can import Swivel 3-D or Super 3D shapes, for example, and then create detailed motion and rendering.

3DWorks has some unique animation features. As opposed to being limited to moving objects in a straight path between key frames, the program enables you to use *splining* in a variety of ways. A spline allows you to graph the axis of motion between two or more points to get the dynamics of complex motion. You can also control the velocity at which an object moves and have it accelerate and decelerate between locations. There is also a 3-D autotransform tool that generates a specified number of frames to show the transformation of one 3-D object into another.

With the RenderWorks part of the Director package, you can give objects sophisticated transparency and surface treatments, working with wire frames or shaded objects. RenderWorks also offers the combination of object shading (using Phong or Gouraud models), texture and reflection maps, and multiple-light-source controls.

Collectively, the features of MacroMind Director, 3DWorks, and RenderWorks make the Mac a complete graphic animation platform. They provide the closest thing there is to a stand-alone Mac solution for the battery of techniques and applications required for versatile and professional animation.

**HYPERANIMATION**

HyperCard is one option for creating and/or displaying Mac animations. Designed for interactive, visually oriented applications, HyperCard’s basic metaphor is a stack of cards that can share common backgrounds. Each card can contain paint and text elements. The pictures can be created with HyperCard’s paint tools or imported from any MacPaint-compatible program. You link cards by creating buttons or through scripting in HyperTalk. Every card, background, field, and button is considered an object, with a script that determines its behavior.

Animated transitions between cards (such as dissolve, wipe, or zoom open or close) can easily be scripted in HyperTalk. But for animation of individual elements, HyperCard is limited; it’s primarily a screen-replacement program. Still, HyperCard has served as a point of departure for some very effective Mac animation innovations.

One innovation that takes advantage of HyperCard is VideoWorks II Accelerator. With Accelerator, animations that could run only at 5 frames per second (fps) in VideoWorks II can run at 30 fps. To accomplish this Accelerator keeps track only of the differences between frames. Accelerator comes with a HyperCard driver so that you can play accelerated files as part of a HyperCard stack. Studio/1 also has a HyperCard driver, so that you can easily import complete Studio/1 animations into HyperCard, instead of doing it frame by frame at a time.

Silicon Beach has created a second-generation HyperCard program called SuperCard. To HyperCard’s abilities, SuperCard adds color and several commands that facilitate stack animation. For example, you can now move graphics along drawn paths or have the program cycle colors. SuperCard can also compile animations to increase speed. SuperCard imports and supports TIFF, PICT, MacPaint,
and HyperCard graphic formats, and it imports and exports PICS format animations. These format options mean you can work with scanned images; draw files; paint files; HyperCard transitions; and prebuilt animation sequences from Super 3D, Swivel 3D, and 3DWorks. Something of a hybrid of VideoWorks and HyperCard, SuperCard offers a powerful platform for editing animations and combining them in an interactive format.

One final program is in a class by itself: HyperAnimator, from Bright Star Technology. HyperAnimator gives you access to a random-access software engine, called RAVE, to create and edit lip-synchronized synthetic actors. You can use HyperAnimator to create cartoon talking heads whose mouth positions synchronize with speech sounds (either in Macintalk or digitized speech). These actors are controlled through HyperTalk scripting.

HyperAnimator comes with two programs that demonstrate its use. Talking Tiles and Alphabet Blocks are language-instruction programs in which talking tutors teach phonics. These products use the random-access capabilities of the RAVE driver to link HyperCard stacks and sounds and take advantage of HyperCard's sorting and display speed. They exemplify an animation-based product that suggests innovative means not only for interacting with displays, but for creating animations.

On with the Show

Of course choosing software to create and display an animation is only half the battle. Hardware also comes into play. Memory restrictions, for example, may prohibit you from making a radical change in every frame of an animation. To get animations to run smoothly you may have to design them so that in each frame only one little element changes.

Mac animators also face difficulties when it comes to getting their stuff out to videotape. There are functional differences between the Mac's noninterlaced scan (refreshing the screen one line at a time at 66 frames per second) and the NTSC standard, which is made up of two interlaced scans (odd and even sets of scan lines that sequentially refresh the screen at 30 frames per second). The difference in scan methods is the main source of problems associated with going directly from the Mac to broadcast-quality video. A concurrent problem is that of translating the Mac's red-green-blue (RGB) color information into the NTSC composite color signal displayed in standard video. The development of new hardware to resolve these problems and to get animations out of the Mac and into other systems is fueling the growing enthusiasm for video publishing and presentations. For the time being, if you want to put complex Mac animations on videotape look for hardware that records single frames and for software that enables you to output animations in single frames.

Master Digital has developed software that facilitates the transfer of animation to videotape. TapeOp displays and transfers PICT2 and PICS documents without any

How VideoWorks Works

VideoWorks's (or Director's, in this case) Cast window acts as a catalog of the components—from animating elements and backgrounds to sound events—that will be combined to make an animation. The Score window shows a frame-by-frame breakdown of the active elements in an animation. This piece, Dino and the Butterfly, was created by Pat Perrin, of Los Angeles.

Tape to Mac, and Back

Peter Mitchell of Big Animated Digital Productions, Melbourne, Australia, used a MacVision video digitizer to grab video frames and put them into the Mac for this music video. He edited the video bitmaps using VideoWorks's paint tools and also used VideoWorks to composite the image. To assemble the piece, he filmed individual frames displayed on the screen of a Mac II and then had a service transfer the film to video.
### ANIMATION SOFTWARE

#### 3-DIMENSIONAL

<table>
<thead>
<tr>
<th>Category</th>
<th>Dimensions 1.19 Visual Information S2500</th>
<th>DynaPerspective 1.0* Dynoware S1495</th>
<th>SpaceEdit 2.2 Abvent S625</th>
<th>Super 3D 2.0 Silicon Beach S495</th>
<th>Swivel 3D 1.0 Parscomp S395</th>
<th>MacMovies 1.0 Beck-Tech S99</th>
<th>MacroMind Director** Silicon Beach S695</th>
<th>SuperCard** S199</th>
<th>VideoWorks II 2.0 MacroMind S295</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAD related</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full animation</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Limited animation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Runs On</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mac 512K</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mac Plus and SE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mac II</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Animation Types</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Create, store multiple frames</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Play back stored frames</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tweening</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Text animation scripts</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-D Manipulations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rotate/move objects</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rotate/move object elements</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rotate/move world</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rotate/move camera</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Move camera</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zoom</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dolly</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Export/Import</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scrapbook</td>
<td>E/1</td>
<td>E/1</td>
<td>E/1</td>
<td>E/1</td>
<td>E/1</td>
<td>E/1</td>
<td></td>
<td>E/1</td>
<td>E/1</td>
</tr>
<tr>
<td>PICT</td>
<td>E/1</td>
<td>E/1</td>
<td>I</td>
<td>E/1</td>
<td>E/1</td>
<td>E/1</td>
<td></td>
<td>E/1</td>
<td>E/1</td>
</tr>
<tr>
<td>PICS</td>
<td>E</td>
<td>E</td>
<td>E</td>
<td>E</td>
<td>E</td>
<td>E/1</td>
<td></td>
<td>E/1</td>
<td>E/1</td>
</tr>
<tr>
<td>MacPoint</td>
<td>I</td>
<td>I</td>
<td>I</td>
<td>E/1</td>
<td>I</td>
<td>E/1</td>
<td></td>
<td>E/1</td>
<td>I</td>
</tr>
<tr>
<td>PostScript</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ASCII text files</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Export other formats</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Includes Presenter, RayTrace, and Solid Modeler.  **Prelease version.

Mac windows, title bars, or scroll bars so that full-screen Mac animation can be recorded, one frame at a time, to videotape. The package includes modules that control the transfer of Mac animations to various 1-inch, digital (D-2), BetaCam, and U-Matic machines and video switchers, as well as to Sony, Ampex, JVC, and Panasonic recorders. Another module supports the Truevision NuVista card for frame grabbing. And if you can't afford the system, Master Digital also runs a service bureau.

In conclusion, keep in mind that many companies have animation tools and don't know it (video digitizers, for example); it's up to you to innovate. Animation is a creative process in which there are no stand-alone solutions. The cooperation of artists, animators, and developers will be essential in creating an umbrella approach that will integrate the graphic techniques and traditions of animation—with the platform the Mac offers.  

See Where to Buy for contact information.

---

Stuart Cuditz is an artist and filmmaker who has designed computer graphics and special visual effects for feature films, broadcast television, and interdisciplinary fine arts.
Special-effects firm extraordinaire Industrial Light and Magic is creating a comprehensive Mac network for everything from budgeting to motion control and image processing. Above, Ray Gilbert mans a motion-controlled Vista Cruiser camera. Below, Scott Squires in the line-up room.
It's a popular myth that the big-name studios in the film industry constantly keep armies of artists and technicians on their payrolls. Actually, the film giants are primarily in the business of financing and distribution. The work of making motion pictures is primarily done by contract personnel and independent production companies.

Manufacturing a movie may involve hundreds of people working in several locations over a period of a few years. While the large studios use IBM or DEC mainframes to keep their schedules and budgets, independents must bring their skills and tools with them as they move from project to project.

The Mac, with its graphic user interface, is particularly well suited to the requirements of independent film professionals. In fact, the Mac II is becoming a preferred platform for applications in every phase of filmmaking, from scripting through laying down the final score. Particularly in the graphics-oriented applications of storyboarding, special-effects production, animation, and editing, Macintosh technology is making a significant impact on the way films are made.
Lynda Weinman created this animatic to help the Star Trek V film crew determine whether they wanted to produce an expensive special-effects shot (which requires matching zooms on a rear-projection plate and the Enterprise model). She made the Enterprise in Swivel 3D and animated the piece in VideoWorks II. Along the way she made use of Illustrator, MacDraw, and Capture.

**STORYBOARDS**

Storyboards are a tool for pictorially working out the visual details of a script. They can be anything from a few rough drawings showing the continuity of action, to elaborate renderings of entire sequences. Producers, directors, cinematographers, and production designers use storyboards to anticipate problems as well as to gain approval of ideas. For independents, whose budgets leave little room for reshooting, being able to previsualize a production in detail is essential. The Mac provides these filmmakers with the ability to create more-finished—and even animated—boards at less cost and with smaller staffs.

No single tool exists for creating custom storyboards that can carry all the information required. As always in Mac graphics, finding a workable solution requires a certain amount of resourcefulness.

**Effects Animatics**

When Degraf Wahrmann of Los Angeles was engaged to consult on the Star Trek V production, the firm hired free-lance effects animator Lynda Weinman to produce specialized storyboards on a Mac II. Weinman used VideoWorks II with the VideoWorks Ace- celerator to assemble and run animatic* boards for the effects sequences. (Terms marked with an asterisk are defined in “Film and Video Glossary.”)

She created graphic elements in a battery of programs that include Super 3D, Swivel 3D, Pro3D, PixelPaint, MacDraw, and Illustrator 88. She used Capture (from Mainstay) to import this art into VideoWorks. For backgrounds and essential details, Weinman scanned artist Nilos Roodis’s original boards using a MacVision system (see “Zoom”).

This sort of creative solution is necessary even with best available Mac tools. Using film effects terminology, Weinman comments, “There are no programs that provide registered animation templates (rotoscoping*), work in a real-time environment, or stretch and shrink the duration of a sequence.” Still, she uses the Mac for all aspects of her film-design work and bookkeeping, and finds it “amazing that the same machine can do all this.”

Dale Herigstad also uses the Mac to storyboard 3-D computer graphics animation. As a designer/director for Marks Communications in Los Angeles, Herigstad uses the Mac as a “concept station” for designing 3-D storyboards with Abvent’s SpaceEdit and Swivel 3D, previewing on an 8-bit monitor, printing color boards, and faxing images to clients (see “Adventures in 3-D Space”).

Herigstad comments: “The Industry is accustomed to going from page to page with boards. But as designs get more complex, clients may have a hard time understanding motion. Using the Mac on the animatic level, you can bridge the gap. This necessitates using programs like Swivel 3D, which does in-betweening, to smooth the animation.” In computer-created animation, in-betweening is a function in which a program automatically draws the motion of objects between two selected positions.

**Hyperboards**

Hal Barwood, currently in production on a romantic comedy for Lucasfilm, has done all the jobs at the top end of feature-film production. As writer and director on this project he used a Macintosh SE to write the screenplay and produce storyboards.

When Barwood wanted to use Macintosh graphics to replace the usual thumbnail sketches, he found the paint and draw tools on the market “wildly expensive or overcomplicated.” So he took HyperCard and designed a storyboard program. Called StoryCard, it’s available as shareware. StoryCard enables Barwood to visualize sequences, write comments describing the action in a picture, and tie the graphics and notes to their place in the film’s script through HyperCard stacks.
**Feature Animatics**

Independent filmmakers Thomas Brown and Meg Switzgable are currently in production on *Passing thru Linden* for Foresight Films in New York. Directing is Switzgable, nominated for an Academy Award and an Emmy for her previous film *In Our Water*. Producer Brown was part of the original team that assembled filmmaking electronics and hardware for George Lucas and Francis Coppola. Working now as an independent filmmaker, Brown has economized on technology, using the Macintosh as a key production tool. For script writing, budgeting, and scheduling he uses Screenplay Systems' Scriptor, and Movie Magic Budgeting and Movie Magic Scheduling/Breakdown programs.

For storyboards Brown uses the Mac and an updated version of the electronic storyboarding techniques he first developed for Coppola. Using SuperPaint, his production team places text and notes in the draw level and storyboard pictures in the paint level (see “Scene 45: Int. Sadie’s Car”). They draw pictures on a Summagraphics tablet, but also digitize from tape and scan in images with a Dest scanner. By videotaping the storyboards (with the text suppressed) and taping a “radio play” of dialog and sound effects, Brown and company produce an animatic version of the entire film.

These Mac storyboarding techniques are heading

---

**FILM AND VIDEO GLOSSARY**

**Animatic** A limited animation consisting of artwork shot on film or videotape and edited to serve as an on-screen storyboard.

**Compositing** The combining of two or more film, video, or electronic images into a single frame or display.

**Conforming** Performing final editing on film or video using an off-line edited master as a guide.

**Matte** In film, an opaque piece of art or a model that leaves a selected area unexposed to be filled on a subsequent pass or in composite.

**Motion-Control Photography** A system for using computers to precisely control camera movements so that the different elements of a shot—models and backgrounds, for example—can later be composited with a natural and believable unity.

**Off-Line Edit** Preliminary or test edit usually done on a low-cost editing system using videocassette work tapes. Allows editor to make decisions and gain necessary approvals prior to the final edit.

**On-Line Edit** Final edit, using the original master tapes to produce a finished program.

**Opticals (optical printer)** Visual effects produced optically by means of a device (an optical printer) that contains one camera head and perhaps several projectors. The projectors are precisely aligned, so as to produce multiple exposures in exact registration on the film in the camera head.

**Rotoscope** A camera setup that projects live-action film one frame at a time onto a surface so that an animator can trace complicated movements. When it is filmed, the completed animation exactly matches the motion of the original action.

**SMPTE** Society of Motion Picture and Television Engineers. A professional association.

**SMPTE Time Code** A frame-numbering system for video. The numbers track elapsed hours, minutes, seconds, and frames from any point you choose; they look like this: 01-42-13-26.

**Ultimatte** The trade name of a very high quality special-effects system used for background replacement and image composites.
in the direction of full computer simulation of key sequences or even scenes before production begins. Macintosh consultant Michael Backes recently put together such an application for Aliens director James Cameron's new film, The Abyss, using the Mac in all aspects of preproduction, including 3-D simulation of sets. In order to plan special-effects sequences as tightly as possible, Ron Cobb (using Super 3D) and David Smith (programming) actually created 3-D simulations of props and sets. The director used these models in California to test camera angles and movements, such as flybys. When the crew arrived on location in South Carolina, the real-time Mac animations they'd produced helped save time and money on the shoot.

**PRODUCTION**

While these storyboard applications streamline the start-up phase of filmmaking, other filmmakers are using the Macintosh II as a platform for innovative film-and-video production techniques. Some of the unique hardware setups these companies have developed are changing traditional approaches to motion-control photography*, animation, and the production of composite* images.

**INDUSTRIAL LIGHT and MAGIC**

In movies from Star Wars to Who Framed Roger Rabbit?, Lucasfilm and its subsidiary Industrial Light and Magic (ILM) have established themselves as preeminent manufacturers of special effects. At ILM, Scott Squires, Chris Brown, John Knoll, and their associates are developing a comprehensive Macintosh-based network that uses Mac II workstations for budgeting and scheduling, controlling photographic hardware, and image processing.

Scott Squires says ILM picked the Mac for a variety of reasons, but primarily for the visual interface, which appeals to the visually oriented personnel at ILM and makes it easy for the large numbers of free-lancers the company uses to get up and running quickly. Brown, who has been building custom motion-control systems since 1978, attests to the growing popularity of the Mac in the film business: "In my work as a contractor, I used to have clients using a variety of computers. Now I have five or six clients, and they're all using Mac IIs or SEs." The devices he is currently creating for ILM employ hardware devel-

---

**Scene 45:**

Int. Sadie's Car

The Passing thru Linden production team created this storyboard in SuperPaint. The three rectangles and arrows show framing and camera moves that correspond to the shot descriptions at the bottom. The image can be printed with or without these notations, which are in SuperPaint's draw layer.

---

**Synthetic Blue Yonder**

PhotoShop, developed by John and Thomas Knoll, includes tools that enable it to simulate blue-screen replacement with great accuracy. (A) The model is photographed against a pure blue background. (B) To subtract the pure blue from the transparent portion of the canopy, an operation is used that compares the levels of green in the image's blues (normal blues contain some green). (C) A very accurate outline matte is created by combining negative red and positive blue separations. (D) This matte is used to cut the pure blue-subtracted plane from its background; it can then simply be combined with the new background. Notice that the sky shows through the canopy.
opened by Copymotor of Petaluma, California.

ILM has a full computer-graphics department, so its goal is to tie in the motion-control systems through Macs so that filmmakers can pass motion control and graphics data back and forth. "We should be able to look at a movement and duplicate that move whether it's on the stage, on the animation stand, or in the optical printer," says Brown.

One of the areas that special-effects filmmakers have been looking at is the process of digital-composite printing. ILM has achieved good results scanning film footage into a Mac; manipulating, matting, and compositing elements in a digital form; and then using the results either for previzualization or production (see "Synthetic Blue Yonder").

The color image processing program ILM uses is a custom program called PhotoShop. John Knoll describes the program as a superset of the functions of ImageStudio and Digital Darkroom, "which makes it really good for storyboard manipulation. You can use a video frame grabber to get one element and an input camera to grab storyboard art, then make any alterations you want." To check the work before committing to expensive, high-resolution computer imaging, an effects supervisor or an art or optical person can print the Mac image to a LaserWriter or, for color images, to a Tektronix color printer. PhotoShop works with 24-bit files, whether it's on a machine that displays 24 bits or only 8. Since the program exports 24-bit files in a variety of formats, it can send Mac graphics over a network to a Pixar Image Computer, which can drive a proprietary, high-resolution film printing device. If it's desirable, images can be passed in the other direction as well, from the Pixar to the Mac.

Currently ILM is also switching over to Macintosh for production management. The firm has a mainframe to take care of all production data for every shot of every in-house production, and plans to use Macs as dedicated input devices from every department.

ILM has a history of setting the pace for technological research and development in the film industry. The company's uses for Macintosh applications are indicative of the direction the industry will be taking in years to come. As ILM implements its proprietary applications in prominent feature-film special effects, live-action sequences, and commercial productions, the attention of other designers in this highly competitive field will focus increasingly on Macintosh solutions.

**THE DIGITAL MUPPET**

Muppet creator Jim Henson and his associates are renowned for mixing live puppet performances with film and video. For his latest project, Henson wanted to create a character that could have the transformational magic of animation yet maintain the interactivity and spontaneity of the muppet performances. To realize Henson's vision, Pacific Data Images (PDI) of Sunnyvale, California, put together a sophisticated computer graphics system with the Mac as an integral part of the production process.

The most difficult part of computer animation is collecting sufficient motion data so that the characters will move in a lifelike manner. PDI's Graham Walters, Thad Beier, and their associates solved this problem by linking a customized version of Visual Programming Language Research's (VPL's) Mac-based Body-Electric program to PDI's high-end 3-D systems. VPL is best known to the Macintosh community as the creator of the DataGlove and Body Suit input devices, which are used in a variety of 3-D simulation applications.

For PDI and Henson, the DataGlove technology was adapted to an armature equipped with sensors to capture motion data as a real-time performance (see "MacMuppet"). As the Muppet puppeteer moves the armature (known as the Waldo, after Henson's new character, Waldo C. Graphic), the changes in angle of each joint create changes in voltage, which the Mac translates into movements of the Waldo character.

As the armature moves, the Mac displays a simple wire-frame version of the character. Since the Mac cannot produce graphics as fast as is required to get real-time animation, VPL customized the BodyElectric package to enable it to interface with a Silicon Graphics computer. The SG interrogates the Mac to find out where the armature is and applies a software model of Waldo's movement to the armature data to create a preliminary rendering of the character.
STAR QUALITY

Thi real-time rendering is what the puppeteers see as they perform; the puppeteer who works the armature and those who work the characters with whom Waldo interacts monitor their performances on video screens where they see a composite picture of the preliminary Waldo rendering and the other puppets.

When the selected takes are approved, the Waldo data is brought back to PDI in Sunnyvale where the character along with the required mattes, is fully rendered. The fully rendered images and mattes are then sent back to the production facility in Toronto, where an Ultimatte* system is used to combine these images with the Waldo-less video layer.

The net result is that two minutes of performance data yields two minutes of animation. These two minutes of animation take two more weeks to render fully, but this is still a time savings of four to eight weeks over the traditional animation process.

This real-time rendering is what the puppeteers see as they perform; the puppeteer who works the armature and those who work the characters with whom Waldo interacts monitor their performances on video screens where they see a composite picture of the preliminary Waldo rendering and the other puppets.

When the selected takes are approved, the Waldo data is brought back to PDI in Sunnyvale where the character, along with the required mattes, is fully rendered. The fully rendered images and mattes are then sent back to the production facility in Toronto, where an Ultimatte* system is used to combine these images with the Waldo-less video layer.

The net result is that two minutes of performance data yields two minutes of animation. These two minutes of animation take two more weeks to render fully, but this is still a time savings of four to eight weeks over the traditional animation process.

The dynamics built into the automatic-rendering routines that produce Waldo make use of the latest computer graphics techniques. To produce Waldo's distinctive motion, different parts of the character's body were assigned varying degrees of gooiness—a springlike attribute. According to project supervisor Walters, "It's a tremendous amount of fun for us to see this kind of character come out with just the data from the automatic software setup. It was a big challenge to make it this automatic and get this much character out of it at the same time."

Macintosh-based innovations in image processing, photography, compositing control, and animation technique define a specialized industrial-market niche. By linking these applications to the larger production process, Mac filmmakers are creating models for the kind of comprehensive approach that studio feature films and broadcast productions demand. The same can be said for some of the recent applications of Mac hardware and software in film and video editing.

EDITING

The editing process starts with logging the first film shot and ends with the marriage of the final mixed master sound track and the final cut picture. The job of tracking every scene, shot, and take in a picture (and, of course, the corresponding sound tracks) is a labor-intensive and mistake-prone one. To help keep everything straight, film is manufactured with film-edge numbers printed at 1-foot intervals alongside the picture area. When film is transferred to video—as it often is for editing, since videotape is simpler to work with—there is the additional problem of keeping track of where each film image appears on the videotape.

Whether a filmmaker is conforming* a film's final cut to a video edit or using the new high-definition television technology to create a film version directly from video, the accuracy of the film-to-tape relationship is critical. Devices that handle the transfer of film to tape are constantly being improved, and recently the Macintosh has been added to this technology.

EdgeWriter

EdgeWriter is a film-transfer and edit-management system that evolved from the designs and engineering Clark Higgins started working on ten years ago for Francis Coppola. "Francis wanted to create 'the studio of the future,'" Higgins recalls, "so we began designing the Silver Fish for him." The Silver Fish is an Airstream mobile home that Coppola uses as a portable office, conference room, and on-location film-and-video-editing suite. Originally the intention was to design a facility that would allow Coppola to preview edits and effects on tape.

Higgins and his partner Roger Davis have since developed the technology into a hardware-and-software system that uses Macintosh-run devices to control the transfer of film to video. The EdgeWriter is compatible with high-end film-to-tape transfer machines (such as the Rank-Cintel system) and ran-
dom-access video-editing systems (in particular, the Montage Picture Processor, which uses EdgeWriter software).

In addition to being able to control the hardware for the film-to-tape transfer, EdgeWriter makes the laborious process of logging in all the scenes, takes, and shots in a film more convenient. Once the film transfer is complete, you simply play through the videotape, making notations in an Excel template of the SMPTE Time Code number and film-edge number for each shot, scene, and take. An Excel log is created for each reel of film. Since preliminary film for a feature may run to hundreds of reels, EdgeWriter uses a HyperCard database to manage the individual logs.

The final result of this process is that the data from the film-to-tape transfer becomes available for entry into a computer-controlled video-editing system. In fact, the EdgeWriter system in the Silver Fish is part of a complete Mac-based video workstation combining Eli Hollander's VideoMaker (as a video-edit controller), Screenplay Systems software, and Seehorn's Edit Worx for integrated project-management.

**Ultimate Editing**

In designing the Edit Worx film-and-video workstation, Larry Seehorn, of Sunnyvale, realized that when film editors speak fondly of the feel of cutting film, what they're describing is "the immediacy of the thing—make the edit, put it back in the sprockets, and view it." Seehorn's system is designed to provide this flexibility on a video-editing system, offering a single station that controls a video special-effects system (video switcher); audio tape recorders (ATRs); videotape recorders (VTRs); and videodisks, with the input from a high-end frame grabber and EdgeWriter (see "The Worx").

The system is configured with a Macintosh II as the main platform. "The Mac is the primary management software," Seehorn explains. "The second level of software is the edit engine, which is administrative. It looks to see what resources it has (VTRs, ATRs, and disks) and what the Mac is sending down to it, and fulfills the requests. If the right reel isn't up, it asks for it. At the bottom level are the interfaces to the individual machines."

Tim Felon has been writing the software for the Seehorn system using 4th Dimension. Each video sequence listed in the database is referenced by one or more screen icons made from shots in that sequence. A frame grabber from Data Translation captures the approximately 32K icons and stores them in the 4th Dimension fields.

Julian Systems, which markets Edit Worx, is currently working with Seehorn to upgrade the system's direct-video-output capabilities, to enable the Mac CPU to handle such things as video overlay and titling. Seehorn has come to view editing as only one part of a computer-controlled multimedia workstation. "The workstation is a group of tools that ties the script, editing, and catalog together. So, when shooting, one can see what shots are related to what part of the script, and in editing, what shots or script sections are related. I'm really not aiming it as an editor, though it does have these off-line and online capabilities. I want to see it going toward optical disk." Seehorn envisions a video workstation where film makers can randomly access playback sound and image source machines to immediately view digital variations of works in progress.

**FADE TO BRIGHT**

"There's no doubt in my mind," said Francis Coppola in his keynote speech at last year's Apple Media Conference, "that the Macintosh can be a beautiful creative processor where text, sound, and picture can be totally linked...Basically there isn't a task in the whole filmmaking process that can't be handled through the Macintosh computer. It is the machine of note today in the audiovisual future."

At present, the Mac commands only 10 percent of the film-production market, but there is considerable competition among Mac hardware and software developers to crack the major studios through more diverse and more specialized tools. Economic pressures and the creative demands of filmmakers for more comprehensive tools are the forces that motivate research, development, and change in the film industry. With the imminent arrival of desktop video and interactive disk technology, it remains to be seen how Macintosh technology will shape filmmaking and be shaped by it.

See Where to Buy for contact information.

---

Stuart Gedlitz is an artist and filmmaker who has designed computer graphics and special visual effects for feature films, broadcast television, and interdisciplinary fine arts.
HyperCard is nearly two years old. And although it has many fans, it has been plagued by a rumble of discontent from the beginning. Some complaints imply a basic misunderstanding of the program; HyperCard was never intended as a full-fledged relational database or programming language. Other complaints, however, are more legitimate. Items on many stack authors' wish lists include cards that can be larger or smaller than HyperCard 1.2's limit of 512 by 342 pixels, the size of a Mac Plus's screen; the ability to open more than one card/window at a time; object-oriented drawing tools and the ability to print high-resolution, full-page output; customizable menus and dialog boxes; the ability to write scripts for any object, even an irregularly shaped text field or bitmapped graphic, in order to define the object as a button; and color stacks.

Many of these requests are already addressed through add-on external commands (XCMDs) and external functions (XFCNs), which are written in Pascal or C code, compiled and installed into stacks using ResEdit or ResCopy (see "Extending HyperCard" for details on a few of these). Also, HyperCard 2.0 will probably incorporate many of these enhancements, al-
though Apple's commitment to keeping the program's size down and speed up may preclude adding color.

Now, two products—SuperCard, from Silicon Beach, and Format Software's Plus, from West Germany—promise to address many of HyperCard's major deficiencies as well as expand the program in new ways. It is difficult to compete with a free product, particularly one bundled with all new Macintoshes. To succeed, a competitor must be able to open all existing HyperCard stacks, read HyperTalk scripts, offer features unavailable in HyperCard, and, finally, accept the risk of being superseded by Apple upgrades. For a year and a half, no one accepted this challenge. And even now, at press time, neither SuperCard nor Plus is shipping. But a brief catalog of features already implemented in the beta versions of these programs offers us a window onto the future of hypermedia.

**SuperCard**

In keeping with Silicon Beach's strong graphics reputation, SuperCard adds a number of paint and draw enhancements to the usual HyperCard features. Object-oriented draw tools allow SuperCard authors to create high-resolution images for their stacks. This ability is augmented by the AutoTrace feature, which transforms bitmapped graphics into object-oriented ones. Because SuperCard can import MacPaint, PICT, PICT2, TIFF, and PICS animation formats, users can pull in images created in a variety of other programs. And SuperCard's 8-bit color support includes the ability to import or create a separate palette for each card.

Additional graphics capabilities include color cycling—an animation effect in which a series of colors are displayed in rapid succession—and a variety of "inks" that allow you to define the relationship between an object and the ground around it. Your ability to group and align objects on a card and to make multiple selections facilitates layout. And the final version will probably include several image processing tools from stablemate Digital Darkroom.

SuperCard not only translates HyperCard stacks and HyperTalk scripts into its own SuperTalk environment, but it automatically brings resources such as icons, cursors and CLUTs (color look-up tables), and XCMDs and XFCNs into its stacks without resorting to ResEdit or ResCopy. You can import resources from other commercial programs, and you can insert the Apple icon into your menu for access to desk accessories.

**SUPERCard to the Rescue**

Other ways that SuperCard helps stack authors include giving them the ability to open more than one stack at a time; you even have access to external stacks, regardless of whether they are open or not. For those who feel constrained by HyperCard's window size, you can also design cards of any dimension up to 34-by-34 feet. Stack authors will appreciate the ability to mix fonts, styles, and sizes of text in any given text field. And, for professional-looking output, SuperCard supports high-resolution laser printing.

To ease the scripting of animated sequences, SuperCard introduces a few new commands. For instance, you can draw a path that you would like an object to follow and then write a button script using the new Move command that tells an object to travel along the preordained path. If you would like something to happen whenever two objects touch, you can use the Intersect command to define that action.

SuperEditor, a separate module that accompanies SuperCard, lets you see and work on cards, windows, menus, resources, and scripts in an environment optimized for speed and ease of use. Online support, font control, and scrolling for long scripts facilitate the editing process.

Application authors should take special note of SuperCard's ability to create stand-alone products. You can distribute your new stacks with all their graphics tools intact without a separate SuperCard runner and without licensing fees.
EXTENDING HYPERCARD

While SuperCard and Plus offer integrated stack-authoring packages, many of the whizzes and bangs, such as color and multiple, resizeable windows, have been available to HyperCard users for some time as separate XCMDs and XFCNs. Several of these have appeared recently:

- ColorCard from Drexel University can create a multiple-window environment in which you can view gray scales and color graphics.
- MacRecorder version 2.0, an integrated hardware-and-software package from Farallon, allows real-time recording and playback at compression ratios of up to 8 to 1. A SoundEdit module includes a tempo effect that lets you play a sound at twice or half its recorded speed while maintaining normal pitch.
- Addison-Wesley's HyperComposer provides an on-screen keyboard and musical staff and lets you write up to 11,000 notes rather than HyperCard's limit of 256. The set of XCMDs comes with a full panoply of musical instrument sounds.
- Tim Pittman's Compelit, distributed by Heizer Software, is an XCMD that lets developers without programming expertise turn their scripts into XCMDs and XFCNs. You can access the Macintosh ROM Toolbox from HyperTalk scripts. While it may not speed up all scripts, it's useful for protecting sensitive script elements from prying eyes.
- Icon Simulation's HyperTMON is a combination of XCMDs, XFCNs, and resources that make a variety of debugging options available as menu items.
- Symmetry's HyperEngine 1.1 allows developers to build stack access into non-HyperCard applications. Claris, for instance, is using HyperEngine to provide an online help stack.
- Oracle for Macintosh uses HyperCard as its Macintosh front end and offers database developers three levels of programming—a very simple HyperCard-based tool for users with little programming experience; Hyper SQL, a HyperCard interface for Oracle's Structured Query Language; and Pro C, a C precompiler for veteran programmers.
- GAVA's HyperCom includes an AppleTalk driver that allows HyperCard to communicate stack-to-stack over a network.
- CLR HyperArrays from Clear Lake Research provides XCMDs and XFCNs that manipulate numeric arrays, sort fields, and test variables.
- The HyperCard VideoDisc Toolkit and the soon-to-be-released HyperCard CD Audio Tool kit (written by Bill Atkinson and Apple's Mike Holm) from the Apple Programmer's and Developer's Association allow stacks to control videodisk and CD players.
- HyperScan, the software accompanying AppleScanners, has been updated (as public domain software) to include an interpolation command that allows the software to scan a set number of magnifications as it zooms in on an image. The resulting scanned images can then be played back as an animated sequence.

SuperCard is slated for second quarter release with a retail price of $199. While it is true that HyperCard 2.0 may include many of the enhancements written into SuperCard, Silicon Beach has done an excellent job of incorporating refined graphics tools that may well win the program a bevy of dedicated converts.

PLUS FILLS A SLOT

While SuperCard is distinguished by its graphics abilities, Format Software's Plus emphasizes its "software slots." Plus's slots allow third-party developers to create new fields—spelling checkers, telecommunications programs, or spreadsheets, for instance—in any language supported by the Macintosh Programmer's Workshop and include them in their Plus stacks.

Icons for these new fields are inserted into a bar at the top of each authoring card. Already inserted into the bar are icons for paint, text, word processing, database, and object-oriented drawing modes. The two slots for text input, for instance, include a text field similar to HyperCard's that is used for importing text from HyperCard stacks, and a word processing field that allows multiple fonts, sizes, and styles of text within any field, as well as justification, find and replace capabilities, and some mail merge functions. You can cut and paste data imported into a traditional text field into a more flexible word processing field.

For authors writing stacks that require...
the stacks. Slated for an April 1 release in Europe, Format plans to sell Plus for $299. The company was still looking for an American distributor at press time.

**WHO CARES?**

The obvious similarities between HyperCard and the two supersets caused many to speculate on possible legal implications. In a parallel case, Ashton-Tate has a suit pending against Fox Software and The Santa Cruz Operation for selling software it views as clones of its dBase Mac program. Fox argues that a programming language lies at the heart of the dispute and that such languages are development standards that can't be copyrighted.

While Apple will certainly be watching the case, it's unlikely that a similar suit against Silicon Beach or Format Software is being considered. On the contrary, Jean-Louis Gassée was the opening speaker at the unveiling of SuperCard last January.

"I came here to support Silicon Beach's effort to put together SuperCard," Gassée told a surprised crowd. After dubbing SuperCard a "most beautiful product," Gassée announced the formation of a HyperTalk Language Committee made up of representatives from Apple, Silicon Beach, and other developers. The purpose of the committee is to ensure HyperTalk standards.

Startling as this coziness may appear at first, it is certainly to Apple's advantage to maintain control over HyperTalk and its extensions. A quick look at the UNIX world reveals what happens when there are many versions of a scripting language. Besides, HyperCard is a free product.

**MORE PLUSES**

Like SuperCard, Plus can translate HyperCard stacks into its own environment or create new stacks. Any Plus stack can take advantage of the program's 8-bit color; multiple, resizable windows; and object-oriented drawing tools, as well as customizable menus and dialog boxes.

Plus cards can be as large as a LaserWriter page, and Plus supports high-resolution printing. The color capabilities include special effects like sunbursts and rainbows, and each card can have its own palette. While Plus can't import TIFF or PICS formats, it can import MacWrite files, complete with headers and footers (each on a separate card). Like SuperCard, Plus can import XCMDs and XFCNs as long as they don't assume anything like a HyperCard event loop. And Plus includes two kinds of Find functions: the default one works like HyperCard's and the other allows you to index large files for quicker searches.

Applications created with Plus can't stand alone, but free run-time versions of Plus will be available for distribution with

**HYPERFUTURE**

All this competition and enhancement bodes well for the future of hypermedia. Over a million copies of HyperCard have been distributed, and while not all Macintosh users are sold on the program's potential, it is gradually winning more and more favor.

Stack authors already familiar with HyperCard's abilities will appreciate the ways in which these improvements facilitate the creation of elegant, functional stacks. Those new to hypermedia may be won over by the increased ease and expedience offered by the new products. In any case, the number of researchers and developers devoted to augmenting HyperCard and its genre points to a future in which hypermedia may well play an integral part. The rumors that subsequent system software may include a scripting language to facilitate customization and communication may not be such a pipe dream after all.
Choosing an Organizer

by David Pogue

What're you gonna do with your new computer—organize your recipes?

It's not surprising that the first image many people get when they think of a computer is a database: organizing recipes, typing a grocery list, storing names and addresses. As it happens, they're not far wrong; managing tabular data is one of the things a computer does best. And with each new generation of software, database programs for the Macintosh get more powerful and flexible.

**BACKGROUND DATA**

You can organize information with any database product; any database software can search for a particular record, sort data alphabetically, and print it in rows and columns. Granted, a spreadsheet can do these things just as easily, but a good database program goes far beyond arranging data into tidy lists. The best of these programs help you enter data, sort it on multiple criteria, calculate totals, display the results in a variety of ways, and print reports in a multitude of formats.

If you're looking for a database program that's as easy to manage as a spreadsheet, you should check out the flat-file managers, or a program like Reflex Plus, which is halfway between a relational database manager and a flat-file program. Here are some key ways to weed out the top-notch products from the ones that are only so-so.

**LAYOUT AND DESIGN**

Being able to tailor the look-and-feel of a filing system is one of the best features of a database program. The amount of power you have over setting up a database varies from program to program, however; here are some features that should be on your shopping list.

- **Multiple Layouts** A good database program enables you to format information in...
several different ways simultaneously. For instance, one view (or layout in database vernacular) of a name-and-address list might be standard mailing labels. A second layout might show only the name field, so you could print out name badges. This ability to use the same set of information in several ways is a hallmark of a flexible, state-of-the-art database.

- **User-Designable Interface** Can you customize the look of the data entry screen? Can you pop a corporate logo into the corner, or are you condemned to type information into a bare-bones spreadsheet? The best programs let you design a data entry screen, control the order in which you tab through the fields, and set a different font for individual fields.

- **Font Support** Even in this day and age, some database programs permit only a single font per file. Sending out invoices in 9-point Monaco may have been acceptable two years ago, but there’s no excuse anymore.

- **Online Graphics** If you have anything more complicated than a mailing label to design, you’ll appreciate the ability to quickly draw a border around a field, or to put a horizontal rule above the totals. The best database programs give you as much power in graphics (with a host of MacDraw-like tools) as they do in data processing.

- **Field-Placement Commands** A database should offer commands for manipulating the placement of fields and their labels as you create a layout. These crucial commands include Group/Ungroup, Align Top/Bottom or Left/Right, and even Cluster Resize (the ability to resize several fields in unison, which is essential for order blanks).

**ENTER: THE DATA**

There’s no question about it: the worst part about placing an operation’s data on a computer is typing every piece of information into the machine. If you’ve got a 5000-name mailing list, you’ll be tapping plastic keys for quite a while. A good database product, therefore, should make data input easier.

- **Importing Data** Make sure the program you’re considering can read in data from
external sources—another Macintosh database, for example, or even another computer. The best programs can read files of various formats directly, with a minimum of reshuffling and format converting.

- **Typing Aids** If your information isn’t already stored in some electronic form, you’re not so lucky; you have to type it in piece by piece. But here, too, a good program helps you. Panorama (the greatly expanded reincarnation of OverVue), for example, offers a feature called Clairvoyance; as you’re entering data, the program looks for similar data in previous entries. You have to type but a few letters of a word into a field, and the program fills in the rest of the entry automatically if it finds a match.

- **Default Values** The best database programs let you set up a default value for any field, sparing you the trouble of typing the same thing over and over again if the majority of the records contain the same data for that field.

- **Multiple Choice** If there are only a few possible values for a certain field, a superior program lets you set up a select-one-of-the-following dialog box; the user merely clicks on the proper choice, and the fully typed entry appears in the blank.

- **Lookup Fields** In the most flexible database programs, you can set up a semirelational link from one open file to another with very little effort. In other words, you might enter someone’s name in an invoice file, and the program would automatically fill in the address and telephone number fields for you, by consulting a second file (which contains a full list of names, addresses, and phone numbers).

These data entry shortcuts don’t just save you time and typing; they also ensure that entries are consistent from record to record (is it GE or General Electric?) and that names are spelled correctly.

**Data Crunching**

When you’ve finally typed or imported data into the program, you’re ready to start crunching information. Here, too, the design and elegance of a superior database program are strikingly better than a mediocre one.

- **Mathematical Progess** If you’re going to set up a database that must perform a fair amount of number-crunching, make sure the program’s calculation fields can do more than add and subtract; some programs are more mathematically gifted than others. While Microsoft File and DAtabase can only do simple arithmetic, Reflex Plus, FileMaker II, and Panorama contain built-in functions for financial, text (for example, profit = price – cost) and date calculations.

Use the table at right as a starting point for comparing database features. Some database programs work differently than a traditional list manager. DAtabase is a desk accessory that comes with a separate application for designing and laying out data files. Business FileVision is a graphics-based interactive database program that lets you link data to graphic or text elements in a drawing sheet. Clicking on an element takes you to the corresponding record. Reflex Plus is a relational database. Since it offers dynamic links between files, it has no need for lookup files.

If you need to generate reports with subtotals of the numbers in your fields, double-check to be sure that you can add such summaries, either on screen or when you print.

- **Searches and Sorts** Chances are good that one of your primary motivations for putting data on the Macintosh is so that you can reorganize it quickly. Database programs vary, however, in their implementation of searching and sorting routines. Ask: Can this program perform a one-pass search on several criteria? Does this database store the file in memory or, if it’s disk-based, does it use an indexing scheme? You hope the answer to either question is yes. Memory-based and indexed database programs are much faster at searching and sorting than are programs that have to read the file from beginning to end to find specified data.

- **Macros** You may appreciate the ability to automate repetitive or complicated tasks, particularly if you’re setting up a database for other workers to use. With a macro capability, a database program can search, sort, perform a calculation, select a layout and print—all with a single command. The best programs write the macros for you by recording the actions you perform.
# DECIDING ON A DATABASE

<table>
<thead>
<tr>
<th>Feature</th>
<th>FileVision</th>
<th>Database</th>
<th>FileMaker II</th>
<th>Microsoft</th>
<th>ProVue</th>
<th>Software Discoveries</th>
<th>Borland</th>
</tr>
</thead>
<tbody>
<tr>
<td>List price</td>
<td>$595</td>
<td>$129.95</td>
<td>$999</td>
<td>$195</td>
<td>$195</td>
<td>$999.95</td>
<td>$279</td>
</tr>
<tr>
<td>Maximum number of records</td>
<td>32,000</td>
<td>2500</td>
<td>disk-based</td>
<td>disk-based</td>
<td>RAM-based</td>
<td>disk-based</td>
<td>disk-based</td>
</tr>
<tr>
<td>Maximum number of open files</td>
<td>1</td>
<td>1</td>
<td>16</td>
<td>1</td>
<td>24</td>
<td>1</td>
<td>16</td>
</tr>
<tr>
<td>Creating a layout</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of field types</td>
<td>1</td>
<td>3</td>
<td>6</td>
<td>6</td>
<td>5</td>
<td>9</td>
<td>6</td>
</tr>
<tr>
<td>Default layout</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of functions for calculated fields</td>
<td>6</td>
<td>4</td>
<td>37</td>
<td>4</td>
<td>37</td>
<td>38</td>
<td>55 plus</td>
</tr>
<tr>
<td>Window autoscroll when dragging object</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Line, square, circle drawing tools</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Rulers for measurement</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Paste picture fields (black and white)</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Paste picture fields (color)</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Resize several objects at once</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Data entry</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Automatic capitalization</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Automatic number formats</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Default field values</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Lookup fields</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>n/a</td>
</tr>
<tr>
<td>Multiple-choice fields</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>User-defined range</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Password protection</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Undo</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Data processing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Automatic macro generation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Date calculations</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Form letters</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Multiple-criteria searches</td>
<td></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Search and replace</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>View multiple records</td>
<td>n/a</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Printing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Automatic date stamping</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Automatic page numbering</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Headers and footers</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Concatenate blank spaces</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Page preview</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Print one record</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
</tbody>
</table>

* Only in repeating field.
Fit to Print
Getting data into the program and manipulating it is only half the battle; often the most important function of a database is the printout.
• Laser Printer Support If you plan to print with a laser printer, be sure the database software can support pasted-in encapsulated PostScript or QuickDraw graphics; your corporate logo won’t look very impressive if comes out of the LaserWriter as a 72 dots-per-inch (dpi) bitmap. Peruse the manual. Will the program let you design forms of any size, shape, and orientation, or are you limited to letter- and legal-size forms? Can you design a form that will fit on those bizarre one-across-by-seven-down mailing labels of yours?
• Mail Merge Until recently, you had to export data to Microsoft Word to merge a mailing list into form letters easily; no longer. A couple of the best database products let you perform mail merges from within the program.
• Print Preview Be sure your prospective database program can display a preview of any report you’re about to print. There’s no feeling worse than returning to an ImageWriter a half-hour after starting to print mailing labels, only to find that your layout chops off the first few characters of every line.
• Label Flexibility Speaking of mailing labels: lesser database programs only print one label in a row, and even some of the expensive ones don’t let you decide whether to print them in order across the page or down the page. Needless to say, the best programs let you control all these variables.

Performance and Ease of Use
Even if there’s a database that gets an A+ in all the feature checks so far, you should abandon it if it looks as if it’ll be a chore to learn and use. The elegance of a program’s design and operation is something you’ll have to live with daily, and it should rank high on your list of priorities.
Are you going to have to train others to use the database? Will you have temporary personnel who won’t have time to master a new program? How much time do you have to set up new files? Check the following points.
• Password Protection If several people will be using the program, you may want to consider controlling access to sensitive parts of it, or at least preventing some users from altering the setup. Some database programs permit password protection and can hide menus, assuring you that no one can (willingly or accidentally) destroy the delicate artistic balance of your layout.
• Speed Get some hands-on experience with the program. Functions you use frequently, for example searching and sorting, should be quick, or else you’ll be frustrated when trying to find the data you’ve organized.
• Complexity Be acutely aware of your personal power-versus-learning-curve attitude. If you don’t have the patience to putter through extensive tutorials to master high-level capabilities, by all means consider a simple-but-limited program like Microsoft File. Fortunately, we live in an enlightened age; committing priceless data to one program no longer means it’s locked in that file format forever. If the time comes when you need more-sophisticated powers, you can export the data to another program.
• Multiuser Capabilities Only a couple of database products like FileMaker II support network access; be sure you read the fine print.
• Online Help The best programs spare you from having to crack the manual.
• Capacity Keep your eye on the number of records you expect to have in a file. Some programs have a fixed ceiling on this figure. Others, like Panorama, are limited by memory—which, depending on the size of your files and the amount of memory your system has, can be a strict limit indeed. Disk-based programs limit the number of records only to the size of your hard disk.

Final Reports
While the checklists above don’t cover every aspect of evaluating a database, the chances are good that the remaining signs of quality—such as clarity of the manual, availability of technical support, and frequency of upgrades—will go hand-in-hand with the other hallmarks of top-notch databases. Don’t be afraid to shop around. You don’t have to settle for something chunky. The best programs are dazzlingly efficient and flexible.

See Where to Buy for contact information.

David Page is a writer, composer, and Broadway conductor in New York City. He’s an avid member of the New York Mac Users’ Group.
You're the president of a small business. You need a Macintosh database, but you don't have the money or time to bring in the big, expensive relational guns that require a programmer to set up (like Double Helix II and 4th Dimension). What's a president to do?

The best option is to choose a flat-file database, such as FileMaker II, Panorama, or Microsoft File 2.0. All of these programs provide multiple layouts of the same information; perform complex searches, sorts, and calculations; and offer picture fields and multiple fonts. And you can own any of them for under $300.

But if these three programs were thrown into a ring to battle it out, feature against feature, which one would emerge victorious?

I challenged each program with a typical real-world task: managing the data for a fictional small business called Reciprocity, a recipe-exchange service. The test project incorporates the most important database features, such as lookup fields, automatic calculations, graphics generation, and shortcuts to data entry.
**DATABASE SHOWDOWN**

**INGREDIENTS**

Reciprocity requires three complex data files. The first, the mailing list, manages the names, addresses, membership expiration dates, and account numbers of 8000 members. The second file, an invoice system, is cross-referenced to the mailing list. When you enter a member’s account number on an invoice, the database program enters the name and address automatically. Tax and totals for each invoice are instantly calculated.

The third file contains the company’s recipes. A subscriber to the Reciprocity service can specify any number of characteristics for a dish; for example, someone might be looking for a no-salt entrée that is made with wine, takes 20 minutes or less to prepare, and serves four. The database system must be able to find such dishes quickly, display a digitized photo, and print a recipe card.

The three rival programs await. Let’s tear off the shrink-wrap and see how they perform.

**TASK #1: DESIGN AND LAYOUT**

Not very long ago, working with a database meant typing one-font information into fixed-length rectangles. Those days are over; all three of the database products reviewed here let you arrange information in many different ways.

Microsoft File 2.0 and FileMaker II offer extremely simple systems for defining the fields in a database: type each field name and select the data type (text, numeric, date, or picture). If you’re using File, however, proceed cautiously; once you’ve created a field, you can never change its field type. Panorama and FileMaker are more forgiving—even when a file has data in it, you can still change a field’s definition.

Panorama offers a multitude of features that make form design simple. To create a multiline form such as an Invoice, for instance, you paste in a blank table structure from a template provided with the program. Then use Panorama’s ingenious Cluster Resize feature, which resizes all selected objects at once when you drag one corner. Panorama also includes an extensive MacDraw-type graphics environment for further customizing forms.

**The Rivals**

FileMaker’s Layout mode is only slightly less capable. Its graphics implementation isn’t as complete as Panorama’s; you can draw lines, circles, and rectangles of any line thickness and any fill pattern, but the manipulation commands found in Panorama (like Group, Zoom, Duplicate, and Nudge) are absent in FileMaker.

