78 NEW PRODUCTS: PAGE 273 • 27 IN-DEPTH REVIEWS: PAGE 220

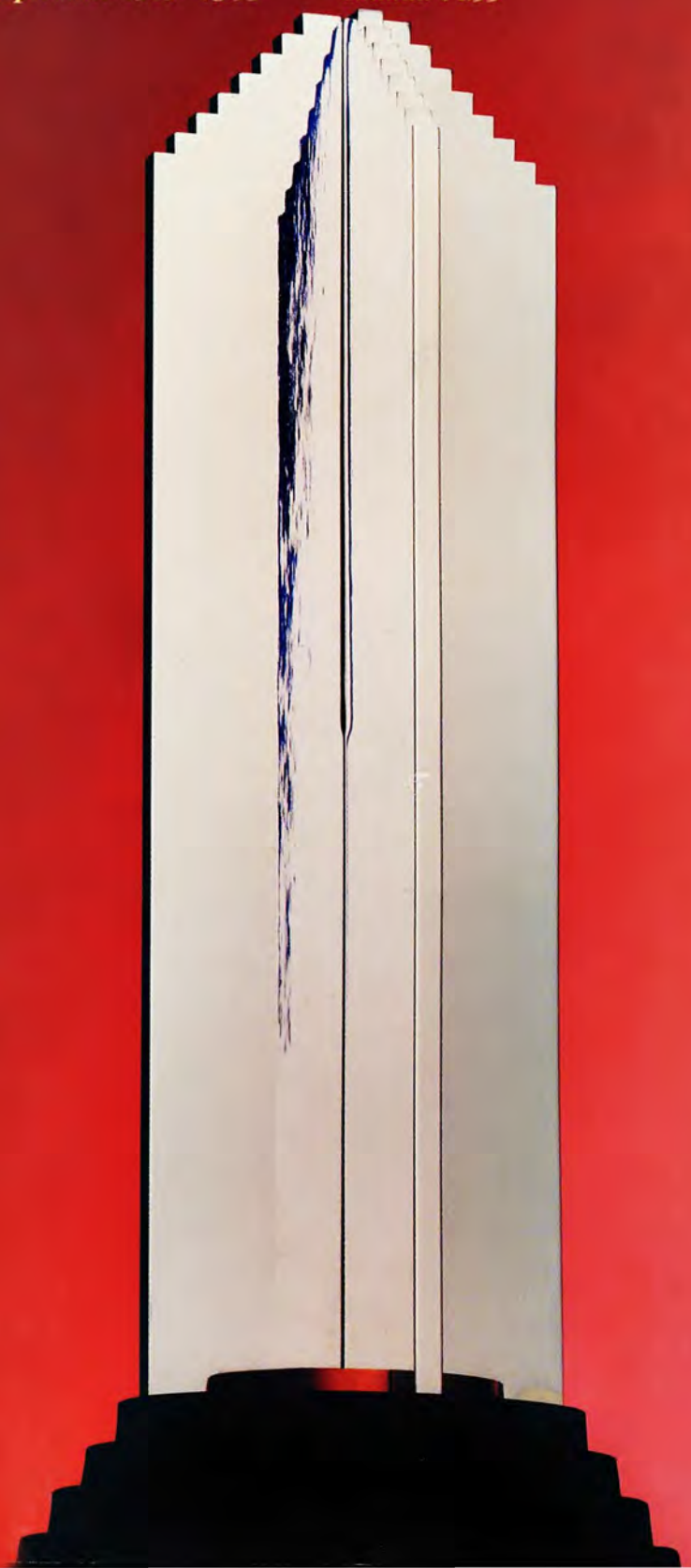
MACWORLD

The Macintosh® Magazine September 1989 $3.95 Canada $4.95

WORLD-CLASS WINNERS!

45 BEST MAC PRODUCTS

OUR READERS CHOOSE



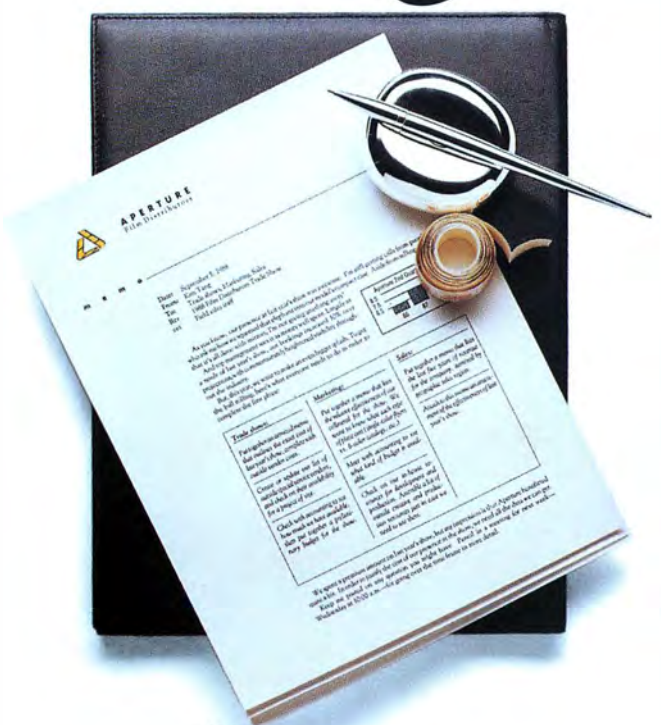
8 WORD PROCESSORS COMPARED
Third Annual Roundup

DESKTOP VIDEO
How It Works

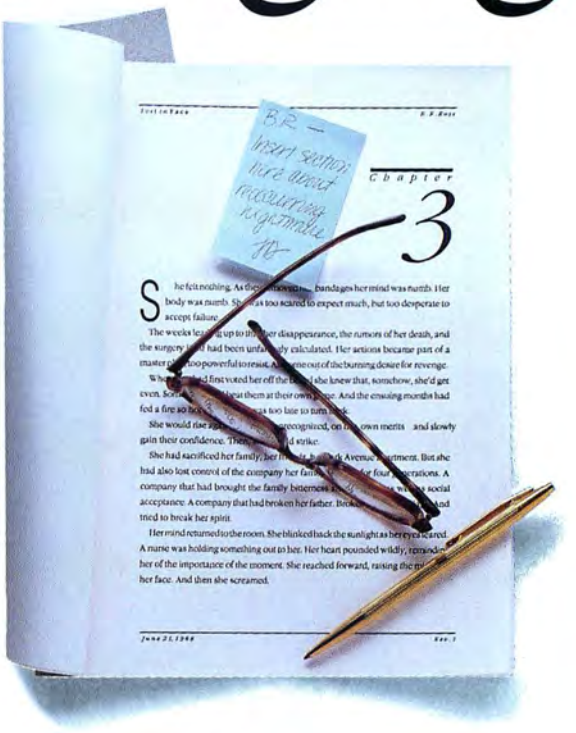
MIDI SEQUENCERS
What's New?

40MB HARD DISKS
Lab-Testing 28 Affordable Drives

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.

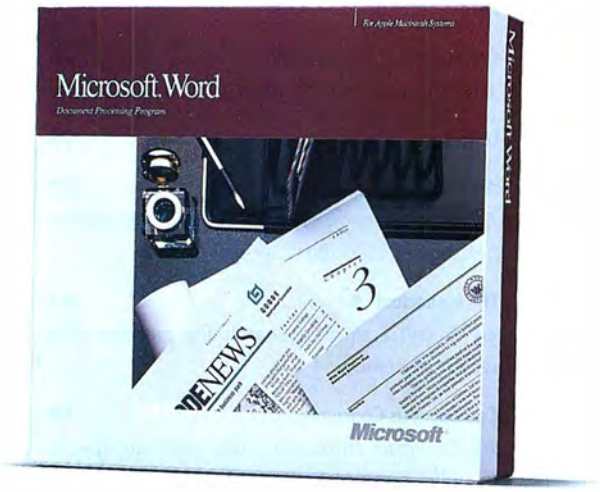


Documents 10,000 pages and longer won't intimidate Word. And Word Count gives authors an exact count of characters, words, lines and paragraphs.

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.

A new Word.



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.™

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.

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MACWORLD

The Macintosh® Magazine September 1989

DEPARTMENTS

The ballots are in for the third annual World-Class Macintosh Contest. To find out which Mac products got the vote, see page 164. (Photo by Fred Stimson.)

How to Contact Macworld **10**
Reprints, subscriptions, *Macworld* in microform, editorial contacts.

Commentary/Jerry Borrell **23**
The true meaning of a low-cost Mac.

Letters **35**

Art Beat **57**
By Ann Garrison/The artists and techniques behind selected illustrations.

The Iconoclast **61**
By Steven Levy/The search for passion in a word processor.

Conspicuous Consumer **69**
By Deborah Branscum/Are user groups in trouble? A report from the front lines.

State of the Mac **79**
By Thom Hogan/Apple's strategy for developers may mean fewer add-ons for consumers.

Verbatim **91**
Apple VP Edward Birss talks about System 7.0, RISC, and the Mac Plus.

Mac Business Tools **117**
By Michael Sloan/Create business forms easily with Works 2.0.

New Products **273**
A quick look at new Macintosh hardware, software, and accessories.

HOW TO/Quick Tips **287**
By Lon Poole/Copyright ethics, placing artwork for position only, automatic caption numbering, and more.

HOW TO/Getting Started with Animation **299**
By Jim Heid/A guide to creating and using animated images on the Mac.

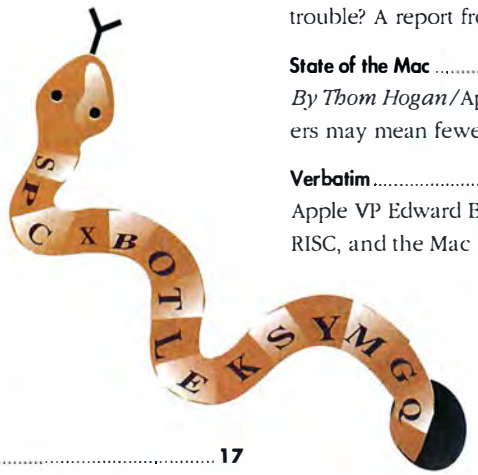
HOW TO/Insights on FreeHand 2.0 ..... **311**
By Simon Tuckett/Tips for using FreeHand's technical controls for more efficient output.

Updates **321**
The latest software upgrade news.

A Guide to Macintosh User Groups **325**
Looking for the latest public domain programs? Need tips on using a complicated program? These user groups can help.

Where to Buy **339**
Contact information for products in this issue.

Best-Sellers **376**



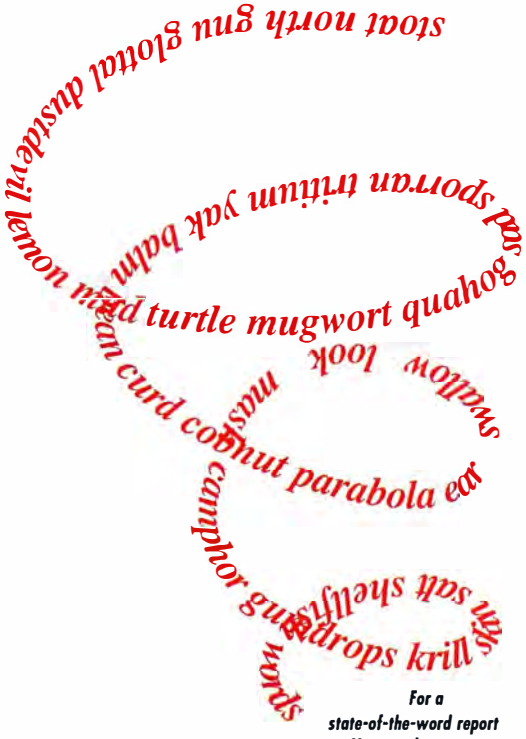
32-bit color is just one of PixelPaint Professional's new features (page 133).

NEWS

Mac Bulletin **17**
Late-breaking news.

Macworld News **131**

■ **DeskWriter Jets All the Way** HP's ink-jet printer for the Mac. ■ **StuffIt Goes Commercial** With new interface. ■ **PixelPaint Goes Pro** And seeing is believing. ■ **Version Control** Software tracks changes. ■ **Macs Connect to IBM Token-Ring Networks** The TokenTalk NB card. ■ **Board of the Rings** Token Ring for the SE. ■ **Odesta Keeping Up with the Times** Odesta's upgrades. ■ **Do Successful Candidates Double-Clique?** Election on the Mac. ■ **Infrared Light "Cables" Cut Network Costs** Connect without cables. ■ **Apple Announces IBM Mainframe Connections** NuBus to 3270 and SNA. ■ **A Different Kind of UNIX Shell** The HyperCard Unix. ■ **Alien Monitors Plugged In to My Mac** And you're next... ■ **Wallaby's Laptop Bounds into the Ring** And connects with desktops. ■ **AppleTalk: Bigger and Better** New version unveiled. ■ **Smart Paper** OCR for forms. ■ **UNIX Network News** EtherTalk support for A/UX. ■ **24-Bit Color Board Breaks Price Barrier** Full functions under $1000. ■ **Reader Survey: Macs at Home** Who's got what?



For a state-of-the-word report on Mac word processors, see page 180.

FEATURES

Desktop video is up and running on the Mac, but it doesn't come easy (page 208).

World Class Macintosh Awards **164**
By Suzanne Stefanac/Once again our readers have cast their votes for the best Mac products. *Macworld* proudly announces this year's winners in 42 categories.

Turning 40 ..... **172**
By Cheryl England Spencer/Macworld Labs tests 40MB to 45MB hard disks for the best performance and the best values.

Words, Words, Everywhere **180**
By Charles Seiter/A roundup of eight word processing packages to help you choose the one that fits your writing style.

The Great E-Mail Puzzle **188**
By David Kosiur/The next generation of electronic-mail systems has arrived. Here's how to take advantage of this new batch of sophisticated products.

MIDI Sequencers: Greatest Hits **194**
By Christopher Yavelow/Get on the right track with the new-and-improved generation of sequencers. Recent arrivals Vision, Portrait, and Dr. T's KCS Level II square off against upgrades of MasterTracks and Performer.

Signed, Sealed, and Delivered **202**
By Lawrence Stevens/Programs, utilities, and techniques for addressing envelopes and printing mailing labels on your laser printer.

Mac TV Tools **208**
By Lon Poole/A survey of hardware products that let you transform Macintosh images into video format and put video images into the Mac.

The speedy DataProducts printer outpaces Apple's IINTX, page 226.

REVIEWS

Abaton Quickstep, Jasmine DirectPrint, La Cie Panther PDX, Qume CrystalPrint Publisher **220**
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MacroMind Director 1.0 ..... **221**
Animation/multimedia presentation tool.

Adobe Streamline **224**
Bitmap-to-PostScript graphics converter.

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SoftPC 1.3 ..... **233**
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Deluxe Music Construction Set 2.5 ..... **235**
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Kodak Datashow Presentation Remote **237**
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Prototyper 2.0 ..... **258**
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Macintosh Communications Package **260**
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Snap 3.0 ..... **260**
2-D CAD system.

Near Miss **264**
Air traffic control simulation.

Window Shopping **267**
TimeMinder, Forecaster, two utilities, and a tutorial for Persuasion.

MegaScreen MegaDeal!

$1,095

'e have obtained a limited supply of ıp-rated MegaScreen 19" black and hite display systems.

ıese are the latest models of the dual-page mono-chrome display that Macworld rated number ıe for the SE in its May, 1989 compar-ɔn article. It's the MegaScreen 19" ack and white display. This is a crisp, ear monitor with built-in tilt-and-ivel base *plus* a MegaGraphics high erformance interface card.

9" MegaScreen data	
esolution:	1024 x 826
efresh Rate:	75 Hz
ots per inch:	75 dpi

We have a model for your Macintosh® II as well as for your Mac SE.

This is your chance to own a top-rated system with a money-back guarantee at the price of a no-name generic display. Hurry, we have a limited supply!

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MegaScreen SE or SE/30 black and white 19" system for Mac SE, SE/30.....$1,095

MegaScreen 2001 black and white 19" system for Macintosh II series.....$1,095

The fine print: shipping is extra (about $25 per system). And you must add sales tax if you're a California resident. MegaScreen SE includes a $20 coupon from MegaGraphics for dealer installation.

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MACWORLD

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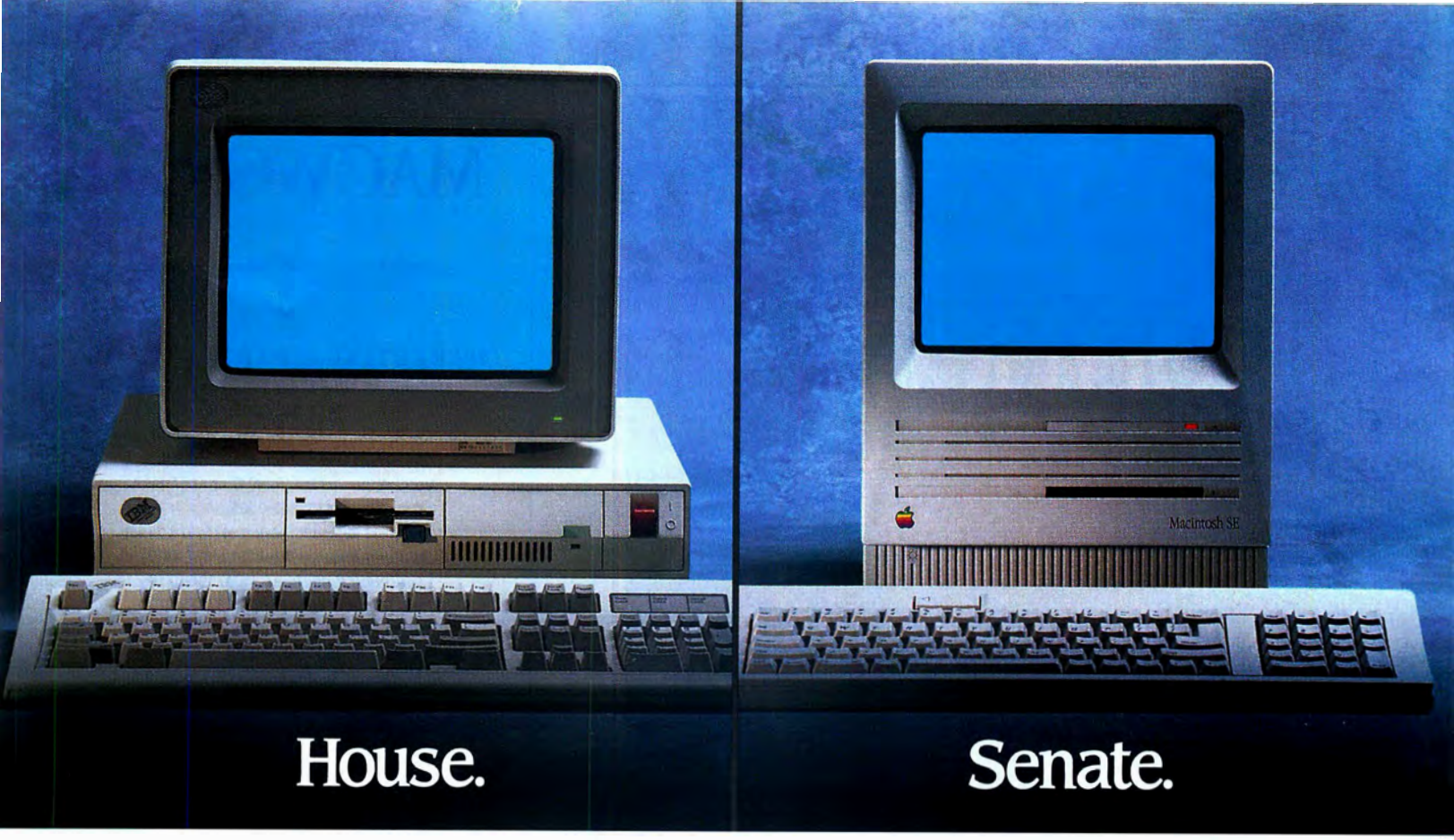
Publisher's statement can be found on page 10.



We found a measure they could both agree on.

Up on the hill it looked like another split along party lines. Both Macintosh and PC users fought for access to the same information. Until a TOPS network brought them together in bipartisan agreement, that is.

TOPS Tech Specs

- TOPS supports AppleTalk and FlashTalk running on twisted-pair cabling (telephone wire), and EtherTalk on thick or thin Ethernet cabling.
- All IBM PCs, PS/2 Models 25 or 30, or compatibles require TOPS FlashCard, 3Com EtherLink II or Western Digital EtherCard Plus. PS/2 Models 50 through 80, or compatibles require 3Com EtherLink/MC card.
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Maybe that's why TOPS has been voted the de facto standard for easy Mac-to-PC connectivity by some 600,000 users. All you have to do is install TOPS software in each Macintosh and PC on the network, add a network card to each PC, and you've got a quorum.

A polished diplomat in any arena, TOPS easily trades data from Lotus 1-2-3 to Excel, Microsoft Word PC to Word Mac and most other Mac and PC applications.

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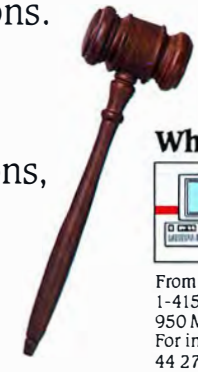

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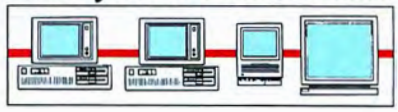

From outside the U.S. and Canada, call TOPS at 1-415-769-8700, ext. 307. Or write to TOPS, 950 Marina Village Parkway, Alameda, CA 94501. For information on European distribution, call 44 276 51440.

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VsCom/Macintosh—The industry standard Wang VS 2110 terminal emulation and file transfer software is now available for the Apple Macintosh.

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VsCom connects locally and remotely through Wang VS ADC, EADC, MULTC or WACS communication ports.

Wang VS function keys are accessible through continuously displayed icons, the Macintosh extended keyboard, or regular keyboard aliases.

Powerful Script Command files can completely automate the Wang VS terminal access.

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Document conversions include MacWrite, Microsoft Word, WriteNow, WordPerfect, and DCA. Wang documents supported include Wang Standard word processing and WP Plus.

An additional key feature is direct transfer of Macintosh documents and files in and out of Wang Office.

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Circle 160 on reader service card

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Circle 237 on reader service card

RasterOps 24-bit color for MacII & SE/30.

How we broke technology barriers, to deliver the worlds most advanced 24-bit color board for just $995.

The new RasterOps ColorBoard 264 rewrites the price book for 24-bit color.

Combine it with Apple's® 13" color monitor, or any Mac-compatible 640 x 480 monitor. You get advanced, third-generation 24-bit color, allowing you to display over 300,000 colors simultaneously.

If you have an Apple 13" color monitor, then you are ready for 24-bit color.

If you are going to buy a 13" color monitor, this is the only board you should consider.

Why? For the quality design and features described in this ad.

And for real, 24-bit color.

24-bit systems let you work with over 16 million colors simultaneously. This is the most accurate way to produce true-to-life colors. With 24-bit color, you can display and manipulate photographic quality images, to create stunning presentations and documents.

24-bit color unlocks the potential of desktop publishing, presentations, and video.

Apple's 32-bit QuickDraw™ is the standard.

Now, we have made it affordable.

300 nanosecond Bus Cycle

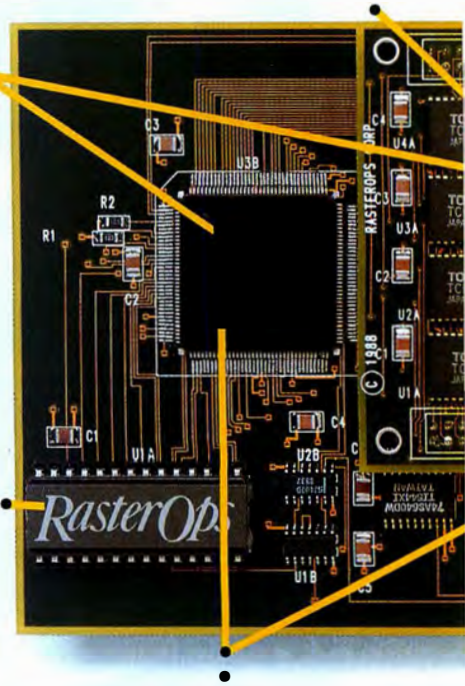
Barrier: 24-bit color takes a lot of memory. One screen image can take up to 900,000 bytes. Slow memory slows your screen draw time.

Breakthrough: These 1 Megabit Video RAMs provide more memory in less space, and operate at 100 nanosecond speeds, providing the fastest possible read-write cycles available on the Macintosh, at 300 nanoseconds.

RasterOps 264 Chip Set

Barrier: Providing professional color capability to Macintosh® users at a price everyone can afford.

Breakthrough: Resulting from many man-years of engineering development time, RasterOps has reduced the large number of components needed (sometimes as many as thirty) to produce 24-bit color video display cards, to a set of two proprietary custom chips utilizing the most advanced VLSI chip design and manufacturing technology. Selecting the most advanced high density CMOS chips throughout, this board has the lowest chip count of any 24-bit card in the industry. The fewer the chips, the less the heat, and the more reliable the product.



SetGamma and DirectSetEntries

Barrier: To see the effects of color corrections in real time, as you make adjustments to gamma, brightness and contrast.

Breakthrough: Your ColorBoard 264 directly supports Apple's DirectSetEntries and SetGamma QuickDraw instructions in hardware. Instantly see the effect of changes to your color image. You can watch the color tones change as you move the mouse. Without this dynamic support, you have to guess at the color correction, enter the new value, and wait for the new screen to repaint. No waiting with the 264.

Color Modes

Barrier: The color mode of the display (2, 4, 16, 256, or millions) affects the speed of your work. When you are word processing you want documents to scroll fast.

Breakthrough: With RasterOps' custom Very Large Scale Integration CMOS chips, all color modes are available including 2, 4, 16, 256, or millions of colors. You decide what color level you need and when you need it.

"Millions of Colors For Millions of People!"™

Both the Mac II family and SE/30 version of the RasterOps ColorBoard 264 are fully compatible with Apple's 32-bit Color QuickDraw. RasterOps is an Apple licensed supplier of the Apple 6.0.3 System Software, including 32-bit color QuickDraw. A copy is shipped with each ColorBoard 264.

ColorBoard 264/II For Any Mac II: **$995.**

ColorBoard 264/SE30: **$1295.**

All registered and unregistered trademarks are the sole property of their respective companies.

Dual Oscillators

Barrier: With the onrush of multimedia and video applications, our customers don't want to invest in a board that locks them out of video.

Breakthrough: Two separate oscillators. The left to support Apple's 13" color monitor at a resolution of 640 by 480, and the right oscillator to output 8-bit gray scale video directly to VCRs or TV monitors. It will also output RGB NTSC video for external encoding in 24-bit True Color. When you need video, (and it's coming fast), you're ready.

DAC 473

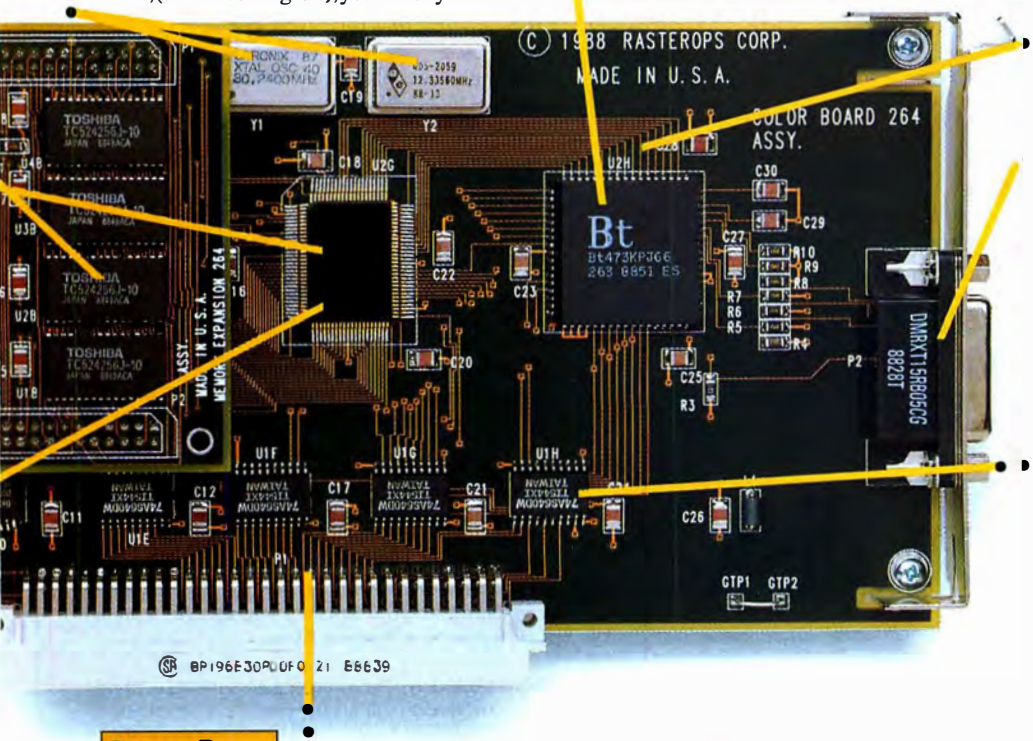
Barrier: Convert a 24-bit image from digital values in memory to analog signals of Red, Green, and Blue, using the least amount of power and board space.

Breakthrough: We are the first to use this advanced, DAC (Digital to Analog Converter) 473. The single, low power chip does a better, faster job, and replaces 3 chips. If you want the best, ask for the DAC 473.

SMOBC Fabrication

Barrier: The accepted, easy way to manufacture a board is wave soldering. But this doesn't allow efficient use of robots, and doesn't create a "Clean" board.

Breakthrough: We use an advanced, Solder Mask Over Bare Copper board fabrication technology and surface mounting of components through efficient, dependable robotics. Note the clean, simple appearence of this board. When you turn the board over, you will see a smooth golden surface, the trademark of a SMOBC board. It costs more and requires a greater design effort, but the benefit to you is a more reliable board.



Auto Sensoring

Barrier: Allow user to change monitors and frequency without setting a switch, changing an oscillator, or making a selection from the control panel.

Breakthrough: Circuitry that automatically senses which monitor you are using and switches automatically from 66.7 Hz to 30 Hz. You just plug in your Apple-compatible monitors, the board will take care of the necessary adjustments.

Bus Buffering

Barrier: The NuBus transmits power spikes and bus noise. These can destroy data as well as circuitry on the display card. Spikes can also cause pixels to trip, causing spots on the screen.

Breakthrough: We designed sophisticated bus buffering circuitry to isolate the hostile NuBus environment from critical components on the board, protecting your video investment, and your data.

Power Draw

Barrier: Power and heat. Your board draws its power through the NuBus. Apple specifies a maximum of 2.1 Amps per slot. Many boards require over 4.0 Amps. Amps mean heat, which is deleterious to your Macintosh, and a drain on the power supply.

Breakthrough: Through the extensive use of CMOS circuits, VLSI parts that replace multiple parts, low chip count, and 5 mil copper traces, the RasterOps ColorBoard 264 needs less than 1.0 Amp. Your system runs cooler. You can use other slots without fear of overloading your power supply.

RasterOps Literature Package

For your nearest dealer and literature on the most advanced Macintosh graphics products, call:
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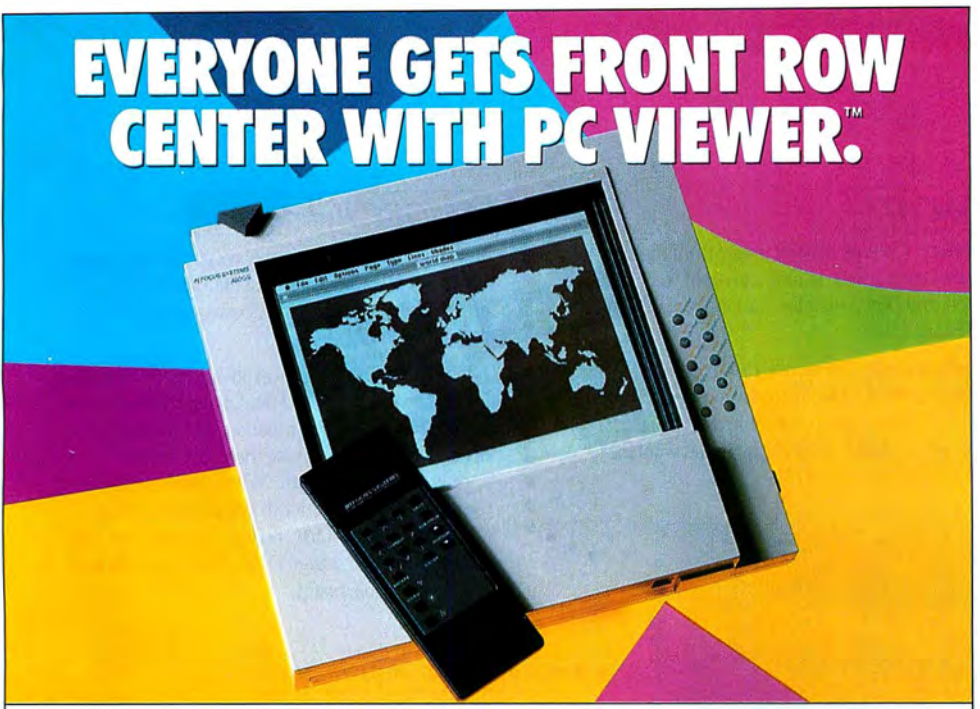

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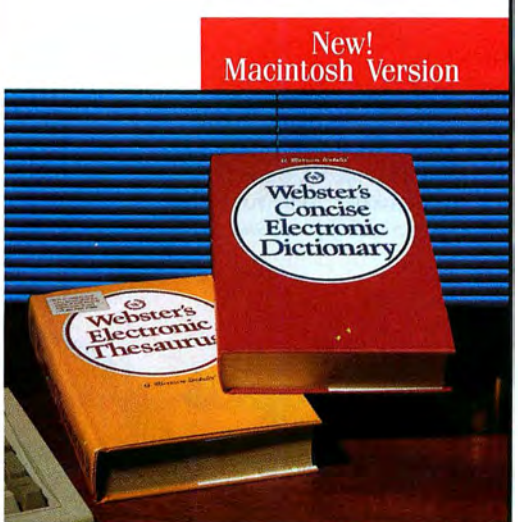

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Page 1

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And, upgrading to the Radius DirectColor/24 is as simple as adding video RAM.

For those of you who use only 256 of the Macintosh colors at one time, there's the 8-bit Radius Color Display™ System.

No matter which Radius color system you choose, you'll be working across two flicker-free, paper-like pages that give you 30% more working area than commonly seen on other 19 inch displays. Which means your work is never cropped off at the sides or chopped off at the bottom.

Naturally, you'll also reap the benefits of all the classic RadiusWare™ features.

Including Tear-off Menus in every application. The ability to capture any portion of your image as a PICT file. Small or large menu bars. And direct control panel access.

The Radius Color Display showing two full pages. (1152 x 882 pixels)

Other color monitors crop off the sides and chop off the bottom. (1024 x 768 pixels)

So if you've been waiting to work with real colors across two real pages, visit a Radius Authorized Dealer. You can find one near you by calling 1-800-227-2795.*

And get ready to make some colorful history of your own.

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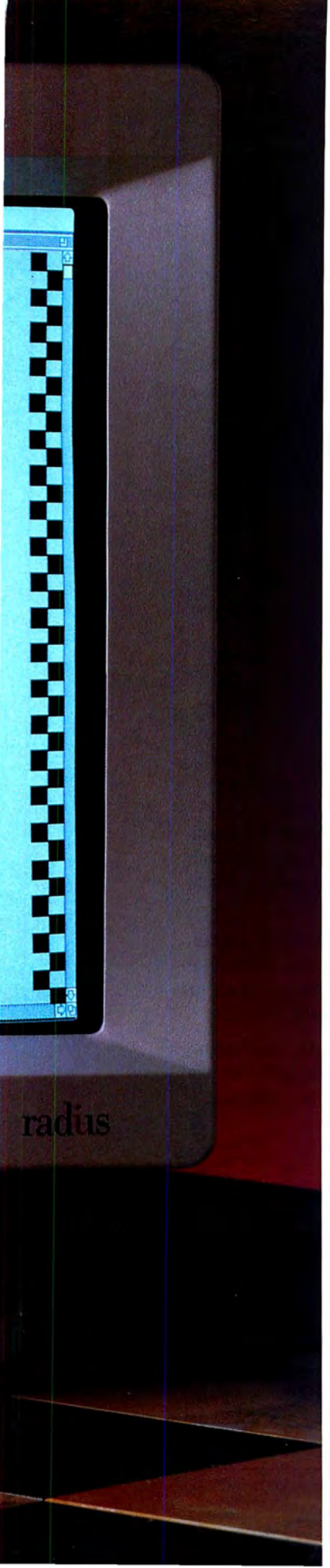
To some it was just a game. An intricate game composed of subtle moves, sublime suggestions, and intricate defenses. To him, it was a paradigm of life. An ever shifting pattern. Of Victory and Defeat. Each game unique. Each game a bitter-sweet experience. He studied Sun Tzu. He read Clausewitz. He explored Napoleon. He marvelled at the Masters. He never stopped learning. He played his opponent as closely as some would hold a lover. He played the clock as if his life depended on hitting the button five seconds under the allotted time. They called him the King of Strategy. He called himself a Student of Life.

Page 1



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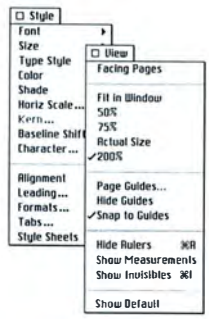
The Radius Full Page Display



Tear-off Menus

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The easiest 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.

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MAC BULLETIN

INDUSTRY NOTES

Apple Cuts Adobe Ties

Apple has announced plans to divest its 16.4 percent interest in Adobe and to develop its own PostScript interpreter to use in Apple printers. With a PostScript clone, which Apple expects to complete at the earliest between spring and fall of 1990, Apple will be able to extend PostScript's features and not pay royalties to Adobe. The two companies also have a new PostScript product-development agreement, but neither company will discuss it.

Olduvai's New Tactics

Olduvai announced that it has sold Icon-It; FontShare; Art-Fonts volumes 1, 2, and 3; and ArtClips volumes 1 and 2 to a new Miami-based company, Tactic Software. Olduvai retains Read-It, MultiClip, and ClipShare. For more information, contact Olduvai at 305/665-4665 or Tactic Software at 800/344-4818.

Olduvai to Distribute GraphistPaint

Olduvai has won U.S. and Canadian marketing rights for French-born GraphistPaint. Olduvai plans to ship version 2.0 of GraphistPaint this fall. It adds color separation capability and 3-D with special effects, and will list for $399. Olduvai also plans to distribute 32-bit and black-and-white versions of GraphistPaint, which are currently under development at Adone in Paris. For upgrade information, contact Olduvai at 305/665-4665.

Next Goes to Asia by Canon

Canon, which makes the erasable optical disk drives for the Next machine, has invested $100 million in Steve Jobs's Next Inc. Another agreement was signed under which Canon will distribute Next's products in Japan and other parts of Asia. In return for its investment, Canon will own 16.7 percent of Next and have a seat on Next's board of directors.

Apple to Fix Problem Hard Disks

Apple has extended the repair policy on its Apple Hard Disk 40SC 40MB hard disks with serial numbers from 335507 to 1023016 due to the drives' high rate of failure at start-up. Users of failed drives with serial numbers in that range will receive another hard disk free through June of 1990, according to Apple. The company will also reimburse customers who have already paid for repairs. For more information, contact your dealer.

PageMaker Gets the Word

A $25 upgrade to **PageMaker, version 3.02, lets you place documents from Microsoft Word 4.0.** The new version can handle files saved in Word 4.0's native format, and with some restrictions, lets you place and then edit charts created with Word's new chart feature. The upgrade also lets you place WordPerfect, Works 2.0, and converted XyWrite 3 Plus files, as well as partially formatted text files. PageMaker version 3.02 also adds support for half-point font sizes. Call Aldus at 206/628-2320 for more information.

DayStar Digital to Launch 50MHz Accelerator

DayStar Digital announced the 50/030 Accelerator II and 50/030 IIx, **a pair of 50MHz 68030-based accelerator boards** for the Mac II and Mac IIx. Each accelerator has its own asynchronous 50MHz bus to get around the computer's 10MHz NuBus. The boards are expected to ship sometime in August after being shown at Macworld Expo. For more information, call DayStar Digital at 404/967-2077.

Music Notes

Plans for Concertware+MIDI version 5.0 call for a simplified interface that makes room for many new features. The music notation capability now allows you to change a note's pitch by dragging it up or down, and adds proper triplet notation, crescendo and decrescendo markings, auto-transposing, double flats, and double sharps. Tools for writing song lyrics and other text elements have been completely revised to provide a ruler for manipulating text and the ability to work with groups of text. Concertware+MIDI version 5.0 supports the Mac Clipboard and exports notation in PICT format for placement in draw or page-layout packages. The program also **exports and imports music files using the new international MIDI standard,** and the Undo command can now undo almost anything.

The new version will list for $189.95; upgrade prices had not been set at press time. For more information, call Great Wave Software at 408/438-1990.

CD ROM Meets Encyclopedia

The 21-book, 31,000-article *Grolier Academic American Encyclopedia* is now available for the Mac on a CD ROM. **Called the New Electronic Encyclopedia, it is indexed as a 9-million-word database,** and the search engine packed on a floppy disk that comes with the CD provides Boolean-smart navigation through this vast pool of information. Grolier developed the $395 version of the encyclopedia as text-only so it would run on a stock Mac Plus, which can't do justice to the four-color art and graphics in the book version. Future versions of the Grolier CD may have color images and even sound. For more information, contact Grolier at 800/356-5590.

Virus Medicine Ships

Two products shipped recently for defending the Mac against digital viruses. Symantec AntiVirus for Macintosh, or SAM, protects by screening floppies on the fly, monitoring disk activity, and if necessary, eradicating viruses and attempting to repair damaged files. SAM lists for $99.95.

Anti-Virus Kit, from 1stAid Software, focuses on protecting data from infection and does not repair dam-

(continues)

INDUSTRY NOTES

CDC Drives Sold to Seagate

Control Data Corporation has agreed to sell its hard disk subsidiary, Imprimis Technology, to hard disk manufacturer Seagate Technology.

Ashton-Tate Sued

Ashton-Tate shareholder Ronda Morganstein has filed suit in Los Angeles claiming the company and certain officers violated securities laws by failing to report the company's actual financial condition. Ashton-Tate said the charges were without merit. Ashton-Tate recently disclosed that it expects to report a second-quarter loss of about $15 million, and that a third-quarter loss is possible as well.

Yet Another Lawsuit

Information International, an electronic prepress publishing system vendor, has filed suit against Adobe Systems and Apple for alleged patent infringement on "typographic character-generating apparatus." The suit asks for unspecified damages and seeks an injunction stopping the sale of certain unspecified Adobe and Apple products. The patent, called the Character Generating Method and System, covers technology used in Information International's product line; in 1986, the patent enabled the company to win a $5 million out-of-court settlement against Compugraphic Corporation.

Cricket Software Acquired

Computer Associates International has agreed to acquire Cricket Software. The acquisition comes not long after Cricket Software chairman and cofounder Jim Rafferty announced he was leaving the graphics software vendor to start a new venture. Products marketed by Cricket that will continue to be developed by Computer Associates include Cricket Graph, Cricket Paint, Color Paint, Cricket Presents, and Cricket Expression.

Maxcess–CE Software Bundling Agreement

Maxcess announced that it has begun bundling with its hard disks a selection of products from CE Software including system-enhancement and network utilities. Among the bundled programs are QuicKeys Lite, QuickAccess, DiskTop, and Mock Package Plus Utilities, a set of ten desk accessories.

aged files. Its VirusGuard, Inoculator, and Same/Diff together monitor writes to disks and other changes on disks; and the Anti-Virus Kit manual, in the tradition of 1stAid Kit, is designed to educate users. Anti-Virus Kit lists for $79.95.

For more information, contact Symantec at 408/253-9600 and 1stAid Software at 617/783-7118.

Access Technology's Mac Division Goes It Alone

When Access Technology was gobbled up by CompuServe, its two Mac products, MindWrite and Trapeze, went down in flames. Now from the ashes rises DeltaPoint, a new company **with the staff from Access Tech.'s Mac division intact,** and with MindWrite, Trapeze, and two new products: DeltaGraph, a $195 business and scientific graphing package with direct hooks to Excel (for more details, see *Macworld News,* August 1989), and a $99 word processor code-named Taste, which features some page-layout capabilities, a drawing module, color support, and a point-and-click interface for performing complex mail merges. DeltaGraph should be available now, and Taste is expected sometime this fall. For more information, call DeltaPoint at 408/648-4000.

Apple Offers Software Update Program

A new annual subscription service available from Apple dealers, called **the Apple Software Update Program, allows users to receive the latest system, networking, and communications software** direct from Apple by mail. Each update comes with complete documentation, which describes new features and installation. Products covered by the service include Mac system software, HyperCard, AppleShare, InterPoll, and MacTerminal; other Apple software will be added to the program in the future. Subscribers can opt for a special bundled package designed for network administrators, one containing individual updates for specific Apple products, or a combination. Subscribers receive the latest version of the software, plus any updates that come out in the subsequent 12-month subscription period. For more information, call Apple Computer at 408/974-1010.

E-Machines Unveils Color Display Subsystem

E-Machines planned to announce at the end of July its ColorPage graphics subsystem, a combination 15-inch color monitor and display board. ColorPage will retail for $2095. The monitor is based on Zenith's Flat Tension Mask tube, which reduces glare and distortion; the 8-bit display board uses one NuBus slot and **is expandable to a 32-bit configuration that will support Apple's 32-bit QuickDraw.** Volume shipments are slated for October. For more information, call E-Machines at 503/646-6699.