FileMaker’s grid is quirky, too; sometimes an object refuses to snap into alignment with other objects in a row, because the grid may have shifted a pixel or two since you placed the original objects. And because FileMaker has no Align Objects command (as Panorama does), when the grid fails to align you must turn it off and place the field by eye.

FileMaker has an elegant solution for creating an invoice—a feature called Repeating Fields. You can make any field Repeating, meaning it will sprout a specified number of clones within a single record, stacked vertically. When you resize the top field, its attached clones change size too.

Layout design is Microsoft File’s weakest area. The most prominent deficiency is that File has no built-in graphics capabilities; you can’t put in a horizontal line under your logo, or draw a box around the Total Due. You can position the fields anywhere, and make them any font you like; but without any drawing power, your ability to generate handsome business-oriented documents is limited.

Furthermore, if you change a field’s font, you won’t see the change until you return to the data entry screen. Unlike the other programs, File doesn’t change the dummy text inside a field (the field name) to the new font or style; you always see Chicago 12-point, which makes it impossible to tell which fields you’ve already

---

**Extending HyperCard**

**David Watson, of the Santa Cruz, California, post office, set up his data in HyperCard, only to discover that the program has limited reporting capabilities. So Watson created HyperCard extensions to Microsoft File. Now Watson keeps his card-based data in HyperCard and prints out mailing labels and postcard-format labels using File.**

Unlike File and FileMaker, Panorama’s field-definition routine uses a spreadsheet format. When you run Panorama for the first time, you can enter data into the spreadsheet before defining the fields, just as you can type numbers into a new Excel document. In fact, to define the fields, you must open a separate window.

**Designing a Screen**

All three programs produce a simple default layout (fields lined up across the page, for example, or stacked in a column). But you’ll probably want something more customized. You can reposition, label, resize, and format fields in a design window. You can attach as many different layouts to a file as you want; File even saves them separately, so you can use a specific layout with other files. All three programs accepted a logo designed in Illustrator; none had any problem storing digitized photos (although Panorama couldn’t scale the image to fit the photo field).

---

**Underlying Data**

All of Panorama’s forms, such as this membership card, are based on underlying data. A tool palette contains icons for commonly used commands. As you drag the cursor over these icons, labels pop out to identify the command.

---

**MACWORLD • JUNE 1989**
formatted. File won't provide any help with a multiline invoice, either—you'll have to create an individual field for every blank on every line.

**The Winners** Though FileMaker and File offer much more straightforward field-definition routines, Panorama's graphics and layout capabilities—which you'll use much more often—make it far outshine its competition.

**FIRST:** Panorama.
**SECOND:** FileMaker.
**THIRD:** File.

**Task #2: Data Entry**

If your data exists in electronic form already, you're in luck: all three database programs import tab-delimited text files with aplomb. It's during manual data entry that you'll learn to love or hate a database product.

**Eliminating Gaps**

When you type data into FileMaker, you may see gaps between fields (as in the ingredients list). If you select the Slide Objects menu command, however, the extra blank spaces won't appear on the printout.

FileMaker and Panorama try to help during data entry. Both let you create multiple-choice fields; when you click in (or tab to) one of these fields, a dialog box pops up listing all the predefined possibilities. This kind of field is ideal for Reciprocity's "Type of Recipe" field, where there are only six possible entries, such as Appetizer and Bread.

Both programs can also provide a default value for a field and can increment a default. For instance, as a record is created in the mailing list, the programs increase the four-digit serial number by one.

FileMaker and Panorama also feature lookup fields. When you want to send an invoice, you normally have to type in the customer's account number, first and last name, and address—not a comforting prospect when you realize that this information has already been typed into the mailing list.

When you assign the lookup option to a field, however, you can instruct the program to fetch data from another open file and to enter it into specific fields in the current file. In the ideal Reciprocity database you type an account number into the invoice; the database compares the number with the account numbers in the mailing list file. If it finds a match, it feeds the name and address information from the mailing list into the corresponding fields in the invoice. Not only have you saved typing time, but you're assured that there are no spelling inconsistencies.

**Extrasensory Panorama** Panorama offers even more time-saving features, going out of its way to make data entry as painless as possible. A Tabs parameter lets you advance from one field to the next by striking the space bar instead of pressing the Tab key. You can define 17 parameters for each field, such as number formatting, or checking for duplicates. Capitalization is an example of a parameter that may seem minor, but when you're typing in dozens of records, you'll love Panorama for automatically putting state abbreviations in all caps.

Finally, there's Clairvoyance. After each character you type into a Clairvoyance-enabled field, Panorama examines all the entries in previous records. If it finds a match, Panorama finishes typing the entry for you. Thus if you've enabled Clairvoyance for the City field, and you type "San Fr." the letters "ancisco" will instantly appear. If you actually meant to type "San Fritos," just keep typing; the guess will vanish.

**The Winners** FileMaker offers a few of the most vital data-entry features, but Panorama's extensive implementation of intelligent time-savers carries the top honors with ease. File's lack of lookup fields puts it miles behind the other two; in fact, it offers no data entry shortcuts at all.

**FIRST:** Panorama.
**SECOND:** FileMaker.
**THIRD:** File.

**Task #3: Data Manipulation**

The names, addresses, and Easy Tuna Bakes are all typed in. Now it's time to crunch some data.

Because Panorama's spreadsheet format displays only a single font, and because it retains the entire file in memory, you'd expect the RAM-based Panorama to be far faster than disk-based File and FileMaker. Yet Panorama places last in the speed tests for finding a record, selecting a subset of records, and scrolling (see "Speed Tests for a 5000-Record Database").

Panorama concedes one other battle to its rivals: multiple criteria searches. To find a (1) vegetarian (2) entrée that (3) serves six, for example, you have to perform three separate searches, each...
time selecting a subset of the currently chosen records. This homing-in search routine is not as efficient as that of Panorama's rivals: both File and FileMaker find records that meet multiple search criteria in one swoop.

Math Transit When it comes to number crunching, both Panorama and FileMaker will impress you. The subtotal, sales tax, and grand total fields on the Reciprocity invoice are good examples; it's simple to make the program calculate them automatically, based on the prices of the items ordered. What's more, each of these programs offers 37 additional built-in math functions, ranging from text funnels to mortgage/principal functions. File's ability to perform simple calculations (addition, subtraction, multiplication, and division) is feasible by comparison.

All three programs perform summaries and grand totals handily, which makes monthly report-generation a snap. Panorama and FileMaker let you set up any number of nested subtotals, which can be placed anywhere. You can put Microsoft File's summaries in the user-definable forms; they're only available in a fixed list format.

Finally, FileMaker and Panorama offer powerful macro capabilities. To generate the labels for a Past Due mailing, all the Reciprocity accountant has to do is select Print Past Due (or whatever you've called it) from the macro menu, and the database program selects the overdue records by checking their dates, chooses the correct report form, sorts the records by zip code, and prints them. Microsoft File has no macro functions, but comes bundled with AutoMac, a third-party macro program; it's not as effective, however, as the integrated approach of the other two programs.

The Winners Despite its clunky multiple-search routine (and slight speed lag), Panorama is a data cruncher par excellence. Its spreadsheet format is conducive to on-screen subsummaries and other groupings; there's even a pseudo-outliner to give you control over the amount of detail you see. Though the Reciprocity project didn't make use of them, Panorama also offers extensive charting capabilities. You can create Bar, Line, Pie, Area, and Scatter charts with your choice of font, tick-mark units, and patterns.

FileMaker's calculation fields are powerful and intuitive, and because of its indexing scheme, FileMaker can find a single record faster than either of its rivals. As for File, although its Sort function is quick and simple, its math capabilities do no better than a pocket calculator.

**FIRST:** Panorama.  
**SECOND:** FileMaker.  
**THIRD:** File.

**Task #4: Printing**  
Microsoft File works easily when creating mailing labels and columnar reports—frequently used printing tasks that don't require much layout. The program comes with templates for numerous Avery printer labels; getting your mailing list to start printing correctly onto labels takes only a few minutes.

<table>
<thead>
<tr>
<th>Task</th>
<th>File</th>
<th>FileMaker</th>
<th>Panorama</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1:</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>#2:</td>
<td>A &amp; A</td>
<td>A &amp; A</td>
<td>A &amp; A</td>
</tr>
<tr>
<td>#3:</td>
<td>A &amp; A</td>
<td>A &amp; A</td>
<td>A &amp; A</td>
</tr>
<tr>
<td>#4:</td>
<td>A &amp; A</td>
<td>A &amp; A</td>
<td>A &amp; A</td>
</tr>
<tr>
<td>#5:</td>
<td>A &amp; A</td>
<td>A &amp; A</td>
<td>A &amp; A</td>
</tr>
<tr>
<td>#7:</td>
<td>A &amp; A</td>
<td>A &amp; A</td>
<td>A &amp; A</td>
</tr>
<tr>
<td>#8:</td>
<td>A &amp; A</td>
<td>A &amp; A</td>
<td>A &amp; A</td>
</tr>
<tr>
<td>#10:</td>
<td>A &amp; A</td>
<td>A &amp; A</td>
<td>A &amp; A</td>
</tr>
<tr>
<td>#11:</td>
<td>A &amp; A</td>
<td>A &amp; A</td>
<td>A &amp; A</td>
</tr>
<tr>
<td>#14:</td>
<td>A &amp; A</td>
<td>A &amp; A</td>
<td>A &amp; A</td>
</tr>
<tr>
<td>#15:</td>
<td>A &amp; A</td>
<td>A &amp; A</td>
<td>A &amp; A</td>
</tr>
<tr>
<td>#16:</td>
<td>A &amp; A</td>
<td>A &amp; A</td>
<td>A &amp; A</td>
</tr>
<tr>
<td>#17:</td>
<td>A &amp; A</td>
<td>A &amp; A</td>
<td>A &amp; A</td>
</tr>
<tr>
<td>#18:</td>
<td>A &amp; A</td>
<td>A &amp; A</td>
<td>A &amp; A</td>
</tr>
<tr>
<td>#19:</td>
<td>A &amp; A</td>
<td>A &amp; A</td>
<td>A &amp; A</td>
</tr>
<tr>
<td>#20:</td>
<td>A &amp; A</td>
<td>A &amp; A</td>
<td>A &amp; A</td>
</tr>
<tr>
<td>#24:</td>
<td>A &amp; A</td>
<td>A &amp; A</td>
<td>A &amp; A</td>
</tr>
<tr>
<td>#26:</td>
<td>A &amp; A</td>
<td>A &amp; A</td>
<td>A &amp; A</td>
</tr>
<tr>
<td>#30:</td>
<td>A &amp; A</td>
<td>A &amp; A</td>
<td>A &amp; A</td>
</tr>
<tr>
<td>#31:</td>
<td>A &amp; A</td>
<td>A &amp; A</td>
<td>A &amp; A</td>
</tr>
<tr>
<td>#32:</td>
<td>A &amp; A</td>
<td>A &amp; A</td>
<td>A &amp; A</td>
</tr>
<tr>
<td>#33:</td>
<td>A &amp; A</td>
<td>A &amp; A</td>
<td>A &amp; A</td>
</tr>
<tr>
<td>#34:</td>
<td>A &amp; A</td>
<td>A &amp; A</td>
<td>A &amp; A</td>
</tr>
<tr>
<td>#35:</td>
<td>A &amp; A</td>
<td>A &amp; A</td>
<td>A &amp; A</td>
</tr>
<tr>
<td>#36:</td>
<td>A &amp; A</td>
<td>A &amp; A</td>
<td>A &amp; A</td>
</tr>
<tr>
<td>#37:</td>
<td>A &amp; A</td>
<td>A &amp; A</td>
<td>A &amp; A</td>
</tr>
</tbody>
</table>

**How accurately do the programs sort?** FileMaker and File produce consistent, logical sorts. The only difference between the two programs is the placement of A & A and A A. Panorama, however, places more emphasis on capitalization than alphabetical order. For instance, AND and AND are placed together, but and is placed after Ave.

But you'll be frustrated if you attempt anything more complex. Creating the Reciprocity membership card, for example, was a headache. File's form-design mode provides no method for defining the width of a card—on the screen, your layout goes all the way across the page. And since File also lacks a Print Preview command, printing cards of a certain size and shape was a trial-and-error affair.

Panorama and FileMaker do much better, especially since they offer a Print Preview command. FileMaker lets you set up individual parts on your printout; a part is a horizontal slice of the page which you can turn into a repeating header, a footer, or a summary section, for example.

Panorama takes the parts concept further. To put together a report, you drag rectangular tiles onto the screen. There are over 35 kinds of tiles, such as 1st Page Left Header, Group Sidebar, and Table Footer. Although learning the tiles' functions and effects takes time, you'll be able to generate such diverse printouts as seven-across labels or nested tables.

Showing Good Form A new Reciprocity subscriber is automatically sent a personalized letter of welcome. Anyone who's ever received a "You may have already won..." sweepstakes letter knows that these letters aren't personalized at all; they're generated by a database program's mail merge function.

Panorama's mail merge function is ingenious. All you have to do is type the text of the letter. At each place you'd like to insert information from the database, just select the field name from a menu. When you print, Panorama seamlessly integrates the information in the database with the text.

Such an effect is possible with FileMaker and File, but it's not easy. In FileMaker, you must create each line of the letter as a separate text object, place it manually in a form, then drag each field into place and hope it's aligned correctly with the text. If you decide to change a phrase, you must set up the whole paragraph again, line by line. With File, you can create each paragraph as a block, but again there's no way to integrate data fields with your text. With either program, you can export data to a word processor
Task #5: Learning Curve and Performance

No one can challenge Microsoft File’s small memory needs (512K) or its tiny learning curve. If you can’t master File’s layout, data entry, and searching skills in an evening, you should go buy some index cards.

FileMaker will take you slightly longer to learn, but you’ll be guided by one of the best manuals in the business. The program is quick, even on a Mac Plus, and extremely stable. It’s also the only program of the three that runs on a network.

It’s agonizing to judge Panorama, which theoretically outshines its competition in features. It is complicated to learn, but the manual is outstanding, with copious crystal-clear illustrations. If there were a competition for ambition and imagination, Panorama would win hands down.

If there were a competition for stability, however, Panorama would lose. The initial release is not very solid—quirky bugs are everywhere. And then there’s the memory issue: Panorama simply could not complete the Reciprocit project. Even on a 2MB Mac, there wasn’t enough memory to have three graphics-laden files open and still print.

The Winners

For smaller projects than Reciprocit, you’ll never have to worry about Panorama’s memory-usage problems; the program will deliver all of its goodies without a whimper. As for the bugs, ProVue promises a cleaned-up version of the program by the time this article appears. If ProVue delivers as promised, then Panorama has a better shot at claiming the Best Database crown; until then, it will have to cede the title to its stabler and simpler rivals.

FIRST: FileMaker.
SECOND: File.
THIRD: Panorama.

Data Birth

In the end, only one database struggled through Reciprocit’s demands with its dignity intact: FileMaker. Microsoft File, while it’s the ideal choice for people with limited filing (and the only choice for Mac 512K owners), lacks too many key features to be a good candidate for a small business.

Only with great reluctance did I drag the Panorama Reciprocit files to the trash. With a 4MB or more Mac and a less buggy version of the program, things would be different. Even then, though, I could only use the RAM-hungry Reciprocit files on other high-memory Macs.

At last Reciprocit is on firm electronic footing. Without any real programming, I’ve created a professional data processing system. Lookup fields and data entry shortcuts minimize typing time, macros perform repetitive multistep chores, and the printouts look like they’ve been prepared by the art department.

Let’s see how long it takes FileMaker to complete one more test: to find a high-calorie dessert that can be prepared in under five minutes, serves one, and contains lots of chocolate.

See Where to Buy for contact information.

David Pogue is a writer, composer, and Broadway conductor in New York City. He’s an avid member of the New York Mac Users’ Group.
Making IBM Work for Your Mac

To remain integral to corporate computing, Macs must keep up with IBM's future mainframe networking strategies.

Welcome to the World of Big Blue

IBM's largest computers belong to the System/370 family, which includes mainframes like the 308X, 309X, and 43XX. (In IBM-speak, X is a number that further specifies system models.) System/370 also includes the 937X computer, which is—relatively speaking—smaller and designed to serve as a departmental computer.

The most popular terminals for System/370 hosts belong to IBM's 327X series. The 3278 (monochrome) and 3279 (color) are strictly character-based terminals, much like the old IBM PC displays.

Linking a terminal to a System/370 mainframe is nothing like hooking together two Macs (or even connecting a VAX to a terminal for that matter). Rather than using RS-232 serial cables, most IBM terminals use coaxial cable to transmit data. That data is transmitted synchronously, not asynchronously, between the mainframe and its terminals. And unlike the Mac, which uses ASCII to represent characters, an IBM mainframe employs a scheme called Extended Binary Coded Decimal Interchange Code (EBCDIC).

Nor do IBM terminals connect directly to the mainframe. A terminal must plug into a cluster controller, or communications controller, that in turn interfaces to a front-end processor in the mainframe (see "Big Blue Connections").

Cluster controllers are responsible for...
controlling communications lines, error recovery during communications, and for distributing the correct data streams to the right terminals. Off-loading these functions to a cluster controller provides the high-speed mainframe with a buffer for linking to the low-speed terminals. IBM 3X74 series cluster controllers can attach to the mainframe either via a direct link, or remotely through high-speed modems.

The 3174 controller uses the Centralized Unit Terminal (CUT) mode, and requires no intelligence within the terminal. However, it's limited to just one host session per terminal. Another controller mode, called Distributed Function Terminal (DFT) mode, requires an intelligent terminal to help process mainframe communications. Terminals that support DFT make fewer demands on the newer 3274 controllers; they also provide multiple sessions with the host (over a single coaxial cable) and offer improved color, graphics, and local printer support.

**The Mac in a 3270 World**

The simplest way to connect a Mac with an IBM mainframe is via 3270 terminal emulation, which supports synchronous communications protocols on coaxial cable (see “Pretending to Be 3270”). However, there are also software products from Simware and Communications Research Group that enable asynchronous communication with the mainframe (see “Asynchronous 3270 Terminal Connections”). Other packages—available from Apple Computer, Avatar Technologies, Digital Communications Associates (DCA), Novell, and Tri-Data Systems—allow the Mac to adapt to IBM’s terminal connection scheme (see “Linking Up with IBM”). Such terminal emulators consist of two parts: a hardware device or board that provides the coaxial cable connection to attach to the mainframe’s cluster controller, and terminal-emulation software that creates an IBM 3278-style display on the Mac screen. Either the software or hardware must also translate the Mac’s ASCII characters to and from the mainframe’s EBCDIC representation.

Apple’s AppleLine, a self-contained protocol converter, is the oldest emulation product available for the Mac. Used in conjunction with MacTerminal, AppleLine connects to the Mac through a serial port. Avatar’s MacMainFrame DX is a similar external protocol converter. MacMainFrame DX uses Avatar’s own MacMainFrame 3270 software as the terminal emulator; you can use the MacMainFrame DX with Shiva’s NetSerial to provide IBM connectivity for an AppleTalk network.

The advent of the Mac SE and the Mac II offered developers the opportunity to produce 3270 interface add-in boards. (Similar boards have long been available for IBM PCs and compatibles.) Companies that now offer such 3270 emulation...


boards for the Mac SE and Mac II include Avatar, DCA, and Novell.

In general, the functionality of these boards is about the same; all provide CUTF-style terminal emulation. Only in the past year has multiple-session support (via DFT) become available—first from Novell, then from Avatar. DCA has gone the next step by providing support in its MacImsa product for mainframe-generated graphics displays that can be saved and manipulated on the Mac.

Tri-Data’s Netway 1000A takes a very different approach to IBM mainframe-to-Mac connectivity. Instead of being the intermediary between the Mac and a clus-

**PUTTING ON A HAPPY FACE**

Working with the character-based terminal screens of an IBM mainframe is a far cry from using the Macintosh interface. Luckily, there are a number of tools that provide more of a Mac look to IBM mainframe communications. These tools support a range of applications, from simplifying navigation through a series of screens to view a memo, to providing transparent access to IBM databases within a Mac application.

First we’ll deal with a class of tools called Applications Program Interfaces, or APIs. An API is a way to simplify the use of hardware interfaces when different computer systems communicate. For example, as a programmer, you might regularly use write and read statements to output or input data. Coupled with an API, the commands (write and read) could
be used to communicate transparently with a mainframe, simply by using commands (send data and receive data) comprehended by the IBM operating system.

Both Avatar and DCA have defined APIs, and are shipping API libraries for use with the MacMainFrame and MacIrma boards, respectively. Avatar and DCA also include XCMDs or XFCNs so that you can design a mainframe interface with HyperCard (see "Which Interface Would You Rather Use?")

Although IBM has defined a series of APIs for communicating with their machines, any vendor of communications hardware can develop its own. Avatar chose to develop its own API, called the MacMainFrame Programmer's ToolKit. Avatar's API stresses conformance to Apple's interface guidelines and toolbox calls for the Mac, as set forth in Inside Macintosh (Addison-Wesley, 1984–1988). DCA's MacIrma API, meanwhile, conforms to an IBM standard called HLLAPI (High-Level Language API). This means any previously developed IBM PC code supporting HLLAPI can run on the Mac with MacIrma, although you may want to change the interface.

**MacWorkStation**

APIs are convenient tools for customizing and simplifying interfaces to existing mainframe applications and operating systems. However, corporate MIS (management information systems) departments may want to design new applications on the mainframe that use the Mac interface. Or such departments may wish to add a standard Mac interface for existing applications on a corporation-wide level. If that's the case, Apple's MacWorkStation (MWS) fits the bill.

MWS is basically a series of programming protocols designed to support remote communications between a Mac and a mainframe. On the host mainframe, any standard application continues to communicate by means of a stream of characters. MWS intercepts those characters and puts them in a form more in keeping with the Mac interface.

Then, using one of MWS's supported communication protocols, character streams representing commands and data are sent to the Macintosh. Simple character codes—like D007, which causes a dialog box to appear on the Mac screen—give the application windows, dialog boxes, and menus, just like a typical Mac program. The only difference is that the application generating or processing the data is actually running on the mainframe.

Initially, the only IBM mainframe communications link for MWS was the AppleLine protocol converter and coaxial cable. In the past few months, however, two significant mainframe drivers have been added to MWS—Avatar's and DCA's versions of TLPk, or the Transport Layer Protocol Module. Thus either MacMainFrame or MacIrma now supports MWS links with a mainframe.

APIs and MacWorkStation are not the only ways to add a Mac interface to mainframe programs. Originally marketed for Mac-to-VAX connectivity, the connectivity language CL/1, from Network Innovations, is being expanded to include communicating with an IBM mainframe via modem may sometimes be more convenient than through the cluster controller. For example, you may not need to be continuously connected to the mainframe, just every once in a while to exchange data.

Simware's Mac3270 behaves like a regular terminal emulator on the Mac. One of Mac3270's strengths is its macro editor and compiler, and Mac macros can be used with Simware's IBM PC version of Mac3270. The software also allows you to transfer text and binary files with the mainframe, provided text files are not formatted.

A similar product called MacBlast, from Communications Research Group, is part of a larger series of Blast terminal-emulation and file-transfer products. In addition to IBM mainframes, the Blast series supports Wang, DEC, Data General, and Hewlett-Packard computers.

Finally, Kermit, a very popular public domain program maintained by Columbia University in New York, offers file-transfer features to bridge the Mac and IBM mainframe. Several Mac communications packages—MicroPhone II, Red Ryder, and VersaTermPro—support Kermit protocols.

IBM mainframes don't innately support asynchronous terminal communications. As a result, Mac3270, MacBlast, and Kermit require that you install file-transfer software on the mainframe. In the case of Mac3270, it's SIM3278 Simware's IBM mainframe application. MacBlast needs the IBM mainframe version of Blast from Communications Research Group, and Kermit requires the mainframe application of the same name.
IBM-based database servers. CL/1 allows Mac users to extract or modify data found in SQL (Structured Query Language) databases, such as IBM's DB2. Several Mac databases already include support for CL/1. The same CL/1 procedures used to access VAX-based data can be used with IBM databases. Network Innovations also offers a HyperCard CL/1 library in case you'd rather use HyperCard to manipulate IBM databases.

Another approach to connectivity is provided by Oracle Corporation. Oracle sells database systems for a wide variety of computers, including IBM mainframes and Macintoshes. For mainframe databases that already use Oracle all you need to do is purchase Oracle for the Mac and you can access the mainframe-based data.

**KEEPING UP WITH IBM'S LATEST NETWORK**

IBM's older strategy for networking large mainframes revolves around what is known as SNA, or Systems Network Architecture (see "Alphabet Soup: SNA, LUs, and PUs").

Systems Application Architecture (SAA) is a networking strategy developed by IBM for connecting all types of computer systems—mainframes, minis, and personal computers—and applications running on those systems. You can think of SAA as an extension of SNA. SNA first introduced the concepts of Logical Units (LUs) and Physical Units (PUs), but within the context of mainframe communications; SAA organizes those units and attempts to provide a common interface for program-to-program communications among mainframes, minis, and personal computers.

A primary component of SAA is the peer-to-peer protocol called LU 6.2. Rather than assume that only one of the conversing devices has intelligence, peer-to-peer protocols assume that both members of the conversation are equally intelligent. Hence the use of the word peer.

As an example, communications between a mainframe and the DPT-style terminals mentioned earlier assumes that the terminal has no local intelligence. On the other hand, a Mac or PC has a great deal of local intelligence. With the Mac and an IBM mainframe working as peers, a database program on a Mac could tell a mainframe what kind of data it wanted, whereupon the mainframe would find that data and send it to the Mac for display in the database.

IBM's most powerful API, one designed more for the future than the present, is Advanced Program-to-Program Communications (APPC). As the name implies, this API allows programs on different machines to communicate with each other as peers. There is no master program and no slave program, as is the case with the older terminal-to-mainframe

**Putting SNA Together**

The different types of PUs are shown here in a typical SNA network of host, controllers, terminals, and IBM PCs. Typical configurations of LUs and PUs are given for each device. The box labeled SSCP in the host is a special system-control process responsible for controlling the rest of the network.

The intent is for SAA to provide links to all of IBM's major services for all kinds of users (see "SAA's Bits and Pieces"). Unfortunately, all of SAA's supporting cast has yet to be implemented across the board of IBM computers and operating systems.

**ALPHABET SOUP: SNA, LUs, AND PUs**

The building blocks of an SNA network are Logical and Physical Units. Logical Units (LUs) provide points of access through which users interact with the SNA network. Different LU types are identified by numbers in SNA (see "Logical Unit Types").

Logical Units allow users to communicate without knowing anything about each other's hardware. For instance, you don't need to know whether the other user is using an IBM PC/AT or a 3033 mainframe.

Of course, an SNA network needs more than Logical Units—after all, something has to connect the devices and maintain communications. Enter the Physical Unit (PU). SNA uses PUs to represent actual devices on the network (see "Putting SNA Together").

Each PU is responsible for providing the services necessary to manage and use a device. The PU also handles any resources, such as communications links, that are associated with it.

Physical Unit does not necessarily mean a piece of hardware; it can be implemented in hardware, software, or a combination of both. For those used to dealing with the AppleTalk or Digital Network Architecture (DNA) networks, SNA is radically different. In AppleTalk and DNA, all nodes are equal in the eyes of the network. SNA, on the other hand, demands that a central point of control exist.
LOGICAL UNIT TYPES

<table>
<thead>
<tr>
<th>Type</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>LU 0</td>
<td>Supports user-defined data stream within SNA formats and protocols.</td>
</tr>
<tr>
<td>LU 1</td>
<td>Supports multiple I/O devices for applications designed to communicate with a terminal.</td>
</tr>
<tr>
<td>LU 2</td>
<td>Supports communication with 3270 terminal types (3270 data stream).</td>
</tr>
<tr>
<td>LU 3</td>
<td>Supports communication with 3270 printer devices (3270 data stream).</td>
</tr>
<tr>
<td>LU 4</td>
<td>Peer-to-peer communication for certain devices (SNA data stream).</td>
</tr>
<tr>
<td>LU 5</td>
<td>Not defined.</td>
</tr>
<tr>
<td>LU 6</td>
<td>General peer-to-peer communication with a user-defined data stream.</td>
</tr>
<tr>
<td>LU 7</td>
<td>Supports applications that communicate with 5250-type terminals.</td>
</tr>
</tbody>
</table>

MacAPPC

With this—admittedly brief—introduction to the IBM networking world and APPC, let's take a look at Apple's product for IBM networking, MacAPPC. MacAPPC allows a Mac II to serve as a gateway between an AppleTalk network of Macs and an SNA network. You install the MacAPPC's support for the rest of the Macs on that (now the MacAPPC platform) into an existing AppleTalk network provides APPC support for the rest of the Macs on that AppleTalk network.

In addition to providing interfaces for C and Pascal with MacAPPC, Apple also includes a HyperTalk interface. The latter will probably prove to be a real boon for developers who would like to experiment with different parts of APPC before casting any code in stone.

The implementation of MacAPPC has certain advantages. First, the MacAPPC board in the Mac II is actually a coprocessor board, requiring very little of the Mac II's processing power to function. Thus, the Mac II can continue to be a regular workstation.

Second, MacAPPC memory requirements are low because most of the APPC code actually resides in RAM on the MacAPPC board. By way of contrast, IBM's APPC/PC loads into each PC's main memory, taking up valuable space—particularly true for MS-DOS machines, which have a 640K RAM limitation.

Third, MacAPPC reduces the cost of connecting Macs to mainframes. Only the Mac II equipped with MacAPPC requires the added hardware for connecting to the SNA network. The other Macs, all connected to the MacAPPC platform via AppleTalk, don't need protocol converters or add-in boards.

At the moment, there is but one choice for linking MacAPPC to an SNA network—AST Research's Intelligent Communications Processor (ICP), a NuBus add-in board that implements the SDLC (Synchronous Data Link Control) data communications protocol. Apple has continually promised an IBM Token-Ring board for over a year, but at the time this article was written, the board had not yet been introduced.

Unfortunately, the computer community is not being overrun with APPC-based applications. Implementing APPC requires a lot of coding and familiarity with distributed processing to create new applications. This is probably one reason that APPC hasn't caught on overnight. The foremost reason, however, is probably IBM's delay in implementing APPC on more of its own machines.

What Now?

If you want to keep Mac-to-IBM-mainframe links simple, the best solution is terminal emulation. Avatar's MacMainFrame and DCA's MacMain provide good one-on-one coaxial links to System/370 computers. However, if you have to connect a number of Macs to a mainframe (especially if they already share an AppleTalk network), Tri-Data's Netway 1000A is a very cost-effective solution.

To progress beyond simple terminal emulation and file transfer, take advantage of the APIs offered by Avatar and DCA. If your corporation has no programmers who can create a custom application, I recommend that you look at the HyperCard support proffered by these APIs. HyperCard can provide you with all the flexibility you need to create a usable custom stack for communicating with a mainframe. An added advantage is that you can use HyperCard to create prototypes of API-based communications programs.

The Mac and IBM mainframes can be good partners. The tools are there for you to access the data you need on IBM mainframes. And thanks to Apple and third-party vendors, you can do so with the interface and ease-of-use of the Mac, leaving IBM's interface where it belongs—on the IBM.

See Where to Buy for contact information.

Dave Kosiur, a Macworld contributing editor, is the publisher of Connections, an international newsletter concerned with Macintosh networking. Despite having been exposed to Big Blue's radiation, Dave still prefers to do his computing with a Mac.
"Two or three years from now, the typical laser printer will be a lot like the Business LaserPrinter™: small, light, with a SCSI connector for a hard disk, and inexpensive."

That's how Publish! magazine characterized our Business LaserPrinter (BLP), a Postscript® printer for Macintoshes® IBM's® and IBM clones. We'd only add that the future has arrived ahead of schedule.

Simply stated, the BLP is a better way to translate the language called Postscript into the graphics, words and numbers people use to communicate in business.

Better because the BLP lets you—or anyone else on your AppleTalk® network—produce superior text with the aid of 39 fonts (four more than our nearest competitor).

Finally, the BLP even takes better care of your bottom line. In fact, you can buy a BLP and a dedicated hard disk for less than the price of a LaserWriter® II NT alone.

Someday, if Publish! magazine is right, other printers will offer all this. But if you prefer not to wait, just visit your authorized GCC Technologies dealer for a BLP demonstration. For more information, or the name of a dealer near you, phone (617) 890-0880.*

*In Canada (800) 263-1405; © 1989 GCC Technologies, Inc. GCC Technologies, Peripherals With Vision, Business LaserPrinter and the GCC Technologies logo are trademarks of GCC Technologies, Inc. All other product and company names are trademarks of their respective companies.
Ramses II was not one to mince words. When it came to getting a point across, he was very direct—what was written was in fact etched in stone.

If he ruled today—in this exciting Information Age—he'd feel compelled to update his method to input and retrieve information. Being the meticulous type, Ramses would choose page recognition software that was accurate, fast and above all, flexible. Ramses would definitely choose OmniPage® to get the job done.

Let's face it, some scribes have less than perfect "chipmanship." Ramses would require the most versatile page recognition software—one that could scan any font or font size, even multiple columns of text—no matter which scribe created it. There's nothing more frustrating than a misplaced hieroglyph. He'd definitely want it to support MacWrite™ and Microsoft Word™, two of the most popular word processors within his kingdom. When it comes to page recognition software, he'd want the very best product at the best possible price.

He'd want OmniPage! And who would argue with the Pharaoh?

When you think about it—can you really blame him? There's just no substitute for a powerful, full-featured page recognition package. How can you afford to make a mistake when your entire "dynasty" depends on it?
So It Is Written...
So It Shall Be.

Means that OmniPage can read virtually any font, in sizes that range from 8 pt. to 72 pt.

This unique landscape feature means that spreadsheets and financial documents are only a scan away. A great addition to your royal granary if storing and accessing numerical data really counts!

Multiple column feature means that complex, compound pages of text and graphics can be handled—automatically.

Transitional Editor™ lets you review scanned text before exporting it to a file. Cut, copy, paste, insert and delete text—or take advantage of the powerful search and replace tools which allow you to modify a page.

Reads and outputs underlines, bold faces and italics.

Supports the most popular word processing programs for the Macintosh, including Microsoft Word and MacWrite.

Supports II of your favorite Indo-European languages, including French, German and Spanish.

WYS/Scan™ interface takes full advantage of Macintosh's incredible ease-of-use.

OmniPage 2.0 has even more features than ever before—this translates into the most comprehensive page recognition software available—anywhere—for any dynasty—at any price.

The bottom line in page recognition software—eliminating excessive keystrokes* for all time.

OmniPage 2.0 now available!

*Egyptian scribes had a real time of it when it came to excessive key strokes. Each letter, or hieroglyph, had to be individually etched into stone. And we complain today about writer's cramp?

OmniPage is a registered trademark of Caere Corporation. Transitional Editor and WYS/Scan are trademarks of Caere Corporation. Apple and Macintosh are registered trademarks of Apple Computer, Inc. Microsoft Word is a trademark of Microsoft Corporation. MacWrite is a licensed trademark of Claris Corporation. Egyptian bust of Ramses II courtesy of the Rosicrucian Society of San Jose, California. ©Copyright 1989 Caere Corporation. All rights reserved.
WINGZ 1.0

Spreadsheet with 3-D Graphics

Pros: Three-dimensional charting ability; full complement of graphics tools; large number of submenus; macros can be accessed through buttons placed on chart.


While Wingz isn't the first spreadsheet to include graphics tools, it is the only one that lets you create 3-D charts and that gives access to the full range of Mac II colors. If you'd like to create bar charts that look like cityscapes, stacked charts that bring to mind mountain ridges, or line charts that resemble flying carpets, Wingz is the only spreadsheet that can do that for you.

Wingz is also generally easy to work with: menu items are well placed, the manual is excellent, and the program's structure is so similar to Excel's (for example, = before formulas, $ before absolute references) that Excel users should be able to use Wingz with little training. In addition, Wingz has a full measure of ingenious minor features.

Unfortunately, the program lacks some features we have grown to expect in Mac spreadsheets.

Unlike Excel, Wingz lets you spruce up worksheets with lines, arrows, circles, polygons, and text fields. Wingz's ability to place charts on a worksheet, instead of in a separate document as Excel requires, makes it better for presentations. In all fairness, however, Full Impact provided these features months before Wingz (actually Trapzce provided them first). The one major advance in worksheet layout that Wingz offers is the ability to add a scroll bar to text fields. If you are creating templates for others to use, a scrolling text field can be an invaluable way of providing instructions.

Easier to Use, but There's a Catch

Wingz replaces the time-consuming dialog boxes found in other spreadsheet programs with 26 submenus that control everything from simple functions like changing the font style and type size, to more advanced activities such as setting the attributes and format of numbers, sorting database entries, choosing a chart type, and scaling the worksheet. While the single-mouse-click nature of submenus is convenient, there are times when you might want more choices than a submenu can hold. Excel and Full Impact, both of which make extensive use of dialog boxes, usually offer more alternatives. In Wingz you can't format dates as: month, day, year (for example, July 3, 1989). Nor can you format integers to display leading zeros, or eliminate the leading zero to the left of a decimal point, as you can in Excel.

Wingz offers an efficient method of specifying sort keys without using a dialog box, but this feature, too, is a double-edged sword. You don't lose functionality with the lack of a sort dialog box, but you do lose the ability to check and alter your sorting plan before you actually sort. To add sort keys, you select the columns or rows one at a time in order of sort preference, selecting Add Ascending Key or Add Descending Key from a submenu each time. The database then sorts in the order you select. If you selected the sort columns in the right order, you'll like Wingz.

Macro Language Compared

Of the three spreadsheets, Wingz is and Full Impact's macro languages are more like English than Excel's. These three macros perform the same activity: place 12 monthly labels along a row, place expense labels along a column, make the expense labels bold, and center the monthly labels. Excel uses numeric and logical codes that you have to memorize. Excel Macros are accessed through Option-# key combinations or from a dialog box. Full Impact macros are easier to access, since you do so through a submenu or icons on the title bar. Wingz is easier still, because it lets you access macros through a HyperCard-type button, which you can place anywhere on the worksheet.
Wingz 3-D Graphics

Creating a 3-D chart is as easy as creating a 2-D one. Just select the cells that contain data, use the chart tool to specify where the chart should appear on the worksheet, and select the type of 3-D chart (bar, line, layer, step, or combination) from a submenu. Once the image is created, you can rotate it in any direction.

for making it so easy, but if you are as prone to error as I am, however, you might want to be able to preview the list of selected sort keys and edit them, as you can in Excel's and Full Impact's sort dialog boxes.

Fill is another example of a Wingz function that's either convenient or inconvenient, depending on how you use it to fill cells with incremental numbers. It's a great feature for generating lists of consecutive numbers or dates. Just type in the first number, select the range of cells by dragging the cursor, and choose Fill from the Select submenu. Nothing could be simpler. But when you are adding increments other than one, Excel and Full Impact let you use a dialog box to specify how much to add to each number and at what number you should stop. The same operation is more cumbersome with Wingz. You must type the start value in the first cell and then enter the stop value in the last cell of the range. Wingz then automatically divides the difference between the two values by the number of cells in the range and adds the result incrementally to each cell.

Surprises, Pleasant and Otherwise

Wingz has some pleasant surprises that will make you wonder why rival spreadsheet developers hadn't thought of them first. But you'll also wonder why Informix omitted certain features generally considered desirable by spreadsheet users.

One nice addition that can save you time in creating and debugging worksheets is the capability to select a range of cells by type of data. For example, you can select all text, value, formula, or error cells. You can also select all blank cells, all unreferenced cells, or all cells having a direct or indirect formula reference to or from a specified cell.

An unwelcome surprise is that when you select a row or column and format it, Wingz formats only the filled cells. You can't, for example, format a column to have a dollar sign appear before all numbers you enter. In Full Impact or Excel you can click on a row or column designator, and the entire row or column will be selected. You can then specify, for example, that all text be formatted in bold. If you select column A, from that point on, everything you type in column A will be formatted in bold. With Wingz, if you select a full column or row, only those cells which contain data will be formatted. The blank cells (which probably make up the vast majority of cells in the row or column) are not formatted, and anything later typed in those cells will not contain the specified format.

A potentially more serious drawback is that Wingz doesn't save in SYLK. You can save your worksheet in text, but when you export the resulting files to Excel or Full Impact, you will not be able to include formulas. You can, however, import SYLK files and either import from or export to Lotus's 1-2-3.

3-D Wins

If Excel, Full Impact, and Wingz were all just arriving on the market today, Microsoft's Excel would probably be considered a weak cousin and would have to sell for less. Now there are thousands of commercial and private templates and macros available for Excel, dozens of books and training materials, a large installed base, and the promise of version 2.0; but if the three spreadsheets were starting together from scratch, either Full Impact or Wingz would be a better choice. These two products are close in functionality. While I prefer Full Impact's greater number of choices over the easier-to-use submenu system incorporated in Wingz, I would ultimately buy Wingz because it can create three-dimensional charts. Trust me, it'll make you the life of the boardroom.—Lawrence Stevens

See Where to Buy for contact information.
ALDUS FREEHAND 2.0

Professional Illustration Program

Pros: Allows editing in preview mode; smaller memory requirements than Illustrator; excellent color-manipulation and color-separation; improved user interface; better text manipulation than Illustrator.

Cons: Autotrace is disappointing, nearly useless for some graphics; requires intensive study to master program; requires PostScript printer to proof images.


The duel between FreeHand and Illustrator has been fascinating to watch. In no other software category, it seems, has there been a hard-fought feature fight. And in the long run, we users are the beneficiaries of the hot competition between Aldus and Adobe, creators of these two PostScript-oriented drawing programs.

If you're reading this review, you probably fall into one of three camps: you own and use Illustrator 88 and wonder whether the new FreeHand version has enough additional features to make you switch; you own the previous version of FreeHand and wonder if the new one is worth the $75 upgrade fee; or you're interested in buying your first PostScript drawing program and wonder if FreeHand's the one. Well, I won't keep you in suspense. The answers to these questions are No, Yes, and Maybe, respectively.

The Adobe/Aldus Wars

FreeHand came out after the original Illustrator and offered several unique strengths—the ability to work on art in a preview mode (which Illustrator still doesn't allow), the ability to draw lines in freehand mode (hence the name), more flexible text handling, and the concept of working in layers of a drawing. Many of us switched from the original Illustrator to the original FreeHand, mostly because we could approximate a shape by drawing it freehand and then refine it using the other tools. Then Adobe introduced Illustrator 88, which added professional color handling and separations, freehand drawing, autotrace of bitmapped images, and several other useful features. The color handling alone won most of us back to the Illustrator camp, and the autotrace was a very nice plus.

The new version of FreeHand brings it back into parity with Illustrator. The color handling has been improved and now includes color separations, Pantone color matching, variable screen ruling in separations, and better registration and over-printing support. FreeHand's toolbox now includes autotrace, magnification, path splitting, and hand grabber (for moving the paper in the window) tools. The user interface has been refined and made more like that in other Aldus products, most notably PageMaker. Other, more subtle changes have been made in some of the tools as well.

Features, Features, and More Features

Overall, FreeHand 2.0 and Illustrator 88 match up almost identically in the features arena. For that matter, I've found them approximately equal in performance as well. So the decision as to which is the one for you boils down to a lot of subtleties, plus a judgment about which one best suits your work style.

Take layering, for example. Illustrator 88 handles layering object by object. The program puts each new object in front of previously drawn objects. You must use the Move to Front or Send to Back commands to alter this arrangement. I've always had problems with this method, because I never quite seem to be able to draw from the background forward as Illustrator would like me to. FreeHand also includes object-by-object layering, plus up to 200 layers on which to draw. For those who like to create one layer of a drawing at a time—and to have that layer unaffected by drawing in subsequent layers—FreeHand is probably the better choice. It allows you to step back and forth between layers as the inspiration comes, without having to move individual objects forward and backward in the drawing.

Other calls go Illustrator's way, however. Autotrace is one example (see "Autotrace"). You can make Illustrator understand the difference between a line and a black shape, and it will create a single-line path for both. FreeHand, on the other hand, can't. While FreeHand outlines black shapes properly (as in the side-view mirrors in "Autotrace"), it sometimes doubles lines or fails to trace them at all (look closely at the hood and roof lines in the figure). Moreover, FreeHand's autotrace tool requires that you select a rectangular area to convert, while Illustrator 88 requires only that you click within a few pixels of the line or shape you want to autotrace. Thus, tracing large complex (continues)
"Impressive In Scale . . .

PSI.
Showing That
The Best Things

Like Our
Brand New

4 MB SIMM.

Do Come
In Small Packages!

• Total MacII*, IIx Memory Capacity
  16, 17, 20, 32 MB
• Uses Standard SIMM Socket
• Surface Mount
• 120ns and Faster
• RAM Disc Available for MacOS
  *MacII Requires SuperDrive Upgrade

<table>
<thead>
<tr>
<th></th>
<th>PSI</th>
<th>NATIONAL SEMI.</th>
<th>CHIP MERCHANT</th>
<th>MICRON</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uses Standard SIMM Socket?</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Surface Mount?</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Lifetime Warranty?</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Length Under 4 1/4 Inches?</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

PSI: Clearly The Best Modules In Memory.

2005 Hamilton Avenue  Suite 220
San Jose, California 95125
(800) 622-1722 Toll Free
(408) 559-8544 in CA
(408) 559-8548 FAX

Circle 436 on reader service card

Brand or product names are trademarks or registered trademarks of their respective holders.
objects requires one command with FreeHand (select the area), while it might take quite a few with Illustrator (select each continuous line or shape individually). Even so, with Illustrator 88 I’ve had to perform far less work to convert autotraced objects from bitmaps and TIFF images into final, publishable form.

Some Colorful Comparisons

Both these drawing programs now support Pantone color specification, as well as the traditional CMYK process color method. FreeHand performs separations from within the program, a plus when compared to Illustrator’s stand-alone separation utility. FreeHand also gives you more control over the separation process, especially if you want to overprint custom colors.

Because FreeHand supports drawing in the preview mode, you can see the colors of objects on screen as you draw; if you don’t mind the slight performance penalty for doing so. Illustrator forces you to toggle back and forth between drawing and preview modes to see the effects of coloring objects. FreeHand’s graduated fills look better on the screen, and appear to have more subtlety and fuller gradations than Illustrator’s, but FreeHand 2.0 seems to be quite susceptible to creating moiré patterns and crashing the typesetter (see “Selecting a Color Separator,” March 1989). On the plus side, FreeHand lets you control the screen angles for each color in separations. This is something that Illustrator doesn’t give you much control over; I’d give the color-handling nod to FreeHand by a slight margin.

Other things that give FreeHand the edge over Illustrator include more extensive text-handling features, such as the ability to fit text to a curve; a set of additional keyboard shortcuts (many tools can be selected from the keyboard); better support materials for first-timers, including a set of Advanced Techniques cards that show how to perform particular jobs, like making an Excel graph into a rotated 3-D chart; and an advantage in restricted memory environments—FreeHand can perform small tasks in a 750K MultiFinder space while Illustrator 88 absolutely requires a 2048K one. There’s even a slight difference in the way each program handles bezier-curve control points; I prefer FreeHand’s because I find them easier to grab; this makes it easier to change the curve predictably.

The Final Mix (And the Winner Is . . .)

But what it all boils down to is work styles and personal preferences. You won’t go wrong buying either FreeHand 2.0 or Illustrator 88. If you already have the first version of either of these products, update today, because the additions have made them both professional, publication-quality drawing programs. I use both regularly, often alternating between them just as an artist might alternate between brushes. But if I had to settle on only one product, FreeHand 2.0 would be my all-purpose brush.

FreeHand 2.0 is a state-of-the-art drawing tool that I can recommend without reservation. Its performance, feature mix, and supporting materials are all professional in caliber. If you’re still shopping for a drawing tool to create high-quality color images, these programs stand out in my mind as two of the best the Macintosh has to offer.—Thom Hogan

See Where to Buy for contact information.

---

**Matrix TT200**

**Thermal-Transfer Color Printer**

**Pros:** Good-quality images; compact; easy to use; flexible printing software. **Cons:** No Chooser-level driver, software not MultiFinder compatible. **Company:** Matrix Instruments. **Requires:** Mac II with one slot available. **List price:** $4995.

The thermal-transfer colorprinter market is heating up. The latest entry is Matrix Instruments’ TT200, which in many ways reflects Matrix’s experience designing high-quality film recorders. The TT200 Thermal Transfer Color Printer, together with its flexible, easy-to-use software, prints 200 dots-per-inch (dpi) 8½-by-11-inch output onto special paper or overhead-transparency film (both come in rolls). The TT200 is a quality piece of hardware and an effective device for capturing full-color presentations and graphics.

To set up the TT200, you open the Mac II and insert an interface board (the interface kit includes well-written step-by-step installation instructions and a 6-foot connecting cable). Then you install a thermal-transfer ribbon inside the printer. The documentation for installing the ribbon and inserting the printer paper could be clearer, but fortunately the procedures it covers aren’t much more complicated than installing an ImageWriter II. With a little patience and common sense the job should go easily.

**Conductor Driven**

The TT200 differs from most printers in that you can’t select it in the Chooser and then access it directly from within a graphics application. Instead, you must access the printer from the TT200’s software, Conductor (an enhanced version of the software supplied with Matrix’s film recorders). Conductor lets you preview, rotate, cut, paste, and scale images prior to printing. It can substitute high-resolution fonts for standard Macintosh screen fonts, though the only fonts supplied are Courier, Helvetica, Symbol, and Times, plus the variations of same that you might find in the Style menu. You can add a background color and select a single color for all noncolor (black) text. You can select and preview multiple images, then print them all in one batch (unfortunately, you can’t print in the background). You can also open a Scrapbook file and print all of the images in it.

(continues)
From SE To Shining See.

RasterOps: First with color for the SE/30. Our brilliant, 8-bit ColorBoard 108+/SE30 with built in Pan and Zoom lets you use affordable smaller displays, including Apple's 13" or equivalent, sliding around a "virtual" 19" display at will. Or power large displays, like our 19" Trinitron. Naturally, you get 100% application software compatibility.

Monochrome display for the SE: Power performance 19" monochrome system gives you a powerful accelerated SE! You get true 72 dpi WYSIWYG and flicker free refresh, including unique dual screen capabilities with Zoom Window.

Monochrome for the SE/30: Power performance 19" graphics system, with true 72 dpi WYSIWYG, flicker free refresh. Dual screen capabilities including Zoom Window, pop-up menus and more.

Turn on your SE and get the big picture.
Get RasterOps. For accurate color on your choice of monitor that fits your budget. And razor-sharp large screen monochrome. Because RasterOps leads the industry in high quality, high performance graphics for the Macintosh®. Color or monochrome, we offer the best solution for your SE.

“*We’re Changing The Way People Look At Computers™”*

So call now, for our brochure and the name of your nearest RasterOps dealer.

Hotline: 1-800-952-6300, Dept. X21

Oh, beautiful, for spacious screens.

All registered trademarks are the sole property of their respective companies.

Circle 13 on reader service card
**Good Coverage**

Even though the TT200 uses only a three-color ribbon (many color printers add a black pass to the usual yellow, magenta, and cyan), its colors are rich and the blacks dark and solid.

While Conductor provides a lot of flexibility and the ability to manipulate images prior to printing, using it can be a problem with some applications: you must save color images to disk before you can print them. That can be trickier than it sounds. Conductor only supports images in PICT2, Scrapbook, and Clipboard format when printing to the TT200. Many programs let you display color images and print them with Chooser-driven devices like the ImageWriter II. Unfortunately, some of the programs won’t let you save in PICT2 format or copy to the Clipboard in color. Matrix describes workarounds for some popular applications that do not save in PICT format. These workarounds are thoroughly documented in the back of the well-written Conductor user guide. Many of the workarounds require Solutions’ SuperGlue, a Chooser-level driver that offers a print-to-disk feature. Unfortunately, TT200 doesn’t include SuperGlue.

There are other drawbacks to using Conductor as well. Dragging images is painfully slow, unless you’re willing to disable the redraw function and drag blindly. Though the user guide discusses running under MultiFinder, a Matrix representative recommended against it. I tried anyway and had a few crashes. Because Conductor and MultiFinder don’t seem to get along, you have to quit your application to do any printing. When you’re using applications that don’t directly save in PICT2 format, and you’re tweaking an image to get it to look just right, the cycle can get rather involved: launch the application, edit the image, save it to disk via SuperGlue, quit your application, launch Conductor, import the saved image, print it, and if the image isn’t yet perfect, quit Conductor and start over. It’s a process that gets old quickly. You also wouldn’t want to try to use the TT200 for everyday printing; its limited selection of high-quality fonts and its 200 dpi resolution mean that it won’t replace a LaserWriter in desktop publishing applications.

**High-Quality Images**

The image quality of the TT200 is impressive, despite having only a 200-dpi resolution. All of the current crop of thermal-transfer color printers really only print seven colors: red, green, blue, yellow, cyan, magenta, and black. Other colors are simulated by dithering, which results in a loss of effective resolution (see “Printing a Rainbow,” *Macworld*, January 1989). Unlike most other color printers, the TT200 allows you to select from several different dithering patterns (see “Choice Dithering”). You can often improve the apparent resolution of a dithered print by choosing a dithering pattern that’s well suited to the image you’re trying to reproduce.

The TT200 also differs from most other color printers in that it only accepts a three-color ribbon (see “Good Coverage”). Many printers add a black pass to the yellow, magenta, and cyan passes required to produce the seven colors. Adding some black can improve the overall sharpness and density of color images and avoids the brownish cast that often results from trying to produce solid black by mixing yellow, magenta, and cyan. The TT200 doesn’t suffer from its lack of black ink, however; the blacks are crisp and sharp, and the color images are clear.

Although the lack of a Chooser-level driver is a major drawback, the Matrix TT200 is a quality color output device with few problems and an attractive price/performance index. Still, if you work primarily with an application that cannot save in PICT2 format, and the type of work you do requires numerous revisions, you’ll soon miss the convenience of being able to print from within an application. If Matrix were to offer a Chooser-level driver in addition to the Conductor application, the TT200 would become a hot contender among thermal-transfer color printers.

—Ron Risley

**Choice Dithering**

The TT200 gives a choice of dithering patterns to allow good apparent resolution of 256-color images at 200 dpi.
The fastest way to learn Macintosh software is to play it by ear.

The fastest way to learn software is to have an expert sit beside you and talk you through the program, step by step. With your hands on the keyboard, trying each new skill as it's explained, learning is a snap.

So Personal Training Systems gives you that expert—on an audio cassette. Each 90-minute tutorial contains the cassette, example files on a disk, and a quick reference card. It's like having your own private tutor . . . only this one works anytime, anywhere, and doesn't charge by the hour.

In addition to training on the Macintosh itself, tutorials are available for Microsoft Excel, Word and Works; Aldus PageMaker and Persuasion; Adobe Illustrator 88; and HyperCard. Since we offer beginning, intermediate and advanced levels for each software program, there's sure to be one that meets your needs.

All our tutorials are unconditionally guaranteed. You'll learn how to use your Mac or favorite software program—without opening a book or attending a class—or your money back.

So if you're looking for a fast, convenient, affordable way to learn, contact Personal Training Systems by calling 1-800-TEACH-99, or mail in the coupon below. Because we know you have better things to do with your time.

[Request form]

YES, please send me information on Personal Training for:
- Macintosh
- Excel
- Word
- PageMaker
- Illustrator 88
- FileMaker
- HyperCard
- Persuasion
- Works

Name ________________________________
Company ________________________________
Street ________________________________
City __________________ State ____________
Zip __________________ Number of Macs ____________

PERSONAL TRAINING SYSTEMS
P.O. Box 54240 ■ San Jose, CA 95154 ■ 408-559-8635
800-TEACH-99
HYPERANIMATOR 1.5

**Animated Lip-Sync Toolkit**

**Pros:** Creates realistic animation; automatically synchronizes digitized sound and text. **Cons:** Limited size of talking faces; works only with HyperCard.

**Company:** Bright Star Technology. **Requires:** Mac Plus; System 6.0.2 and Finder 6.1. **List price:** $199.95.

It seems silly, but we all talk to our Macs now and then. A bomb that sends hours of work into limbo, for instance, sets me off. But when was the last time your Macintosh spoke to you, moving lips and all? You might be surprised to learn that this is easy to arrange simply by adding animated talking faces to your HyperCard stacks with HyperAnimator.

Talking Heads
Each HyperAnimator face (called an actor in the program’s Hollywood metaphor) consists of 16 bitmapped images of 160 by 128 pixels each. Seven of the images are assigned to the lip positions most commonly used in spoken English (see “Lip Sync”). The Rest image appears when the actor has nothing to say. You can designate the remaining 8 images to correspond to any expression you care to imagine, from shock to ecstasy.

If HyperAnimator’s original nine-member cast isn’t enough, you can draw a new actor with HyperCard’s built-in painting tools. You can also import images from other drawing programs via the Clipboard. If you’re not an artist, HyperAnimator comes with enough clip art to keep you busy for days. For a more realistic effect, you’ll want to work with digitized images. HyperCard limits you to MacPaint-style bitmaps, however, and it takes a lot of tinkering to properly convert gray-scale images to black and white.

The Director’s Chair
Actors are manipulated from within HyperCard scripts using Bright Star’s external command (XCMD) language RAVE (Real-Time Animation and Vivification Engine), which lets you access functions not normally available in HyperCard. RAVE commands tell the actors where to appear on the screen, what to say, and what facial expressions to show. As with most XCMDs, though, the syntax is so rigid that it’s easy to make mistakes. Bright Star ought to consider adding a set of tools that would build scripts for you.

The simplest command consists of the word RAVE followed by a string of text, which makes the actor speak in Macintalk, the Mac’s speech synthesizer. HyperAnimator matches the sounds with the correct lip positions, giving a surprisingly realistic illusion of speech. (Unfortunately, since Macintalk sounds remarkably like an old college professor of mine, I can only bear to listen for a few minutes at a time.)

HyperAnimator’s real power lies in its ability to give actors a digitized voice. For example, using Farallon Computing’s MacRecorder, you can record speech to import into your stacks. Then you enter the corresponding text, and HyperAnimator’s speech-sync function selects the appropriate lip positions for you. Add a few facial expressions and a bit of tweaking, and you’ll be asking if it’s live or if it’s Macintosh. One minor problem I encountered was HyperAnimator’s inability to copy sounds from any file that isn’t a HyperCard stack; if your digitizer can’t save sounds directly into stacks, you’ll have to resort to ResEdit to do the job.

The Envelope, Please
Like many of the HyperCard add-ons available today, HyperAnimator is implemented as a stack, so it’s not difficult to learn if you’re already familiar with HyperCard. The manual does a good job of explaining how everything works, although the lack of an index leads to superfluous page turning. HyperAnimator’s most obvious shortcoming is the limited size of the actors—that and the fact that its tools are available only from within HyperCard. Still, if you need to synchronize speech and animation in your stacks, HyperAnimator is the only game in town. And it’s an impressive one at that.—Franklin Tessler

See Where to Buy for contact information.

ALDUS PERSUASION 1.0

**Desktop Presentation Manager**

**Pros:** Clean, simple interface; careful integration of modes; patent drawing and graphing features; templates ensure graphic unity throughout presentation. **Cons:** No dissolves or other screen effects; can’t change template while constructing presentation. **Company:** Aldus. **Requires:** Mac Plus; second disk drive. Hard disk recommended. **List price:** $495.

It takes a certain audacity to introduce a new desktop-presentation program that offers no dramatic new features when there are already a host of excellent presentation managers on the market. Aldus Persuasion, however, offers two distinct advantages: integration and simplicity. Persuasion, it turns out, is both more complete and less daunting than its rivals.

Online Outline
Persuasion’s structure is like a three-dimensional ticktacktoe game. The bottom level consists of master slides, or templates—essentially shells containing formatting, text, and color information into which the text and graphics of a presentation flow. The next layer consists of the slides (or overheads or printouts) themselves. At the topmost layer, you choose the appropriate mode for viewing: outline, slide, speaker’s notes, or audience handouts.

Persuasion’s interface surpasses those of its competitors because it makes mov- (continues)
Good ol' Michelangelo. Mr. Renaissance Man. You name it, he did it. Painting, sculpting and architecting. And everything was bonafide top notch stuff, too.

At EMAC, we like to think of ourselves as one in the cloth with Michelangelo. He was the Renaissance top dog in a slew of artforms, and EMAC networking products demonstrate the same kind of savvy. We can work magic in PC, UNIX®, VAX®, Macintosh® or other environments, like Michelangelo worked miracles in oil paint or marble. And we don't leave nearly the mess.

EMAC networking products. State-of-the-art networking for the Macintosh and IBM® worlds.

EMAC—A full line of products and support from the company with a history of success.
The new SUITCASE II is really packed. Now you can have up to 99 suitcase files full of fonts and DAs, or files containing FKEYs and alert sounds, that you can access at any time—and you don't have to install them in your System file. Plus you can see in the menu what a font will look like before you use it. By merging PostScript fonts into one family, SUITCASE II unclutters your font menus. And by compressing fonts and sounds, SUITCASE II saves you precious space on your hard disk. So, whether you're a new Mac user or a dyed-in-the-wool Mac enthusiast, you need SUITCASE II.

MacUser said, "If you can only buy one program for your Mac...buy SUITCASE," and gave us five mice, their highest rating. And they awarded us BEST NEW UTILITY PROGRAM. Since then, we've picked up the MacWorld WORLD CLASS AWARD and a MacGuide GOLDEN GAVEL, even before SUITCASE II was released!

When it comes to performance, praises and prizes, it looks like SUITCASE II has it in the bag.
ing from one view, layer, or slide to another easy and straightforward; all paths lead everywhere (see “Easy Transposition”). As an example of Persuasion’s intuitive, integrated approach to presentation design, when you’re working in the outliner, all four edges of the screen contain paths to other modes. There are pop-up menus across the bottom, icons on the right and left, and menus across the top.

The outliner, which can import Acta or text files, comes equipped with all the handy features of current Mac outliners. You can create, reorder, and collapse headings with little effort—in fact, Persuasion’s keyboard commands for those manipulations are even easier to remember and use than those in Acta or More II. But Persuasion also shares the faults of other outliners: you can’t move a heading to put it between two lesser-level topics, for example, and you can’t select more than one topic at a time.

Masters of the Universe
To each heading in an outline (each heading becomes a separate slide) you must assign a master—a blank template with preformatted placeholders for text and graphics—as you would in Cricket Presents.

What makes Persuasion better, however, is that it comes with 18 monochrome and 6 color AutoTemplates (see “Dressed for Success”). These color-and-design-coordinated sets each include master slides for title slides, text, graphics (including graphs), and organizational charts. The AutoTemplate system ensures that a presentation’s slides have a uniform look, and it also handles universal tasks such as text formatting. The AutoTemplates included with the program are attractive and functional; you can modify them or create your own.

The AutoTemplates come so close to being an ideally simple, quick, and professional system that their fundamental flaw is especially painful: you can’t switch AutoTemplates in midstream. Once you have started flowing text or graphics, you can’t decide you should have been using a different set of master slides; “what-if” design comparisons are out of the question.

Go Forth and Modify
Persuasion’s drawing, graphing, and text tools are extraordinary. Its object-oriented slide-editing mode often outdraws MacDraw, featuring special options like nested Ungroup/Regroup commands and various graduated fills (available in color for spectacular shading effects). The program also comes with Times and Helvetica screen fonts in presentation-ready sizes such as 48-point and 72-point. This crucial option is lacking in other presentation programs, and it means that practice sessions as well as slide shows will feature smooth, high-quality on-screen text.

If graphs are a part of your talk, you can either import an Excel spreadsheet saved in WK5 format or use Persuasion’s own data sheet, where you can type or paste in the numbers to be charted. The resulting graphs are a joy to work with. Even the minutest elements of numerical, tabular, or organizational charts can be ungrouped, recolored, moved, and manipulated—including labels, slices of pie charts, drop shadows, individual planes of 3-D bar charts, height and width of rows in tables, and so on. You can flip axes and resize charts. You can even assign bars or pie slices to any of 30 layers to create a build chart; in a talk on your company’s progress, for instance, you could make the profit bar for each successive year magically pop into the graph.

Aldus Effort
Once you’ve created the text for slides in the outliner, entered numbers for charts in the data sheet, and fine-tuned individual slides with the MacDraw-type tools, you’re ready to get ready. You can rearrange the order of slides in the Slide Sorter window, use the built-in spelling checker (which checks everything from body text to chart labels), add graphic accents from the included disk of EPS clip art, and edit the text either in outline view or in slide view (changes show up in both).

You can then prepare speaker’s notes (each page containing a mock-up of a slide and a user-definable text box for comments) and four-slides-on-a-page handouts for the audience. To practice the talk, use the Slide Show command, which advances through the slides (including the layered build slides) automatically or at a mouse-click command. You can also use the Mac screen as the medium for the presentation itself. You’ll sorely miss the fades, dissolves, and wipes of More II as you move from one slide to another.

Persuasion is ready for output to either Genigraphics or Autographix; overnight service is about $12 per slide. You can, of course, print the slides of a presentation on any printer, including a film printer.

The Art of Persuasion
True, there’s not much new thinking evident in Persuasion; most of its features can be found in one presentation program or another. But Persuasion’s features outshine its competition’s, if only slightly.
You regain your spare time. And you gain top-speed Mac II performance.

Take a break. Go down to your computer dealer and check out Maccelerate. It's the SCSI/DMA controller board from National that boosts your Mac II throughput.

Maccelerate removes the I/O bottleneck and frees-up your CPU by automatically handling data transfer to your main or NuBus memory. It works for both internal and external SCSI devices. Existing or new. Even multiple SCSI busses on a single Mac.

The result?

Maccelerate can make A/UX processing five times faster.

Your Mac OS will perform at new levels.

And if you're using our NS8/16 memory expansion board, you'll get even better performance.

Maccelerate takes only minutes to install, and it's backed for five years by National.

Maccelerate. A new addition to our growing line of performance enhancement, memory, video and communications products for the Mac. Because in case you didn't know, Mac perfection is a National priority.

Call us or your local National dealer. It could change the way you plan your days.

(800) 538-8510
In California (800) 345-4006
Outside U.S. (408) 562-4719

National Semiconductor, Compatible Products Group, 750 Central Expressway, M/S 34-10, Santa Clara, CA 95050-2627.

Dealer inquiries welcome.

Maccelerate is a trademark of National Semiconductor Corporation. Apple, Mac, Macintosh, A/UX and NuBus are trademarks of Apple Computer. National Semiconductor is a trademark of Texas Instruments, Inc.
The integrated outliner, for instance, gives it a crucial advantage over PowerPoint, StandOut, and Cricket Presents; and More II—which offers a supremely flexible outliner—lacks Persuasion's graphing and slide-sorting capabilities.

In short, Persuasion's features allow it to do a simple thing very, very well: to quickly turn an outline into a sharp-looking series of design-coordinated slides. Its outlining, graphics, and charting skills are exemplary, and its crystal-clear interface assures that you'll never get lost. There's no doubt that Persuasion's predecessors will reattack the desktop-presentation market with a vengeance in upcoming versions. But for this moment in marketing time, at least, Persuasion is the best program of its type.—David Pogue

Where to Buy

See Where to Buy for contact information.

**DAC-EASY LIGHT 1.0**

**Bookkeeping and Accounting Program**

**Pros:** Inexpensive and practical accounting.

**Cons:** Slow for data input; no file import; limited file export; awkward for accrual accounting; can't customize reports or statements; no graphics.

**Company:** Dae Software.

**Requires:** Mac 512K. **List Price:** $69.95.

Dae-Easy Light will serve you well, so long as you stick to personal and small-business bookkeeping. Although the program is slow and awkward at times, and makes little use of the Macintosh's particular strengths, it is priced right, it's reliable, and it does what it sets out to do. However, if your business involves employees, multiple products, accounts payable, monthly statements, and accrual accounting, you need something more powerful.

**Dull, Practical Data Entry**

The transaction input process is practical but dull, and so are the financial statements you get in return. True to its MS-DOS heritage, the program makes little use of Macintosh graphics capabilities. It cannot generate bar charts, line graphs, or customized reports with your logo on them. It does offer tools for budgeting and variance analysis, and has some limited data-export capabilities for spreadsheet analysis.

You can enter transactions from several different menus. Checks, deposits, and withdrawals go through the Banks menu; credit card payments and other accounts payable go through the Credit Cards menu; invoices, through the Invoice menu; and other transactions, through a catch-all Accounting menu. As you input check information Dae-Easy doesn't advance the check numbers automatically, and it does a poor job of guiding you through the chart of accounts to debit an account (see "Paying by the Numbers"). A single-transaction entry can involve three or four different steps through the chart of accounts. I ended up entering information into the wrong account by accident on several occasions. Everything works, however, and any confusion is eventually cleared up, but the program could be more nimble getting from one place to another.

**Printing Statements and Forms**

Dae-Easy Light's data output format follows the same theme as its input process: dull but practical. The program prints checks, invoices, and customer statements—but on its own terms. You can buy printed forms and checks through Dac Software and other vendors, but you can't have your LaserWriter put out nice, customized statements or invoices. Furthermore, you can't use a nonstandard invoice system (for example, including project codes in invoice numbers), because Dae-Easy demands sequential invoice numbering.

The Reports menu includes standard business statements such as chart of accounts, balance sheet, income statements, several comparative statements for budgeting and variance analysis, customer statements, account directories, and mailing labels. These reports follow an acceptable business format and do the job well enough; but you cannot make them less busy or detailed, and almost all of them will print out only horizontally across the page, in multiple columns of relatively small type.

**No File Import, Limited Export**

Like most accounting programs, Dae-Easy refuses to recognize any input files except its own. You can't keep records in HyperCard and ship them over to Dae-Easy; you have to retype instead.

Dae-Easy's chart of accounts and its balance sheet will export to files that you can access with Excel, HyperCard, and other programs. This is not the case, however, for most of the program's other reports and listings. I was unable to export my income statement or budget—not even a variance report—into a text file for Excel.

Since begrudgingly accepting my place in the adult world, I've learned to live with the painful chore of keeping track of my personal financial obligations. I've tried solutions ranging from a $695 full-featured business-accounting package that I hated; to hand-written systems in dBase, HyperCard, and CBASIC, which I also hated; to Intuit's $49.95 quick-and-dirty solution, Quicken, which I tolerate. Dae-Easy Light arrived in my office offering the hope of something as practical and simple as Quicken, but with a little more sophistication to make it work for the small business. And by and large, it fulfills its promise. Although you have to make compromises with your invoice forms and statements because the software won't, you certainly do get a workable, small-time accounting package for an attractive price.—Tim Berry

See Where to Buy for contact information.
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 ext. 368 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.

©1988 Sun Remarketing Inc. P.O. Box 4059 Logan Utah 84321, 1-800-752-7631, FAX 1-801-563-3236 *Depending on options

Circle 186 on reader service card
NEMESIS GO MASTER 3.0

Go-Playing Program

Pros: Best available program in playing competence; game and tactics; can view program's strategy.

Go is the national game of Japan and one of the most abstract, aesthetic pastimes ever developed. The game can be played for fun, however, even at the beginning level. At the highest level of play, it calls for formidable quantities of both intuition and analysis.

The main problem with go is that unless you live on the West Coast, in Hawaii, or in a relatively large college town or other such citadel of enlightenment, you won't find anyone to teach you the game or to play it with you. An ideal solution would be a computer program capable of teaching the game and playing at a reasonably challenging level. Nemesis is that solution. As a bonus, it costs only as much as a decent low-end go set with a properly wooden board. If you don't play go but would like to start, start here.

The game itself is simple to describe. A go board is a square ruled with a 19-by-19 grid, giving 361 points, or intersections. Players take turns placing round stones on the points, black stones versus white ones, and attempt to occupy territory by enclosing it with connected chains of stones of the same color. A few more rules are used to decide the ownership of territories within territories. By the end of the game, the board is a complex mosaic, often strikingly beautiful, of black and white stones.

Although the rules can be explained in a few pages, the larger strategy of the game is the subject of scores of books. As recently as the 1970s, Japanese authors confidently predicted that no computer could play a creditable game even against totally incompetent humans.

Can It Really Play?
So much for predictions. Claims for the quality ratings of computer go programs warrant some critical examination. Go is a well-organized competitive activity, with player ratings falling into two classes: dan (the extremely competent players' ratings) range from 1 up to 10, and kyu (the non-expert class) start at the absolute beginner's rating of 35 and move to successively smaller numbers (down to 1 kyu) for better players. In practice, the ratings are used to give different-level players an even chance by giving the weaker player a number of free moves at the beginning of a game. No program now (or even on the experimental horizon) plays go at the lowest dan grade. There are now some computer chess games, on the other hand, in which the program plays near the master level. What a go player asks of a program like this, therefore, is its approximate rating in kyu.

Bruce Wilcox, the author of Nemesis and a leading go theorist, has taken a simple step toward clarification of program ratings. He conservatively rates Nemesis at 15 kyu, a figure derived from playing the program extensively against rated human players. This is a much stiffer challenge than that provided by Nemesis's only Mac competitor, Go for the Macintosh from Infinity Software. It is also, in the opinion of an assortment of club players in San Francisco, an underestimation, with a plausible case to be made for a rating of around 12.

This snappy performance grows out of the effort Wilcox has put into defining programming approaches to go strategy. Basically, the program uses the tactics described in his book Instant Go—tactics that enable a quick appraisal of board position and selection of appropriate moves without tracing a huge search tree of moves, the brute-force approach used in chess programs. Nemesis isn't just good; it is fast, and its exceptional quality indicates that clear, straightforward analysis (and subsequent programming) of the strategies of professional players is going to contribute more to computer go progress than parallelism, neural nets, or modestly faster processors.

Promising Beginnings
Nemesis provides the expected amenities: a game can be edited, modified, and saved; level of play can be specified; board size (9 by 9, 13 by 13, 19 by 19) can be adjusted for fast or standard games; display size can be adjusted for large screens. You can have the program suggest moves, and you can watch it try out intermediate steps as it picks its moves. Beyond this, you can install Toyogo's Joseki Tutor ($49), a program that helps you practice the basic sets of opening moves in go, can be installed directly in Nemesis and appears as part of the menu bar. This is without question one of the most extraordinary automated aids to go instruction developed.

An overall tactics tutorial (currently being programmed into a hand-held electronic go game by Toyogo) will be available in the spring of 1989. Being able to see, over and over again, sets of solid elementary moves and their explanations is probably the fastest way to gain the level of proficiency in go that makes it really interesting.

Nemesis is the leading go game for the Macintosh (or the Atari or the IBM PC, for that matter), and it is still being improved by Bruce Wilcox at Toyogo. Using it is an improvement over learning the game from books or from all but the most patient humans, and with the addition of the Joseki Tutor Nemesis should become a standard introduction to the game. Go players will undoubtedly like it, but non-players also might consider getting interested in the last game left in which mere mortals can routinely trounce computers.—Charles Seiter
See Where to Buy for contact information.
Get your modem off your desk... and into your desktop.

With an internal ProModem® for your Mac II or SE.

Modems are wonderful tools for communicating with other computers over the phone lines. However, until now they added to the clutter and complexity of your desk. With the ProModem 2400SE or ProModem 2400MII, you can keep your modem where it belongs: on your Mac's desktop.

If you plan to take your SE on the road or simply want the convenience of an internal modem, a ProModem is your obvious choice.

For the Macintosh® SE or SE/30.
The ProModem 2400SE mounts inside your SE or SE/30 and won’t use up your only expansion slot. You will still be able to install an accelerator card or other add-on card if you like. The 2400SE installs in minutes with no modifications necessary. Our unique Pass-Thru port connects other serial devices to your SE without switch boxes or swapping cables. We even include an exclusive Status Lights DA that provides visual modem status just like an external modem.

For the Macintosh® II.
For Mac II owners, our ProModem 2400MII plugs directly into one of your Mac II’s NUBUS slots. With the included software, you can switch between serial devices with a simple keystroke. The 2400MII even allows you to add an extra serial port in case you have more peripherals than ports. Unlike some internal modems, the 2400MII won’t lock out your Mac’s modem port. Our exclusive Status Lights DA provides visual status just like an external modem.

Plus! 4800 baud and error-free!
Our Plus series are fast and accurate with 4800 baud throughput and error free transmissions. Purchase a ProModem 2400SE Plus, ProModem 2400MII Plus or simply buy the ProModem and add the Plus later. All Plus modems can operate at up to 4800 baud totally error free using MNPTM-5. That's because MNP compresses your data and automatically checks the accuracy of all of your information coming and going. Sending and receiving data takes up to half the time required with a standard 2400 baud modem.

Like all ProModems, the 2400SE and 2400MII are compatible with CCITT and Bell standards. You will also find the ProModem works the industry-standard AT command set. You can use whatever communications software you choose. Use Red Ryder®, Microphone II", or Smartcom II®—The choice is yours.

Prometheus has manufactured computer products since 1981. Our only business is data communications for computers. All ProModems are designed and manufactured in the U.S. and include a 2 year warranty and free lifetime technical support. Depend on Prometheus—we’ll be here to answer your questions long after the warranty expires.

ProModem 2400SE $299
ProModem 2400MII $399
PC TOOLS DELUXE 1.0

**Disk Maintenance and Repair Utilities**

**Pros:** Good selection of easy-to-use preventive maintenance, recovery, and efficiency utilities.

**Cons:** Needs polish; documentation needs improvement.

**Company:** Central Point Software.

**Requires:** Mac 512KE; Hard disk recommended.

**List Price:** $19.95.

PC Tools Deluxe is a collection of seven utilities that protect against disk inefficiency, hardware disaster, and unauthorized intruders. These utilities are PC Backup, FastCopy, Mirror, MacTools, PC Secure, Optimizer, and Locate. Because the PC Tools programs take advantage of all the memory they can find, they run more efficiently without MultiFinder or a disk cache.

**Be Prepared**

You should assume that it's just a matter of time before your hard disk gives up the ghost. PC Tools Deluxe provides a series of complementary tools designed to make it easier to cope with this inevitability.

PC Backup offers complete or incremental backups; it also restores floppy disks, hard disks, or Apple-compatible tape drives. It is faster than DiskFit, and almost as fast as FastBack (see “Backup Times Compared”). You can also copy files using the accelerated copy utility in FastCopy. This feature formats a disk in just 30 seconds, a little more than half the Finder’s time, and automatically names the destination disk instead of prompting you to name it as the Finder does. FastCopy’s ability to read an entire source disk into RAM once and write multiple copies is a faster and less cumbersome alternative to the Finder, especially on machines that have just a single floppy drive.

If you forget to make a backup and you lose important data, you may still be able to recover it using one of three PC Tools Deluxe utilities. Mirror saves an image of the information the computer uses to keep track of where data is stored on a disk and writes the image to a storage file; if disaster strikes, you can rebuild the disk from the Mirror file. If you accidentally delete files or folders, MacTools offers you several ways to undelete them, as well as tools to repair “unreadable” disks. The Track Editor in FastCopy lets you read and edit individual sectors for repair of severely damaged disks.

The documentation for file-recovery procedures is quite rightly divided into sections for the average and the advanced user. Nontechnical information, such as how to undelete files, is presented clearly and is easy to understand. More technical subjects, however, are not explained very well. The documentation needs a troubleshooting guide, a better index, and a clearer warning about what precautions to take before running potentially damaging programs.

**Hands Off**

PC Secure will discourage the casual snoop, but not experienced thieves or hackers. This program uses the standard DES (data encryption standard) encryption algorithm and offers password protection for an entire disk, for individual folders, and for files. You've really got to want to secure a file to type a password twice and wait for that file to be decrypted every time you open it.

PC Secure’s master key feature works like a spare key: with it you can decrypt a file even if you’ve forgotten the password. Expert Mode enables you to allow access by the password only. But watch out, in Expert Mode there’s no way to get into a file if you forget the magic word. To doubly secure a file and optimize disk space, you can also run the utility’s compression routine, which eliminates redundancy that might make the file more cryptanalyzable; or you can make the file invisible with MacTools.

**Where Did that File Go?**

Even though the Mac operating system doesn’t forget where it puts files on your hard disk, there are times when you’re both going to have difficulty finding them. The Optimizer helps your Mac; Locate helps you.

When files are written, the Mac operating system tries to put the information in contiguous blocks. As information is written and deleted, holes are created, some of which are too small to efficiently hold data. The result is that in order to bring up especially large files, the disk heads have to seek far and wide. Optimizer defragments files; it frees up space and makes reading files more efficient because the disk doesn’t have to work so hard when looking for all the pieces. Although there are no statistics to prove it, reducing how hard it works should extend a drive’s average mechanical (as opposed to electronic) life expectancy.

The Locate desk accessory, which is an expansion of the Mac’s Find File, has added a three-level keyword search within files using the Boolean AND or OR operators. You can limit a search by specifying: all files or only text files, only file names or keywords, or folders or subfolders. Once you’ve found what you’re looking for, the Copy More function enables you to append items to the Clipboard without affecting text that is already there.

PC Tools Deluxe is a useful selection of tools. In some cases it has less polish than competitors’ programs, like DiskFit, Sentinel, 1st Aid Kit, Symantec Utilities for the Macintosh, or FastBack. While there are some more sophisticated programs individually addressing specific utility areas, PC Tools Deluxe offers all of them in one package, and for a reasonable price.

—Nancy Canning

See Where to Buy for contact information.
INTERFAX 12/48

Fax Modem with Data Modem

Pros: Fax modem can switch to data modem function; supports wide range of magnifications for viewing faxes; allows polling of regular faxes for waiting mail.

Cons: Does not support special cover pages; fax modem is one-half maximum speed of most other faxes.

Company: Abaton, a division of Everex Systems.

Requires: Mac 512K; hard disk recommended.

List price: $495.

There are some of us who want to be able to combine different telecommunications functions in one unit. Abaton's InterFax 12/48 appears to partially fill the bill by combining a 4800-bits-per-second (bps) facsimile modem with a Hayes-compatible 1200-bps data modem. In opting for comparatively slow transmission speeds, however, the company didn't go far enough.

InterFax's design enables you to switch between fax operation and other telecommunications tasks (like calling your favorite bulletin board) simply by switching programs.

Gaining Control

When you're setting up InterFax 12/48, you can copy the FaxMaker and InterFax Control files to the System Folder and then use the InterFax application to set up your address books. The application serves as your main control center; it allows you to reschedule fax transmissions, and view or print fax documents you receive.

The InterFax 12/48 software controls only the fax modem components of the hardware. The software consists of the FaxMaker fax driver (selectable via the Chooser DA), an InterFax Control file for the Control Panel DA, and the InterFax application itself.

The InterFax Control CDEV provides the more frequently used fax options, so that you can make fax transmissions through the Control Panel without having to exit the program you're in. This can be especially useful if you're not running under MultiFinder. Not only can you turn the fax modem on or off, but you can also use the InterFax Control CDEV to monitor a current fax transmission or receipt, cancel the transmission, and see the unopened faxes you've received.

It's a Fax

The InterFax application is the first fax program that allows 5 percent to 1000 percent magnification of a document. If you're concerned about the on-screen legibility of a fax document, you can have the InterFax application map an integral number of fax pixels to one screen pixel. You might find this necessary because a fax's 203-by-98 or 203-by-196-dot-per-inch (dpi) resolutions aren't easily converted to the Mac's 72-dpi screen resolution. Also, I like to scan my faxes first on the Mac and then decide if I want to print them. InterFax is currently the only program that lets me do that easily.

The InterFax application lets you format fax documents as MacPaint, PICT, or TIFF files. You can also use the same graphics formats to create a fax document. Normally, however, you would use the FaxMaker driver to create fax documents for transmission to other faxes. Once you have selected the FaxMaker within the Chooser DA, you can use any Mac application to print to the fax modem. When you select the Print command in a Mac application, you're given the choice of immediately sending the document as a fax, or of scheduling the fax for later transmission. If transmission is delayed, the document is spooled to your disk.

Some of the first fax programs for the Mac (from Apple, Solutions, and STF Technologies) used the ImageWriter LQ fonts for preparing high-resolution fax documents for transmission. However, the 216-dpi resolution of ImageWriter LQ fonts doesn't quite match that of fax machines, so you can often see some distortion of the fonts. Abaton got around this by providing two outline fonts from Bitstream—SWA Dutch and SWA Swiss—to serve as substitutes for Times and Helvetica. When you create a fax document, InterFax asks you if you wish to substitute these fonts for Times and Helvetica. If you use any other fonts in the document, you have to live with whatever bitmapped sizes are in your System file, with less than satisfactory results.

It's a Modem

The InterFax 12/48 hardware includes a 1200-bps modem chip set. The regular modem chip set understands the industry-standard AT or Hayes command set for controlling communications. That means you can use the 1200-bps modem for ordinary telecommunications with just about any telecommunications program that runs on the Mac. When a telecommunications program tries to use the 1200-bps modem, the InterFax background software turns itself off. When the telecommunications program quits, the InterFax software turns back on. Unfortunately, InterFax cannot detect when certain software packages are through using the modem. With software packages such as AppleLink and most telecommunications DAs, you have to return to the InterFax CDEV in the Control Panel and turn InterFax back on manually.

There, but Not All There

Although I found many of InterFax's features useful, I was disappointed to see the software tied to a 4800-bps fax modem. The most common fax machines, Group 3 machines, are designed to run at 9600 bps. A 4800-bps fax modem can still talk to them, but at half the speed (obviously). Thus you're forced to pay twice as much for faxes that you send with the InterFax 12/48 as you would with another fax modem—like Apple's, for instance. Even though you might be only an occasional fax user, you'll find that the size of your fax phone bill quickly compensates for the price differential between the InterFax and more expensive but faster fax modems.—Dave Rostur

See Where to Buy for contact information.

The InterFax 12/48 is designed to complement the Mac II.
And on and on. Because with an on-board math coprocessor, the Excelerator moves things even faster. Up to 100 times faster on all those number crunching jobs that make a Mac dawdle.

Or for that matter, you can access up to 8 megabytes of high speed memory. In no time at all.

And with that, we’re back to our time-saving point.

The Excelerator XL 25 is just one of the new MacPower™ products from Irwin. Products that include high-performance accelerators, flicker-free monitors and no-hassle tape backups.

From the people who already back up more people than anybody.

To see for yourself, just call 1-800-222-5871 for the name of the dealer nearest you.

So. What are you waiting for?

---

<table>
<thead>
<tr>
<th>Excel with Excel, it takes almost 17 seconds to fill this spreadsheet on the Mac SE. Or less than 4 seconds with the Excelerator XL 25 board.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Be quicker on the draw. You can draw this on the Mac SE in about 42 seconds. Or under 6 seconds with the Excelerator XL 25 board.</td>
</tr>
</tbody>
</table>

---

**Irwin**

© 1989 Irwin International, Inc., 2101 Commonwealth Blvd., Ann Arbor, MI 48105. Excelerator and MacPower are trademarks of Irwin International, Inc. MacDraw and MacWrite are registered trademarks of Claris Corporation. Other brand or product names are trademarks or registered trademarks of their respective holders.

Circle 82 on reader service card
MEAN 18 ULTIMATE GOLF

Interactive Golf Game

Pros: Challenging; extensive player setup options; supports Mac II color and large monitor; displays statistics.
Cons: Slow graphics redraw; no breaks in putting green; no wind factor. Company: Accolade.
Requires: Mac 512K. List price: $44.95.

WORLD CLASS LEADER BOARD

Interactive Golf Game

Pros: Challenging; extensive player setup options.
Cons: No color support; no large monitor support. Company: Access Software.
Requires: Mac 512KE. List price: $49.95.

When four friends recently wanted to play golf, I offered to caddy. Luckily, I didn’t have to carry four sets of clubs. Instead I brought my Mac II and two new golf games for the Mac. These new games—Mean 18 Ultimate Golf and World Class Leader Board—want to usurp MacGolf Classic’s position as king of the tee (see “Golf as a Matter of Pixels,” Macworld, October 1988).

This Green Is Mean (18)

We opted for Mean 18’s Augusta National course, rather than St. Andrews, Pebble Beach, or Accolade’s own Bush Hill course. The foursome chose to score our match by strokes. Mean 18 also offers match play for two players and best ball play for four-player team golf.

You choose from two tee options: regular and pro; the pro tee is set farther back, making each hole more difficult. You also choose either beginner or expert playing level. Beginner provides perfect aim and an all-knowing caddy who recommends the best club for each shot. Playing at expert level means you choose your own clubs and aim your own shots.

On a color Mac II, the course appears in 16 colors and expands to fill the entire monitor screen. While Mean 18 offers some nice animation and sound effects, the program’s graphics are definitely not as nice as those of MacGolf. In fact, trees, hazards, and buildings look downright chunky. The program suffers from colorization problems, too: the putting green appears blue during approach shots. You see aerial views of each hole before tee off, but they’re too small for a lot of detail, and you don’t get a true overhead view since the aerials are really 60-to-70-degree angle views.

Unlike MacGolf’s phantom trees, Mean 18’s trees affect the flight of the ball. Your ball will also ricochet off the pin if you hit it, but Mean 18 doesn’t include wind factor, as does MacGolf.

It took a bit of practice for everyone to hit the ball in Mean 18. Everything is based on the Power Meter. It gives you a visual way to gauge the power, slice, and hook of your swing. Each shot requires three mouse clicks. The first one starts your swing, and the barometer begins to rise. As it reaches the top of the Power Meter, you click again to release the ball. As the barometer falls back to zero, you click a third time to control the hook or slice of the shot (see “Approaching with Mean 18”). This is substantially different from MacGolf, where you’re only concerned with power. In Mean 18, a good shot results from good timing and good hand-eye coordination. A quick mouse finger doesn’t hurt either. Putting is much easier than driving, because aiming a putt is very clear-cut. You never need to worry about the green breaking (sloping off at an angle), either. It doesn’t.

Mean 18’s biggest drawback is slow drawing speed. To aim a drive or approach shot, you click on two arrow icons at the bottom right of the screen. Your player moves incrementally in the direction of the arrow, and the program completely redraws the course from each new viewpoint. As a result, if you want to dramatically realign your shot, you must keep clicking the arrow and wait for the program to redraw the screen after each click. As one of the foursome said, “It’s so slow that you’d rather hit a tree.”

The Wide World of World Class

Having tired of aiming shots in Mean 18, we traveled to St. Andrews in Scotland with World Class Leader Board. Other available courses included Champions Cypress Creek, Doral, and Access’s own Gauntlet.

World Class offers numerous levels of play: kids, amateur, and professional. Shots taken at the kids level do not hook or slice, nor are they affected by wind. Amateur balls do hook and slice, but are not affected by wind. The professional level goes all out with hook, slice, and wind; this level also offers more difficult putting conditions. You can choose to play rounds by medal (or stroke), match, or best ball methods. However, if you decide on match play or best ball play, you have to keep track of your scores; World Class doesn’t keep score that way.

Because it supports neither color on the Mac II nor the large Mac II monitor, World Class Leader Board is more difficult to play than Mean 18. You just can’t easily identify the rough, water, or other hazards in black and white, and the trees and backgrounds all look the same. World Class does offer true overhead views of each hole, but again, you’ll find it hard to see detail. On the plus side, the animation is realistic (for example, the ball will bounce off the cup if you hit a putt too hard), and the sound effects are good.

Aiming an approach shot or drive in World Class was a breath of fresh air for the foursome after playing with Mean 18. Instead of repositioning the golfer (and redrawing the screen), all you do is drag (continues)
How To Triple The Speed Of Your Mac For Under $250

by Randall D. Smith, Founder of MacAcademy™

A few years ago I wanted to be a better golfer so I went out and bought the same clubs that Jack Nicklaus uses. Today I play exactly the same clubs ... he's still great and I'm still terrible.

Last month I bought a Porsche 911 Turbo. I now have one of the fastest, most powerful cars in the world. As I was reading through the manual I came across a statement that suddenly made me realize the error of my thinking. The manual basically said that the only weakness this car has is the driver. In other words, no matter how good the equipment, the key element is still the operator!

As you read through the Mac magazines you'll realize that the same delusion exists among Mac users. People believe that to dramatically increase the productivity of the Mac they simply need to buy bigger, better, and faster hardware and software. If you don't believe me take a look at all the ads in this magazine for the newest Macs, fastest hard drives, and the latest in accelerator boards.

Usually the difference is a matter of milliseconds. Imagine the person who passes up a Mac Plus and spends an extra $4,000 to get the fastest Motorola processor, spends another thousand on an accelerator board, two thousand on a huge hard drive, and now spends two hours trying to figure out how to do a mail merge on Microsoft Word!

If you want to save hours instead of milliseconds, invest your money in training the user instead of upgrading the equipment. Training is the wisest and least expensive investment you can make in your Mac.

If you have a hardware and software surplus, but a training deficit, I'd like to invite you to attend MacAcademy. Over 2,000 companies have found MacAcademy to be the low cost solution to their training needs. MacAcademy is a full two day Macintosh training course that costs only $249. MacAcademy offers both basic and advanced training on the Mac, Microsoft Excel, Works, and Word. Also included is training for Aldus PageMaker, Claris HyperCard and FileMaker II.

After spending two days with our unique, all-star, teaching staff you will dramatically increase your productivity and cut your learning curve in half. Your work will be done faster, more professionally, and you'll feel 10 times more confident with your machine. One MacAcademy graduate recently wrote us that if he had to choose between a MacAcademy trained employee on terrible equipment or a non-MacAcademy trained employee on the latest equipment he'd choose the MacAcademy trained employee any day. He'd get more work done in less time.

Here are a few comments from people who attended MacAcademy in Boston on March 20th:

"This has been the most productive two days I have ever spent. Well worth the price, very cost effective, the most knowledge per dollar I've seen. Quality instructors who understand and respond to the needs of the attendees."

K. Hemeon, Norwell, MA.

"I felt all classes contained excellent material. All the instructors maintained a level of patience and support which surpassed all of Macintosh's user friendly features."

D. Quinn, Seabrook, N.H.

"Bravo! What a fantastic learning experience! I really think that 2 days at MacAcademy should entitle every graduate a week's vacation to absorb! Thank you. Thank you."

C. Bancroft, Plymouth, MA.

"This is my second venture at MacAcademy and I again feel it was well worth the money. I have 10 of your video training tapes which I also find extremely helpful."

C. Allen, Framingham, MA.

Over the past year and a half MacAcademy has been presented in over 22 cities to over 14,000 Macintosh users. Our satisfied corporate graduates include General Electric, TRW, NASA, Citibank, Federal Express, HBO, the U.S. Army, Navy, Marines, and Air Force, nearly every branch of the U.S. government, nearly every large university in America, and thousands of corporations both large and small. Each company put their trust in our company by investing $249 per employee and enrolling in MacAcademy. We at MacAcademy take that trust very seriously. On a scale of 1 to 5 our attendees consistently rate us a 4.6. Our goal is nothing less than 5! I invite you to plan now to attend the next MacAcademy in your area. If you want references please call us...we literally have thousands.

Like any other successful program MacAcademy has recently seen its share of "clones". There are those out there who have attempted to copy our format, our brochure, even our price. What they can not copy is our quality.

MacAcademy Schedule

San Diego May 8, 9
Anaheim May 11, 12
Los Angeles May 15, 16
San Jose May 18, 19
San Francisco May 22, 23
Sacramento June 1, 2
Denver June 5, 6
Spokane June 8, 9
Las Vegas June 12, 13
Austin July 11, 12
Dallas July 13, 14
Atlanta July 20, 21
Raleigh July 24, 25
New Orleans July 27, 28

To attend MacAcademy please call 904-677-1918 or write to: MacAcademy 477 S. Nova Rd. Ormond Beach, FL 32074. Thank you.
a crosshair marker to aim your shot. As in Mean 18, hitting a ball in World Class takes skill and coordination. World Class—like Mean 18—offers a much more active swinging process than MacGolf does. Power, hook, and slice all depend on how you use the Power/Snap Indicator in the right-hand portion of the screen. You start the swing by holding down the mouse button, release the button for power control, and click the mouse again to set the snap.

Trees in World Class pose real obstacles. The greens slope away at an angle, indicated on a sundial-like gauge that shows you both the angle and the grade of the slope. These breaks make putting in World Class more challenging than in Mean 18.

Some strange inconsistencies in World Class may confuse you. For example, your selection of clubs doesn’t include a sand wedge, a club that’s handy for those hapless golfers stuck in sand traps. It does, however, include a #1 iron, which is a hard club to master. Equally puzzling is World Class’s penalty system: if you hit into the rough, you are not penalized, even though you do receive a distance penalty if your ball should land in a water hazard.

**Picking the Right Club**
After playing rounds with MacGolf Classic, Mean 18, and World Class, duffers and hackers alike agreed. Everyone liked the way Mean 18 and World Class challenged you to shoot the ball, which took more skill and coordination (luck, too) than in MacGolf. And one of MacGolf’s inconsistencies with the real game of golf has been corrected by Mean 18 and World Class: the winner of the previous hole does tee off first at the next hole.

In the end, however, the foursome agreed that if they were to buy a golf game, they’d choose MacGolf. The slow graphics of Mean 18 knocked it out of the running. The lack of Mac II large-screen and color support effectively whiffed World Class. MacGolf may hold on to its position of preference for now, but if Mean 18 or World Class are upgraded, this game of golf may go another round.—Brita Meng

---

**VANTAGE 1.0**

**Desk Accessory Text Processor**

**Pros:** Reads Word 3.01, MacWrite, and WriteNow files; superb manual; indispensable in many situations.

**Cons:** No word wrap; no multiple-font support.

**Companies:** Preferred Publishers.

**Requires:** Mac 512K. List price: $99.95.

Vantage, a text processing desk accessory, is what’s known as a niche product. In other words, some people desperately need it. Vantage is not a word processor. Not only does it not support tab stops or more than a single font per document, but it lacks word wrap. If you delete a phrase on one line, the words on the next line don’t move up to close the gap.

Believe it or not, these preposterous limitations are worth accepting because Vantage can do dozens of incredible things with text. Its features work brilliantly but are utterly unrelated to one another; each individual menu item seems to be the answer to someone’s specific prayer (see “Potpourri on the Menu”). The result is a hodgepodge of utilities that, in their precommercial incarnation, were aptly called McSink (as in “the kitchen”).

**Vantage Points**

Since Vantage is not a general-use product, the best approach is to outline specific situations where you might need it. For example, if you transfer data from non-Mac computers, Vantage’s Strip Control Characters command is indispensable. In less than 1 second, Vantage strips all the little squares and ampersands out of a 20-page file, leaving only the English behind in a clean, simple document.

Or if, in a blaze of inspiration, you type a full chapter of your novel and then realize the Caps Lock was down the entire time, Vantage will save you. A single command, Capitalize Sentences, converts all-caps documents into upper- and lowercase text, ready for pasting back into your word processor (see “In Any Case”).

Or perhaps you’re a programmer. Vantage will instantaneously insert any prefix string, including line numbers, into your listing. Vantage is also ripe for picking by telecommunicators; its strange, word-wrapless format is just right for composing messages offline (most telecommunications programs need a carriage return at the end of each line).

The grandest concession Vantage makes to the vast word processing populace is that it can directly open Microsoft Word 3.01, WriteNow, and MacWrite files (however, all formatting is lost). If you’re using a spreadsheet program, and you need to recall the exact wording of a letter you mailed last week, Vantage is the only DA that will let you read a file in any of these three word processing programs without leaving the spreadsheet program. Vantage reads non-word processing files, too. If you hold the Option key down as you select Open from Vantage’s File menu, you can see and open any file on the disk. A moment of creative thinking reveals that this tool is enormously valuable in the event of an unreadable trashed file. Not only can Vantage read it, but the above-mentioned Strip Control Characters command will strip out the formatting garbage and enable you to recover the priceless text contained within that More, Illustrator, Finale, MacDraw, or Excel document, or within any other.

**Laundry Lists**

Vantage performs dozens of other instantaneous miracles; some are more obviously useful than others. It’s easy to appreciate Vantage’s ability to count the letters, words, sentences, and paragraphs in a

(continues)
The Finest SCSI Data Storage Systems For The Macintosh

- "Zero" Foot Print Externals for Mac IICx
- Combo Hard Disk and Tape Systems
- 45 MB Removable/Single or Dual Systems
- Internal and Externals from 20 to 600 MB
  "Power Matched" Storage Systems For The Mac Plus, SE, II, IIC, SE/30 and IICx

Wren Runner - 10.7 ms - SCSI Hard Disk Drive
MicroNet's IIC-300 or SBX-330, developed around the new Imprimis Wren Runner, 321 MB, 10.7 ms drive, is the fastest SCSI hard disk drive available. Best used with a Mac SE/30, II, IIC or IICx with disk intensive applications.

150, 300 and 600 MB - 16 ms Access
MicroNet specializes in Control Data/Imprimis drives that are industry known for their reliability and speed. Internal and external systems with tape combinations available.

10.7 ms - 321 MB - Wren Runner
- 15 ms - 172 MB - SE/30 or IICx
- 320 MB Streaming Tape Backup
- Mac/OS and A/UX Partitions

Micro/Stack Series - 20 to 173 MB Systems
MicroNet offers 20, 45, 62, 90 and 173 MB, fast access hard disk drives in our zero foot print cabinet for the Plus, SE, SE/30 and the new IICx. Plus our 60, 150 or 320 MB streaming tape or 45 MB removable cartridge systems.

Micro/Internal Series - 20 to 600 MB
We offer a complete range of internal systems for the Macintosh SE, SE/30, II, IIC and IICx that are "Power Matched" with CPU and triple tested to ensure reliability.

Call today for data sheets. Products sold through dealers only. Dealer inquiries invited.
We maintain excellent quality standards and offer superior technical support.

MicroNet Technology, Inc.
13765-A Alton Parkway • Irvine, CA 92718 • Telephone: (714) 837-6033
FAX: (714) 837-1164 • AppleLink: D1656 • Compuserve: 76004,1611

Circle 275 on reader service card
The first menu is for the user to fill up with easy-to-write macro commands. The second menu, External, is something like a computer expansion slot: any programmer can write a new feature for Vantage, and you can install it into this menu. You can get new features from CompuServe, from friends, or even download them from the publisher's bulletin board (free to registered users). Several of these XCMDs come with the program, including a curly quotes converter and an icon grabber.

Ad Out
The main problem with Vantage—the lack of automatic word wrap—is a very big problem. The fact that words don't rewrap correctly when you add or delete text isn't even the worst of it.

When you import a file, or paste in text, all you see in the Vantage window is the first part of each sentence; the rest stretches out invisibly for several feet to the right of your screen. To pull the text onto the screen, you select Wrap to Window, which snaps the text back into sight. This command has a nasty side effect of its own, however: it removes any carriage returns that were in the text. The result is that your entire document appears on screen as one massive, run-on paragraph.

Unfortunately, these limitations mean you can't really use Vantage as a handy mini-word processor like MockWrite, MiniWriter, and MicroEditor (which, however, are limited to editing 32K files; Vantage can handle up to 500K files).