The Evolution of AppleLink

Apple's user-friendly proprietary online service is a repository of information about Apple and Apple-related news for Apple employees, dealers, developers, and many other people in the Macintosh market. Version 5.0, which should be available now, **expands the system's user capacity, speeds up messaging, makes 2400-baud access widely available** (there are plans to develop 9600-baud access), and runs in the background with or without MultiFinder. Other new features include a DA for automatically sending binary files and messages from inside other applications, a special menu that users can add common commands to, group addressing, and integrated access to Solutions' Glue and ImageSaver formats. Unfortunately, AppleLink is not available to the general public, though rumors persist that someday it will be. AppleLink sign-on and hourly rates vary for different categories of users.

Dove Computer Bundles OmniPage OCR with Accelerator

Dove Computer will bundle Caere's OmniPage 2.0 optical character recognition software with Dove's MaraThon 020 accelerator for the SE and MacSnap 4S memory-expansion kit. OmniPage 2.0 runs only on the Mac II family or on SEs with 020 accelerators. The joint promotion, which runs through August, offers the bundle for a suggested list price of $1995, **$650 less than the price of the individual components.** For more information, call Dove Computer at 800/622-7627.

Microtech International to Ship 650MB Hard Disk

Microtech International will introduce at the Macworld Expo a 650MB hard disk, the Nova 650. Slated to ship in the third quarter, **the hard disk will list for $3430 and have an average access time of 18ms.** For more information, call Microtech International at 203/488-9847. M

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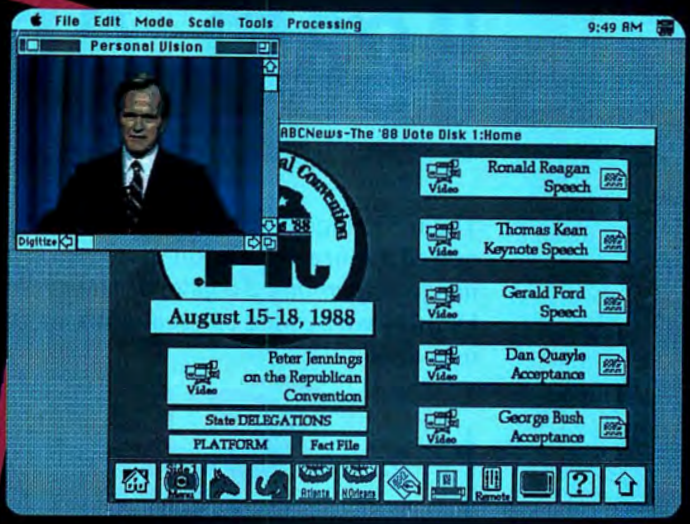

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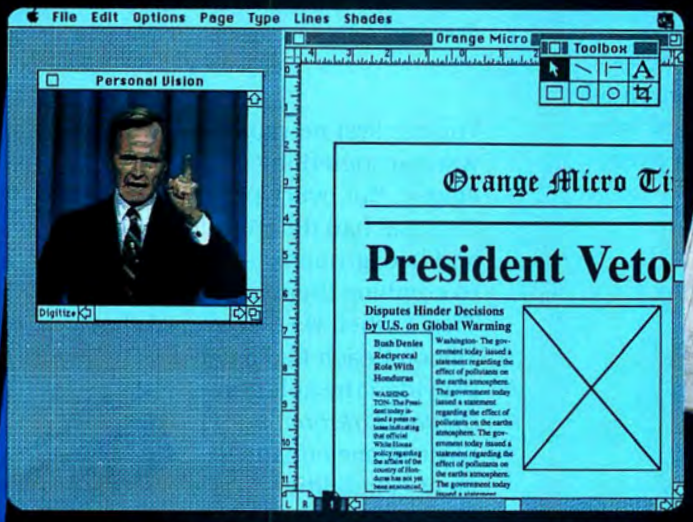

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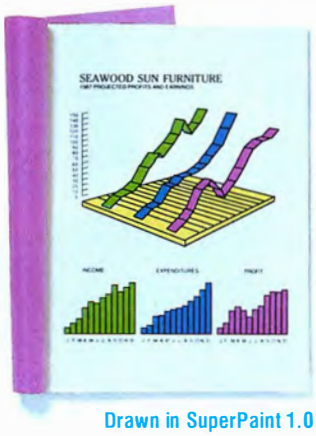
Logo in SuperPaint 1.0

In Seawood's early days, we had to do everything ourselves. We even designed our own logo on our new Macintosh®. Silicon Beach's *SuperPaint*, with its combined Paint and Draw features, was just the solution we needed.



Drawn in SuperPaint 1.0

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SEAWOOD
SUN FURNITURE

SuperPaint 2.0

For our first newspaper ad, we wanted something clean and simple. But every photo at our disposal had different lighting and backgrounds — it was tough to combine them in one ad. That's when we discovered that Silicon Beach had again provided the solution. *Digital Darkroom*'s basic image enhancement capabilities and sophisticated tools automated the process for us.

Digital Darkroom

For our mail-order catalog, we sat down with *Digital Darkroom* again, but this time we let our imaginations run wild and created this composite image. *Digital Darkroom* made short work of the seemingly impossible task of getting the dog and cat to sit still for a photograph.

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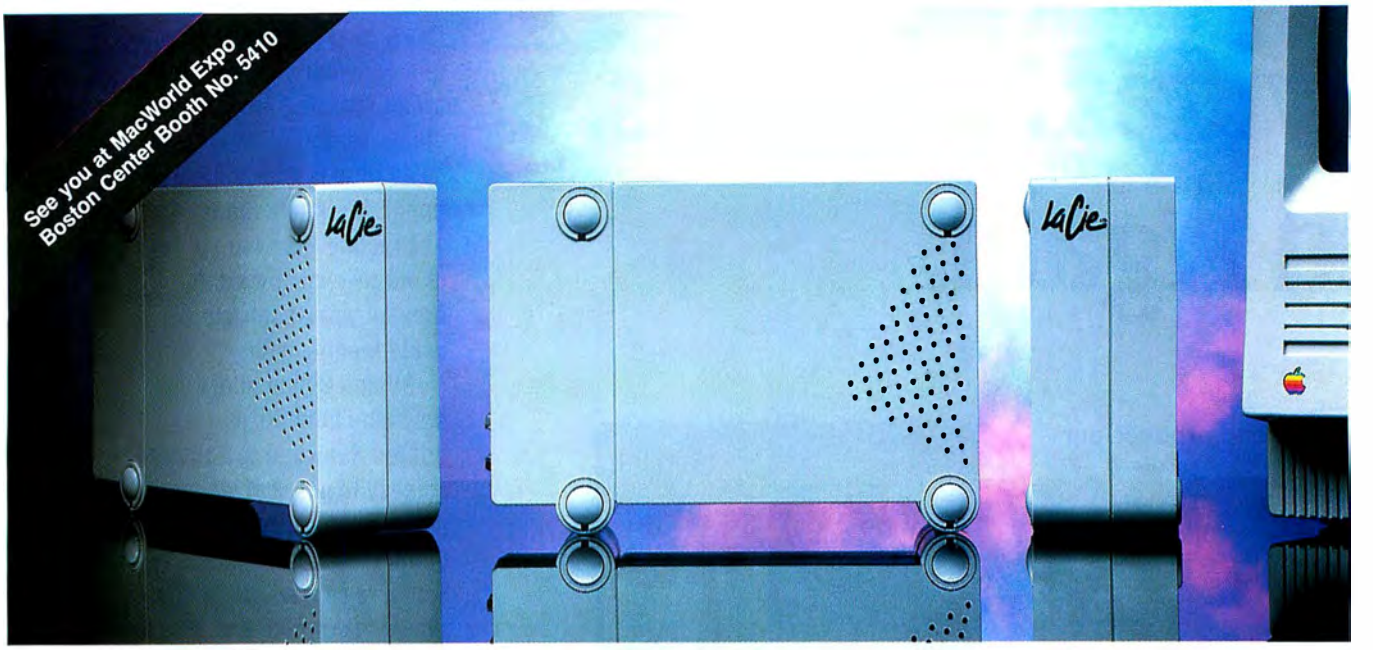

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Circle 145 on reader service card

A Low-Cost Mac

What it really means

by Jerry Borrell

It was one of those jobs that had to be done. Something that needed doing for a long time, but no one had the time. In fact, it's still not finished, but at least I've started going through *Macworld*'s software library. For the past five years we have kept every piece of software for the Macintosh that we've received. So much software that three years ago I asked our librarian to throw away the packaging and store the documentation and disks in manila envelopes. So much software that the manila envelopes were wedged into shelves too tightly to allow any addition.

So one night I gritted my teeth and waded into the room where we keep software. And that is how this column became a parable on the meaning of the low-cost Mac. For on those shelves I found hundreds of software programs—word processors, spreadsheets, fonts, databases, math processors, clip art, games, utilities, business programs—that have never seen the light of day. Sure, we had all the versions of Microsoft Word, PageMaker, MacWrite, and the rest of the best-selling programs (and quite a few versions of lesser-known software). We had lots of envelopes in which popular games used to reside. We had lots of products that were once visible but have now disappeared from view: Habadex, Word Handler, Mac Lion, Crunch, Draw It Again, Sam. But many envelopes contained programs that few people know about, and that no magazines (including this one) have written about.

As I stood there opening package after package, faced with the number of Mac software programs that have been written over the last five years, I was saddened to realize how many individual programmers and small development teams have put so much effort into products that so few people know about.

These programmers have met the same fate as today's average novelist. The would-be author of the next Great American Novel produces a tome and, lacking any connections to New York publishing circles or relatives in the business, sends the manuscript off into the wilderness of Manhattan publishing. More than fifty thousand such manuscripts in manila envelopes are sent out each year. The attitude is expectant. "Well, I've done it. Written the next great novel. Now all I have to do is send it out there and wait for it to be picked up by some publisher." Fame is to follow shortly thereafter; then movie rights, talk-show appearances, and retirement to an island in the Aegean, where the author ambles down to the dock each evening to drink ouzo, eat calamari, and watch the sun set. But 90 percent of those manuscripts never result in so much as a frozen fish stick.

The software-publishing industry is essentially the same. So as I stood surrounded by the thousands of manila envelopes, I could imagine two young developers who had written a database, desktop published a manual, copied some disks, kissed each envelope that went out to the magazines, and then dreamt about . . . (see above).

The difference between literature and software is that the talk show is "Computer Chronicles," the magazine interview is in *Macworld,* and the recognition comes from Mac enthusiasts. And we're probably talking not calamari but sushi.

LAMENT FOR SMALL DEVELOPERS

If you read this column with any regularity you'll have seen an occasional lament for the small developer who has a tough time making it in the Mac market. Okay, but everyone knows that, in terms of dollar volume, the bulk of software and hardware sold in this marketplace comes from a handful of companies. So why worry about all those envelopes? Well, for one reason, because Aldus was once a small start-up too. But five guys out of Atex with years of electronic publishing experience do not make up your average start-up. To which I reply, true—almost. If you look around at the people who started compa-

(continues)

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Circle 246 on reader service card.

nies in the Macintosh marketplace, especially the successful people like Charlie Jackson (Silicon Beach) and Mike Boich (Radius), they typically are bright computer enthusiasts who have had the vision to see where computers are taking society, and the insight to recognize the potential of the technology underlying the Mac.

They all start out small. And it only takes one product with a difference to change an industry. So out of those thousands of products in envelopes we may be missing a lot. Or there may be a product that would beget the product that would make a difference.

If a low-cost machine were available by mid-1990, Apple could end up with an installed base of 4 million by the end of the year

Not long ago I was talking with Rick Barron, president of Affinity, the company that develops and produces Tempo, and Rick commented on my concerns about small developers. Rick's company had been hit hard by the release of System 6.0 because it included a feature called MacroMaker, which did many of the things that Rick's Tempo and Tempo II products do. Once System 6.0 was introduced, the distinction between what MacroMaker and Tempo could do was less important than the simple fact that fewer people were likely to spend money on a product whose functions they perceived as present already in Apple's system software.

Not that these are new ideas among third-party developers. Doug Macrae's company, General Computer, was one of the first to come up against the idea that the important thing about the cutting edge of technology is staying behind the blade. Some developers are fatalistic about their chances, others find profit in staying ahead of Apple's announcements. At one conference I bumped into Dick Skeie, president of CE Software (producer of QuickMail), as he came out of a secret enclave—a meeting about Apple's intentions regarding electronic mail. Dick allowed as how

(continues)

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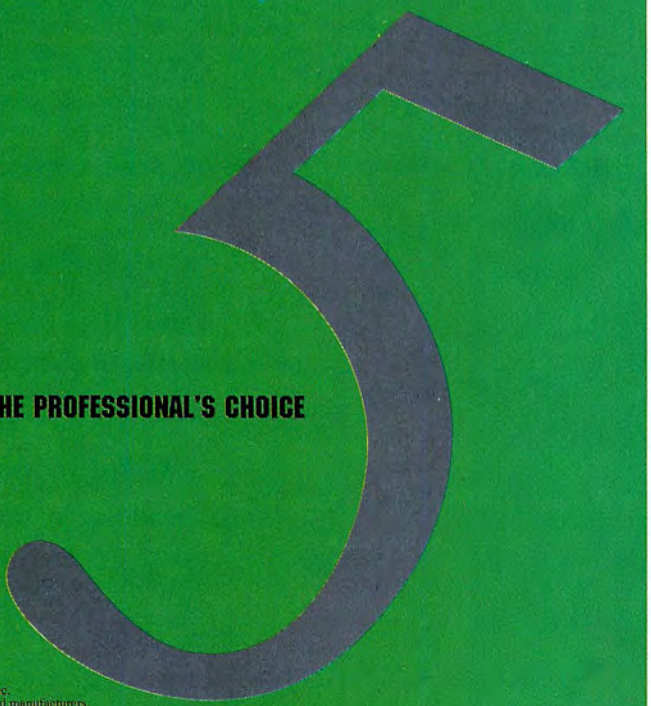

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Apple's next announcements in this area would provide his company with more opportunities.

MARKETING DIFFICULTIES

Of late, small developers have shifted their concerns; they're less worried now that Apple's actions might hurt them, but they're concerned about the difficulties in marketing products. The Mac market is unlike that of MS-DOS machines essentially because of the difference in the number of machines in the installed base. There are many fewer Macs than PCs and PC clones.

Small developers say the Mac market is becoming prohibitively expensive

The small developers say the Mac market is becoming prohibitively expensive, even apart from the difference in size of the Mac and PC markets. Research and development, staff, facilities, marketing, trade shows, advertising, technical support, discount marketing, and upgrades—all add to the cost. And because developers tend to sell most products to first-time Macintosh purchasers, each time there is a downturn in Mac sales (such as the January/February doldrums caused by Apple's pricing problem, or the summer-quarter slowdown) they tend to sell fewer products. (I also suspect, and know this to be true among our readers, that many Mac owners have more than one machine—making the market for additional software and hardware smaller than what might otherwise be the case.) So over the past year the concerns voiced by developers have focused on whether Apple can increase its market share quickly enough to fund a robust third-party market.

LOW-COST MAC WANTED

The notable result over the past year was that Macintosh developers, such as Heidi Roizen of T/Maker and Bill Campbell of Claris, have been calling publicly for a low-cost Mac. *Macworld* added its own gentle (and lonely voice in the Mac press)

(continues)

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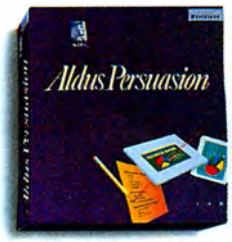

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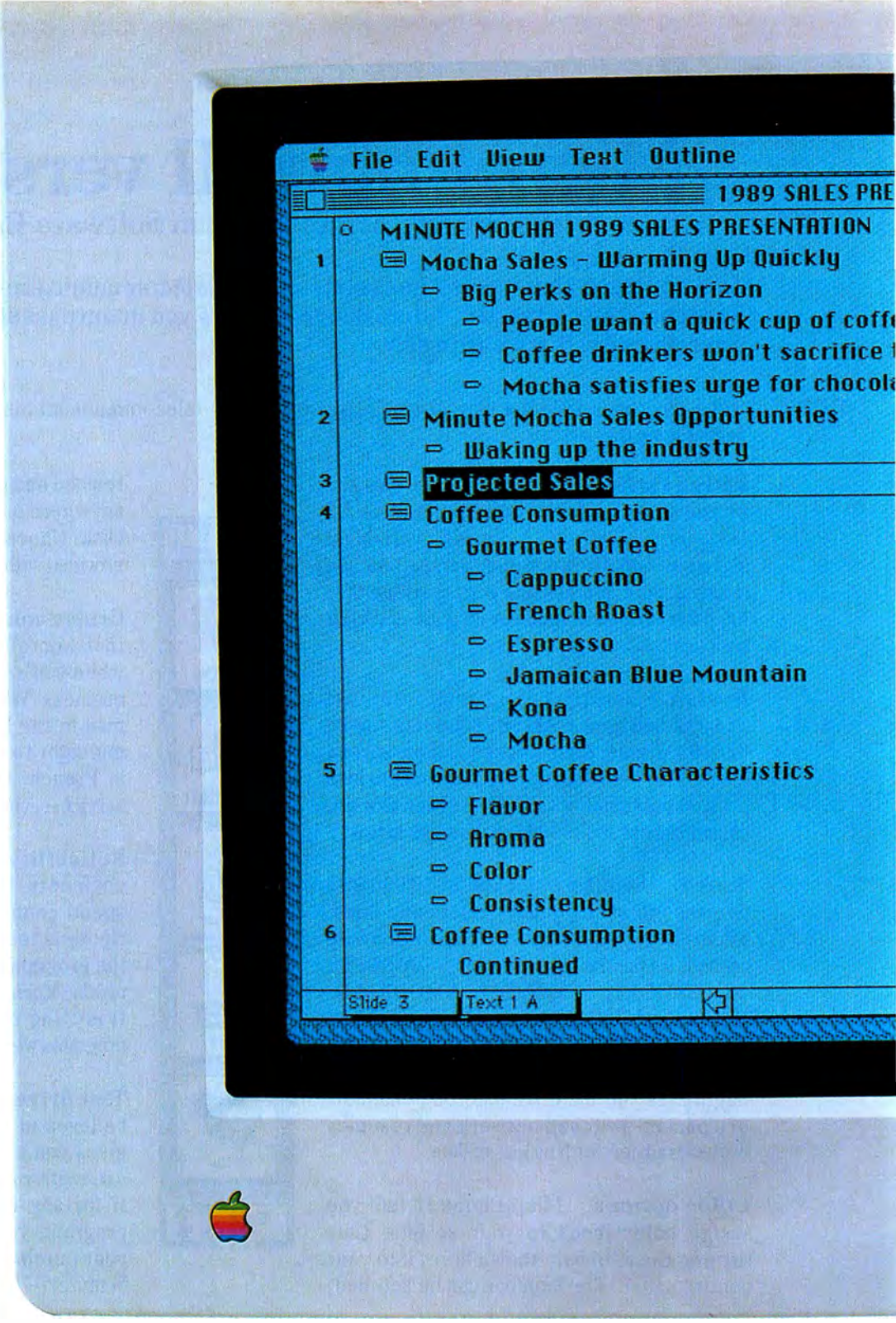

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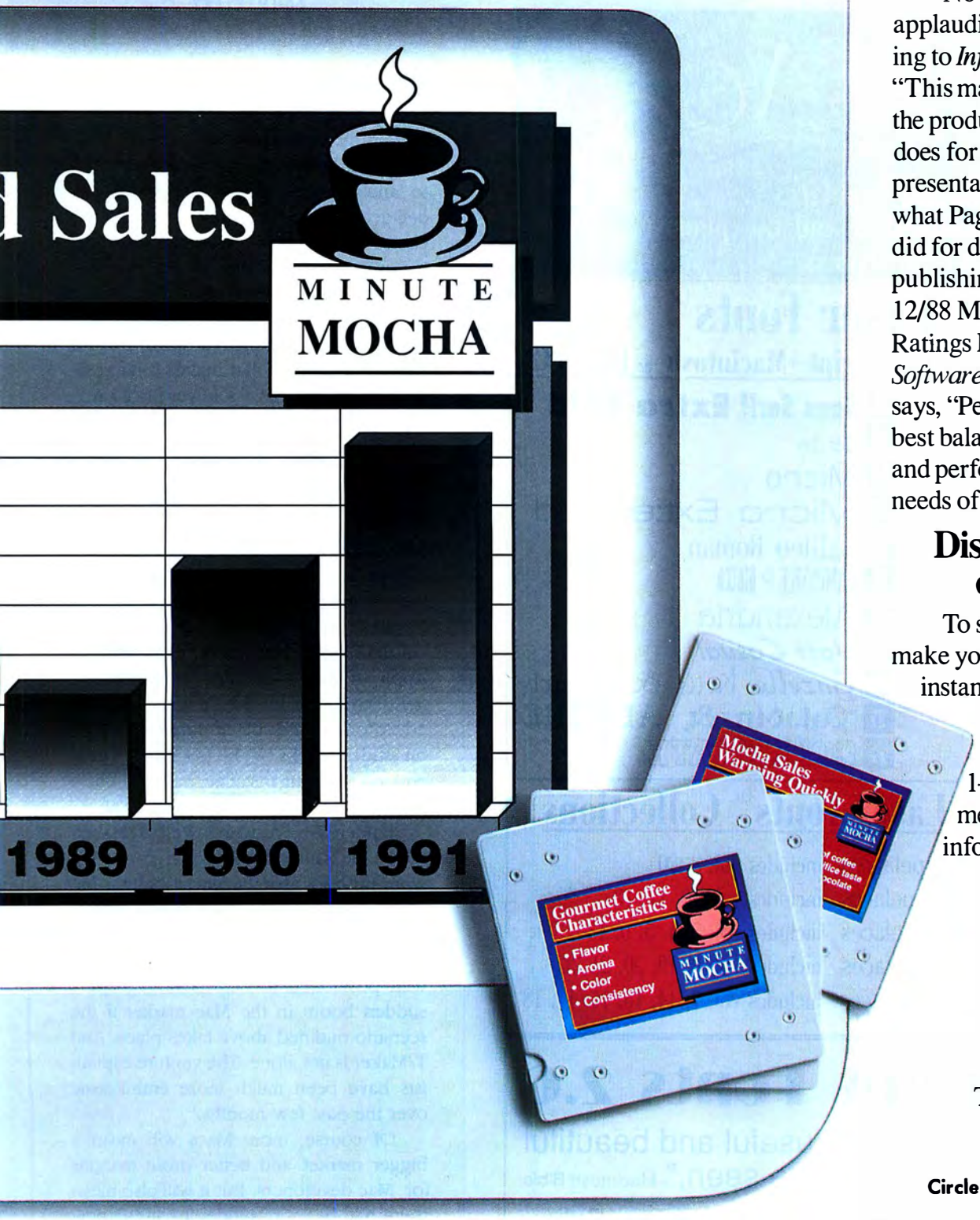

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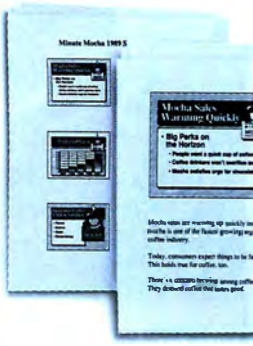

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pressure by printing an article last year noting that Apple was making quite a margin off its product.

Lo and behold, John Sculley announced to analysts last winter that Apple has decided to produce a "low-cost design center for the Mac." Was it pressure to increase Apple's share of the personal computer market? Was it the much-rumored demise of the Apple II line (which produces such a large part of Apple's revenues) that makes it necessary for Apple to have a lower-priced machine to sell into the K-through-12 education market? Was it a decision whose time had come? Who knows? It was a conscious preannouncement, well ahead of a ship date, which now looks like midyear 1990 at the earliest. A Mac selling for less than $1000 that can sell into the K-through-12, higher-education, and business markets (depending upon its configuration) bodes solid growth for Apple. If such a machine were available for distribution by the summer of 1990, educators could place large numbers on student desks by the fall. Apple could end up with an installed base of, oh, 4 million machines by the end of 1990.

Balderdash, you say? Well, T/Maker, which publishes the third-largest-selling word processor for the Mac, is betting that it's a reality. T/Maker just raised several million dollars of venture capital based primarily on the fact that the company is well positioned to take advantage of a sudden boom in the Mac market if the scenario outlined above takes place. And T/Maker is not alone. The venture capitalists have been much more enthusiastic over the past few months.

Of course, more Macs will mean a bigger market and better profit margins for Mac developers. But it will also mean there will be more money to attract new product developers—and it's not always the largest that succeed. I thought of that as I came upon a copy of Jazz from Lotus on our shelves, and another word processor/spreadsheet integrated product from a couple of unknown developers. Both products met a similar fate. Funny, only last week someone mentioned to me that Microsoft Works looks like a product to topple. M

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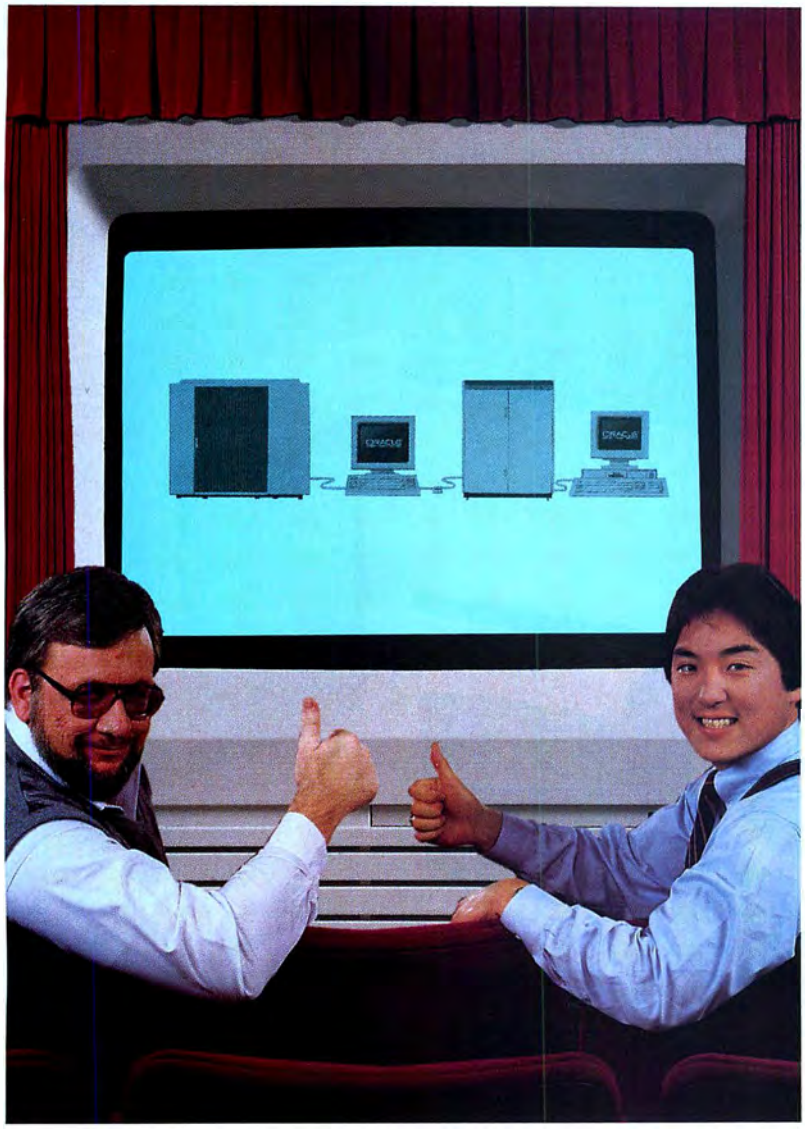

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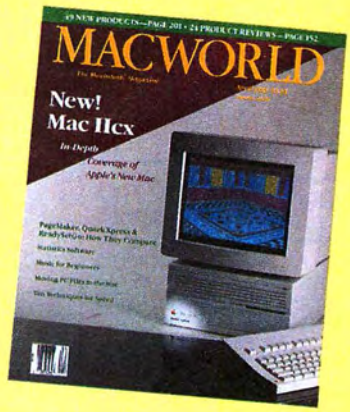

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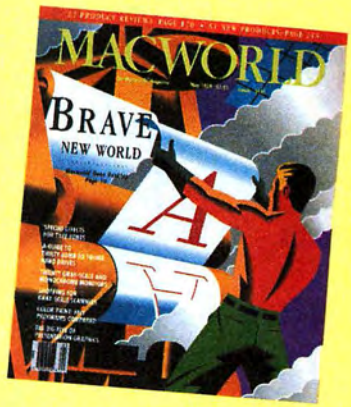

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G-MW09

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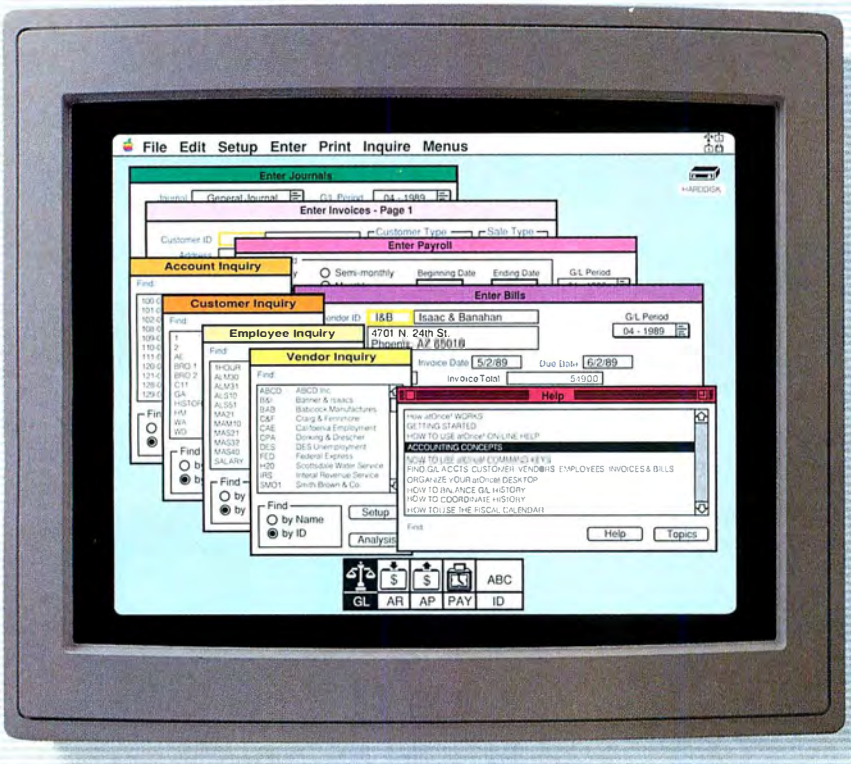

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LETTERS

A Forum for Macworld Readers

Page-Layout Contenders Square Off

Your desktop publishing showdown between PageMaker, QuarkXPress, and ReadySetGo ["Page-Layout Contenders," April 1989] illustrates what we consider the first law of computing: One will always recommend the computer or software one uses.

We are users of all three products, and the one that sits on the shelf collecting dust is PageMaker. The primary criteria for choosing a page-layout product are typography and accuracy of placement. PageMaker is so substandard in these areas as to make it almost unusable.

Jim Heid seems so smitten with PageMaker's elegant interface that he is willing to forgive its glaring inadequacies: terrible file-size management, lost picture-linking, inability to have more than one document open at a time, rough kerning, no fractional font sizes, Aldus Prep (a hindrance, not a help), no numeric picture sizing, and its turtlelike performance.

We have no ax to grind with Aldus—its support is the best of the three—but XPress and RSG outfeature PageMaker in every area.

Paul and Ramona Chato
Toronto, Ontario, Canada

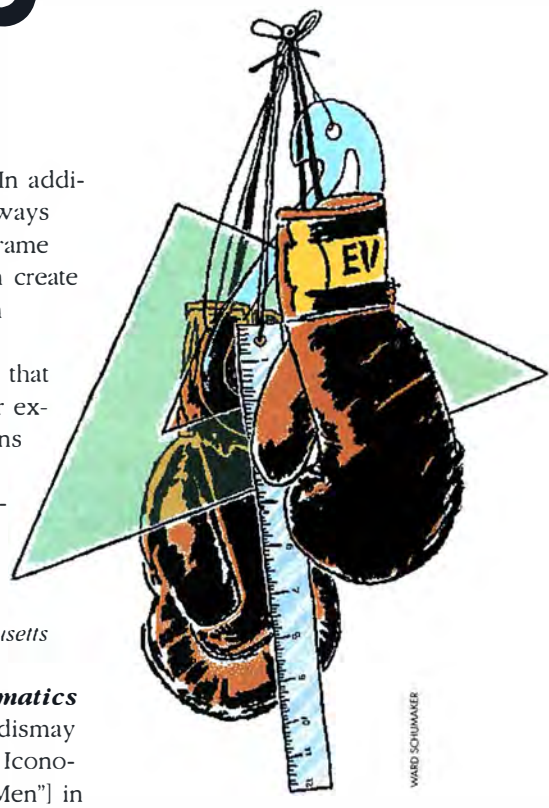
We found PageMaker's typographic accuracy superior to XPress's. The bug in XPress that causes irregular spacing in justified italic text was also a large strike against it. While you may see three digits after the decimal point in on XPress positioning dialog box, there's no way you'll get accuracy to a thousandth of on inch in your hard copy. That's because no Mac-compatible printer can render the kind of precision that XPress and ReodySetGo offer. In theory, a Linotronic 300 hos a positional accuracy of 1/2540 inch, but because of its friction-bosed paper-feed mechanism plus variations in photographic paper and processing techniques, it's nearly impossible to actually obtain that kind of accuracy. PogeMoker's graphics-linking feature is the best of the three (XPress merely beeps when it can't find on image). Although many users find XPress preferable for structured documents, in the key areas—quality and accuracy of mouse-accessible layout features, adherence to professional standards of typography, PostScript printer support, reliability, documentation, and support—PogeMaker excels.—Ed.

Data Translation's Video Frame Grabber

In response to Geoffrey R. Coulter's letter ["False Advertising"] in the July issue: We have never claimed that our QuickCapture board for the Mac II has the ability to capture images from a VCR in pause or freeze-frame mode. The difficulty of capturing pause-mode images is common to many, if not all, frame grabbers. However, the culprit is not the frame grabber but the VCR video signal. During pause mode, the video signal output from many VCRs degrades so much that the sync signal is delayed, distorted, or completely missing. In addition, VCRs do not always pause exactly on a frame boundary, which can create ghosts or shimmer in the image.

We are confident that our product meets or exceeds all specifications listed in our documentation and advertisements.

Michael W. Atkins
Data Translation
Marlborough, Massachusetts



Reinventing Mathematics

I read with intense dismay Steven Levy's The Iconoclast ["Of Math and Men"] in the May 1989 issue.

Thomas Edison did not invent the light bulb; he merely improved on others' inventions and then issued a lot of press releases. Similarly, Stephen Wolfram is trying to rewrite history, taking credit for all the work done to date in the symbolic-algebra research community. Wolfram invented neither symbolic algebra nor the idea of mathematical computer programs.

His program, Mathematica, is not the first symbolic algebra program; it is simply the first one to be aggressively marketed. He is doing a "service" to the marketplace the same way IBM does when it "standardizes" everything—and then milks users for all the cash they have. The people at Apple have realized that, and that's why they haven't incorporated Mathematica into the ROM the way some have suggested.

Allen Bonadio
San Francisco

Editor's note: Allen Bonadio Associates publishes The Expressionist, a competing mathematics program.

Corrections

MacVision ("Star Quality," "Move It!," June 1989, and Where to Buy, July 1989), is a video digitizer by Koala Technologies, 70 N. Second St., San Jose, CA 95113; 408/287-6311.

The Magic 45 removable media drive by MacProducts USA, 800/622-3475 ("Hard Disk Alternatives," July 1989),

(continues)

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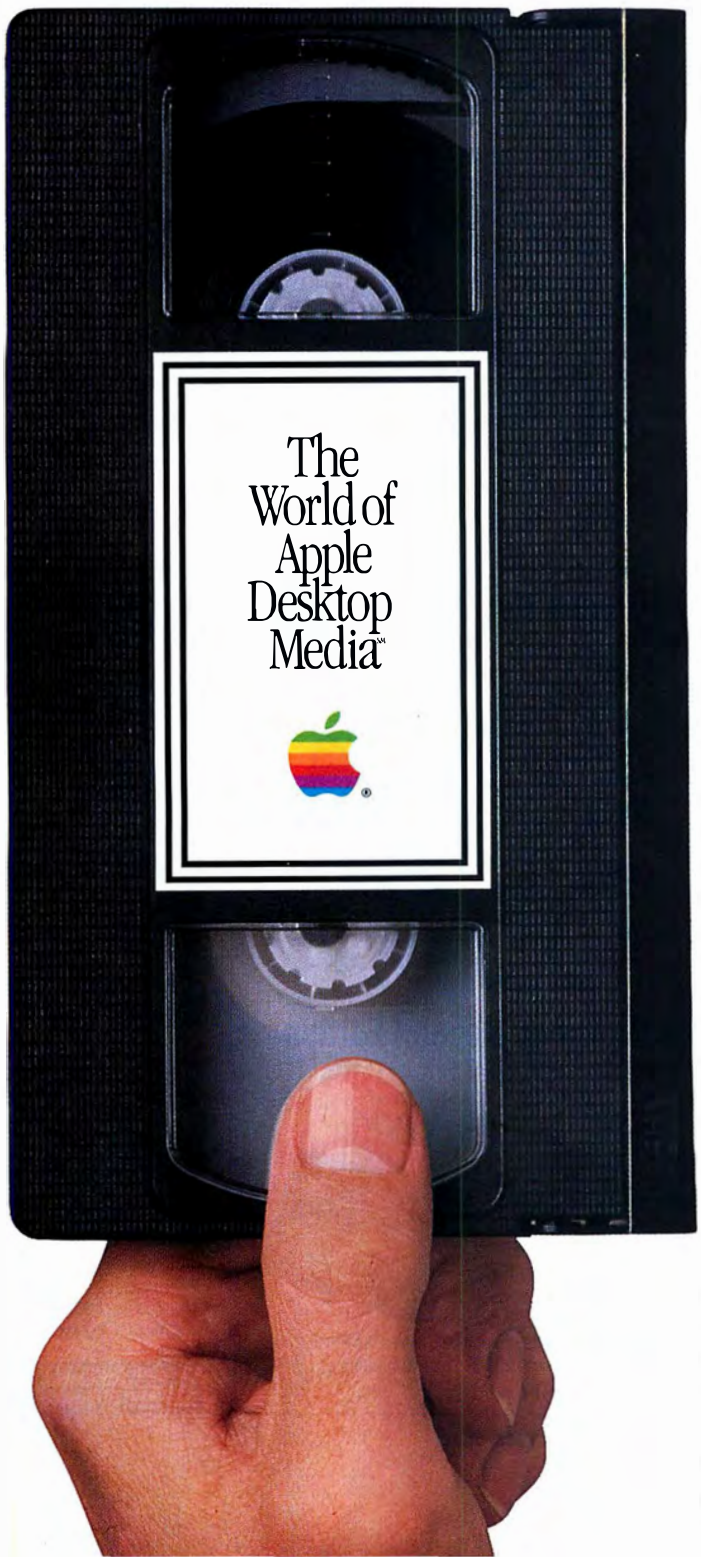

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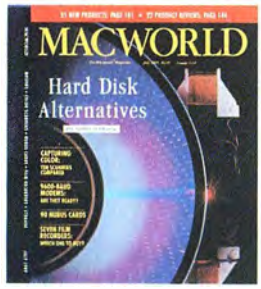
The Microtech R45 ("Hard Disk Alternatives," July 1989) by Microtech International, 800/626-4276, is a Syquest removable-cartridge drive that has a two-year warranty. The drive (including one cartridge) lists for $1099. Additional cartridges are $99 each.

The MacStack Removable ("Hard Disk Alternatives," July 1989) by CMS Enhancements, 714/259-9555, is a Winchester-based removable hard drive that has a one-year warranty. The drive (including one cartridge) lists for $1695; additional cartridges are $195 each or six for $1050.

The Bus-Link communications boards ("New Life for the NuBus," July 1989) by Flavors Technology, 603/672-3340, list for $7999.99. The package includes two boards, two cables, and software for the Mac II and the host operating system.



Featured on our July 1989 cover (but unattributed) was the above photo of the read/write head assembly and magneto optical disk from the Tahiti I erasable optical drive. Manufactured by Maxtor and available through its subsidiary Storage Dimensions, the drive is a plug-and-play subsystem that features up to 1 gigabyte of cartridge storage, a 35ms seek time, and an 8-megabits-per-second transfer rate.

More II Features

In your comparison of desktop presentation programs ("Picking the Best Presenter," May 1989), Phillip Robinson incorrectly stated that More II "does not provide speakers' notes and audience handouts." Speakers' notes (under the Window menu) can be attached to any slide in a presentation. These text windows serve as note cards and act as an electronic script for the presenter.

More II's audience handouts are automatically generated from the Preview/Options dialog box under the File menu. Once a slide presentation has been created in More II, the user can create audience handouts in ten different formats. Headers and footers are options that can be selected from the Preview/Options dialog; they are not required to print handouts.

Sue Kelly
Symantec Corporation
Mountain View, California

A Second Offense

Your extraordinarily superficial review of FreeHand 2.0 [June 1989] served to compound rather than mitigate the original offense—your February cover story—"The Big Match: Illustrator 88 vs. FreeHand."

(continues)

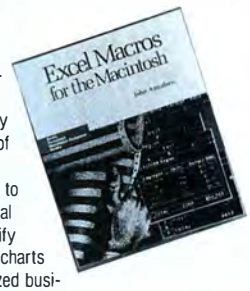
The Macintosh CAD/CAM Book
by the editors of the CAD/CAM Journal

If you're planning to invest in a CAD/CAM system for your Mac, this is one reference you can't afford to be without. Written by the editors of the most important journal in the field, the book provides state-of-the-art information and advice on ☐ determining your CAD/CAM needs ☐ planning and setting up a system ☐ getting the most from hardware and software ☐ networking with IBM PCs and mainframes ☐ converting graphics files to more generic formats ☐ and much more. **Softbound, 352 pages, $24.95**

Working with WordPerfect on the Macintosh
by Beverly B. Zimmerman and S. Scott Zimmerman

Here's the most complete, current, and comprehensive guide available for mastering WordPerfect version 1.01 for the Mac. Filled with step-by-step examples and detailed explanations, the book will help you ☐ edit, format and print documents ☐ create columns, change fonts and display graphics ☐ automate address lists, labels and contracts ☐ transfer WordPerfect files between a Mac and an IBM computer ☐ and much more. Includes guidelines for desktop publishing. **Softbound, 352 pages, $22.95**

Excel Macros for the Macintosh
by John Annaloro



Perfect for both beginning as well as more experienced users, this book provides step-by-step instructions and detailed examples that thoroughly cover every important aspect of Excel macro programming, including how to ☐ use macros to handle numerous computational tasks simultaneously ☐ simplify frequently used spreadsheets, charts and reports ☐ create customized business solutions and complex macros ☐ use a macro to turn a spreadsheet program into a fully functional database program ☐ and much more. **Softbound, 252 pages, $21.95**

Hands-On Excel, Second Edition
by Danny Goodman and Gordon McComb

If you're looking for a resource that will help you master all of Excel's power and sophistication, look no further! This heavily-illustrated edition (newly updated to include version 1.5) is packed with tips, shortcuts and strategies that will soon make you an Excel power user, including ☐ how to exploit Excel's far-reaching spreadsheet, database and graphic capabilities ☐ functions of macros and how to use them ☐ applying advanced Excel techniques in practical business and personal applications. **Softbound, 384 pages, $22.95**

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Ad 920095

You state that "FreeHand 2.0 and Illustrator 88 match up almost identically in the features arena," but you fail to mention some of the most significant features in FreeHand 2.0, such as the presence of both a user-definable grid and PageMaker-like guides that can be dragged from the rulers, and the ability not only to import gray-scale TIFF images (and EPS, PICT, and Illustrator 1.1 files), but also to modify their brightness and contrast. You also missed many of FreeHand's important text-handling features: kerning; multiple fonts, sizes, and colors in a single text block; and exceptional control over letter-spacing, tracking, and word spacing—all of which Illustrator 88 lacks.

This doesn't mean that FreeHand is better than Illustrator 88; rather it demonstrates the pitfalls of taking a checklist approach to software comparisons. Each program has a distinct identity, and many professionals use both, choosing whichever is more suitable for the task at hand.

Bruce Fraser
San Francisco, California

Star-Crossed Review

Your review of Ruby Systems' StarDrive 60TX tape drive and StarTape software [Reviews, April 1989], though generally fair, contained a few errors.

The review states that "tapes cannot be overwritten, only appended." Both append and overwrite (called Erase) are options with the tested version.

The review goes on to say that StarTape "cannot do a mirror-image backup or back up multiple volumes in one session over a network." StarTape can do mirror-image backups and can back up any number and type of mounted volumes in one session, including network volumes. No backup software can do a mirror-image back-up of volumes on a Macintosh network.

Finally, the review lists a nonstandard tape format as a disadvantage, when in fact, Apple has not been able to establish a standard.

Thomas L. Huang
Ruby Systems
Mountain View, California

In the tested version, you could not overwrite o previous backup session with updated information. You could append a tape (that is, add new sessions to it) or overwrite an older session by erasing it, but you couldn't append new information to a previously written session. And as implied in the review, we asked one of Ruby Systems' engineers about this feature, which is where we got confirmation of our version of "append."

We did not say that StarTape couldn't do mirror-image backups or multiple volumes in one session, only that it could do neither over a network or under AppleShare, unlike some competitive products.

The problem with Ruby's tape format is not that it's a different format (which is more efficient than Apple's) but that we were unable to buy the tapes from anyone but Ruby (this was not the case with two other nonstandard cartridges we reviewed—Irwin's and Northern Telecom's).—Ed.