So long as you're aware of these quirks, Vantage will delight you with its powers. It effectively adds spell checking, line numbering, and word counting to any program you're using; it permits you to read any kind of file without leaving the program you're in; and it offers a host of rarely used but powerful text tools. Vantage is also polished, well documented, and innovative (double-clicking a word is nothing; in Vantage you can triple- and quadruple-click to select chunks of text).

Vantage is a niche product, yes; but if you happen to need any of its features, you should see to it that Vantage has a niche of its own—on your Apple menu.

—David Pogue
See Where to Buy for contact information.

MORE II 2.0
Presentation Graphics - Capable Outliner

Pros: Powerful outliner with word processing and presentation graphics capabilities; templates, libraries, and style rules simplify graphics creation; extremely versatile.
Cons: No quantitative charting capability; not available as desk accessory. Company: Symantec Corporation.
Requires: Mac Plus; one 800K drive, hard disk.
List price: $395.

Back in the days when you could count all available Macintosh applications while waiting for MacPaint to open, a small company called Living Videotext introduced an idea processor named ThinkTank. This program evolved into More, and each new version along the way has had more features for idea processing, word processing, personal-information management, and presentation graphics. In fact More II sports so many diverse capabilities that it's impossible to classify as part of any single software category.

More Ideas
More II is at its core an outstanding outliner. Ideas (More calls them headlines) are organized hierarchically, so that main points can be broken into finer and finer levels of detail. When you move any headline to another part of the outline, all attached subheadlines automatically move with it. An outline can be instantly expanded or contracted so you can focus on the forest, the trees, or individual leaves.

More II has several features that make it especially useful for personal productivity applications like to-do lists, address books, and time management. Calendar creates a customized appointment calendar. Date Stamp, Time Stamp, and Calculate allow you to quickly insert the date, time, or sum of a set of numbers anywhere in your outline. Dial Phone dials a phone number through your modem. Sort, Clone, Mark, and Gather lend themselves particularly well to organizing information.

More II also enables you to reorganize and navigate through your information (continues)
YES! Please send my FREE copy of 101 Best Desktop Publishing Tips and begin a one-year subscription (12 issues) to Publish! at the low introductory rate of just $23.95 (that's 40% off the regular subscription rate).

Send no money now. We'll bill you later.

FREE BOOK

- How to set text diagonally
- Making the most of your font choices
- Secrets of special typographical effects
- Time-saving tricks for using clip-art
- Tips on retrieving lost images

And over 95 other valuable tips from the best desktop publishers in the business!

Name ______________________
Company ______________________
Address _______________________ 
City ____________ State _____ Zip ____

Please allow 6–8 weeks for delivery of your first issue. By regular subscription, Publish! is $39.90 for 12 issues.

A PCW Communications, Inc. Publication
HOW CAN YOU JUSTIFY BUYING AN IMAGESETTER TO PRODUCE POSTSCRIPT 'LINO' OUTPUT LIKE THIS?
BUY IT FROM AGFA COMPUGRAPHIC.
A lot of people think it's a good time to add high-resolution POSTSCRIPT output capability. They're right. A lot of them also think the only way to do it is with a Linotronic® machine. They're wrong.

Because now AGFA Compugraphic offers you a better alternative. Our CG 9400-PS's combination of professional features and affordability—under $50 a day, leased*—finally makes adding a POSTSCRIPT imagesetter make sense.

**A BETTER WAY TO ADD POSTSCRIPT**

If you buy a Linotronic L200 machine, you'll have to settle for a top resolution of 1693 dots-per-inch. Good enough for some jobs, but will it satisfy your most demanding customers? Or you? For about the same price, our 9400-PS has a top resolution of 2400 dpi. To get output that sharp from a Linotronic machine, you'd have to spend almost twice as much for an L300.

Can you justify that?

And if you also want to output non-POSTSCRIPT files, buying a 9400-PS makes even more sense. Unlike the L200, our imagesetter can be configured to output both POSTSCRIPT and most non-POSTSCRIPT files. That's because its raster image processor (RIP) and writing engine are designed as separate, modular units.

The modular design also lets you upgrade to our faster 9600-PS, or our wide-measure 9700-PS, without replacing your entire system. Again, to get the same functionality from a Linotronic machine, you'll have to spend about twice as much for an L300.

Can you justify that?

**WORRY-FREE SERVICE AND SUPPORT**

AGFA Compugraphic equipment is designed to seldom require servicing. But if you do need service, you should know that we have five times the service force of our closest competitor.

If you ever have a problem, we guarantee that a service technician will be in your shop within a single business day. Which is something our competition won't promise.

**FREE HYPERCARD™ STACK FOR YOUR MACINTOSH®**

Whether you're a typesetter, printer, publisher, designer or run an in-plant shop, the 9400-PS is the most cost-effective way to add high-resolution POSTSCRIPT output to your operation.

If you'd like to speak to an AGFA Compugraphic representative or get more information, send in the coupon below or call us toll-free at 1-800-227-2780 (in Canada 1-800-387-9533). We'll send you our free HyperCard POSTSCRIPT Products Overview diskette. (You'll need a Macintosh with HyperCard to view this program.) It's an entertaining, self-guided tour of the AGFA Compugraphic family of POSTSCRIPT output devices.
### The proven resource for Macintosh systems & support.

1 MB SIMM's

1MB SIMM's ...................... $149
We will beat any price, period!

**VIDEO BOARDS**

- RasterOps
- Viking
- Taxan
- Cornerstone
- Sigma
- Sharp
- Datacopy
- Digital Vision Thunderware. Call for prices.

**ENTRY LEVEL HARD DRIVE**

MacBest 20 mb external ...... $439

**MAGIC MODEM 2400**

100% Hayes Compatible
2400/1200 Baud
2-Year Warranty ............. $129

**SOFTWARE**

- Adobe Fonts
- Aldus Freehand
- Big Thesaurus
- Canvas 2.0
- FontDrawer
- Fox Base +
- Fox Base Multiuser
- Hyper D.A.
- Illustrator 88
- LightSPEED C
- MS Word
- Macintosh
- Mac Link +
- Managing Your Money
- Master Juggler
- MathMatics
- Milo
- MiniCAD +
- MS Works 2.0
- PageMaker 3.0
- Persuasion
- Quark XPress 2.0
- Quark Style
- QuickKeys
- Red Ryder
- Suitcase II
- SUM
- SuperCard
- SuperPaint 2.0
- TOPS
- Vantage
- WriteZ
- WriteNow 2.0

**SOFTWARE**

- Adobe Fonts
- Aldus Freehand
- Big Thesaurus
- Canvas 2.0
- FontDrawer
- Fox Base +
- Fox Base Multiuser
- Hyper D.A.
- Illustrator 88
- LightSPEED C
- MS Word
- Macintosh
- Mac Link +
- Managing Your Money
- Master Juggler
- MathMatics
- Milo
- MiniCAD +
- MS Works 2.0
- PageMaker 3.0
- Persuasion
- Quark XPress 2.0
- Quark Style
- QuickKeys
- Red Ryder
- Suitcase II
- SUM
- SuperCard
- SuperPaint 2.0
- TOPS
- Vantage
- WriteZ
- WriteNow 2.0

**MACINTOSH SYSTEMS**

MacProducts USA carries all Macintosh™ systems and peripherals. We will configure a system to meet your needs. Call us today for current prices.

**HARDWARE**

- 45meg Removable
- Cartridges, each
- 600meg Read/Write
- Optical Drive
- Thunder Scan
- Abaton Interfac
- Grappler Interfaces
- "A" Mouse
- "A" Mouse (ADB)
- Kraft Quick SE +
- TOPS Flash Box
- Datadisk 101 Keyboard
- 800 K Drive
- Tape Backup 60mb
- Mac Recorder
- MIDI Interface
- TurboMouse 3.0
- Selkoea Printer
- Shiva NetModem v2400

**ACCESSORIES**

- Disks:
  - DS SS
- Sony Boxed (10)
- Sony Bulk (50)
- MacDisk Bulk (50)
- KAC Bulk (50)
- KAC Boxed (10)
- Black Ribbons
- Colored Ribbons
- ImageWriter LQ Ribbons
- ImageWriter LQ 4-Color
- Mac Plus, SE Bag
- Teak Disk Box 20mb
- Disk File/50/80
- MacGuard
- Fanny Mac QT

**ORDERING**

Orders ONLY: 1-800-622-3475
Information: 1-512-343-9441
FAX: 1-512-343-6313
Tech Support: 1-512-343-6141

Hours: 7am - 10pm, M-F
10am - 6pm Sat-Sun CST
Tech Support Hours: 9am - 5pm, M-F CST

Minimum Order: $40.00
Payment:
- American Express, Optima, Visa, MasterCard (No surcharge).
- Checks, C.O.D., and Company & Institutional PO's.
- Net 15.
- Tax: Texas residents only, add 6% sales tax.
- Prices and items are subject to change and availability.
- Terms: You are not charged until your order is shipped. Returns may be subject to a restocking fee.
- Leasing: Available on orders over $2500. Call for more information.

MacProducts USA carries over 3500 products for the Mac, so call for products not listed.

Call for a free catalog.
More Words

More II offers powerful word processing capabilities. Long headlines can be collapsed to display just one line or expanded to reveal the complete text. Menu commands control indentation, justification, page breaks, font, style, headers, footers, and other facets of a document to such a degree that for most purposes there's no need to export the outline to a word processor.

More II also has a powerful search-and-replace function with a wild card, a spelling checker with a 100,000-word dictionary, and a table-of-contents generator are also included. Although More II lacks automatic footnoting, multiple-column printouts, and other features important to power wordsmiths, it's a convenient and functional tool for the kinds of word processing that most of us do most of the time.

More Presentations

You can transform a More II outline into an impressive graphic presentation. Any outline (even part of an outline) can be viewed as a tree chart or as a series of bullet charts. However, you must return to the outline view to make any changes to the outline text.

Bullets and Palettes

Pop-up palettes in More II's bullet chart view make graphic embellishments easy.

with both mouse and keyboard. Headlines can be displayed or printed with different label styles. And like its predecessors, More II allows you to attach graphics or lengthy text documents to headlines in document windows, which travel with their associated headlines.

MacDraw-like tool palettes enable you to add caption text or graphics to tree charts or to the master page, which underlies all bullet charts. Pop-up picture menus enable you to choose among different types of boxes, backgrounds, patterns, lines, and styles of alignment for the current chart or for an entire series. Speakers' notes, which aren't visible in the final presentation or printed outline, can be added to any bullet chart (see "Bullets and Palettes").

You can also create style rules that apply to outline, bullet, and tree chart views. Style rules are similar to the style sheets found in many word processors, but they are more versatile because they take advantage of an outline's hierarchical structure. These rules are easy to install and change; they can even be copied and pasted into different outlines.

More II makes it easy to reuse graphics, standard charts, parts of outlines or rules by letting you store them in libraries. Libraries appear as items on the Library menu. More II comes with several libraries that can be used as templates for color slides, overhead transparencies, and other common display formats.

More Output

More II offers many ways of going from outline to output. Printouts from any of the three views can be previewed on screen. You can export part or all of any More document to a word processing, page-layout, or graphics program. More II includes import/export drivers for 11 common applications, and Symantec plans to put updates and additions to these drivers on the LVTFORUM on ComputerServe. And More II files can be turned directly into 35mm color slides overnight by Magicorp.

But More II is most impressive when viewed directly on a Mac screen (or overhead projection) using the Slide Show command. A series of bullet charts becomes a dynamic presentation, complete with dissolves, wipes, point-by-point builds, and other effects. Slide shows can be controlled with the Mac's keyboard, the mouse, or a Kodak Datashow Presentation Remote, or they can be set to run indefinitely on automatic pilot. If your computer has multiple monitors, you can even display speaker's notes and controls on one screen while displaying the show on the other.

More or Less?

While More II is occasionally frustrating, it's much more flexible, powerful, and satisfying than its predecessor. If all you need, however, is an idea processor, you're probably better off with Acta Advantage, an outliner that comes with a desk accessory version. If you want a presentation graphics tool that includes quantitative charting capabilities and maximum design flexibility, you may prefer Aldus Persuasion. But if you want a single program that can sit on your screen all day long, taking care of everything from appointments to slide shows, look no more.

—George Beekman

See Where to Buy for contact information.

DATABASE 1.11

Desk Accessory Database

Pros: Powerful and well designed; superb manual; supports text, graphics (including PICT), and calculated fields. Cons: Limited printing options; weak layout program. Company: Preferred Publishers. Requires: Mac 512KE. List price: $129.95

It's amazing what they can squeeze into a desk accessory nowadays. Take Database, for instance: a flat-file database manager that supports picture and calculated fields, user-definable check boxes and pop-up menus, multiple fonts and sizes, even phone dialing—and it resides in the Apple menu.

Oh, What a DA

Database does not itself offer any design or layout tools—those are in the accompanying Database Builder. Once you lay out a file to your satisfaction, you enter data with the desk accessory.

The Database Builder is a stripped-down cousin of the Layout mode in FileMaker II; it's here that you define fields, set (continues)
AMIE is the newest addition to our family.

Air Land Systems’ Apple Macintosh Interface Emulator lets you connect the Macintosh II to your Unisys/Sperry host.

Now you can have the tremendous capabilities of the Macintosh running on your Uniscope network with AMIE, the newest member of Air Land Systems’ family of interface emulators. AMIE is a hardware/software package that emulates the UTS40 terminal, allowing the features of the Mac II to be retained and interactively used in the Unisys environment. AMIE supports various forms of connectivity and handles the communication line protocol. The software emulator is fully compatible with a UTS40 terminal and includes a multitude of features, such as file saving and printing, color capability, menu selections, help screens, and cut/copy/paste to and from other applications. For more information on sales and service for this product, contact Air Land Systems.

AIR LAND SYSTEMS

2710 Prosperity Avenue, Fairfax, Virginia 22031-4387
(703) 573-1100; FAX (703) 573-0121; TWX 710-833-1174 AIRLAND FRAX

Circle 1 on reader service card
their font characteristics, and place them on the page. A snap-to grid and nudge commands help you place text labels and fields, which can be any one of five types: text/number, picture, calculation, pop-up menu, or check box. To determine the look of a new database file, you can import a MacPaint, MacDraw, or EPS graphics program to serve as a static backdrop to the data fields, much as a single HyperCard background might lurk behind the fields of several cards.

In general, the DAtabase Builder is DAtabase’s weakest link. There’s no provision for drawing lines, squares, or circles; if you want these accent graphics in your design, you’ll have to paste them in from a graphics program (and you can’t resize them once they’re in the DAtabase Builder). Worse, there’s no way to select more than one field label or text label at a time; if you decide to change the font characteristics of ten fields, you’re forced to step through the font dialog box for each, one at a time.

Living Dangerously
DAtabase is something of a cross between HyperDA and QuickDex, with which it will inevitably be compared. Unlike HyperDA (which lets you look at—but not edit—HyperCard stacks), DAtabase lets you enter, change, and manipulate the data on the fly. And unlike QuickDex, DAtabase offers infinite font, layout, and graphics capabilities, as well as sorting, multiple-criteria searching, and dozens of other true database skills.

When you open DAtabase, you see a MiniFinder of up to 60 icons, each representing a file that you’ve set up. You can, if you wish, select one file to be opened automatically when you start DAtabase. Files can also be password protected.

DAtabase looks phenomenal. All of its graphics—program, manual, and packaging—are striking and tasteful. The actual desk accessory feels solid; tabbing, calculations, and pop-up menu selections are immediate and responsive. You can even opt for a digitized clicking sound when you click the mouse. There are no data entry shortcuts like default field values or lookup fields, but the package includes a powerful import program with one-click options for creating DAtabase files from QuickDex, PictureBase, tab-delimited text, and other files.

The latest version (1.11) includes a substantial packet of new features, including a splendid command called View As List. This feature brings to the screen a spreadsheet-like representation of your data, giving you an overview of dozens of records; a double-click on any row takes you instantly to that record.

The new DAtabase is fast, too: if you choose the Load File Into RAM option, finding a record is only a blink shy of instantaneous, and you can sort 500 records in just over 15 seconds.

Insufficient Data
DAtabase was designed to be the best possible online data-management system—the operative word being online; the program’s printing skills are weak. You can print a subset of your records, but you only have two choices of layout: record-by-record or list format.

The single-record approach is appropriate for full-page invoices or receipts. The list format (columnar report) is good, too, as far as it goes; you can select which fields should be included and choose a page reduction if you want to include more fields per row. But there are no other options. If the fields you’d like to include won’t fit on one line, DAtabase can’t put the remainder on a second line. Nor can you specify the order of the fields on the page, or change fonts or type size (except to select Print All in Monaco). Be glad, therefore, that DAtabase includes an extremely powerful Export Data command.

The Break of DA
There is no limitation, however, for which there isn’t hope in the form of DAtabase’s most brilliant option: Xtra Features. These are small chunks of computer code that can be written by anyone, and they can be appended to a DAtabase setup one by one.

These Xtra Features, according to Preferred Publishers, are available on bulletin boards, CompuServe, and the publisher’s own registered-user BBS. The sophisticated dialing feature, improved sorting routines, any F-key—all of these are Xtra Features that you can add to one or more of your DAtabase files. In the unlikely event that the current DAtabase program is missing a feature you need, there’s no need to wait months for version 2.0; developers all over the country are busy sprucing up the program.

A DA to Remember
Certain applications already cry out for DAtabase: a Rolodex, simple forms, and rosters are all good bets; the latter could include digitized photos (DAtabase supports color). DAtabase also makes a knock-out phone system; one of its features is a sophisticated auto-dialer that supports various calling-card sequences. DAtabase can time calls and calculate long-distance charges. You could also use DAtabase as a desk accessory front-end for a real database. When you close up shop each day, export the new DAtabase records into the main database application.

DAtabase delivers everything it promises with style. Time/date stamping is automatic; there’s online help; for added speed the program loads as much data as it can into RAM; it even runs on a Mac 512KE. Because DAtabase is only a desk accessory, however, you can’t have multiple layouts of one set of data, you can’t have more than 2500 records in a file, and the printing options are limited. But DAtabase comes admirably close to application-league functionality.—David Pogue

See Where to Buy for contact information.
Before you give your next presentation, press this button.

Turn Desktop Presentations Into Conference Room Power

Your Macintosh® is one of the best tools around for creating great presentation images. Now VideoShow® can take those images into the conference room where you'll really impress your audience with high-resolution presentations in up to 100,000 brilliant colors on screen. And it's as easy as pressing a button.

Create your images with your favorite graphics or presentation software like Microsoft® PowerPoint™, Aldus® Persuasion™, Symantec™ MORE II™, etc. Then take your presentation diskette from your Macintosh into the conference room. Insert it into VideoShow and press the button.

VideoShow turns your images into exciting, boardroom-quality presentations with dynamic transition effects, all in brilliant full color. Even if you've created your images on a Mac® SE or Plus.

And your Macintosh can remain in your office while you're in the conference room. Just connect VideoShow to a color monitor or large-screen video projector. Insert your presentation disk, and press the button.

Easy On Your Budget

With three models, starting at $1795, there's a VideoShow unit to fit every budget and presentation need. And VideoShow can operate as the cornerstone of a full system for creating presentations in a variety of media.

Brilliant Slides, Too

When you need professional quality high-resolution slides, simply add PhotoMetric® SlideMaker® to turn your great images into great slides. At your desk. No guesswork. No service bureaus. No delays. No problems.

And Instant Overheads

VideoShow with Print-Maker® software and a color printer, produces sharp, brilliantly colored overhead transparencies and hard-copy handouts. Easily and instantly.

You have to see VideoShow to believe it. Call today 800-556-1234, ext. 234. In California, call 800-441-2345, ext. 234.

General Parametrics Corporation The leader in desktop presentation products
LIGHTSPEED PASCAL 2.0
Pascal Compiler and Development System

TML PASCAL II 3.0
Pascal Compiler and Development System

Think's Lightspeed Pascal and TML Pascal were the first third-party Pascal compilers for Mac professionals. Originally engineered for the 512K environment, both have been revised significantly to accommodate changes in hardware, and both products have seen improvements in compilers and linkers. Fortunately, a choice between them is a matter of picking your favorite strong points.

Light and speedy
Lightspeed Pascal and its sister language, Lightspeed C, were specifically developed to help with the tiresome realities of applications programming by streamlining and speeding up the edit/link/compile cycle. Still, many developers felt that Lightspeed Pascal generated object code that was bulkier and slower to execute than TML's; a major part of Lightspeed's upgrade to 2.0 is an improvement in the compilation engine itself. Object-code size on a test suite of smaller programs (source-code size 20K to 40K) was 5 percent to 25 percent smaller using 2.0 instead of 1.11. Symantec has improved execution speed of compiled code by a similar amount. Compilation speed and linking speed, already quite respectable, are also marginally better.

The upgrade also supports Object Pascal extensions, larger projects (to 255 files), larger arrays (over 32K), and conditional compilation. Lightspeed Pascal now also comes with an entertaining tutorial called Just Enough Pascal that steps a beginner through an animated mini-application. LightsBug, the convenient built-in debugger, has also been enhanced, allowing variable manipulation and setting of watchpoints in code (see "Bugs under the Light"). It's not quite as comprehensive as the best stand-alone debuggers—Jasik Design's The Debugger and Icom Simulations' TMON—but it's an amazing offering in a product at this price. Lightspeed's only obvious weakness is its documentation, a well-written 460-page paperback that falls apart after a few weeks' use.

TML and MPW
TML Systems now offers its well-regarded compiler in a package that runs under the Macintosh Programmer's Workshop 3.0 (MPW) shell. It supports Object Pascal, generates both object and assembly language code as output, and lets you easily include assembly, C, and MPW Pascal code in TML Pascal project files. TML directs file management from a special menu item that appears in the MPW menu. Most significantly, TML Pascal now supports MacApp.

The changes to the compiler mostly involve extensions rather than speed or code-quality improvements. In fact, developers consistently praise TML's object-code optimization on large programs, despite its middling performance on the tiny benchmark programs so beloved of reviewers. Extensions include MultiFinder support and a well-documented HyperCard interface. More than a megabyte of examples and utilities illustrating extensions and basic features (windowing, menus, Color QuickDraw, F-keys, DAs, and so forth) are available, for $69.95, in the TML Pascal Source Code Library. Although Macsbug is the only debugger provided, TML includes a few tools for spotting potential code improvement in successfully compiled programs.

Not much concession is made to beginners. The MPW package assumes you are an experienced programmer, and poring through the source-code library is the closest thing to a tutorial you'll get from TML. On the other hand, a phone call to TML with a serious question will generally get you Tom M. Leonard himself; most developers rate the product's phone support as exemplary.

A Pleasurable Choice
Both these products are complete development systems, enabling you to produce stand-alone applications and desk accessories. Both support 68020/68881 instructions and updated procedures (Cycle, Exit, and Leave, for example). The MPW editor and the Lightspeed editor are good enough to satisfy most programmers. LightsBug gives Lightspeed an edge over TML, but then TML's Rez and DeRez are more convenient for handling resource files than the RMaker provided with Lightspeed. Lightspeed's project manager is still great, and its compiler has been improved; TML's project-management facility is better than before, and its compiler is still tops in many contexts.

If you're interested in Pascal programming it makes sense to buy both programs. It's difficult to predict which compiler will produce better object code from your source, especially for large programs. If you can take a gamble that will cost you little money and only a day or so (porting the code is not trivial but not forbidding either), see if you can cadge significant optimization from another compiler. It's a pleasure to report that you can scarcely make a mistake choosing either one.

—Charles Seiter
See Where to Buy for contact information.
SuperPaint 2.0
Setting the Standard. Again.

1 These faces were created using the freehand Bezier tool, which allows you to create editable Bezier paths quickly and easily. Color preview lets you design on screen and in color.

2 Both painting and drawing features were used to create this scientific illustration.

3 Special effects, such as these bubbles on the water, can be easily created with custom-programmed, plug-in paint tools.

4 The freehand Bezier tool provided the precise control necessary to draw this architectural column.

SuperPaint, the best-selling graphics program for the Macintosh®, has always set the standard against which other software is compared. And we just raised that standard.

In Version 2.0, SuperPaint gives you more graphics power than the costly "professional" drawing programs, yet it's easier to use. Draw spontaneously with the freehand Bezier tool, for example. You don't have to get it perfect the first time — the Bezier path is completely editable, so you can progressively refine your work. Or use AutoTrace™ to instantly convert any bitmapped image to an object-oriented line drawing.

Then, with a mouse click, you can further refine your graphic with the most flexible and sophisticated painting tools available on the Mac, including a slick new airbrush that works just like the real thing. Plug-in paint tools can be custom-programmed and will show up in the tool palette.

We've added nearly all the other features you wanted, too. You can set any document size for printing multiple pages, work in landscape view, or use SuperBits™ to edit bitmaps of any size and resolution — you can even edit a full page at 300 dpi. Plus you can preview your image in color before printing.

More power, more flexibility, and easier to use. That's SuperPaint 2.0 — setting the standard for Macintosh graphics...again.

Suggested retail price: $199. Upgrade from 1.0 or 1.1: $50.

System requirements:
Macintosh Plus, SE or Macintosh II;
System 6.0 or later
Silicon Beach Software, Inc.
P.O. Box 261430
San Diego, CA 92126 • (619) 695-6956

Silicon Beach SOFTWARE
AutoTrace, SuperBits and the Silicon Beach Software logo are trademarks of Silicon Beach Software, Inc. Macintosh is a registered trademark of Apple Computer, Inc.

Circle 266 on reader service card
NETMODEM V2400

2400-Baud Modem with AppleTalk Support

Pros: Allows multiple users to share modem; provides remote connection to AppleTalk networks; twofold increase in speed over former model. Cons: No easy way to control volume for NetModem's sounds; sensitive to line noise. Company: Shiva Corporation. Requires: LocalTalk connectors and cabling (or equivalent). List price: $599.

As AppleTalk networks grow, users are becoming more accustomed to sharing resources on a network. Shiva's Hayes-compatible NetModem V2400 is designed specifically for network usage, combining normal telecommunications capabilities with AppleTalk support. In addition, remote Macintosh users can dial this modem and become part of an AppleTalk network.

My Modem, Your Modem?

At first glance the NetModem V2400 might look like just another 2400-baud modem. However, the AppleTalk connector at the rear of the modem makes all the difference in what would otherwise be just another Hayes-compatible modem. Because it supports AppleTalk, the NetModem can become part of an AppleTalk network and, therefore, can be used by any member of the network.

The NetModem works with just about any terminal-emulation program currently available for the Mac. The NM Prefs CDEV allows the NetModem to emulate either the modem port or the printer port, or to be turned off entirely to avoid conflicts with other peripherals (such as another modem). NM Prefs also allows you to set the NetModem to automatically answer or ignore incoming phone calls. A NetModem driver adds flexibility by letting you assign a password for dial-in users and allowing you to select which NetModem you wish to use, should your network connect to more than one NetModem. One caution, however—the NetModem must be emulating one of the serial ports before you can configure it through the Chooser.

Once you've selected a NetModem, you'll find a new menu bar display when you enter the terminal emulator. Because the NetModem is usually not located near a particular user's Macintosh, Shiva has chosen to provide the feedback normally associated with a modem by other means. The default menu display is a graphic of a mock modem front panel, complete with flashing LEDs (they flash red on a color monitor). In addition, when you're dialing, the NetModem encapsulates the phone line's sounds on AppleTalk and plays the sounds on the Mac's speaker.

I tested the NetModem with the following terminal emulators and generally had no problems in operation: AppleLink 4.0, Desktop Express 1.0, MacTerminal 2.2, Red Ryder 10.3, FreeTerm 2.0, MacNet 1.0, VersiTerm 3.0, and the DAs MockTerminal 4.3.4 and ASL Talk 1.23. On some occasions the NetModem seemed to be excessively sensitive to line noise, causing problems with connections to GEdevices, Connect, and some local bulletin boards using VersiTerm and MacNet software. The precise cause of these difficulties was hard to pin down, but the NetModem seemed to cause problems about twice as often as my standard 2400-baud Practical Peripherals PM2400SA modem.

Distant (Network) Relatives

The NetModem can also provide AppleTalk network links for call-in users. You implement remote access to an AppleTalk network via the Dial-In Access CDEV, which uses a regular modem attached to the remote Mac. You can store a list of names and numbers for dialing within the CDEV. Double-clicking a network name on the Dial-In Network Access screen starts the dialing procedure. You can also add or remove a network. You can alter the phone number, serial port for the modem, baud rate, and similar parameters using the modify button. Once the remote modem connects to the NetModem, you can close the Control Panel and use any of the applications on the network that the NetModem is connected to, albeit more slowly than on LocalTalk.

Fast Enough?

Initially, the NetModem appears to transmit data more slowly than a regular 2400-baud modem. Lines of text are written to the screen of any terminal emulator in a jerky fashion, rather than in a smooth flow of characters. The NetModem's performance is certainly better than its predecessor's, the 1200-baud version. Furthermore, file transfers using the Xmodem protocol, which have a well-defined packet size, proceeded much more smoothly than text displays and were essentially indistinguishable from file transfers using a regular modem.

Since the NetModem operates at a speed of 2400 baud, which is only about 1/100 of AppleTalk's 230,000 baud speed, don't expect great things when remote linking a NetModem to an AppleTalk network. It might suffice for file transfers to a network server or for printing a report, but I wouldn't recommend running any applications on it, and I certainly wouldn't try playing NetTrek or Falcon over such a link.

The network-shareable modem is a reasonable and useful concept, and implementing the concept in hardware makes good sense. However, with the cost of 2400-baud modems being so low, you would need more than two or three users to offset the cost of the NetModem—it would be a lot more appealing if it were 9600 baud.

Since the NetModem goes beyond simple modem sharing and provides remote access to AppleTalk networks, it should prove to be a more valuable resource for companies that have users with Macs in the field who wish to transfer files or print reports on the home office's LaserWriter. —Dave Kostur

See Where to Buy for contact information.
COREL Macintosh WORM Drives

**WORM's vs Floppies**
- 1000 times capacity
- Hard drive speed
- Rugged cartridges

**WORM's vs Tapes**
- 12 times capacity
- Hard drive speed
- More reliable
- withstand airport X-Rays

**WORM's vs Bernoullis**
- 20 times capacity
- Lower cost/Mbyte
- State of the art technology
- Multiple drive vendors

**WORM's vs Erasables**
- Proven technology
- No accidental erase
- Lower cost/Mbyte
- Ideal for archiving/audit
- Proven life for media
- Available NOW!

**Total MacCompatibility**
COREL WORM drives are 100% Macintosh compatible and use the familiar Mac icon interface. Use them just like your floppy or hard drive. COREL software enables the WORM to appear erasable so you can delete files as usual. Files can be saved and retrieved individually or in bulk, and you have the benefit of full recovery at any time.

**COREL Leads the Industry**
COREL is the World leader in Optical disk interfacing software and uses this vast experience to provide seamless optical subsystems.

**Proven Software**
COREL has led the way in 5 1/4" WORM drive software with many thousands of installations.

**Proven Hardware**
COREL uses proven drive mechanisms from the leaders of the industry such as Panasonic, Ricoh and Pioneer.

**Dozens of Applications**
- Hypercard databases
- Digitized sound
- Multi-media applications
- Virus protection for data
- LAN file servers
- Archiving (Ultra long life)
- Back-up/Multiple copies
- Graphics/CAD libraries
- Image files
- Software libraries
- Full-text retrieval
- Medical scanned images
- Audit trails
- CD-ROM development
- Data distribution
- UNIX applications

**Other Systems Available**
COREL WORM subsystems available for:
- IBM PC
- Novell LAN file servers
- 3COM LAN file servers
- UNIX (Available early 1989)

**Plug and Play**
Everything you need is included: Drive, Software, Cable, and Manual. Your WORM can be running minutes after opening the box.

**Hot Line & Bulletin Board**
In case you have any problems, COREL provides total support to find the solution quickly and efficiently.

**Choice of Drives**
- COREL 400M
  - 400 Mbyte (2 x 200/side)
  - $2,895
  - Cartridges
  - $115
- COREL 600M
  - 600 Mbyte (2 x 300/side)
  - $3,795
  - Cartridges
  - $180
- COREL 800M
  - 800 Mbyte (2 x 400/side)
  - $3,995
  - Cartridges
  - $160

**Order Now From COREL**
No delays, you will receive your drive within a few days of your order.

COREL Systems Corporation, 1600 Carling Avenue, Ottawa, Ontario K1Z 8R7 Tel: (613) 728-8200 Fax: (613) 728-9790

Circle 233 on reader service card
WINDOW SHOPPING

by Lawrence Stevens

This month I look at five software packages, each of which employs a unique graphical user interface for quickly conveying information. For example, there's a disk-analyzing utility that displays a picture of the free space on a hard disk; a security program that changes the look of folders to denote access; and a labeling program that allows you to sort data by moving fields.

Empower 2.0

Put simply, Empower ($395 from Magna) keeps track of who is using a hard or floppy disk and limits access to individual folders. A user can be authorized full access or be limited to one or any combination of the following: viewing file icons within a folder (pass-through); opening documents but not making changes (read only); making changes at the Finder, such as duplicating or erasing files, but not opening documents (write only).

Once you install the Empower INIT, you designate users as being one of three ranks: System Administrator, Authorized User, or Guest. System Administrators can designate Authorized Users and other System Administrators and assign passwords. A System Administrator also can place users in groups and set the authorization privileges at the same time.

An Authorized User or System Administrator can claim ownership of any folder that is not already owned, an action that can be overridden only by a System Administrator. You claim ownership by selecting a folder and choosing Get Privileges from the Finder menu. Once you claim ownership of a folder, you can specify which privileges are available to everyone, which privileges are available only to a given group, and which are reserved for private use.

The third type of user, Guest, is anyone who has not been assigned a password. Guests can access any folder whose owner has not locked out Everyone, unless a System Administrator disallows Guests from accessing all folders.

Users must register their names and passwords each time they turn on the Mac; System Administrators and Authorized Users must include their passwords when they log on. Users can log off by clicking the key icon in the Empower Control Panel window. This enables the Mac screen and displays a box that asks new users to register. There is also an optional automatic log-off facility that disables the screen if the Mac remains idle for a predetermined period of time.

Empower's primary mode of protection is encryption. Most Mac encryption programs require that you type in a password each time you encrypt or decrypt a file. The advantage of Empower is that you log on only once, and each time you open and close a file, the program automatically encrypts and decrypts the file.

The program has a wonderful user interface: Icons at the Finder let you know your exact privileges for each folder. Once you log on, all the folders you own have highlighted tabs; those that you have no access to are gray. And a line through a small icon—a folder, file, or pen—indicates restrictions on seeing folders, opening documents, or writing to files.

Empower takes only a couple of hours to learn and is easy to use. If you need folder protection, this product provides the most direct way to get it.

DiskExpress 1.5

MultiDisk 1.0

Instead of giving each user a password, an alternative approach to security is to password protect the files or disks themselves. If your security situation is relatively constant and simple—for example, only personnel-department staff have access to employee records—file or disk protection may be the most efficient way to authorize groups of users to specific files.

(continues)
MultiDisk ($39.95 from ALSoft) partitions a hard disk into volumes that can be password protected or encrypted for even greater security. Once you create a volume, you treat it exactly as if it were a separate disk drive—you toggle between volumes using the Drive button in the Save or Open window of an application.

To secure files you close the volume using MultiDisk DA. The Mac treats a closed volume as if it were a disconnected drive. All files in that volume are now inaccessible until the volume is reopened, an action which optionally requires a password. Besides providing security, partitioning a disk allows you to place files and applications in different "drives," making them easier to find. If you regularly purge records, partitioning can simplify that task by letting you erase a volume of files and documents in one operation.

ALSoft has also updated DiskExpress ($49.95). DiskExpress 1.5 optimizes a hard disk by rejoining files, applications, documents, and free space that were fragmented on the disk because the Mac could not find enough contiguous space.

DiskExpress essentially works itself. You just select the icon of the disk you want to optimize and choose Express from the menu bar. Version 1.5 adds a Quick Optimize option that speeds up the process if you do not want to unfragment free space. This version also can display a graphical map of the free space on a disk, which allows you to see the degree of fragmentation.

The most popular alternative to both these ALSoft programs is Symantec Utilities for the Macintosh (SUM), which contains the two utilities described above plus about ten more. The ALSoft programs do have some minor advantages over SUM, the most notable being that with MultiDisk, once you create a volume, you can later enlarge it without erasing the data as you do in SUM. Basically, the choice is between shelling out $100 for SUM and getting some utilities that you can’t use, or buying just what you need. If I were planning to buy both ALSoft products, I would be sorely tempted to pay a few dollars extra for SUM just in case I needed those extra utilities at some point.

FastLabel is unique in a number of ways. First of all, the label is divided into three fields that contain text. The Text field, the only one of the three fields that is not optional, contains the basic text: name and address, or title of a cassette. The location of this field on the screen image represents its location on the labels. The Global field contains data that will not vary from label to label, such as a return address. And the Spine field, which is used primarily with cassette or disk labels, contains text printed upside down. Each field can be relocated on the label, resized, and given its own font size and style.

A fourth, noncontext field, Icon, allows you to import icons to appear on your label. Unfortunately, FastLabel doesn’t import MacPaint documents. If you want to include a logo on your label, you’ll have to create an icon using Apple’s ResEdit, Icon Factory (from Hyperpress), or another icon utility.

While most label programs require that you arrange the label list in a word processing or spreadsheet application, FastLabel gives you complete control of imported lists and does so in a fascinating way. Once you import any tab-delineated list and choose the Formatter screen, the headings—name, address, company, for example—appear in boxes along the left side of the screen. To rearrange the list for the labels, you drag the boxes, blank-space indicators, and comma indicators into the format you want. For any elements you do not want printed—say, phone numbers—just drag the element to the trash. When you’re finished you can name and save your format for future use.

There are several other labeling programs, but none I have seen (and I think I’ve seen them all) give you as many formatting options as FastLabel. The trade-off is that FastLabel requires some work to set up. If you are printing standard mailing labels, there are simpler (and cheaper) programs. But if you want special formatting, FastLabel is the best there is.

See Where to Buy for contact information.
VISUAL BUSINESS No. 5

for professional charts and graphs on Macintosh II for Presenters and Producers

you can

make slides with impact and professionalism just like the ones shown here, made on Macintosh II, with Visual Business No. 5 (even if you have Excel, Power Point or other popular spreadsheet programs).

Enhance your data, numbers and ideas into visual decision-making graphics—quickly, professionally and easily...true 3D text and art, 360° rotations, special effects, shaded background (lots of techniques for "non-artists").

There's nothing like Visual Business No. 5

There is an extra advantage for users of Visual Business No. 5—for a limited time, the proprietary Output Manager which makes you device-independent (lists for $195) is packaged with this professional charts and graphics software....FREE.

---

FREE DEMO DISK

Yes, I would like to be one of the first five-hundred to receive your Visual Business No. 5 software demonstration disk for the Macintosh II and appropriate information at no cost obligation.

Name________________________ Title________________________

Company________________________

Address________________________

City________________________ State________________________ Zip________________________

Send this coupon to: Visual Business Systems, 700 Lake St., Ramsey, NJ 07446 or FAX: 201-326-0355

Circle 408 on reader service card

---

Visual Business No. 5

The first Macintosh software to offer truly professional charts and graphs.

The first Macintosh software to offer 3 Dimensional text, at high resolution.

The first Macintosh software to take advantage of the Mac II for professional presentations.

---

Visual Business Systems, Inc.; 700 Lake Street, Suite H, Ramsey, NJ 07446
1-800-462-FIVE
201-327-2526
FAX: 201-327-0355

---

3D with Artwork

2D with Grid

3D with Artwork

3D Boxed and Rotated
Here’s an easy way to figure out which products will help you get the most out of your SE (or any other Mac): call the Mac experts at MacZone. Simply dial (800) 248-0800. Orders gladly taken at the same number.

Oh, say can you SE.

Software

3G Graphics - Images with Impact
Business 1 .......................................65.
Graphics & Symbols 1 ....................58.
Atrix
Payroll 3.5 ................................ 98.
Payroll Plus ..................................158.
TimeCard ....................................108.
TimeMinder ..................................109.
C. Bonobo & Associates
Expressionist 2,3 ..........................78.
ACUT
4th Dimension ............................455.
Adobe
Illustrator 86 ..............................307.
Adobe PostScript Fonts ................CALL.
AEC Management Systems
AEC Information Manager ..........575.
Aegis Development
Showcase F/X ..............................235.
Alien
Tempo II ....................................79.
Aldas
Freehand ...................................348.
PageMaker 3.0 ..............................397.
Persuasion ...................................348.
Alp Systems
Mac Pro 3.0 .................................114.
Alsoft
DiskExpress 1.5 ............................39.
Master Juggler ..............................63.
Aldine-Tate-J
DBASE Mac .................................234.
Full Impact .................................248.
FullWrite Professional .................259.
Bedford
Simply Accounting .......................218.
Berkeley System Design
Stepping Out 2.01 ...........................51.
Bible Research
The Word (KJV, RV, NKJV, RSV) ....179.
Bight Software
Omnis 3+ & Express (1-3 Users) ......395.
Booktoware Software
ResumeWriter - Professional ..........60.
ResumeWriter - Student .................18.
Brainiac
Eureka: The Solver .......................128.
Reflex Plus ..................................120.
Turbo Pascal 1.1 ............................67.
Turbo Pascal Tutor 1.0 ....................45.
BrightStar Technology
Alphabet Blocks ...........................30.
Hyper Animator .............................77.
Talking Tiles ................................67.
Broderbund
Calculus ......................................58.
Geometry .....................................58.
Pysics .........................................58.
PosterMaker Plus .........................38.
PrintShop ..................................35.
Type! .........................................19.
Caere
OmniPage 1.0 ..............................565.
Casady & Greene
QuickDEX .................................31.
CE Software
CalendarMaker 3.0 .........................26.
ClockTron 3.0 (for Centura & paper) ..28.
QuickKeys 1.1 ...............................52.
QuickMail 2.0 (1-5 Users) ............149.
QuickMail 2.0 (10 Users) ...............219.
CentralPoint Software
Copy II Mac (Version 7.2) .............18.
PC Tools Deluxe .........................40.
CheckMark Software
Cash Ledger ..................................125.
MultiLedger .................................255.
Payroll ......................................215.
Claris
Claris Card ..................................635.
FileMaker II ..................................235.
MacDraw ......................................158.
MacDraw II ...................................305.
MacPaint 2.0 .................................99.
MacProject II ...............................392.
MacWrite II ..................................CALL.
SmartForm Designer ....................315.
Connect
MacNET ......................................CALL.
Cricket Software
Cricket Draw ...............................169.
Cricket Graph 1.3 ..........................118.
Cricket Paint ...............................118.
Cricket Presents ...........................287.
DataViz
MacLink Plus W/Cable ..................142.
Davidson & Associates
Design Software
MacTree + (free Do Back Up) ...........46.
Denise Software
Big Thesaurus ..............................53.
Canvass 2.0 .................................159.
Coach Professional ......................104.
Duck!-Clip-Cloth Software
World Class Laser Design-bit mapped clip art
• 7.5" "Classic Clip Art" • 3.4" "For Publishing"
• 5.6" "Animal Kingdom" • 7.8" "Special Occ.
• 9.10" "Promo & Help" • 11.12" "Relocation"
• 13.14" "Old Earth America" • 15.16" "Island Life"
• 17.18" "At The People"
Each two volume set ......................43.
World Class Fonts
• 1 & 2 "Originals" • 3 & 4 "Stylish"
• 5 & 6 "Giants" • 7 & 8 "Tripples"
Each two volume set ......................43.
World Class Laser Type
Volumes 1 - 6 ..............................each 43.
Electronic Arts
Disk Tools Plus ............................30.
Studio Eight .................................318.
Tender II ....................................53.
Emerald City Software
Smart Art 1 .................................94.
FanciD
Timbuktu Single User ...................69.
Timbuktu Remote .........................195.
Fifth Generation
Fast Back .................................53.
PowerStation 2.3 .........................29.
Pyro! .........................................14.
Suitscase 2.0 .................................44.
Foundation Publications
Comic Strip Factory .....................40.
Comic People 1 - City Dawgs 1 ....24.
Fox Software - ForBASE+/Mac
Single User Version 1.1 ...............207.
Multi User Version 1.1 .................318.
Runtime (Unlimited Users) ..........259.
FreeSoft
Red Ryder 10.3 .............................53.
Generic Software
Generic BASIS Level 1 ...................CALL.
Great Wave Software
KidsTime .................................25.
Hages
Smartcom II ...............................87.
High Performance Systems
STELLA .......................................385.
HUC Software
65.
ICOM Simulations
On Cue 1.3 .................................35.
TMON .........................................88.
Individual Software
101 Macros for Excel ....................36.
101 Scripts & Buttons/HyperCard .....36.
Informix
WingZL ......................................275.
Innovative Data Design
Dreams ......................................278.
MacDraft 1.2b .............................148.
Insight Development
MacPrint .....................................45.
Intuit
Quicken .....................................32.
Jun Software
Smart Alarms Single User ............55.
Smart Alarms Multistater (4 Users) ..99.
Kent/Marsh
MacSale .....................................88.
Night Watch ..................................88.
Laserware
LaserPaint Color II .......................359.
Learning Company
Reader Rabbit ..............................32.
Letreset
ImageStudio ................................275.
LetraStudio ................................268.
ReadySetCol 4.3 ..........................274.
ReadySetShow ............................169.
Letrafonts .................................each 56.
MacMaster
FedIt + Version 1.07 .....................28.
Masten
MacFlow .....................................110.
MacStar .....................................29.
Typenow .....................................27.
V.I.P. (Visual Interactive Programming) 105.
MECA
Managing Your Money 127.
Mediagenic
Focal Point II .............................118.
Reports .....................................78.
Micro Planning Software
Micro Planer Plus 6.1e .................325.
Microfights
GOfer .........................................43.
WordFinder ..................................32.
Huge savings. Free advice.

MacZone has been providing Macintosh users with some of the best prices on software and hardware for years. But we also provide something else:

Knowledge. Advice. Words of wisdom.
And now MacZone is newly revitalized and rededicated to providing not just low prices, but also valuable information from people who really know Macs (we’re the only direct mail company that runs its entire operation on Macs!).

Here’s what you can expect from us.

Unbeatable Prices. Our prices are as low as you’ll find. We invite you to compare them to the prices from the other major direct mail companies in this magazine.

Complete Selection. We carry tons of the most up-to-date Macintosh products—too many to list in this ad. If you don’t see what you want here, call and ask. We probably have it.

Top Service. We work hard to answer your call promptly and to make sure you get exactly what you ordered. And we ship most orders overnight via Federal Express, just $3.

Product Knowledge. Our people really know and love Macs. After all, they use them every day. So they’re well qualified to answer your questions about the products we carry—how they compare and which one’s right for you. They may even pass on a Macintosh tip or two. You see, at MacZone, you’re always welcome to call and talk about what you need—even if you aren’t ordering.

Flexible Ordering. We let you order in the way that works best for you:

- Order by phone with MasterCard, VISA, or American Express. No surcharge on any of them—ever.
- Order by FAX by sending your credit card number and product information to our OrderFAX: (206) 881-3421.
- Order from anywhere in the free world. We ship just about everywhere. Take advantage of our OrderFAX: (206) 881-3421.
- Order by P.O. We accept Corporate, Government, and Educational Institution purchase orders. Call us for details.

So if you want the best products, the best prices, and the best service, there’s just one thing to do: Enter the MacZone.

1-800-248-0800
Canada: 800-248-0344 FAX (206) 881-3421
Our savings are huge. Our advice is free.

Circle 449 on reader service card
Attention buyers in corporations, government agencies, school systems, universities, and other institutions—MacZone is the perfect place to buy products for your Macs. We not only have the products, but also the knowledge to help make sure you get the rights ones. And we’ll happily accept your PO.

**MacZone**

Our salespeople know your needs. Our advice is free.

---

**Institutionalize us.**

---

**The Zone**

---

**Our selection edge: Our advice is free.**

---

**Emerald City**

Dazzling PostScript special effects fonts. Custom-typed your text and paste anywhere into your application. Smart Art 1... 94

**Infomix**

State-of-the-art presentation spreadsheet for novice power user. Includes instructional video "Learn to Fly." Wing2...

**Microgeeks**

This handy DA searches files for that elusive word or phrase. It doesn’t matter where you put it. Gopher finds it for you. Gopher...

**Insight Devel.**

Break down the barriers between your Mac and your Hewlett-Packard printer. Supports HP LaserJet II and IID. MacPrint...

**Dagstar Digital**

Full speed ahead, fire up your SE armed with 68Gbps power of speeds of 16, 25, and 33M bytes speeds you need to dream about. G30 SE Accelerator. CALL...

**Affinity**

Customize your Mac! Automate keyboards & mouse movements. Tempo II makes creating macros a breeze. Tempo II...

**Best Data**

Everything you need for telecommunication in one affordable package: 2400 baud modem, cable and communication software. Smart One 2400... 165

---

**Smothers Banes**

Professional programmer for anyone involved in software development. An invaluable tool for programmers. Prototype. 145

---

**Nuvolech**

Turbo Bridge 345.

Turbo Net: DB-9 or DIN-8 29.

Turbo Net: DB-9 or DIN-8 22.

---

**Ars Nova**

**Mac Packs**

**OScom Technologies**

**MacBest 20EXT** 485.

**MacBest 30EXT** 575.

**MacBest 45EXT** 635.

**MacBest 60EXT** 745.

**MacBest 80EXT** 885.

**MacBest 90EXT** 990.

**MacBest 90 Internal Mac II** 595.

**MacBest 90 Internal Mac II** 750.

**MacBest 90 Internal SE 1** 695.

**MacBest 150 Internal Mac II** 1388.

**MacBest 300 Internal Mac** 1970.

**MacBest 30ISE** 425.

**MacBest 45ISE** 495.

---

**Future**

MacTrack 92.

---

**Emagic**

Excel In Business 20.

---

**Suitcase 2.0** 69.

---

**Datacopy 730GFS (Grayscale Scanner)** 1595.

---

**Impulse**

**DataDesk**

**OPTIMA card**

---

**Bogas Productions**

**The Melon** 1

---

**Music**

**Arts Nova**

**Practica Musica 2.07** 74.

---

**Bogas Productions**

**Studio Session** 48.

---

**Broderbund**

**Jam Session** 28.

---

**Coda**

Finale 950.

---

**Mac Zone**

Working With Word 19.

**MSC Technologies**

**A + Mouse (522 + Plus)** 64.

**A + Mouse ADB** 84.

---

**Orange Micro**

**Grapple 1/4" Mac/5G** 78.

**Grapple Mac LO** 102.

**Grapple Mac LS** 91.

**Grapple Spooler** 39.

---

**Impulse**

Audio Digitizer 140.

---

**Kraft**

Quickstick (JoyStick for any Mac) 49.

---

**Mac Zone**

**7 Outlet Noise & Surge Protector** 24.

**8000 Disk Drive (Platinum)** 175.

**Mouse Pad** 9.

**Mouse Tool Kit w/ Grounding Strap** 15.

---

**Microsoft Excel**

Business 20.

---

**Nanotech**

**Zepto** 345.

---

**Oki**

**MicroZone**

**The Molecule** 41.

---

**PLI (Peripheral Land, Inc.)**

**Infinty 40 Turbo Removable** 1285.

**Infinty 40/40 Turbo Removable** 2155.

**PLI 30 Turbo (Ext.)** 655.

**PLI 50 Turbo (Ext.)** 850.

---

**Panasonic**

**Optical Worm Drive** 169.

---

**Panasonic**

**Q'tls** 45.

---

**Kraak**

**Music**

---

**MacBest 60** 1595.

---

**Mac Best 90 Internal Mac II** 895.

---

**MacBest 30EXT** 575.

---

**MacBest 300 Internal Mac II** 235.

---

**MacBest 60EXT** 2399.

---

**Panasonic**

**Panasonic** 6825 17th Ave. NE, Suite 100, Redmond, WA 98052
No question too dumb.

Mac users are great machines. But they can be a little confusing when you’re first starting out. We understand. That’s why we’ll try our best to answer any question you have before you order. Just call us at (800) 248-0800.

The Mac Zone
Our service is huge. Our advice is free.
It doesn’t take a computer to figure out the difference.

The difference between the GEnie™ service and CompuServe® could make a big difference to you. Here’s why: GEnie’s rate for 1200 baud access is just $6 per non-prime hour. That’s more than twice as much. Which means that with GEnie you can stay online longer for a whole lot less.

And that means more time to enjoy more of GEnie’s services. Like valuable computer Roundtables.

Exciting multi-player games. Useful financial information and much more. All at hourly rates designed to allow you to spend more time online. Not more money.

And with GEnie signing up is as easy as one, two, three:
(1) Set your modem for local echo (half duplex), 300 or 1200 baud.
(2) Dial 1-800-638-9636. When connected, you just enter HHH.
(3) At the U# = prompt simply enter XTX99687. GEnie then RETURN.

And have a major credit card or your checking account number ready. For information in the U.S. or Canada, call 1-800-638-9636. Or write GE Information Services, 401 North Washington, Rockville, MD 20850.

We bring good things to life.

*Applies only in U.S. Mon. Fri. 6PM-8AM local time and all day Sat, Sun, and national holidays. Subject to service availability. Some services may be subject to a surcharge. Prices effective May 1, 1989.
**NEW PRODUCTS**

**HARDWARE**

**AutoPrint Switch**  

**ColorBoard 108 Plus**  
VLSI surface-mount 8-bit board that allows the user to upgrade with software for specific functions, such as pan, zoom, and virtual desktop. Complete system upgrade includes Aldus Persuasion. $1595. Pan and zoom $100; virtual desktop $200; pan and zoom, virtual desktop, and Aldus Persuasion $600. RasterOps, 408/446-4090.

**Color Space FX**  
Video board with flicker-free video and image-manipulation capabilities for the Mac II. Automatically converts standard NTSC, PAL, or SECAM composite video signals to standard frame rate or high frame rate RGB video signals. Decodes RGB signals and converts them to NTSC signals. $2995. Mass Microsystems, 408/522-1200.

**Emac-150ID**  
A 5½-inch internal hard disk for the Mac II. Provides 150MB of hard disk storage capacity without internal modifications to the computer. $2395. Emac, 415/683-2222.

**Mac FileSafe 150**  
Streaming-tape backup system that stores 150MB of formatted data and incorporates a half-height, 5¼-inch form factor. Has image backup speed of 6MB per minute on the Mac II. Uses DC600XTD 1/4-inch cartridge. $2195. Mountain Computer, 408/379-4300.

**MacMainFrame SE/30**  
Internal board bundled with communications software for connecting a Mac SE/30 to an IBM 3270 network. Enables IBM 3278/79 terminal emulation and file transfer under IBM's CICS, TSO, and CMS operating environments. $995. Avatar, 508/435-3000.

**MaraTbox 120/96 Bus Adapter**  
Adapter board that enables expansion boards designed for the original Mac SE to operate in the Mac SE/30. Plugs into the 120-pin, vertical expansion-slot in the SE/30 without physical modifications to board or computer. $199. Dove Computer, 919/763-7918 or 800/622-7627.

**The Mousestick**  
Universal input device consisting of an optomechanical digital joystick, a Gravis Micro Processing Unit designed with 16K of ROM, and an LCD status indicator. Emulates keyboard commands. $169.5. Advanced Gravis Computer Technology, 604/434-7274.

**PC Laser 6000/PS**  
PostScript laser printer that is both Macintosh and PC/AT/XT compatible. $4495. Ricoh, 408/432-8800.

**Radius DirectColor Series**  
16- and 24-bit single-slot video interface boards designed to work with the Radius Color Display monitor. DirectColor/16 $4000; DirectColor/24 $5000. Radius, 408/434-1010.

**SinglePage XL Display System**  

---

(continues)
**NEW PRODUCTS**

**SOFTWARE**

**Ultra Vision 1000 and Gray Vision Display System**

Ultra Vision 1000, a 20-inch color multiformat monitor for the Mac II, works with boards that run at 30kHz to 78kHz and 50Hz to 80Hz. Gray Vision Display System is a 19-inch gray-scale monitor-board for the Mac II, with 74Hz vertical scan rate. Ultra Vision 1000 $3695; Gray Vision Display System $3190. Color board sold separately. Taxan, 408/946-3400.

**Accu-Weather Forecaster**

Uses telecommunications to access current weather information from Accu-Weather's private weather service. Covers 1000 locations in the United States and displays information in map, graph, and chart formats. 1MB min. memory. $89.95. Metacomet Software, 203/523-5661.

**AutoRead**

OCR software that reads all languages and all typewritten fonts from 5 to 20 points in size. Recognizes different fonts on the same page and unlimited types of characters; reads more than 100 characters per second. Has text editor and zoom. 2MB min. memory. $795. Tutorland and Informatique Systemes TeleCom, 408/973-0472.

**Bullet Proof**

Hard disk and floppy disk file-protection utility. Can be used like Font/DA Mover. 128K min. memory. $99.95. Spectra, 602/884-7402.

**Calendar Creator**

Software for creating individual and group calendars. Can be used to create individual event lists and merge them into comprehensive master schedules. Lets you add unlimited number of events. Compatible with ImageWriter and LaserWriter. 1MB min. memory. $59.95. Power Up, 415/345-5900.

**cc:Mail for Macintosh**

Macintosh extension for cc:Mail application for MS-DOS PCs. Enables you to send any file, graphic, or scanned image produced on the Mac to another Mac, or to an MS-DOS–or OS/2-based personal computer. Requires system 6.0 or later. 1MB min. memory. $69.95 per work-station, plus $695 for basic LAN package with 25 mailboxes. cc:Mail, 415/321-0430.

---

With the new PaintJet color printer from Hewlett-Packard.

Look at the possibilities. Instead of basic black and a few dull shades of gray, look at the zip that color adds to your graphs and charts.

Overheads will command attention.

And reports will have sparkling visual surprises tucked inside.

The PaintJet printer brings so much
CompileIt

Datacopy AccuText
Artificial intelligence-based text- and character-recognition software. Captures all typefaces. Program automatically interprets text and formats; examines characters in context, and compensates for real-world conditions, such as dust or photocopy distortion. 4MB min. memory. $995. Xerox Imaging Systems, 415/965-7900.

DocuComp
Document-comparison program that gives two-paned comparison window with split-screen displays of old and new file; prints composite document identifying changes in text; saves composite document with changes highlighted; and lists summary information about compared files. 512K min. memory. $159.95. Advanced Software, 408/733-0745.

Faststat

Gantt Maker
Produces Gantt charts with up to 256 tasks defined per project. Project duration can be set for days, weeks, months, or years. Charts are 1 to 255 cells long (each cell representing a unit of time) and can be up to 36 pages tiled. 512K min. memory. $95. Magic Software, 800/342-6243.

Global Data Manager
Research and educational software for analysis of world statistics on variables such as economics, food, energy, health, and education. (continues)
If you don’t see exactly what you’re looking for, just ask.

System Saver® Mac, $99.95

Macintosh II Stand and Extension Cables, Complete Kit $99.95, Separately $29.95 to $39.95

Master Piece® Mac II, $159.95

Power Backer® UPS’s, $399 to $1,399, Network Interface, $99.95

Maccessories® SuperBase, $49.95

Maccessories Tilt/Swivel, $29.95

Turbo Mouse® ADB, Turbo Mouse Plus, $169.95 each
Chances are, we'll have it. Because, at Kensington, we're always finding ways to make your Macintosh® quicker and more convenient.

Our award-winning Turbo Mouse trackballs will make your Mac quicker with their automatic acceleration and advanced button features.

Our best-selling System Saver Mac will keep your Mac Plus cool, calm and collected with its quiet cooling fan, surge protection, and extra outlets.

And everything you see here will make your Mac more comfortable. Our Mac II Stand and Cables will get your Mac II off your desk and out of your way. And our Anti-Glare Filters are a sight for sore eyes—in every shape and size.

In fact, we've got so many good ideas, we couldn't fit them all in one ad. But we did manage to fit them in a free 20-page brochure, so call for yours today. Or ask about a dealer near you. 800-535-4242 or 212-475-5200. Or write to Kensington, 251 Park Ave. South, New York, NY 10010.
Prevent Macintosh Theft!

MacKablit System

Heavy duty 10' steel cable (7 x 19) secures and locks computer, printer, other equipment. The unique MacKablit system includes 2 brackets that snap into existing slots on the Macintosh keyboard and computer. Additional hardware included for other Mac peripherals (disk drive, printers). The unique MacKablit system utilizes existing security slots on the keyboard and computer and existing screws in other peripheral equipment. The system includes 2 brackets for the security slots plus unique Kabbit fasteners for peripherals. Cable passes through Kabbit fasteners, preventing removal of screws.

EXCLUSIVE!
Proprietary components (Pat. Pend.) permit only your key to release MacKablit. When ordering multiple units, specify locks to be keyed differently or alike. Specify Mac, Mac Plus SE, or Mac II.

Other Kabbit systems for IBM, Apple, others.

Money back if returned in 30 days. Phone or send check.

Secure-It, Inc.
18 Maple Court
East Longmeadow, MA 01028
800-451-7592 413-629-7093

Circle 239 on reader service card

FlashTalk Compatible!!

CompuNet has PhoneNet Plus beat.

Two to one

At half the price of PhoneNet Plus, The CompuNet System is unbeatable! CompuNet is a local area network (LAN) system that conforms to AppleTalk LAN standards. It has the convenience of using ordinary telephone wire and RJ 11 modular phone connectors. All of CompuNet's connections are positive locking and make it easy to create custom length cables by using simple materials and crimping tools found at most hardware and telephone accessory stores.

With an unimpaired limit of 3000 feet and a signaling speed of 1 megabit per second, the CompuNet System is able to function at three times the rated distance and speed of a comparable AppleTalk Network.

Suggested retail price: $29.95

CompuNet Dealer inquiries invited:

Trinmar USA, Inc. 256 W. 15th Street New York, NY 10011 212-645-7008 800-872-4454
FAX 212-645-4766
In Canada call DataSpace Corp.: 616-474-5800-378-0492

MACWORLD • JUNE 1989 198

Global Data Manager

Provides statistics for countries, groups of countries, or continents in spreadsheet format using up to 200 variables. 512K min. memory. $95. World Game Institute, 215/387-0220.

HyperExternals I and II

External commands for HyperCard. Routines are written in MPW C and come in a stack with documentation. Increase functionality and speed of standard HyperCard scripts. 1MB min. memory. $25 each. Boojum Computer Systems, 15004 Donna Dr., Silver Spring, MD, 20904.

Japanese Language Instruction

HyperCard application that assists in reading, writing, and comprehension of Japanese language. Uses character generation and phonetic pronunciation; provides reading and writing exercises. 1MB min. memory. $45. Anonae Software, 415/845-8292.

JetLink Express

Printer driver for HP-compatible laser printers. Uses outline-print technology at up to 300 dots per inch. Comes with cable and 13 outline fonts. Optional Expressive Fonts package increases font compatibility to 35 fonts and is standard with LaserWriter Plus and INI T. 1MB min. memory. $149; with Expressive Font package $195. GDT Softworks, 604/291-9121.

Landware Designer

Landscape-design program for use with Pegasys CADD and HyperCard. Includes symbols that have been assigned attributes, macros that run under the Pegasys macro command language, and stackware that includes plant and landscape-product databases and a macro interface. 1MB min. memory. $495. Landware, 714/832-8046.

Lauman

An old west adventure game with three levels of play. 512K min. memory. $49.95. Recreations Software, 317/823-1164.

Leprechaun

Strategy game that uses various levels of play involving mazes. Main character is a leprechaun whose objective is to push a pot of gold onto a rainbow. Full-color graphics and sound. 1MB min. memory. $59. Shodan, 415/849-9475.

Leprechaun

Japanese Language Instruction

JetLink Express

Leprechaun

JetLink Express

Leprechaun

(continues)

Circle 26 on reader service card

Circle 239 on reader service card

NEW PRODUCTS
Mac On-Call
Program generator for diagnostics, with an attached database for medical general practitioners. Database can be customized for various professional interests and can be used as a reference, teaching, or review tool. Does problem analysis, diagnostics, and therapeutics. Sets up studies and builds reports. 1MB min. memory. $595. latrocom, 619/698-6927.

Manage That
Multituser project-management software produces work-breakdown structure, Gantt, PERT, and Resource charts. Lets you define print configurations, calendars, and all aspects of scheduling. Automatically regenerates charts when changes are made. 1MB min. memory. $495; source code available for additional $495. Varcon Systems, 619/563-6700.

Nisus
Word processor that includes catalog facility, thesaurus, glossary for storing both text and graphics, and ten editable clipboards. Spelling checker runs without interrupting editing. 1MB min. memory. $395. Paragon Concepts, 619/481-1477.

Nisus

Quarterstaff: The Tomb of Setmoth
Fantasy game with monsters, demons, magic, and a variety of solutions and sound effects—slamming doors, rattling chains, and human screams intermixed with sounds of sleeping, eating, and walking. Available to (continues)

AFFORDABLE
Large Format Plotting
from $1695

A-E
$2695
(Sugg. ret. $2995)

C-D
$1695
(Sugg. ret. $1795)

Made In USA

ECONOMICAL: $1000 less than other large format plotters without sacrificing quality.

MULTIPLE MEDIASIZES: As small as 8½" x 11" or as large as 36" x 48". Eliminates the need for a second plotter.

REPEATABILITY AND RESOLUTION: .002 assures quality suitable for the most demanding applications including PCB artwork.

SPEED: 8" per second assures excellent drawing throughput.

Call for free sample plot

DMJPL is a registered trademark of Houston Instrument

Circle 267 on reader service card

THE DESK ACCESSORY
THAT...um...

[Insert clipTEXT™ Here]

OVER 1000 PHRASES!
clipTEXT™ provides a full spectrum of phrases for government, university, business and personal use. Insert the actual phrases or use them as a springboard for your own creativity.

FULLY USER-MODIFIABLE!
Add phrases of your own—delete those you'll never use.

FULLY COMPATIBLE!
With all major word processing and page layout applications.

Introductory Price $59.95

SKYLAR TECHNOLOGY, INC.
7400 Richie Hwy; Glen Burnie, MD 21061-3115
(301) 766-0510 voice
(301) 766-0664 FAX
MC/VISA

Circle 64 on reader service card

Quarterstaff: The Tomb of Setmoth

MACWORLD • JUNE 1989

199
Put the revolutionary BackPac on your Mac Plus or SE, and gain extra power and storage without losing portability. 20MB: $649. 40MB: $799. 80MB: $1099. 100MB: $1299.

- The TalkBac 2400 Baud internal modem is Hayes AT-compatible, fits right into the back of the BackPac. $199.
- For reliable mass storage, the DirectOptical Drive features a removable, erasable cartridge with 300MB of storage on each side. $499.5.
- Only 12 ounces and about the size of a mouse, the stand-alone TalkBac 2400 Baud modem gives you greater performance per pound. $269.
- For the capacity of a hard drive plus the convenience of a floppy drive, the MegaDrive removable media system lets you store 10 or 20MB of data on a single, removable MegaFloppy disk. Awarded the 1988 World Class Award by Macworld. (20MB model shown at right.) 10MB: $699. 20MB: $999.

- We can't show you the InnerDrive, since it's already installed inside this Mac II. And since it's incredibly quiet and 33% cooler than most other drives, chances are you won't notice it even when it's running. (Also available for the SE.) 40/SE: $649. 40/II: $649. 80/SE: $949. 80/II: $949. 100/SE: $1099. 100/II: $1099. 140/II: $1499. (Mac II only.)
- The DirectDrive XL free standing mass storage sub-system offers 1.4 gigabyte capacity and optional tape backup. Custom configurable and powerful enough for dozens of applications from CAD to LAN to desktop.
art is always a state of mind.

publishing. (Call for pricing)
- With the DirectServe dedicated file server running your network, you'll be able to share peripherals and send and receive files more economically than ever before. (Call for pricing.)
- The DirectDrive Series gives you more than more megabytes for your money. They're thoroughly tested, incredibly fast, and come with 10MB of disk utilities and shareware. 20MB: $549. 40MB: $699. 80MB: $999. 100MB: $1199. 140MB: $1499. 300MB: $2795.
- With the amazing DirectTape backup system, backing up data is as easy as it is fast. Provides 40MB of storage for a single user, or an entire network. $899.

The DirectPrint 300-dpi printer is PostScript page description language-compatible and uses liquid crystal shutter technology for a superior printed image. 1989 Eddy Award winner. $3495.

Jasmine
1-800-347-3228
Circle 102 on reader service card
owners of the original Quarterstaff for $20. 1MB min. memory. $49.95. Infocom, 617/492-6000.

**Relay Baton**
File-transfer software for transmitting data between Macintosh and IBM main-frame computers. Works asynchronously over normal phone lines; no boards or cables needed. 1MB min. memory. $150 per unit; volume purchase agreements available. Relay Communications, 203/798-3800 or 800/847-3529.

**Service Industry Accounting**
Single-user business accounting software with modules for sales, purchase, inventory, ledger, bidding, quoting, and job costing. Has two user-defined levels of costing, two levels of password protection, and three levels of pricing. Exports data to spreadsheets and outputs to printers, disks, or screen display. 1MB min. memory. $395. Brown Wagh, 408/395-3838.

**Smart Art**
Graphics desk accessory consisting of a library of customizable text effects, graphics, and borders. Lets you access artwork from within an application. Files compatible with any application using encapsulated PostScript. 1MB min. memory. $149.95. Emerald City Software, 415/324-8080.

**Strategic Craps**

**TableTools**
Financial- and scientific-table editor for desktop publishing. Cell sizes are adjustable and may have multiple border styles and fill patterns. Lets you place and edit graphic, paint, and chart objects in table cells. Uses Microsoft Excel for numerical computation. 1MB min. memory. $395. Mansfield Systems, 800/872-3332; 800/367-3332 in California.

**TimeMinder**
Time-management desk accessory. Includes job costing and automatic tracking of daily, weekly, and hourly costs, billing and cost rates, and custom invoice printing. Multiple users may combine files for reporting or invoicing. 1MB min. memory. $299. Atrix Software, 800/426-0854.

**Toccata**
Object-oriented, graphically based page-layout program for creating any type of musical score. Produces (continues)

---

**Never buy another ribbon!!!**

Each MacInker shipped complete with free ink bottle, reservoir cover and ink dispenser. MacInker™, the original, automatic ribbon re-inker. MacInker mod 2341M re-inks ImageWriter II black & single color cartridges. The Universal MacInker re-inks hundreds of cartridge types (including the ImageWriter LQ, one color and multicolor) with suitable adapters. Proprietary, extra dark, dot matrix, lubricant ink yields better than new print quality and extends printhead life. New feltless reservoir for precise ink metering. Average number of re-inkings/cartridge is 60-100. With the optional Multicolor Adapter (mod M422, $40.00) your MacInker re-inks 4-color ImageWriter II cartridges. Full range of accessories available, inks & cartridges: indelible ink, heat transfer etc. Colors: red, green, blue, yellow, purple, brown, orange, silver, gold. Free catalog.

MacInker™

$42.00

Immediate shipment - 30 days money back guarantee - Major credit cards

Order Toll Free 800-547-3303
in Oregon (503)626-2291 - fax(503)643-5379

Special Offer. Order for >$50.00 and say "I saw it in MacWorld" and get a free mousepad or free photo-art disk. Order for >$100.00 and get free key-beeper with flashlight combined (a $15 value), or get a guaranteed, accurate LCD electronic pedometer, jogging & step meter + calculator for only $15.00 (a $40 value).

Computer Friends, Inc. 14250 NW Science Park Dr. Portland OR 97229

---

**LightFax 9624 FaxModem**

$749.00

6900 baud fax and 2400 fully Hayes compatible modem in one. Front panel control lights. Software features Background operation, NameCard data management, Scheduled Sending, Broadcasting, full input/output Journal and much more. Optional 200 dpi scanner for direct input into fax window or favorite paint program. Ask for bulletin "Facts on faxes".

<table>
<thead>
<tr>
<th>Feature</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>LightFax 9624</td>
<td>$749.00</td>
</tr>
<tr>
<td>LightScan 200 dpi</td>
<td>$199.00</td>
</tr>
<tr>
<td>2400 b modem only</td>
<td>$239.00</td>
</tr>
<tr>
<td>4 port 8 pin switch</td>
<td>$99.00</td>
</tr>
<tr>
<td>1200 baud modem only</td>
<td>$50.00</td>
</tr>
</tbody>
</table>

One year warranty

Shipping $4.50
After centuries of practice, mankind perfects engineering calculations: MathCAD.

Announcing MathCAD: A Calculating Renaissance For Your Mac.

What the historians will call it, only time will tell.
Perhaps the Century of Speed, or the Era of Ease. But whatever the name, this is the age of MathCAD, the only math package that looks and works the way you think.

MathCAD is the best selling math software in the world because it lets you perform engineering and scientific calculations in a way that’s faster, more natural and less error-prone than the way you’re doing them now—whether you’re using a scratchpad, calculator, spreadsheet, or program that you wrote yourself. It gives you more control and more flexibility than ever before.

MathCAD’s live document interface lets you enter equations anywhere on the screen, add text, and graph the results. Then print your analysis as a presentation quality document.
And it has over 120 commonly used functions built right in, for handling all kinds of equations and formulas, as well as exponentials, differentials, cubic splines, FFTs and matrices.

No matter what kind of work you do, MathCAD has a solution for you. In fact, it’s used by over 50,000 engineers and scientists, including electrical, industrial, and mechanical engineers, physicists, biologists, and economists.

But don’t take our word for it. Just recently MathCAD was reviewed as being “everything you have ever dreamed about in a mathematical toolbox.” And when it was compared to the competition, it was “MathCAD by a mile.”

And if you work with an IBM® PC or compatible, there’s a MathCAD version designed exclusively for you. Or if you use both Macs and PCs, don’t worry: MathCAD files are completely compatible between the two.

Look for MathCAD at your local software dealer. Or call MathSoft at 1-800-MATHCAD (in MA, 617-577-1017) for more information or for a free demo disk.

MathCAD®
MathSoft, Inc. One Kendall Square, Cambridge, MA 02139

Available for Macintosh and IBM compatibles. TM and © signify manufacturer’s trademark or manufacturer’s registered trademark respectively.
TopDown
Hierarchical flow-charting tool used for business and systems design. Lets you explode a project or business plan into discrete elements. Note-card feature containing up to 32,000 text characters is used to further describe components and may be exported into text files. 1MB min. memory. $295. Kaetron Software, 713/320-0278.

TurboBridge
AppleTalk bridge works with Nuvotech's line of TurboNet connectors and with Apple's LocalTalk connectors. Allows multiple AppleTalk LANs to be connected into one network. Can be configured for transparency to users. 512K min. memory. $499. Nuvotech, 415/331-7815.

TypeStyler
Program for creating special effects with display type. Includes ten AGFA Compugraphic fonts. 512K min. memory. $199.95. Broderbund Software, 415/492-3200.

Zork Zero
Latest offering in the Zork Trilogy series, which explores the collapse of the Great Underground Empire. Has more than 200 locations and includes graphical puzzles. 512K min. memory. $59.95. Infocom, 617/492-6000.

HardTop

Large Screen Anti-Glare Filters

NuPaint casts a TALL SHADOW!
No other monochrome painting program for the Macintosh offers realistic Shadowing. NuPaint gives you features like Masking Tape, formerly found only in high-end CAD packages, and much more. All at an unbelievably low price.

Macintosh graphics will never be the same. NuPaint is the "nu" standard!
Beginning paint users love NuPaint because it’s quick to learn and easy to use. Power users love it because it has more power and depth than any other painting program.

NuPaint pushes bitmapped graphics to new limits, and does things that object-oriented programs can’t — like Mixing, Fading and Smoothing to add special effects to an object.

Order NuPaint now, and save $25 off the regular retail price of $139.95. Call 1-800-423-6837 to order by credit card OR use the coupon below. Dealer and distributor inquiries welcome.

NuPaint, Inc., 1701 N. Greenville Ave., Ste. 705, Richardson, TX 75081
I can’t wait! RUSH me my copy of NuPaint NOW. Enclosed is full payment of $114.95. I want to save $25 off the suggested retail price of $139.95 during this special offer for the new standard in monochrome painting programs.

Name _________________________ Title _________________________
Company _________________________ Phone _________________________
Address _________________________ Zip _________________________
City _________________________ State _________________________
□ VISA □ MasterCard □ Check or Money Order _________________________
Card No. _________________________ Expiration Date _________________________
Signature _________________________
The BigBin 1000. Because 200 sheets is not enough.

The BigBin is a motorized paper tray that replaces your LaserWriter II's old 200-sheet paper tray to give you 1,000 sheets of paper. That means you can print bigger jobs unattended. Satisfy the paper-hungry needs of a Macintosh" network. And spend less time refilling paper.

**Sizable advantages** BigBin lets you load 1,000 sheets of letter-size paper. All at once. You can even add a kit that handles legal-size.

**Simple addition** BigBin is a simple addition to your computer system. Just replace your printer's paper tray with BigBin and plug it into the wall. It's fully approved by Apple Computer for use with Apple LaserWriter IISC, LaserWriter IINT, and LaserWriter IINTX. And BigBin is covered by a limited 90-day warranty.

Despite the big name, BigBin needs only about a foot of space in front of your printer, and it weighs in at only 14 pounds.

**To make the connection** BigBin is available exclusively through authorized Laser Connection™ dealers. For more information on how BigBin can maximize your paper handling, call Laser Connection at 1-800-523-2696 for the dealer nearest you.

And be sure to ask for a free copy of *The Sourcebook™*—our exclusive catalog filled with the latest laser printer products and enhancements.

Circle 104 on reader service card
SuperMac has been making Macintosh classics since 1985. Like DataFrame, the first SCSI drive. Spectrum, the first color video card. The first large-screen displays for the Macintosh II. And PixelPaint, the first color paint program for the Mac II.


Add SuperMac to your repertoire. And create some classics of your own.

Available now at authorized SuperMac dealers nationwide.
January 1986. Macintosh® Plus takes the stage. But SuperMac™ steals the show. With DataFrame™, The first SCSI hard drive for the Mac®. And we're still the superstar in Macintosh mass storage.

Our new DataFrame drives provide full SCSI partitioning support. Fast seek. Fast access. From 30MB to 100MB internal for the Mac SE. 100MB to 330MB internal for the Mac II. 20MB to 330MB external for any Macintosh. And a brand name that stands for rock-hard reliability. In desktop publishing. In color graphics. In whatever you do.

And they include a new manager. Which adds flexible partitioning, greater security and virus control. Plus DiskFit™ backup and restore software, and SuperSpool™ and SuperLaserSpool™ print spoolers.

See them today. At your authorized SuperMac dealer.
**QuickCard**

**SX Envelope Cassette Tray**
Automatic feeding tray holds up to 15 envelopes. Fits into the paper cassette slot of any Canon SX-based laser printer including the Apple LaserWriter II. $85. Laser Connection, 205/633-7223.

**TransMac**

**The Treatment**
Spray that reduces the reflective glare on television screens and computer monitors. Package includes cleaner/polisher and antiglare spray. $10 plus $1 s/h. Everglades Products, 817/566-2036.

**WristMac**
Seiko digital watch that downloads up to 80 screen pages from a Mac. Imports data from a variety of sources including HyperCard stacks, text files, and databases. Produces free-form text displays, alarms, and phone numbers. Executive model is water resistant. Requires HyperCard version 1.2 or higher. WristMac $225; Executive WristMac $295; Bidirectional adapter $45. Ex Machina, 800/227-6900.

**BOOKS & VIDEOS**

**The Best Mac Deal, Edition II**
Guide to shareware and public domain software for the Mac. Details more than 5000 applications in 15 categories such as desktop publishing, games, and personal productivity. $9.95 plus $2 s/h. The Public Domain Exchange, 408/496-0624, 800/331-8125.

**The Macintosh Font Book**

**Working with MacWrite II**
Book-and-disk package designed to acquaint users with MacWrite II's new features, and provide instructions on using these applications in particular word processing situations. Provides ready-to-use templates on disk. Bantam Books, 212/765-6500.

---

*To have your product considered for inclusion in New Products, send an announcement with product name, description, minimum memory, peripherals required, pricing, company name, and phone number to New Products Editor, Macworld, 501 Second St., San Francisco, CA, 94107. We reserve the right to edit submissions.*
Be a Mac master.

☐ YES! Send me 12 issues of MACWORLD for $24. Save me almost 50% off the annual cover price of $47.40

☐ YES! YES! Send me 24 months of MACWORLD for $37.90

Name ____________________________________________________________

Company ________________________________________________________

Address _________________________________________________________

City State Zip ___________________________________________________

☐ Payment enclosed. ☐ Bill me later.

Basic subscription rate for Macworld is $30 for 12 issues. The annual cover price is $47.40 (12 issues). This rate limited to U.S.A. and its possessions. Please allow 6-8 weeks for delivery of your first issue.
Smart investors always buy utilities.

You've invested in a Macintosh® to bring out the best in what you do. Now enhance that investment with SuperMac's family of easy-to-use utilities. Programs that protect your work. And help you do more in less time.

Don't let your printer regulate your business.

Why stop working just because you're printing? Let SuperLaserSpool and SuperSpool take control. So you can use your computer again seconds after you select "Print." Even if your documents are long and complex.

See if documents have printed, preview them, or zoom in to see part of a page up close. Or send several documents to the spooler and change the printing order later. Both products work faster under MultiFinder® than any other spoolers.

SuperSpool works with any ImageWriter.* Or SuperLaserSpool is the only spooler that works with all Apple® printers. Plus, it's the only one compatible with PageMaker® 3.0.

MacWeek said, "The speed at which SuperLaserSpool returns control of the Mac to the user is impressive, in some cases even astonishing."

Keep insider information where it belongs.

Lock up your confidential information with Sentinel, a program that lets you convert any document on your disk into a secure code. No one can open it without the password you define. Or a Cray* and about 50 years.

Documents and folders can be grouped together in convenient sets. Then choose one of three advanced encoding techniques, including DES, the U.S. government's official data encryption standard. Sentinel encrypts, locks and unlocks faster than any other program.

The critics at MacWorld said, "...Sentinel provides a simple, effective security tool that does exactly what it claims to do and does it well."

Add SuperMac's utilities to your Macintosh portfolio.

Put SuperMac's utilities on your buy list. To protect the investment you've made in your Macintosh system, and to do more work in less time.

You'll find our family of utility programs at authorized SuperMac dealers and leading software specialty stores.

485 Potrero Avenue
Sunnyvale, CA 94086

Circle 190 on reader service card
MiniCad+™
Computer-Aided Design and Analysis comes of Age

MiniCad+ rises on the foundations of a groundbreaking Macintosh CAD program, MiniCad 2D/3D. Universal in aim, MiniCad Plus is a total design and analysis solution, the answer to time-consuming transfers between applications. This professional CAD system offers the following easy-to-use components:

- High precision 2D drafting environment which includes complex duplication with arrays, hierarchical symbol editing with both external and internal libraries, fillets, bezier & cubic splines, auto-join, auto-dimensioning, continuously variable zoom up to 1000x, double line tools with auto-clean up, 256 user-definable attributes, 8 line types, unlimited layers, full use of Mac II, and more...
- Active spreadsheet inside drafting area which can be hot linked with objects to perform area calculations, parts schedules, cost estimation and more. As easy-to-use as the spreadsheet you’re using now.
- All new integrated 3D that is so powerful and user-friendly we may change your mind about micro 3D.
- MiniPascal, a programmable macro language, will allow advanced users and 3rd party vendors to create reports, macros, and powerful extensions to MiniCad Plus’s capabilities.

Graphsoft • 8370 Court Ave, Suite 101 • Ellicott City, MD • 21043
MiniCad+ $695 • Demo Available for only $19.00
MiniCad Plotter Drivers: Prof. $300 Stand. $150
U.S.: 1 (800) 461-9488 • Canada: 1 (604) 384-2131 • Australia: 61-7-369-1204
Visa & MasterCard Welcome

Circle 77 on reader service card
QUICK TIPS
HOW TO

When trying to move a very small graphic object, you may inadvertently resize it by dragging one of its handles. A tip in last December’s issue suggested you work around this difficulty by selecting a large object along with the small one, and then dragging the pair. Tony Armentazar of Gilroy, California, and others wrote to recommend a simpler method. Make sure the object you want to move is not selected. To deselect it, click in an empty area of the document. Then select the object and drag it all in one motion, without releasing the mouse button.

CENTERING MACPAINT

Q When I used MacPaint 1.5, I was able to center a drawing on a printed page. With MacPaint 2.0, I seem to have lost that capability. Is it me, or is it the update?

Maxwell J. Richards
Palm Bay, Florida

A I presume you centered by eye using MacPaint 1.5’s Show Page command. MacPaint 2.0 has no Show Page command, although it does have a Zoom Out command that can show your document reduced by 50 percent. At that reduction, you can see an entire page on a Mac II or another Mac with a large screen, and you can edit the whole drawing without scrolling. To center the drawing, first select all of it—excluding extra white space around the edges—by tearing off the Tool menu and pressing §-Shift while double-clicking the Selection Rectangle tool. Then drag the drawing until it looks centered on the page.

Centering a drawing on the standard 9-inch screen of a Mac Plus or an SE is not so easy, however. On a small screen you can see the whole width of the page but not the whole height. In that case you can center the drawing horizontally by eye and vertically by using the mouse position window. First select the whole drawing as described in the previous paragraph. Drag left or right until it looks centered horizontally. Then press the Shift key, constraining movement to one direction, and drag the drawing to the top of the page. Next choose Show Mouse Position from the Goodies menu to display the mouse position window. Measure the distance from the bottom of the drawing to the bottom of the page by watching the middle of the mouse position window while dragging a selection rectangle between those two locations. Select the whole drawing again, press the Shift key, and drag the drawing down the page half the distance you just measured.

CANCEL TEST PAGE

Q I am about to tear out what strands of hair I have left on my head, thanks to the LaserWriter INT. It seems intent on spitting out a test page every single time I turn it on. I would be ever so grateful if you could show me how to tell my LaserWriter where it can put those test pages.

Alex Rodriguez
Hialeah, Florida

A You can disable the test page by pulling the paper tray partially out before switching on the LaserWriter. The application Widgets has menu commands for disabling and enabling the test page on any LaserWriter that uses PostScript. Widgets is included with DiskTop or MockPackage from CE Software (515/224-1995).

POKY LABELS

Q Microsoft Works takes at least six hours to print 5000 four-line mailing labels on an ImageWriter II. The labels are printed once a month on plain paper (not adhesive labels) for an automatic labeling machine at a commercial mailing house. The list needs constant updating, and Works is very convenient for this. Should I copy the records needed for labels to some other software for faster printing?

Don Herrmann
Clayton, Missouri

A You are waiting for the ImageWriter II, not for Microsoft Works. Works printed 100 labels for me as fast or faster (continues)
QUICK TIPS
HOW TO

ImageWriter II
Time Trials
This chart compares the time Works kept the Mac busy printing 100 four-line labels two-up using Best, Faster, three variations of Draft qualities, and a print spooler (which frees up the Mac the most quickly).

![ImageWriter II Time Trials Chart]

Who's Got Memory?
Choosing About the Finder from the Apple menu shows that if you're using MultiFinder on a 1MB Mac, you probably won't have enough memory to have two medium-size applications open simultaneously or one large one by itself.

MULTIFINDER WITH ONE MEGABYTE

Q Can I expect to use MultiFinder or Switcher with the one megabyte of RAM in my SE? When I try to use any combination of Word, MacWrite, SuperPaint, or StatView 512+ with MultiFinder, a message tells me there isn't enough space. With Switcher, I get a system error. Am I doing something wrong?

Robert A. Levine
Philadelphia, Pennsylvania

A Very few applications can be open concurrently under MultiFinder on a 1MB Mac. The full megabyte is not available for applications because the Finder, which occupies 160K of memory, remains open when you open an application using MultiFinder (see "Who's Got Memory?"). In addition, system resources, such as fonts and system software modules, typically occupy at least 200K more. That leaves 640K available for applications—too little for two of today's average applications. In fact, you may not be able to open a complex application such as HyperCard or FullWrite Professional under MultiFinder at all, if you have less than 2MB of RAM.

MultiFinder does have its uses with 1MB. It speeds up switching from one application to another—even if you can't open both at once—by sharply reducing the time it takes to quit and return to the omnipresent Finder. And because the Finder is always open, you can use it to copy disks and files, create new folders, and so on, without quitting the application you're using. Of course, you can have all these advantages with less overhead by using a Finder replacement such as CE Software's DiskTop desk accessory.

Switcher leaves more room for applications than MultiFinder does, because it doesn't keep the Finder open. But as you've discovered, it isn't as reliable as MultiFinder.

MULTIFINDER WITH ONE MEGABYTE

Can I expect to use MultiFinder or Switcher with the one megabyte of RAM in my SE? When I try to use any combination of Word, MacWrite, SuperPaint, or StatView 512+ with MultiFinder, a message tells me there isn't enough space. With Switcher, I get a system error. Am I doing something wrong?

Robert A. Levine
Philadelphia, Pennsylvania

A Very few applications can be open concurrently under MultiFinder on a 1MB Mac. The full megabyte is not available for applications because the Finder, which occupies 160K of memory, remains open when you open an application using MultiFinder (see "Who's Got Memory?"). In addition, system resources, such as fonts and system software modules, typically occupy at least 200K more. That leaves 640K available for applications—too little for two of today's average applications. In fact, you may not be able to open a complex application such as HyperCard or FullWrite Professional under MultiFinder at all, if you have less than 2MB of RAM.

MultiFinder does have its uses with 1MB. It speeds up switching from one application to another—even if you can't open both at once—by sharply reducing the time it takes to quit and return to the omnipresent Finder. And because the Finder is always open, you can use it to copy disks and files, create new folders, and so on, without quitting the application you're using. Of course, you can have all these advantages with less overhead by using a Finder replacement such as CE Software's DiskTop desk accessory.

Switcher leaves more room for applications than MultiFinder does, because it doesn't keep the Finder open. But as you've discovered, it isn't as reliable as MultiFinder.

MULTIFINDER WITH ONE MEGABYTE

Can I expect to use MultiFinder or Switcher with the one megabyte of RAM in my SE? When I try to use any combination of Word, MacWrite, SuperPaint, or StatView 512+ with MultiFinder, a message tells me there isn't enough space. With Switcher, I get a system error. Am I doing something wrong?

Robert A. Levine
Philadelphia, Pennsylvania

A Very few applications can be open concurrently under MultiFinder on a 1MB Mac. The full megabyte is not available for applications because the Finder, which occupies 160K of memory, remains open when you open an application using MultiFinder (see "Who's Got Memory?"). In addition, system resources, such as fonts and system software modules, typically occupy at least 200K more. That leaves 640K available for applications—too little for two of today's average applications. In fact, you may not be able to open a complex application such as HyperCard or FullWrite Professional under MultiFinder at all, if you have less than 2MB of RAM.

MultiFinder does have its uses with 1MB. It speeds up switching from one application to another—even if you can't open both at once—by sharply reducing the time it takes to quit and return to the omnipresent Finder. And because the Finder is always open, you can use it to copy disks and files, create new folders, and so on, without quitting the application you're using. Of course, you can have all these advantages with less overhead by using a Finder replacement such as CE Software's DiskTop desk accessory.

Switcher leaves more room for applications than MultiFinder does, because it doesn't keep the Finder open. But as you've discovered, it isn't as reliable as MultiFinder.

MULTIFINDER WITH ONE MEGABYTE

Can I expect to use MultiFinder or Switcher with the one megabyte of RAM in my SE? When I try to use any combination of Word, MacWrite, SuperPaint, or StatView 512+ with MultiFinder, a message tells me there isn't enough space. With Switcher, I get a system error. Am I doing something wrong?

Robert A. Levine
Philadelphia, Pennsylvania

A Very few applications can be open concurrently under MultiFinder on a 1MB Mac. The full megabyte is not available for applications because the Finder, which occupies 160K of memory, remains open when you open an application using MultiFinder (see "Who's Got Memory?"). In addition, system resources, such as fonts and system software modules, typically occupy at least 200K more. That leaves 640K available for applications—too little for two of today's average applications. In fact, you may not be able to open a complex application such as HyperCard or FullWrite Professional under MultiFinder at all, if you have less than 2MB of RAM.

MultiFinder does have its uses with 1MB. It speeds up switching from one application to another—even if you can't open both at once—by sharply reducing the time it takes to quit and return to the omnipresent Finder. And because the Finder is always open, you can use it to copy disks and files, create new folders, and so on, without quitting the application you're using. Of course, you can have all these advantages with less overhead by using a Finder replacement such as CE Software's DiskTop desk accessory.

Switcher leaves more room for applications than MultiFinder does, because it doesn't keep the Finder open. But as you've discovered, it isn't as reliable as MultiFinder.

MULTIFINDER WITH ONE MEGABYTE

Can I expect to use MultiFinder or Switcher with the one megabyte of RAM in my SE? When I try to use any combination of Word, MacWrite, SuperPaint, or StatView 512+ with MultiFinder, a message tells me there isn't enough space. With Switcher, I get a system error. Am I doing something wrong?

Robert A. Levine
Philadelphia, Pennsylvania

A Very few applications can be open concurrently under MultiFinder on a 1MB Mac. The full megabyte is not available for applications because the Finder, which occupies 160K of memory, remains open when you open an application using MultiFinder (see "Who's Got Memory?"). In addition, system resources, such as fonts and system software modules, typically occupy at least 200K more. That leaves 640K available for applications—too little for two of today's average applications. In fact, you may not be able to open a complex application such as HyperCard or FullWrite Professional under MultiFinder at all, if you have less than 2MB of RAM.

MultiFinder does have its uses with 1MB. It speeds up switching from one
When you need an Apple* Macintosh™ computer or peripheral for a short-term project, like a presentation, trade show or training session, shake our tree first. We have bushels of Apple, IBM, Compaq, and compatible PCs, as well as quality peripherals for rent. And, with our extensive inventory and overnight shipment, we make sure the equipment you want is available, gets there fast and works when it arrives. One free phone call is all it takes. Call 1-800-GE-RENTS, Dept. K.

**Catch This Special Offer, Too!**

Call today and get your FREE catalog of GE Rental/Lease products and services. Ask for your copy when you place your order, or call our special information number—1-800-345-2451.

To Order, Call 1-800-GE-RENTS, Dept. K.
For Information, Call 1-800-345-2451.
Or Mail This Coupon.

- Yes! I need to rent PCs and peripherals ASAP. Please have a representative call me immediately!
- Please send me your FREE catalog of GE Rental/Lease products and services.

Name: __________________________
Title: __________________________
Company: _______________________
Address: _______________________
City: __________ State: ______ Zip: __________
Phone: __________ Ext. or Dept. __________

Send to: GE Rental/Lease, PO. Box 105625, Atlanta, GA 30348

Circle 195 on reader service card
This is way too easy. Unsurpassed number-crunching power. Charts so graphic, they jump off the screen into page perfect presentations. You're actually looking forward to your next meeting. Because you're not just going to show them numbers. You're going to win them over with Wingz.
LEARN TO FLY FREE.

For a limited time only, the instructional video, "Learn To Fly," is yours free when you buy Wingz. You'll learn about the basic spreadsheet, advanced graphics capabilities and HyperScript® programmability. And it's absolutely free. But you must hurry. Call now for the location of your nearest Wingz dealer, 1-800-331-1763 ext. 3800. In Kansas, Alaska or Canada, call (913) 492-3800.

THE FIRST GRAPHIC SPREADSHEET

Circle 360 on reader service card
A BLANK LINE'S POINT SIZE

**TIP:** You can't change the point size of a blank line when creating a sign with Broderbund's Print Shop. To work around this limitation, put a single blank space on each blank line. Then you can adjust line spacing by changing the point size of the blank space on the blank line.

David Fiel
Clearfield, Kentucky

Similarly, you can adjust the height (leading) of a nonblank line by changing the size of a blank space on it. These tricks also work in word processors like MacWrite that don't let you adjust line height independent of font size.

CENTERING OBJECTS IN PAGEMAKER

**TIP:** In PageMaker, you align text blocks, graphics, or both along their left or right edges by dragging them to a guideline. You can use a similar method to center objects without measuring (see “Centered in PageMaker”). Start by drawing a rectangle that exactly spans the width of the page or column in which you want to center objects. Next drag a vertical guideline to the rectangle's center handle (zoom in for precise alignment). Select the rectangle and press the Delete or Backspace key to eliminate it. Now you can center any object that has center handles, including a text block, by moving it so that its center handles straddle the guideline. For precise positioning, use Easy Access. Be sure to remove excess white space around an imported graphic by cropping before trying to center it. Some asymmetrical images may need to be positioned off-center to appear centered.

You can also use the same vertical centering guideline to set up an automatic centering ruler. Simply drag the horizontal ruler's zero point to the guideline. Now to center an object, move it until the dashed lines that indicate its left and right edges in the ruler are both on the same number. For example, edges of a 24-pica object will be at 12 and 12 on opposite sides of the horizontal zero point.

Jungle Payne
Santa Barbara, California

Easy Access has a feature called Mouse Keys, which enables you to move the mouse pointer 1 pixel at a time using the numeric keypad. It is described in the system software user's guide that comes with the Mac and in the March 1988 Quick Tips.

HANDLING SMALL OBJECTS IN SUPERPAINT

**TIP:** The mouse pointer gets in the way when you try to select, move, or resize small objects in SuperPaint. To get around this problem, work with small objects in a magnified view (select the magnifier tool and click on an area to magnify).

Joe Ligotti
Rochester, New York

WORD FORMULA CONTROL

**TIP:** One of Microsoft Word's formula commands, \( \int \), can create special operators such as integral (\( \int \)), summation (\( \sum \)), and product (\( \prod \)). The size of the operator depends on the height of the operand, which is normally the third argument of the \( \int \) command. As a result, you may end up with small, medium, and large operators on the same page of a document. To produce operators of uniform size, use a subscripted blank space as the third argument of the \( \int \) command and put the actual operand after the \( \int \) command. For example, entering

\[
\int_{a}^{b} \frac{1}{x} \, dx
\]

yields

\[
\int_{a}^{b} \frac{1}{x} \, dx
\]

To adjust the size of the operator, change the value of the superscript. For example, UP20 makes a larger operator than UP5.

Ted and Penny Smith
Iowa City, Iowa

THE ULTIMATE TIP

**TIP:** I am dismayed when I see a tip that I figured out a year ago by reading the manual. I always think, "Gee, I could have gotten $25 for that." So here's a tip that will help you with anything you do with your Mac. *Read the manuals.* You don't have to read all of a manual when you first get some software or hardware. Just leaf through it and see how it's organized, so you know where to look later. The key to using manuals is not to memorize them, but to know where to look for help.

Carl Aron
Ellicott City, Maryland

We pay from $25 to $100 for tips published here. Send tips or questions (include your address and phone number) to Quick Tips, Macworld, 501 Second St., San Francisco, CA 94107. Send electronic mail to CompuServe (70370,702) or MCI Mail (addressed to Macworld). All published submissions become the property of Macworld.

Lon Poole answers readers' questions and offers advice in his monthly Macworld column. Many of the tips he's compiled can be found in his book *Mac Insights* (Microsoft Press, 1987) and in the more recent *HyperTalk* (Microsoft Press, 1988).
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.”

35 Corporate Drive Trumbull, Connecticut 06611

System Requirements: Macintosh Plus, SE and II. All IBM PCs and compatible systems.

Circle 40 on reader service card
DIGIT-ART

Digit-Art* MAC by Image Club is vector based PostScript clip art that can be used with any popular Macintosh applications such as PageMaker, PageView, Ventura, Ventura Publisher, and Illustrator. You can maximize printing detail with any PostScript laser printer including a DotMatrix for type-rendering sharpness. Image Club Digit-Art is easy to customize or add color to for separations when used with Adobe Illustrator or Adobe FreeHand. Unlike jaggy edges, 300 dpi scanned bit-map clip art is only window. Digit-Art is a PostScript EPS. You will experience scaling and editing flexibility without any loss of image quality. Your Image Club art is expertly rendered by our staff of in-house artists and is equivalent to the very best in line art when reproduced on a PostScript printer. Digit-Art is available on the ArtRoom CD-ROM and in diskette packages as featured above.

Digit-Art* PC for PostScript printers is compatible with PageMaker, Ventura or any other program that will accept EPS format graphics. There is even a version of Digit-Art* PC that will print on non-PostScript printers such as the HP LaserJet. Digit-Art PC is available on the ArtRoom PC CD-ROM or in diskette packages.

Also on disk - the Image Club Typeface Library - 100 licensed PostScript typefaces for Mac or PC. Call for a catalog.

Digit-Art Volume

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>4</td>
<td>7</td>
<td>10</td>
<td>5</td>
<td>1</td>
<td>3</td>
<td>6</td>
<td>3</td>
<td>5</td>
<td>3</td>
<td>5</td>
<td>3</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

# 800K Disks


This ad - color and all - was created with Image Club clip art and typefaces using a Mac R. PageMaker 3.0, Illustrator BB and FreeHand 2.5. Color separations were output as negatives on a Linotronic.
When you use the Mac, you’re better suited to lengthy text passages. You’re specifying the type characteristics that will convey your message clearly and attractively.

Or are you? Do you choose fonts that are appropriate to your message, or do you flit from font to font because the Mac makes it easy to do so? Do you choose type size, line spacing, and line length with readability in mind, or do you use whatever combination strikes your fancy?

The fact is, fine typography requires years of training and experience. This month, I present some techniques for making your documents more readable, gleaned from my prior experience as a typographer. “Type Terms” defines much of the typographic jargon used here.

**CHOOSING A FONT**

The most basic typographic choice is usually that of a typeface. Each typeface has a personality; some are sophisticated, some are casual, and others are forceful and bold (see “Font Personalities”). Your goal is to choose typefaces whose personality complements your message.

Although some studies show little difference in legibility between serif and sans serif fonts, it’s generally believed that serif typefaces are more legible and therefore better suited to lengthy text passages.

I recommend that typographic newcomers follow this rule of thumb: Better serif than sorry.

Another issue concerns whether to use the same font for all the elements of a document, or to use a different font for headings and subheadings. One way to get good results is to use different fonts within the same family. For example, you might use Garamond for body type (or body text), Garamond Bold for headlines, and Garamond Italic for captions. Or you could mix typefaces by using, for example, New Baskerville for body text and Helvetica Black for headlines. Just be consistent throughout a document, and don’t mix with abandon.

The amount of copy you have may also influence your choice of typeface. To squeeze a lot of text into a small area, consider a space-efficient condensed typeface. Adobe Systems’ library of over 300 downloadable fonts includes attractive condensed versions of Helvetica, Univers, and Futura.

**LINE LENGTH AND TYPE SIZE**

After choosing a font, you need to settle on the width of text columns and the type size. Both decisions are related and have one goal: putting a manageable number of words on each line.