Winning through Mail Order

I was delighted to see the appearance of your column

(continues)

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Circle 11 on reader service card

Ad 920093

and your discussion of mail order ["Mail Order Update," *Conspicuous Consumer*, May 1989], but I cannot agree with your recommendations. I use mail order to gain productivity and to save money. (The nearest Mac dealer is a 20-minute drive, and the nearest discount dealer more than an hour; the dealer's sales tax is almost always more than the shipping charge, and the dealer's prices are higher.)

Anyone following your recommendations will spend a lot of time and money calling numerous agencies to check for pending lawsuits or investigations. Moreover, those harmed by Your Mac Source would have learned little from calling Fulton County, Georgia, or the FBI, because it's often illegal for public agencies to disclose investigations until the cases have become formal proceedings.

Paying by credit card can also be a problem. I have seen people spend 40 hours or more trying to clear up a credit card charge for goods never received.

I mail order virtually all my purchases and have them sent C.O.D. If I need the product immediately, I have it shipped for next-day delivery. Otherwise, I use UPI Blue service. I have saved as much as 2 1/2 hours of aggravating drive time, have avoided paying sales tax, and have the satisfaction of knowing I'll be paying for only those goods I actually receive. To me, this is a win-win proposition.

Moreland G. Smith, Jr.
Dallas, Texas

Taking the Risk with FullWrite

Blake Lee Spahr's letter on FullWrite in the March 1989 issue ["Still Staggering," p. 31] accurately describes FullWrite's slowness with long documents, but I'm taking a different approach. We'll see who turns out to be right.

I wrote my first book in Microsoft Word as a single 310K file. Word was fast, but it drove me nuts. It didn't have some features I really wanted. I started my second book in FullWrite. I knew about its performance with large files, but it had the right features for a professional writer, so I figured I'd bet on Ashton-Tate to speed up the routines. After all, the competition is getting brisk at the high end, with Word 4.0, Nisus, and WordPerfect getting up to speed.

My file is up to 130K, and I notice a considerable loss of speed already on my Mac II, but I'm able to use it by breaking up the file into separate files, each containing one chapter. Meanwhile, I'll have my Posted Notes, Sidebars, Browse, and all the rest.

If Ashton-Tate shows no signs of fixing it by the time the book is pretty near completion, I'll make an extra copy for record, use search and replace to omit all the outline, contents, index, posted notes, and sidebar references, and transfer it into something else. Then I'll have to manually reinsert all the contents and index references, but that's life.

(continues)

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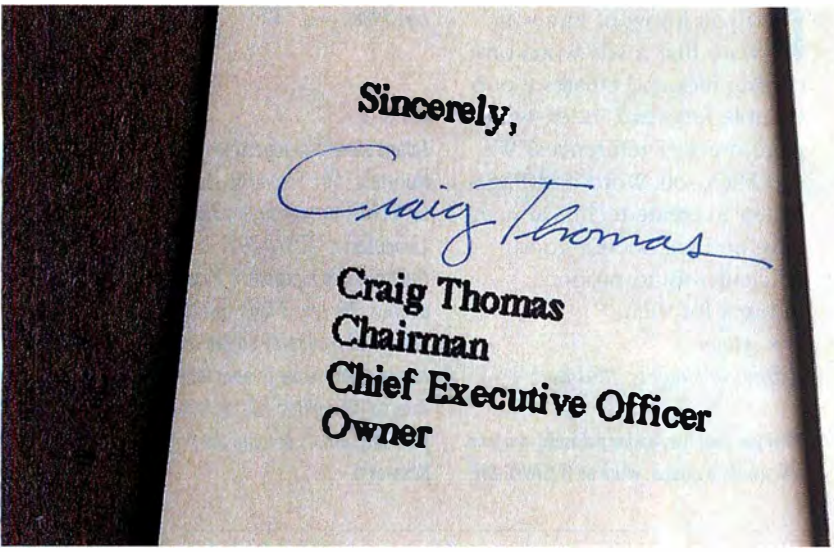
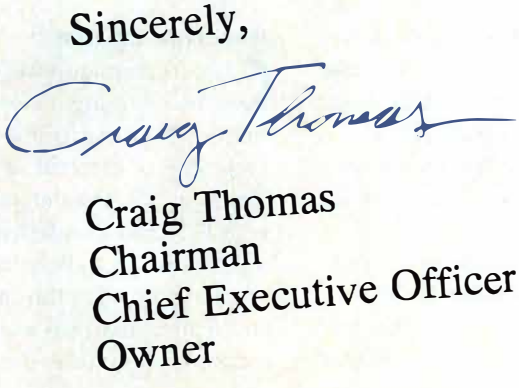
What's more, we guarantee satisfaction. If after trying the PLP for up to 30 days you aren't completely satisfied, just return the printer and we'll cheerfully refund your money, no questions asked.





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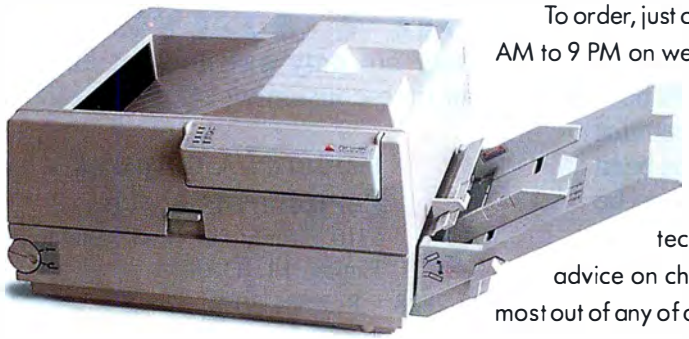

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Ad 920091

I think it's worth the risk.
Martin K. Barrack
via CompuServe

CAD Complaints

Your review of MGM-Station [Reviews, April 1989] is misleading, inaccurate, and not in your readers' best interests. You've minimized or omitted many significant shortcomings, including the program's user interface (which flagrantly violates Apple's guidelines), its poor documentation, its inaccurate text placement, and the bug in the latest version [2.5], which causes the picture to fragment when you zoom in very tightly.

With so many new CAD products available for the Mac, it's unfortunate that you reviewed this product instead of some of the really new ones your readers would be better off learning about.
David Peltz
Chatsworth, California

Since MGMStation is optimized for CAD work, we considered a departure from Apple's standards a productivity advantage rather than a major design flaw. We did extensive testing and talked to serious users and never encountered a zoom problem or inaccurate plotting.—Ed.

MacCrate Update

Crate Technology will shortly be releasing a sleeker, slimmer housing for the MacCrate line of external drives. The new housing complies with FCC and CSA federal regulations, as did our old "chunky" housing (an important feature that was not covered in your article—"Massive Media," May 1989). Also, our "limited" software has now been updated to include password protection, A/UX compatibility, and partitioning.
Jan Gass
Crate Technology
North Hollywood, California

Indexing Tools

Do you know of any software that reads word processing files and creates a publishable keyword index with page number references? We use Microsoft Word and PageMaker to create technical manuals, and we need a good, efficient way to produce indexes for them.
L. K. Miller
Arlington Heights, Illinois

What you need is a desktop publishing program with a built-in indexer, which no WYSIWYG DTP program has. Although several word processing programs have indexing capabilities (including Word, FullWrite, WordPerfect, and Nisus), once you import the document into PageMaker and add figures or refine the layout, your page-number references are likely to change. You could use one of those word processors to produce your manuals, or you might consider using a code-oriented publishing program like MocTex instead (see Reviews, June 1988).—Ed.

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

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Ad 920094

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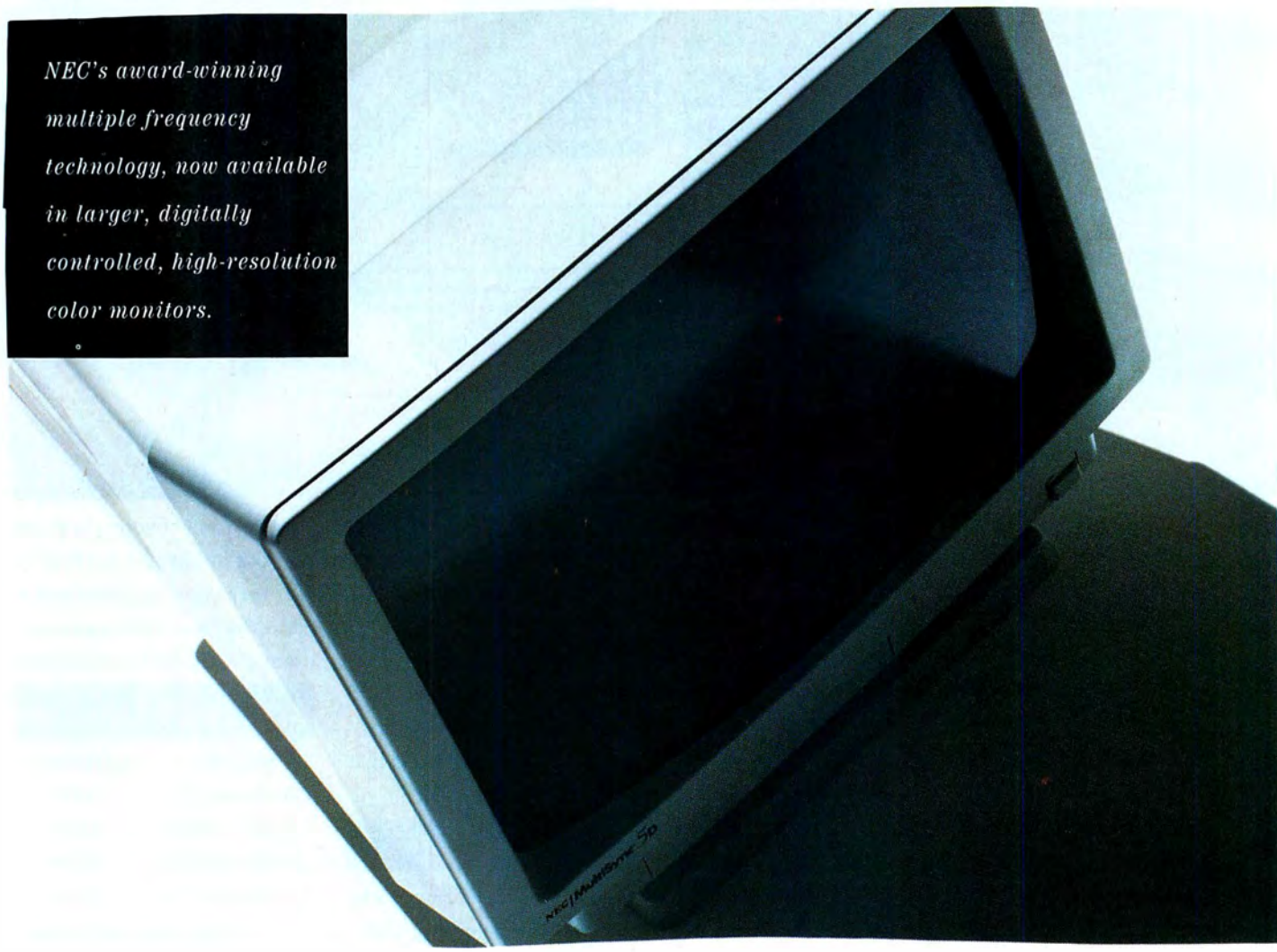

Both are optimized for the IBM PS/2, PC/AT/XT (and 100% compatibles) and the Macintosh II. Both offer a microprocessor-based digital control system for preset and custom graphics modes, automatic screen

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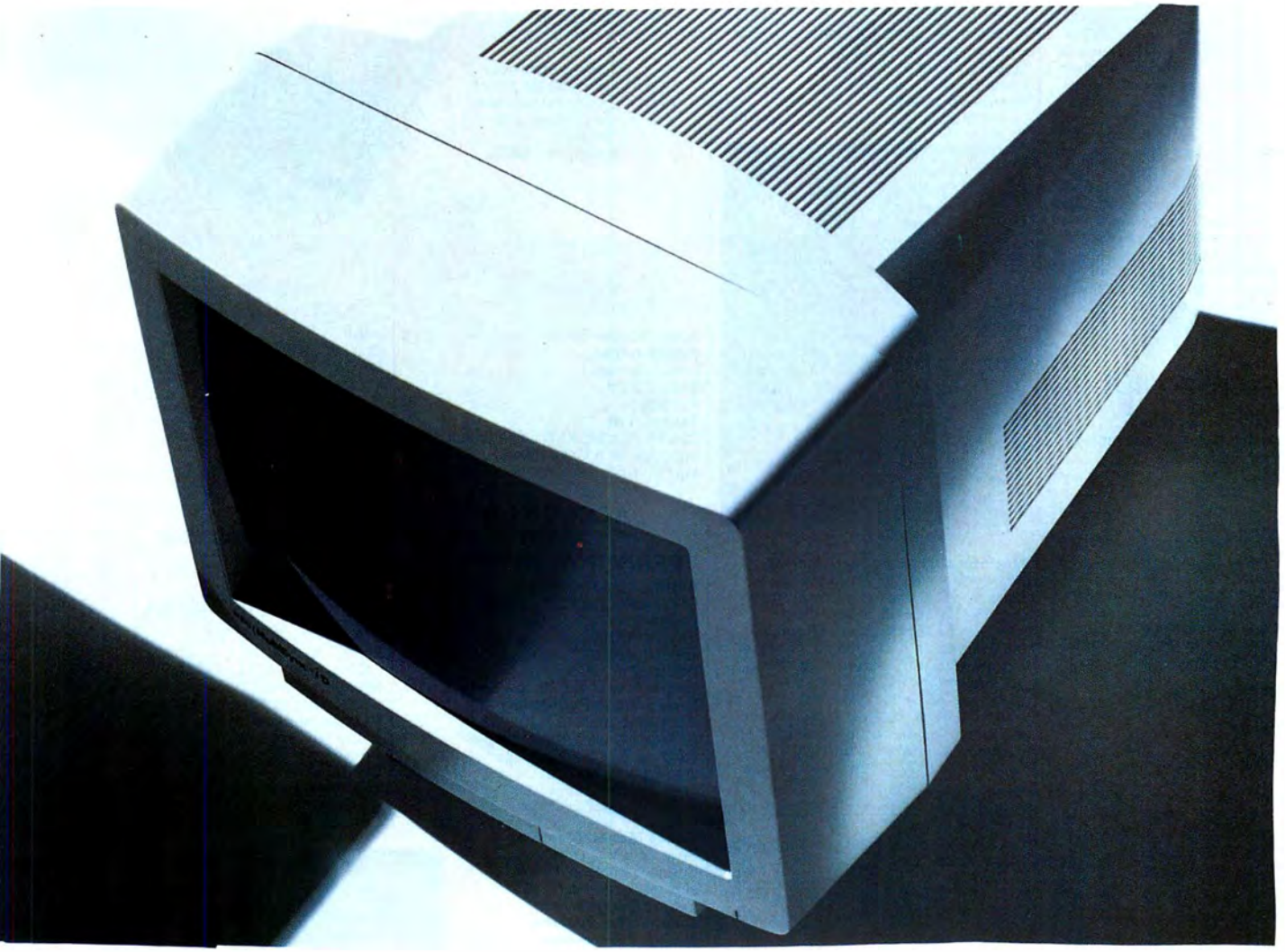

The main difference: one is for large ideas. The other, for extra-

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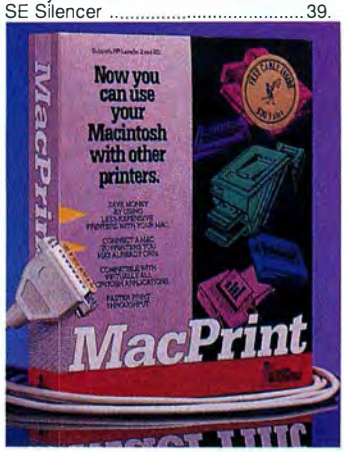

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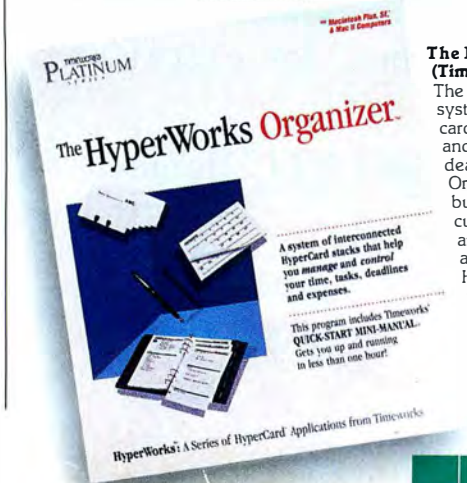
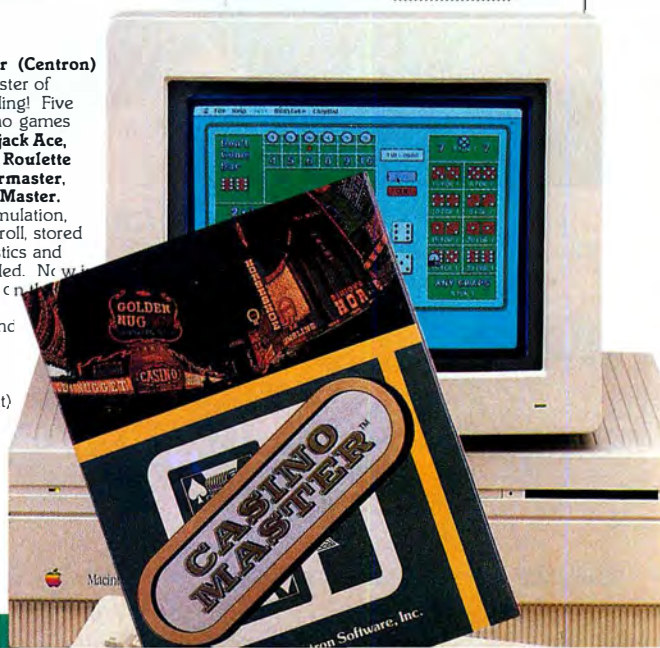


The HyperWorks Organizer (TimeWorks, Inc.)
The HyperWorks Organizer is a system of interconnected Hypercard stacks that help you manage and control you time, tasks, deadlines and expenses. Organize all your personal and business information, client or customer data; daily, monthly and yearly calendars; projects and plans; expense accounts. Hypercard icons let you perform a variety of tasks. Hypercard enviroment, combined with Quick-start minimanual, gets both novice and power user up and running FAST! (hyperware) **$60.**



Casino Master (Centron)
Become a Master of Casino Gambling! Five separate casino games include **Blackjack Ace, Crapsmaster, Roulette Master, Pokermaster, and Baccarat Master.** Exact table simulation, betting, bankroll, stored win/lose statistics and manual included. No w... dazzling color c... Mac II!! Recommended and used by professional gamblers! (entertainment) **$27.** each game or 5 game Casino Master Package for **$49.** or Deluxe Mac II color version for **$55.**

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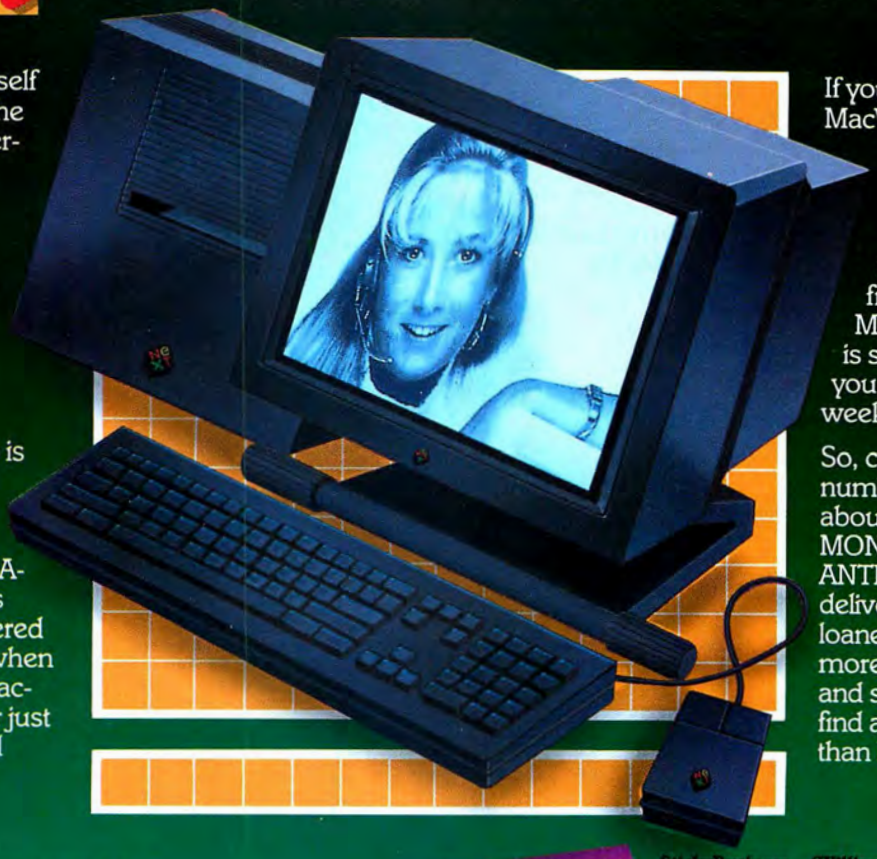

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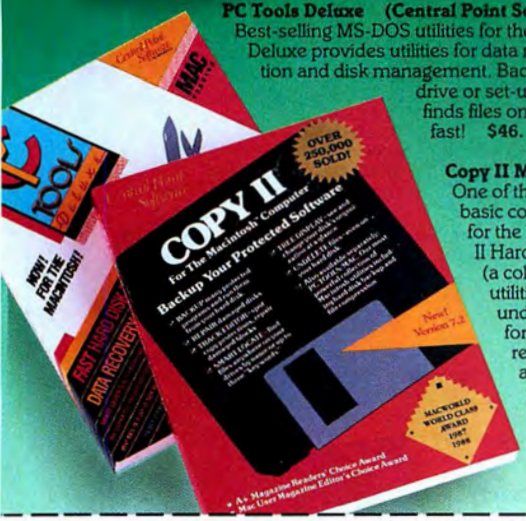

PC Tools Deluxe (Central Point Software)
Best-selling MS-DOS utilities for the Mac. PC Tools Deluxe provides utilities for data recovery, file protection and disk management. Backs up your hard disk drive or set-up floppies. A DA finds files on a hard disk fast! **$46.**

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StickyBusiness (William & Macias, Inc.)
William & Macias premiere labeling program, StickyBusiness, prints high-quality labels, cards, tags, and envelopes on Imagewriters and Laserwriters; imports EPS, PICT, PICT2, and bit-mapped graphics; merges text, SYLK, and basic files from any standard Macintosh database or word-processing software; includes preformatted templates for more than 200 labeling products; has a template maker so that you can design your own label templates, and much more. StickyBusiness solves your labeling problems. (utilities) **$99.**

TimeMinder (Aatrix Software)
Save time and money. Keep track of the time you spend on each project. TimeMinder lets you enter data manually and accommodates 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) **$159.**

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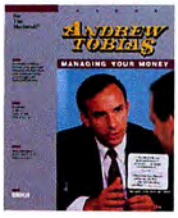

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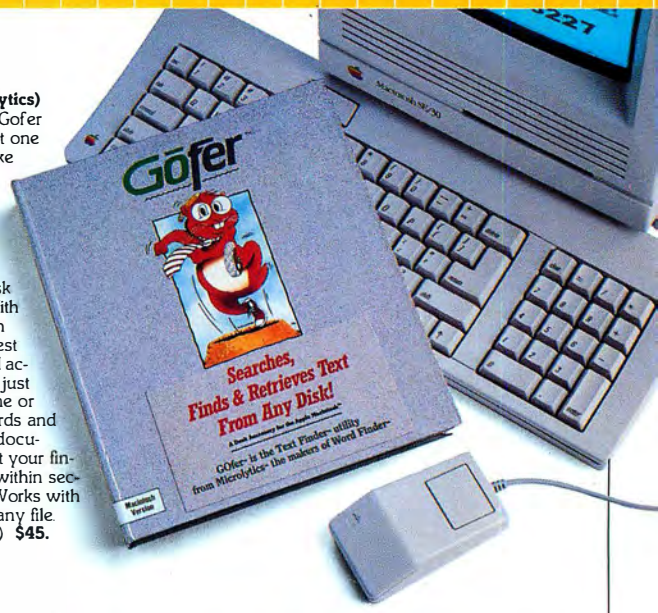

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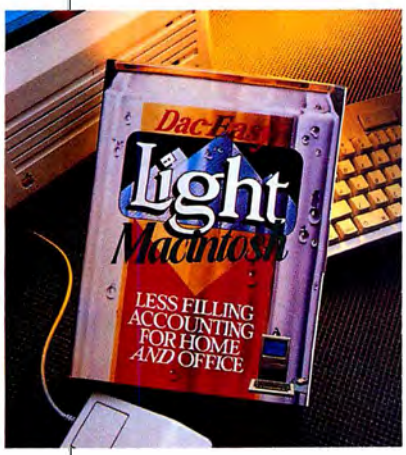

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Ideal for the home and/or sole proprietorship, here's the perfect solution to your finances. DacEasy Light tracks a 12-month budget, writes checks, prepares invoices and reports financial statements. Two pre-defined chart of accounts, one for home and one for the office, give you simple, easy accounting without having to know a debit from a credit. Password protection, pop-up calculator, and more are added features that make DacEasy Light fun to use. Again, whether at home or at work! (accounting) **$45.**

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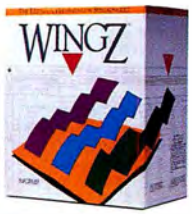

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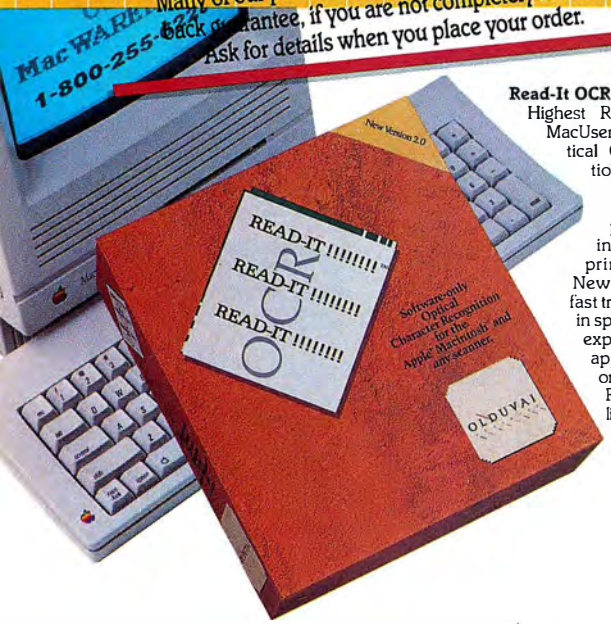

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Highest Rated (4 1/2 mice MacUser Rating) Brings Optical Character Recognition to your Mac. Use any scanner to input virtually any printed text, including typeset and laser printed documents. New "Easy Learn" superfast training option, built-in speech option and file export to any Macintosh application. Requires only one Megabyte of RAM. (desktop publishing) **$249.**

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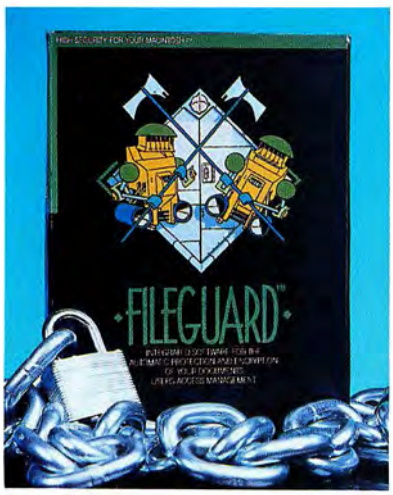

FileGuard (A.S.D)
Operating totally transparently, FileGuard is the integrated encryption utility that provides the most comprehensive and transparent solution to todays security and confidentiality problems. Upon saving a new document, FileGuard gives you the option to password protect it. Encryption is performed automatically when you quit your application. Opening protected documents is just as easy and automatic. When you double-click on an encrypted document, FileGuard asks for your password, then immediately decrypts and launches the appropriate application. The document is automatically re-encrypted when you quit. (security) **$129.**

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MacEnvelope gives your mail that "special touch". You can create layouts, adjust fonts and styles, import graphics, and even print in color (on the ImageWriter II) . It even prints Postal Bar Codes giving you the most reliable postal deliveries possible (saves money on bulk mailings!). Stores up to 1600 names and addresses and sorts alphabetically or by zip code. (business) **$55.**

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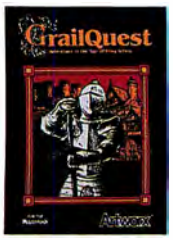

GrailQuest
Offers hours of entertainment for those who enjoy adventure games with adult situations and sensibilities, features interactive, digitized graphics and sound. (entertainment) **$19.**

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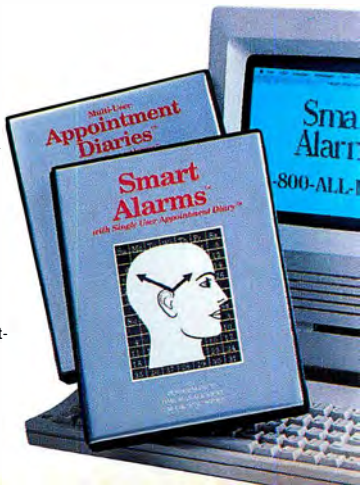
The ultimate reminder system, Smart Alarms desk accessory creates reminders which interrupt you at an appointed time. Features snooze up to 1 hour, printing, choice of beeps, & text editing reminders. Appointment Diary desk accessory calendar for appointments features: Auto-layout, Day Layout, set reminders directly into Smart Alarms, Week at a view, Month at a glance, printing. Multi-User versions require AppleShare or TOPS.
(desk accessories) **single version $99. 5 - 8 users $149.**



Mac - 101 Keyboards (DataDesk Intl.)
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. Manufacturer's two year warranty. (input/output) **$145. International Versions also available**

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Put new life into your study of the Bible. Over 100,000 notes and cross references. Easy word and phrase search of scripture. Ready made studies for meetings.(hyperware) Available in the New International Version **$179.** or the King James Version **$149.**

Virex
Virus detection and treatment software. Intended for individuals that have unusually high risk of exposure to viral infections. Including Fortune 500 companies, and desktop publishing firms. Useful for those who use public domain software, or networks. (security) **$69.**

Bill-IT Version 2
Integrated billing for small businesses that works from a staight inventory or services list. Track sales,print invoices and statements, maintain customer lists. Users include consultants, clubs etc. (finance) **$99.**

Tactic Software
Art Clips ..... 59.
Zedcor
Deskpaint 2.0 ..... 69.

HARDWARE AND PERIPHERALS

Cambridge North America
Z88 Portable Computer ..... 799.
Z88 AC Adapter ..... 9.
Z88 Pocket Modem ..... 225.
Z88 512K RAM Cartridge ..... 359.
The Complete PC
Half-Page Scanner ..... 379.
Page Scanner ..... 799.
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Dest PC Scan Plus ..... SPECIAL 799.

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General Computing Company
WriteMove Ink Jet Printer ..... 585.
Magnavox
Color Monitor 14" ..... 599.
Seikosha America
Seikosha Printer (dot-matrix) ..... 235.
ThunderWare
LightningScan ..... 409.
ThunderScan 5.0 ..... 189.

HYPERWARE

Activision
Focal Point II ..... 119.
Reports for HyperCard ..... 69.
Bantam
Complete HyperCard Handbook ..... 23.
Beacon Technologies
HyperBible International Version ... 179.
HyperBible King James Version .... 149.
BrainPower
ArchiText ..... 179.
Bright Star Technology
HyperAnimator ..... 99.
HyperPress Publishing
Script Expert ..... 46.
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HyperTMON ..... 75.
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HyperAtlas ..... 64.
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HyperTutor ..... 29.

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SuperCard ..... 129.
Springboard
Family Matters ..... 28.
Symmetry
HyperDA ..... 35.
TimeWorks
HyperWorks Organizer ..... 60.

Trendware Corporation
HyperTools #1 or #2 ..... ea 52.

INPUT/OUTPUT

Cutting Edge
CE-105 ADB Keyboard ..... 125.
DataDesk Intl.
Mac 101 Keyboards ..... 145.
Kensington
New Turbo Mouse ..... 109.
Koala
MacVision 2.0 ..... 219.
Kraft
ADB Joystick Premium III (SE&II) .... 51.
Kurta
IS/ADB Tablet 8 1/2 x 11 ..... 259.
IS/ADB Tablet 12 x 12 ..... 385.
IS/ADB Tablet 12 x 17 ..... 625.
Cordless 4 Button Cursor ..... 65.
Mouse Systems
A+ Mouse (512/Plus or SE/II) ..... Call.
Summagraphics
Bit Pad Plus ..... 325.

LANGUAGES

Digitalk, Inc.
Smalltalk/V MAC ..... 139.
Manx Software Systems
Aztec C or Unitools ..... ea 65.
Aztec C+SDB or C+MPW ..... ea 99.

Microsoft.
QuickBasic ..... 65.
Shana Corporation
Inside Out ..... 369.
SmethersBarnes
Prototyper ..... 149.
Symantec
Lightspeed C 3.0 ..... 169.
Lightspeed Pascal ..... 95.
Zedcor
ZBasic 5.0 ..... 99.

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FastNet II ..... 565.
FastNet III ..... 375.
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MaraThon 030X ..... 999.
MaraThon SP or Multi-Comm ..... 315.
MacSnap 2S ..... 349.
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Acta Advantage (Symmetry)
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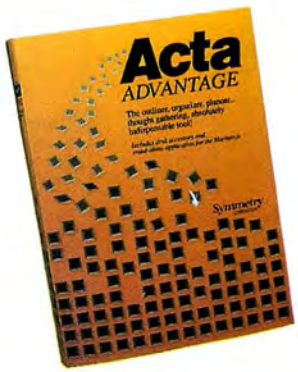

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Best Data Products
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EPIC Technology
2400II Internal Modem ..... 315.
Hayes
Smartmodem 1200 ..... 299.
Smartmodem 2400 ..... 449.
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Prometheus
ProModem 2400 SE Int. ..... 209.
ProModem 2400M ..... 199.
STF Technologies
FAXstf Modem ..... 525.
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Supra Modem 2400 ..... 149.
US Robotics
Courier 9600 Modem ..... 699.

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MIDI Basic ..... 30.
Bogas Productions
Super Studio Session 2.0 ..... 69.
Coda
MacDrums ..... 31.
Perceive ..... 50.
Electronic Arts
Deluxe Music Construction 2.5 ..... 84.
Esthetic Engineering
Music Mouse ..... 49.
Farallon Computing
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First Byte
SmoothTalker ..... 33.
Graphic Notes
Music Publisher ..... 375.
Great Wave
Concertware+MIDI 4.0 ..... 79.
HIPP Software
Harmony Grid ..... 59.
Impulse
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Intelligent Music
OvalTune ..... 95.
Passport Designs
Master Tracks Pro 3.0 ..... 259.
NoteWriter ..... 189.
Passport MIDI Interface ..... 95.
Primera Software
Different Drummer ..... 59.
Resonate
Listen 2.0 ..... 62.

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SuperSpool for direct connect ImageWriters and SuperLaser-Spool for all networked or non-networked Apple printers, are best-selling print spoolers that let you work and print at the same time. Fastest spoolers available. Can handle large and complex graphics, spreadsheet or database documents. Special desk accessory allows you to see and manipulate the print queue; delete documents, re-order documents to another printer. (utilities) **SuperSpool $53. or SuperLaserSpool $79.**

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ASD Software, Inc.
FileGuard ..... 129.
HJC Software, Inc.
Virex ..... 69.
Kent Marsh
MacSafe ..... 87.
NightWatch ..... 87.
Mainstay
AntiToxin ..... 65.
Symantec Corporation
S. A. M. ..... 69.

SPELLING/DICTIONARY THESAURUS CHECKERS

Aegis Development, Inc.
Doug Clapp's Word Tools ..... 42.
Deneba Software
BigThesaurus ..... 59.
Spelling Coach Pro ..... 115.
Electronic Arts
Thunder II ..... 52.

NETWORKING PRODUCTS

Connect Inc.
MacNet ..... 43.
Farallon
Timbuktu 2.0.1 ..... 65.
Timbuktu Remote 1.0.1 ..... 195.
TrafficWatch ..... 139.
PhoneNET PLUS ..... 35.
PhoneNET Repeater ..... 325.
PhoneNet Star Controller ..... 1199.
Punch Down Block Tool ..... 9.
Shiva
NetBridge ..... 349.
NetSerial X232 ..... 289.
TOPS
NetPrint ..... 119.
FlashBox ..... 125.
FlashCard ..... 169.
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Teleconnectors ..... 29.
TOPS 2.1 ..... 149.
TOPS DOS ..... 119.

OvalTune (Intelligent Music)
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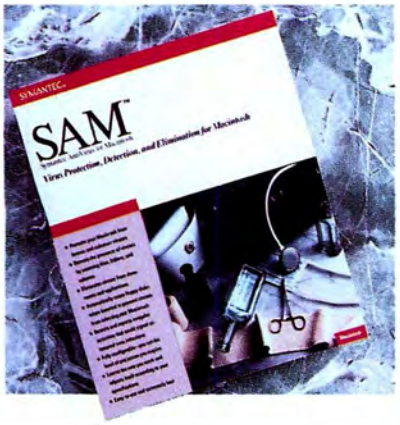

Symantec Anti-Virus for the Mac (SAM) (Symantec)
SAM (Symantec Anti-Virus for the Mac) detects any viruses by monitoring the suspicious activities that characterize them. If it finds one, it eliminates it immediately, protecting your Mac and software from infection. SAM scans floppies whenever you insert them, and at your request, will scan a file, folder, or volume for both known and unknown viruses. SAM has an easy to use interface and on-line Help. (utilities) **$65.**

Microlytics
Word Finder 2.0 ..... 33.
Sensible Software
BookEnds ..... 53.
Sensible Grammar ..... 53.

STATISTICAL ANALYSIS

Abacus Concepts
StatView II ..... 295.
StatView SE+Graphics ..... 225.
BrainPower
StatView 512+ (requires 512k) ..... 149.
D2 Software
MacSpin 2.0 ..... 189.
Odesta
Data Desk Professional ..... 289.
Paracomp
Milo ..... 159.
Select Micro Systems, Inc.
Exstatix ..... 219.
Wolfram Research
Mathematica (SE) ..... 450.

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CanOpener ..... 65.
Affinity
Tempo II ..... 89.

Precision (ISI)
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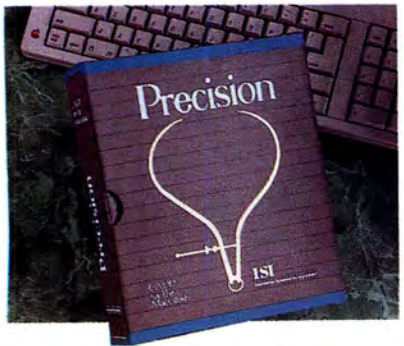

ALSoft
DiskExpress ..... 49.
Font/DA Juggler ..... 42.
MasterDisk ..... 49.
Master Juggler ..... 64.
Berkeley System Design, Inc.
Stepping Out II ..... 52.
CE Software
DiskTop 3.0.2 ..... 27.
QuicKeys (macro programmer) ..... 52.
Caere
OmniPage ..... 559.
Central Point Software
Copy II Mac (with MacTools) ..... 24.
PC Tools Deluxe For Mac ..... 46.
Emerald City Software
Lasertalk 1.0 ..... 187.
Fifth Generation
FastBack II ..... 109.
PowerStation 2.5 ..... 35.
Pyro ..... 15.
Suitcase II ..... 45.
GO Technologies
MacTree Plus ..... 46.
ICOM Simulations
On Cue ..... 35.
Insight Development
MacPrint ..... 79.
LaCie Ltd.
SilverServer ..... 89.
Magic Software
AutoSave II ..... 29.
POWERICONS ..... 39.
POWERmenus ..... 39.
Mainstay
Capture ..... 42.
TypeNow ..... 27.
Microlytics
GOfer ..... 43.
Olduvai
MultiClip ..... 55.
PCPC
HFS Backup 3.0 ..... 54.
Peripheral Land, Inc.
TurboBack ..... 49.
TurboCache or Turbo Spool ..... ea. 59.
TurboOptimizer ..... 25.
SuperMac
DiskFit 1.5 or SuperSpool 5.0 ..... ea 53.
Sentinel 2.0 ..... 89.
SuperLaserSpool 2.0 ..... 79.
Symantec Corporation
Symantec Utilities for Macintosh ..... 65.
Tactic Software
ClipShare ..... 99.
FontShare ..... 149.
Williams & Macias
DiskFinder ..... 29.
myDiskLabeler ..... 34.
StickyBusiness ..... 99.
XTree Company
XTree Mac ..... 52.

WORD PROCESSORS AND OUTLINERS

Access Technology, Inc.
MindWrite 2.1 ..... 95.
Ashton-Tate
FullWrite Professional ..... 265.
Claris
MacWrite II ..... 239.
Microsoft
Word 4 ..... 255.
Niles & Associates
End Note ..... 82.
Symmetry
Acta Advantage w/DA ..... 65.
T/Maker
WriteNow 2.0 ..... 119.
WordPerfect Corp.
WordPerfect ..... 185.
Working Software
QuickLetter ..... 75.

CONTEST RULES 1. Entries must be received on or before 1/31/90. 2. Winners selected in random drawings by attorneys for MacWarehouse Inc. (MWH), whose decisions are final. 3. NeXT Computer prize subject to availability. MWH reserves the right to substitute wholesale cash value up to $10,000. 4. Winners responsible for taxes. 5. Odds of winning depend on number of entries. All prizes will be awarded. 6. MWH will announce the winners on or around 2/28/90. Winners notified by mail. Dates subject to change at the discretion of MWH. If unable to contact any winner, an alternate will be selected by random drawing. 7. Contest is open to US residents, except where prohibited by law. Employees of MWH and suppliers not eligible. 8. Prizes - one Next Computer including keyboard and monitor and 150 software and media prizes.

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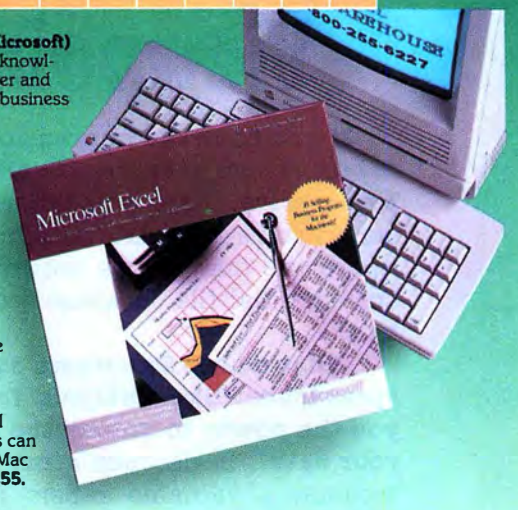

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Microsoft Excel is the acknowledged standard for power and reliability for macintosh business programs. Superior design, intuitive ease-of-use, unmatched training and support, and seamless intergration with other leading business programs, like Microsoft Word. Excel is a spreadsheet designed for the real world - where the average user spends most of the time doing numeric analysis, serious number crunching, What-If statements, investments, and model simulations. Now users can access the full 8 MB of Mac Memory! (business) **$255.**

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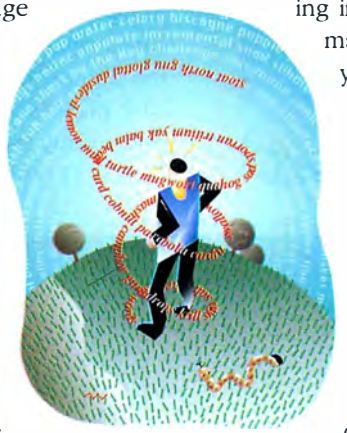
ART BEAT

by Ann Garrison

This column examines the tools and the talent behind Macworld's graphics and the techniques that make them possible

Artist: Mick Wiggins of Oakland, California, is an unusually modest illustrator: he claims his illustrations were only average until he began using the Mac II. The machine radically altered his way of working by allowing him to change colors, lines, and designs right up to deadline. "When I worked with oil, acrylic, paper, or canvas," he says, "my options narrowed as I made irreversible choices. When the Mac came along, I began to work in a more experimental, intuitive, and undisciplined fashion."



His illustrations have appeared in *Connoisseur, Outside, Special Report,* Apple's corporate publications, and many computer magazines.

Tools: Macintosh II, PixelPaint, and FreeHand 1.0.

How It Was Done: To illustrate our word processing feature, Wiggins first sketched his design in PixelPaint, the bitmapped program he likes best for sketching. After printing the design and faxing it to *Macworld* for approval, he saved it in his Scrapbook and moved it into FreeHand, his favorite PostScript program. The sketch appeared in FreeHand as a light gray template. Wiggins then retraced it and began to color, shade, and experiment. "One thing I love about FreeHand," he says, "is working in layers. In bitmapped programs, you remove a tree from your landscape and get a hole in its place. In PostScript programs, you can remove the tree and get a new landscape. Then you can decide which one looks better."