Two rules of thumb exist for determining line length. One states that each line should have roughly from 8 to 11 words. Another says that a column should be just wide enough to accommodate 2½ lowercase alphabets in the typeface and size you plan to use (see “How Long a Line?”). Experimentation with both rules reveals that they often provide the same results. The bottom line: strive for lines containing between 50 and 70 characters.

Most people read groups of three or four words at a time rather than individual words. If there are too many words on each line, the eyes tire as they journey from left to right. Too few words on each line, and the flow of the text becomes disrupted by line breaks and excessive hyphenation.

Your choice of type size will be influenced by the amount of text you have and...
**GETTING STARTED**

**HOW TO**

---

**TYPE TERMS**

- **Ascender** The part of characters such as \( \overline{f} \) that rises above the body of the letter.
- **Base line** The imaginary line on which the body of a character sits. Leading is measured from base line to base line.
- **Body type, or body text** The typeface used for the main text of a job.
- **Descender** The portion of characters such as \( \underline{f} \) or \( \underline{g} \) that drops below the base line.
- **Dingbat** A decorative graphic element.
- **Downloadable font** A font stored on a floppy or hard disk and downloaded into a laser printer's memory before use.
- **Em space** A fixed amount of space equal to the point size of the typeface you're using. In 12-point type, an em space is 12 points wide.
- **En space** Also called a nut space, a fixed amount of space equal to half an em space.
- **Family** A group of related typefaces. For example, Times Roman, Times Italic, Times Bold, and Times Bold Italic are all members of the Times family.
- **Font** All the characters for one typeface, and historically, in one size. Today, font and typeface are often used interchangeably.
- **Leading** The amount of space between two base lines (pronounced led-ing).
- **Ligature** Two or more connected characters, such as \( \frac{1}{2} \) or \( \frac{1}{3} \).
- **Pica** A unit of measurement that is equal to 12 points.
- **Point** A unit of measurement equal to .01384, or approximately 1/72, inch. The point size of a given typeface is the distance between the top of the highest ascender and the bottom of the lowest descender.
- **Pull quote** A key phrase extracted from the text and set in large type to attract the reader's attention.
- **Sans serif** A typeface without serifs. Sans-serif typefaces include Helvetica, Futura, and the Mac's Geneva screen font.
- **Serif** A line crossing the main strokes of a character. Serifs lead the eye across a line of type. Serif typefaces include Times, Palatino, Century Schoolbook, and the Mac's New York screen font.
- **Small caps** Capital letters with the same height as the lowercase characters.
- **Subhead** A heading within the text that's used to split up lengthy passages and draw the reader's attention.
- **Thin space** A fixed amount of space equal to half an em space.
- **X-Height** The height of a typeface's lowercase letters, excluding ascenders and descenders.

---

The space into which it must fit. For documents duplicated on a laser printer or photocopier, you probably won't have a preconceived number of pages, or a page count, in mind. If that's the case, simply choose a type size that works with your column width to provide from 8 to 11 words per line.

For a document that will be commercially printed, however, you must determine the page count in advance—and make sure your text fits within it. Before WYSIWYG (what-you-see-is-what-you-get) screen displays, designers and typographers endured a complex copyfitting routine that involved crunching through formulas to calculate character widths.

Today's WYSIWYG programs and displays let you adjust the type size as you work.

Of course, on-the-fly tweaking is effective only to a point. In a newsletter, for instance, you wouldn't adjust each article's type size to accommodate its text. That would destroy the publication's uniformity, and uniformity is a cornerstone of good typography and design. When an article is a tad long, try hyphenating more lines (this works best with text that's set ragged right). If it's still too long, consider cutting some text.

When an article is too short, try removing hyphenations, breaking long paragraphs (continues)
Our standards are the toughest part of our 3.5" diskette.

We've got you covered. The rigid plastic jacket of our 3.5" Micro Diskette is molded to our own specifications for unsurpassed protection. And, our clipping level is 44% higher than industry standards. Call 800-343-4600 for the name of your nearest BASF supplier.

Depend on it.
Friz Quadrata is contemporary and calligraphic.

ITC Franklin Gothic is legible and honest.

**ITC Franklin Gothic Heavy carries weight.**

Futura is geometric and "moderne," no?

Helvetica Condensed is space-efficient, yet legible.

ITC New Century Schoolbook is easy to read. **Helvetica Condensed Black Oblique is progressive.**

ITC Lubalin Graph is sturdy and distinctive.

---

**Font Personalities**

A sampling of eight Adobe Systems Post-Script typefaces. The shape and thickness, or weight, of each character contributes to a typeface’s overall appearance. So do special flourishes such as Futura’s flashy question mark, and Friz Quadrata’s lowercase p and g, whose strokes don’t completely close.

---

**LEADING GUIDELINES**

Another way to do your readers a favor is through appropriate use of line spacing, or leading. For body text, the general rule is to lead at 20 percent of the type size. For 10-point type, for example, use 2 points of lead for a total of 12 points from one base line to the next. The Mac’s fonts contain built-in autoleading specifications that use this 20 percent rule. When you specify "auto" in your word processor or desktop publishing program, the program uses the font’s autoleading value.

The 20 percent rule is a good starting place, but many other factors should influence your choice of leading. Line length is one. With long lines, too little leading causes readers to occasionally read the same line twice, a phenomenon known as doubling. Longer lines benefit from more leading.

Type size should also influence how much leading you use. Headline type (14-point or larger) generally needs more leading than body type (8- to 12-point). Type that’s smaller than 8-point sometimes needs more than 20 percent leading to make the tiny type appear less dense.

The rule, “Large type requires more leading,” doesn’t always apply to headlines. Headlines often look better when set solid—with no extra space. (For example, a 24-point headline set solid has 24 points of space between base lines.) With some fonts, you might even consider minus line spacing, such as 22-point leading with 24-point type. Just watch that one (continues)

---

Don't Forget!

Send for the latest edition of the free Consumer Information Catalog. The Catalog lists over 200 selected federal publications of consumer interest on subjects like health, nutrition, federal benefits, money management. The Catalog is free and so are many of the booklets. Just send your name and address, no strings attached. Write today:

Consumer Information Center
Department DF
Pueblo, Colorado 81009

A public service of this publication and the Consumer Information Center of the U.S. General Services Administration.

---

Open stacks without going out to get in

Need your stacks while working? Don’t leave your application to go into HyperCard. Use HyperDA, the stack-browsing desk accessory. Copy text or art to Clipboard, even print and dial—on any Macintosh at any time. HyperDA, $69.00 wherever you buy software.

Symmetry CORPORATION
761 E. University Drive • Mesa, AZ 85203
1-800-624-2485 (602/844-2199)

HyperDA is a trademark of Symmetry Corporation. HyperCard and Macintosh are registered trademarks of Apple Computer, Inc.

Circle 302 on reader service card
End Financial Hassles.
Quicken®, $49.95

Quicken is the absolute fastest, easiest way to do your personal or small business finances. It saves you hours of time while perfectly organizing your finances. With Quicken, you'll always know exactly how much money you have and where it's going.

Forget Financial Hassle
Quicken is so automatic, it does your financial work for you. It actually learns your regular bills. Just confirm the payment amounts on your auto loan, utilities, and other bills. Quicken does 14 bookkeeping steps and hands you the printed checks already addressed for mailing. All you do is sign them and seal the envelopes.

Finish Financial Work in Seconds
Instead of dreading tax time, use Quicken to print itemized lists supporting each tax deduction. Quicken delivers other detailed reports such as income and expenses by category, P&Ls, and budget vs. actual comparisons. Quicken provides complete reports on screen or on paper almost instantaneously. Quicken will finish in seconds the same work that used to take you hours.

No Accounting Mumbo Jumbo
Quicken is as easy as the pen and paper you use now. You'll see the familiar checkbook and check register right on your screen. The only thing that changes is how fast you finish your financial chores. This is bookkeeping that's totally hassle-free.

The World's #1 Selling Financial Software
Here's why Quicken is the world's most popular:

...an all-around excellent product. It is one of the best implementations of the Macintosh user interface that we've seen; it's very fast even when running from floppy disk.

—David Beaver, MacWeek

Quicken is a great program... Its combination of an outstanding implementation of the Mac interface, sophisticated keyword-searching techniques, and a readable, well-designed manual make it the industry standard.

—Ken Landis, MacUser

For Personal and Small Business Use
No other financial software provides more flexibility to handle the wide range of personal or business needs. Quicken is for service and manufacturing businesses, doctors, consultants, designers, retailers, as well as for households. Quicken is ideal for anyone who wants relief from bookkeeping hassles.

Specifications:
Software Compatibility: Exports data to spreadsheets like Excel® and imports data from Excel®
Hardware Compatibility: All Macintoshes with 1 MB memory. All printers including laser printers. Also available for IBM and compatibles, Apple IIe, IIc, IIc+, IICl, IIPE, and IICl.
Capacity: Unlimited number of bank accounts. Unlimited number of transactions. Unlimited number of income/expenditure categories. Maximum amount $9,999,999.99.

Try Quicken FREE for 30 Days
Order Quicken from the coupon below, or through our toll-free 800 number. If you're not completely satisfied with Quicken for any reason, simply return it for a full refund. No questions asked.

Intuit
540 University Avenue
Palo Alto, California 94301
Why Ralph Volk cancelled Linotype for a Varityper PostScript Imagesetter

"I made head-to-head comparisons between Linotype® and Varityper® PostScript imagesetters for the same jobs. What I found, more often than not, was that Linotype produced a 1 point miss or overlap at what looked like uniform intervals on the page. I'm told this banding is a result of their start/stop scheme and that it will only get worse as the equipment gets older. Whatever it is, the results are unacceptable for my work, particularly my color work. On the other hand, Varityper produced flawless, high-quality output at speeds much faster than those other guys. And when I found out that I could get the Varityper for substantially less money, there was no contest . . . I said, buy the Varityper!"

"My advice to anyone looking for a high quality PostScript imagesetter: Do yourself a favor. Consider Varityper and make your own comparisons."

Mr. Ralph Volk, President, Sun Graphics & Publications, Inc., Ypsilanti, Michigan. SG&P includes three service divisions each using a 4300P: SG&P Advertising—a full service advertising, marketing and design agency. Sun Graphics and Publications—a design and production art studio employing professional electronic systems for high quality, 4-color brochures, catalogs and ad design. MacSunSet—a desktop publishing and PostScript imagesetting service bureau for design professionals.

See for yourself. Just call and we will send you output samples from Varityper imagesetters. You'll see the quality difference for yourself.

Give Varityper a Call Today
1-800-631-8134
(In New Jersey 201-887-8000 x-999)

Circle 93 on reader service card

Varityper

The #1 Supplier of Imagesetters with Adobe's PostScript Interpreter

Varityper is a registered trademark of Varityper, Inc. PostScript is a registered trademark of Adobe Systems, Inc. MacSunSet is a registered trademark of Sun Graphics and Publications, Inc. Linotype is a registered trademark of Linotype Corporation.
GETTING STARTED
HOW TO

One rule of thumb for determining line length states that a line should be wide enough to accommodate 2.5 lowercase alphabets in the typeface and size you plan to use. This works out to roughly 8 to 11 words per line—not so many that the eye gets lost, but enough to retain the smooth flow of the text.

How Long a Line?
One way to determine the ideal line length for a given font and size is to type 2 1/2 lowercase alphabets, as demonstrated here in 10-point Optima.

line's descenders don't touch the next line's ascenders.

When specifying type size and leading, designers write a kind of fraction in which the type size is the numerator and the leading is the denominator. For example, 10-point type and 12 points of leading from base line to base line is specified as 10/12, and pronounced ten on twelve or ten over twelve.

ALIGNMENT ISSUES
Another major aspect of type formatting concerns the alignment of the left and right margins. You're probably familiar with the three most common forms of alignment: flush left, ragged right; justified; and flush right, ragged left. But which to use, and when?

Traditionally, large passages of text have been set justified. Many designers believe that neatly aligned left and right margins are best suited to sustained reading because they give pages a quiet look that lets readers concentrate on content.

To justify text, word processors add space between each word. Some desktop publishing programs, including Aldus PageMaker and QuarkXpress, can also add space between each character, a process called letter spacing. Letter spacing helps eliminate the large word spaces and the rivers of white space that can occur (see “Justifying Your Actions”). Hyphenation also helps, although you should never hyphenate more than two or three consecutive lines.

These days, ragged-right margins have become more popular, even in such bastions of justification as textbooks and magazines. Ragged-right text requires fewer hyphenations, and its consistent word and letter spacing give it a clean, even texture (see “Running Ragged”). And because the eyes stop at a different point in each line, it can actually be less fatiguing to read than justified text.

As for the other alignment options—
(continues)

Justified text, long preferred for its smooth appearance, is less readable when there's too much space between words. Distracting “rivers” of white space can appear. This problem is especially common with narrow column measures. Letter spacing and hyphenation can help eliminate the problem.

Justifying Your Actions
Appropriate use of letter spacing and hyphenation can dramatically improve the appearance of justified type. Also note that because more text can fit on each line, the same amount of copy takes up less space.

MacIIX-Compatible
The MC2RAM/4 MB delivers up to 32 MB for the power-hungry MacIIX system running A/UX. Packed with 32 megabit SOJ DRAMS, the MC2RAM/4 operates with a PAL chip for logic control to store the 32-bit word required by the 68030 processor.

Mac II, SE, SE/30 & Plus-Compatible
The MC2RAM/1 series is Clearpoint's complete line of one megabyte Macintosh memory. Version D features megabit DIP DRAMS for a high profile design recommended only for the Mac II and IIX installations. Version S1 uses megabit SOJ DRAMS and is compatible with all Mac systems. Version S1-10 is customized to match the higher processing speeds of third party accelerator boards.

Call 1-800-CLEARPT
Ask for our Product Catalog, Designer’s Guide to Add-in Memory and applications video.

CLEARPOINT
One Parkwood Drive
Hopkinton, MA 01748
1-800-CLEARPT (508) 435-2000
EUROPE Clearepoint Europe B.V.
Tel: 31-23-2731144 Telex: 71080CPLNL
CANADA Clearpoint Canada: 416-630-2342
JAPAN Clearpoint Japan: 03-221-9726

Circle 375 on reader service card
STAX! HELPER

State-of-the-Art HyperCard® Stack

Simplifies stack development for beginners
Automates repetitive activities for advanced users
Provides all tools in non-modal, moveable windows

STAX! HELPER is a collection of hyper card utilities all under one menu item. The Helper helps you launch your favorite documents and applications directly from any HyperCard stack. Helper launches any one of five standard Macintosh windows that pop-out into any stack you're working on.

- Use "canned" scripts for buttons & fields • Extract scripts from any button or field • Inject scripts into any button or field • Choose font properties not available in any HyperCard dialog • Create a new button or field containing properties or scripts you've chosen • An illustrated reference manual is included with each three disk package.

CALL TODAY
order by credit card
1-800-MAC-STAX
in Texas call 512/467-4563

CLOSE OUT!

The Macintosh Bible:
STAX! Edition™
(1st Edition book included)
Reg. 79.95 39.95
STAX! Sound Effects Studio™
Reg. 59.95 39.95

ALL STAX! products have an unconditional 30-day money-back guarantee. We don't process credit card orders and checks until we ship your product. $5 shipping/handling charge per order. HyperCards is registered trademarks of Apple Computer Inc.

Circle 179 on reader service card
Whether a ragged-right margin is more readable depends in part on the contour, or rag, of the right margin. A good rag has a rhythm, with text alternating between longer lines and shorter ones. The best typographers ensure that each line ending contributes to the margin's profile, even if they have to break certain lines by hand.

Whether a ragged-right margin is more readable depends in part on the contour, or rag, of the right margin. A good rag has a rhythm, with text alternating between longer lines and shorter ones. The best typographers ensure that each line ending contributes to the margin's profile, even if they have to break certain lines by hand.

centered and flush-right, ragged left—both can be effective in small doses. Centering, for example, is ideal for short passages such as headlines. But because centered and ragged-left text force you to hunt for the start of each line, they can be hard to read in large doses.

**TYPE ON DISPLAY**

Headlines and other large, attention-getting blocks of type are called display type. Showing attention to detail in display type is an important step in making documents hard to read in large doses.

Centering, for example, is ideal for short passages such as headlines. But because centered and ragged-left text force you to hunt for the start of each line, they can be hard to read in large doses.

With display type intended to grab the reader's interest, you might be tempted to use all capital letters for added oomph. Resist the urge. A mix of upper- and lowercase characters gives words an overall shape that aids in recognition; text set in **all caps** lacks these patterns. It's generally better to capitalize only the first letter of important words, leaving conjunctions and articles such as *and*, *in*, and *the* lowercase. That way you won't put undue emphasis on less important words.

Once you've settled on case, concentrate on the space between characters and words. In large type sizes, most fonts produce too much space between certain character pairs. You can improve the look by tightening those spaced-out pairs, a process called *kerning*.

In smaller type sizes, kerning usually involves tightening only certain letter pairs, such as *To* or *Av*. But in large sizes, almost every combination of characters is a candidate (see "Kerned versus Unkerned"). Use the manual-kerning features in your desktop publishing program or word processor to remove space between characters until they are tight, but not touching. Also decrease the spaces between words. Just be sure to apply the same degree of kerning and word spacing throughout a document. Inconsistent spacing is worse than none at all.

A variation on the letter spacing theme in headlines involves adding space between each character to obtain an airy, elegant effect. This letterspacing technique can be effective when used sparingly.

You'll say, "wow."

You'll say, "wow."

**Kerned versus Unkerned**

In display type, nearly every character is a candidate for kerning. Here, space was removed between the *Y* and the *o*, around the apostrophe, between the *y* and the comma, between each *w*, and between the period and the closing quotes. A little less space was removed between the *a* and the *y*. Notice how the kerned headline uses less space. This headline was created with Letraset's **LetraStudio** display-type program, which provides a high-quality screen display and lets you position individual characters by dragging them.

---

Clearpoint, the leading manufacturer of add-in workstation memory, offers a powerful dealer program with competitive pricing, comprehensive technical service and an unconditional lifetime warranty program—a unbeatable dealer support program.

You and your staff will benefit from on-site technical product training, free point-of-purchase displays, free product literature and a highly effective national advertising campaign. Offer your customers a 24-hour product support hotline, a guaranteed repair/replacement policy for the lifetime of the product and user group presentations. Call our Product Marketing Specialist today!

1-800-CLEARPT

Ask for our Product Catalog, Designer's Guide to Add-in Memory and applications video.
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 better than 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 II Past Its Limits

Complex illustrating, drawing and CAD layout is no longer a drag, click and wait. The DayStar 33/030 Accelerator II 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 and high speed data cache 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 68881.

The Accelerator II is fully compatible with standard Mac II/IIX software, including A/UX™.

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

1-800-962-2077

Other brands and product names are trademarks or registered trademarks of their respective holders. Product specifications are subject to change without notice. © 1988 DayStar Digital. Inc.

ELEGANT AND SPACIOUS

TOUGH AS STEEL

TOUGH AS STEEL.

Headline Spacing

Top: Letterspaced headlines can create an airy, dignified effect, especially if you use a typeface with such elegant capitals as ITC Benguiat’s. Extra space between words keeps them from running together. Bottom: Heavy, condensed faces such as ITC Machine don’t letterspace well and are best set tight. Note the kissing T and O.

ingly. Be sure to also add more space between words so they don’t run together, and avoid letterspacing heavy, condensed typefaces such as Adobe’s ITC Machine.

Type set in Machine actually looks better when certain characters touch slightly, or kiss (see “Headline Spacing”).

With body text, you usually let your word processor or publishing program end each line for you. With display type, however, you should take a more active role in determining line breaks. Good typographers end lines at logical stopping points, such as after a comma or a key phrase (see “Breaking for Sense”). The best advertising typographers will also apply this technique to body text.

In headlines containing trademark or copyright symbols, the symbols are usually much too large and obtrusive. Use a smaller type size for the symbol itself, and then move the symbol so that its top aligns with the top of the text (also see “Breaking for Sense”).

THE FORM FACTOR

One document that imposes some unique typographic requirements is the form. Forms range in size and style from reply (continues)
CHARACTER CAUTIONS

One of the easiest ways to make documents look typeset is to replace the Mac's typewriter-like punctuation characters with ones typesetters use. (See "Getting Started with Desktop Publishing," page 260, February 1988, for a complete list of these characters plus other type tips.) A few more cautions: Avoid gimmicky font styles such as shadow and outline. Also think twice about using the small-caps option that many programs provide. To create small caps, typesetting systems provide special fonts in which the small capitals are drawn to match the texture and line thickness of the large capitals. On the Mac, programs with small-caps options simply use a smaller type size for the small capitals. The resulting small caps don't match the large ones, giving the text an uneven appearance.

Finally, avoid superimposing type over a gray-shaded background. Type is most legible when it's easily distinguished from the background; black-on-gray isn't exactly a high-contrast combination.

BIBLIOGRAPHY

I've run out of space, but I doubt that Macworld's art director is willing to shrink the point size of this column to give me more room. To learn more about typography, read the following books: Designing with Type, by James Craig (Watson-Guptill Publications, 1971); Graphic Design for the Electronic Age, by Jan White (Watson-Guptill Publications, 1988); Basic Typography, by John R. Biggs (Watson-Guptill Publications, 1968); and Design Principles for Desktop Publishers, by Tom Lichty (Scott, Foresman and Company, 1989).

You'll find more information on basic text formatting in last October's "Getting Started with Word Processing." And when you're ready to start modifying typefaces and creating special effects, see "Enhancing PostScript Fonts," Macworld, May 1989.

Two more excellent sources of type tips are Adobe's Font & Function and the quarterly Usenix catalogs.

As you create and format documents, remember that the best type is the one that's appropriate to the message it conveys. Every formatting command you issue should be aimed at improving your document's readability. Aaron Burns, chairman of the International Typeface Corporation, summed it up when he said, "In typography, function is of major importance; form is secondary; and fashion, almost meaningless."  

See Where to Buy for contact information.

Macworld contributing editor Jim Heid is a former typographer and former member of the International Typographer's Union. He is currently writing an advanced user's guide to the Mac, to be published this year by Brady Books.
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™.

With its ultra-high speed, compact size and PostScript®-compatible page description language, the CrystalPrint Publisher gives you choices no other page printer can.

Choose Productivity
CrystalPrint Publisher maximizes your productivity. Put more simply, it's fast. Faster than any printer with Adobe® PostScript®. Faster than Apple® LaserWriter® II/IN. Even faster than LaserWriter II/IN with a hard disk. The Publisher still wins. And at a price less than LaserWriter II/IN.

That used to take minutes to print are now in your hands in seconds. You spend more time creating and less time waiting to see what you've created. That makes you more productive than ever.

Choose Print Quality
You need top print quality to fully express your creativity. CrystalPrint Publisher delivers. The Publisher's PostScript®-compatible page description language lets you print detailed drawings with fine lines, solid blacks and smoothly graduated grays.

Mix in text using the wide range of resident authentic typefaces from ITC and Bitstream®. The result — elegant images with print quality not even the LaserWriter II can match.

Choose Convenience
The Publisher's footprint is more than 43% smaller than the LaserWriter II. That's the smallest of any competitive...
page printer. Which means the Publisher stays close and convenient — where you need it— even in the most space conscious environments.

**Compare, Then Choose**

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.

---

**CrystalPrint Publisher™**

**Graphic Proof of Quality and Speed**

You know graphic quality when you see it. That’s why we used an original printout taken directly from the CrystalPrint Publisher to produce the artwork for the adjacent page. So you can see the fine lines, the well-formed characters and uniform blacks for yourself.

You also know the importance of speed. The LaserWriter IINT takes 172 seconds longer to print the same page. Even the expensive, top-of-the-line LaserWriter IINTX takes longer.

Now, the choice is yours. Choose CrystalPrint Publisher and choose print quality and speed. Then spend more time creating and less time waiting to see what you’ve created.

CrystalPrint Publisher … The Power to Choose.
If you’re concerned that $479 is too little to pay for the new Ehman 32 MB Hard Drive, we’ll give you 30 days to change your mind.

The Ehman 32 MB Hard Drive is vivid proof that you don’t always get what you pay for...sometimes you get more. At just $479 the Ehman drive is actually significantly less than the leading 20 MB drives on the market. But please don’t judge us by our price.

True value is based on performance and price, and the Ehman drive really hums. It is built upon Seagate technology for optimal speed and reliability. And while it includes all the usual utility software and necessary cables, it may be what’s not included that you’ll appreciate the most...noise. In fact the Ehman drive provides virtually noiseless performance.

You may be wondering how we can provide so much for so little. The simple answer is excellent engineering and an obsession with efficiency. Ehman has been a leading OEM manufacturer of Macintosh peripherals since 1985. We know how to design better Macintosh peripherals. And we keep the overhead low and the margins thin so we can provide our customers with the very best values.

In case you’re still not convinced we’ll give you 30 days to return your purchase with no questions asked. In addition we back our products with a two-year limited warranty, compared to as little as 90 days for some manufacturers. Ehman drives are compatible with the Mac Plus, Mac SE, and the Mac II and come in a variety of sizes. Larger drives are available at equally attractive prices. So call 1-800-257-1666 today or order by FAX at 307-789-4656 for the best value in Macintosh peripherals. Ehman calling hours are 9:00 A.M.–9:00 P.M. EST Monday–Saturday.

*Good on Macintosh II models only. SE Drives also available.
All product names mentioned are trademarks of their respective holders.
PC Tools/Macnot included with 20 MB drives.
Microsoft Word 4.0 is here. It's full of new features: big ones like Page View, which shows multicolumn formatting while allowing you to edit; small ones like a word counter that counts characters, words, lines, and paragraphs. Word 4.0's look—windows, menus, dialog boxes—has changed too. The commands are grouped more logically (compared to Word 3.0), and current Word users should adapt quickly to the new arrangement.

YOUR WISH IS WORD'S COMMAND
Like most programs, Word 4.0 has many more commands (273 at last count) than will fit within its pull-down menus. These commands are normally accessed through dialog boxes. Some commands have keyboard equivalents such as $S for Save. Word 4.0 lets you assign your own keyboard equivalents to any command. Here's how.

If you're in Full Menus mode, pull down the Edit menu, and you'll see Commands at the bottom of the menu. Notice that it doesn't have a keyboard equivalent. Let's add one. Select Commands. “At Your Command” shows the resulting dialog box. Scroll through the command list, find Blue, and select it. Next, click the Add button in the Keys section of the dialog box, and Word prompts you for a keystroke equivalent. For example, press Shift→. (If you try to assign a keystroke already in use, Word warns you and asks if you really want to reassign the keystroke.) The keystroke appears in the Keys list box. Close the dialog box.

Pull down the Edit menu and look at Commands. A keystroke equivalent is now listed. Release the menu without selecting Blue and try the new keystroke.

Assigning (or removing) keystroke equivalents is one of the two functions of the Commands dialog box. The other lets you add or remove any command in any menu, giving you complete control over the contents of Word's menus. You can even create a menu in the menu bar, and fill it with your choice of commands.

If you have a color monitor and printer, for example, you might want to place Word's eight color commands (Red, Green, Blue, Yellow, Magenta, Cyan, Black, and White) in the Work menu. Just select a color from the list in the Commands dialog box, choose Work from the drop-down Menu list, and click the Add button. If you haven't yet placed any commands in the Work menu, Word creates the menu and then inserts the command. If you select a command that is currently in a menu, the Add button changes to a Remove button. Click Remove, and the command disappears from the menu. You can use Remove and Add to switch commands from one menu to another if Word's initial arrangement doesn't suit you.

STATE YOUR PREFERENCES
You can customize Word with any or all of the features listed under Preferences in the Edit menu. Desktop publishers should go for Picture Placeholders, which replaces any picture you've inserted into text with a blank hole of the same size. This really improves the scrolling speed; redrawing pictures is time consuming.

You can activate the Keep Program in Memory and Keep File in Memory options for the current session by checking the options' Now boxes. If you want an option to be permanently activated, click the Always box. The options increase (continues)
A VIEW TO FORMATTING

One of the criticisms leveled at Word 3.0 was that while you could display multicolumn text using Page Preview, you couldn’t edit in this view. Word 4.0 has solved that problem nicely with Page View, a fully interactive, dynamic view under the Document menu. (You can toggle between Galley View, the default, and Page View by pressing $F-B$.) Aside from displaying multiple columns as they will print, Page View shows all margins, including headers and footers.

Formatting text is quite easy. Suppose you want a single headline over two columns of text. Simply place your cursor below the headline and insert a section mark by pressing $F-Enter$. Select Section from the Format menu and in the resulting dialog box type 2 for columns and .25 for spacing between the columns. Choose No Break from the Start drop-down menu. Click on Okay and the text reformats itself.

TURNING THE TABLES

Microsoft has added some much-needed table-generation commands to Word. Suppose you want to create a table similar to the one shown in “A New View.” Start by choosing Insert Table from the Document menu. Select Show Table Gridlines in the Preferences dialog box. Specify two columns and five rows, and change the default column spacing to 1 inch (see “Table Hopping”). Click on OK. Word creates a table with two columns and five rows. Because you selected Show Table Gridlines, thin lines separate the sections, or cells, of the table. The lines don’t print; they’re just there to outline the cells.

Entering table data is easy. Place the cursor in the upper left cell and type in an entry. Press the Tab key to move the cursor over one cell to the right. When you reach the end of a row, pressing Tab moves the cursor to the beginning of the next row. Enter the data shown in “A New View,” and don’t worry about alignment.

If you click the scale icon in the Ruler, T-shape markers appear at the right edge of each column—moving a marker changes the width of selected cells. Let’s center the

(continues)
Cricket Means Business.
for all your presentation and graphing needs

For all your presentation and graphing needs.

Employee/Age Comparison

- Over 60
- 50-60
- 35-50
- 23-35
- Under 23

1987 MacWorld Magazine “World Class Award.”
1988 MacUser Magazine “Reader’s Choice Award.”

Cricket Graph™ is the recognized standard for Macintosh graphing. Its graphing flexibility, combined with an intuitive user interface, make it easy for anyone to create a wide variety of business and scientific graphs including Column, Bar, Stacked Column, Stacked Bar, Pie, Area, Line, Scatter, Double Y, Polar, Text and Quality Control graphs.

Cricket Presents...

“For creation of 35-mm. slides, overheads, and other visuals, Cricket Presents 2.0 is the top choice in the Macintosh desktop presentation market.”
—Datapro Research, February 1989

Cricket Presents™ has everything you need to organize information, create complete presentations including tables, graphs, and supporting materials, and produce beautiful color and black-and-white overheads and 35mm slides. Its powerful capabilities include a professionally-designed template library, a spelling checker and thesaurus, coordinated color schemes, and automatic presentation generation with the Acta™ outliner and Auto Presents.

Cricket Software. The only name you need to know for advanced drawing, painting, graphing, or presentation applications for the Macintosh®.
Call (215) 889-1950 for the Cricket Software dealer nearest you.

The Leader in Graphics Productivity

Get $25 Back when you buy Cricket Graph or Cricket Presents!

Just send proof of purchase (a photocopy of your receipt will do) along with your completed registration card to:

Cricket Rebate Offer
Cricket Software
40 Valley Stream Parkway
Malvern, PA 19355

Please allow 4 to 6 weeks for your rebate. Offer expires September 30, 1989.

Circle 15 on reader service card
Table Hopping
The Insert Table dialog box allows you to create tables from text in any of the four formats listed as Convert From options. Clicking the Format button creates a table and displays the Cell dialog box.

entries in the first row. Select the top two cells, then click on the centering alignment icon in the Ruler. (Press ⌘-R to display the ruler.)

Now let's align the numbers. Click on the Ruler's decimal tab icon to select it. Then highlight the four cells under the word Digital, and insert a decimal tab at the 1/8-inch mark. Do the same thing with the four cells under Analog.

As a finishing touch, let's surround each cell with a border and draw a thick line between the first and second rows. Highlight the entire table and choose Cells from the Format menu. Click on the Borders button in the Cells dialog box to display the Cell Borders dialog box. Choose the Every Cell in Selection option; accept the default thin border line; and click at the left, right, top, and bottom of the displayed cell. Click OK in the Cell Borders dialog box, and in the Cells dialog box. (You might want to add the Cell Borders command to the Format menu if you do a lot of tabular work.)

To place a thick line between the first and second rows, highlight the cells in the top row, and display the Cell Borders dialog box. Again choose Every Cell in Selection. Choose the thick line. Then click at the bottom of the displayed cell to apply the thick line to the bottom border. Close the dialog box and you'll see that a thick line now separates the first two rows of the table. Border lines come in five styles: single, thick, double, dotted, and hairline. Hairline borders appear the same as single-line borders on screen, but then print as hairlines on a laser printer.

You can convert existing text into a table, too. Suppose you have a list of names and addresses with each entry on its own line. Just highlight the entire list and choose Insert Table. Use the number of entries per record as the Number of Columns value, and choose Paragraphs as
**Hold That Position**

How do you get text to flow around a picture? Let's use the table we just created as a graphic and insert it into the middle of a two-column page.

First, convert the table into a graphic. Select the entire table, then use the Copy as Picture command (press `Ctrl-Shift-D`). This places a picture of the selected text in the Clipboard. Next, create a two-column document by selecting Section from the Format menu and typing **2** in the Number box and **.5** in for spacing between columns. With an extended keyboard you can press **F14** for Page View (or press **Ctrl-B** or simply choose it from the Document menu), and then place the cursor anywhere you want the table to appear. Paste the table into the page, select the table, and choose Position from the Format menu.

Choose the Center option in the Horizontal and Vertical menus and make both of them relative to the page (see "Prime Position"). The Distance From Text value controls the gap between the graphic and the surrounding text. I used 0.5 inch in this example. Click OK, and Word places the table in the middle of the page.

Word 4.0 is designed to let you use graphics easily—so easily, in fact, that drawings created with MacPaint or SuperPaint can be opened directly into Word 4.0. You use the same Open command that you would for opening a text file. (By the way, SuperPaint is included in the Word 4.0 package.)

**Who's Counting?**

Each time you save a document, Word shows you the total number of characters. But if you want more information about the document, select Word Count from the Utilities menu to display a dialog box that shows the number of characters, words, lines, and paragraphs in a document. If you've entered footnotes, Word shows the same four statistics for footnotes separately.

(continues)

---

**High Performance to the Macs.**

Plug a 330-megabyte MacDisk™ drive into your Mac, and scream through all the high-performance applications you want. No slowing. No bottlenecks.

Programs load in about 18 milliseconds. Data transfers at up to 1.3 megabytes per second.

And MacDisk is already formatted, so it's out of the box, hooked into your Mac's SCSI port and ready to go in about two minutes.

With certification at a whopping 40,000-hour Mean Time Between Failure, you'll make tracks for a long, long time before you have to think about it again.

Call now, and get your Mac off the blocks with a 65-MB, 100-MB, 230-MB or 330-MB MacDisk high-performance storage system. 800-345-9242, Dept. 250. In California, 714-545-2774, Dept. 250.

At Macworld, see us at booth 749.
INSIGHTS
HOW TO

Dealers circle 381 on reader service card
End Users circle 187 on reader service card

EASIER FIND AND CHANGE
Microsoft has included many small improvements in this version of Word. The Find and Change commands are one example. You can now paste text from the Clipboard into the Find What and Change To text boxes to avoid retyping.

AN OUTLINE FOR SUCCESS
Outlines help you to focus your thoughts so that you can write clearly and logically. Word 4.0 has a separate Outline View in which you can create an outline and then add text under the various headings and subheadings. "Outline Example" shows Word 4.0's outline view, its special ruler, and a sample outline.

To create an outline, open a new document and select Outlining from the Document menu. You'll probably want to list several minor topics under a major heading. Type the name of the first major topic and press Return. Don't number or letter outline topics; Word numbers them for you. Now click on the right arrow on the Outline ruler and type in an item that is subordinate to the first major topic. Word automatically indents this item 1/2 inch relative to the level above. Or create the item first, then indent it by selecting the right arrow. You click the left arrow to create a major heading. (Word supports up to nine levels of outline headings; major headings appear in boldface.)

Now number the headings by selecting Renumber from the Utilities menu. Type 1.1.1. into the Format box of the Renumber dialog to duplicate the numbering used in "Outline Example."

To type ordinary text under any heading, place the cursor at the end of the heading line, press Return, and click the double arrow icon on the outline ruler. This sets the paragraph to Normal style text. When numbering an outline, Word ignores text paragraphs.

Notice that all the lines in "Outline Example" begin with a symbol. The plus symbol denotes a heading with one or more subordinate headings or text paragraphs under it. If you click on this symbol, the heading and everything subordinate to it will be highlighted. If you click the right arrow on the ruler, all the highlighted headings will move down

FORMULATING FRACTIONS
Word's formula generator is actually a feature carried over from the earlier version. For those of us who need to type equations, or just fractions, this feature is a godsend. Suppose, for example, you wanted to type a stock's closing price, 36 5/8. You could type the fraction as 5/8, but try this instead. First, choose the Show Paragraph command in the Edit menu. Type 36 and then press % Option-backslash (\). This character (\) alerts the formula generator to interpret the text that follows it as a formula. Now type, with no spaces, f(5,8). Word displays the fraction when you select the hide paragraph command from the Edit menu. If you're feeling adventurous, type the following expression and see how Word displays it: \(\frac{\sqrt{-b \pm \sqrt{b^2 - 4ac}}}{2a}\)

(Note: The plus-or-minus (±) symbol is produced by pressing Option-Shift-equal sign [=]. To superscript the 2, highlight it and press % Shift-equal sign [=].)

All in all, Word 4.0 is a significant improvement over its predecessor. Microsoft has apparently listened to its customers' suggestions (and complaints) and has released a product that addresses most, if not all, of them.

SHARING THE WEALTH
If you've found a shortcut or undocumented trick not mentioned here, spread the word to other readers by sending it to Quick Tips, Macworld, 501 Second St., San Francisco, CA 94107. See Where to Buy for contact information.

<table>
<thead>
<tr>
<th>Drive Size</th>
<th>Model</th>
<th>Internal Access Time (ms)</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>20Mb</td>
<td>MiniScribe</td>
<td>68</td>
<td>$299</td>
</tr>
<tr>
<td>30Mb</td>
<td>Seagate</td>
<td>40</td>
<td>$369</td>
</tr>
<tr>
<td>42Mb</td>
<td>MiniScribe</td>
<td>28</td>
<td>$449</td>
</tr>
<tr>
<td>80Mb</td>
<td>Quantum</td>
<td>19</td>
<td>$775</td>
</tr>
<tr>
<td>65Mb</td>
<td>Seagate</td>
<td>40</td>
<td>$499</td>
</tr>
<tr>
<td>160Mb</td>
<td>MiniScribe</td>
<td>17</td>
<td>$1222</td>
</tr>
<tr>
<td>340Mb</td>
<td>MiniScribe</td>
<td>16</td>
<td>$1895</td>
</tr>
</tbody>
</table>

These complete internal drive kits include the drive, UniMac™ formatting & partitioning software, hardware mounting kit, all necessary cabling, and How-To manual.

<table>
<thead>
<tr>
<th>Drive Size</th>
<th>Model</th>
<th>Internal Access Time (ms)</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>20Mb</td>
<td>MiniScribe</td>
<td>68</td>
<td>$426</td>
</tr>
<tr>
<td>30Mb</td>
<td>Seagate</td>
<td>40</td>
<td>$479</td>
</tr>
<tr>
<td>45Mb</td>
<td>MiniScribe</td>
<td>28</td>
<td>$549</td>
</tr>
<tr>
<td>60Mb</td>
<td>Seagate</td>
<td>40</td>
<td>$589</td>
</tr>
<tr>
<td>80Mb</td>
<td>Seagate</td>
<td>28</td>
<td>$749</td>
</tr>
<tr>
<td>80Mb</td>
<td>Quantum</td>
<td>19</td>
<td>$919</td>
</tr>
<tr>
<td>160Mb</td>
<td>MiniScribe</td>
<td>17</td>
<td>$1275</td>
</tr>
<tr>
<td>340Mb</td>
<td>MiniScribe</td>
<td>16</td>
<td>$1995</td>
</tr>
</tbody>
</table>

External drives include drive, UniMac™ external case, power supply, cabling, formatting & partitioning software.

Three great names, one low price!

The BIGGEST name in low priced hard drives comes to MACINTOSH™

HARD DRIVES International . . .

- Our Multi-Million Dollar buying power assures the lowest possible prices.
- Friendly, knowledgeable sales staff will help you choose the drives you need.
- Factory-trained technicians in our Technical Department can assist you with trouble-free installation and setup of your hard drive.
- Helpful Customer Service Representatives provide service after the sale.
- All products include a One Year Warranty and our 30-day "Worry-Free" Guarantee.

1-800-234-DISK

International Orders: (602) 967-7435
Phone Orders: 7am—7pm Mon. — Fri. 10am — 4pm Sat. (MST)
Customer Service: 1-800-234-5197
TELEX: 405765

Never A Surcharge For MC and Visa

30-day "Worry-Free" Guarantee
If for any reason, you are not completely satisfied with any product, simply return it for a prompt and courteous refund!
AutoCAD® on the Mac®. A new window of opportunity opens.

Be sure to see
AUTODESK EXPO '89
at AEC Systems '89
Anaheim Convention Center
June 5-8, 1989

For more information call the
Autodesk EXPO Hotline at
415/332-2344 extension 2799
12 issues
just $24.

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 1262 BOULDER, CO
POSTAGE WILL BE PAID BY ADDRESSEE

MACWORLD
Subscription Department
P.O. Box 51666
Boulder, CO 80321-1666
Be a Mac master.

☐ YES! Send me 12 issues of MACWORLD for $24. Save me almost 50% off the annual cover price of $47.40

☐ YES! YES! Send me 24 months of MACWORLD for $37.90

12 issues for
$47.40
Now only
$24.00

Name

Company

Address

City State Zip

☐ Payment enclosed. ☐ Bill me later.

Basic subscription rate for Macworld is $30 for 12 issues. The annual cover price is $47.40 (12 issues). This rate limited to U.S.A. and its possessions. Please allow 6-8 weeks for delivery of your first issue.

MACWORLD
AutoCAD, the world-standard CAD software, now runs on your Macintosh II.

Your designs reflect the quality of your thinking. And your drawings reflect the quality of your designs. Put AutoCAD on your Mac II and nothing gets lost in the translation.

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, 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.

Opportunity knocks just once. The CAD software you standardize on today will determine your productivity for years to come. To see a demonstration at the dealer nearest you, call Autodesk at 800/445-5415, extension 25, at your earliest opportunity.
"What's wrong with copying software?"

"I use a lot of programs on my personal computer, and I copy them all the time."

"I'm a programmer. Every time you copy one of my programs, you're taking away my income—I depend on sold programs for a living."

"Oh, come on. I bought it: I have a right to copy it."

"You do have a right to make a back-up, that's true. But when you start copying programs for your friends and co-workers, that's breaking the law."

"What law? Any copying I do is in the privacy of my own home."

"It doesn't make any difference where you do it. Every time you copy a program without permission from the publisher, you're committing a federal offense."

"That's all right, I won't get caught."

"You're missing the point. The issue isn't "What can I get away with?"—it's "who am I hurting?"

Remember, lots of people worked hard to produce every program you use: designers, programmers, distributors, retailers, not to mention all the people who support users. They have a right to be compensated for their efforts, and their major compensation is through software sales."

"Well, I don't mean to hurt all those people—or anyone, really."

"Unfortunately, that's what copying does: it hurts people. And, ultimately, it hurts people like you, who want new and innovative software."

Do you copy software? Think about it.

The unauthorized copying of software is a crime.

Software Publishers Association
Suite 1200
1111 19th Street, N.W.
Washington, D.C. 20036

Created by Halcyon Associates, Brooklyn, New York.
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.

**Aatrix TimeCard** version 2.0 interfaces with bar-code readers and employee-ID-card slot readers. Combines with a variety of hardware to allow automated punch-in and punch-out of company-issued time cards, provides employee time calculations, and includes audio greeting and warning of improper ID-card users. Aatrix Software, 405 Bruce Ave., Grand Forks, ND 58206; 701/746-7202. Free; $199 new.

**APL68000** version 7.0 supports the Mac SE and Mac II. Provides APL multitasking. Mac II version also supports MC68810. Spencer Organization, 366 Kinderkamack Rd., Westwood, NJ 07675; 201/666-6011. Mac II version $279; $399 new. Other models $49; $149 new.

**ArtRoom** version 3.0 contains three additional volumes of clip art that include images of recreation, occasions, and holiday themes. Compatible with both IBM PC and Mac for network users. Supports EPS and PICT formats. Image Club Graphics, 1902 11th St. SE, Calgary, Alberta, Canada T2G 3G2; 403/262-8008. $199 on a subscription basis; $99 new.

**Business Sense** version 1.2 runs faster than earlier versions and is compatible with laser printers and with the ImageWriter LQ. Monogram Software, 531 Van Ness Ave., Torrance, CA 90501; 714/240-8985. Free to owners with subscription support, $89 for others; $495 new.

**CADD Level 1** version 1.1 includes PC/Macintosh translator and additional snaps, including snap midpoint, object, and intersection. Saves as PICT or EPS files and opens as PICT files. Also contains a select all feature. Performs multi-line text placement and backward redraw, and adds two new fonts for engineers and architects. Includes sample drawing and symbols. Generic Software, 11911 North Creek Pkwy. S, Bothell, WA 98011; 206/487-2233. Free; $149.95 new.

**Cricket Presents** version 2.0 comes with AutoPresents feature that can be used with templating tool to automatically create presentations from outlines. Program performs color blending and automatic kerning; imports data saved in SYLK file format; and has an expanded Template Library. Includes a 220,000-word spelling checker and a thesaurus. Cricket Software, Great Valley Corporate Center, 40 Valley Stream Pkwy., Malvern, PA 19355; 215/251-9890. Free; $495 new.

**DiskTop** version 3.0.4 contains new command features. In the international versions, when the Find command or a folder has too many items to display, DiskTop alerts and advises you. When ejecting a floppy disk under Finder, you no longer receive an error. CE Software, 1854 Fuller (continues)

---

**Milo** is the first math processor that combines mathematical calculations with graphing and word-processing capabilities. Milo effortlessly describes a problem, solves it, and graphs your solution. Our WYSIWYG interface allows you to easily manipulate expressions with a click of the mouse. No programming language required! Easily move your results to any word processor or desktop publishing application. Milo is the essential tool for all users of mathematics.

Introduction Retail Price $249.

**PARACOMP**

123 Townsend Street, Suite 310
San Francisco, CA 94107 (415) 543-3848

Circle 213 on reader service card
Mac II application for image capture, enhancement and analysis with either frame grab or PICT and TIFF image files.

- Feature extraction, gray scale, edge, vectors, area, convolution and morphology are a few techniques.
- Distance and location measurements in REAL WORLD units.
- Three levels of user interface:
  1. Click and drag for over 70 image analysis and measurement tools. Interactive and automatic sequencing.
  2. MacRAIL Developers Kit - An interpretive language to add your own algorithm or access our extensive imaging library. Easy interface to Apple graphical presentation format.
  3. C Libraries - For the professional imaging programmer.

**IMAGE PROCESSING WORKSHOP**
Introduce concepts and terminology in a hands-on clinic. Participants will set up and implement practical applications using a menu driven package. $1,100 / student; 3 days

**IMAGE ANALYST™**
Call for our Technical Summary Package 508-601-7900
755 Middlesex Turnpike, Billerica, MA 01821

Circle 428 on reader service card

MacDraw II version 1.1 contains a slide manager to design, preview, sort, store, and print slides, and a spelling checker with a 100,000-word dictionary. Also has extended metric ruler and a notes feature that lets you add multiple notes to a document. This version exports files via PICT2 and via customizable formats that can be saved to create new defaults for any MacDraw II 1.1 options. Claris, 440 Clyde Ave., Mountain View, CA 94043; 415/960-1500. $30 for MacDraw II 1.0 owners; $200 for original MacDraw owners; $599 new.

HyperCard version 1.2.2 is a maintenance release with additional support for international users. Offers improved display and prints Japanese, Arabic, and other non-Roman alphabets. Also provides international users with support for CD ROM drives. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014; 408/996-1010. $10; $49 new.

HyperPort Chess version 2.0 allows two people to play chess via modem or over an AppleTalk network. Can also be used as a chess database on a single Mac to store, replay, and analyze games. Checks for legality of moves and includes a comments field. Computer Ingenuity Consulting Associates, Star Rte. 1, Mailbox 110A, McDaniels, KY 40152; 502/257-8065. $10; $49.95 one copy new, $79.95 two copies new.

Laserpoint (Monochrome) version 1.9 adds configurable lasso, freehand PostScript drawing tool, and import and export capability for a variety of file formats including Tiff, PICT, and EPS. Rewritten manual includes tutorials on some of the basic functions. Compatible with all versions of System and Finder. LaserWare, P.O. Box 668, San Rafael, CA 94915; 415/453-9500. Free; $49.95 new.

EndNote version 1.1 supports WordPerfect, WriteNow 2.0, and EndLink, which gives you the ability to import data from online bibliographic database services such as dialog and BRS Colleague. Niles and Associates, 2200 Powell, #765, Emeryville, CA 94608-1809; 415/655-6666. Free; $129 new.

HyperCard version 1.2.2 is a maintenance release with additional support for international users. Offers improved display and prints Japanese, Arabic, and other non-Roman alphabets. Also provides international users with support for CD ROM drives. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014; 408/996-1010. $10; $49 new.

HyperProject II version 2.0 has automatic and interactive resource leveler, and does cross-project resource analysis. Gathers data from multiple projects and consolidates it through subproject hierarchies. Imports or exports files from a variety of applications running on Macs, MS-DOS machines, and mainframe computers. Creates multiple charts for layering or tiling. Uses HyperCard-based online help system, has spelling checker, and has ability to import graphic objects or pictures. Claris, 440 Clyde Ave., Mountain View, CA 94043; 415/960-1500. $65 if you own version 1.0; $199 if you own original version; $499 new.

McMax version 2.0 supports large screen displays, colors, and fonts. This version introduces user-defined READS feature, which lets developers do object-oriented programming and create modeless applications. Includes serial support for communicating with external devices such as printers, modems, or other computers via Mac modem port. Supports HyperCard's XCMDs. Nantucket, 12555 W. Jefferson Blvd., #300, Los Angeles, CA 90066; 213/390-7923. $39 if originally purchased before (continues)
Macworld's Third Annual

Technology and Issues Conference

June 27-30, 1989

The Technology and Issues Conference brings together third-party Mac hardware and software developers for a series of informal sessions to discuss the latest issues concerning the Mac community.

The setting for this year's conference is the Inn and Links at Spanish Bay, situated on the beautiful Monterey Bay Peninsula. Opening sessions will begin on June 27 and run through June 30, 1989.

Yes, I'm interested in attending the Macworld Technology and Issues Conference.

Please send details to:

NAME
TITLE
COMPANY
ADDRESS
CITY STATE ZIP

Send to: Technology and Issues Conference, Macworld Editorial, 501 2nd St., San Francisco, CA 94107
The fact that you’re considering a Macintosh II shows you’re serious about computers. That you want to reach as far as a great system will let you. So you can reach your potential.

Well, now there’s a way to go even further.

By giving your Mac II a MacSync™ monitor from NEC.

MacSync is designed solely for the Macintosh II Video Card. And because it is the direct result of some meaningful conversations with Mac II users, it has all the features you’ve always wanted in a monitor.

For instance, you asked for easier, more convenient controls. So we moved them up front. You also wanted a 14” non-glare screen to reduce
the Macs.

fatigue. A smaller footprint and a tilt-swivel base, for more comfortable viewing. They're yours. What's more, we give you a cabinet that looks as good from the back as it does from the front. And a HyperCard stack on-screen user reference guide called MacSync Valet. All at no extra cost.

And if you don't mind us saying so, that's the least you and your Macintosh II deserve.

MacSync from NEC. We've taken everything we've learned about making great color monitors. And applied it to the Macs.

For literature, call 1-800-826-2255. For technical details, call NEC Home Electronics (USA) Inc. 1-800-FONE-NEC.
When you do accounting you'll want something more than database adaptations, spreadsheet templates or converted MS-DOS programs. All three of our fine accounting programs were created especially for the Macintosh!

**MULTILEGDER**
Now you can get General Ledger, Accounts Receivable, Accounts Payable, and Inventory tracking together in one completely integrated program... at a fraction of the cost of buying individual GIL, NA, NP, and Inventory modules.

**PAYROLL**
This easy-to-learn, easy-to-use payroll system is ideal for most organizations or businesses with 1 to 1000 employees. Use it as a standalone program or integrate it with either of our ledger programs.

**CASH LEDGER**
This is a full-featured accounting system for businesses or organizations using cash-basis reporting. It can also be used by accountants or other professionals who require "write-up" capability.

---

**MockPackage Plus Utilities** version 4.4 includes five new programs. Ask feature selectively turns on and off start-up utilities. Control-1 enables you to specify which CDEV is active when the Control Panel is opened. FolderShare changes the privileged default setting when creating new folders in AppleShare. LaserStatus is a DA that monitors the use of LaserWriter and PostScript printers, and Widgets is a set of utility functions. Ez-Menu has been rewritten as a CDEV that includes keyboard control of menus. CE Software, 1854 Fuller Rd., West Des Moines, IA 50265; 515/224-1995. $15; $49.95 new.

**Navigate** version 2.0 adds color for the Mac II. Program displays deep contour lines. Lets you point and click for route planning. Comes bundled with HyperCard chart catalog and supports three additional orisons. Fair Tide Technologies, 18 Ray Ave., Burlington, MA 01803; 617/229-6409. Free; monochrome $395 new; color $695 new.

**Pegasys II** version 3.2 supports large-format digitizing tables for inputting drawings. Journalizing feature automatically creates macros that can be edited and played back to simulate the operator’s actions in real time. Runs on Mac II. IGC Technology, 305 Lennon Ln., Walnut Creek, CA 94598; 415/945-7300. Free; $1795 new.

**Propsforms** version 2.0 does not require SuperPaint. Can be used with any graphics, word processing, page-layout, or presentation application that can read PICT files. JLA Computer Services, P.O. Box 444, Kulpsville, PA 19443; 215/855-5159. Free; $79 new.

**SuperPaint** version 2.0 contains AutoTrace, a freehand tool for drawing editable bezier paths, and an airbrush feature to control paint flow. Supports plug-in modules for custom-programmed paint tools. Bitmapped objects in the draw layer can be edited at a user-specified resolution. Transformation functions allow scaling, free rotating, flipping, or slanting of text and objects. Prints and previews in color. Silicon Beach Software, 9770 Carroll Center Rd., Ste. J, San Diego, CA 92126; 619/695-6956. $50; $199 new.

**Timeslips III for the Macintosh** version 1.1 lets you print bills using various fonts, and includes rates and details of client funds on bills. International money, date, and time formats can be used, based on the System installed. North Edge Software, 239 Western Ave., Essex, MA 01929; 508/768-6100. Free; monochrome $395 new; color $695 new.

**Wall Street Investor** version 3.0 includes multaccount management capabilities, point and figure charts, and online trading with Fidelity Discount Brokerage; allows for file transfer of historical data from other programs. Pro Plus Software, 2150 E. Brown Rd., Mesa, AZ 85203; 602/461-3296. $150; $695 new.
Finally, the individual investor has direct access to the easiest and most statistically proven method to increase wealth!

Introducing WealthBuilder™ by Money Magazine, software that turns your computer into your own personal financial assistant.

It's Like Having an All-Star Team of Financial Advisors in Your Home!

Imagine having a private financial planner on-call twenty-four hours a day, helping you achieve both your long- and short-term goals, including:
- Retirement
- Home Ownership
- College Education
- Insurance
- Savings
- Tax Planning

Match Your Financial Goals to Real Investment Products.

Taking into account your goals, your profile and your own tolerance for risk, WealthBuilder by Money Magazine automatically searches for the best investment products available that will allow you to fulfill your objectives. Then, you print out an action plan that provides instructions on how to obtain those products.

See How Today's Transactions Impact Your Tomorrow.

What if you rent a house for the next few years instead of buying one? What if you purchase that new sports car? How will such actions affect your retirement planning? The program allows you to view how your everyday decisions impact your long-term financial picture.

WealthBuilder by Money Magazine operates on IBM PC/XT/AT, PS/2 and compatibles with DOS 2.0 or higher, at least 512K RAM and a hard disk. The Apple Macintosh version requires minimum 512K RAM and a hard disk.

Super Simple to Use!

To use WealthBuilder by Money Magazine, you only have to know how to point a mouse or press a key. You don't have to understand finance or computers. It comes complete with financial tutorials, defining everything you need to know about your finances. You'll be able to:
- set your goals
- lower your tax bill
- develop your own financial plan

Sample WealthBuilder by Money Magazine for Only $9.95 and Receive a Special Bonus!

For only $9.95 you'll get a live working version of the software which will provide you with valuable tax and retirement tips. In addition, you'll receive the MONEY Guide to the Basics of Personal Finance (a $3.95 value) and a $10 rebate on your final purchase! Or try WealthBuilder by Money Magazine with a no-risk 30-day guarantee and receive MONEY's Making Your Money Count videocassette FREE! If you're not completely satisfied, return everything within 30 days for a full refund.

CALL 1-800-346-2024 or send this coupon to:
WealthBuilder Special Offer, Reality Technologies, Inc.
3624 Market Street, Philadelphia, PA 19104

Send me: ___ Preview Disk(s) @ $9.95 per copy or ___ copies of WealthBuilder by Money Magazine @ $249.95 plus $7.50 s/h per copy
(In PA & CT add state sales tax.)

Name ________________________________
Company ________________________________
Address ________________________________
City ____________________________________ State ______________ ZIP __________

☐ IBM 5 1/4”
☐ IBM 3 1/2”
☐ Macintosh
☐ Check enclosed
☐ VISA
☐ MasterCard
☐ Amex

Acct # __________________ Exp. Date ______________

Signature ________________________________

WealthBuilder™ is a trademark of WealthBuilder Inc. licensed to Reality Technologies, Inc. MONEY is a trademark of The Time Inc. Magazine Company.
The Story Of Apple® & Eve.

In the beginning, there was an Apple. & a lot of software. Great stuff to use. Great stuff for pirates to copy free.

Then came a bigger, more powerful Apple called the Mac. The temptation for free software rose once more. & piracy again had its way.

Then Eve arrived. To quickly end the free-loaders' rule. & the rest is history.

Introducing EVE for the Apple—the software developer's key to a secure return on development investment.

EVE protects Macintosh software from piracy—with a simple but virtually foolproof concept: The software won't run unless the EVE hardware key is plugged in. And only those who purchased the software have a key that works with the program.

To developers, EVE's implementation is simple. Key codes are imbedded in the software which require a correct response from EVE any time the program is accessed. Without EVE, the software doesn't run.

And to users, EVE is totally transparent. The software runs as if EVE wasn't even there. It's that simple.

KEY FEATURES:
- For the Macintosh SE and II
- Developer implemented
- Completely transparent to the user
- Permits unlimited backup copies
- Seven programmable security locks
- Up to seven programs per key
- Multi-level password-based access
- Installs via any Mac ADB connector
- Compact and easy to install

EVE. The perfect companion to Mac software. For additional information, call Rainbow Technologies. European inquiries can be conveniently made to Rainbow Technologies Ltd, United Kingdom.

Rainbow Technologies also provides the SentinelPro and Sentinel-C hardware keys to protect software developed for IBM PCs, PS/2s and compatibles, and the Atari ST. And the DataSentry for PC users who want to protect data files.

RAINBOW TECHNOLOGIES
18011-A Mitchell South, Irvine, CA 92714 • (714) 261-0228 • TELEX: 386078 • FAX: (714) 261-0260
Rainbow Technologies, Ltd., Shirley Lodge, 470 London Rd, Slough, Berkshire, SL3 9QY, U.K., Tel: 0753-41512 Fax: 0753-43610
©1989 Rainbow Technologies. All product names are trademarks of their respective manufacturers.

Circle 106 on reader service card
WHERE TO BUY

This listing provides company addresses and phone numbers for products mentioned in this issue. Allow several weeks for responses to Reader Service Card inquiries. Asterisks indicate vendors who prefer to be contacted by phone.

Reader Service


751 Aldus FreeHand Aldus Corp., 411 First Ave., Seattle, WA 98104; 206/622-5500.

752 Aldus Persuasion Aldus Corp., 411 First Ave., Seattle, WA 98104; 206/622-5500.

753 AppleLine Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014; 408/996-1010.

754 AppleScanner Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014; 408/996-1010.


756 Business FileVision Marvelin Corp., 3420 Ocean Park Blvd., #3020, Santa Monica, CA 90405; 213/450-6813.

757 CL/1 Network Innovations

Reader Service

Corps., 20863 Stevens Creek Blvd., Cupertino, CA 95014; 408/257-6800.

CLR HyperArrays Clear Lake Research, 5615 Morningside, #127, Houston, TX 77005; 713/523-7842.


Dac-Easy Light Dac Software, Inc., 17950 Preston Rd., #800, Dallas, TX 75221; 214/248-0205, 800/992-7779.

DataBase Preferred Publishers, Inc., 5100 Poplar Ave., #617, Memphis, TN 38137; 901/683-3383.

DataGlove VPL Research, Inc., 656 Bair Island Rd., #304, Redwood City, CA 94065; 415/031-1710.

dBase Moc Ashton-Tate, 20101 Hamilton Ave., Torrance, CA 90502-1119; 213/329-8000.

dCalc Programmer's Calculator DelSoft Software, P.O. Box 1577, Carlsbad, CA 92008; 619/945-2353.

Digital Darkroom Silicon Beach Software, Inc., P.O. Box 261420, San Diego, CA 92126; 619/695-6956.

Dimensions Visual Information Development, Inc., 16309 Doublegrove St., La Puente, CA 91744; 818/918-8834.

DiskExpress AlSoft, Inc., P.O. Box 927, Spring, TX 77383-0927; 713/353-4090.


Emailer Magna, 2540 N. First St., #302, San Jose, CA 95151; 408/433-5467.

FastLabel Vertical Solutions, P.O. Box 7555, Olympia, WA 98507; 206/352-2097, 800/942-4008.

FileMaker II Claris Corp., 440 Clyde Ave., Mountain View, CA 94043; 415/960-1500, 800/334-3535.

Focal Point II Mediagenic, 3885 Bohannon Dr., Menlo Park, CA 94025; 415/329-0800.


HyperCard Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014; 408/996-1010.

HyperCard VideoDisc Toolkit APDA/Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014; 408/996-1010.

HyperComposer Addison-Wesley Publishing Co., 128/Jacob Way, Reading, MA 01867; 617/944-5700.

HyperEngine Symmetry Corp., 761 E. University Dr., Ste. C, Mesa, AZ 85203; 602/844-2199, 800/624-2485.

HyperScan Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014; 408/996-1010.

HyperMON Icon Simulations, Inc., 5648 S. Wheeling Rd., Wheeling, IL 60090; 312/520-4440.

Intelligent Communications Processor AST Research, Inc., 2121 Alon Ave., Irvine, CA 92714-4992; 714/863-1333.

Interfax 12/48 Abaton, 48431 Milmont Dr., Fremont, CA 94538; 415/683-2226, 800/444-5521.

Interpreter Dimensions Visual Information Development, Inc., 16309 Doublegrove St., La Puente, CA 91744; 818/918-8834.

(continues)
WHERE TO BUY

L

786 LetraStudio Letraset USA, 40 Eisenhower Dr., Paramus, NJ 07653; 201/845-6100, 800/526-9703.

787 Lightspeed Pascal Symantec Corp., 10201 Torre Ave., Cupertino, CA 95014; 408/253-9600.

788 MacAPPC Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014; 408/996-1010.

789 MacBlast Communications Research Group, 5615 Corporate Blvd., Baton Rouge, LA 70808; 504/923-0888.

790 MacDraco Digital Communications Associates, Inc., 1000 Alderman Dr., Alpharetta, GA 30021; 404/442-4000, 800/241-4762.


792 MacMainframe Avatar Corp., 99 South St., Hopkinton, MA 01748; 508/435-6872, 800/289-2526.

793 MacMainframe SE Avatar Corp., 99 South St., Hopkinton, MA 01748; 508/435-6872, 800/289-2526.

794 MacMainframe II Avatar Corp., 99 South St., Hopkinton, MA 01748; 508/435-6872, 800/289-2526.

795 MacMainframe II/DFT Avatar Corp., 99 South St., Hopkinton, MA 01748; 508/435-6872, 800/289-2526.


797 MacRecorder Farallon Computing, 2150 Kittredge St., Berkeley, CA 95709; 415/849-2331.

798 MacroMind Director MacroMind, Inc., 410 Townsend St., #908, San Francisco, CA 94107; 415/442-0200.

799 MacTerminal Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014; 408/996-1010.

800 MacV Pascal Symantec Inc., 20525 Mariani Ave., Cupertino, CA 95014; 408/996-1010.

801 MacWrite II Claris Corp., 440 Clyde Ave., Mountain View, CA 94043; 415/960-1500, 800/334-5355.

802 Matrix T2200 Matrix Instruments, Inc., 1 Ramland Rd., Orangeburg, NY 10962; 914/365-0190, 800/852-8533.

803 Mean 18 Ultimate Golf Acolade, Inc., 550 S. Winchester Blvd., #200, San Jose, CA 95128; 408/985-1700.

804 Microsoft File Microsoft Corp., 16011 N.E. 36th Way, Box 97017, Redmond, WA 98073-9177; 206/882-8080, 800/426-9400.

805 Microsoft Word Microsoft Corp., 16011 N.E. 36th Way, Box 97017, Redmond, WA 98073-9177; 206/882-8080, 800/426-9400.

806 Miles Paracom, 125 Townsend St., #310, San Francisco, CA 94107; 415/543-3848.

807 More II Symantec Corp., 10201 Torre Ave., Cupertino, CA 95014; 408/253-9600.

808 Movie Magic Budgeting Screenplay Systems, 150 E. Olive, #905, Burbank, CA 91501; 818/842-6557.

809 Movie Magic Budgeting/ Breakdown Screenplay Systems, 150 E. Olive, #905, Burbank, CA 91501; 818/842-6557.

810 Multidisk ALSoft, Inc., P.O. Box 927, Spring, TX 77383-0927; 713/353-4090.

811 NetModem V2400 Shiva Corp., 155 Second St., Cambridge, MA 02141; 617/864-8500, 800/458-3550.

812 Netway 1000A Tri-Data Systems, 1450 Kifer Rd., Sunnyvale, CA 94086; 408/746-2900, 800/874-3282.

813 Oracle Oracle Corp., 20 Davis Dr., Belmont, CA 94002; 415/598-8000.

814 Oracle for Macintosh Oracle Corp., 20 Davis Dr., Belmont, CA 94002; 415/598-8000.


816 Panorama ProVu Development Corp., 15180 Transistor Ln., Huntington Beach, CA 92649, 714/892-8199.


819 PC Tools Deluxe Central Point Software, Inc., 15220 Greenbrier Pkwy., #200, Beaverton, OR 97006, 503/690-8090.

820 PhotoShop Adobe Systems, Inc., P.O. Box 7900, Mountain View, CA 94043-7900; 415/961-4400, 800/833-6687.

S

829 Screen Recorder Farallon Computing, 2150 Kittredge St., Berkeley, CA 95709; 415/849-2331.

(continues)
America is worth fighting for.

From the Atlantic to the Pacific, the Arctic to the Gulf, our land is constantly under attack from the polluters and despoilers.

That's why Sierra Club Legal Defense Fund attorneys are pursuing dozens of cases nationwide in defense of wildlife, rare habitats, the air we breathe and the water we drink.

Most of our support comes from individual contributors like you. Please help us win. Because America is worth fighting for.

I enclose my tax-deductible contribution to save what I love most about America. Send me your quarterly newsletters in return.

NAME

ADDRESS

CITY   STATE   ZIP

Sierra Club Legal Defense Fund
2044 Fillmore, San Francisco, CA 94115
From PCPC, those who created

PCPC II™
8-bit Color Graphic System
High-resolution, flicker-free color monitor and video card, bundled with cable, tilt/swivel base, and Stepping Out™ II virtual screen software.

PCPC Optical Erasable Removable Drive (OER600) NEW!
600 Mbytes of storage on an optical, erasable, removable disk. Over 1,000,000 rewrites! Comes with MacBottom Utilities and a 600-Mbyte cartridge.

PCPC IIID Series
Internal Drives for Mac II
MacBottom quality in an internal hard disk drive, 88 or 158 Mbytes, with mounting hardware and MacBottom Utilities.

JETSTREAM™ Tape Backup
Archive 2.2 gigabytes of data at a blazing 14.4 Mb/minute. Comes with HFS Backup 3.0, SCSI cable, 2.2-gigabyte tape.

PCPC 24-bit Color Graphic Card (CGC/2/24)
Create dazzling graphics with 16.7 million colors!
Fully compatible with Apple's 32-bit Color QuickDraw.

SHADOWGRAPH™
Gray Scale & Monochrome Systems
Crisp, clear, flicker-free 2-page monitors with video card, cable, tilt/swivel base, and Stepping Out™ II virtual screen software.

©1989 PCPC. All rights reserved. Macintosh is a registered trademark of Apple Computer, Inc. QuickDraw is a trademark of Apple Computer, Inc. Stepping Out II is a trademark of Berkeley System Design, Inc. All others trademarked by PCPC.

"Peyote" was created with Design and Solid Dimensions from Visual Information, Inc.; "Dolphine" was created by Lewis Johnson.
Over four years ago, we created the best hard disk drive for Macintosh: The MacBottom™. The one about which reviewers say, “its exceptional performance and reliability make it more than worth the price.”

We didn’t stop there. We followed MacBottom with more products, each designed to meet professional needs — all of them built to last and last.

Now PCPC offers an entire family of Macintosh™ peripherals for desktop publishing, CAD/CAE, video production, and more. Including our video cards leading from 1-bit monochrome directly to 32-bit Color QuickDraw™. And a trend-setting 600-Mbyte optical, erasable and removable disk drive.

Every PCPC product provides:
- 100% Apple compatibility
- State-of-the-art engineering
- Industry-leading warranties

So before you buy anything less, ask your dealer about PCPC products. Or, call us for the dealer nearest you.

800-622-2888 • 813-884-3092 • FAX 813-886-0520

From the wonderful folks who bring you MacBottom.

Personal Computer Peripherals Corporation
4710 Eisenhower Blvd., Bldg. A1 • Tampa, Florida 33634

Circle 223 on reader service card
PRODUCT INDEX

Software

BUSINESS
— Actus, 49
329 Aldus, 62-63
220 Ashton Tate, 21-25
428 Automatic, 244
— Checkmark Software, 248
— Claris, 36-37
— Claris, 39
360 Inforans, 214-215
— Intuit, 223
— Microsoft, IFC-1
87 Monogram, 94
59 Multi Solutions 53
42 Personal Training Systems, 155
190 Supersmac Technology, 209
257 Symantec, 7
491 Sytux, 86
492 Sytux, 86
125 TRSIP, 58
— Vertical Solutions, 229
408 Visual Business Systems, 187

VERTICAL
49 allan benadio associates, 220
— Checkmark Software, 248
213 Pancomp, 243
96 Symantec, 26-29
125 TRSF, 58

DATA MANAGEMENT
— Actus, 49
181 ABC Management Systems, 30
152 Fox Software, 84
— Oracle, 31
42 Pro Visio, 56

WORK PROCESSING
220 Ashton Tate, 21-25
— Claris, 36-37
— Claris, 39
42 Personal Training Systems, 155
64 Skylar Technology, 199
215 Symantec, 26
313 T/Maker, IBC

CAD/CAM
454 Autodesk, 240-241
— Claris, 80-81
77 Graphsoft, 210
94 Mathsoft, 205

COMMUNICATIONS
371 Compuserve, 90
40 Datavis, 217
48 Software Ventures, 35

HYPERGARD
302 Symantec, 222

EDUCATIONAL
213 Pancomp, 243
42 Personal Training Systems, 155
179 STAXI, 226

GRAPHICS/DESKTOP PUBLISHING
— Adobe Systems, 4
329 Aldus, 62-63
428 Automatic, 244
15 Cideric Software, 235
346 DecoByte Software, 33
— Image Club, 218
323 NoteEQuation, 204
39 Outilux Corporation, 52
203 Quark, 98
135 Quark, 230-231
353 Quark, 230-231

Hardware

PRINTERS
— AGFA Graphics, 173-175
11 GCC Technologies, 147
— GEL Technologies, 31
344 Hewlett Packard, 194-195
304 Laser Connection/QMS, 205
265 Orange Micro, 39
315 Quate, 230-231
393 Quate, 230-231
93 Val Byrne, 224

BOARDS
1 Air Land Systems, 178
375 Clearpoint Research, 225
327 Clearpoint Research, 227
477 Daystar Digital, 228
324 GIP Instruments, 60
82 Irwin Magnetics, 167
161 Micron Technology, 249
413 Mobile Technologies, 242
196 National Semiconductor, 160
223 Personal Computer Peripherals Corporation, 254-255
496 Pinasa Sales Intl., 151
13 Raster Ops, 153
105 Supersmac Technology, 206
495 Supersmac Technology, 207
390 Supersmac Technology, 209
473 Television, 78-79

DISSIPERS/SCANNERS
230 Carel Corp, 146-147
176 Thunderwave, 6

DISPLAY
101 E-Machines, 65
354 MacFriends, 74
223 Personal Computer Peripherals Corporation, 254-255
46 Radius, 12-13
423 Shine, 17
137 Sigma Designs, 8-9

MODEMS
61 Computer Friends, 202
363 Hayes, 54-55
194 Prometheus Products, 154
469 Vell-Tel, 72

HARD DISKS/STORAGE
3 Archive, 96
225 Core Systems Corporation, 184
452 Human Engineering, 232
110 Inverex Systems, 157
440 Hard Drives International, 239
21 Jasmine, 14
102 Jasmine, 200-201
245 Laza, 18
554 MacFriends, 74
275 MicroNet, 171
450 Microtech International, 77
245 Microtech International, 77
424 Mirror Technologies, 92-93
58 Mirror Technologies, 92-93
43 Mirror Technologies, 92-93
203 Personal Computer Peripherals Corporation, 254-255
336 Prism, 250-257
149 Redline Systems, 59
— Seagate, 84
524 Tecmar, 51

VIDEO
467 General Parametric, 180
257 NEC, 246-247

MISCELLANEOUS
401 Advanced Gravis, 48
460 AGFA Multis Division, 34
64 Computer Friends, 203
186 Sun Remarking, 162
26 Tritter USA, 198
469 Vell-Tel, 72
267 Zericom, 199

EXPANSIONS/UPGRADES
161 Micron Technology, 249

SOFTWARE SECURITY DEVICE
106 Rainbow Technologies, 250

Accessories

FLOPPY DISKS/HANDERS
479 BASP, 221
— Maxell, 46

FURNITURE
— Anthro Corp., 4
296 ScanCo, 61

MISCELLANEOUS
401 Advanced Gravis, 48
61 Computer Friends, 203
128 Kensington Microware Ltd., BC
30 Kensington Microwave Ltd., 196-197
276 MicroComputer Accessories, 182
296 ScanCo, 61
139 SecureIt, 198

Mail Order
5 Beverly Hills Computers, 260-261
32 CDI Computer Sales, 56
562 Diskette Connection, 290
68 Dr. Mac, 259
469 Mac Zone, The, 180-191
— MacConnection, 100-101
354 MacFriends, 74
264 MacLand, 262
86 MacProducts USA, 176
78 MacWarehouse, 60-63
45 Open Mac, 257
44 Programs Plus, 66-71
— Software Library, 258
— Scotsman, 52A-S2AF
94 USA Flex, 250.
Get more information on products you're interested in—simply return one of these cards today. There's no cost. And no obligation.

Expires 8/15/89.
**NEW Software**

- Aatrix Payroll+...3.02...NCP $154
- Adobe Illustrator 88...2.0...NCP 228
- Certificate Maker...2.0...CP 24
- Copy II for the Macintosh...7.2...NCP 20
- DeskPaint 2.01...NCP 68
- Falcon 2...2.0...NCP 32
- FileMaker II...1.0...NCP 229
- 4th Dimension...1.0.6...NCP 599
- Jam Factory...1.32...CP 162
- KidTalk...1.0...NCP 30
- Lightspeed C...3.01...NCP 139
- MacGolf Classic (Color)...3.0...CP 54
- MacMoney...3.02...NCP 61
- MicroPhone II...3.0...NCP 225
- MiniCAD...1.0.65...NCP 519
- Microsoft Excel...1.5...NCP 257
- Panorama...1.0...NCP 209
- PC Tools...1.0...NCP 45
- PowerMath II...2.6...NCP 108
- Quicken...1.0...NCP 33
- Read-It for ThunderScan...1.0.65...NCP 79
- SpellStat...1.0...NCP 23
- SpellStat Coach Prof...3.0...NCP 105
- Strictly Business GL...1.98...NCP 199
- Suitecase II...1.2.2...NCP 69
- SuperCard...1.0...NCP 137
- SuperLaserSpool...2.0...NCP 82
- SuperPaint...2.0...NCP 129
- Super 3D (Color)...2.0...NCP 325
- Symantec Utilities...1.1...NCP 59
- Tempo II...1.0...NCP 69
- Virex...1.3...NCP 69
- WingZ...1.0...NCP 273

**Hardware / Other**

- Cables...lowest prices $ Call
- 3M SONY SS/DD...Box of 10 13
- 3M SONY DS/DD...Box of 10 18
- Emac 20 SS int HD...40ms...1 yr. 518
- Emac 40 Ultra ext HD...40ms...1 yr. 795
- Emac MD 2400 Mics...1.1...NCP 38
- Levy SE Accel...299
- MacOpener...open Mac case...lifetime 17
- R. Synchro SIMMs...32MB...100 ns...1 yr. 398
- R. Synchro SIMMs...64MB...100 ns...1 yr. 398
- R. Synchro SIMMs...128MB...100 ns...1 yr. 398
- TurboNet SD...512Kb/SE/Mac II...1 yr. 30
- Backup 19" Monitor includes: anti-glare, tilt/swivel, & card...SE/Mac II...1 yr. 1375
- ThunderScan MAC...power acc...90 days 45
- TurboNet SD...512Kb/SE/Mac II...1 yr. 30
- All items subject to availability
- Prices subject to change without notice
- Defective hardware repaired or replaced at our discretion

**RETURN PRIVILEGES ON NEW ITEMS**

Money-back guarantees are available for many items with participating manufacturers. Restocking fees apply to all the rest @ 2% of the sales price per day (min 10 days).

- Toll-Free Order Line 24 hrs.
- Toll-Free Customer Service
- Tech Support (713) 526-1100
- $3 Shipping (Same Day if by 2:00 CST)
- Continental USA only
- Visa & MasterCard no Surcharge
- No charge on split ship completions
# 20 Megabyte External

**Hard Drives**

<table>
<thead>
<tr>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMS (Mac Plus, SE, II External)</td>
<td></td>
</tr>
<tr>
<td>SD 20 Megabyte</td>
<td>$499</td>
</tr>
<tr>
<td>SD 30 Megabyte</td>
<td>$599</td>
</tr>
<tr>
<td>SD 60 Megabyte</td>
<td>$769</td>
</tr>
<tr>
<td>SD 80 Megabyte</td>
<td>$1249</td>
</tr>
<tr>
<td>SD 140 Megabyte</td>
<td>$1298</td>
</tr>
<tr>
<td>CMS Pro Series Internal Mac SE/II</td>
<td></td>
</tr>
<tr>
<td>30 Megabyte SE rear</td>
<td>$489</td>
</tr>
<tr>
<td>45 Megabyte SE rear</td>
<td>$649</td>
</tr>
<tr>
<td>65 Megabyte SE rear</td>
<td>$899</td>
</tr>
<tr>
<td>80 Megabyte SE rear</td>
<td>$1199</td>
</tr>
<tr>
<td>40 Megabyte Mac II</td>
<td>$549</td>
</tr>
<tr>
<td>60 Megabyte Mac II</td>
<td>$699</td>
</tr>
<tr>
<td>80 Megabyte Mac II</td>
<td>$1145</td>
</tr>
<tr>
<td>150 Megabyte Mac II</td>
<td>$1879</td>
</tr>
<tr>
<td>300 Megabyte Mac II</td>
<td>$2749</td>
</tr>
</tbody>
</table>

**Epson Printers**

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>FX-850, FX-1050, LQ-500</td>
<td>$599</td>
</tr>
</tbody>
</table>

**GCC Write Move**

Portable ink-jet printer ........ $529

**Monitors**

<table>
<thead>
<tr>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Big Picture 17&quot; monochrome</td>
<td>$1298</td>
</tr>
<tr>
<td>Big Picture Z21</td>
<td>$1798</td>
</tr>
<tr>
<td>Big Picture Z21 IQ</td>
<td>$2598</td>
</tr>
<tr>
<td>Big Picture T-16 color</td>
<td>$2598</td>
</tr>
<tr>
<td>Big Picture TX-16</td>
<td>$3398</td>
</tr>
<tr>
<td>Big Picture T-19</td>
<td>$4498</td>
</tr>
</tbody>
</table>

**Monitorm**

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viking 1 19&quot;</td>
<td>$1498</td>
</tr>
<tr>
<td>Viking 2400 24&quot;</td>
<td>$1898</td>
</tr>
<tr>
<td>Viking GS 19&quot;</td>
<td>$2498</td>
</tr>
<tr>
<td>Viking 10 Color 19&quot;</td>
<td>$3898</td>
</tr>
</tbody>
</table>

**Cutting Edge**

800K External Drive ............... $175

**Everex/EMAC**

External 20D ...................... $499
External 20 Zero Footprint ....... $499
Impact 40 Plus ................... $789
Impact 60 ........................ $999
Internal Mac II 20 Megabyte ....... $445

**PCPC MacBottom**

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>HD-21</td>
<td>$639</td>
</tr>
<tr>
<td>HD-32</td>
<td>$689</td>
</tr>
<tr>
<td>HD-45</td>
<td>$829</td>
</tr>
<tr>
<td>HD-70</td>
<td>$969</td>
</tr>
<tr>
<td>HD-84</td>
<td>$1299</td>
</tr>
</tbody>
</table>

**Tape Back-up Systems**

<table>
<thead>
<tr>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMS 60 Megabyte External</td>
<td>$729</td>
</tr>
<tr>
<td>TS-60</td>
<td></td>
</tr>
</tbody>
</table>

**Epson LX-800**

9 pin, 180 cps .................. $199
Grappler C/Mac .................. $79

**Epson LQ-500**

24 pin, 180 cps ................ $339
Grappler LQ ..................... $89

**Heiwlett Packard**

DeskJet ......................... $698
Grappler LS ........................ $89

**General Computer**

<table>
<thead>
<tr>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLP Laser</td>
<td>$1598</td>
</tr>
<tr>
<td>PLP Plus</td>
<td>$1698</td>
</tr>
<tr>
<td>Business Laser Plus</td>
<td>$2998</td>
</tr>
</tbody>
</table>

**Imagewriter Compatible**

Seikosha SP 1000 AP ............ $215

**Specials**

<table>
<thead>
<tr>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magnovox 14&quot; Mac Display</td>
<td>$509</td>
</tr>
<tr>
<td>640 x 480 Resolution</td>
<td></td>
</tr>
<tr>
<td>Fine Dot Pitch, Tilt &amp; Swivel Base</td>
<td></td>
</tr>
</tbody>
</table>

**Sigma Design**

Pageview Plus/SE 15" .......... $988
Silverview 21" ................ $1598
Silverview 256 Grey Shades     | $2398
Colormax 19" ................ $3898

**Raster Ops**

Colorboards ........................ Call
Monitors .......................... Call

Please call for competitive system pricing.

Beverly Hills Computer

Computer professionals since 1975.
1-800-426-8166

From Beverly Hills  (213)273-3710
Fax Machine (213)675-2522

279 South Beverly Drive, Suite 1200, Beverly Hills, California 90212
**Hard Drive $449**

New!

Logitech
Hand-Held Scanner ......... $398
Selectable Resolution to 400 d.p.i. Scans Images Quickly 4" Wide and Up to 14" Long.

**Modems**

Abaton InterFax ......... $328
Beverly Hills
External 1200 Baud ......... $99
External 2400 Baud ........ $149
Internal 2400 Mac II ......... $199
Epic Technology
Internal 2400 Mac II ........ $299
Everex
Emac External 2400 ........ $219

**Accessories**

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

**Generic Computer Supply**

Disks Box of 10 DS/DD ....... $17
Mouse Pad ....................... $7
Monitor Stand ............... $18
Printer Stand 80 column ....... $14
Printer Stand 132 column ....... $19
Surge Protector 6 outlet ........ $18

**Kensington**

Superbase ................. $33
System Saver ............... $63
System Saver SE ........... $52
Security System .............. $34
Mac II System Stand ....... $19
Masterpiece Mac II ........ $105
Keyboard Cable ADB ........ $25
Monitor Extension Kit ........ $33
MacTilt & Swivel ............. $22
Turbo Mouse ................. $109
Turbo Mouse ADB ............. $109

**Microspeed**

MacTrac Trackball ........... $78

**Low prices, great service!**

**Practical Peripherals**

Mac Pack 2400 ............. $229
Shiva Corp
NetModem 2400 ............ $399
NetSerial ....................... $269
U.S. Robotics
External 2400 .............. $169
DCA
Mac Irma-Mac II or SE ....... $795
**Dove Computer**

MacSnap Tool Kit ........ $115
MacSnap Plus 2 ......... Call
MacSnap 2 SE .......... Call
MacSnap 524S ......... Call
MacSnap 548S .......... Call
MaraThon 020 Accelerator .... $549
MaraThon 030 Accelerator .... $1198
Co-Processor 68881 ........ $249

**Call for SIMM prices**

**Accelerators**

DoubleTime-16 ............ $299
GCC Technologies
Hypercharger 020 Accelerator $679

**Scanners**

Hewlett Packard ScanJet .... $1395
Microtek
300C 16 grey levels ....... $1349
300QS 64 grey levels ....... $1949
300G 256 grey levels ....... $2749
400G 256 grey levels 400 dpi $3349
All Scanners bundled w/Software.

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
ScreenRecorder ............... $135

**OUR POLICY**

- Plain and simple. Hardware; your satisfaction guaranteed or your money back.
- Software; defective software will be replace. 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.
- C.O.D. orders accepted.
- 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.
- Prices and availability subject to change.

Circle 5 on reader service card

**SHIPPING**

All items in stock will ship in 24 hours. We offer daily service from Federal Express, UPS, U.S. Postal Service. Call for handling and shipping fees. Minimum shipping charge $4.00.

SE Silencer
Ultra quiet
Internal Fan
Keeps it cool & quiet ........ $39

Mobius
Fanny Mac QT ............... $58
SE Silencer ....................... $39
Multiscreen Video Card .... $339

Mouse System
A+ Mouse ...................... $65
A+ ADB Mouse ................. $79

**Kensington**

Superbase ................. $33
System Saver ............... $63
System Saver SE ........... $52
Security System .............. $34
Mac II System Stand ....... $19
Masterpiece Mac II ........ $105
Keyboard Cable ADB ........ $25
Monitor Extension Kit ........ $33
MacTilt & Swivel ............. $22
Turbo Mouse ................. $109
Turbo Mouse ADB ............. $109
**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.

### Externals

<table>
<thead>
<tr>
<th>Price</th>
<th>20 Megabyte</th>
<th>30 Megabyte</th>
<th>40 Megabyte</th>
<th>60 Megabyte</th>
<th>80 Megabyte</th>
<th>100 Megabyte</th>
</tr>
</thead>
<tbody>
<tr>
<td>MicroNet 20 65ms</td>
<td>$499.</td>
<td>$449.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MacBest 65ms</td>
<td>$499.</td>
<td>$439.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MacBest 30 28ms</td>
<td>$549.</td>
<td>$499.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MicroNet 30 38ms</td>
<td>$579.</td>
<td>$569.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MacBest 45 28ms</td>
<td>$669.</td>
<td>$639.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MicroNet 46 40ms</td>
<td>$649.</td>
<td>$569.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quantum 40* 19ms</td>
<td>$699.</td>
<td>$649.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MacBest 60 28ms</td>
<td>$729.</td>
<td>$649.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MicroNet 60 28ms</td>
<td>$739.</td>
<td>$699.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MacBest 80 28ms</td>
<td>$849.</td>
<td>$779.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quantum 80* 19ms</td>
<td>$949.</td>
<td>$899.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conner 100 25ms</td>
<td>$999.</td>
<td>$929.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MacBest 90 18ms</td>
<td>$939.</td>
<td>$879.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CDC 150 17ms</td>
<td>$1,579.</td>
<td>$1,475.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MicroNet (CDC) 173 18ms</td>
<td>$1,649.</td>
<td>$1,599.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CDC Wren Runner 10.7ms</td>
<td>$3,195.</td>
<td>$2,895.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MicroNet 620 16ms</td>
<td>$3,899.</td>
<td>$3,699.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Mac II Internals

<table>
<thead>
<tr>
<th>Price</th>
<th>40 Megabyte</th>
<th>60 Megabyte</th>
<th>80 Megabyte</th>
<th>100 Megabyte</th>
</tr>
</thead>
<tbody>
<tr>
<td>MacBest 45 28ms</td>
<td>$499.</td>
<td>$439.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MicroNet 46 40ms</td>
<td>$549.</td>
<td>$499.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quantum 40* 19ms</td>
<td>$599.</td>
<td>$569.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MacBest 60 28ms</td>
<td>$629.</td>
<td>$549.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MicroNet 60 28ms</td>
<td>$669.</td>
<td>$669.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MacBest 80 28ms</td>
<td>$749.</td>
<td>$679.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quantum 80* 19ms</td>
<td>$899.</td>
<td>$799.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conner 100 25ms</td>
<td>$889.</td>
<td>$829.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MacBest 90 18ms</td>
<td>$949.</td>
<td>$889.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MacBest 150 17ms</td>
<td>$1,499.</td>
<td>$1,279.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MicroNet (CDC) 173 18ms</td>
<td>$1,549.</td>
<td>$1,499.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Miniscribe 160 16ms</td>
<td>$1,219.</td>
<td>$1,199.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CDC Wren Runner 330 10.7ms</td>
<td>$3,795.</td>
<td>$3,595.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### SE Internals

<table>
<thead>
<tr>
<th>Price</th>
<th>20 Megabyte</th>
<th>30 Megabyte</th>
<th>40 Megabyte</th>
<th>80 Megabyte</th>
<th>100 Megabyte</th>
</tr>
</thead>
<tbody>
<tr>
<td>MacBest 20 65ms</td>
<td>$399.</td>
<td>$339.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MacBest 30 28ms</td>
<td>$449.</td>
<td>$399.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MicroNet 46 40ms</td>
<td>$549.</td>
<td>$469.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MacBest 45 28ms</td>
<td>$499.</td>
<td>$479.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quantum 40* 19ms</td>
<td>$599.</td>
<td>$569.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quantum 80* 19ms</td>
<td>$619.</td>
<td>$599.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conner 100 25ms</td>
<td>$899.</td>
<td>$829.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Accelerators, Printers, Memory, Monitors and More!

- **Syquest Removable Cartridges**
- **General Computer**
  - Personal LaserWriter: $1,499. $1,479.
- **Ome**
  - Crystal Print Publisher: $3,299. $3,199.
  - ScriptTEN Postscript Printer: $3,299. $3,199.
- **Radius**
  - Radius 15+ Accelerator: $739. $599.
  - Radius 25 Accelerator: $1,249. $999.
  - Two Page Display SE, II: $1,299. $1,099.
  - Two Page Display SE, II: $1,849. $1,599.
- **SystemsGate**
  - 800K External Floppy Drive: $999. $159.

**SIMMS IN STOCK CALL FOR THE LOWEST PRICES.**

**SAME DAY SHIPPING** on all stock items if orders are placed by 3 PM Mountain Standard Time.

**ALL DRIVES** are preformatted and tested by MacLand technicians.

---

**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% charge AZ residents, add 6.5%. All shipments made by Federal Express.

Standard Air which is 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 30% restocking fee. All prices subject to change without notice. All products subject to availability.
The world's largest Macintosh show will be coming to Boston, August 10, 11 and 12. See, touch and learn about new products, new services, new ideas ... Plus new ways to use your Mac in business management, education, publishing, forecasting, data bases, design, analysis, music, art, and more.

MACWORLD EXPOSITION
Boston, August 10, 11 and 12

It's the MacEverything Show!

TURN PAGE FOR DETAILS...
Imagine a conference filled with seminars and workshops led by experts covering a variety of current MacTopics. Imagine more than 400 exhibiting companies and over 250,000 square feet of floor space. Imagine thousands of products available to see, touch and learn about. Imagine new products you haven’t heard of yet.

Imagine yourself in the middle of MACWORLD Expo/Boston!
Whether you’re into business, networking, databases, education, research, design, publishing, art, music, games or programming, MACWORLD Expo can give you more concentrated, hands-on, practical information than you can get anywhere else.

See and hear the MacExperts
At the MACWORLD Expo conference you’ll get the latest word on the Macintosh directly from industry leaders and experts like John Sculley, Jean-Louis Gassee, Jonathan Rotenberg, Jerry Borrell, and many more. Plus, you’ll get the inside story on Apple’s future technology plans at our first-time-ever Apple Technology Extravaganza hosted by Apple Computer, Inc.

You can also attend our new “Connectivity Mini-Conference,” to learn about the latest trends in networking. Or come to our “MacMasters Executive Seminars,” for a full day of intensive instruction on the topics business users want to hear about most.

We also give you the choice of more than 75 regular sessions in eight different conference tracks, including Introductory Workshops, Vendor Updates/Trends, Advanced User Tips, Programmer/Developer Forums, How-To’s for Small Business, Solutions for Corporate Users, Education Workshops, and MacMicro Clinics.

All together, this is our biggest conference ever, with something for everyone — from novice to expert.

All show locations are convenient and connected
MACWORLD Expo/Boston is held at:
Bayside Exposition Center, 10 A.M. to 6 P.M., all three days (conference and exhibits)
World Trade Center, 10 A.M. to 6 P.M., all three days (conference and exhibits)
The Wang Center, 9 A.M. to 12:50 P.M., all three days (conference only)
The special MACWORLD Expo Express connects you with all three show locations and most participating hotels. Just look for the “Expo Express” and hop on the bus. Or you can take the T — all three centers are on rapid transit lines.
Detailed directions and a map to all three sites will be mailed to you with your advance registration admission badge.
Show!

Register early. Save time and money

You can save $15 on a full registration, including all conference sessions and exhibits, by registering before July 14th. ($65 in advance; $80 at the door.) Or you can register for exhibits only for just $20 ($15 for students — you must send a photocopy of your student ID with your registration form).

In either case, you'll save time when you register in advance because we'll send you your admission badge. And you can walk right in!

Just complete the registration form on the last page of this ad and send it in. For more information, call our hotline at (617) 326-9955.

Advance registrations must be received by July 14, 1989. On-site registration is cash only. Admission to all conference sessions is on a first-come, first-served basis, with no reserved seating.

MACWORLD Expo is brought to you by Macworld Magazine

Macworld, the Macintosh magazine, is the official sponsor of MACWORLD Expo/Boston. Macworld is published by IDG Communications, the world's largest publisher of computer-related newspapers and magazines, with 100 publications in 30 countries. MACWORLD Expo is managed by Mitch Hall Associates, a leading producer of computer trade shows.

Save money on hotels and travel arrangements, too

For preferred, discount rates on hotels, airfare, and car rentals, contact the official travel agency of MACWORLD Expo: Great Get Aways, P.O. Box 536, Dedham, MA 02026. Phone: (800) 722-5569, or telex: 49572300.

If you're staying over in Boston, you can get special rates at these participating hotels:

57 Park Plaza, Boston Harbor, Boston Marriott Copley, Cambridge Marriott, Colonnade, Copley Plaza, Four Seasons, Guest Quarters Suites, Hilton at Dedham Place, Holiday Inn Boston, Howard Johnson Cambridge, Howard Johnson Boston, Hyatt Regency Cambridge, Inn at Children's, Lafayette Hotel, Lenox Hotel, Marriott Long Wharf, Meridien, Omni Parker House, Quality Inn, Ritz-Carlton, Sheraton Tara Braintree, Sheraton Tara Framingham, and the Westin Copley. (Please call (800) 722-5569 directly. Do not call the individual hotels.)

American Airlines is the official airline of MACWORLD Expo, and you can save up to 45% if you fly to Boston on American. Just call American Airlines at (800) 433-1790 and ask for Star File Number S-16729. Or you can make your reservations on American by calling Great Get Aways at (800) 722-5569.

You can save money on car rentals, too, by calling Excel Car Rental in advance at 617-CAR-RENT and telling them you're going to MACWORLD Expo. You can also make these arrangements through Great Get Aways.

For further information, please call the MACWORLD Expo Hotline at 617-326-9955.

MACWORLD EXPOSITION
Boston, August 10, 11 and 12

...To register, turn the page

This is your chance to pre-register for MACWORLD Expo/Boston, August 10-12, 1989, at the Bayside Exposition Center, the World Trade Center, and the Wang Center. Please choose your package and fill out this form completely. Incomplete forms will be returned. Use one form per person. (Make photocopies to register additional people.) Then send the completed form(s) along with your payment to: MACWORLD Expo, P.O. Box 67, Westwood, MA 02090.

Registration coupons must be received by July 14. And registration fees are non-refundable. For further information, call the MACWORLD Expo hotline at 617-326-9955. U.S. attendees will be mailed their badges on or around July 20. All other badges will be held at the Pre-registration Counter at Bayside Exposition Center for pick up beginning Wednesday, August 9, 1989. Registration coupons received after July 14 will be returned.

Please register me for:  
- **Package One** $65 Conference sessions and exhibits. Pre-register by July 14. $80 at the door.  
- **Package Two** $20 Admission to exhibits only. Pre-register by July 14.

Please send my badge and further information to:  
Please check one:  
- **Home Address**  
- **Company Address**

<table>
<thead>
<tr>
<th>Last Name</th>
<th>Middle</th>
<th>First Name</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mailing Address</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>City, State, Zip</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Telephone</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

If mailing to company address:

<table>
<thead>
<tr>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Company</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

☐ Check enclosed (make payable to MACWORLD Exposition)  
- **Amount $**

☐ MasterCard  
☐ Visa  
☐ American Express  
- **Amount $**

<table>
<thead>
<tr>
<th>Account Number</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

(Include all numbers)

<table>
<thead>
<tr>
<th>Expiration Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

Cardholder Signature  
(Signature necessary to be valid)

If cardholder is other than registrant, please print name below:

<table>
<thead>
<tr>
<th>Last Name</th>
<th>First Name</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Cash only at the door. After July 14, you must register at the show.

Please check the appropriate boxes:

**Your industry or profession:**
- a. Manufacturer (non-computer)  
- b. Manufacturer (computer industry)  
- c. Distributor/dealer/retailer/service  
- d. Finance/insurance/real estate  
- e. Business services  
- f. Professional (law/medicine)  
- g. Health services  
- h. Communications/publication  
- i. Education  
- j. Government  
- k. Consultant  
- l. Other (specify)  

**Your title:**
- m. CEO/president/vice president  
- n. Comptroller/treasurer/accountant  
- o. IPM/IS manager  
- p. Owner/partner  
- q. Engineer  
- r. Doctor/lawyer/dentist  
- s. Educator  
- t. Art director/writer/editor  
- u. Consultant  
- v. Marketing  
- w. Sales  
- x. Other (specify)  

**Size of your organization (number of employees national/international):**
- y. Under 50  
- z. 50-100  
- aa. 101-200  
- bb. 201-400  
- cc. 401-1,000  
- dd. Over 1,000

**Which personal computer(s) do you own or use?**
- ee. Macintosh  
- ff. Macintosh Plus  
- gg. Macintosh SE  
- hh. Macintosh II  
- ii. Apple II Series  
- jj. IBM PC/PS/compatible  
- kk. None  
- ll. Other (specify)  

**What is your involvement with each of the following types of personal computers or microcomputer systems?**
- mm. Approve purchase  
- nn. Develop/make  
- oo. Evaluate/select  
- pp. Own  
- qq. Purchase or acquire  
- rr. Recommend to others  
- ss. Sell  
- tt. Train people to use  
- uu. Other (specify)
Now *Macworld* connects you with the world of Macintosh products instantly. And cost-effectively. *The Macworld Catalog* is your immediate access to hundreds of Macintosh products, manufacturers, and services. Each month, this special direct response section brings you detailed product information arranged by category—so you can quickly compare prices and capabilities. Then pick up the phone and order!

For the best Macintosh buys, scroll through *The Macworld Catalog*. 
## The Macworld Catalog

### Accessories
- Furniture ..................... 269
- Gifts .............................. 269
- Hardware ..................... 269
- Mouse Pads .................. 269
- Supplies ....................... 269

### Software
- Fund Raising .................. 281
- Genealogy ..................... 281
- Graphics ....................... 282
- Health ......................... 282
- Investment .................... 282
- Languages ..................... 282
- Medical ......................... 282
- Music/MIDI .................... 283
- Networking .................... 283
- Personnel ....................... 283
- Presentation ................... 283
- Programming Tools ........... 283
- Real Estate ...................... 284
- Recreational ................... 284
- Religion ......................... 284

### Hardware
- Bar Code ....................... 270
- Computer Systems .......... 270
- Data Acquisition ......... 271
- Emulators ....................... 271
- Expansion Chassis .......... 271
- Memory Upgrade ............. 271
- Miscellaneous ................ 273
- Peripherals ...................... 274
- Printers ........................ 274

### Miscellaneous
- Bar Code ....................... 284
- Business Oppor ............. 286
- Mailing Lists ................. 286

### Services
- Data Conversion .......... 275
- Desktop Publishing ....... 275
- Disk Duplication .......... 275
- Laser Recharge ............. 275
- Training ....................... 276

### Hypercard Stacks
- 274

---

### 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 $399 per issue (total).

For more information, space closings, and material deadlines, please call toll-free 800/888-8622.

**Instant Link:**
- Macintosh Products, Manufacturers, Services

**Account Managers**
- Niki Stranz, Western U.S.
- Carol Felde, Eastern U.S.

**The Macworld Catalog**
- 501 Second Street
- San Francisco, CA 94107
- 800/888-8622

**The Biggest Small Investment You Can Make.**

Take advantage of the direct link with your buyers that maximizes exposure at a low cost. *The Macworld Catalog* reflects the expanding corporate Macintosh audience whose purchasing activities increasingly include mail order. The cost-effective direct response advertising available monthly in *The Macworld Catalog* links you instantly with nearly 500,000 qualified buyers.

Get into the link. Call 800/888-8622 and place your ad now!