Another key reason for using FreeHand was its unique collection of tools for joining text to a line or *path*. Wiggins drew a spiraling line around his character, selected the text tool and typed in a text block, selected both the text block and the spiraling line, and then typed ⌘-J. FreeHand eliminated the line and replaced it with spiraling text. Wiggins says that the predominance of text in the illustration also made FreeHand or some other PostScript program indispensable. "Bitmapped programs don't create elegant text," he says. "Instead of a

(continues)

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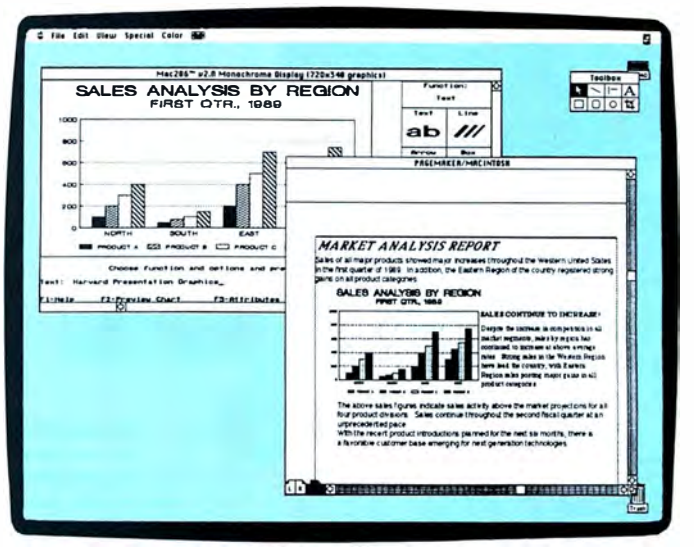

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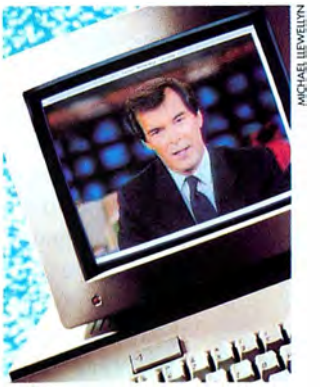
Circle 265 on reader service card.

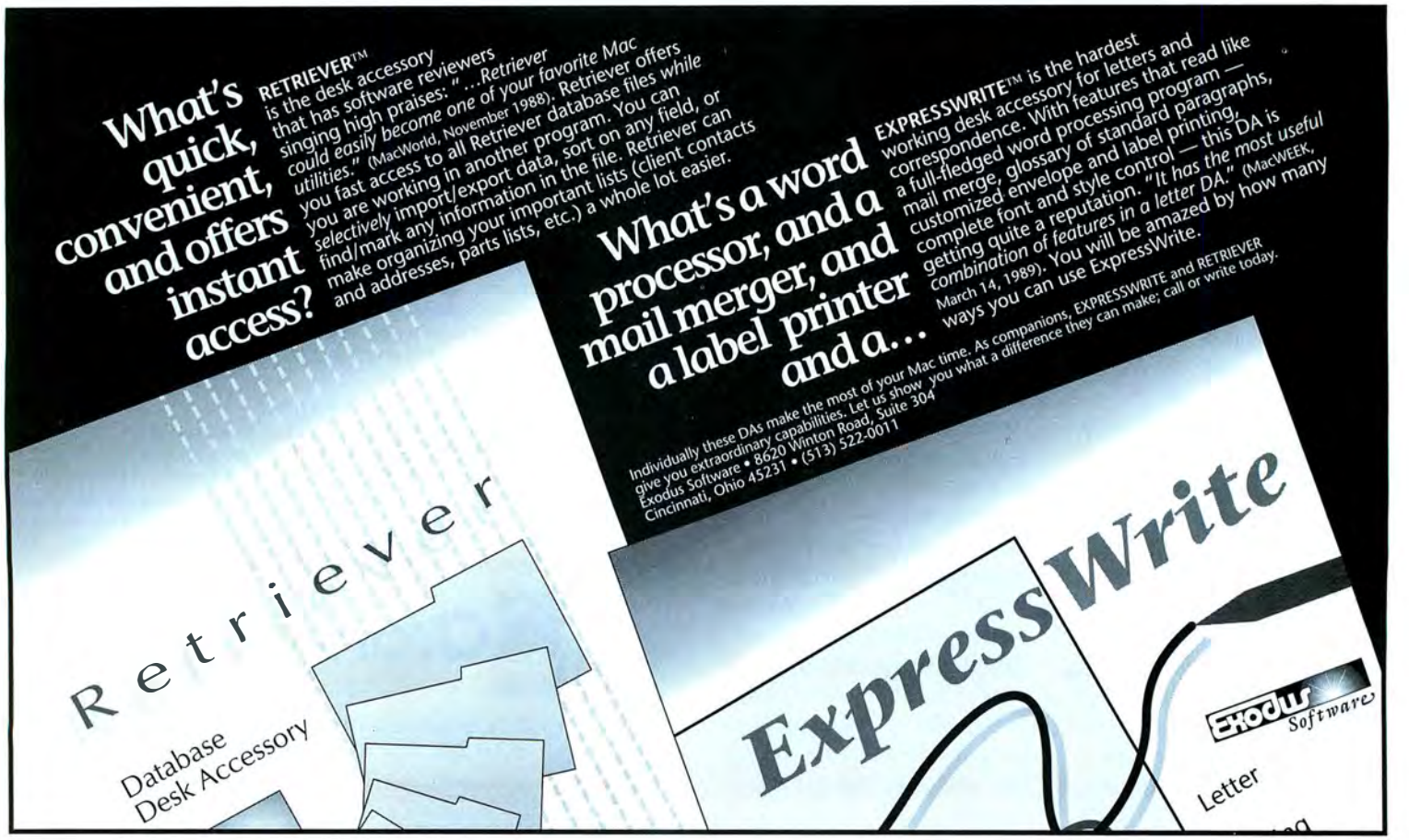
Circle 10 on reader service card.

serif, for example, you get a clump."

More Art, More Tools: The photographic image that opens our feature on desktop video hardware was created with a Mac II, a Truevision NuVista board and the NuVista Capture application, a Pioneer LD-V4200 videodisk player, Apple's HyperCard VideoDisc Toolkit, and MultiFinder.



The photo features a screen image on a Mac that is itself positioned within a television screen. *Macworld* stripped in both a photo of the Mac and a Mac screen image. We used the NuVista board with NuVista Capture to grab a frame from ABC News's *The '88 Vote: Campaign for the White House.* After installing the NuVista card in a Mac II, we connected the Mac to the Pioneer laserdisk player and then used MultiFinder to run the HyperCard VideoDisc Toolkit and NuVista Capture at the same time. We used the Toolkit to choose a still frame from the videodisk, selected 32-bit color from NuVista Capture's options, and grabbed the frame—digitizing the laserdisk player's NTSC signals and storing them in the Mac II as a 32-bit PICT file. M



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"JVC's KY-15CI is a wonderful camera that will help us grow."

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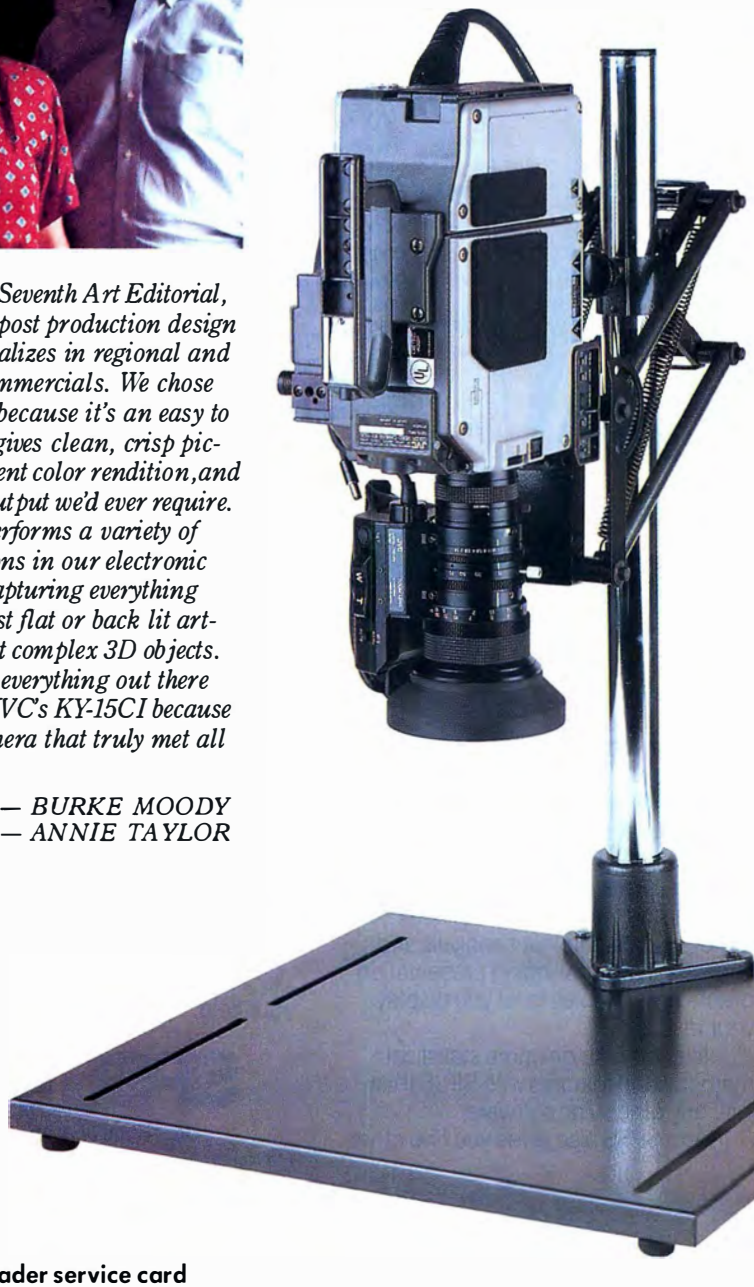

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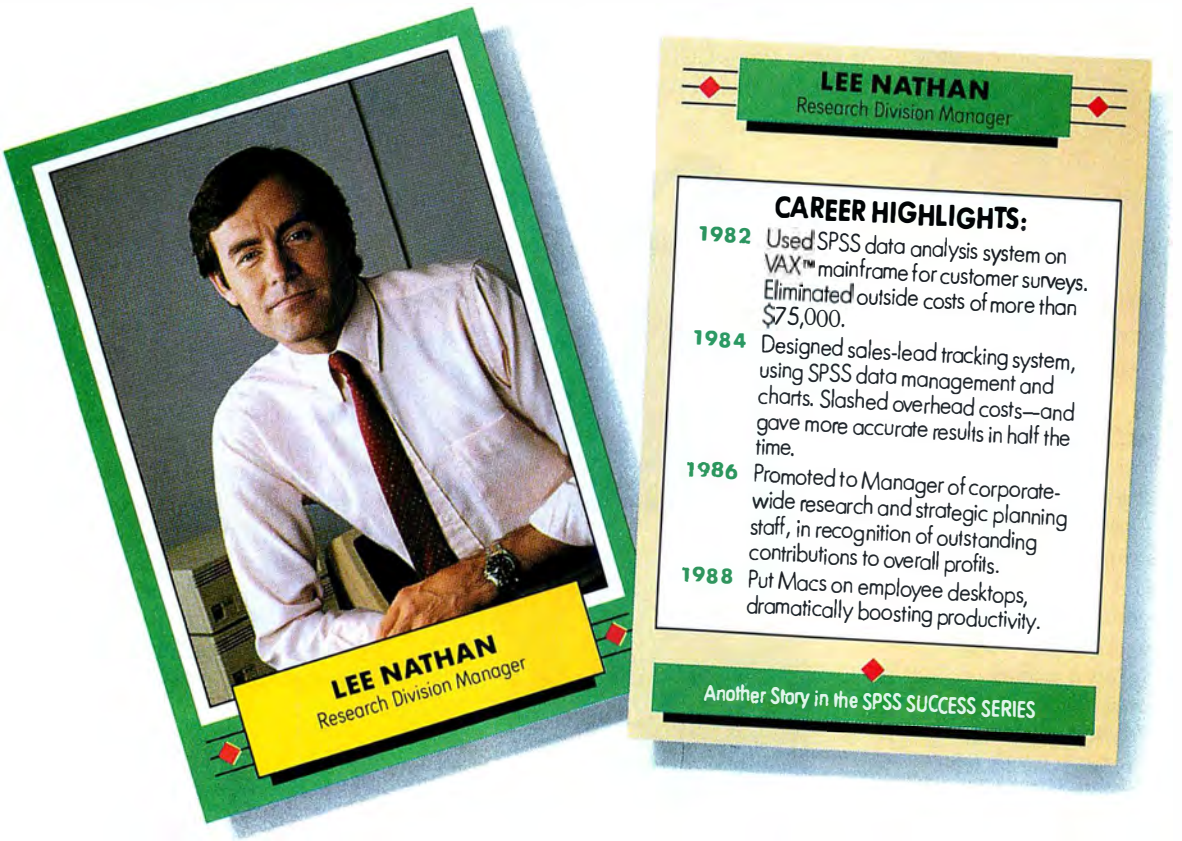

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Romancing the Word Processor

Love and writing tools

by Steven Levy

Since losing my word processing virginity to a CP/M version of WordStar that ran on an Apple II (a harsh initiation, my friends), I have engaged in a perpetual quest for a writing program to share my life with. As I wrote in "Love and Word Processors" (October 1988), choosing a text tool is no casual fling. In a vital way, it is akin to mating. Perfection is out of the question—I have long since forsaken the hope of an irresistible shrink-wrapped package riding up to my doorstep on a white horse. But something more than competence is required. I want passion in my word processor.

Is it too much to ask? Apparently not. I had scarcely flirted with such hot software as FullWrite and WordPerfect before another batch of prospects arrived in the mail. I lustily determined to sample them all. Of course, in choosing lovers and word processors, personal preference is a mighty factor. (Charles Seiter offers a more sober overview of the field in "Words, Words, Everywhere" in this issue.)

NOT NOW, HONEY

First let me explain my situation at the time these comely programs appeared. I was shacking up with a sizzling little number called WriteNow 2.0. Sure, I had been seduced earlier by Ashton-Tate's FullWrite. But that momma was too much for me to handle. First of all, it refused to perform adequately in my little Mac Plus: it demanded that we use the Mac II, or the SE/30. Then, of course, all of its voluptuous features could be shown to best advantage. More than its page-layout capabilities or its nifty outlining capabilities, it was the little things of FullWrite that captivated me. It drove me wild, for instance, that when I triple-clicked the mouse button, FullWrite would select the whole paragraph.

Still, I gave it up for the simple pleasures of WriteNow 2.0. It astonished me that such a tiny package—a mere 103K-could do so much—everything you'd normally ask a word processor to do. I'd never seen anything like its efficiency, and it could handle even a large document with grace and speed. I guess if I had to, I could have lived with WriteNow 2.0 forever. If I were someone like William Hurt's character in *The Accidental Tourist*—say, if I were an Accidental Word Processor, who wanted to write as if there were no tool at all between me and the words I was spewing—I would have remained faithful. But the others came along and enticed me with something different: well, it's an old story. Since I was not by nature an Accidental Word Processor—call me fatally attracted to the self-conscious alternative—I had to try them.

I was most eager to get my hands on something called Nisus. Its publisher, Paragon Concepts, was trying to produce the big enchilada—the omnibus word processor that Did Everything.

NISUS AND PLENTY

I can't say it was love at first sight. The Nisus screen is cluttered with all sorts of unfamiliar icons. But with the grudging help of the sometimes confusing documentation, I sorted everything out; Nisus really did give me a rough approximation of Everything. With a click of the mouse on the icon bar, you can switch to a drawing mode or an interactive page preview. You have constant information on where you are in the document, and easy formatting capabilities. And the program moves briskly, not something taken for granted in a space-gobbler like Nisus. It works fine on an SE or a Plus.

To get to know Nisus really well, you need more than a joyride. You have to be willing to go places you haven't gone with many word processors. Case in point is the search function. In many programs, it's a question of finding a word and maybe replacing it with another. But ask Nisus about this, and you discover that

(continues)

searching is a kind of religion. If you spend enough time with Nisus to develop a relationship, you find that it can conduct penetrating searches through multiple documents, either making simple seek-and-gather operations, or incredibly complicated ones through a protocol named GREP. This unwieldy moniker bespeaks Nisus's unsavory past, rooted in the realm of wirehead-dominated UNIX.

Generally, Nisus has made the transition from user-contemptuous UNIX to user-embracing Macintosh quite neatly: sort of an Eliza Doolittle transformation. The seams show only when Nisus does certain remarkable tricks, and even then the program is more charming than offensive. I'm thinking of its macros. Nisus has them in abundance; besides the usual ability to make your own, it comes packaged with an assortment of about 50, ranging from the useful Character Swap to Zip Code sorters. Like Scheherazade weaving a tale each night, Nisus offers a macro for every need. Choose something called BeginParagraph36 and you find that after every carriage return, the next letter is a big drop cap. Only after much contemplation did I realize that the first letter of each paragraph is changed to a size of 36 points. Ah, the inscrutable wisdom of Nisus.

More important, Nisus *feels* right. Its huge powers—table of contents, indexing, cross-referencing, flexible menu keys—don't get in the way of the writing. And its drawing capabilities are both simple and powerful. Never has it been so easy to draw an arrow from one key phrase to another. And talk about forgiving—Nisus has an unlimited number of undo commands, so you can retrace your steps and fix whatever error you might have committed. Besides all this, every so often Nisus does something that makes me weak with pleasure; with a simple keystroke, for instance, you get a detailed reading of your document, akin to a baseball box score, with word and sentence count, creation date, and even a Flesch Reading Ease score. The more I used Nisus, the more I cared about it.

THE LAST WORD

Still I was tempted to try yet another full-tilt word processor, Microsoft's Word 4.0. Since I had been around the block more than once with the previous version of Word, I approached this overdue new version with some trepidation. But I had some pleasant surprises. Sure, the Rube Goldberg quality was still there—Word 4.0 has more commands than a dominatrix. But it seems to have acquired a sense of humor about them. One dialog box lets you scroll through all the various options—it goes on like a phone book—and choose which ones you want on your pull-down menus.

Overall, Word 4.0 is a real improvement. I was startled to find, for instance, that since we'd split, Word had revamped its previously laughable outlining function; it now has the intuitiveness of some of the stand-alone outliners and it's one

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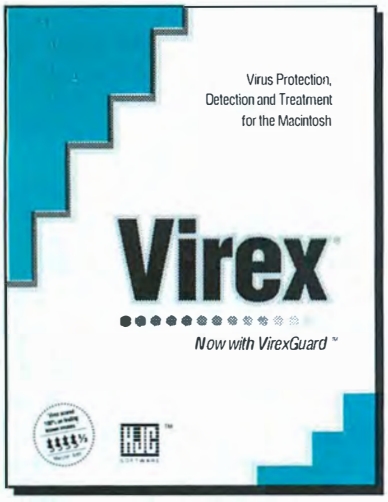

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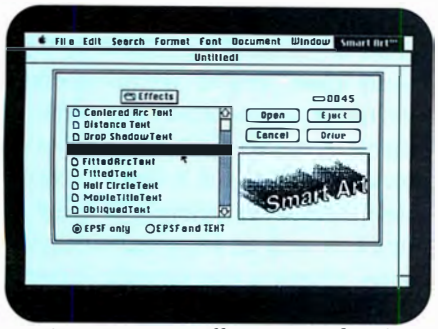

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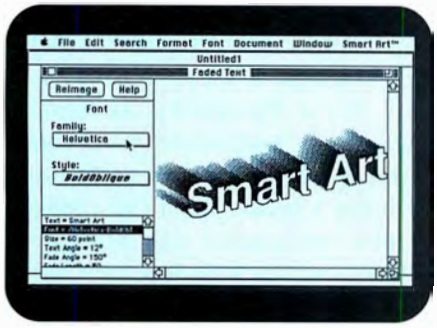

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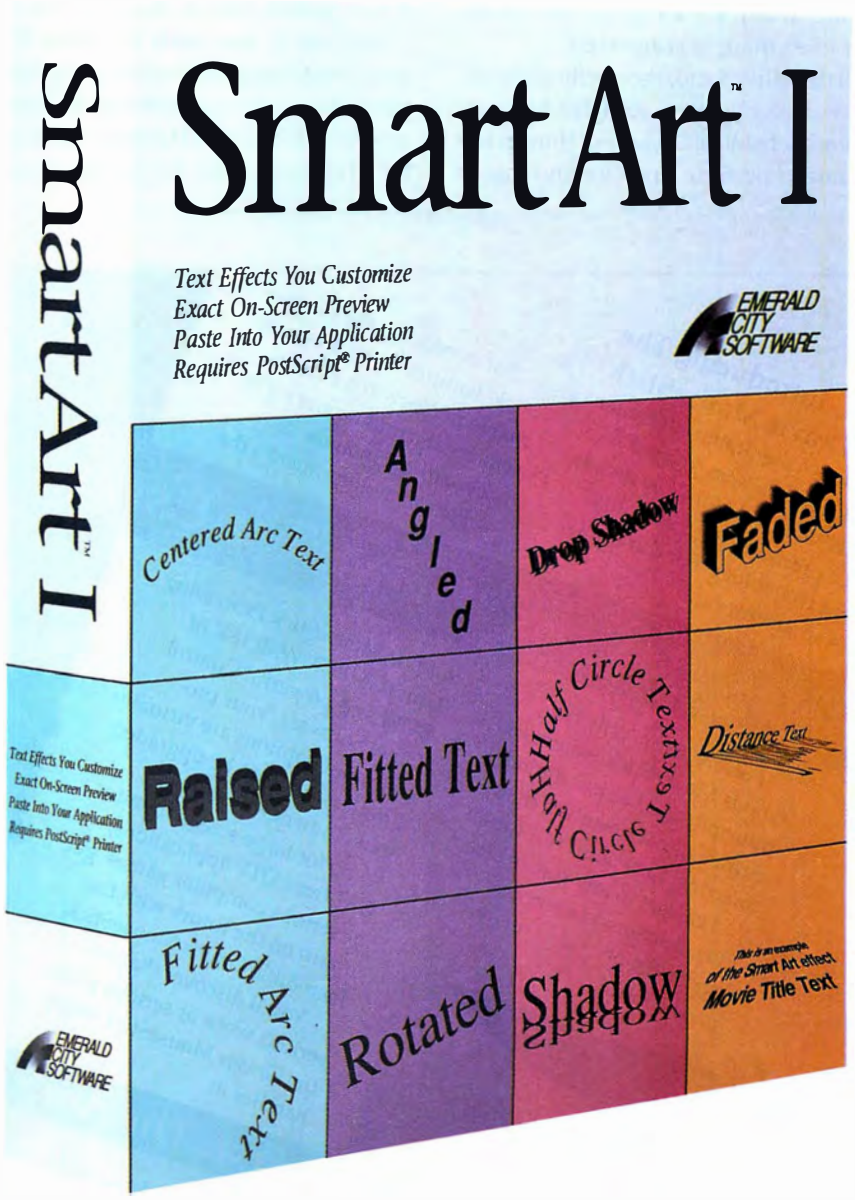

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of the best built-in on a Mac word processor. Word's new function for creating and editing tables is brilliant. And if I ever wanted to merge my text with a real Excel spreadsheet, it has hot links with that program. Word 4.0 looks to the future, where everything is connected.

On the other hand, the spelling checker is as clunky as ever. And I'm not sure that Word's habit of including third-party programs to perform drawing and macro functions is as good as building them in. Yet Word 4.0 was making a strong play to win me back.

MACWRITE BECKONS

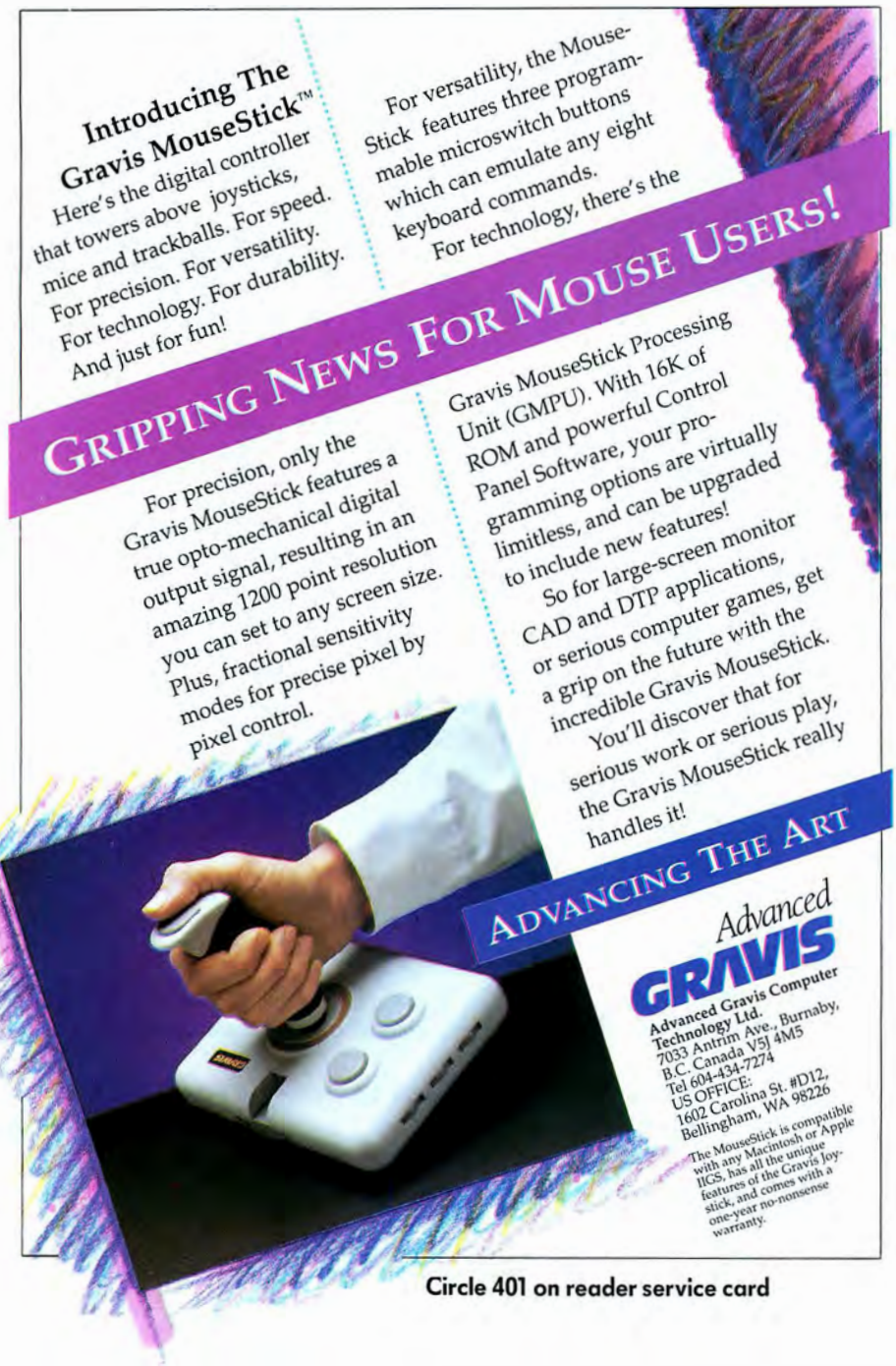
It was getting time to make a choice, but I went for a spin with MacWrite II. My ardor was dampened when I cranked up this new model and saw that its standard screen typeface was Helvetica. This is fine for advertising copy, but it's a lousy screen font—too closely kerned, and badly in need of a serif or two.

But otherwise, MacWrite II was impressive. Support and documentation for the program are unparalleled, and the HyperCard-like help system is nothing short of breathtaking. MacWrite II generously allows you to take documents from its major competitors, and write documents back into those formats. (I wish the makers of, say, the solipsistic Nisus had been half as thoughtful.) It handles columns as well as any word processor I've seen, allowing you interactive control of them as you write. Then there are some nice touches, like a font menu that displays the choices as they look on screen. Everything is cleanly arranged, with a pleasing combo of pull-down and pop-up menus—there's none of the kludgy feeling you got with the earlier version.

MacWrite II seems a logical Accidental Word Processing alternative to WriteNow, and would be a contender were it not for its main problem—bulk. I'm not a fanatic about demanding lithe, sleek programs, but compared to WriteNow, MacWrite is porcine and slothful. And when it comes to Accidental Word Processing, small is beautiful. Just the other day, I had a situation when I had to write something and I only had a Mac Plus with no external drive. I slipped in a disk with a stripped-down System and Finder and WriteNow—and cruised along.

So what's a fellow to do? Well, I think that WriteNow 2.0 is always going to have a place in my heart, and on my desktop as well. For quick encounters, or for short trips away from home, it will serve my needs ably. But after all my rambling, I've decided to tie the knot with Nisus. I can't ignore its attraction. Do I sound like someone on a honeymoon? So be it. Nisus and I will make a go of it. Don't bring me another word processor until the Do Not Disturb sign is removed from my office door. ■

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



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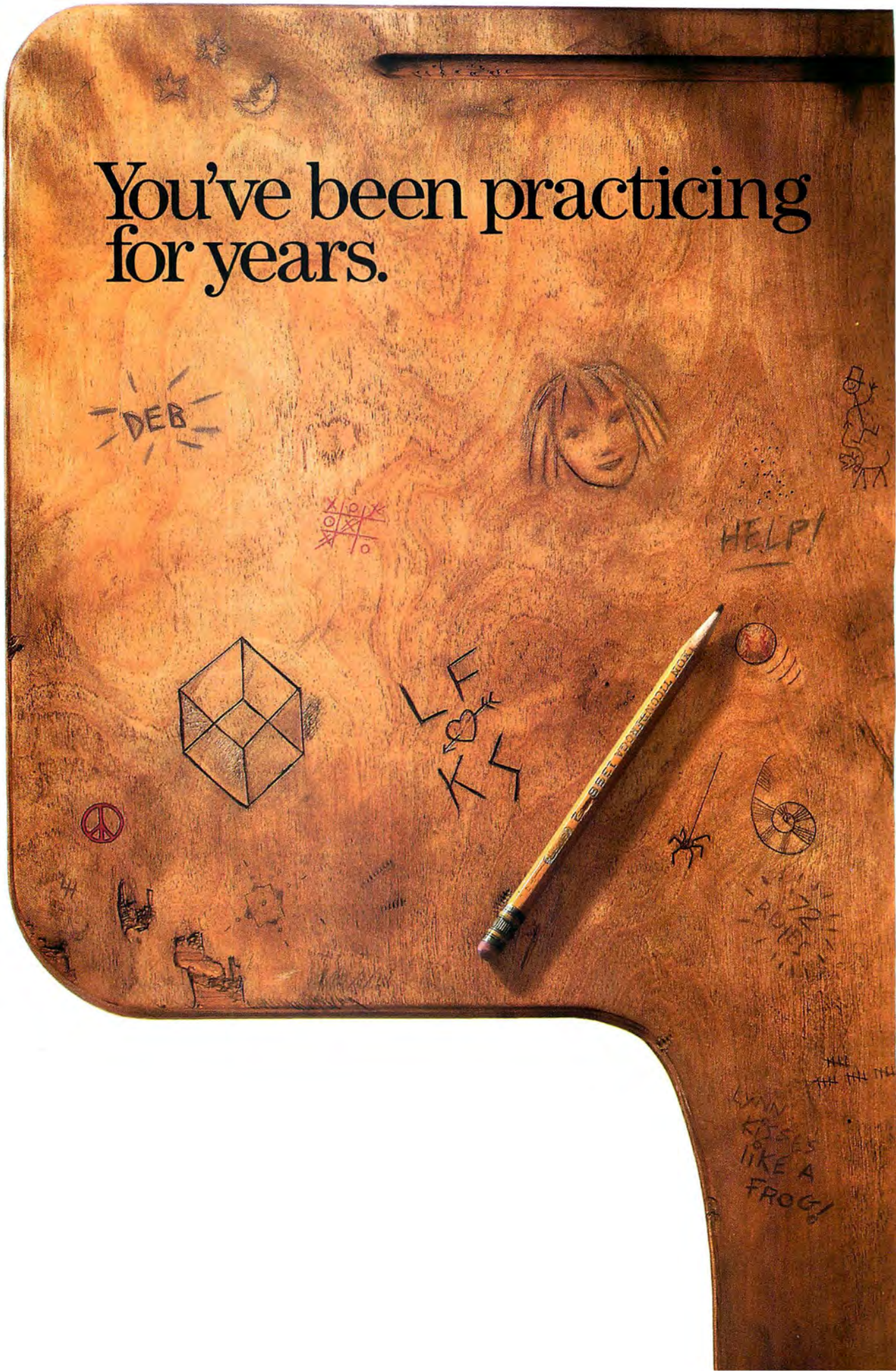
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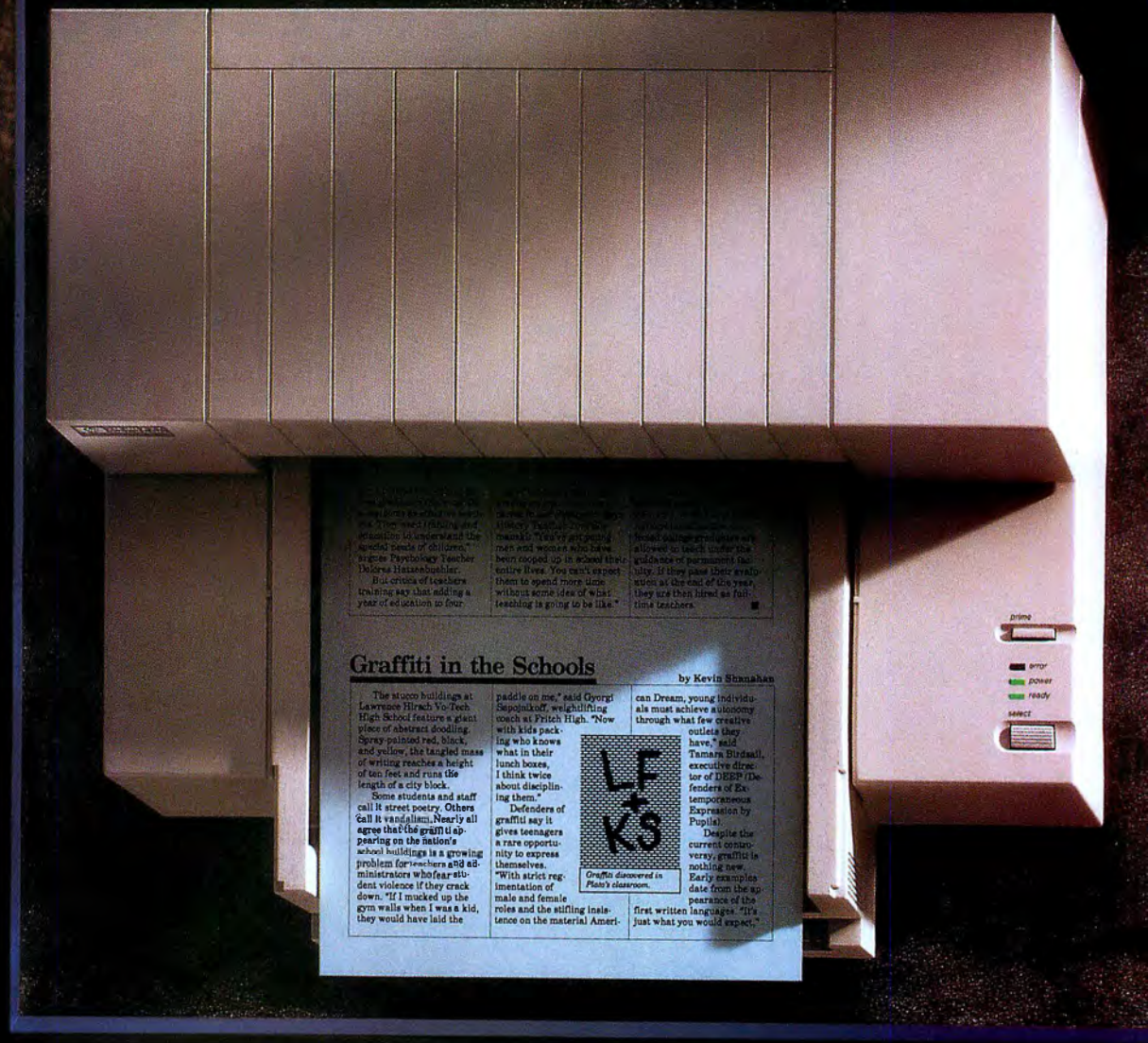

Graffiti in the Schools

by Kevin Shanahan

The stucco buildings at Lawrence Hirach Vo-Tech High School feature a giant piece of abstract doodling. Spray-painted red, black, and yellow, the tangled mass of writing reaches a height of ten feet and runs the length of a city block.

Some students and staff call it street poetry. Others call it vandalism. Nearly all agree that the graffiti appearing on the nation's school buildings is a growing problem for teachers and administrators who fear student violence if they crack down. "If I mucked up the gym walls when I was a kid, they would have laid the paddle on me," said Gyorgi Sepojnikoff, weightlifting coach at Fritch High. "Now with kids packing who knows what in their lunch boxes, I think twice about disciplining them."

Defenders of graffiti say it gives teenagers a rare opportunity to express themselves. "With strict regimentation of male and female roles and the stifling insistence on the material American Dream, young individuals must achieve autonomy through what few creative outlets they have," said Tamara Birdsall, executive director of DEEP (Defenders of Extemporaneous Expression by Pupils).

Despite the current controversy, graffiti is nothing new. Early examples date from the appearance of the first written languages. "It's just what you would expect,"

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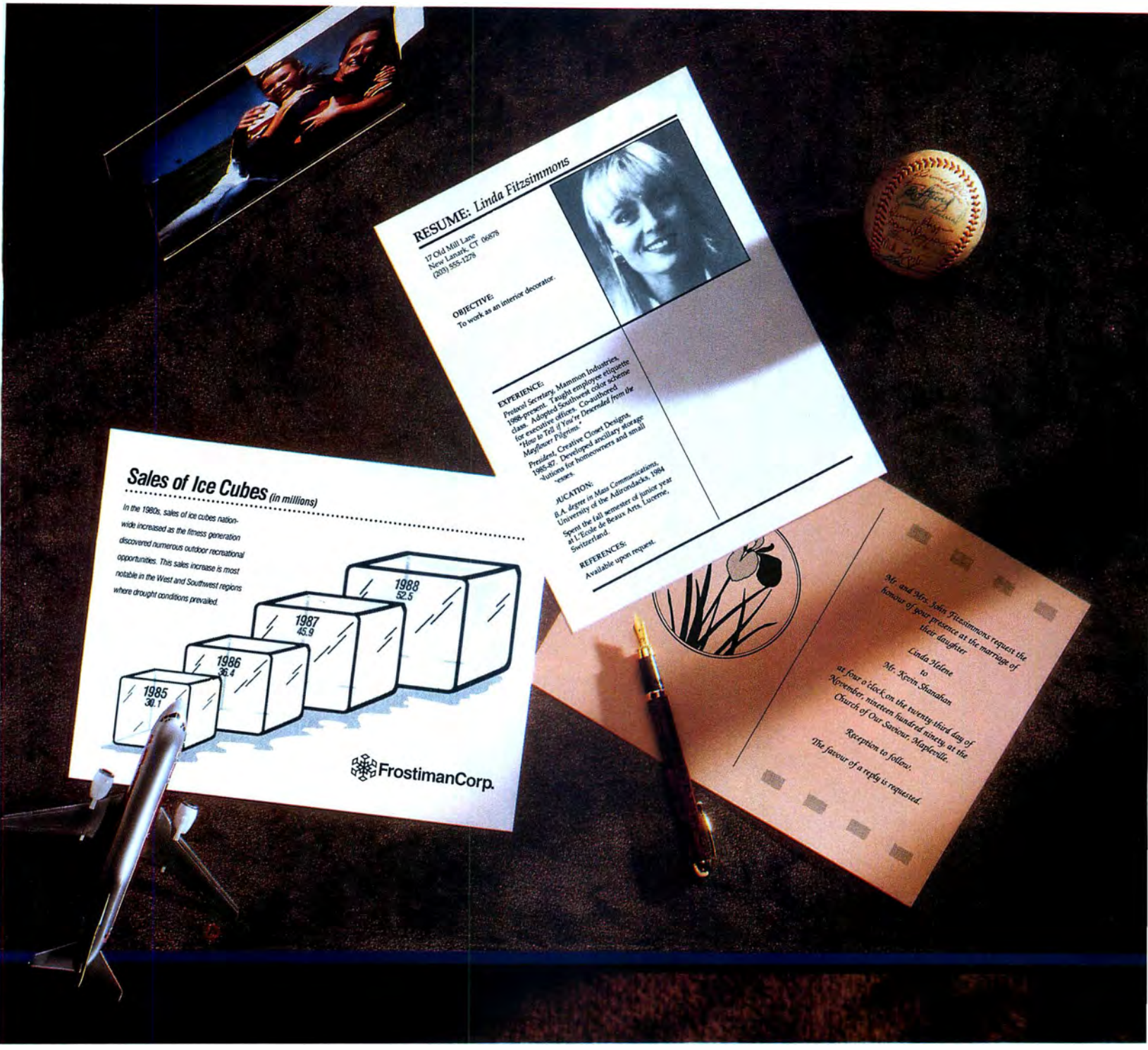

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The Good Fight

User groups need you

by Deborah Branscum

In the old days the members would buy every single public domain disk that came out. They would live, eat, and sleep the Macintosh," says Brian DeLacey. "Now people want solutions. I don't think it's negative, but it has changed the way the group does business."

DeLacey heads BCS Mac, the 12,400-member subgroup of the Boston Computer Society. Strong and solvent, BCS Mac is the envy of smaller groups with fewer resources. Yet BCS Mac is feeling pinched by the times, and there is talk of eventually putting a cap on membership as the group's resources are stretched tight.

The same core of volunteers is now serving many more members, DeLacey says. "People expect to pay for a service when they join, instead of learning and then participating as a volunteer. It's becoming harder and harder to find volunteers who will assume significant responsibility for the group."

Are user groups in trouble? Maybe so. On the West Coast, BMUG cofounder Raines Cohen, in Berkeley, California, bears witness to the same shift in membership. "The new crop of members is much more solutions-oriented and a much greater drain on the group," he says. These users need information for their jobs and don't have the time or interest to volunteer.

As president of the New York Mac Users Group, Sonya Brockman grapples with a similar issue. Her 1500-member organization does not actively seek memberships from corporations because it can't support a technical hot line. "We have to manage expectations," says Brockman, who must balance the demands of members for service against the very real limits of the group.

BCS Mac supports one-and-a-half paid positions to keep the group running. BMUG has passed the 8000-member mark and hums along with six paid staff members. The smaller NYMUG has one part-time office worker. The volunteer crunch affects all three groups.

Smaller groups face different issues. "So many Mac users are rank computer novices, they feel inadequate in a management role when it comes to user groups," says Dave Game, president of the 200-member Gold Coast MUG in Miami. "If they could just understand that it's not computer expertise, but management expertise, that most user groups need, we'd have a better pool of candidates and our group would be stronger."

"We're losing members because we can't hold their interest," says Mike Pappas, president of the Panhandle Macintosh User Group of Pensacola, Florida. Pappas wants advice on attracting speakers to his group because "the better the speakers, the more people we bring in." The full membership of 60 people showed up recently to hear a representative from SuperMac, but that size audience rarely entices other companies to the area. Another problem is an Apple-authorized dealership that has no interest in the group's members. How can the organization encourage dealer support? And how can it attract new members?

Groups outside of urban centers struggle to provide the services that larger groups take for granted. It's a fight to find money to produce a newsletter and copy to fill it, for example. Locating speakers and acquiring industry support are always problems, and few can afford the benefits that AppleLink provides. Isolated by location or size, many groups seem unable to draw on the experience of larger, more successful groups, which are fighting their own set of battles.

Avenues do exist for exchanging information—from the National Apple User Group conferences, to the gatherings at every Macworld Expo, to the forums on information services. Although there is no organized push for linking up all of the groups, regional alliances are developing.

A year ago, for example, Seattle's Macintosh Downtown Business User Group sponsored a regional meeting that included representatives from Washington, Oregon, and Idaho. Questionnaires

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were sent to groups that couldn't attend the meeting, which focused on sharing resources. "It quickly jumped into a user group exchange," says Tim Celeski, a founder of DBUG. In southern California, the president of the Conejo-Ventura MUG meets once a month with leaders from other groups in the area to share information and discuss ways of working together. Oregon's Corvallis MUG sponsored the first statewide meeting of Apple user groups last September. MUG Shot '88 discussed fund-raising, burnout, and the group's unhappiness with Apple's warranty, according to Phil Russel, editor of *Mouse Droppings,* the group's newsletter. Eugene's MUG is sponsoring Mugshot '89, scheduled for November 5. (Leave your name and number at 503/342-7928 if you'd like more information.)

Perhaps more promising are the meetings that have taken place online. Seattle's DBUG followed up its regional discussions with a meeting on AppleLink Personal Edition. As beta testers for the Macintosh version, the Northwest groups were able to conference online. "It's very easy for all the groups in a region to post their meetings and to have online conferences on specific dates," says Celeski. There have been many requests to share DBUG's core library, he adds, "and that might help other groups by saving them several thousand hours of work."

Jerry Cline, who has headed the Arizona Apple User Group for the past five years, is also enthusiastic about linking groups electronically. In charge of the Apple II user group forum within Personal Edition, he's been involved in discussions about creating a "supergroup" from the very beginning. "A lot of us have created charts and discussed ideas, but nothing ever came of it," he says. "The closest thing would be for us to come together on a service like AppleLink. That's where a supergroup will become a reality."

BMUG's Cohen is skeptical, however. "Personal Edition is a big information provider, but it's a one-way flow of information," he says. "Users can post things, but AppleLink is still very centralized and it's hard to find things." Cohen would rather spread the gospel of FidoNet, a

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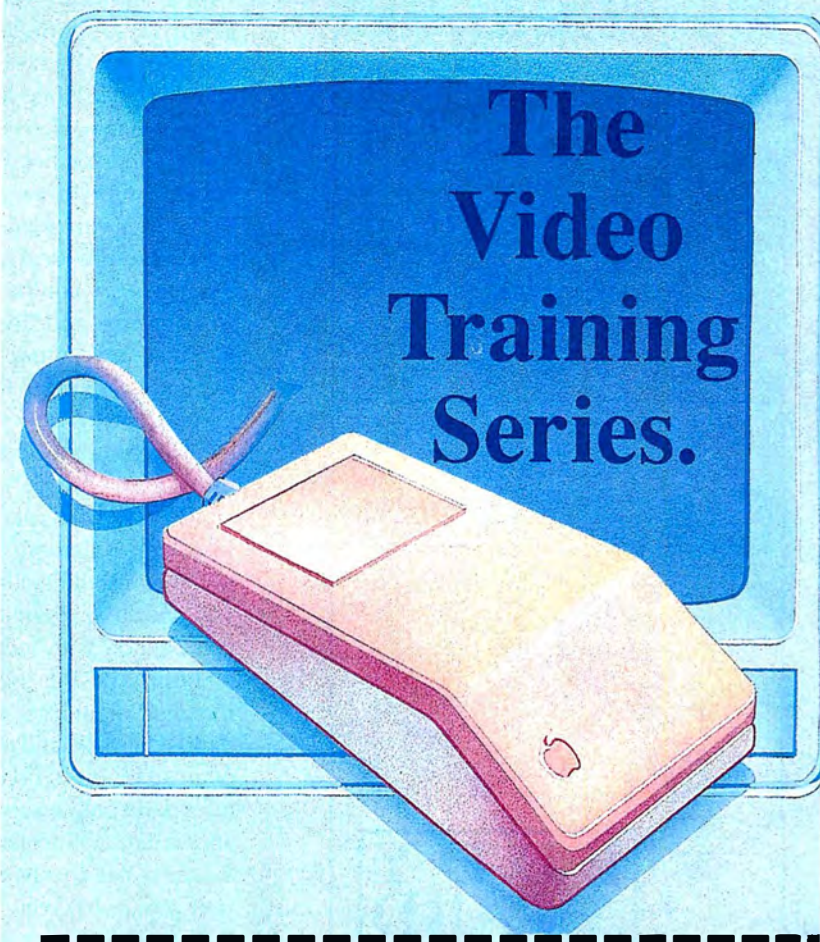

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"virtual" bulletin board. "It's like user groups: decentralized and grass roots–based," he says. And it allows information to be shared less expensively than with commercial services.

Whether or not Personal Edition becomes a success, user groups will remain eager to swap ideas. An online forum seems like the ideal means, but financing the necessary equipment is a problem for small groups, and larger groups battling to keep volunteers may not have the energy to pursue regional ties. Some organizations face management turmoil that makes even day-to-day operation difficult. And user groups can be very territorial.

Boston Computer Society president Jonathan Rotenberg is all too aware of possible resentment by other groups. "We will not do anything that puts the BCS in competition with local user groups," Rotenberg says. But the mammoth 31,000-member organization does plan to expand nationally and internationally as part of an ambitious ten-year plan. One goal is to expand online services to include local access nationwide. But the most intriguing scenario has the BCS joining with other user groups to create a national organization modeled after the American Automobile Association, started by automobile clubs earlier in the century.

"The AAA began as a group of hobbyists interested in getting peripherals for their cars," says Rotenberg. Over many years it grew into a consumer-service-based group "with fiercely independent local chapters." Of course, the AAA approach may not be the answer, and in any case "it will be years before user groups feel comfortable about such an organization," he says.

Clearly, some groups already feel threatened by the BCS. According to one user group president, "the BCS has gone out and taken over lots of groups in the Northeast. We're happy to be ourselves. We don't feel the need to become a conglomerate." But perhaps he might be persuaded that there are advantages to forging ties with groups outside his area. More clout, for instance. An umbrella group that represented hundreds of thousands of computer users would command the respect of manufacturers, dealers, and politicians alike. And groups could help one another as each tackled the problems of volunteer shortages, tight money, and a changing membership.

In Miami, for example, Dave Game battles burnout with patient hand-hold-

(continues)

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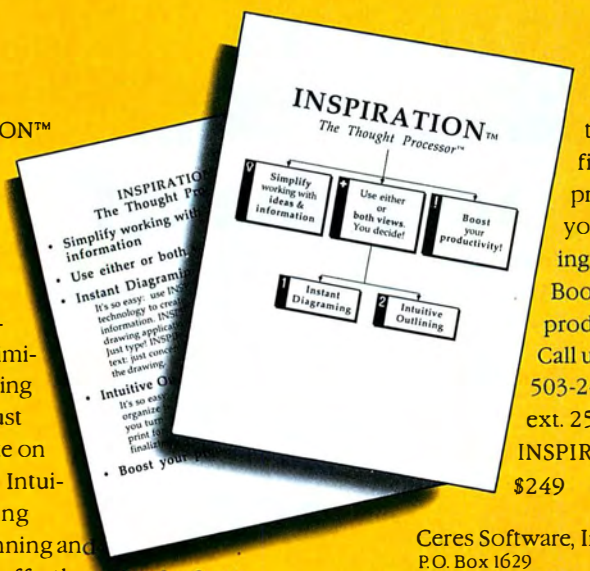

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ing. "Our board is always on the lookout for people who have energy, interest, and a willingness to share," he says. When the Gold Coast's board spots a likely candidate, Game says, "we find a position, usually appointive, for that person to fill, and then help him or her feel comfortable with serving as an officer." In Berkeley, Raines Cohen hopes to respond to new members' needs without bankrupting his organization. "The key is to develop ways to levy new taxes on these users," he says. "Perhaps package the same services differently and charge corporate rates." In Boston, the BCS is putting together a start-up kit for other groups.

Information is like money. Hoarded, it's useless. Its true value is found in exchange. User groups are based on this principle. And one day I hope to see a national group or clearinghouse emerge from this idea as well. But such a group can't be built on a shaky foundation.

User groups are volunteer organizations, not service-based businesses. They need *you* to survive and thrive. New jobs and new lives have been forged out of volunteer work. If you don't belong to a user group, join. If you are a member, be active and volunteer. See the User Group Directory for groups in your area. M

I love happy endings. Send your nominees for sainthood to Service Heroes, Macworld, 501 Second St., San Francisco, CA 94107 or via AppleLink (Macworld1) or Connect (Branscum). Conversely, drop me a line if a company is ignoring you. I will help solve your problem, if I can.

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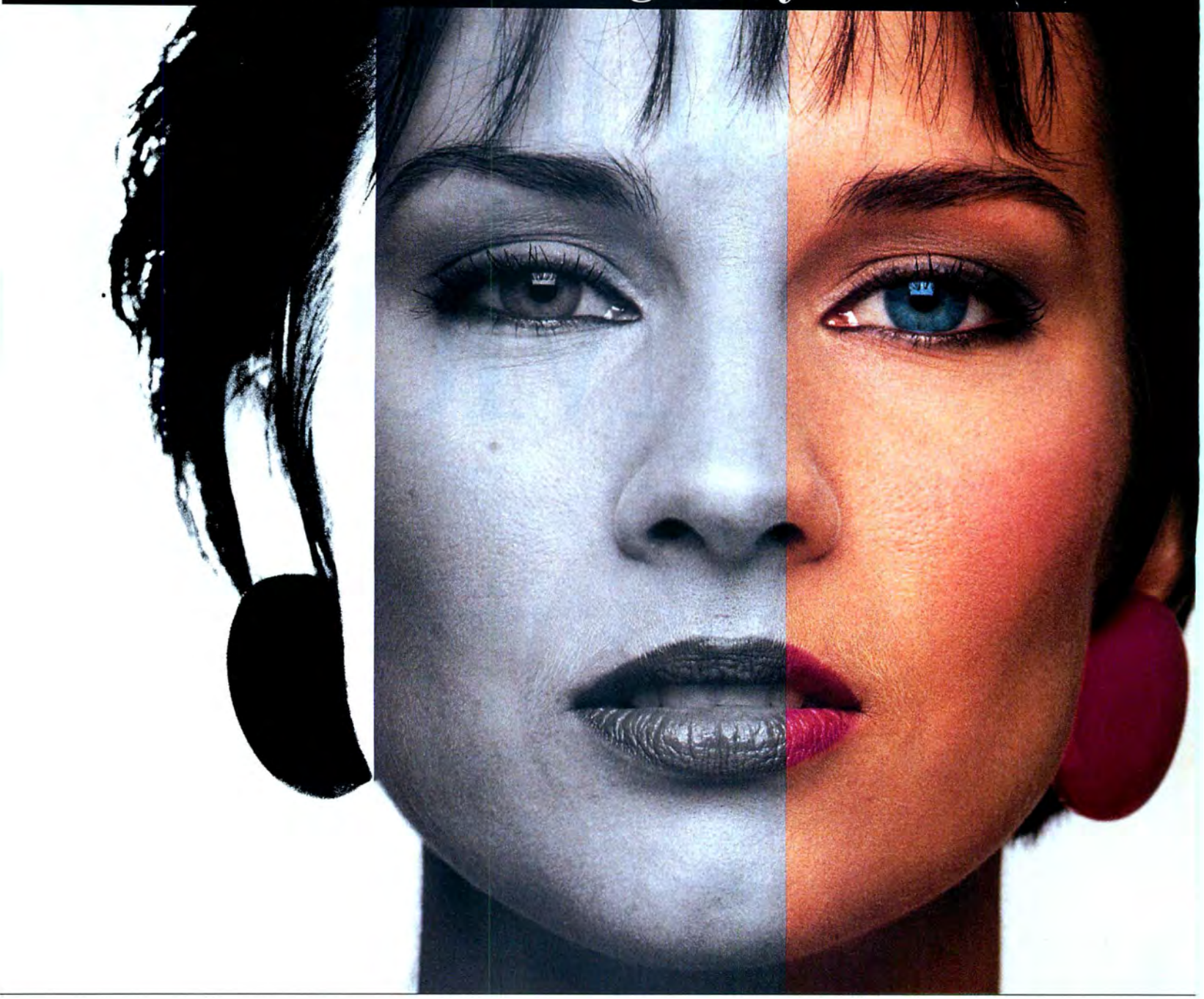

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The Proliferation of Buses

Too many spells trouble

By Thom Hogan

If you've talked to a Macintosh hardware designer lately, you might have heard a bit of grumbling about buses. No, Silicon Valley's engineers haven't turned in their BMWs and started commuting to work; they're upset about computer buses. In particular, the Macintosh II's NuBus, the SE's slot, the SE/30's Direct Bus, and what I call the Mac Plus's solution, the NoBus. (For more information on what these buses are and how they work, see "Getting Started with Desktop Presentations" and "New Life for the NuBus," *Macworld,* July 1989.)

The problem with the proliferation of Macintosh buses is that they're all gassed up and ready to hit the road, but nobody seems to know where they're destined. Even Apple's official communiqué in the March issue of *Apple Direct,* Apple's publication for the developer community, doesn't seem to have the answer: "Our goal is to limit the number of PDS's [processor direct slots, a fancy word for bus] to one per processor model." Currently there are two different PDS buses (for the existing 68000 and 68030 chips), and there may be another in the future (for the 68040). For users, the lack of clear direction on Apple's part can only mean hesitation on the part of third-party suppliers and, therefore, fewer options to choose from in the short term.

WHITHER THE MAC PLUS?

One implication of Apple's directive is that the Plus will go away, since it doesn't use the SE PDS scheme but has the same processor. Yet, the Plus is one of the most popular Macs and has an installed base larger than any of the other models. Is Apple telling engineers to forget about designing new add-ons for the Plus?

Meanwhile, the introduction of the SE/30 model poses some interesting additional questions. The standard SE and the SE/30 have different PDS connectors—the SE/30 sports address and data lines the regular SE doesn't. But the *Apple Direct* article also states "you can expect PDS cards to work for...machines *running the same processor (possibly at the same speed) only.*" (The italics are Apple's.) Since there are four common speeds (8MHz, 16MHz, 25MHz, and 33MHz) at which the current crop of CPUs can be run, could those two PDS connectors spawn eight different types of PDS boards?

If I were thinking about buying a newly engineered board for the Macintosh, I'd be confused. If Apple introduces an SE/30 running at 25MHz (instead of the current 16MHz), would my new board stop working? If so, how can I find out when, if ever, Apple might make that change? Still, Apple might choose to make faster processors use the same bus clock signals, meaning the hypothetical board would work on the new machine after all.

The problem, simply stated, is that Apple is playing a game of three-card monte with developers. It is very irrational to design new products without first determining if there is a market large enough to warrant the effort. But Apple's hedging-the-bet type of proclamations make it almost impossible for a developer to determine whether or not a potential market will be large enough or last long enough to warrant designing a product for an existing machine. And, of course, this means that we, as consumers, may find fewer options available for our machines in the future.

A BLOW-BY-BLOW PROGNOSIS

Let's analyze the lineup, one by one, to see what I mean.

- *Mac Plus* The current Plus is dead—at least if I'm reading correctly between the lines of Apple's various communiqués. Perhaps they'll redesign it to add the SE's PDS bus, but then it would just be a one-drive SE. Developers in the future will release fewer new add-ons for the Plus.

I already see some evidence of this. Take accelerators, for example. It's easier, cheaper, and takes less after-sale support to market an accelerator for the SE, which has a PDS slot, than for the Plus, which

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doesn't. So it's no surprise to discover that more accelerators are available for the SE than for the Plus, and at lower cost.

- *Mac SE* There are apparently no major problems for developers, at least as long as the processor speed remains 8MHz. Some developers screamed when Apple changed the board-holding mechanism slightly during the last year, but the only real issue is one of multiple add-ons.
- *Mac SE/30* Again, developers have no problems as long as the processor speed remains at 16MHz. (Apple says "at least one more future compact 68030-based Macintosh" will use this slot design.) The faster processor, expanded address/data signals, and different connector configuration have forced developers to redesign their older SE add-ons to support the SE/30, because the same board will not fit or work in both machines. Some developers may be hesitant to convert existing designs until it is obvious that this (and future machines) will sell in large quantities and won't soon be replaced by new models that run at a different processor speed. As a result, the very same board may cost more on an SE/30 than on an SE.
- *Mac II, IIx, IIcx* There are no substantial problems in developing for the current models, since they all use the NuBus. (The IIcx doesn't have quite the same headroom as the II and IIx, so some older NuBus boards don't fit into the IIcx's case.) Developers are scratching their heads, however, over the rumors of a faster NuBus in development for the next-generation machine. (The Next machine sports a NuBus that is primarily different in two respects: board size and speed; the Next bus works twice as fast as the defined standard. Thus Apple may be feeling pressure to match the competition.)

Generally, hardware options for the standard SE and the II should continue to appear, since buses for these machines seem to be guaranteed some long-term stability and, thus, a mass market.

Jim Nakasuji, general manager of Siclone (maker of accelerator and other add-on boards), suggests a different way of looking at a manufacturer's bus options. He points out that the cost of connecting a board to the different Apple machines is

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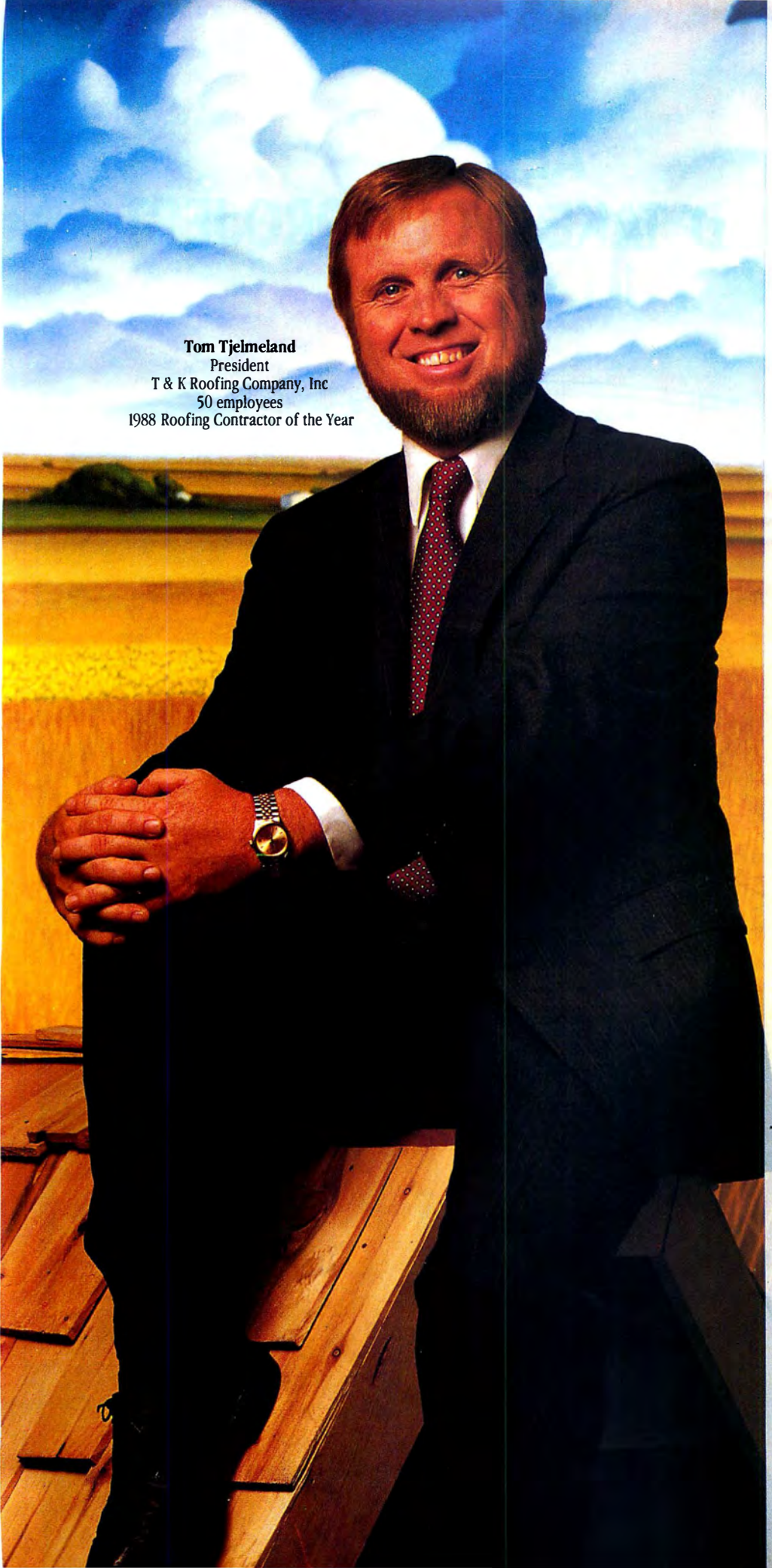

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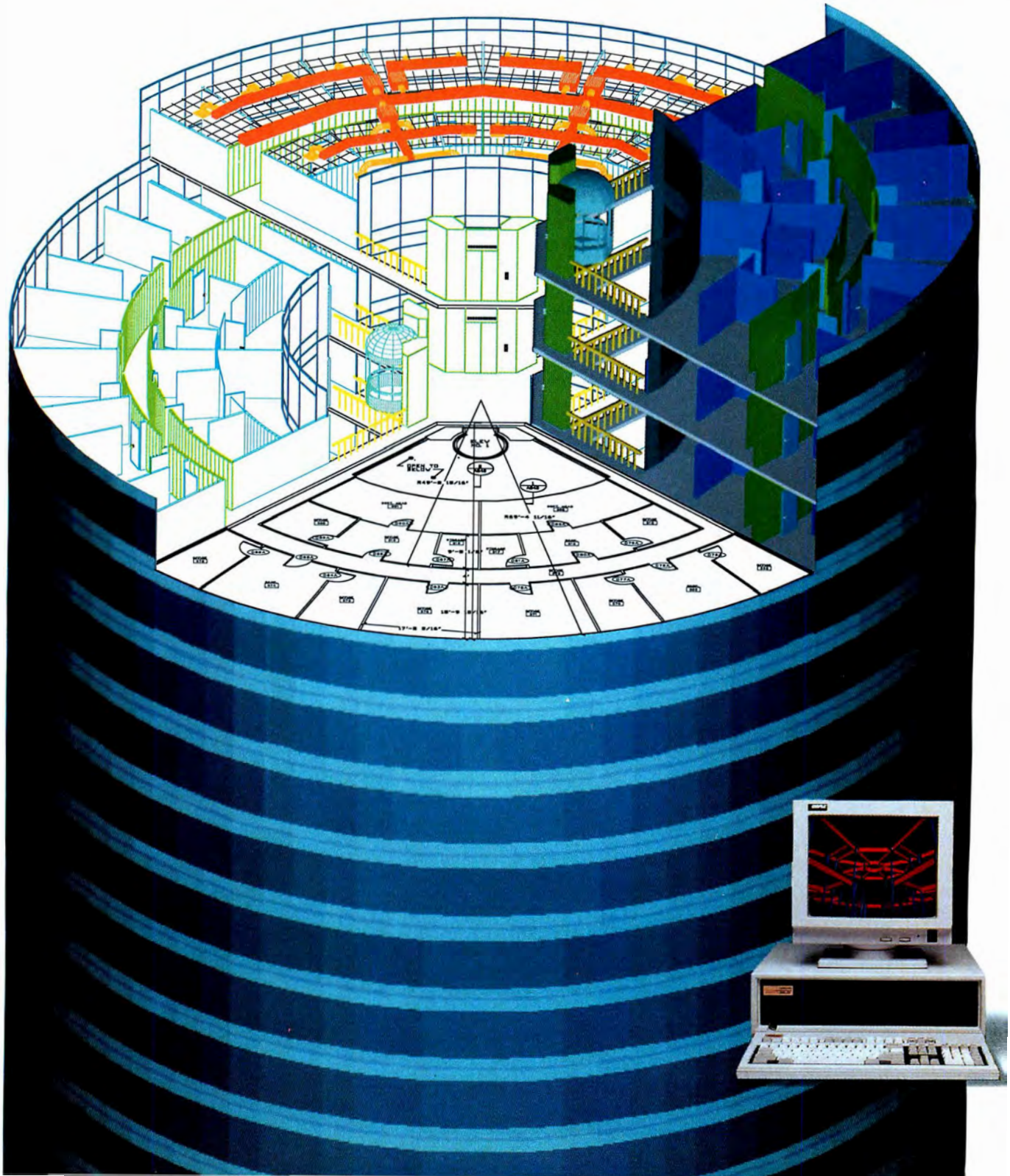

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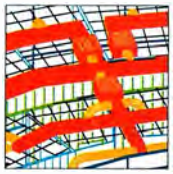

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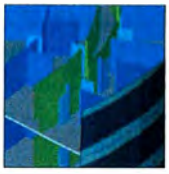

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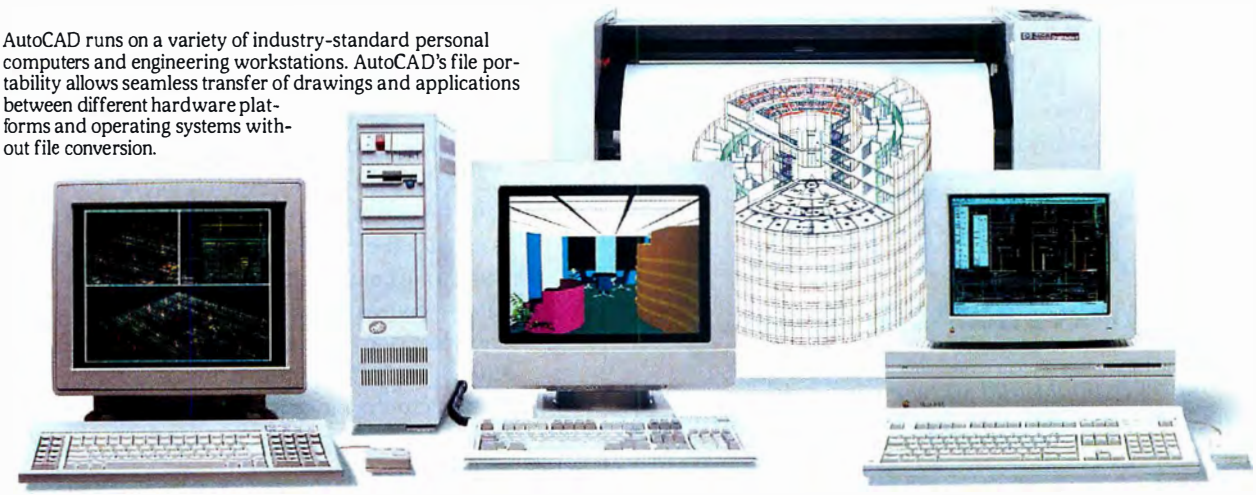

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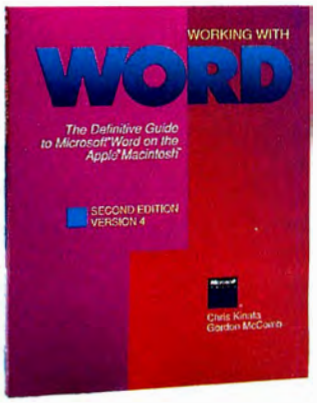

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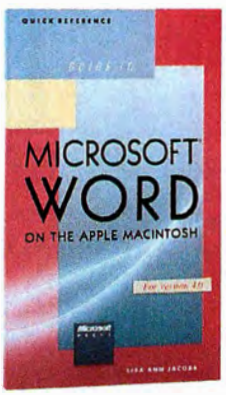

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a significant factor in its design and marketing. Here are his rankings, from lowest to highest cost for manufacturers.

(1) Mac SE: simple 16-bit interface with a simple connector; (2) Mac SE/30: simple 32-bit interface, with a slightly more expensive, but still simple, connector; (3) Mac Plus/512KE: 16-bit interface with a complex CPU clamp and mounting mechanism (electronics are cheap to design, but the physical attachment adds to the price); (4) Mac II/IIx/IIcx NuBus: complex, software-controlled, 32-bit interface, with a simple connector (although more expensive than the one in the SE); and (5) Mac II/IIx/IIcx: the physical connection is a simple 32-bit interface, but the logical connection (usually a board that plugs into the CPU socket) is expensive and complex.

The simpler the interface, the easier it is to design the electronics. The cheaper the connection, the less cost that's passed on to the user. All else being equal, you'd expect to see more options for the SE than for the II.

ONE SLOT, ONE OPTION

But other problems loom on the horizon, and Apple seems reluctant to solve them.

For example, take the problem of adding two boards to an SE. The SE only has one slot, so something has to give when you try to add a second option. Apple's official position is one slot, one option. Anything else and developers are on their own.

Unfortunately, this policy can't stand its ground. It is quite common for SE owners to want to accelerate their machines and also add a large monitor. After all, Apple has proclaimed itself the winner in desktop publishing. What could be more natural than adding a full-page display to your SE?

Well, if you do so, you'll find that a full page takes longer to display than the little internal screen. So it's only natural to next want to accelerate the machine. Unfortunately, you've just run up against Apple's one slot, one option policy. Fortunately, Radius, E-Machines, and a few other savvy manufacturers ignore it, and provide ways to add multiple options to an SE.

(continues)

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You could, of course, add an external expansion box to your SE. Yuck. I've already got too many boxes and cables in my office as it is. Moreover, an external box seems to violate the natural simplicity of the Macintosh design.

So what can be done? Apple could establish a set of standards for half-board and full-board options, which would generally make it possible to stuff two half-board options into an SE and have them work together. (By half-board, I mean something similar to the scheme Radius and others use, which extends the SE's slot by always adding a replacement slot at the end of any board you add to the machine.) But it's probably already too late for Apple to go this route, since Radius and others would object to having to redesign their boards.

It's unlikely that Apple will provide multiple PDS's in any single machine, either. One of the glories of the PDS concept is its simplicity and low cost. Adding slots means adding more buffering circuitry, a slot-addressing scheme, and a host of other problems—you might as well just stick a NuBus into the machine if you want multiple slots.

As an SE or SE/30 owner, about the only thing you can do is find a manufacturer who makes all the add-ons you might ever want to stick into your machine, and buy only those products. At the very least, make sure you know which is more important to you—acceleration or big screen—and buy that option first. It may narrow your choices later, but at least your first choice can be fully considered.

THERE'S A NUBUS A' COMIN'

We Mac II owners spent most of the last two years with only one slot filled in our machines: the NuBus slot with a video board. It wasn't until January of this year that any other kind of board found its way into my Mac II. The good news is that, after some initial hesitation, developers are making NuBus options rapidly available. Frankly, I see only three types that make any sense.

- *SCSI speedup boards* Boards like the Jets Cybernetics SurfBoard and the Golden Triangle Pronto (both listed for under $1000) will make your hard disks (and any other SCSI device) act as if they've found the fountain of youth. I haven't had enough experience with either to predict how much faster disk access will be, but the difference is significant.
- *Internal modems* Hayes, Epic, Ventel, and others have introduced 2400-baud internal modems for the Mac II, and I'm glad. Having an external modem hooked to my computer generated three extra cables, an extra power switch, and another box. Modem circuitry these days is small enough to fit into any Mac, which is where it belongs.
- *Additional video options* I finally broke down and ordered a second video board and monitor for a design and debugging machine. Now I wonder why I waited so long. If you make use of MultiFinder and switch between applications a lot, you might consider adding a second monitor to your system (full-page if you do desktop publishing, 32-bit color if you're into color graphics, and so on). With the complete monochrome package going for only $500, this is a cheap way to extend

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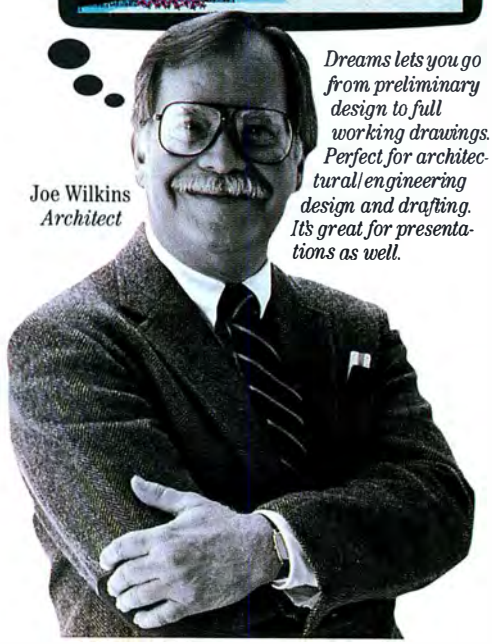

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the capabilities of your system.

Notice I didn't say anything about accelerators or coprocessors. I've yet to see a NuBus-based accelerator that does much in the way of accelerating. That's because the CPU on the NuBus board has to get to memory and other I/O through the NuBus, which imposes waits and timing restrictions that negate the acceleration. The very best Mac II accelerators (Dove, DayStar Digital, Siclone) all use the approach of plugging directly into the 680x0 socket on the system board. Coprocessors, on the other hand, generally don't run Mac software directly, and thus require that you buy additional software to use them effectively. The most likely coprocessor to add to the Mac II—something like Orange Micro's Mac286 board—is more expensive than a complete IBM PC compatible, the cabling to hook it to a Mac, and the software to transfer files back and forth!

NUBUS/PDS COMPATIBILITY

All of which should bring to mind this question: are the NuBus and processor direct slot similar enough in design to allow an engineer to create products that will work on both? After all, accelerators seem to work just fine on the SE's PDS while the same thing on a II's NuBus would be a slug.

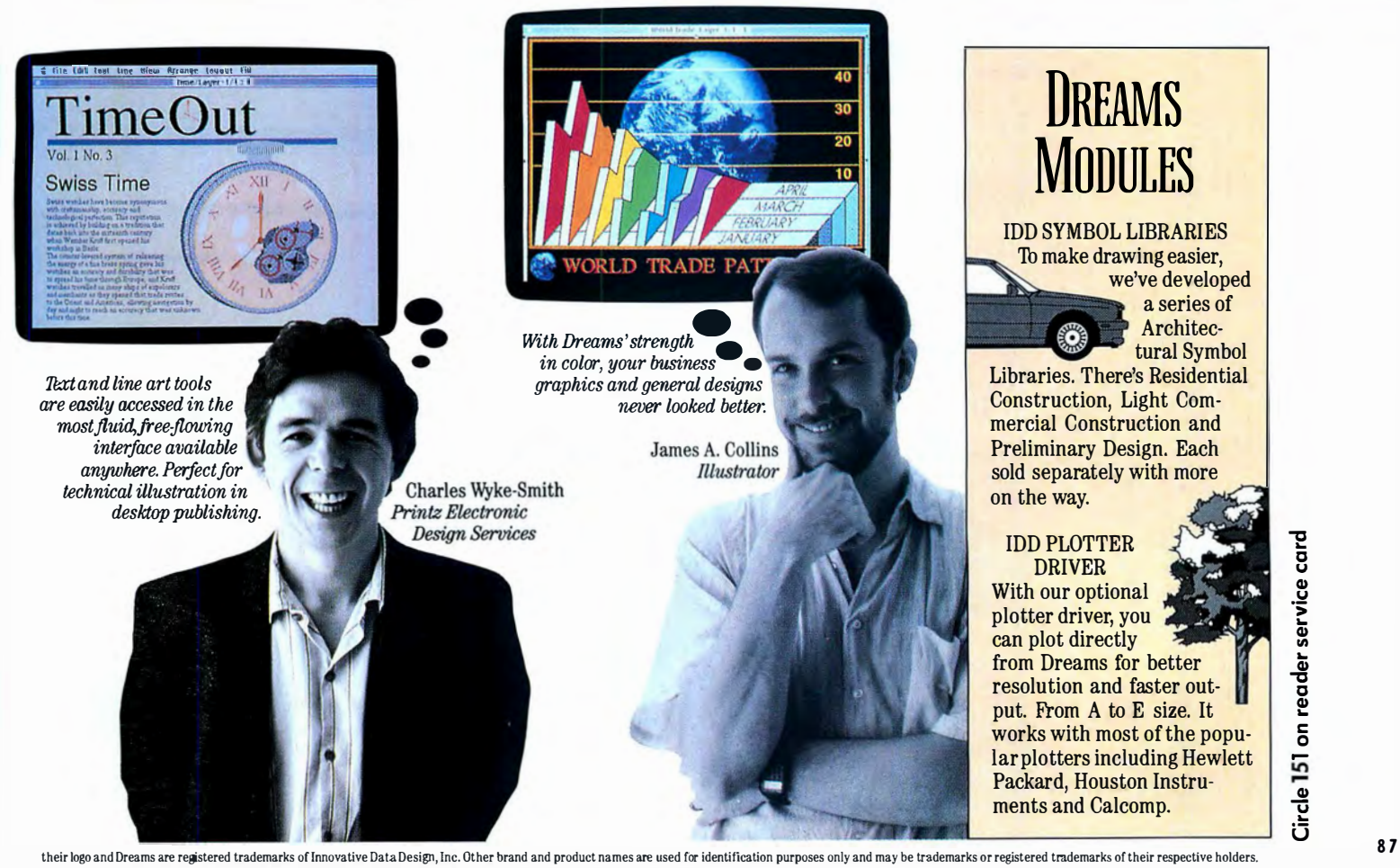
Apple says that a smart developer can design boards to work for both without having to do a lot of redesign work (other than the actual board layout). There are some restrictions (where the board "sits" in memory, for example), but none—according to Apple—are significant barriers. Well, I suppose that's true. However the designers I've talked to all point out how much they preferred the PDS, since it is basically just a direct connection to the CPU and memory. And that makes it easy to make a design run as fast as it possibly can.

The NuBus approach is not so simple. Between the Macintosh master device (the system board) and the option board (which can be another master or a slave) lies an additional level of software protocol, which sets a standard for how the two devices talk to one another. The net result is a more sophisticated design involving more chips and additional software (usually in ROM). To add all that to a PDS board, as Apple suggests, is fine, but who really wants to? Nobody I've talked to.

All of this suggests that the current state of Macintosh options may be around for a while. SE users will continue to get lots of choices at reasonable prices. Mac Plus users will see few options, and at somewhat higher prices. Mac II users will have access to certain types of NuBus boards, but will have to wait for coprocessors to support the Apple software. Meanwhile, Mac II accelerators will still force us to pry out our CPU.

So, now that Apple has seen fit to give us lots of buses, what do you say we ask them for a bus schedule? Ⓜ

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.*



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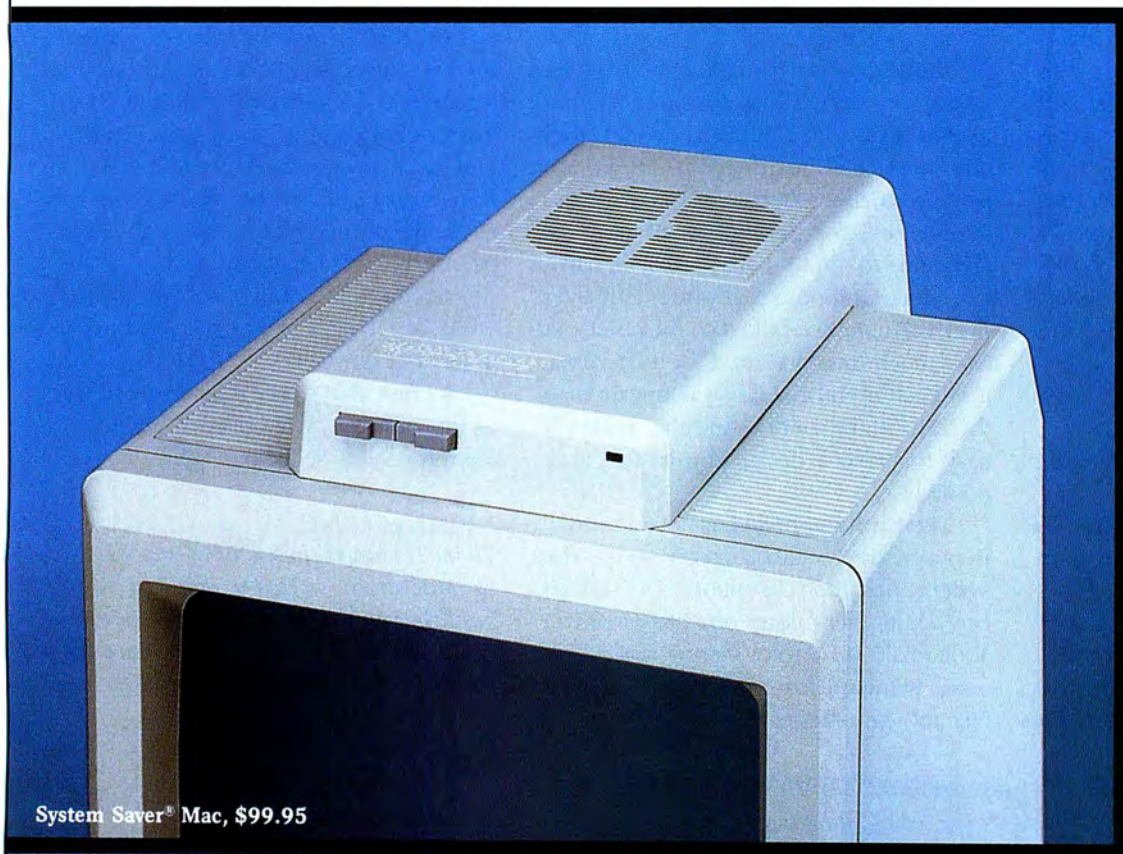

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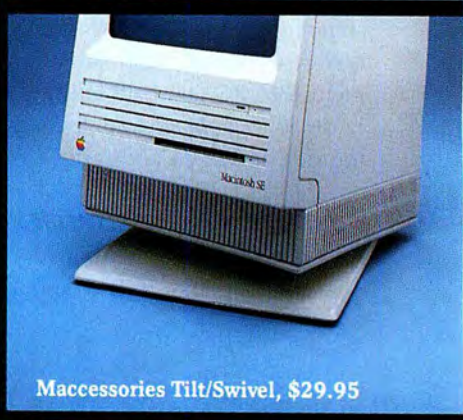

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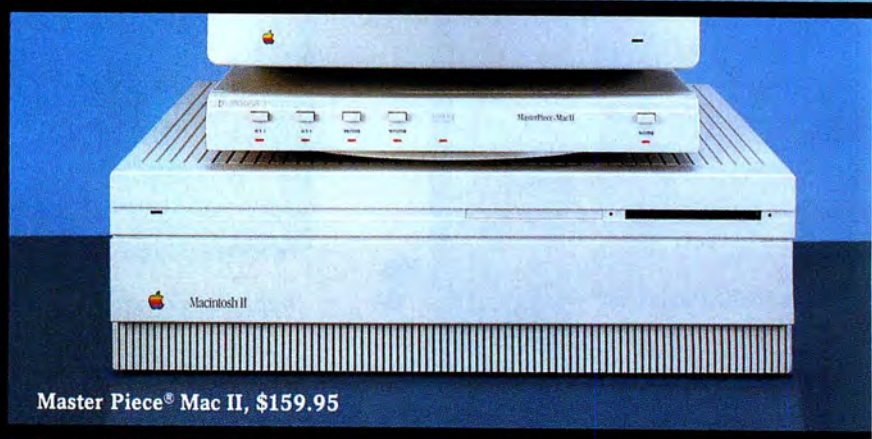

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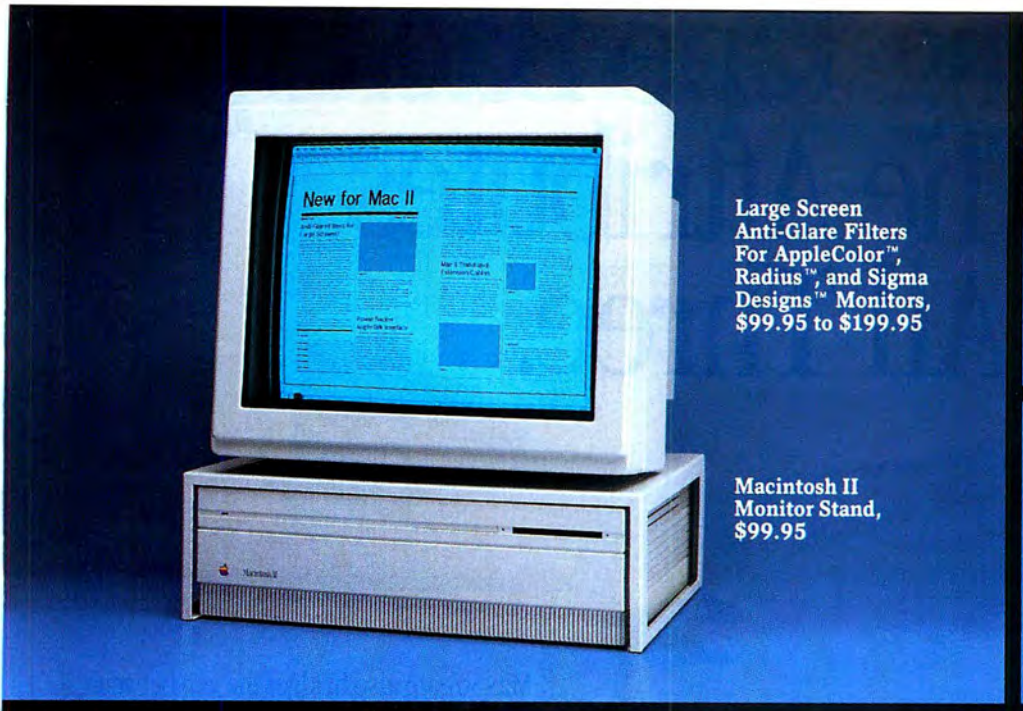

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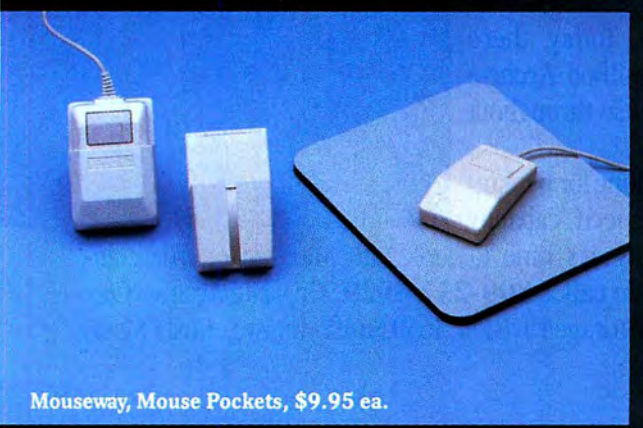

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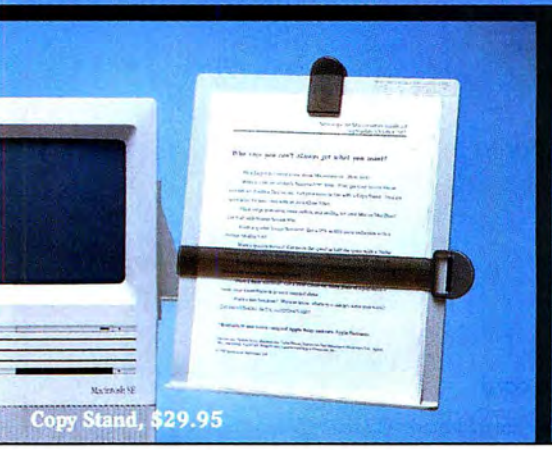

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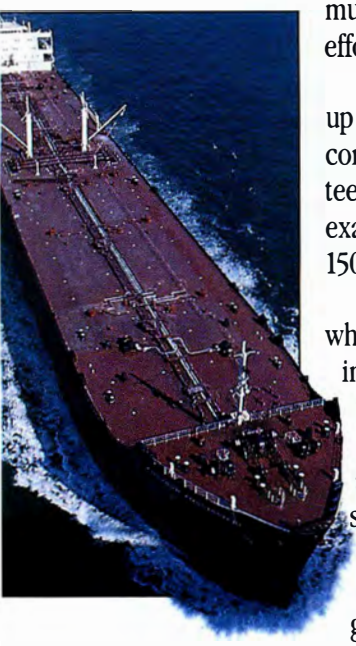

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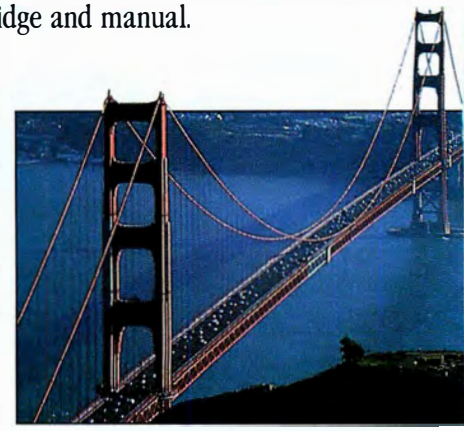

Just as important, when you go with MaxStream, you're getting backup and support from the company that pioneered streaming tape technology back in 1980. Today, there are over one-million Archive tape drives in use throughout the world.