800.888.8622

---

For your ad to appear on *The Macworld Catalog* screen, call 800/888-8622.
The Macworld Catalog

Accessories

Furniture

The MacDesk
The Perfect Workstation
Hawelt Services
386 Freeman Suite 1
Long Beach, CA 90814

Only $30

- Affordable, sturdy, functional, handsome
- Raised the Mac 4 inches
- Handmade of 100% wood
- Finished in cherry, golden oak, or walnut
- 3 models to choose from
- Holds both external and hard disk drives
- Keyboard and power supplies fit underneath
- Cost only $30 plus shipping and handling

KODAK DATASHOW
+Apollo, Chisholm and others.

Call Now To Order
(213) 433-3507

Solutions for SE, Plus, 512, & Mac Ilx, Apple IIx, & all PCs
M/C, VISA, AMEX & COD

1-800-872-8628

Peek Products, Inc.
12241 Cedar Road, Cuyahoga, Ohio 44106 • (216) 298-2576

Custom Printed Mouse Mats

Company Logo Specialist

Grey, Gold & Red Pads
Size: 12 pads w/logo $3.95
36 pads w/logo $8.50
72 pads w/logo $16.00
100 pads w/logo $24.00

Entire pad imprinted. GUARANTEED TO LAST. Multi-color jobs OK. SAMPLES without your company logo $12.50.

Mouse Mats

Custom Printing Available
Cloth: Blue, Gray, Burgundy, Red, Brown, Green, Black, Navy & Platinum
Size: 8x7/1/2 x 8x9/1/2 81/2 x 11
12 Pads 3.25 3.50 3.75
72 3.00 3.25 3.50
144 2.85 3.10 3.35

Plastic: Blue, Platinum, Gray & Red
Size: 81/2 x 11
12 Pads 16.50 16.00
72-15.75 14.50 15.25

Call And Ask Us About Our View Pad and Picture Pad.

Security Kits/Cust Cables


MacProducts, 20231 San Gabriel Valley Dr., Walnut, CA 91789, 714/595-4838

KODAK DATASHOW

+Apollo, Chisholm and others.

Call Now To Order
(213) 433-3507

Solutions for SE, Plus, 512, & Mac Ilx, Apple IIx, & all PCs
M/C, VISA, AMEX & COD

1-800-872-8628

Peek Products, Inc.
12241 Cedar Road, Cuyahoga, Ohio 44106 • (216) 298-2576

Custom Printed Mouse Mats

Company Logo Specialist

Grey, Gold & Red Pads
Size: 12 pads w/logo $3.95
36 pads w/logo $8.50
72 pads w/logo $16.00
100 pads w/logo $24.00

Entire pad imprinted. GUARANTEED TO LAST. Multi-color jobs OK. SAMPLES without your company logo $12.50.

Mouse Mats

Custom Printing Available
Cloth: Blue, Gray, Burgundy, Red, Brown, Green, Black, Navy & Platinum
Size: 8x7/1/2 x 8x9/1/2 81/2 x 11
12 Pads 3.25 3.50 3.75
72 3.00 3.25 3.50
144 2.85 3.10 3.35

Plastic: Blue, Platinum, Gray & Red
Size: 8 1/2 x 11
12 Pads 16.50 16.00
72-15.75 14.50 15.25

Call And Ask Us About Our View Pad and Picture Pad.

Security Kits/Cust Cables


MacProducts, 20231 San Gabriel Valley Dr., Walnut, CA 91789, 714/595-4838

KODAK DATASHOW

+Apollo, Chisholm and others.

Call Now To Order
(213) 433-3507

Solutions for SE, Plus, 512, & Mac Ilx, Apple IIx, & all PCs
M/C, VISA, AMEX & COD

1-800-872-8628

Peek Products, Inc.
12241 Cedar Road, Cuyahoga, Ohio 44106 • (216) 298-2576

Custom Printed Mouse Mats

Company Logo Specialist

Grey, Gold & Red Pads
Size: 12 pads w/logo $3.95
36 pads w/logo $8.50
72 pads w/logo $16.00
100 pads w/logo $24.00

Entire pad imprinted. GUARANTEED TO LAST. Multi-color jobs OK. SAMPLES without your company logo $12.50.

Mouse Mats

Custom Printing Available
Cloth: Blue, Gray, Burgundy, Red, Brown, Green, Black, Navy & Platinum
Size: 8x7/1/2 x 8x9/1/2 81/2 x 11
12 Pads 3.25 3.50 3.75
72 3.00 3.25 3.50
144 2.85 3.10 3.35

Plastic: Blue, Platinum, Gray & Red
Size: 8 1/2 x 11
12 Pads 16.50 16.00
72-15.75 14.50 15.25

Call And Ask Us About Our View Pad and Picture Pad.

Security Kits/Cust Cables


MacProducts, 20231 San Gabriel Valley Dr., Walnut, CA 91789, 714/595-4838

KODAK DATASHOW

+Apollo, Chisholm and others.

Call Now To Order
(213) 433-3507

Solutions for SE, Plus, 512, & Mac Ilx, Apple IIx, & all PCs
M/C, VISA, AMEX & COD

1-800-872-8628

Peek Products, Inc.
12241 Cedar Road, Cuyahoga, Ohio 44106 • (216) 298-2576

Custom Printed Mouse Mats

Company Logo Specialist

Grey, Gold & Red Pads
Size: 12 pads w/logo $3.95
36 pads w/logo $8.50
72 pads w/logo $16.00
100 pads w/logo $24.00

Entire pad imprinted. GUARANTEED TO LAST. Multi-color jobs OK. SAMPLES without your company logo $12.50.

Mouse Mats

Custom Printing Available
Cloth: Blue, Gray, Burgundy, Red, Brown, Green, Black, Navy & Platinum
Size: 8x7/1/2 x 8x9/1/2 81/2 x 11
12 Pads 3.25 3.50 3.75
72 3.00 3.25 3.50
144 2.85 3.10 3.35

Plastic: Blue, Platinum, Gray & Red
Size: 8 1/2 x 11
12 Pads 16.50 16.00
72-15.75 14.50 15.25

Call And Ask Us About Our View Pad and Picture Pad.

Security Kits/Cust Cables


MacProducts, 20231 San Gabriel Valley Dr., Walnut, CA 91789, 714/595-4838
MACINTOSH DUST COVERS
Mac, keyboard & mouse.
Reg. $32 ----------- NOW $25
Mac II, monitor atop CPU, keyboard & mouse.
Reg. $42 ----------- NOW $33
"Free 8"x9½" Mousepad valued at $10 with cover set purchase.

DUST COVERS
100% COTTON
CANVAS
MAC, SE, II, & PRINTERS
Beige w/ Grey Trim Breathable Static-Free!

NEW! SEAL-SKINS
For Keyboards

1-(800) 826-5761
Int. (415) 759-1466 Fax (415) 759-9506
Contemporary Computerwear 1230-36th San Francisco 94122

SECURITY
PADLOCK™ physically secures your computer from theft without cables or bolts.
Two interlocking steel pads use high-bond acrylic adhesive technology to protect your equipment with 10,000 lbs. of strength.
Easy to install. Order keyed different or alike.
$ 79.95 + $5.00 shipping
CONTROL POWER™ gives you control over the use of your computer with a key. No unauthorized access. Control Power attaches to any electronic device with a removable, 3 prong power cord. Order keyed different or alike.
$ 69.95 + $3.00 S/h

Computer Cover Company
23352 Peralta, #4, Laguna Hills, CA 92653
TOLL-FREE: 800/235-5330
In CA: 800/237-5376

3.5 DS Bulk
Major U.S. Manu. 94¢
1 Meg SIMS
E.L.P $249. LP $219
New HP Toner Cartridges
Laser I $85, Laser II $85

For your ad to appear on The Macworld Catalog screen, call 800/888-8622.
### Data

<table>
<thead>
<tr>
<th>DISCOUNT MACINTOSH</th>
<th>PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Macintosh Plus</td>
<td>$1295</td>
</tr>
<tr>
<td>Macintosh SE 2drive</td>
<td>$2250</td>
</tr>
<tr>
<td>Macintosh SE 30mb internal</td>
<td>$2575</td>
</tr>
<tr>
<td>Macintosh SE 40mb internal</td>
<td>$2745</td>
</tr>
<tr>
<td>Macintosh SE/30</td>
<td>$Call</td>
</tr>
<tr>
<td>Macintosh II</td>
<td>$Call</td>
</tr>
<tr>
<td>Macintosh IIcx</td>
<td>$Call</td>
</tr>
<tr>
<td>Macintosh IIx 80mb internal</td>
<td>$5695</td>
</tr>
<tr>
<td>Apple keyboard for SE or II</td>
<td>$100</td>
</tr>
<tr>
<td>Apple extended keyboard</td>
<td>$175</td>
</tr>
<tr>
<td>Apple 13” color monitor</td>
<td>$750</td>
</tr>
<tr>
<td>Mac II 8 bit video card</td>
<td>$495</td>
</tr>
<tr>
<td>Imagewriter II w/cable</td>
<td>$450</td>
</tr>
<tr>
<td>Imagewriter LQ w/cable</td>
<td>$995</td>
</tr>
<tr>
<td>Apple Laserwriter II NT</td>
<td>$3595</td>
</tr>
<tr>
<td>General Computer P.L.P. Plus</td>
<td>$1550</td>
</tr>
</tbody>
</table>

### Expansion Chassis

Open up your Macintosh Plus, SE or II with an expansion chassis system from Second Wave, Inc. Expanse Plus, Expanse SE, and Expanse II allow you to custom configure your Macintosh with a variety of option boards:

- Accelerators
- Monitors
- MS-DOS Communications
- Data Acquisition
- Industrial Control
- Transputers

### Memory Upgrade

SIMM (Memory Modules)

Diamond-Pact™, Top Quality American made memory modules offer easy and economical expansion of Mac Plus, SE, II, DRAM by 1,2,4 or 8 megabytes. MC/VISA/AMEX

AMD

American Micro Distributors, Inc., 16687-D Algonquin, Huntington Beach, CA 92649, 714/846-5560, Fax: 714/846-0570

### The Macworld Catalog

For your ad to appear on The Macworld Catalog screen, call 800/888-8622.
Memory Upgrade

A SIMM IS A TERRIBLE THING TO WASTE!

Computer Care Inc. has introduced a new line of cost effective memory upgrades for Macintosh computers. SOFTSTEP allows you to upgrade by using standard 256K SIMMs.

SOFTSTEP I & II are socketed SIMMs with onboard memory that accept the factory installed 256K SIMMs to increase the machine's memory.

SOFTSTEP III, IV & V are SIMM modules that allow you to build 512K & 1 Meg SIMMs for the Macintosh using 256K SIMMs.

No machine modifications are required when using any of our products. 1 year warranty on all parts. Made in USA. Call for free information. VISA / MC accepted.

ORDERS & INFO

1-800-950-CARE

in MN (612) 920-CARE (2273)

Dealer inquiries welcome

Memory Upgrade

Upgrade w/ Accu-SIMMs

Upgrade your Mac Plus, SE or Mac II with our low profile one MEG SIMM modules. We assemble, test, and have strict quality control, and can give a lifetime warranty. $165 per meg. (Qty. discounts.) Full instructions come with order. (All SIMMS are 120NS or faster.) Prices may be lower by the time this ad comes out. Call for quote & info 1-800/662 SIMM.

Data Memory Systems Co.,
15 Union St., Lawrence,
MA 01840 Tel: 508/883-2325
Fax: 508/975-5232

SIMMS

• 1 MEG SOJ
• 1 MEG DIPS
• 256K SIMMS

HARD DRIVES

LIFETIME WARRANTY

20 MEG INTERNAL $349 Call
31 MEG INTERNAL $410
46 MEG INTERNAL $489
20 MEG EXTERNAL $485 on
31 MEG EXTERNAL $499 Current
41 MEG EXTERNAL $547 Low
46 MEG EXTERNAL $590
81 MEG EXTERNAL $990
90 MEG EXTERNAL $705
100 MEG UP - Call

Fits in SE+Mac II with 2 drives
Include PO+Backup Software
External fits under Mac
Seagate-Minister-Quantum
WESTCOM COMPUTER
P.O.Box 194-Ayden, NC 28513
800-422-8591-919-7464961

Macintosh System Enhancements/New Macintosh Systems

RAM/ROM Upgrades
128K to 512K
128K to 1 MEG
512K to 2 MEG Plus
512K to Mac Plus
512K to MacPlus
$3250 SCSI Interface

Used Mac Systems

512K $679
512K $889
MacPlus $1149
Mac SE $1900

MacSimons Consulting

5526 Pemberton Street
Philadelphia, Pa. 19143
(215) 471-9242 Ext. 30

For your ad to appear on The Macworld Catalog screen, call 800/888-8622.
About the Macintosh™ Finder

Finder: 6.1
System: 6.0
Total Memory: 4,096k

Larry, John, Steve, and Bruce
© Apple Computer, Inc. 1983-88

- JAPANESE MANUFACTURE
- LIFETIME GUARANTEE

- 1Mb SIMMS - 120ns or faster
- Low Profile - In stock!

We ship the same day of your order.

Frustrated with your old 512 KE?
Don’t get mad . . . UPGRADE!

Accelerator card transforms your 512KE
- 2X speed of SE - 16mHz
- 1, 2.5, 4 Mb of RAM - SCSI port
- Internal fan - 100% software compatibility
- Also upgrades Plus & SE

PINNACLE
SALES
INTERNATIONAL

2005 Hamilton Avenue • Suite 220
San Jose, CA 95125
(800) 622-1722
(408) 559-8544

We ship the same day of your order.

How big do you want your Apple?

Memory Expansion SIMMs From Newer™ Technology

4MB
- High Profile
- 16 - 32MB For Mac IIX
- Perfect For A/UX

1MB
- High Profile
- Low Profile
- 2 - 8MB For Mac Plus,
SE, II and IIX

256K
- Low Profile
- 1 - 2MB
- Ideal for MAC PLUS

We Stock:
120ns SIMMs
100ns SIMMs
80ns SIMMs

Guaranteed Same Day Shipment
University and Corporate Purchase Orders Accepted
Ask about our Exclusive Extended Warranty

Call Our Memory Hotline
For Prices and Discounts

1-800-678-DRAM
(678-3726)

Pinnacle
Sales
International

2005 Hamilton Avenue • Suite 220
San Jose, CA 95125
(800) 622-1722
(408) 559-8544

VISA/Master Card Accepted
University P.O.’s

Macintosh Plus, SE and II are registered trademarks of Apple Computer, Inc.

We BUY Mac's & Mac Stuff!!

We Buy, Sell, & Horse-trade Popular Computers!!

Shreve
Systems
2421 Malcolm Street • Shreveport, La. 71108
Fax 318-865-2006

Everex 20 meg. $495.
Used Mac’s--------CALL

Mac Parts
Call

Everex 20 meg. $495.
Used Mac’s--------CALL

Shreve
Systems
2421 Malcolm Street • Shreveport, La. 71108
Fax 318-865-2006

VISA/M.C. O.K. 318-635-1121

For your ad to appear on The Macworld Catalog screen, call 800/888-8622.
The Macworld Catalog

9-Track Tape Subsystem For the Macintosh

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 SCSI interface. Subsystem includes tape drive, software, and complete documentation. For more information, call us today!

Apple Daisywheel Printer

TRUE letter quality on all Mac's & Apple II's. Proport. spacing, boldface, 198 columns. Fast 40cps speed and full 130 character printwheel. NEW $449, RECONDITIONED $349 includes easy MAC point & click driver software & cable. New bi-di tractor $99, sheetfeeder $49. All heavy duty with 90-day guarantee.

Hypercrowned Stacks

HyperCard Foreign-Language Software

Spanish and French Pronunciation with sound-49.95 ea. Intro. to Russian with sound 39.95. Verb Tutors 29.95 ea; Vocabulary Tutors, 19.95 ea. in French, German, Spanish & Russian. Japanese Hiragana & Katakana Tutors, 45.00 for both.

The HyperGlot Software Company
505 Forest Hills Blvd. Knoxville, TN 37919 (615)558-8270

Add Power to Your Stacks

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

HyperTools™ #2: Multiple Choose Lists for Fields, Field Sorting, Formatting & Data Validation, Sound Tools, Group Tools, Font Tools and more. 16 tools for visual presentation of data! $99.95

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 delete stacks. $49.95

Softworks Inc
PO Box 2285 Huntington, CT 06484 (203)926-1116

HyperWindows™

- Add color to your stacks
- Show pictures of any size
- Create overlapping windows

...all under control of your scripts, which keep on running while the pictures are viewed. Only $59.

Macintosh Plus, SE & II compatible.

Any Bright Ideas?

Copyrights, Trademarks & Patents (V. 3.0) Protect all of your bright ideas with CTP™!

- Comprehensive Govt. guidelines unravel the complicated rules & procedures involved in federal registrations.
- Complete U.S. Codes • Complete Code of Fed. Regulations
- Great resource for attorneys, corporate legal dept. & entrepreneurs! $159.95 “Mini” version avail. $49.95 (64 s/h, $10 Int'l) MC/VISA/AMEX.

Aardvark Dev. Labs, 14400 Ella Blvd. #150, Houston, TX 77014, 713/872-8085

For your ad to appear on The Macworld Catalog screen, call 800/888-8622.
Desktop Publishing

WE PUT OUT!

We help top-notch designers achieve high resolution type & graphics using desktop tools. Keep your standards while lowering your costs. Original electronic art and PostScript special effects our specialty. 3000 dpi pages from Linotype L300s.

Waldman Graphics
NYC/NJ/Phila DESIGNERS
111 W. Kingsley, 
Ann Arbor, MI 48104, 
313/668-7330 (voice), 
313/482-9880 (24-hr. BBS)

For your ad to appear on The Macworld Catalog screen, call 800/888-8622.
**Laser Recharge**

**Toner**

- Remanufacturing services
  - Laser cartridges in Black: $44.50
  - Laser cartridges in Color: $64.50
  - PC cartridges in Black: $39.50
  - Microfiche cartridges: $45.50
  - Remanufactured cartridges: $59.50

2 Day Air Prepaid Return: $44.50 for laser cartridges

100% Satisfaction

24 Hour Turnaround

Get back your cartridge! Every cartridge pretested! Color test prints available!

- We support over 200 printers!
- Bulk toner • Quantity Discounts • Jumbo's
- We buy empties in quantities, please call.

**Long-Life Recharged Toner Cartridges**

- 30% More Printing
- Your Cartridge
- Blacker Blacks
- Colors Available
- 24-hr Turnaround
- 100% Guaranteed

Shipping:

1-800-234-3383

**Instant-Expert™ 2.0**

...a complete expert system development program for the price of a book: "Macworld, April '88. Now you can make your computer intelligent. Instant-Expert is a powerful expert system development tool for your Macintosh. Applications developed with Instant-Expert effortlessly use your experience to solve problems, make decisions and provide intelligent solutions. $69.95, Human Intellect Systems, 1670 S. Amphlett Blvd., San Mateo, CA 94402, 415/571-5939

**Call Up Your Ad On Our Screen.**

The Macworld Catalog, 800.888.8622

**Artificial Intelligence**

**McHOROSCOPE**

Be your own astrologer, for fun or profit.

Produce amazing astrological reports for friends and family. $199.50

McHoroScope (Chart interpreter) produces beautiful natal charts plus 15- to 17-page interpretations. Professional astrologers charge $50.00 and more for similar reports. Excellent study guide for students and great fun for parties and get-togethers.

• Astrology for the Macintosh from Time Cycles Research
  • Write or call for free brochure
  • Time Cycles Research 27 Dunmack Rd. Waterford, CT 06385
  • Visa/Amer.

**Software Accounting**

Time Saver Payroll™ V.5

- NEW FEATURES FOR 1989
- Full Featured Payroll system
- Salaried, hourly, comm. & tip wages
- 11 deductions, incl. fed., state & local taxes
- 401k deductions
- Tax tables easily edited by user
- Monthly & quarterly reports, incl. 941, PUTA/940, SUTA
- Prints checks and W-2 forms
- Flexible-easy to use
- Requires Microsoft Excel
- $99.50/3 s/h. MC/Visa/Chk.
- Demo $15.50/3 s/h (applied to purchase).

Western Software Associates, 110 El Dorado Rd., Walnut Creek, CA 94595, 415/932-3999

**Training**

CBT Development Stacks

Create Computer-Based Training in HYPERCARD

Four disks, 32 stacks, almost 3 mgs of routines, templates and scripts—a roadmap for developing CBT in HyperCard. 100-page User Manual with documentation, instructions and authoring ideas. Price: $135.

No licensing fees or royalties. VISA or MasterCard.

New: Version 1.1

First Reference, Inc. 516 Fifth Ave., #706
New York, NY 10036

(212) 730-6211

**Software Bar Code**

**Excel Templates**

- Business Management 2.0 $39.95
- 19 templates for planning & operations.
- Financial Decisions 2.0 $49.95
- 31 calculator templates & loan amort.
- Invoices, PO's, and Inventory 2.0 $45.95
- Integrated, macro-driven.
- Personal Affairs 2.0 $29.95
- 13 for finance, investments, etc.
- All 4 plus bonus package $109.95

Money back guarantee. Terrific values! Send for more info.

HeadStart Software
P.O. Box 51396 • Durham, NC 27717

**ABC Templates**

- Code 39, UPC, and EAN
- PostScript fonts for LaserWriter and Linotronic printers.
- Bit-mapped fonts for screen and ImageWriter.
- Use PrintBar with any software.

Bear Rock Software Co., Inc.

6039 Enterprise Dr., Placerville, CA 95667

**For your ad to appear on The Macworld Catalog screen, call 800/888-8622.**
Look Before You Leap...
50 Classic Business Contracts
Don't jump into a business agreement without knowing what's involved! 50 Classic Business Contracts, a major resource for the small business.
- 50 Copy and Edit Contracts
- "Hyperlinked" legal definitions
- Use with Word, Works, MacWrite, WriteNow, and many others!
- Easy-to-Use • On-line Help • Only $49.95 (add $4 s/h, $10 Int'l) MC/VISA/AMEX, Checks, MO's.
Aardvark Dev. Labs, 14400 Ella Blvd. #150, Houston, TX 77014, 713-872-8095

50 TEMPLATES - $79.95
FOR MICROSOFT EXCEL™ and WORKS™
PRE-BUILT • READY TO USE • JUST ADD VALUES
• Monthly Payments
• Loan Amortizations
• Depreciations
• Cash Flows
• Break-Even Analysis
REAL ESTATE • ACCOUNTING • FINANCIAL PLANNING

MICROTEMP
1-800-284-8367 FINANCIAL CALCULATORS
318 MENDOCINO AVENUE, SUITE 22, SANTA ROSA, CALIFORNIA 95404

BizPlanBuilder™ Quickly and easily complete an effective business / marketing plan for presentation to senior management, investors or clients. A comprehensive and proven framework - Over 65 pages of outlines, headings, structured sentences & paragraphs, lists, suggestions... already typed & formatted in 29 MacWrite™ & MS WORD™ files. Includes spreadsheet financials in Excel™.
Marketing & Sales Oriented Everything you will need to organize, describe, promote & support your venture. (Similar to reverse engineering where the best elements of good plans are cut & pasted together.) No blank pages. Follow the tutorials & edit into a finished plan. Includes manual. Preferred by investment capital experts, corporate managers & experienced consultants.

Tools For Sales
Roadmaps to Better Margins
13335 Wildcreek Drive • Los Altos Hills, CA 94022
800/442-7373 • 415/941-9191
$99.95 • S3 Shipping & $75 Tax (CA)
30-day acceptance / return.
Site licenses available.

CAD/CAM

Your Ad Gets More For Less.
call The Macworld Catalog and see why.
800.888.8622

Clip Art

Flexible CAD

GlobaArt Clip art on disk

"As lovely as they are useful." 
C.I. Wiegand, Personal Publishing, June '88

Cathay Europa Designs 2-disk set
P.O. Drawer B
579 postpaid
Newmarket, NH 03857
Call Toll Free
800-533-5504

For your ad to appear on The Macworld Catalog screen, call 800/888-8622.
The Macworld Catalog

MILITARY CLIP ART

Each $69.95 plus $3 s/h
800-441-1228

ArmyArt™

AirArt™

NavyArt™

Storm King Technology
Department JHW-30608 • PO Box 185 • Wilson, WY 83014

PacerLink (was pLINK)
Connects Macs to VAX (VMS/ULTRIX), DG Stratus & UNIX systems. Supports connections via RS232, direct Ethernet, LocalTalk bridged to Ethernet. Provides terminal emulation (VT220, VT100), file transfer, virtual disk, & print services. PacerShare extension lets VAX system be an AppleShare compatible file server; PacerTOPS extension lets VAX/VMS system be file server onTOPS network. Pacer Software, Inc;
#402, 7911 Herschel Ave.
La Jolla, CA 92037,
619/454-0965

Data Base

Bookends Mac
Bookends® is a specialized database for managing your references. You can quickly put your finger on any article from books, journals, or newspapers. When it comes time to print your bibliography, Bookends outputs your bibliography in almost any style without reentering references. $99.95.
Sensible Software, Inc.,
335 E. Big Beaver, Ste. 207,
Troy, MI 48083, 313/528-1950

Desktop Publishing

MacPalette
By Microspot, prints multicolored graphics & text from most Macintosh® software using the ImageWriter II. MacPalette will colorprint documents from MacDraw, MacDraft MiniCad, MacProject, MacWrite, JAZZ, Microsoft Chart, Word, Excel, etc. (not MacPaint). It prints black as a true black instead of mixing a black. 569.
CompServCo, 800 Freedom,
Sidell, LA 70458, 800/272-5533 or 504/649-0484
Japanese Word Processor

日本語ワープロ ByWord™

今、日本でうわさのByWord新発売!!!

*Complete word processing function for both English and Japanese

*Supports Kanji JIS level I and II

*Compatible with KanjiTalk

*Imports graphics

Distributed by:
Qualitas Trading Co.
6907 Norfolk Rd., Berkeley, CA 94705
Phone: 415-848-8080 Fax: 415-848-8009

Developed by:
Ministry of Software

Teacher's Rollbook
A complete classroom management tool! Grade averaging and reporting. • New quick grade entry • Full attendance records and totals • Records disciplinary actions • Class size reports • Up to 315 students per file • Remembrance birthdays & checked-out items • Letters to parents • Min. req. Mac 512SE, 2 drives • $99 • Demo $10.
Current Class Productions,
22824 Berendo Ave., Torrance, CA 90502, 213/326-4246

Kieran
Integrated learning program for children 2-6 yrs. Uses child's name in speech and pictures. Totally mouse driven interactive program with iconic interface. Covers alphabet training, time telling, counting skills, upper-lower case, and mystery door! 4-mice rating in MacUser. Great gift! MC/VISA 839.95.
Ohm Software, 163 Richard Dr., Teterion, RI 02878, 401/253-9354, 800/346-9034

Algebra Homework Tutor
Revolutionary Homework Tutor™ lets you do your Algebra homework or classwork on a Mac. Checks each step you enter, gives hints, poses practice problems, solves and explains examples, and prints completed homework. Easy editing, standard Mac interface and too much more to tell. Send for free brochure.
Missing Link Software, Box 3280, South Ameo, NJ 08879, 201/721-2569, 800/222-9296

MacAnatomy
A complete electronic atlas of human anatomy in MacPaint document form. The drawings may be modified and merged into MacWrite documents using the Clipboard. Comprised of four volumes, available singly or as a collection.
MacMedic Publications Inc.,
7530 Harwin Dr., Houston, TX 77036, 713/977-2655

For your ad to appear on The Macworld Catalog screen, call 800/888-8622.
The Macworld Catalog

Engineering

E(E)PROM, MICRO & MEMORY CARD PROGRAMMERS WITH INTEGRATED MAC USER INTERFACE

- Write to modern port
- Full-down commands
- No personality modules for E(E)PROMs & Ibond Memory
- All 256K 32 pin E PROMs in 1 Mbit (upgradable to 32 Mbit)
- 8741, 2-5, 6-6, 6-5, 4-5, 5-5, 5-7, 7-5, 7-6, 9-5, 9-6, 9-7
- Memory Cards (Hitachi etc.
- Flash E Proms
- Board Programming capability
- User defined design
- Easy F/W upgrade
- Stand alone E(E)PROM and Memory Card duplication/verify
- Offset/parallel, Binary, Serial & parallel

Cost: $45 - $95

BAC MICROSYSTEMS
333 WEST OLIVE AVE, SUNNYVALE CA 94086
PH: (408)730-5551 FAX: (408)730-5521 TELEX: 944916

Circle 725

Electronic CAD

The powerful easy-to-use Douglas CADD/CAM Professional System takes you from the schematic drawing to the final routed board with:

- Color support on Mac II
- Unlimited multilayers
- SMT capability
- Mill simulation
- Layout w/ parts placement facility
- Schematic to digital simulation
- Flexible, multi-pass router

Take your first step into the new age of electronic CAD by ordering a full-feature demo with all 3 programs included. Call or write to us today.

Douglas Electronics, Inc.
Pro. Location: $1500
Schematic: $700
Auto Router: $700
Demo: $25

Circle 760

WINGING-IT Audio
Air Traffic Control
for Microsoft & Sublogic Flight Simulators
Get on audio cassette including: ground, tower, departure, center, approach controls, traffic advisories, weather alerts, plus airport maps & flight plans. Realistic adventures. Order today!
Each tape: $12.95 plus $1.75 shipping (California residents add 7% act)
Calypso Products
POB 5388
Novato, CA 94948

Circle 768

Road Design
MacRoad is a fully interactive road design program that allows you to:
- Design cross sections using a palette of edge & surface types
- Design vertical gradings graphically
- Produce a schedule of quantities
- Adjust the grading & immediately see the effect on the cross sections & quantities
- Produce drawings on a range of printers or pen plotters

Creative Engineering, 6 Antill St., Wilston Queensland 4051, Australia, +61 73566277

Circle 766

ENTERTAINMENT

STAMP, COIN & BASEBALL CARD COLLECTORS!

Call or write for FREE catalog describing the most popular software for the inventorying and evaluation of your collection.

COMPUTE QUOTE SOFTWARE FOR COLLECTORS
6914 Berwick Ave. Dept. CM
Canoga Park, CA 91307
800-777-5072 (ext. 219)
In CA (818) 348-3662

Circle 653

WEB DESIGN & PROGRAMMING

Public Web Design & Programming

355 WEST OLIVE AVE., SUNNYVALE CA 94086
(408) 730-5551

Circle 646

IEEE 488 Interfaces

Mac488 • NuBus IEEE board for MacII
Mac5C5488 • SCSI/IEEE controller
Mac488 • Serial/IEEE controller
MacSerial488 • IEEE plotter interface
MacDA488 • IEE desk accessory
MacDriver488 • IEE language driver

Call or send for your FREE Technical Guide
(216) 439-4091

Pardon me, boys, is this the Macinnooga Choo-Choo?

Yes, it's a super true-to-life electronic train set!
You can build your model railroad systems on your Macintosh and bring them to life with the click of a button. You simply place around your trains, rails, magnets, and terrain on a grid in any configuration. Build layouts of one scene or more. Run your train at night, when the Macintosh is turned on.

$49.95 + $4.00 Shipping

Abrasacata
Box 2440, Dept. M
Eugene, OR 97402
(503) 342-2303

Circle 676

For your ad to appear on The Macworld Catalog, call 800/888-8622.
Tired of Arcade Games?

Try

* BirdSongs! *

Improve your office — play digitized bird songs in the background while you work with your Macintosh.

BirdSongs! program with 20 bird songs: $45

Additional digitized bird & animal calls: $15 per disk.

* Orbit War *

Arcade-style space war in a gravitational field.

Two can play, or one against a smart Macintosh.

Strong, weak, or negative gravity.

Torus or Klein-bottle spatial geometry!

$49

Soon:

BirdSongs! program with 20 bird songs: $45 + $6 (S&H)

Prepare

for genealogy

Custom Laser Typography


Neoscribe International, P.O. Box 633, East Haven, CT 06512, 203/467-9880

Hyperl Family-Tree™

the family tree stack

The HyperCard stack that easily records and graphically displays genealogy information including digitized photographs of your relatives, all standard genealogy facts, and up to 5000 words of miscellaneous notes and comments per person. Automatically create, print, and export 5-generation pedigree charts, 20-generation descendant charts, family group sheets, family lines, family history books, mailing lists and labels, birthday calendars, person sheets and indexes. $69 plus $3 S&H. Visa/MC welcome. Call or write for a free brochure.

Communications

Community Contact Sys.

A unique approach and solution for nonprofits to more effectively communicate to the public they serve. The system enables organizations to increase fund-raising, public relations and marketing activities. Macintosh and the Community Contact System. Set yourself apart! Call today.

CIRCLE 648 ON READER SERVICE CARD

CIRCLE 615 ON READER SERVICE CARD

CIRCLE 683 ON READER SERVICE CARD

CIRCLE 680 ON READER SERVICE CARD

CIRCLE 664 ON READER SERVICE CARD

CIRCLE 660 ON READER SERVICE CARD

CIRCLE 670 ON READER SERVICE CARD

CIRCLE 693 ON READER SERVICE CARD

CIRCLE 623 ON READER SERVICE CARD

CIRCLE 663 ON READER SERVICE CARD
**Genealogy**

**MacGene** "new 3.1"

- LARGEST INSTALLED BASE

- Custom fields
- Personal reports
- Import/Export
- No copy protection
- $145 Demo $25.

*Applied Ideas, Inc., P.O. Box 3225, Manhattan Beach, CA 90266, Free info: 213/545-2996*

**MacPlot & MacCAD**

MacPlot by Microspot is a powerful plotter driver that will plot any object-oriented graphics produced on the Mac in up to 30 colors/pens. MacCAD supports over 50 plots. MacCAD is a series of 12 separate architectural & engineering template symbol libraries for use with MacDraw, MacDraft, MiniCAD, etc.

*CompSerCo, 800 Freedom, Slidell, LA 70458, 800/272-5533 or 504/649-0484*

**MinicAD 3.0**

By Diehl Graphsoft, boasts 1000+ power zoom, symbol library, 15 layers, auto-dimensioning, double-line tool, clip/ add/intersect polygon tools, object snap, fillet & trim-lines tools, object sizer & locator, 9 decimals accuracy, full 2-D & 3-D modes, etc. It reads MacDraw & MacDraft files.

*5495 Demo avail. CompSerCo, 800 Freedom, Slidell, LA 70458, 800/272-5533 or 504/649-0484*

**MacPerspective**

It's simple and easy to construct accurate perspectives on screen with dimension coordinates input by relative commands. (left/right - up/down - forward/back)

*Knick Drafting, Inc. (407) 777-0275 1275 S. Pallad Or. Sis. P, Satellite Beach, Fl 32937 CIRCLE 70 ON READER SERVICE CARD*

**Graphics**

**CADMOVER**

GRAPHIC TRANSLATION UTILITY FOR MACINTOSH CONNECTIVITY

IGES

SNAP!

MINICAD

MINDRAW

SPACE EDIT

MSC/pal

KANDU SOFTWARE CORP. 703-532-0213 CIRCLE 861 ON READER SERVICE CARD

**Health**

**Analyze Diets, Menus...**

so much more with the FOOD PROCESSOR II! This TOP-rated software has the best database of any system on the market today! Acclaimed by schools-colleges-hospitals-fitness centers & businesses.

- 2400-3000 foods - 30 nutrients
- $250
- CALL OR WRITE TODAY FOR FREE DEMO DISK!

*ESHA Research, P.O. Box 13028, Dept. D, Salem, OR 97309, 503/585-6242 or 585-7755*

**Languages**

**Fortran on Your Desktop**

No need to wait for time on the "big" computer any longer. Language Systems Fortran lets you run the same high performance Fortran programs at your desk. AX's-compatible extensions, high precision IEEE floating point data types, complete access to Toolbox, direct code generation for the Mac II, and the MPW programming environment make this compiler the most powerful Fortran for the Mac.

*Language Systems Corp., 441 Carlisle Drive, Herndon, VA 22070, 703/478-0181*

**Investment**

**The Right Time System**

The Stock, Index & Futures programs generate accurate Buy/Sell signals for individual stocks, indexes and commodities. The software was developed by an expert portfolio manager for his own personal use & are now available for any smart trader who wants to make quick profits. Call or write for free info.

*T.B.S.P., Inc., 2265 Westwood Blvd. #703, Los Angeles, CA 90065, 213/312-0154*

**Mac ON-CALL**

Intuitive expert system and program generator. Data format for medical practice. User can customize for specialty. Does problems analysis, sets up studies and differentiates diagnoses for findings, builds and prints reports. Encrypts saved patient files if desired. Therapeutics can be attached. A versatile reference tool for teaching and review.

*IntroCom, 7150 Navajo Rd., Ste. E., San Diego, CA 92119, 619/698-6927*

**MedQuest**

Our program handles all the routine medical office tasks: e.g., patient & third party billing, DX & procedure tracking with recall, appointments and practice analysis. MedQuest is running in over 180 medical offices, support & training available. Single or multi-user version $2,495 & demo $50 (+, SE, MacII).

*The Program Workshop, Inc., 159 Martine Street, Suite 6, Anderson Gibbs Bldg., St. Augustine, Fl 32084, 904/829-6500*
ScreenShare

ScreenShare is a software product which enables an instructor to do demonstrations in a classroom of networked Macintosh computers. ScreenShare broadcasts the contents of an instructor's Macintosh screen to the screens of the students' Macintoshes while temporarily suspending the students' work. ScreenShare for a classroom $249 (5295 Canada) White Knight Software Corp., P.O. Box 564 - 810 West Broadway, Vancouver, B.C. Canada V5Z 4C9 (604) 290-4855

Call 1/800/FOR MIDI
MIDI for everyone! Start your computer/MIDI system today with discount prices & expert help from FUTURE MUSIC. You don't have to be a PRO--most of our customers are just "plain folks" with a home computer and a love of music. Call for FREE CATALOG of Hardware, Software, Synthesizers, 4-tracks and more. All major brands avail.

Future Music Inc., 489 E. Plumb Lane, Reno, NV 89502, 702/826-6434

Music/Midi

For your ad to appear on The Macworld Catalog screen, call 800/888-8622.
You Pick It!
Tired of getting what they want to send you? Choose an 800K disk of what YOU want from our library of over 300 meg of high quality shareware & public domain software, graphics, games, DA's, fonts, utilities & stacks. ONLY $15. Prices reduced for multiple disks. Send $5 (refundable) for a catalog. HK Distribution, P.O. Box 201432, Austin, TX 78720-1432 (512) 331-8170

Free Custom Software!
Don't buy public domain software you don't want! Pick the programs you want from our catalog of thousands P.D.-S.W. programs to create a custom disk. We do not charge for programs, pay only a small fee for producing a custom disk. No club fees. Prices as low as $2.90 per disk. Call now for a free catalog!
Software Supermarket, 5101 Addison Dr., Charlotte, N.C. 28211, 800/438-1242 Ext. 515, in N.C. 800/532-0476 Ext. 515

New from RealData —
Real Estate Investment Analysis, Version 6.0
Real Estate Investment Analysis has been our best-selling product since it was introduced in 1982. Many software products have come and gone over the years, but RealData and our Investment Analysis have stood the test of time. Now Version 6.0 adds new power to this popular program.

What can it do? Real Estate Investment Analysis allows you to make ten-year projections of the income, expenses, cash flows, re-sale and tax implications of your property. It performs virtually all of the complex tax reform, financing and rate-of-return calculations for you in just seconds. It also includes a lease analysis and annual operating statement.

Real Estate Investment Analysis, Version 6.0 runs with Microsoft Excel™ or Works™ on the Mac for $250. New from RealData, Inc., 813 Yardi Systems, Inc., 83103, 805/966-3666

Property Management
Comprehensive software for managing residential, commercial, condos, and more. Two versions: Basic PM for owner/manager—$495, Deluxe PM with complete general ledger for professional management—$1,195. Includes check writing, recurring expenses, financial statements, complete management reporting.

Yardi Systems, Inc., 813 Reddick St., Santa Barbara, CA 93103, 805/966-3666

For your ad to appear on The Macworld Catalog screen, call 800/888-8622.
New dimensions in Bible study

THE WORD processor
A comprehensive Bible study program.
Instant access to any verse in the Bible.
You can search for any word or phrase
and build indexes to record your study.
Separate windows for comparing various
verses and translations. Only $199.95

Our family of products
Choose from NIV, RSV, KJV or
NKJV text. Add Greek or Hebrew
translators or capital cross
references, personal commentary,
a chronological Bible and chain
references. Our memory resident,
VERSE TYPIST transfers
verses to your word processor.

Bible Research Systems
(512)251-7541
2013 Wells Branch Parkway #304
Austin, Texas 78728

Postage extra. For IBM, MS-DOS, Macintosh. Some products for Apple II.

Geological Software
Great graphics, low prices!
• Lithologic log plotting
• Gridding • Contouring • Piper/ Stiff plots • Oil & Gas econom­
ics • Stereonet plots • Plate tec­
tonics • Geophysical modelling, +much more for the Macintosh
& PC $50-$1500. Call or write
for FREE catalog of easy-to-use software products.
RockWare Inc., 4251 Kipling,
Suite 595, Wheat Ridge,
CO 80033, 303/423-6171,
Telex: 9102504964

CLR ANOVA
Analysis of variance program
that can compute up to a 10­
way design with repeated mea­
ures and unequal n. Marginal
means, plots of interactions,
simple effects, range tests, con­
trasts, and more. Full Mac inter­
face. Can read text files w/
entries separated by spaces,
commas, or tabs. $100 + $5 s/h.
Clear Lake Research, 5615
Morningside #127, Houston,
TX 77005, 713/523-7842

RATS! Version 2.1
Best-selling econometrics soft­
ware program. Now available
on the Mac. Multiple regression,
including stepwise, 2SLS, logit,
probit, and much more! Fore­
casting with ARIMA, VAR. Ex­
ponential smoothing, model
simulations, support for daily/
weekly data. $300. VISA/MC.
512K+external drive.
VAR Econometrics, Inc.,
P.O. Box 1818, Evanston, IL
60204-1818, 312/864-8772,
800/822-8038

For your ad to appear on The Macworld Catalog screen, call 800/888-8622.
The Macworld Catalog

Utilities

**DiskQuick**
*the Macintosh Disk Librarian*
- Catalogs hard disks and floppies
- Powerful "Subset" finds files fast
- Shows folder chain
- Info box comments
- Renames disks
- Only $49.95

"Essential for anyone who owns more than two floppy disks..." - MacGuide Ideaform Inc. (515) 472-7256

**Japanese Software**
- **New Kanji Pagemaker 2.0**: Japanese DTP. Intl. standard w/pro quality. $995.
- **New EGBook 1.2**: Japanese DTP. Supports vertical format. $599.
- **New EGWord 3.0**: Japanese WP. Auto kana-kanji conversion. $499.
- **EG Word & EGBook Bundle**: $799
- **New MacVIE 1.0**: Japanese FEP. $249.
- **MacKenji 2.0**: Japanese FEP. $99.95. All Req. 2MB RAM.
- **NewSweetJAM v.3.51**: Japanese FEP. $249. Req. 1MB RAM.

Distributed by:
Qualitas Trading Co., 6907 Norfolk Rd., Berkeley, CA 94705, 415/848-8080 or 415/848-5815

**Word Processors**

**Address envelopes!**

Enclose your quality correspondence in envelopes addressed on your LaserWriter® or ImageWriter®.

**InfoLogic**

You deserve quality results.

**Mailing Lists**

For your ad to appear on The Macworld Catalog screen, call 800/888-8622.
Come to the first truly international MacWorld in Singapore, the ideal opportunity to see and hear about everything that runs with or on a Mac today. Top exhibitors and speakers will be here from all over the world, in the prestigious new Raffles City Convention Centre.

29th June to 2nd July. Don't miss it. (Or the chance to take a holiday in your favourite tropical paradise afterwards!) Book now and get four nights in one of the deluxe Convention Centre hotels, registration for the show and all seminars (first come, first seated), for only US$400!

MacWorld Expo Asia '89
### BUSINESS SOFTWARE

<table>
<thead>
<tr>
<th>Months on chart</th>
<th>Last month</th>
<th>This month</th>
</tr>
</thead>
<tbody>
<tr>
<td>28</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>40</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>49</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>36</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>38</td>
<td>9</td>
<td>5</td>
</tr>
<tr>
<td>9</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>8</td>
<td>—</td>
<td>7</td>
</tr>
<tr>
<td>25</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>8</td>
<td>—</td>
<td>9</td>
</tr>
<tr>
<td>3</td>
<td>—</td>
<td>10</td>
</tr>
</tbody>
</table>

- **Microsoft Works** by Microsoft
- **Microsoft Excel** by Microsoft
- **Microsoft Word** by Microsoft
- **PageMaker** by Aldus
- **MacDraw** by Aldus
- **WordPerfect for the Macintosh** by WordPerfect
- **FileMaker II** by Claris
- **MacWrite** by Claris
- **Adobe Illustrator/Illustrator 88** by Adobe
- **FreeHand** by Aldus

### EDUCATION SOFTWARE

<table>
<thead>
<tr>
<th>Months on chart</th>
<th>Last month</th>
<th>This month</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>32</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>16</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>29</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>29</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

- **Where in the World Is Carmen Sandiego?** by Broderbund
- **Math Blaster** by Davidson & Associates
- **Reader Rabbit** by The Learning Company
- **Typing Tutor** by Simon & Schuster Computer Software
- **KidsTime** by Great Wave Software

### ENTERTAINMENT SOFTWARE

<table>
<thead>
<tr>
<th>Months on chart</th>
<th>Last month</th>
<th>This month</th>
</tr>
</thead>
<tbody>
<tr>
<td>31</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>28</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>32</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>13</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>12</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

- **Flight Simulator** by Microsoft
- **Dark Castle** by Silicon Beach Software
- **MacGolf** by PGA
- **Falcon** by Spectrum Holobyte
- **Beyond Dark Castle** by Silicon Beach Software

### HARD DISKS*

<table>
<thead>
<tr>
<th>Months on chart</th>
<th>Last month</th>
<th>This month</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>15</td>
<td>—</td>
<td>3</td>
</tr>
<tr>
<td>16</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>—</td>
<td>5</td>
</tr>
</tbody>
</table>

- **EMAC 20 External** by Everex
- **MacStack SD20** by CMS Enhancements
- **FX20** by General Computer
- **Rodime 20 Plus External** by Rodime
- **Rodime 45 Plus External** by Rodime

### ADD-IN BOARDS

<table>
<thead>
<tr>
<th>Months on chart</th>
<th>Last month</th>
<th>This month</th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>18</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>11</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>17</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

- **Radius Accelerator** by Radius
- **Radius Interface Display** by Radius
- **Apple 2MB Memory Expansion Kit** by Apple Computer
- **Macintosh II Video Card** by Apple Computer
- **Apple 1MB Memory Expansion Kit** by Apple Computer

### PRODUCT WATCH

Editors' choice of other recent or forthcoming products of particular interest.

- **MicroPhone II** by Software Ventures communications software
- **SimCity** by Maxis Software simulates process of city development
- **SlideWriter** by Matrix film recorder

Source: Exclusive InfoCorp survey of more than 125 Macintosh retailers and selected mail-order vendors. Covers sales during February 1989.

*Does not include hard disks installed at the factory.
The WriteNow difference:
Ease, Performance, and...

<table>
<thead>
<tr>
<th>WriteNow 2.0</th>
<th>MacWrite 5.0</th>
<th>MS Write</th>
<th>MS Word 3.01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spelling checker size</td>
<td>100,000 words</td>
<td>100,000 words</td>
<td>80,000 words</td>
</tr>
<tr>
<td>Font size range</td>
<td>4-127 pts.</td>
<td>7-127 pts.</td>
<td>2-127 pts.</td>
</tr>
<tr>
<td>Maximum recommended document size (in pages)</td>
<td>Over 2,000</td>
<td>Unlimited</td>
<td>Unlimited</td>
</tr>
<tr>
<td>Number of open documents</td>
<td>Unlimited</td>
<td>Unlimited</td>
<td>Unlimited</td>
</tr>
<tr>
<td>Mail merge</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Number of editable, on-screen columns (WYSIWYG)</td>
<td>4</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>On-screen auto-numbering footnotes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Automatic repagination</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Graphics in same line as text</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Multiple headers and footers</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Extensive Undo</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Variable line spacing (in points)</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Selective font, size, and ruler changes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>MacUser Magazine's Best New Word Processor</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Search for a word</td>
<td>2.4 sec</td>
<td>7.6 sec</td>
<td>9.7 sec</td>
</tr>
<tr>
<td>Spell Check document</td>
<td>6.3 sec</td>
<td>9.5 sec</td>
<td>9.7 sec</td>
</tr>
<tr>
<td>Copy &amp; Paste large area</td>
<td>6.8 sec</td>
<td>2 min 34.0 sec</td>
<td>2 min 23.3 sec</td>
</tr>
<tr>
<td>Change font size of document</td>
<td>10.7 sec</td>
<td>1 min 0.9 sec</td>
<td>1 min 48.0 sec</td>
</tr>
<tr>
<td>Change font of document</td>
<td>10.8 sec</td>
<td>50.2 sec</td>
<td>16.2 sec</td>
</tr>
<tr>
<td>&quot;Save As&quot; a 12-page document</td>
<td>3.6 sec</td>
<td>37.1 sec</td>
<td>15.2 sec</td>
</tr>
<tr>
<td>Retail Price</td>
<td>$195</td>
<td>$125</td>
<td>$175</td>
</tr>
<tr>
<td>Happy Users</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

* Number determined by Macintosh system constraints.

...Happy Users!

Our users love WriteNow—a claim our competition can't easily make for their products.
How do we know? Because our users tell us—on registration cards, on the telephone, on bulletin boards, and in letters.

We've heard dramatic stories about how WriteNow has significantly reduced training and support costs. And how clean, fast, and enjoyable it is to use. And how WriteNow got the job done when our competition sputtered.

You see, at T/ Maker we feel a great word processor is more than just a stockpile of features. It's the usability of those features—how easy they are to learn and use, and how they feel under your fingertips when doing real work.

And from their overwhelmingly terrific response, it's clear our users agree.

WriteNow 2.0 is the user's choice for best Macintosh word processor—and we'll show anyone our customer registration cards to prove it!

What's new with WriteNow 2.0?
Over 50 New Features And Improvements!

- Mail Merge • 100,000-Word Dictionary • Character and Word Count
- Direct Opening and Saving of Text, MacWrite, and RTF (Word Option)
- Cursor Key Support • Windows Menu • Decimal Tabs
- Case Change • Hide Pictures Option • "Smart Quotes"
- Fixed Line Spacing • MultiFinder/Network Compatibility • and More

© 1988 T/Maker Company. All rights reserved. WriteNow is a trademark licensed to T/MakerCo.
Admit it. Aren’t you tired of rolling your mouse around, running into papers or off the edge of the desk, knocking over coffee cups with its tail? Wouldn’t you love an easier way to do things? We thought so. That’s why we developed the Turbo Mouse.

It takes half the space.
You move only the ball, not the whole mouse, so there’s no rolling room required.

It’s twice as fast. Fly across the biggest screen with automatic acceleration. It senses your working speed and moves the cursor further when you roll faster.

It’s twice as smart. Its 200 CPI resolution is twice that of a mouse. It lets you use one button as a click, the other as a click lock. And with a Mac SE or Mac II, it will even perform one command when you press both buttons at once.

It’s perfect for any Mac.
For Mac or Mac Plus, choose Turbo Mouse Plus. For Mac SE or Mac II, Turbo Mouse ADB. Both are $169.95.
Call 800-535-4242 or 212-475-5200 for a dealer near you. Or write to us at Kensington, 251 Park Ave. South, New York, NY 10010.