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Verbatim

An interview with Edward Birss, vice president for product engineering at Apple Computer

Edward Birss received a B.S. in electrical engineering and an M.S. in computer engineering from the University of Michigan. He joined Apple eight years ago as part of the Lisa development team, after working on database projects at Lawrence Livermore Laboratory and Hewlett-Packard. Birss moved to the educational research group, then became the manager for Apple's Advanced Development Group (precursor to the current Advanced Technology Group) in 1985. The following year he became director of software, overseeing the release of MultiFinder and Mac II system software.

Is the Motorola 68030 the new base-level CPU for Macs?

The 030 represents a new level of functionality that is not realized today. The major difference between the 020 and the 030 is the internal MMU [memory management unit] in the latter and some incremental changes. The MMU provides the ability for the operating system to use multitasking and for hardware support of demand paging, virtual memory, and memory protection.

How important are demand paging and virtual memory?

PHOTOGRAPHS BY DAN ESCOBAR

It depends on the situation. Let's look at mainframes and minicomputers as a way of looking at the advantages of virtual memory and demand paging. The original problem that virtual memory tried to solve was the high cost of RAM, which lots of computer manufacturers actually loved because that high cost allowed them to sell more memory.

An additional point of using virtual memory versus more DRAM is the level of performance acceptable to users. The way mainframe and minicomputer vendors solve the problem is to add more memory. The same manufacturers use virtual memory in time-sharing of computers. So part of the benefit of virtual memory in personal computers is using less RAM. Today we're running out of memory with MultiFinder. Virtual memory can be used to substitute several I/O swaps to disk in place of more RAM.

Why doesn't Apple support a rich text format that would allow documents to be shared among different applications without losing the characteristics of the document?

We're trying to work on the larger issues of document composition; that includes different types of objects: graphics, text, and eventually other media as well. We are trying to develop a complete solution to cover lots of variables, rather than just text. There is no question though, that a rich text format would be useful.

Why have outline fonts been so important?

Outline fonts are extremely useful to our customers because they give the highest quality or resolution at all point sizes on screen and in printing on the LaserWriter. One of the most important issues here is open font formats. At present font outlines are not copyrightable, so developers do not have a great incentive to develop fonts. That's why, for example, Adobe uses hints to encrypt their fonts. The world would be better off if fonts were copyrightable. You have to understand the type industry to appreciate this. First you have the type foundries like ITC, Linotronic (formerly Merganthaler), and others. Essentially these houses are groups of artists that compose the outline descriptions. Adobe, Bitstream, and others license these outlines and add value to the type by adding descriptions of how to render outlines on a raster device to get the highest quality possible.

Apple released a version of the X Windows interface for the Mac. Why is X Windows important?

It's important for those users who want to connect their Macs up to X clients. The Mac runs the X server and the host is the client. Suppose, for example, you have a host VAX running UNIX or VMS and an application on that host expects the X Window protocol, or uses the protocol. It

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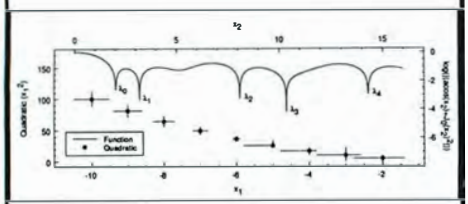

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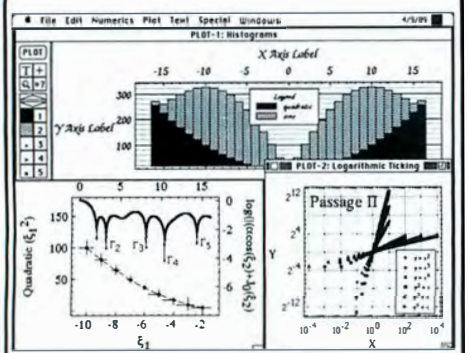

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* See our review in MacWorld - July, 1988, page 153.

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makes sense for an individual in an office to have a Macintosh with X Windows instead of an additional terminal. The individual gets the benefits of all the productivity tools on the Mac and has access to X Window services. And we can put the Macintosh user interface on top of the X Window protocols.

Apple promises that 1MB machines will run Apple system software well into the future. How can Apple do this?

With cleverness. For our new products, it is possible to put more system software in ROM. The effect is to get more use out of 1MB of memory. That's one way to keep 1MB machines alive. At some point, as we add more system functionality, the system begins to squeeze large applications that run in a megabyte, so customers in the installed base may want to use more memory.

But Apple remains committed to the Plus's ability to run new system software?

We are committed to offering future machines that can function with 1MB and are committed to giving users the opportunity to upgrade their systems to allow for new features. We won't leave people behind; they'll have multiple options.

RISC technology is being explored as a possibility for a new product line

So I can buy a machine today with confidence?

Yes, but you may need more memory in time.

Does the 50MHz 68030 announcement from Motorola have any importance for Macintosh owners?

It shows that the 68000 family has lots of life and functionality left in it. We're committed to the Motorola family over time, and as Motorola comes out with new technology and we can afford to put out new devices in a reasonable volume, new technology will appear. That is not a preannouncement, but a statement of direction. When Motorola came out with the 020 we announced the Mac II; when they had the 030 we had the Mac IIX.

John Sculley has gone on record that Apple is pursuing RISC technology. What shape is this interest likely to take?

We are, of course, always interested in great technology. We have to wear the hats of the entrepreneurs out there who are trying to beat us at our game. We need to understand how someone else would impact our technology, and do it before they do. We want to stay ahead of our competition. RISC is being explored as a possibility for a new product line that would complement and not replace our existing products.

What happened with the RAM glut at Apple earlier in the year?

We projected the market for RAM differently—that people would buy machines configured with more RAM than they did. At the same time we ran into the situation where memory prices decreased on the open market. The combination of those two factors led to our RAM problems. If the projections we made had been correct, we would not have had enough RAM.

What are the implications of 32-bit QuickDraw for users?

The main result is the supply of hardware products that third parties provide for 24 bits of color, or high-quality images. Now you have a more complete set of colors, better color ramps instead of the visible steps in the transitions between two colors.

There is no Apple video board with NTSC output available for the Mac. Why not?

The real reason stems from the lack of resolution on NTSC. Connecting the Mac screen to an NTSC signal, you find the quality is not that great. Mapping square pixels to rectangular pixels—640 by 480 into NTSC resolution—gives a degrada-

(continues)

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tion of quality. We are working on how to integrate a better solution for merging Mac and video capabilities.

What is the purpose of Apple's new outline font strategy?

The outline font approach is part of System 7.0. We have always been committed to good output at different resolutions on different printers. Part of the problem with our printing model has been the difference between the screen and the printer. We want to make our approach more consistent; give Macintosh users all sizes of fonts and have them available for the screen, QuickDraw printers, and LaserWriters.

Why not a PostScript approach to printing?

Our friends at Adobe have their own mechanism for outline fonts; ours is a different approach. The distinction between our outline fonts and PostScript is really caused by different things. We continue to support PostScript for printing and to support our own print model for QuickDraw.

We have opened font specifications and formats so that many vendors can offer outline fonts

The advantage of our new font technology is clear when talking about products with little capacity for PostScript: LaserWriter IISC, Apple Fax Modem, ImageWriter LQ and II, all of which benefit from having a variety of fonts at all point sizes. Another benefit to users is that we have opened font specifications and formats so that many vendors can offer outline fonts.

Will the open font specifications mean lower-cost fonts or simply more font availability?

You'll probably see a greater variety of fonts. I don't know if competition will result in lower cost. But we expect a large number of type vendors to make products for our customers.

Of the major firms?

The list includes Adobe, Agfa Compugraphic, Bitstream, Kingsley/ATF, Linotype, Monotype, and URW.

Unlike Adobe, Apple uses quadratic definitions of curves rather than the beziers.

I don't think this is really germane to users. There are many approaches to defining curves: B-splines, beziers, quadratics. We chose quadratics for several reasons, based on the number of points it takes to represent curves.

But quadratics require more points to represent curves. Won't processing times be even slower than before?

We're seeing very fast results on screen and on the printer. You'll have to try them yourself.

Any problems with sizing fonts, from agate type to display type?

Just existing limitations. At very small sizes, say a 6-point face, you have only one byte on a screen to represent a face, and any technology has a problem putting that on the screen. I don't believe that we'll have any inherent limitations on size, but there are bound to be some constraints such as memory.

There is a problem for those people who add fonts to their printers, in that address spaces have been assigned to specific fonts. Has this been considered?

That varies depending on what type of printer you're talking about. There are two classes: PostScript and QuickDraw. If we're talking about a LaserWriter IISC or an ImageWriter II or LQ, you have no such problem. In the case of the LaserWriter IINT or IINTX, then you use Adobe fonts and download fonts as you would today.

Everything that worked before will continue to work. Apple outline fonts will

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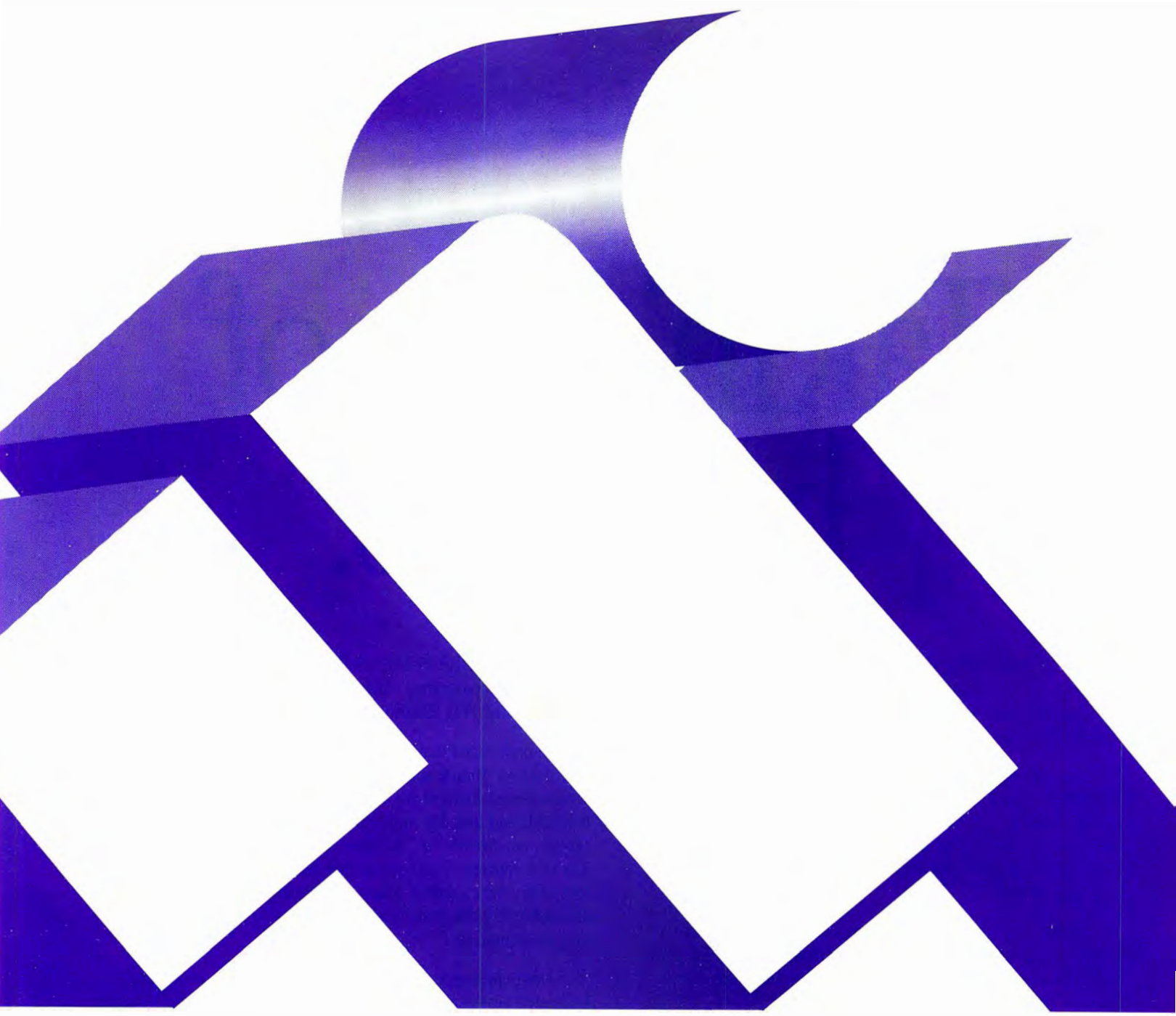

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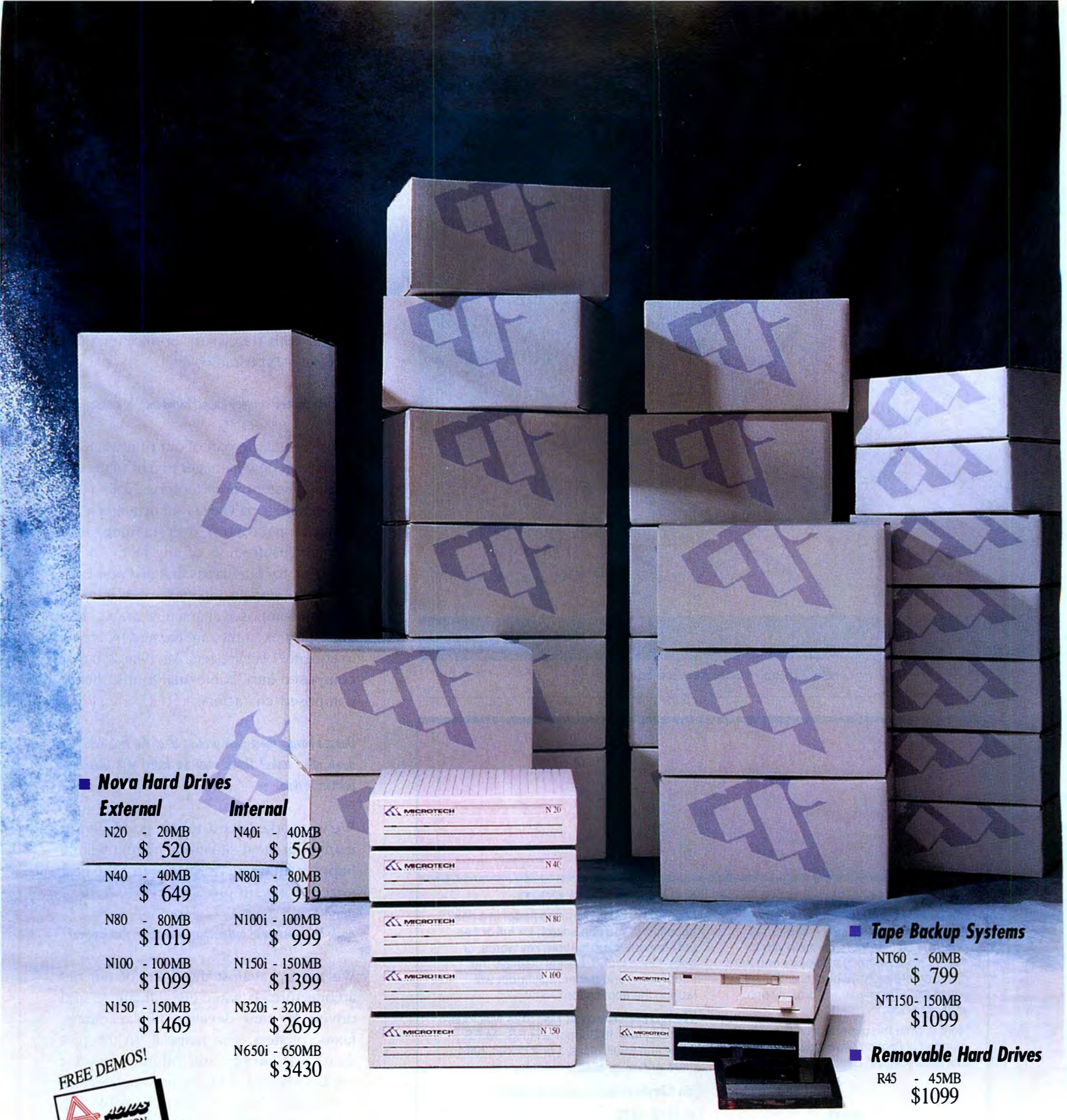

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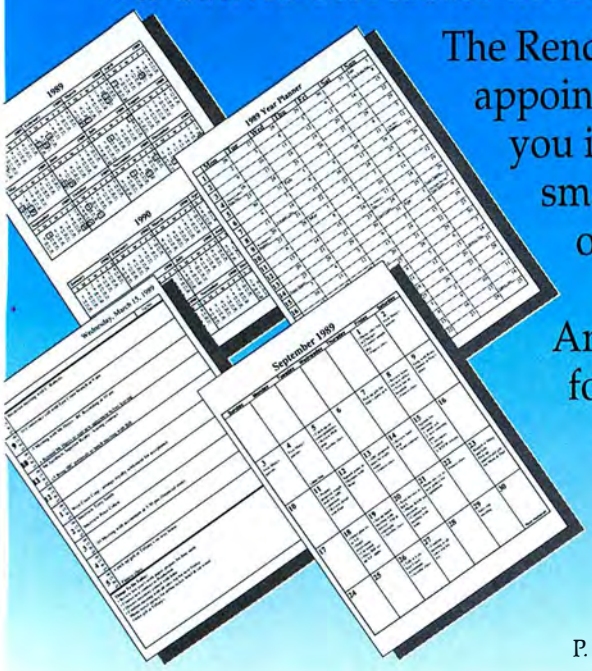

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work on all PostScript printers. And everything that worked before will have new capability.

What about special effects for text that PostScript handled—can these be done in a QuickDraw printing model?

Not specifically with the Apple outline font approach. But there is always the opportunity to skew, distort, or do special effects with third-party applications like Letraset's TypeStudio.

How will the new strategy impact issues such as kerning?

Those issues are part of our print strategy. We have a new manager in part of the operating system and toolbox, called the layout manager. The layout manager gives applications control over kerning, ligature, or justification of any text. And in addition, for languages that use non-Latin alphabets such as Japanese or Arabic, we support composed characters. Arabic characters, for example, are created by typing a sequence of characters. Afterwards they're composed into "contextual forms," hence composed characters.

Doesn't having the printer process all of the font work slow down other tasks? That's what we found with QuickDraw printers to date.

We've worked hard to get good performance. In most situations people will be happy with the performance that the new system software provides.

Apple has a new print architecture. What does that involve?

We ran up against the limits of our old architecture. It was very difficult to add drivers for new devices—film recorders, faxes, plotters, you name it. In the past there was background printing only for the LaserWriter. With the new architecture you have drivers for devices; Apple will supply its own, and third-party printer manufacturers will supply their own. You end up with background printing for all types of printers. Also there are improvements for halftones and color, and increased application control of the printing process—for example, the ability to in-

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clude both landscape and portrait pages in the same document.

Will Apple produce PostScript printers in the future?

We intend to support PostScript for our customers. Many of them like the advantages of PostScript, and we will continue to offer PostScript support. PostScript is a standard, and there is a community of vendors with higher-resolution output devices for desktop publishing that have standardized on PostScript.

But will Apple build future PostScript printers?

Some future printers from Apple will probably offer PostScript support and some will not. ImageWriter-class printers will have no PostScript; if we produce another LaserWriter, then it will support PostScript.

What changes have you made in regard to color printing?

In the past, color drivers were harder to write. It is easier now. The changes do not address the issues of different media, laser toners, ink-jet printers or phosphor dots on screens. Our industry needs to fix that over time, and we are working toward that.

One of the most noticeable changes is how DAs and fonts are installed with the new system software.

We have put together a new Finder and extensions to make it even better. For example, to install DAs and fonts you simply drag them into the System Folder. We have rewritten the entire Finder in C++ to allow us to add new functionality over time in a fashion that makes the interface simpler and more intuitive to use. We are delivering on our original promise of easy-to-use and fun products.

What are other visible changes to the desktop?

A help function for the desktop menus and icons. We provide a find function that replaces Find File; it quickly looks at a document or a folder, brings it to the front, and highlights it.

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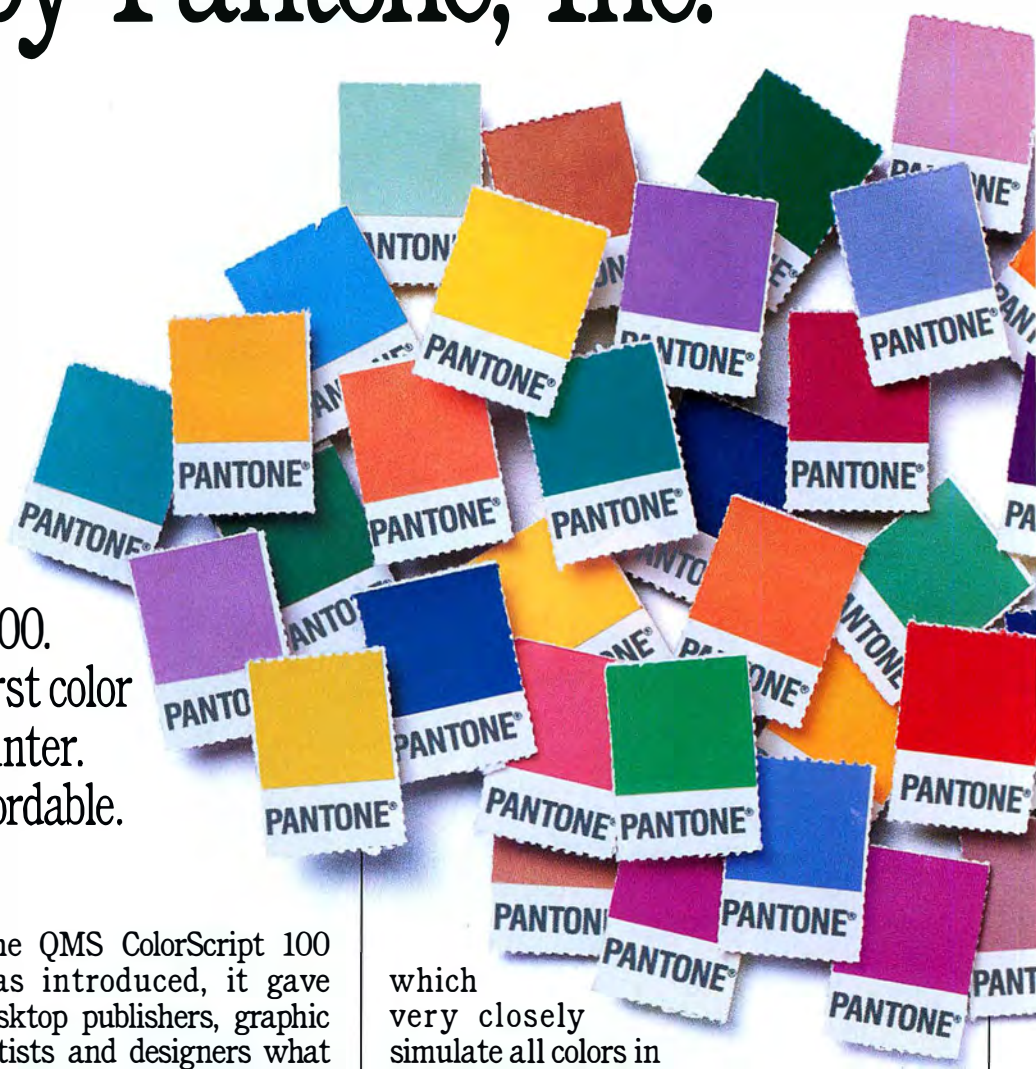

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The printer has the advantage of a 68020—based Atlas controller running at 16 MHz, so you can see your results faster. You can print an 8½″x11″ page in just under one minute. An 11″x17″ page in just under two. And the quality is excellent. The ColorScript 100 uses a thermal transfer process that produces true 300x300-dot-per-inch resolution.

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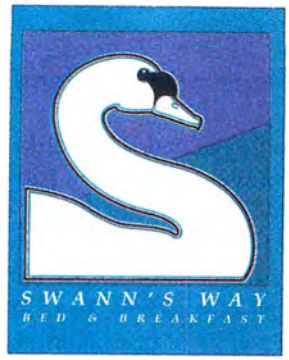
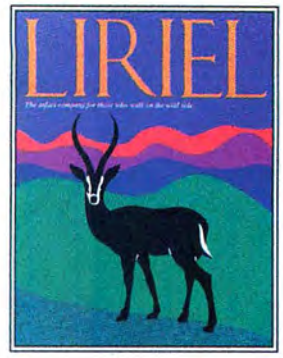
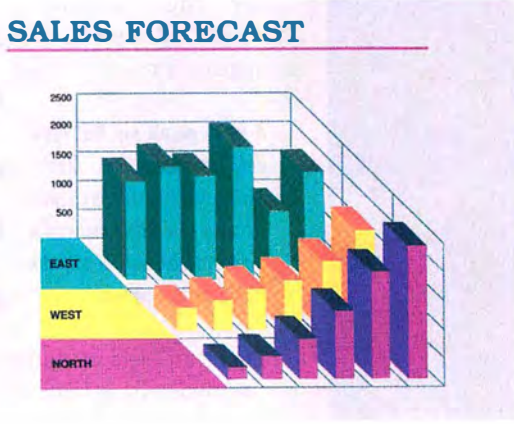




Pictured are just some of the ways designers are using the QMS ColorScript 100. The creative director at one design firm notes: "We're doing comps that used to take hours in minutes. The quality is fantastic." A computer design system manager in the Midwest says: "Our clients are getting more options, in less time, at lower costs."



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It can be queried so as to do that. We've also provided stationery pads, templates for documents. Rather than use a word processor for templates, now you'll just turn a document into a template or what we call a stationery pad. And you can open a copy of that pad from the Finder.

I've heard of an in-box/out-box icon for the desktop.

Not for the first release. But we do have a desire to support such functionality as mail and backup at the desktop.

Third-party developers all over the land just shivered as you said that. What does this mean to them?

This is a general approach that allows much more functionality to be integrated into the Finder. Now you'll have more icons on the desktop, and you won't have to open applications in order to use their functions on the desktop.

So we'll have easier access to Mac software applications?

Yes, or functionality for the desktop. Apple doesn't do applications.

A lot of people say that Apple does do applications. MacroMaker and Find File are representative of functions that earlier were available only in software from other companies.

Apple has the desire to support such functionality as mail and backup at the desktop

There are sets of things that all personal computer users benefit from having built into the system. When there are advantages to consumers, and common resources that can empower the individual, it makes sense for third parties to supply them. If the individual consumer benefits from all people having a certain functionality, then Apple should play a role.

Everyone needs a word processor. Will Apple put that into system software?

That's a good example of what Apple should not provide. Apple should provide the common formats so that word processing documents can be interchanged.

How does that relate to the interapplications communications [IAC] functions being added to system software?

We will provide a variety of services that relate to IAC. Our goal is to allow applications to exchange data and instructions on either a single Mac or across a network.

What kind of services will IAC provide?

Four types of services. One, program-to-program communication, a set of interactions that will allow applications to send data between themselves (as in a word processing document being sent to update a mail message). Second, a live copy and paste mechanism. This supports the dynamic linking of documents, allowing, for example, a word processing document to be automatically updated with a chart that has changed as a result of its data being manipulated. Third, Apple Events, a standard set of messages that applications can use to request an action from another application, such as "open a document." Fourth, the Clipboard will continue to be a function.

How do you distinguish between IAC and IPC [interprocess communications]?

IPC is a low-level functionality within these services, a subset of IAC. In fact we've done these in a way that provides external access across the network with the same interface.

Traditional IPC mechanisms have focused on a single CPU, have focused on program-to-program communication. We do that and support network access as well. An application can use IPC and support the same interface across the network; the same communications occur within applications on a Mac, or across a network between two. So the chart I mentioned earlier, that updates a word pro-

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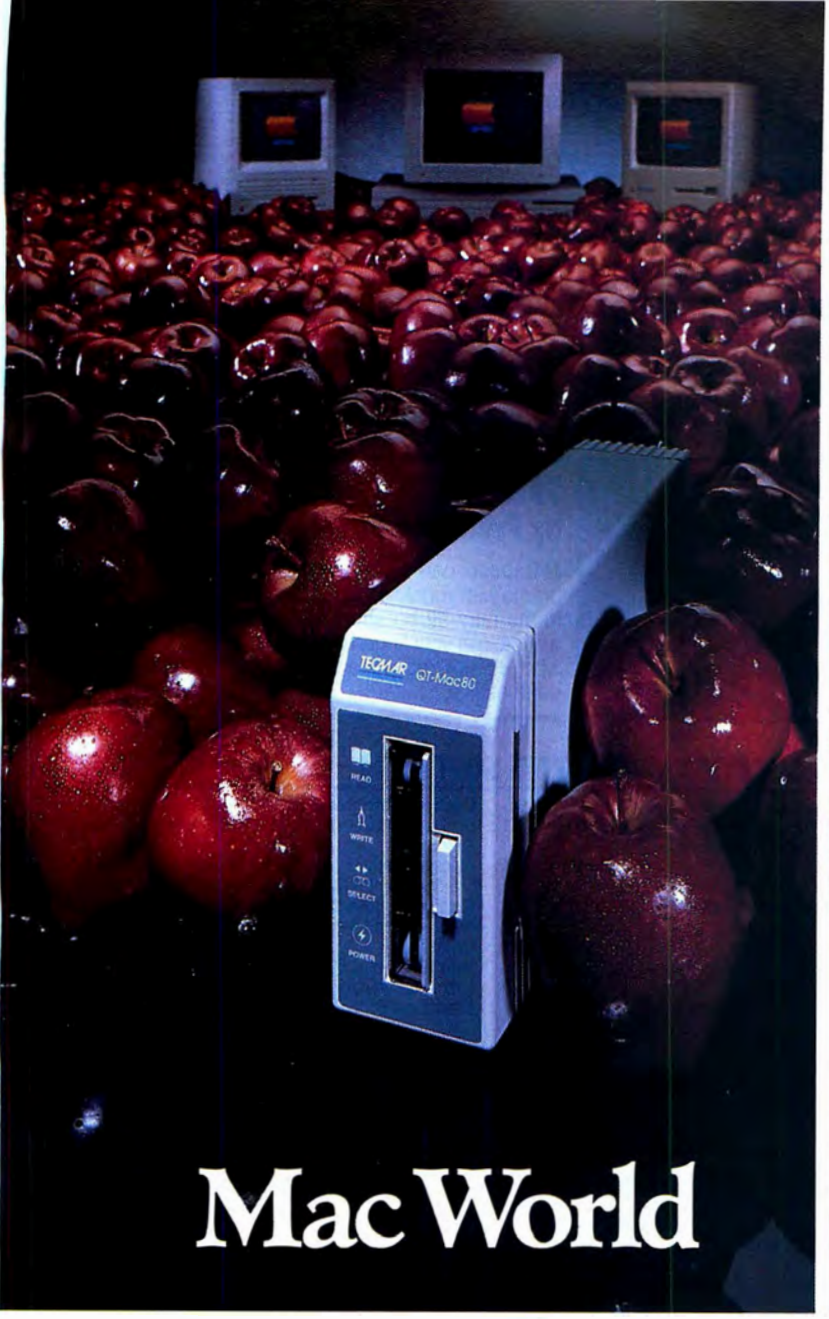

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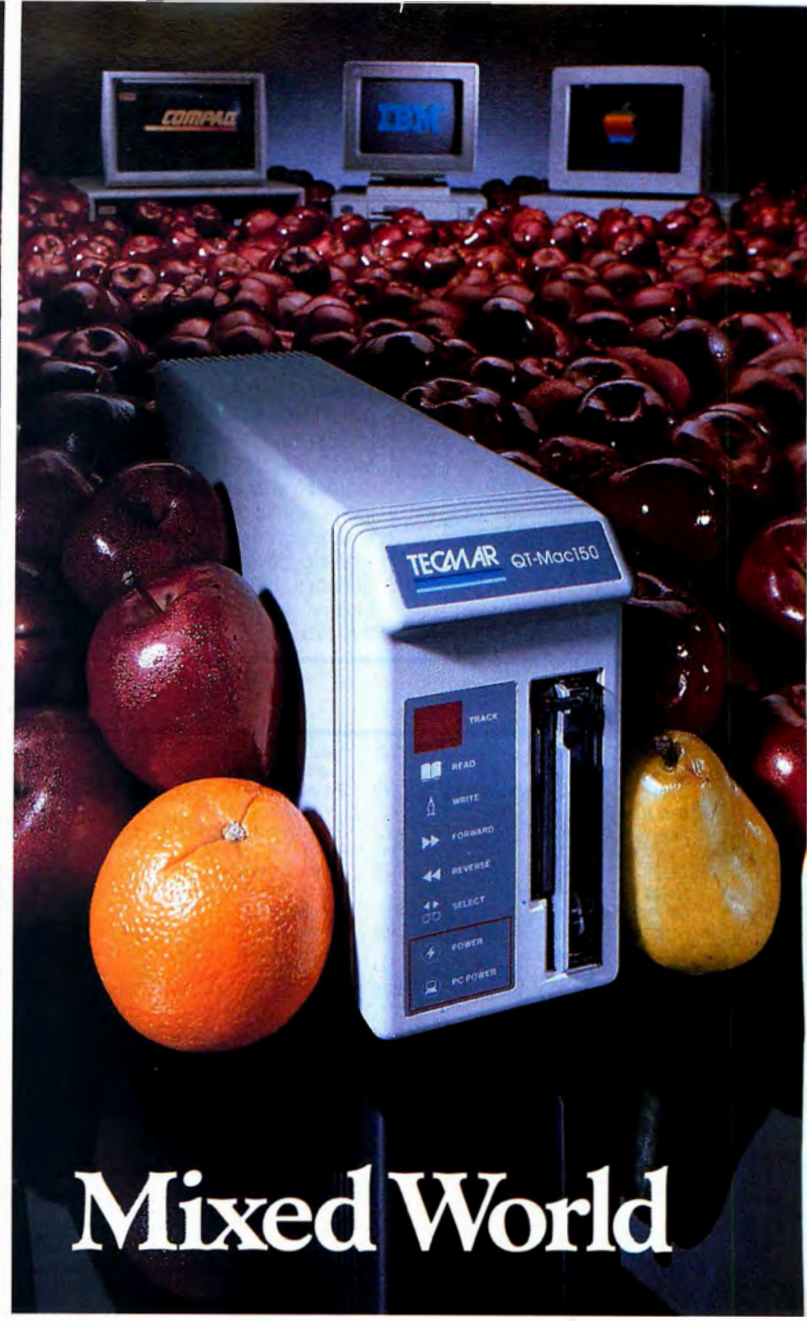

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Magnus FileMagic	65.	Tops FlashCard	169.
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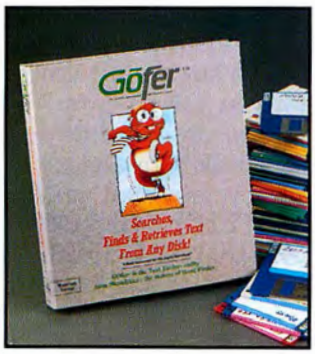
Nuvotech TurboNet ST *(Din8 or DB9)*	30.	InBox-Starter Kit	149.
Olduvai Software Font Sharer	149.	Tops Teleconnector Din8 or DB9	39.



GOfer by Microlytics, Inc.

GOfer is the ultimate desk accessory for finding hidden facts. Give *GOfer* a phrase, fact or date and send him looking through floppies, hard disks, ram disks and most networks. Search for up to eight items simultaneously. *GOfer* allows you to view, cut and paste. Multifinder and Hypercard compatible plus AND, OR, NOT and Nearby search criteria. *GOfer* a real find. ..... **$47.**

PRINTERS & DIGITIZERS

Digital Vision Computer Eyes-Mac	209.	**LogiTech** ScanMan	349.
Koala Technologies Corp.		**Seikosha** SP1000 *(Imagewriter comp.)*	235.
MacVision 2.0 *(Digitizer)*	219.	**Summagraphics** Bit Pad Plus	325.
Mac Director	109.	**ThunderWare** ThunderScan	189.
Kurta IS ADB Tablet	255.	LightningScan	409.
Cordless 4 Button Cursor	65.	Mac II Power Accessory	42.

DAtabase by Preferred Publishers

DAtabase can file any type of data you create with your Mac. Color pictures, text and forms may all be stored, and they are all available at your fingertips! Perfect for people who do not require a large sophisticated database. ..... **$75.**

EDUCATIONAL/CREATIVE SOFTWARE

Ars Nova Practica Musica 2.1	75.	**ElectronicArts** Mavis Beacon Typing	33.
Barron's Barron's SAT	35.	Deluxe Music Construction Set V2.5	84.
Bogas Productions		**First Byte**	
String Quartet, Country or Heavy Metal	14.	Dinosaur Discovery Kit, Puzzle	
Super Studio Session	69.	Storybook or Rhyming NoteBook	27.
Bright Star Technology Alphabet Blocks	32.	**Great Wave Software** KidsTime	26.
Talking Tiles	69.	Number Maze	27.
Broderbund		Crystal Paint	27.
Sensei Geometry, Calculus or Physics	59.	**Individual** Typing Instructor Encore	26.
Type!	20.	**Learning Company** Reader Rabbit	32.
Where in the World is Carmen SanDiego?	27.	**Mindscape** Perfect Score SAT	
Where in the USA is Carmen SanDiego?	30.	w/The Perfect College	46.
Coda Mac Drums	31.	**Nordic** MacKids Educational Prog. *(ea)*	28.
Perceive	50.	**Simon & Schuster** Typing Tutor IV	35.
Davidson & Associates Speed Reader II	36.	**Springboard** Top Honors	59.
Math Blaster or Word Attack!	27.	Family Matters or Atlas Explorer	28.

MacSnap Memory Boards by Dove Computer

It's a safe bet that no matter what Macintosh model you have, Dove Computer has a ***MacSnap*** memory expansion product that matches your needs. That's because Dove has an extensive line of high quality memory and productivity enhancement products available. All models listed include Dove's RamSnap software, their intelligent ram management software. We've selected some of the most popular models.

BUSINESS SOFTWARE

Abacus Concepts StatView II *(Mac+, SE, II w/68020 & 68881)*	295.	**Microsoft** Microsoft Works 2.0	189.
StatView SE+ Graphics	225.	Microsoft Excel 1.5	255.
A.E.C. FastTrack Schedule	115.	**Nolo Press** WillMaker 3.0	32.
AEC Information Manager	409.	For the Record	29.
Ashton Tate Full Impact	249.	**Paracomp** Milo	159.
BrainPower ArchiText	175.	**Power Up** Fast Forms	***Special*** 89.
Casady & Greene		Calendar Creator	***Special*** 38.
A.C.E. *(Access Control Environment)*	Call	**Pro Plus** WallStreet Investor V3.0	469.
Chang Laboratories C.A.T.	229.	**Satori Software** Bulk Mailer 3.2	78.
MacCalc	83.	Bulk Mailer Plus	189.
Claris MacProject II	379.	**Select Micro Systems, Inc.** Exstatix	215.
Smartform Designer	309.	MapMaker	215.
Individual 101 Macros For Excel	37.	**SoftView** MacInUse	42.
Mainstay Capture	49.	Form Set Business Forms	55.
Mac Flow 3.0	125.	**Synex** Mac Envelope 4.10	55.
Mac Schedule	115.	Mac Invoice	29.
Meta Software MetaDesign	199.	**Systat**	
Micro Planning International		Systat 3.2 *(Specify MacPlus, SE or Mac II)*	459.
Micro Planner 6.0	325.	Fastat	165.

Overnight $3

Simply Accounting by Computer Associates

Simply Accounting, for small to medium size businesses, is sophisticated enough to please CPA's but simple enough to allow accounting and computer neophytes the power of a full accounting program. Includes general ledger, accounts payable, accounts receivable, payroll (50 state and federal tax schedules built-in), inventory and jobcost. It received a 7.9 rating from Infoworld and four mice from MacUser. ..... **$209.**

DESK ACCESSORY PROGRAMS

Affinity Microsystems Tempo II	89.	**Jam Software**	
Affinifile	45.	Smart Alarms w/Appt. Diary	65.
Casady & Greene, Inc		Multi-User Appt. Diary w/Smart Alarms	119.
QuickDex 1.4A	32.	**Mainstay** Think'n Time	59.
CE Software DiskTop	32.	**Solutions, International** Super Glue II	62.
Deneba Software		SmartScrap & The Clipper V2.0	46.
Comment 2.0	59.	**Symmetry** HyperDA *(Req. 512K)*	35.
Icom Simulations MacKern	119.		

MAC-101 Keyboard by DataDesk

Replace your Mac's keyboard with the ***MAC-101*** by DataDesk. The positive tactile, firm feel 101 includes a full numeric keypad, 15 function keys, 6 page control keys, and a T-style cursor pad. Includes 101-Keys desk accessory software, a powerful macro utility that allows you to exploit the full power of the function keys in almost any Mac application. Available in ADB and non-ADB versions. ..... **$145.**

SPELLING & GRAMMAR CHECKERS

Aegis Development		**Microlytics, Inc.**	
Doug Clapp's Word Tools 2nd Edition	42.	Word Finder *(Synonym Finder)*	36.
Deneba Software Big Thesaurus	59.	Electronic Word Finder	***Special*** 59.
Spelling Coach 3.0 Professional	115.	**Sensible Software**	
Electronic Arts Thunder! II	52.	Sensible Grammar or BookEnds	53.
Lundeen & Associates WorksPlus Spell	46.	**Working Software** Spellswell 2.0	45.

Publish-It! by TimeWorks

Publish-It! is the first completely self-contained Desktop Publishing program for Macintosh computers. It allows both professional and non-professional business communicators to write, design and produce dynamic sophisticated documents — from simple in-house newsletters and business forms to full-length magazines and distinctive annual reports. And, do it faster and easier than ever before! ..... **$239.**

UTILITY SOFTWARE

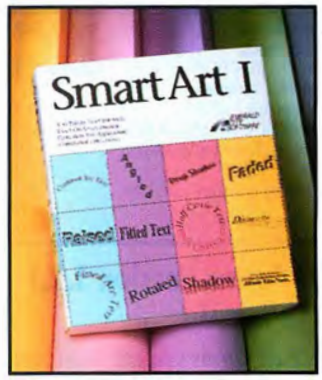
Abbott Systems, Inc.		**Kent Marsh** MacSafe or KnightWatch	87.
CanOpener	***Special*** 65.	**MainStay** AntiToxin or ClickPaste	65.
ALSoft Master Juggler	64.	**Microlytics, Inc.** GOfer	***Special*** 47.
MultiDisk	49.	**Microseeds** INITPicker	27.
Disk Express	49.	Redux	52.
Font/DA Juggler Plus	42.	ScreenGems	42.
A.S.D. FileGuard	129.	**Olduvai Software** MultiClip	51.
Berkeley System Design Stepping Out II	52.	Read-It! O.C.R. Personal	99.
Beyond Inc. Menu Fonts 2	28.	Read-It! O.C.R. 2.1	245.
Central Point Software		**PCPC** HFS Back-Up 3.0	54.
Copy II Mac *(Includes MacTools)*	24.	**SuperMac Software** SuperSpool 5.0	53.
PC Tools Deluxe Mac	45.	SuperLaserSpool 2.0	79.
CE Software		Diskfit 1.5	53.
QuicKeys *(Macro Program)*	69.	Sentinel 2.0	89.
MockPackage Plus Utilities	32.	**Symantec** MacSQZ!	52.
Farallon Computing Screen Recorder	133.	Symantec Utilities for Mac *(S.U.M.)*	65.
Fifth Generation Systems Suitcase II	45.	Symantec AntiVirus for Mac *(S.A.M.)*	65.
FastBack II	109.	**Tactic Software** Icon-It!	39.
Power Station	35.	**Williams & Macias** DiskFinder	27.
Pyro!	15.	myDiskLabeler w/Color	29.
HJC Virex	69.	myDiskLabeler	
Icom Simulations On Cue	35.	w/LaserWriter Option	34.
Insight Development		StickyBusiness	99.
MacPrint	***Special*** 79.	**XTree Company** XTree	52.

Managing Your Money by MECA

With ***Managing Your Money***, you can write, print checks, set up a personal budget, estimate your taxes, set up a retirement plan, manage an investment portfolio, and calculate your net worth. ..... **$125.**

DATABASE MANAGEMENT

Acius 4th Dimension	349.	**Generation Four** Multiuser Business	
Activision		Administration Series *(each)*	115.
Reports for Hypercard	69.	**Microsoft** Microsoft File 2.0	129.
Focal Point & Business Class Bundle	49.	**Odesta** Double Helix II	339.
Apple Computer HyperCard	42.	DataDesk Professional	285.
Borland Reflex Plus	189.	GeoQuery	199.
Claris FileMaker II	229.	**Preferred Publishers**	
Exodus Retriever	59.	DAtabase	***Special*** 75.
Fox Software FoxBase+ V2.0	259.	**ProVUE** Panorama	205.
FoxBase+ Multi-User V2.0	365.	**Software Discoveries**	
FoxBase+ Runtime V2.0	155.	RecordHolderPlus	65.



Smart Art by Emerald City Software

SmartArt from Emerald City Software brings custom text effects to your favorite word processor, page layout or presentation program. With *Smart Art* you simply select one of the pre-programmed effects, customize it with the powerful, but simple controls, and place it in your document. *Smart Art* comes with the fifteen most wanted text effects for a word processor, desktop publishing and graphics design. ..... **$89.**

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Programs Plus

Rags to Riches '3-Packs' by Chang Labs

Rags to Riches '3-Packs' offers the user flexible reporting, batch totals for any time period, user definable accounting cycles and impressive speed. As a special bonus, if you choose a '3-Pack' before June 30, *Programs Plus* will send you an Aatrix Payroll program, absolutely FREE! **General 3-Pack** (G/L, A/R, A/P) **($289), Pro 3-Pack** (G/L, Pro. Bill., A/P) **($359), Retail 3-Pack** (G/L, Invent., A/P) **($359)**.

ACCOUNTING PACKAGES

Aatrix Software Aatrix TimeMinder	159.
Aatrix Payroll Plus	159.
Chang Labs	
Rags to Riches Gen. 3-Pak 3.1 *(GL/AR/AP)*	***Special*** 289.
Rags to Riches GL, AR, or AP	119.
Check Mark MultiLedger	259.
Payroll	189.
Cash Ledger	129.
Computer Associates	
Simply Accounting	***Special*** 209.
Dac Software Dac-Easy Light	42.
Intuit Quicken V1.5	***Special*** Call
Layered Insight One Write At Once!	125. ***Special*** 295.
Insight Expert INV or Time Billing	***Special*** 409.
Insight Expert GL, AR, AP or Payroll	***Special*** 409.
MECA Managing Your Money	***Special*** 125.
Monogram	
Business Sense	279.
Dollars & $ense 4.0	81.
Niles & Associates Grant Manager	249.
Peachtree	
Back To Basics Professional *(GL/AR/AP/INV)*	159.
Satori Software Components GL	369.
Survivor Software	
MacMoney 3.0 *(Enhanced Ver.)*	61.

atOnce! by Layered Inc.

atOnce! is the next generation in high-speed small business accounting. Included in one seamlessly integrated module are four full featured applications: General Ledger, Accounts Receivable w/Billing, Accounts Payable & Payroll. ..... **$295.**

COMMUNICATION SOFTWARE

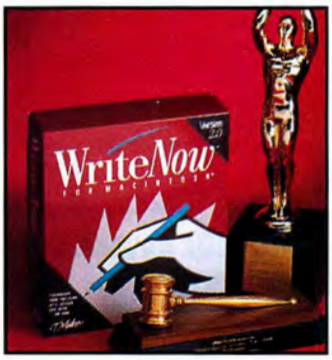
Compuserve	
Compuserve Starter Kit	24.
Compuserve Navigator	45.
DataViz	
MacLink Plus/Translator	115.
MacLink Plus with Cable	139.
Freesoft	
Red Ryder V10.3	54.
Hayes Smartcom II 3.1	88.
Insigna SoftPC	249.
Prometheus	
MAcKNOWLEDGE	***Special*** 125.
Software Ventures	
Microphone II v3.0	219.
Solutions, International BackFax	125.
Synergy Software VersaTerm	89.
VersaTerm-Pro	179.
Traveling Software LAP-LINK	82.

Fast Forms Version 1.2.1 by Power Up

With ***Fast Forms*** you can fill in your forms from within the Fast Forms application, or use the desk accessory that it comes with to quickly access, fill in and print forms. Just in case you need a little help getting started, *Fast Forms* also provides over 30 ready-to-use forms designs, including invoices, order forms and envelopes. ..... **$89.**

GRAPHICS SOFTWARE

3G Graphics	
Images w/Impact Graphics & Symbols	52.
Images w/Impact Business 1	65.
Adobe Systems	
Adobe Illustrator *88*	***Special*** 299.
Streamline	239.
Adobe Collector's Ed. 2	139.
Newsletters	249.
Forms & Schedules	299.
Presentations	299.
ITC Garamond (9)	125.
Helvetica Condensed (14)	239.
Stencil, Hobo, Brush (33)	95.
Life (83)	95.
Concord (84)	125.
Gothic 13/Tempo (85)	95.
Adobe Fonts *(Various volumes)*	Call
Aldus Freehand	349.
Altsys Corp. Fontographer 2.2	229.
FONTastic Plus 2.0 or KeyMaster	52.
Electronic Arts Studio 8 *(MacII)*	309.
Studio 1	99.
Enabling Technology Clip 3D *(ea)*	57.
Pro3D	285.
Generic Software Generic CADD	85.
Symbol Libraries:	Call
Graphsoft Mini Cad +	519.
Blueprint	349.
Informix Wingz	259.
Innovative Data Design	
Residential Construction	139.
Dreams	269.
MacDraft 1.2B	145.
Letraset ImageStudio 1.5	275.
MacroMind MacroMind Director	449.
MathSoft MathCAD	309.
Micro: Maps MacAtlas Hyper Atlas	64.
MacAtlas Professional *(PICT/MacDraw Version)*	129.
Microsoft Microsoft PowerPoint 2.1	255.



WriteNow 2.0 by T/Maker

WriteNow 2.0 is the long-awaited update of the easy-to-use, easy-to-learn, powerful word processor from T/Maker. The features added to *WriteNow 2.0* include a 100,000 word dictionary and spelling checker, WYSIWYG multiple columns, and graphic support, an unlimited number of open documents, and count for characters, words and paragraphs, and mail merge. ... **$109.**

Ashton Tate Full Paint	67.
Broderbund Print Shop	35.
Drawing Tables	75.
Casady & Greene Vivid Impressions	69.
Quill Pack *(vol. 8 & 20)*	105.
Headline Pack *(vol. 10-12)*	145.
Modern Pack *(vol. 7, 14-18)* or Distinctive Pack *(vol. 8, 19-22)*	195.
Classic Pack *(vol. 3-6, & 13)*	195.
CE Software Calendar Maker	32.
Claris MacPaint II	99.
MacDraw II	309.
Claris Cad	625.
Cricket Software Cricket Draw	167.
Cricket Paint	95.
Pictograph	85.
Cricket Graph	115.
Cricket Color Paint	179.
Cricket Presents	289.
Deneba Software Canvas 2.0 *(Includes Desk Accessory)*	159.
Dream Maker	
MacGallery *(Hypercard or Paint)*	27.
Cliptures *(vol. 1 or vol. 2)*	85.
Dubl-Click Software World Class Fonts: Various Vol. 1-8 *(ea)*	45.
World Class Lasertype: Various Vol. 1-6 *(ea)*	45.
WetPaint: Various Vol. 1-18 *(ea)*	45.
Micro Spot MacInteriors	***Special*** 199.
MacPlot Series:	Call
Miles Computing	
Mac the Ripper or Orchestra of Fonts	32.
People, Places-Things or Taking Care of Business	32.
NuEquation Nu Paint	95.
Paracomp Swivel 3D	***Special*** 245.
Model Shop	379.
Silicon Beach Software SuperCard	129.
SuperPaint 2.0	129.
Digital Darkroom	195.
Super 3D 2.0	325.
Solutions International	
The Curator *(Catalog Your Art)*	75.
Springboard Certificate Maker	24.
Springboard Publisher	109.
SuperMac Software	
Pixel Paint Professional	***Special*** Call
Symmetry	
Picture Base & Wet Paint Bundle	79.
Synergy KaleidaGraph	119.
Tactic Software Art Clip vol 2	69.
Art Clip or ArtFonts 1, 2 or 3	55.
TimeWorks Publish-It!	***Special*** 239.
T/Maker Christian Images	35.
ClickArt EPS Illustrations or EPS Business Art	75.
Zedcor DeskPaint 2.0	69.

Macinware SE Carrying Case by I/O Design

MacLuggage Macinware SE features a tear, soil and water resistant Cordura outer shell and ultra-high density foam. Compartments for your mouse, cords, extended keyboard and external hard drive. ..... **$75.**

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Adobe Illustrator *88* by Adobe Systems

Best of the best... Best business application... Best graphics in a graphics program... SPA Awards, 1988. ***Adobe Illustrator 88***, the most precise drawing and illustration tool ever created for your Macintosh. And, for a limited time, you'll also get a free copy of Adobe Collector's Edition Vol. 1 - a $125 value. Do it fast and save yourself a bundle. ..... **$299.**

HYPERMEDIA & LANGUAGES

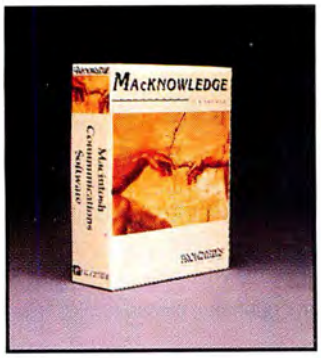
Beacon Technology		**Olduvai Corporation** Plus 1.1	109.
HyperBible King James	149.	**Smethers & Barnes**	
HyperBible International	179.	Prototyper	129.
Borland Turbo Pascal	68.	**Symantec** Lightspeed C	165.
Bright Star Technology		Lightspeed Pascal	95.
Hyper Animator	109.	Just Enough Pascal	49.
Consulair Mac 68000 Dev. System	57.	**TENpointO** FocalPoint II	119.
Digitalk, Inc. Smalltalk/vmac	129.	**Trendware Corporation** Stack Cleaner	29.
Hyper Press Script Expert	46.	HyperTools 1 or 2	58.
Manx Aztec C	65.	**T.M.L.**	
Aztec C + SDB	99.	TML Pascal II V3.0	115.
Aztec C + MPW	99.	TML Source Code Library II	42.
Microsoft Quick Basic	65.	**Zedcore** ZBasic 5.0	99.

Quicken 1.5 by Intuit

Forget financial hassles with ***Quicken***, the world's #1 selling finance software. It's the absolute fastest, easiest way to do your personal or small business bookkeeping. *Quicken* slashes the time you spend on your finances by automating all your routine financial tasks, from printing recurring checks without typing, to providing detailed tax deduction summaries instantaneously.

BLANK MEDIA

Single Sided 3½" Diskettes		Centech 3½" DS/DD Color Disks *(10)*	19.
Bulk *(Sony)* 3½" SS/DD Disks *(10)*	14.	Sony 3½" DS/DD Disks *(box of 10)*	16.
Sony 3½" SS/DD Disks *(box of 10)*	16.	Maxell 3½" DS/DD Disks *(box of 10)*	17.
Double Sided 3½" Diskettes		Verbatim 3½" DS/DD Disks *(box of 10)*	17.
BASF 3½" DS/DD *(box of 10)*	15.	3M 3½" DS/DD Disks *(box of 10)*	20.
Bulk *(Sony)* 3½" DS/DD *(10)*	17.		



MACKNOWLEDGE by Prometheus

MACKNOWLEDGE is the latest communications software available for your Mac. Icon based scripts provide instant access to all major online services with just a click of your mouse. The TAL scripting language provides all the capabilities for customizing and automating your own online sessions or the record function will watch your session and create an icon based script automatically. ..... **$125.**

Insight Expert Accounting Series by Layered Inc.

A series of stand-alone or fully integrated accounting modules for general ledger, accounts receivable w/billing, accounts payable, payroll, inventory control and time billing which gives you answers, advice and analysis. Now includes *Data Import!* ..... **$409.**

WORD PROCESSORS & DESKTOP PUBLISHING

Access Technology Mind Write 2.0	95.	Letra Studio	289.
Mind Write Express	129.	LetraFonts *(Various Vol. 1-45 ea.)*	65.
Aegis Showcase F/X	199.	**Microsoft** Microsoft Word 4.0	255.
Allan Bonadio Associates		**Niles & Associates** EndLink	59.
Expressionist 2.0	79.	EndNote	82.
Aldus Corporation Aldus Persuasion	385.	**Paragon Concepts** Nisus	259.
PageMaker 3.0	389.	**Preferred Publishers**	
Ashton Tate		Vantage	***Special*** 59.
FullWrite Professional	265.	**Quark, Inc.**	
Broderbund DTP Advisor	47.	QuarkXPress V2.0	499.
Caere Omnipage	559.	QuarkStyle	189.
Claris MacWrite II	185.	**Symantec** More II	255.
Design Science		**Symmetry** Acta Advantage	65.
Math Type 2.0	99.	**T/Maker Company**	
Emerald City Smart Art	***Special*** 89.	WriteNow V2.0	***Special*** 109.
Exodus Expresswrite	65.	**U.S. MicroLabs** Font Sizer	79.
Letraset		**Word Perfect Corporation**	
Design Studio 1	459.	Word Perfect	179.
Ready, Set, Go! 4.5	275.	**Working Software** QuickLetter	75.

CanOpener by Abbott Systems

CanOpener is *the* information retrieval utility for the Mac. It will search and retrieve text, pictures and sounds from just about anywhere. Which means you can extract information from almost any document, even if you don't have the application. Or, recover data from corrupted files. And *CanOpener* will scan disks, hard drives and networks to locate missing information! ..... **$65.**

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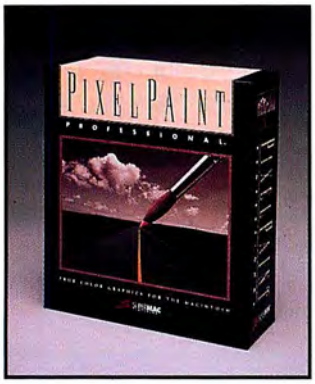
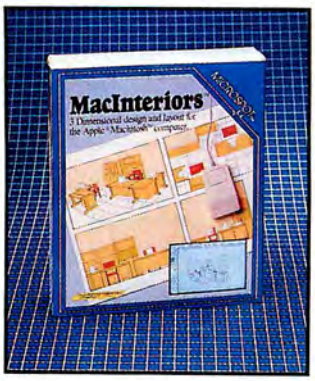
PixelPaint Professional by SuperMac Software



PixelPaint Professional is the first "true-color" paint program for the Macintosh. It is designed to grow with you — from 8-bit to 32-bit systems. From general painting to advanced design. *PixelPaint Professional* gives you the intuitive tools to do your work easily. Use powerful features like advanced masking, fill effects, dithering, anti-aliasing and transparency control for advanced graphics effects and photographic-quality images.

ACCESSORIES

Advanced Gravis
MouseStick *(Plus or ADB)* ***Special*** 85.
Cutting Edge
Cutting Edge MCK-105QK Keyboard w/Quickeys 135.
DataDesk
MAC-101 Keyboard/Beige *(128k/512k & MacPlus)* ***Special*** 145.
MAC-101 ADB Keyboard/Platinum *(Mac SE & Mac II)* ***Special*** 145.
Ergotron Mousecleaner 360° 15.
MacTilt *(Mac, SE or II)* 68.
Muzzle SE 62.
Muzzle Mac II 69.
Farallon MacRecorder Sound System *(Mac SE or Mac II)* 165.
Goldstein & Blair
Macintosh Bible 2nd ed. 20.
Impulse Audio Digitizer w/soundware 139.
I/O Design
Mac Luggage in Navy or Plat.
Macinware Plus Carrying Case 64.
Macinware SE Carrying Case ***Special*** 75.
Imageware II Carrying Case 49.
Kalmar Designs
Teakwood Roll-Top Disk Cases:
Micro Cabinet *(holds 45 disks)* 14.
Double Micro Cabinet *(holds 90 disks)* 21.
Triple Micro Cabinet *(holds 135 disks)* 31.
Kensington
Mouseway *(Mousepad)* 8.
ImageWriter or ImageWriter II Cover 9.
Macintosh Plus/SE Dust Cover 9.
Apple Security Kit 34.
Antiglare Polarizing Filter 33.
Mac II Stand and Cable Kit 65.
Mac II Monitor Stand 65.
Power Tree Surge Suppressors (10, 20, or 50) Call
Printer Muffler Stand *(80 & 132)* 24.
Printer Muffler 80 43.
System Saver Mac *(Beige or Platinum)* 64.
Space Saver Printer Stand 17.
Super Base 34.
System Saver SE 52.
Masterpiece Mac II 105.
New Turbo Mouse *(Reg. or ADB)* 109.
Universal Copy Stand 22.
Universal Printer Stand 15.
Lynx Computer
Lynx Trackball *(Mac & Mac+ or Mac SE & Mac II)* ***Special*** 65.
Moblus Fanny Mac QT *(Beige or Platinum)* 60.
Mouse Systems A+ Mouse *(MacPlus)* 65.
A+ ADB Mouse *(Mac SE/Mac II)* 85.
Moustrak
MousePad 7"x9" Size 8.
MousePad 9"x11" Size 9.
Orange Micro Grappler Spooler 39.
Grappler C/Mac/GS or Alphabits 79.
Grappler L/Q or Grappler L/S 103.
Ribbons
Available in Black, Blue, Brown, Green, Orange, Purple, Red, Yellow, Silver & Gold
ImageWriter Ribbon 4.
ImageWriter Black 6-pack 20.
ImageWriter Rainbow Pack *(6 Colors)* 20.
ImageWriter II-Four Color Ribbon 9.
ImageWriter LQ Black 17.
ImageWriter LQ Four Color 20.
Seikosha Ribbon Black 6.
Targus
Imagewriter II Carry Case Blk. 49.
Macintosh Plus Carry Case Blk. 59.
Deluxe MacPlus-XKB Blk. 75.



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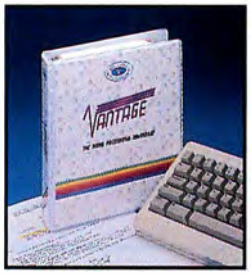

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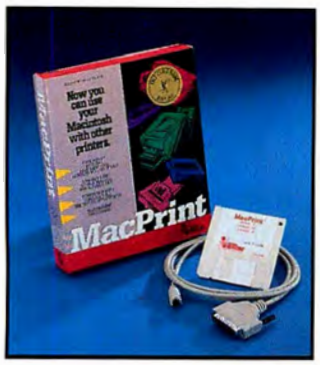

MacPrint 1.1 by Insight Development

Introducing ***MacPrint 1.1***, an easy-to-use software package that lets you use virtually any Mac application on alternative printers. Including HP LaserJet+, series II, IID and compatibles and the HP DeskJet and DeskJet Plus. Use *MacPrint 1.1* for true WYSIWYG performance. Four Compugraphic font families are included with point sizes from 9 to 96. Completely transparent after installation. ..... **$79.**

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Casino Master Deluxe Version is an integrated package of five casino games in dazzling color; runs on Mac II, IIx and IIcx. Play Blackjack, Craps, Roulette, Video Poker and Baccarat. All games have mouse-controlled betting, long-term storage of wins/losses. Complete manuals include rules, strategy. Standard version has same features, runs on all Mac's with 512K. ..... **$55.**

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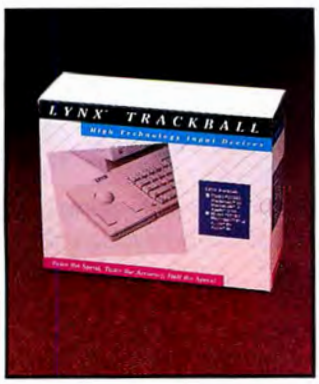

LYNX Trackball by LYNX Computer

The attractive, easy-to-use ***LYNX Trackball*** offers you precise fingertip cursor control at an affordable price in a sleek desktop profile. A patented high-technology encoder which is also used in sophisticated aerospace applications assures built-in quality. It is ideal for desktop publishing, CAD/CAM and graphics. Available for all Mac and Apple models. It offers you twice the speed, twice the accuracy at half the space. ..... **$65.**

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cessing document, could originate with another machine.

Is this the first time Apple has discussed its new system software so far in advance?

Yes. It's a major change for Apple and important to our customers. We announced it to developers on May 8 of this year so that they could take advantage of the features for their customers. We begin seeding code with many developers this fall.

Is AppleMail part of this system release?

No comment.

Virtual memory is part of the new release. What will it do?

For systems with a hard disk and a 68020 and a PMMU [paged memory management unit], or a 68030, the system software will be able use the disk as additional RAM. It means that users can run more and larger applications with less RAM and gain more flexibility from MultiFinder with a lower memory configuration.

Will it speed up application interaction?

That depends upon what you do. You're trading disk speed for memory speed. There is the potential for thrashing; if you load up too many applications and run the machine with only one megabyte then it will take a while to switch between applications. If you only have a few applications, with one or two open at one time, then there will be an improvement in switching between them.

How will we take advantage of virtual memory?

Everyone with the hardware I mentioned will have access to it. Virtual memory will be backward-compatible with applications if the developer has adhered to *Inside Macintosh* guidelines.

But some of the popular applications, such as Microsoft Word and PageMaker, do not adhere to all the guidelines.

That's one reason why we give develop-

(continues)

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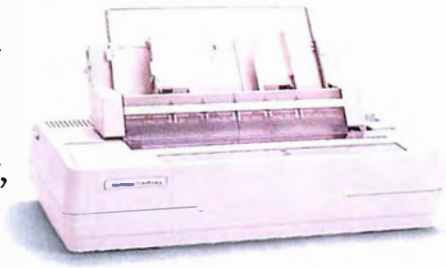

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ers early access to the software. When you have PMMU functions (such as hardware memory allocation), virtual address space is not the same as physical address space. Those programs that make the assumption that virtual equals physical will have problems.

You also extended address space to 32 bits.

This adds even more memory addressing to system memory, which is what we're after. In the past we had a limit of 8MB of real memory. With 32-bit addressing, the Mac can use up to 4 gigabytes of main memory.

On the system board or on the backplane?

On the NuBus there are other memory limits per slot, so only on the system board. The practical limit will depend upon the availability of 4-megabit memory chips—the limit of SIMMS and slots.

There is also DBMS support of a kind in System 7.0.

Essentially it's a facility at the manager level that allows applications to transparently access a database on a remote computer. You might want to retrieve data from the mainframe and use it on your own machine. The goal of this manager is to allow applications developers to access data from a host and pass it to Mac applications.

Is 7.0 truly multitasking?

It depends upon what you mean by truly. From the user perspective, yes absolutely, because you can print in the background, download from CompuServe, and type a memo, all at the same time.

From the perspective of someone working with UNIX or A/UX?

I would say that we have shown multitasking capability for both the user and for systems programming. And while it is not a traditional definition of multitasking, it is a version of multitasking well suited to our vision of personal computing.

Interviewed by Jerry Borrell

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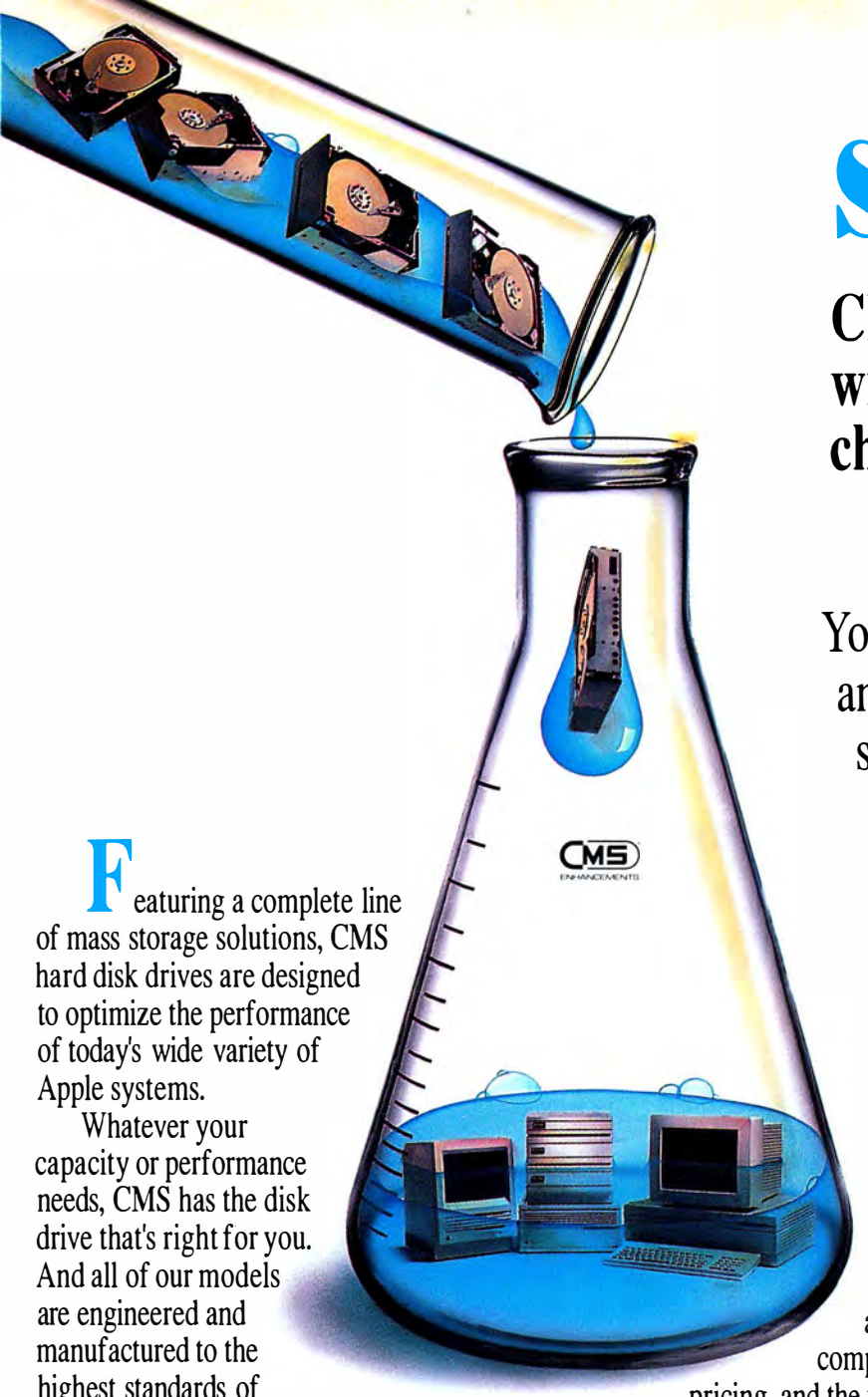

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Mac Business Tools

Create business forms quickly and easily using Microsoft Works 2

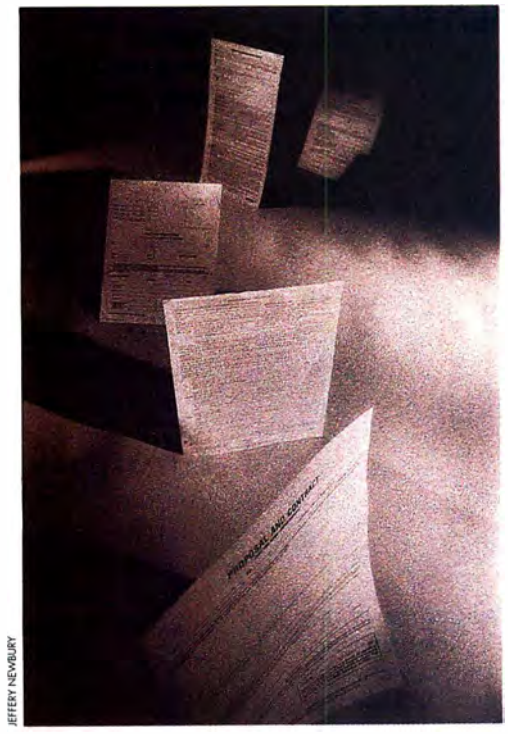
by Michael Sloan

You can create personalized business forms, such as invoices, purchase orders, and billing statements, using a number of graphics programs. You can generate form letters easily with several popular word processors. But by using Microsoft Works 2.0, you can do both of these within a single, fully integrated package.

I've created a monthly billing statement from a mythical garden shop as an example of the business forms you can produce in Works. Everything in Figure 1 (except the tree) was created with version 2.0. Data for the customer address block and the statement line items was merged from a Works database. Let's start with the database, so you'll know what data is available for the statement form.

CREATING THE DATABASE

The Works database contains standard information on customers—company name, address, and contact person—as well as account activity for the month. Figure 2 shows a typical database layout in Works' form display. Works lets you control the size and placement of each field. In this sample, the record contains a single customer's monthly activity. Each row in the lower part of the form holds data for a single account transaction, either a purchase or a payment. Short field names allow the maximum amount of data per line.



JEFFERY NEWBURY

The D fields (D1, D2, and so forth) hold the transaction date. The T fields hold the customer purchase order number, or the phrase "Payment—Thank you," depending on the type of transaction. The CH fields hold the amount of the charge (they remain blank, if the transaction is a payment). The CR fields hold the amount of payment (they stay blank, if the transaction is a charge). The B fields maintain a running balance, beginning with the value in the Balance Forward field, which would be carried over from the end of the previous month. While Figure 2 shows only six transaction lines, there is easily space for at least six more lines.

Enter some data for a few records (you can use the entries in Figure 2 as a model), and save the database. I recommend using a short file name for the database (you will see why in a moment). I used the month (JAN) and the year (89) to comprise the file name.

DESIGNING FORMS

Before you begin to lay out the statement form, give some thought to the overall design. What size (length and width) do you want it to be? My form is 6½ inches wide and about 7 inches long.

Choose one font, and stick to it. I used Helvetica throughout, except for the words *Thank You* at the bottom of the form. If you print on an ImageWriter, you might want to use Geneva instead of Helvetica. I know it's tempting to mix several fonts because they're readily available, but using a single font (in different sizes and styles, to be sure) improves a form's readability. If you need some general ideas on form design, look at a few commercial forms catalogs.

MAKING A STATEMENT

The form begins with the word *STATEMENT*, right-aligned, in 18-point bold italic. You'll find text formatting in Works 2.0 a little different from earlier versions of the program. There are no separate menus in the menu bar for font, size, and style. Instead, commands for Font, Size, Style, Justification, and Spacing appear in the Format menu. When you select one of them with the mouse, a menu pops up listing all the choices for that command. The Size pop-up menu, for example, lists the standard 9-, 10-, 12-, 14-, 18-, 20-, and 24-point sizes. It also has an Other choice that displays a dialog box letting you

(continues)

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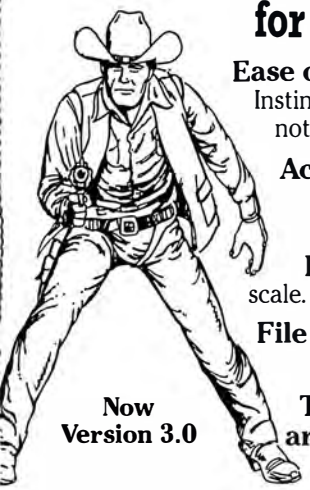

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WHITE PINE SOFTWARE

For more information, call or write: White Pine Software, 94 Route 101A, PO Box 1108, Amherst, NH 03031, **(603) 886-9050.**

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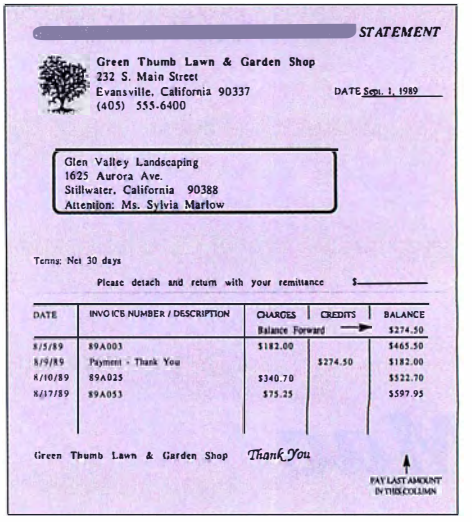


STATEMENT

Green Thumb Lawn & Garden Shop
232 S. Main Street
Evansville, California 90337
(405) 555-6400

DATE Sept. 1, 1989

Glen Valley Landscaping
1625 Aurora Ave.
Stillwater, California 90388
Attention: Ms. Sylvia Marlow

Terms: Net 30 days

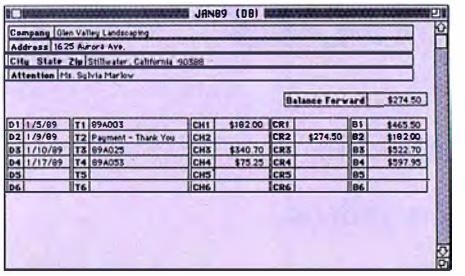
Please detach and return with your remittance $_____

DATE	INVOICE NUMBER / DESCRIPTION	CHARGES	CREDITS	BALANCE
		Balance Forward →		$274.50
8/5/89	89A003	$182.00		$465.50
8/9/89	Payment - Thank You		$274.50	$182.00
8/10/89	89A025	$340.70		$522.70
8/17/89	89A053	$75.25		$597.95

Green Thumb Lawn & Garden Shop *Thank You*

PAY LAST AMOUNT IN THIS COLUMN

Figure 1
A monthly statement form was created with the new drawing tools of Microsoft Works 2.0. The data in the form has been merged from a Works database file.



JAN89 (DB)

Company: Glen Valley Landscaping
Address: 1625 Aurora Ave.
City State Zip: Stillwater, California 90388
Attention: Ms. Sylvia Marlow

Balance Forward $274.50

D1	1/5/89	T1	89A003	CH1	$182.00	CR1		B1 $465.50
D2	1/9/89	T2	Payment - Thank You	CH2		CR2	$274.50	B2 $182.00
D3	1/10/89	T3	89A025	CH3	$340.70	CR3		B3 $522.70
D4	1/17/89	T4	89A053	CH4	$75.25	CR4		B4 $597.95
D5		T5		CH5		CR5		B5
D6		T6		CH6		CR6		B6

Figure 2
Use the database's Form window to design the fields' layout so that data entry flows naturally.

select any type size from 1 to 72 points. The Spacing pop-up menu offers single, one-and-a-half, and double spacing, as well as 6 lines per inch. There's also a new Color command in the Format menu. So if your Mac has color capability, you can change the color of your text to red, green, blue, cyan, magenta, or yellow.

LAYING DOWN THE RULES

You can create the wide gray band (or rule) to the left of *STATEMENT* with Works' new drawing tools (see "The Tool Palette"). Select Draw On from the Edit menu. Works displays a freestanding tool palette. You can drag the palette anywhere on the screen, and it remains visible until you choose Draw Off.

Select the rectangle tool and draw a box starting at the upper left corner of

(continues)

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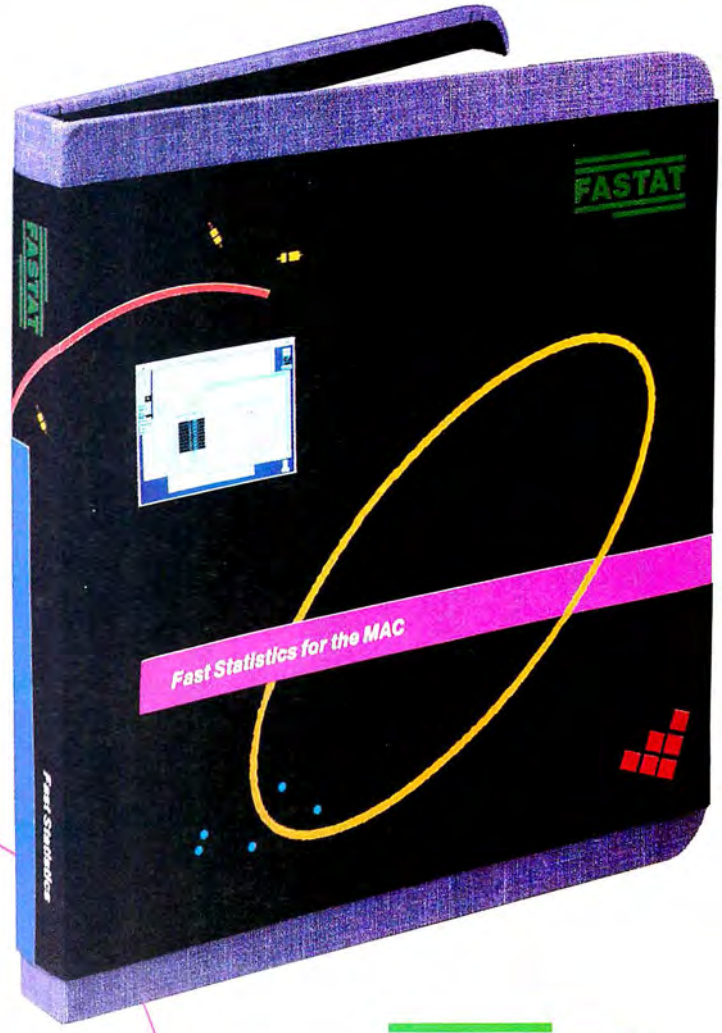

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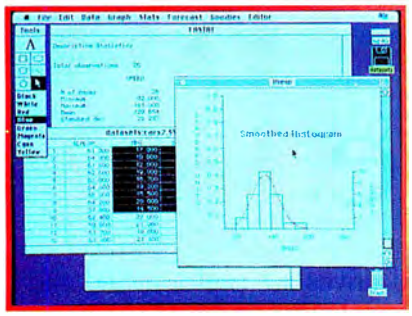

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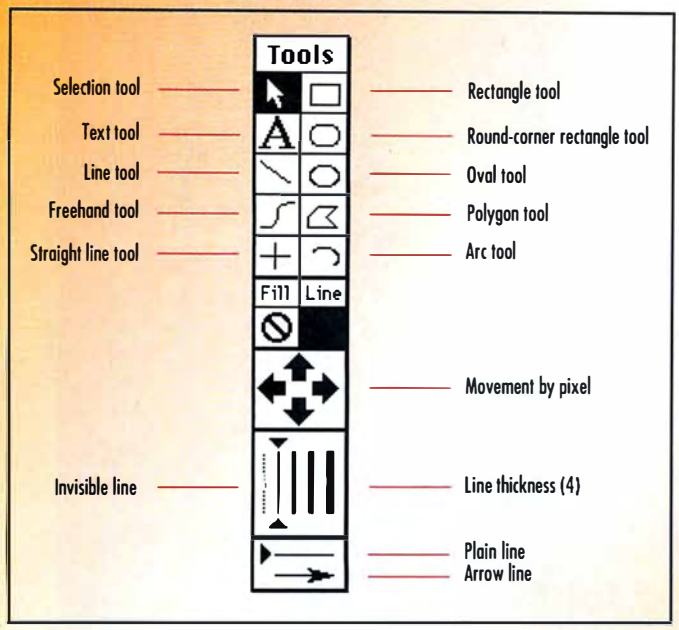
THE TOOL PALETTE



Works' drawing palette contains virtually all of the tools found in dedicated drawing programs such as MacDraw. Additional features include grouping objects, aligning objects to a grid, and drawing text along a sloped or curved line.

The tool palette displayed when you select Draw On from the Edit menu has eight standard drawing tools, a text tool, and a selection tool. These are the same tools you'll find in MacDraw and other object-oriented graphics programs. Works gives you a choice of 39 fill patterns for objects such as rectangles and circles, and the same number of line patterns. The tool palette shows your current selection for both.

The four palette arrows enable you to position a graphic object precisely. Each time you click a palette arrow, the selected graphic moves 1 pixel in the direction of the arrow. You have a choice of four line thicknesses, plus an invisible line, and you can draw the lines themselves with or without arrowheads.

Any graphic object can be colored. If your object is patterned, as opposed to all black or all white, you can change the "white" pixels to one color and the "black" pixels to a different color.

your document. Extend the box's width to the beginning of the word *STATEMENT*, and make it the same height as the text. Choose an appropriate fill pattern. Hide the box's outline by clicking on the invisible line choice. Then turn off Draw.

Now use the ruler to indent to 1 inch, and type your company's address block. I used 12-point Helvetica and made the first line bold. The date on the third line was tabbed at 4 ¾ inches and reduced to 10-point type.

The tree is a piece of clip art, pasted in via the Scrapbook. You can use a similar graphic, or create one yourself with MacPaint, FullPaint, or another program. When you paste a graphic into a document, Works automatically turns on the Draw mode. Drag the graphic to the left of the address block and use the arrow buttons on the tool palette to place the art exactly where you want it. Before you select Draw Off, draw a horizontal line after the word *DATE*. Later, when you use the form, you can change the statement date without affecting the line.

MERGING DATA

Before you begin to merge information from the database, select Show Field

(continues)

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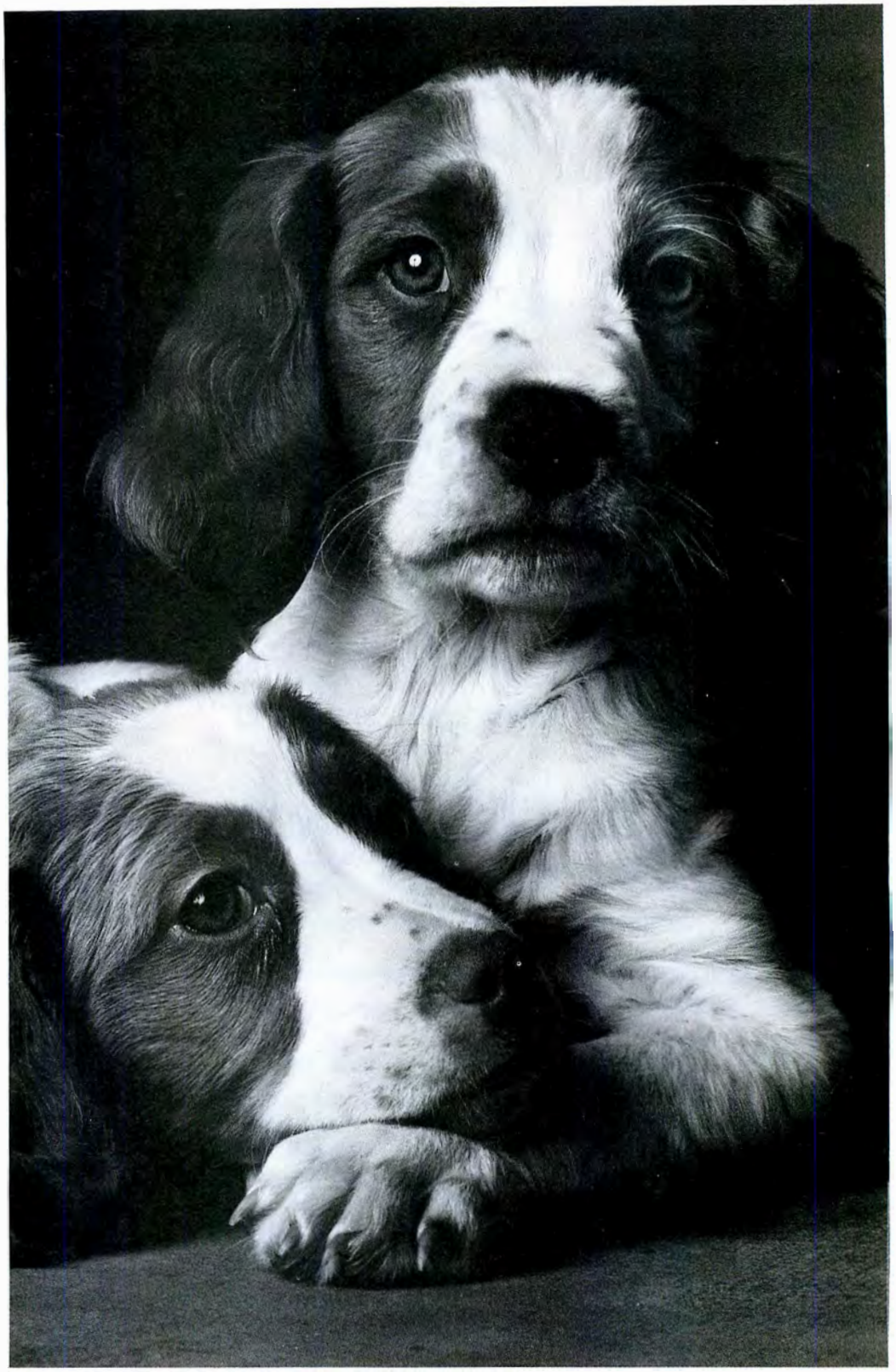

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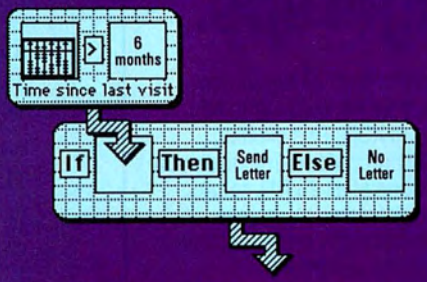

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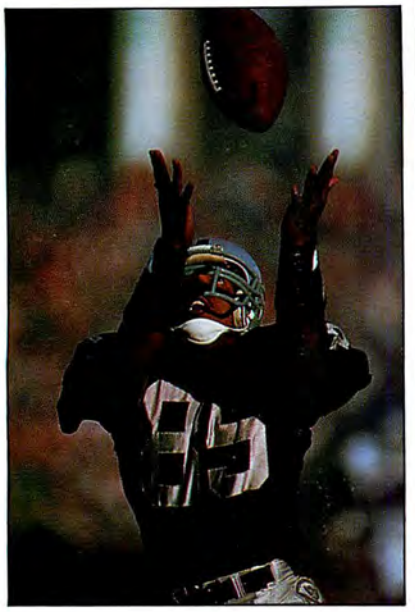

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Names from the Edit menu. The Show Field Names feature shows the effect of merging fields from a database. Leave three or four blank lines below the company address block and indent it about half an inch.

Choose Prepare to Merge from the Edit menu. Works displays a dialog box listing open databases (databases currently on the desktop) and their fields (see Figure 3). Select the Company field, and click the Merge button. Works inserts a placeholder representing the data from the database. The placeholder consists of the database name followed by the field name, for example: JAN89:Company.

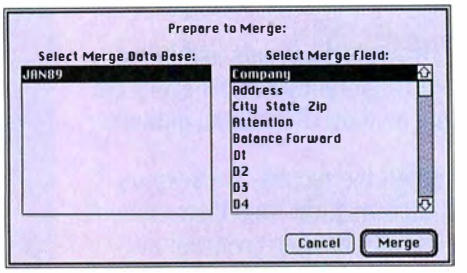

Figure 3
You can merge data from more than one database into a word processing document. Just be sure that all the databases are on the desktop when you're ready to print the forms.

Insert a placeholder for Address below the Company placeholder, and one for City State Zip on the following line. Begin the fourth line of the customer address block by typing **Attention:** and a space. Then, insert the Attention placeholder.

Use the rounded rectangle tool to draw a box around all four lines; now compare your statement form with Figure 4. Notice that all drawn objects have handles, so you can stretch or shrink them at will.

You'd probably like to see how the customer address block will look when it's printed, so choose Show Field Data from the Edit menu. Works replaces the placeholders with entries from the database's first record.

The next two lines (starting with the words *Terms* and *Please detach*) are in 10-point. *Terms* is flush left, while *Please detach* is tabbed at 1 inch. The dollar sign was tabbed at 5 inches, and the line was drawn with a drawing tool.

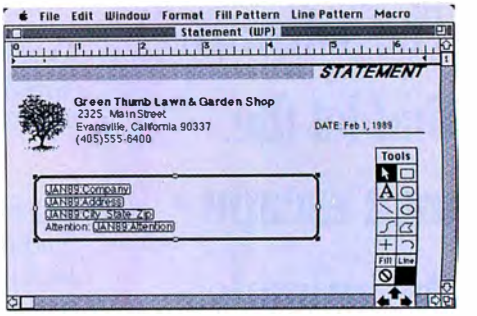

Figure 4
Dragging the handles on drawn objects resizes them. If you drag on any part of the graphic other than its handles, you move the entire object.

A dotted line indicates where the statement detaches into two parts. To create a dotted line, draw a standard, solid line across the page. Then, select a diagonal pattern from the pull-down Line Pattern menu. (I used the pattern in the upper-right corner of that menu.)

TABLE THAT MOTION

The entire table, including the column headings, uses 9-point Helvetica. The word *DATE* is flush left, while the other four headings are tabbed at 1, 3 1/2, 4 1/2, and 5 1/2 inches, respectively.

The Balance Forward line consists of three elements: the text, tabbed at 3 3/4 inches; a placeholder representing the Balance Forward field from the database, right-tabbed at 6 inches; and an arrow placed between text and placeholder. I used the medium-weight line with the arrow tool. You determine the direction of the arrow by dragging the mouse as you draw the line. If you drag to the right, the arrow points to the right.

Each data line in the table consists of five placeholders: the date, flush left; the transaction, tabbed at 1 inch; the charge, right-tabbed at 4 inches; the credit, right-tabbed at 5 inches; and the balance, right-tabbed at 6 inches. Figure 5 uses Show Field Names to display all the placeholders for the table. (Now you see why short database and field names work best.) If you look closely, you can see the tab markers in the ruler. By the way, Works 2.0 has two new tab markers, centering and decimal. If you click on the tab marker in the ruler without moving it, the marker

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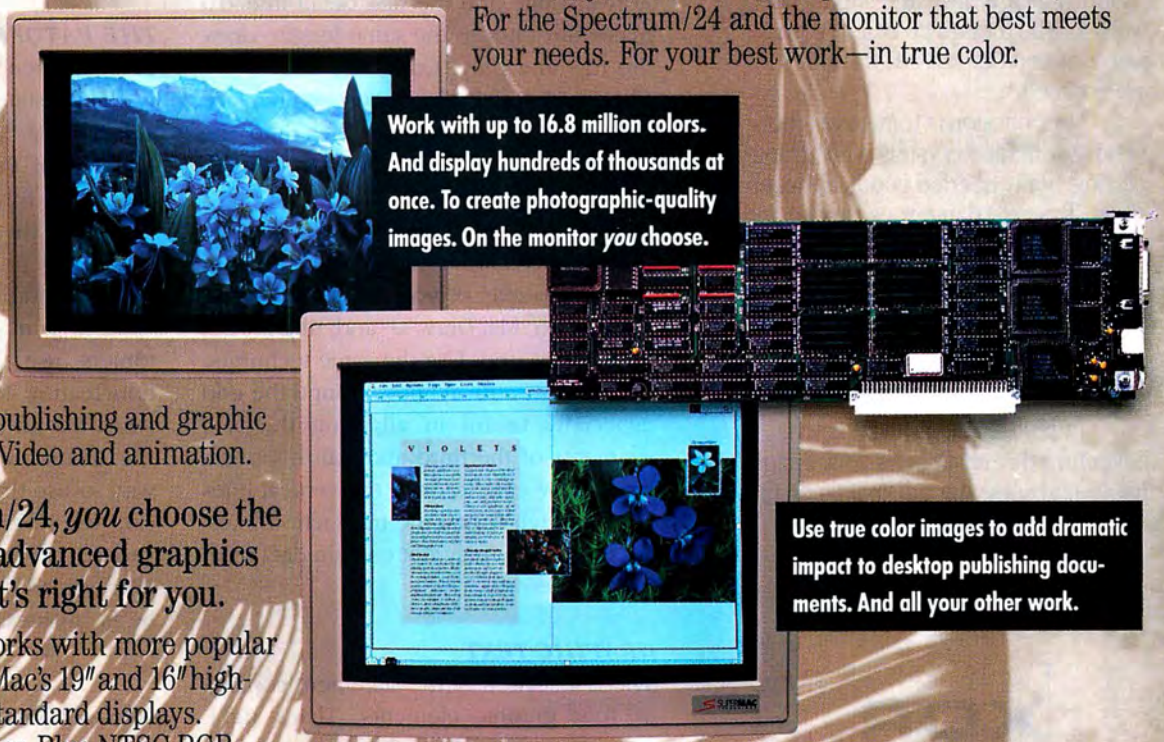

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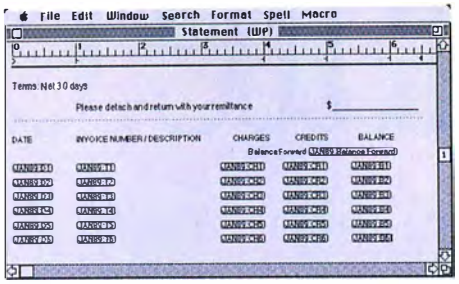

Figure 5
The merged data placeholders are inserted and tabbed into their respective columns. Notice that the Balance Forward placeholder extends through the graphic arrow. A shorter field name would prevent this.

changes from left to right, to decimal, to centering, and back to left.

After you've inserted all the placeholders for the table, choose Show Field Data and draw the vertical lines dividing the columns and the horizontal lines separating the heading from the body of the table. Start with the horizontal lines—one above the table, the other between the Balance Forward line and the first detail line. To make sure they're the same length, draw the top line only. Copy this line to the Clipboard. Click the mouse someplace else, then paste the line back into the document. You now have two equal-length lines.

You can either align them using the pixel-by-pixel-arrow-movement buttons in the tool palette, or you can set up a grid (similar to MacDraw's) and align both lines to the grid. Use the same technique to draw the vertical lines. I found the grid especially useful in align-ing the two segments of the third and fourth vertical lines. Take care to draw the vertical lines long enough for all the transaction lines, even ones that may not contain data from the first record.

GRAPHIC TEXT

The last section of the statement consists of four graphic elements. That's right, even the text will be created as a graphic. Select the text tool from the tool palette. Click on a point below the table to open a text block, then use the Format menu to select 10-point Helvetica bold, and type the company name.

Click the mouse at another location to open a second text box, and change the type to 24-point Zapf Chancery, plain. (If you don't have Zapf Chancery, use 14-point Venice). Type **Thank You**.

Open a third text box. Change the font back to Helvetica, and choose Other from the Sizes pop-up menu. Use this dialog box to select 7-point text size. Choose Center justification, and type **PAY LAST AMOUNT IN THIS COLUMN** on two lines.

Draw an upward-pointing arrow using the thinnest line weight. Move the three text elements into a line, with the company name flush left, *PayLastAmount* under the Balance column of the table, and *Thank You* about midway between. Place the arrow above the text, pointing at the Balance column.

When you're satisfied with the arrangement of the four items, select all four (hold down the Shift key while you click on each item), and choose Group from the Format menu. Now Works treats the four objects as one; if you move them, they all move together.

THE PAYOFF

Finally, when you're ready to print monthly billing statements for your customers, select Print Merge from the File menu (instead of Print). Works will print one statement for every record that is displayed in the database. If you want the statements to print in a particular order, sort the database before you print. If you want to print statements for selected customers, use the database's record-selection feature to display only the records you want and then print.

Creating a billing statement is just one way to use the power of Works 2.0. You can use these techniques to design a variety of forms, and when you add Works' mail-merge capability, you'll really be in business. ■

Michael Sloan is the author of Word Power: The Complete Guide to Microsoft Word 3.0 for the Macintosh *(1989) and* Working with Works: A Guide to Microsoft Works *(1987), both published by Scott, Foresman and Company. Formerly a senior engineer with Apple Computer, Sloan is on the staff of the Illinois Mathematics and Science Academy in Aurora.*

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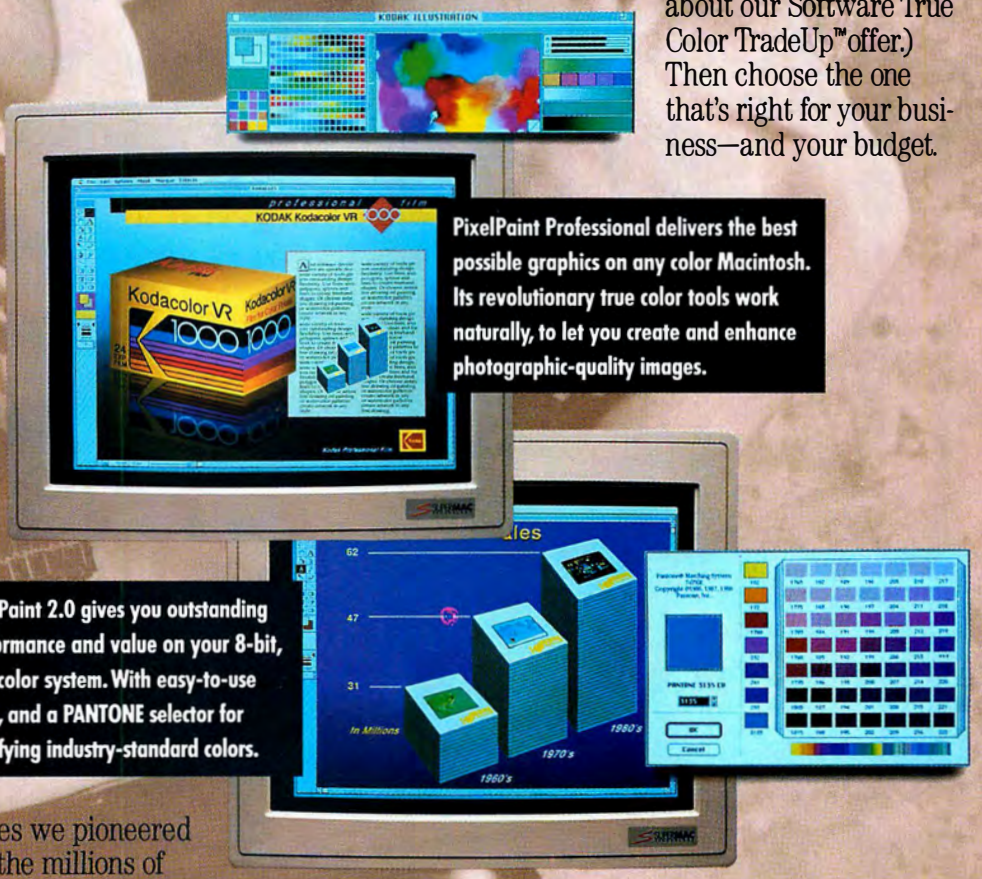

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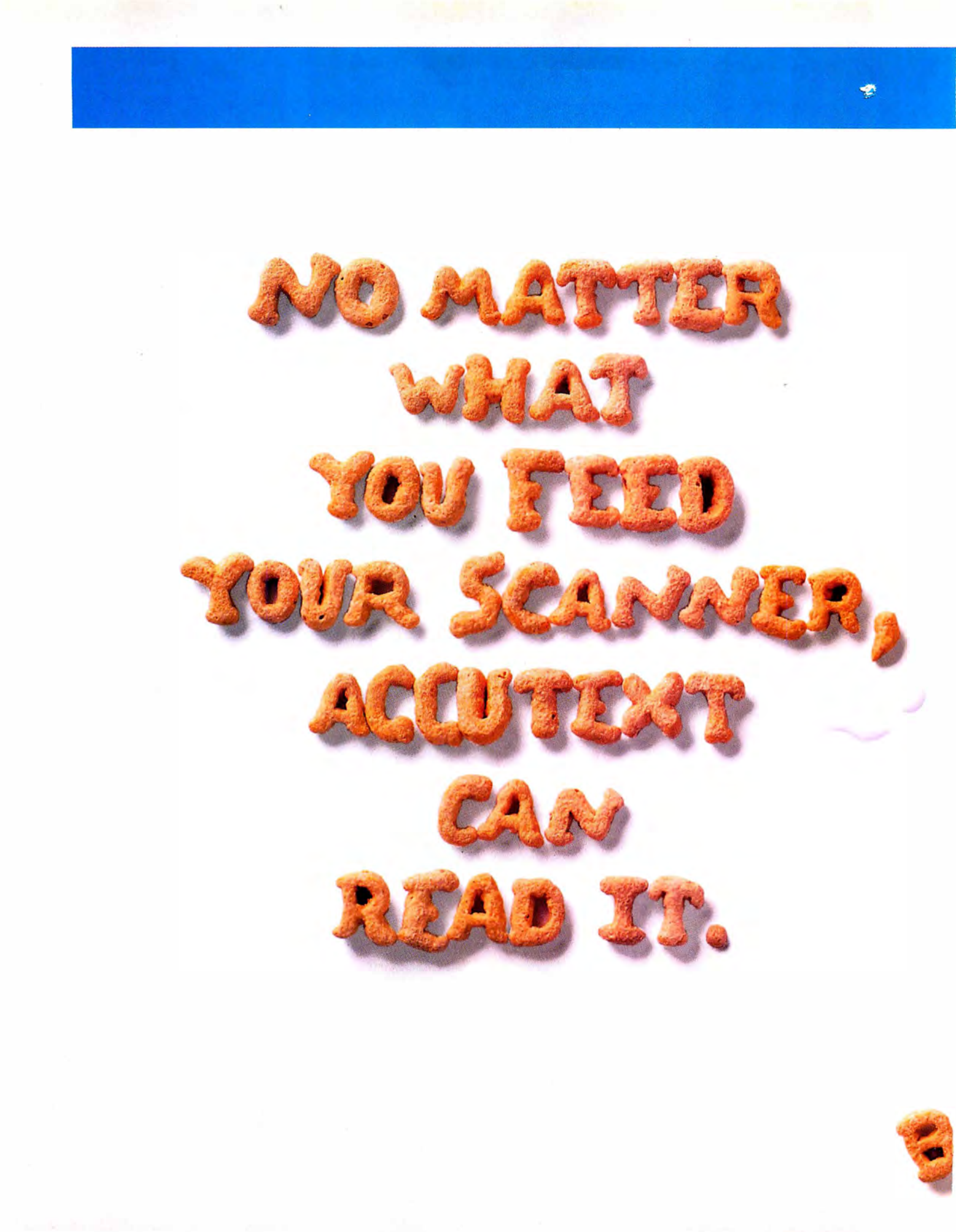
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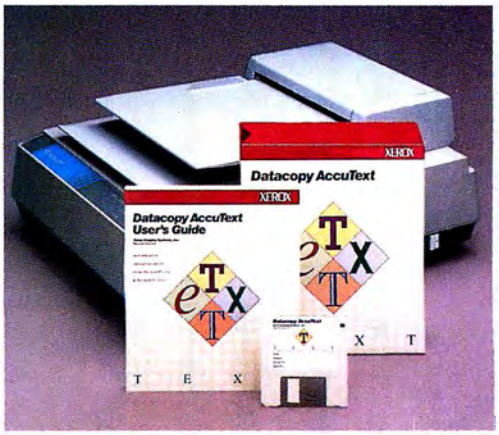

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PC Tools not included with 20MB drives.

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30+	*$379*	*$449*
45	*$449*	*$529*
60+	*$499**	*$579*
80+	*$599**	*$679*
45MB Removable Drive		*$849*

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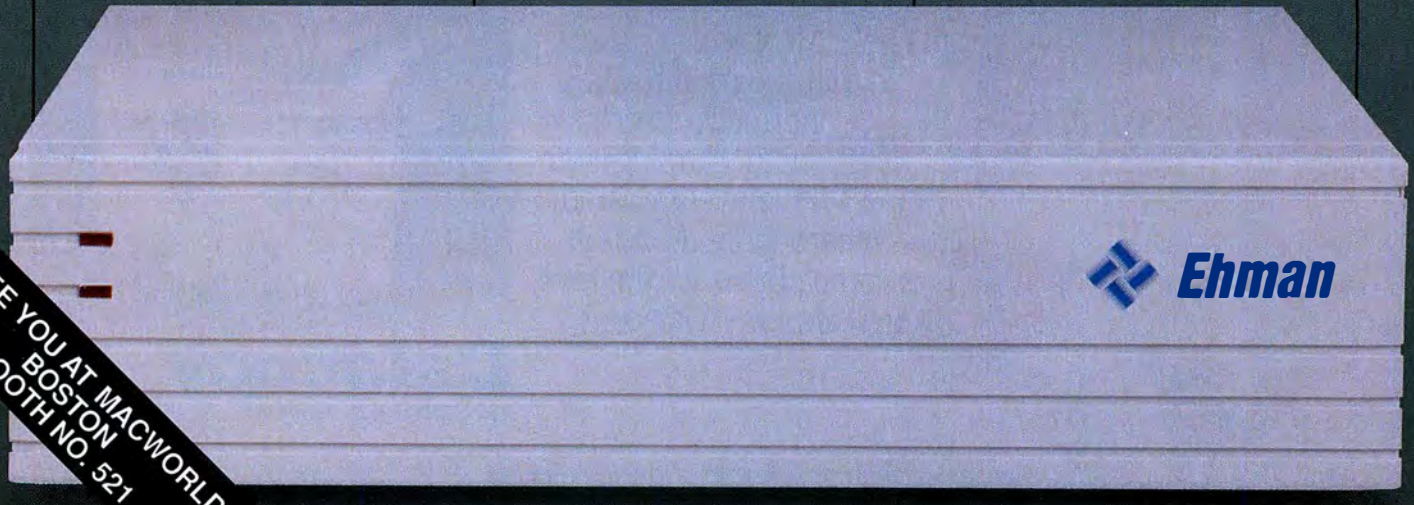

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*Good on Macintosh II models only. SE Drives also available. All product names mentioned are trademarks of their respective holders.

Circle 452 on reader service card

MACWORLD NEWS

by Tom Moran and Dan Littman

DeskWriter: Jets All the Way

Hewlett-Packard's DeskJet, one of the most popular ink-jet printers in the IBM world, is now available in a Mac version, the DeskWriter.

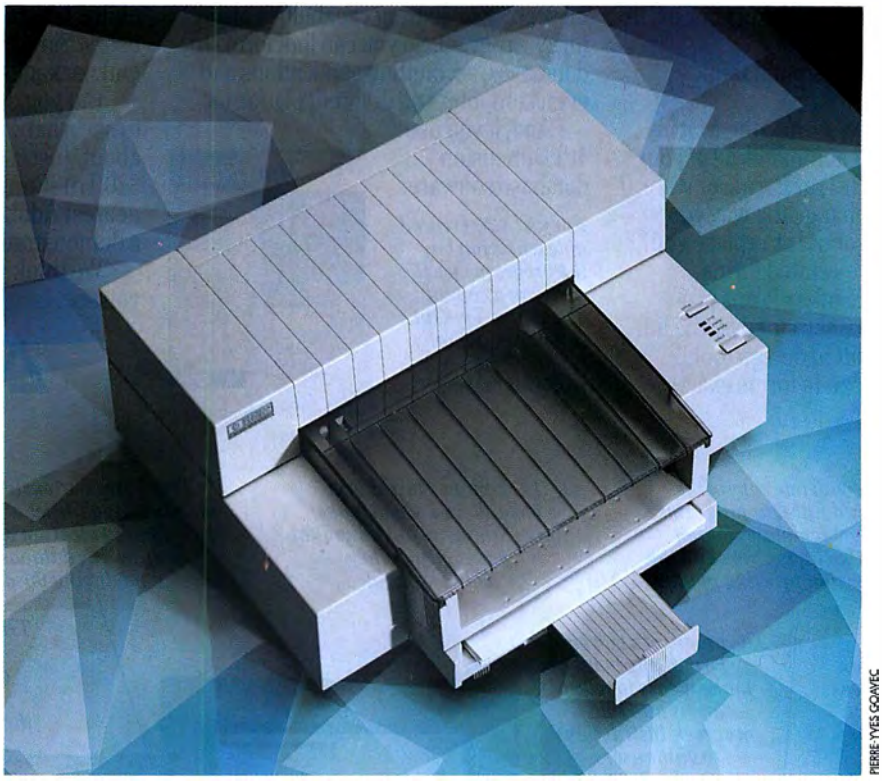
At $1195, it costs less than Apple's LaserWriter laser printer and offers the same 300-by-300-dpi resolution. The DeskWriter's ink formula works well with plain paper, but will smear if you spill on it. Fortunately, the ink comes as part of a throwaway printhead, so the nonsmear ink formulation that HP says it is working on will probably work with existing DeskWriters.

According to HP, the DeskWriter and the Apple LaserWriter take about the same amount of time to produce their first printed page, but the LaserWriter's larger memory lets it print multiple copies of the same page faster. The DeskWriter prints about one page per minute at 300-dpi resolution, and up to twice that in 150-dpi draft mode.

You install HP's proprietary Chooser-level printer resource simply by dragging it into the System Folder along with the fonts. The printer supports all the features of QuickDraw and provides polygon smoothing for improved graphics.

The Mac Plus, SE, and Mac II can all drive the DeskWriter, but a hard disk is required for font storage. Font families that come standard are Times, Helvetica, Courier, and Symbol, for a total of 13 fonts. You can also purchase an additional 7 font families, comprising 22 fonts, individually or as a collection. All the fonts include bold, italic, and bold italic versions of each face and support all Macintosh text enhancements. Scaling up to 250 points and rotation in 90-degree increments is possible. For more information, call HP at 800/752-0900.

—Tom Moran



PIERRE-YVES GOAVEC

HP's DeskWriter is an inkjet printer that offers 300-by-300-dpi resolution, a Chooser-level printer resource, and four font families.

StuffIt Goes Commercial

The Mac's best-known file-compression utility, a shareware program called StuffIt, will make its commercial debut this summer as StuffIt Deluxe. Familiar to everyone who haunts online services or frequents user group disk libraries, StuffIt shrinks files into condensed form so more can fit on a single disk. It also allows multiple documents—made by one application or various applications—to be grouped together, compressed, and transmitted electronically as a single file, called an archive. Users run UnStuffIt on archives to restore them to their bulky original size and disparate lineage.

Raymond Lau, the young developer of StuffIt and its spinoffs UnStuffIt DA and StuffIt Viewer DA, has signed a deal with Aladdin Systems to promote and market the family of products. The com-

(continues)

Our new program can take any form you like.

If your business is like most, it relies on forms to communicate, administrate and delegate.

Yet, while the thought of replacing your labor-intensive forms system with a highly-productive forms program sounds good, the thought of replacing your existing forms probably does not.

Which is why you should think about this.

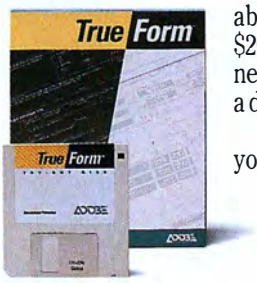
Introducing TrueForm,™ the Macintosh® program that automates all of your *existing* forms. With TrueForm software, you don't have to change the way you work, re-train personnel or replace your current stock of pre-printed forms.

Because, unlike other forms programs, you aren't constrained by the limitations of a few built-in design tools. Instead, you can scan-in forms exactly as they are. Or you can create new forms with your own drawing or page layout programs and easily import them into the TrueForm program.

TrueForm offers complete spreadsheet features, along with the most powerful set of data-sharing capabilities of any forms program. So you can link forms to databases, accounting applications and even computers on different platforms.

And, if you use 4th Dimension® database software, our special interface enables you to print onto master forms without leaving that popular program.

For just $20 (refundable when you buy the program) we'll rush you a copy of TrueForm Try-Out, so you can actually see how TrueForm performs for you.



What's more, because TrueForm is actually two programs—Set-Up and Fill-Out—you won't have to buy the entire Trueform package when you add users. Simply purchase additional Fill-Out packages whenever you need them.

But you don't have to buy either one to see what TrueForm software is all about. Just call (800) 344-8335 for our $20 TrueForm Try-Out or visit your nearest Adobe Authorized Dealer for a demonstration.

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Along with one copy of the Set-Up and Fill-Out programs, you'll get templates for ten common business forms and the 4th Dimension printing module.

The unique QuickForm™ tool allows users to make important notes on individual forms, just as they would by hand.

TrueForm's extensive merging capabilities allow easy communication with virtually any database without modifying the data.

Because TrueForm compresses each of your scanned images to save valuable memory, you can use existing forms regardless of their size or complexity.

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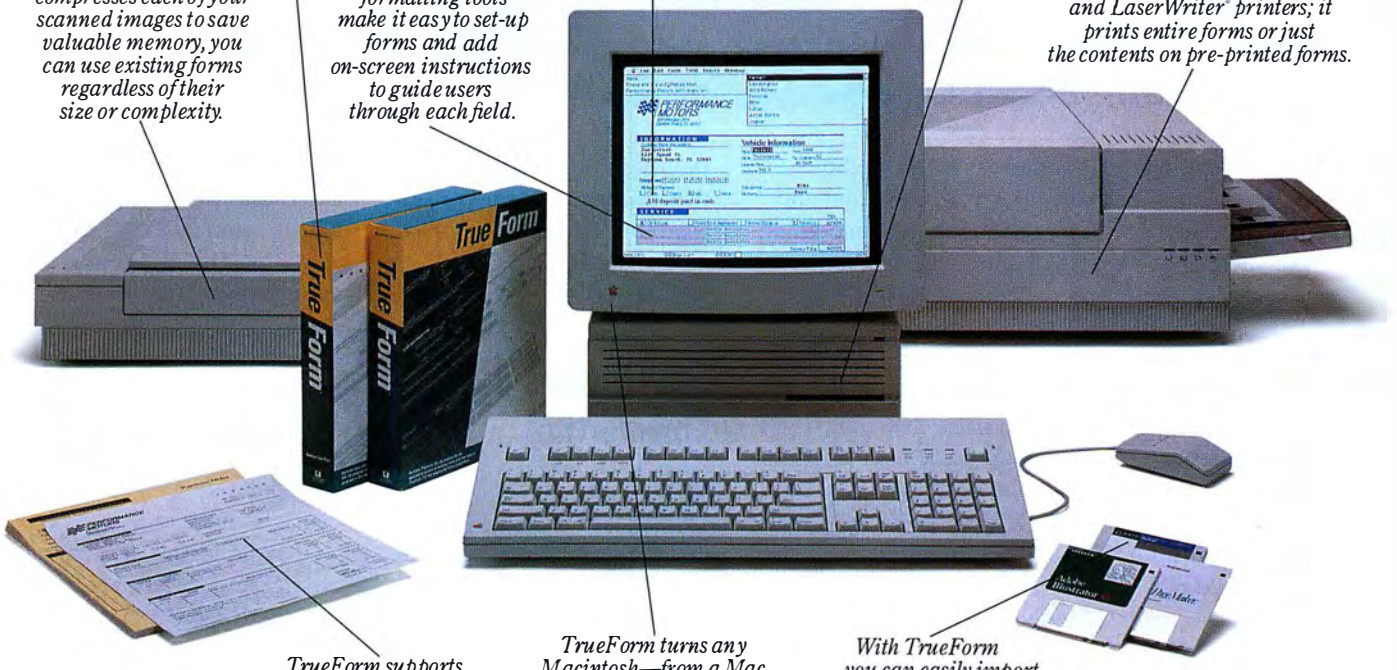
TrueForm supports all PostScript,® as well as ImageWriter® and LaserWriter® printers; it prints entire forms or just the contents on pre-printed forms.



TrueForm supports odd-sized forms, multiple-part forms, mailing labels and forms of unlimited pages.

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mercial version will combine features of all of the shareware products, adding more than two dozen improvements in a more integrated package. StuffIt Deluxe will be easier for novices to use than the shareware version, which often left users wondering where to click.

In addition, StuffIt Deluxe checks itself for viruses whenever it's opened and offers you the option of having it check for signs of infection in files as it unstuffs them. The commercial version also improves StuffIt's security features by adding a second type of data encryption, the DES algorithm commonly used in the business world.

With StuffIt Deluxe you can also read compressed IBM data files in the popular ARC and PKA formats---either over a network or from a Mac disk drive that accepts DOS or OS/2 disks. That capability makes IBM-to-Mac file transfer more efficient: no longer must it be done one file at a time.

Aladdin promises that the shareware version will continue to be updated, although it will remain a less ambitious product than StuffIt Deluxe, which will sell for under $100.

Aladdin will market another utility by Lau—a $59.95 CDEV, tentatively named ShortCut, that lets you search for files or folders and rename, lock, delete, or unstuff files from the Standard Open dialog box.

For details, contact Aladdin Systems in New York City, at 212/410-3080.
—*Nancy E. Dunn*

PixelPaint Goes Pro

Shortly before releasing an upgrade to the original PixelPaint, SuperMac Software changed the product's name from PixelPaint Professional to PixelPaint 2.0. Now we know why: SuperMac was holding back the Professional tag for its color paint program until Apple settled on a 32-bit color standard. The wait is over, and by mid-August the real PixelPaint Professional should be available.

At first glance the PixelPaint Pro interface appears almost unchanged from the original version, but many new features lie hidden underneath. Chief among them is support for 32-bit color, which makes it possible to assign each pixel on the screen a different color from the Mac's palette of 16.7 million colors. This eliminates the banding often seen in 8-bit (256-color) images and makes possible such fine shading that images appear almost photo-real. Features available that 8-bit color cannot provide include realistic transparency; mixing of colors; and anti-aliasing, which uses shading around the edges of objects and letters to eliminate jaggies. The new version also has smoothing, blending, and masking capabilities that permit, for example, isolating an object, painting in a background and illuminating it, and then restoring the original object with a shadow. Many tools can be modified with other tools, providing a vast reservoir of possible effects. PixelPaint Professional will list for $699. For more information, contact SuperMac Software in Sunnyvale, California at 408/245-2202.
—*Dan Littman*

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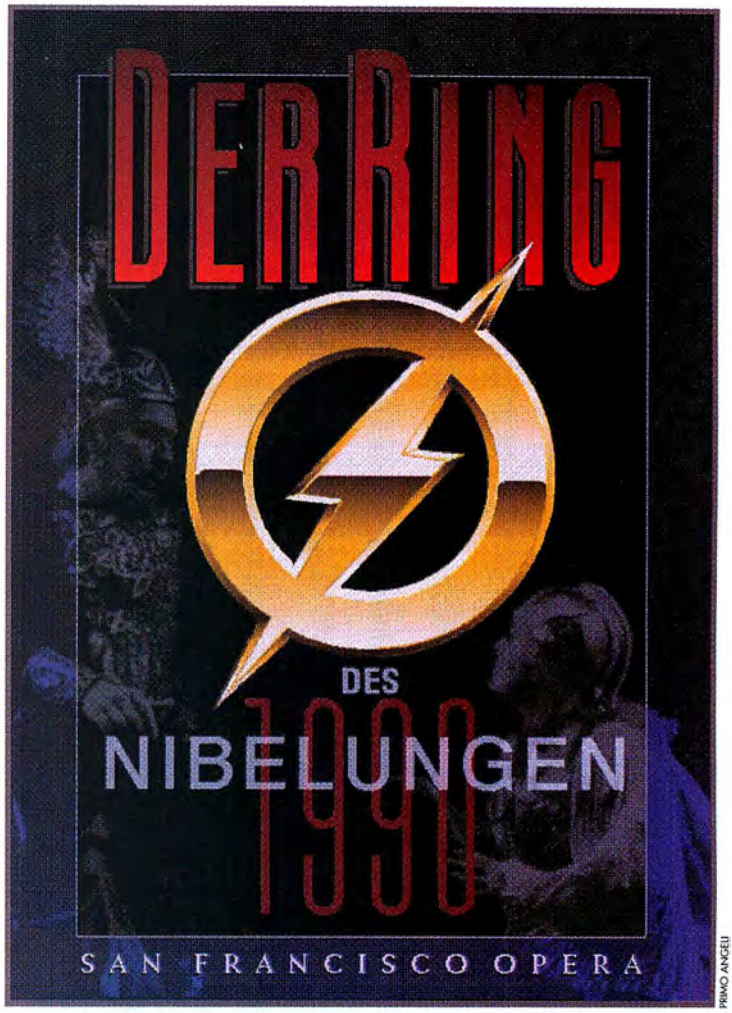
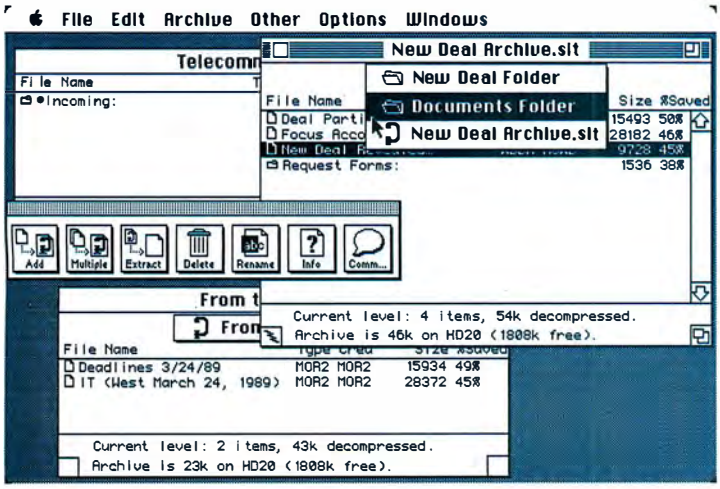
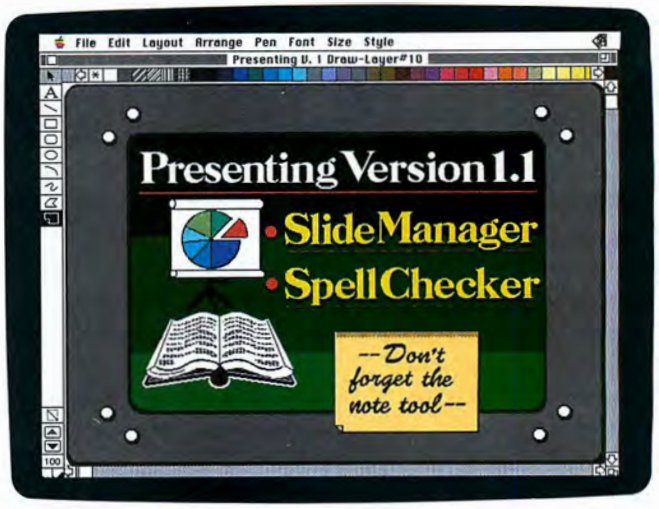
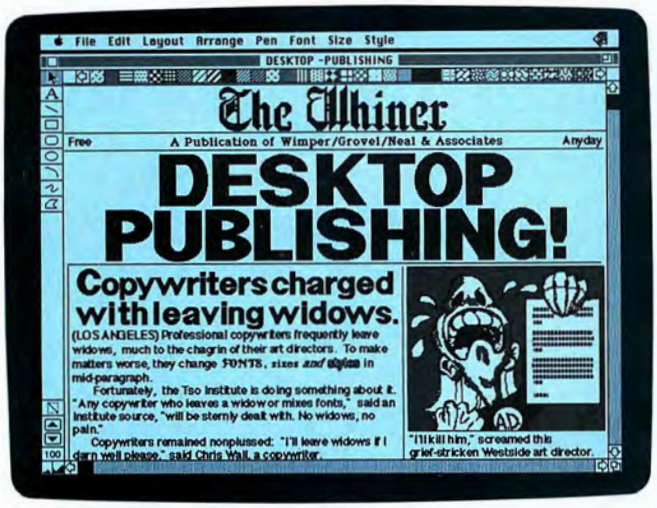


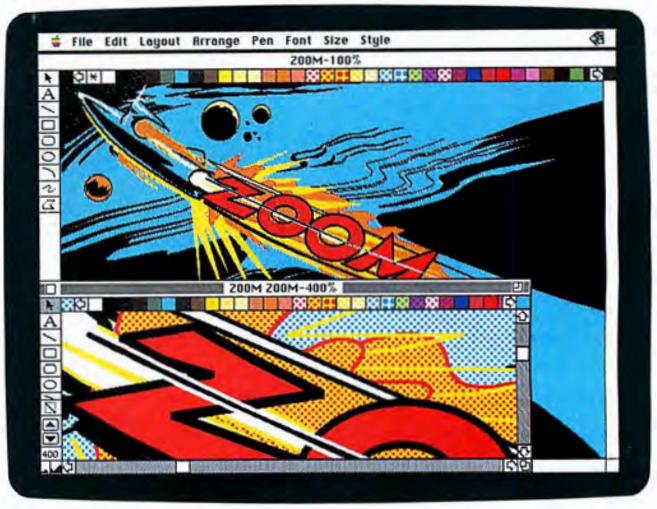
Primo Angeli and Mark Crumpacker used PixelPaint Professional to create this preliminary design for the San Francisco Opera.



StuffIt Deluxe's interface makes it easier to use than its shareware predecessor, StuffIt. The new version checks itself and other files for viruses, and can read compressed IBM files in ARC and PKA formats.







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Version Control

DocuComp, a document-comparison program for the Mac, takes a lot of the tedium out of what can be the most dreaded office task of all—keeping track of even minute changes between versions of documents. Originally designed for law offices, where people are constantly scrutinizing contracts for slight but meaningful changes, DocuComp looks for insertions, deletions, replacements, moves, and changes in moved text when it compares two versions of the same document. Then the program presents a report on screen or on paper that shows the differences with obvious symbols. Attorney and legal-software guru Martin Dean calls the program "a flagship Mac legal product."

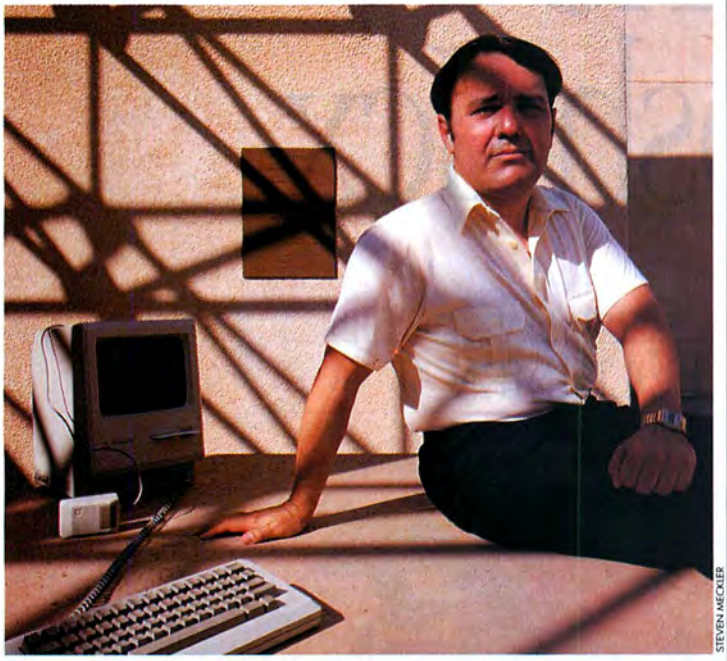
The program has also been welcomed by engineers trying to keep track of specification changes, programmers recording incremental improvements in code, and—of course—people in government and publishing who write by committee.

Senior software engineer John Buono, who develops telecommunications programs for the United States Army Information Systems Software Development Center, says it's the best document-comparison software he's tried. "It's not only faster than the others, it's the most intelligent." Buono cites as outstanding DocuComp's ability to notice when text is moved from one part of a report to another, with all its changes. He uses the program to track versions of his reports, and he recommends it to his Pascal students to help them document changes in their listings.

DocuComp reads the formats of six Mac word processors, as well as ASCII text, and can compare versions produced by different word processors—that is, it can review a WriteNow contract from Atlanta and compare it with a FullWrite Professional version from Chicago, and then print out a comparative summary in Microsoft Word.

DocuComp retails for $159.95 (but when Word 4.0 is released, it will come boxed with a coupon that's good for a limited Word/ASCII version for only $12.50 postpaid). For more information, contact Advanced Software in Sunnyvale, California, at 408/733-0745.

—Nancy E. Dunn



STEVEN MECKLER

John Buono uses DocuComp to track changes in the telecommunications programs he develops.

Macs Connect to IBM Token-Ring Networks

Apple's long-awaited link with IBM's Token-Ring network is finally a reality. The Apple TokenTalk NB board lets NuBus-equipped Macs connect with the local area network standard called token ring, defined by the IEEE standard 802.5. The Apple board lets a Mac send and receive data over the 4-megabits-per-second token ring cable hardware favored by an increasing number of IBM workstation and mainframe systems. When used with Apple's TokenTalk software, up to 64,000 Macs can access over a token ring network all AppleTalk-based services, such as printers, as well as AppleShare and Novell Netware file servers.

Alternatively, users can run the TokenTalk board with one of three new Apple software packages to connect to IBM mainframes or PCs over a token ring network. Apple's MacDFT software enables the Mac to connect to a host by emulating up to five simultaneous 3270 sessions. Apple's APPC (Advanced Program-to-Program-Communications) version 1.1 package lets the Mac connect and transfer information with machines adhering to IBM's LU 6.2 and PU 2.1 peer-to-peer protocols, a key element of IBM's Systems Network Architecture (SNA). Apple's SMB File Transfer Utility lets Macs access information on IBM PC file servers using the System Message Block (SMB) protocols.

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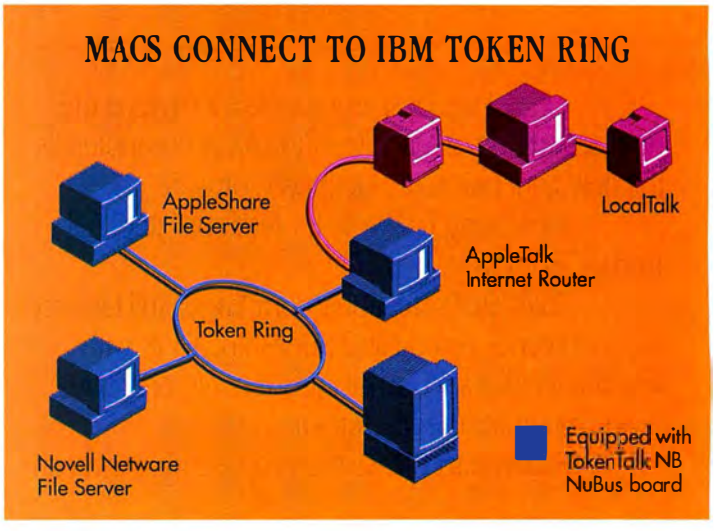

The Apple TokenTalk NB board links NuBus-based Macs to IBM Token-Ring networks.

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Circle 232 on reader service card

The TokenTalk board—based on an intelligent processor board, the NCP (Network Control Processor)—contains its own Motorola 68000 and 512K of RAM, and runs its own non-Mac operating system. Because the NCP is essentially independent from the Mac's CPU, it can handle communications tasks without interfering with an application running on the Mac.

Apple expects to ship the TokenTalk board in the third quarter of 1989. The list price for the TokenTalk NB with the TokenTalk and SMB File Transfer software will be $1250. The MacDFT software lists for $245, and the MacAPPC version 1.1 will be $2500 for a site license.
—*David Ushijima*

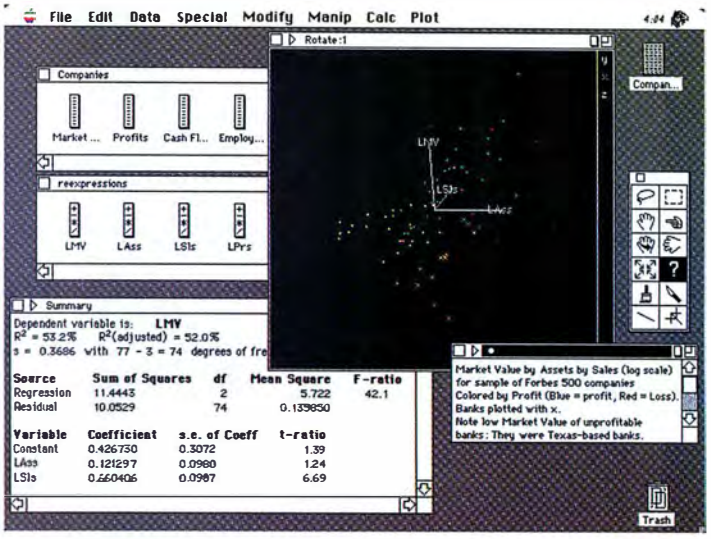
CHRIS SEWARD

Left to right, h-three's Ron Pinkus, James Sutton, Sudie Chitale, Ned Robie, Jim Ingram, and Scott Crenshaw, developers of the MacRing board for the SE.

Board of the Rings

At the same time that Apple was unveiling its hoard of new communications products, h-three Systems Corporation introduced MacRing, the first Token-Ring–compatible board for the Macintosh SE. MacRing supports communications over Token-Ring local area networks to IBM mainframes, other Macs, and IBM PCs and compatibles; users of these systems can share files and programs. MacRing transfers data at 4 megabits per second, and works with PC Token-Ring gateways including the IBM 3174 and the IBM Token-Ring Interface Coupler. The board comes with software that's compatible with Apple's TokenTalk and IPC programs and is reportedly completely compatible with the Novell Netware network operating system. h-three Systems expects that 3270 terminal-emulation software will also become available for the board.

Scheduled for shipment by September, MacRing is expected to retail for between $800 and $900. h-three Systems also has a Mac II board slated to ship by the end of 1989 and an SE/30 board expected in early 1990. For more information, contact h-three Systems in Research Triangle Park, North Carolina, at 919/549-8334.—*T.M.*



A DataDesk 3.0 scatter plot of some Forbes 500 companies by Sales, Assets, and Value. Companies showing losses appear in red, profit makers in blue (the x's represent banks).

Odesta Keeping Up with the Times

Odesta is upgrading its statistical analysis package DataDesk to version 3.0, and is also upgrading GeoQuery, a geographical data analysis package.

DataDesk generates a wide variety of charts and graphs from numeric data entered directly or imported from other applications. The graphs it generates are useful for understanding raw data, and they can also be exported to presentation and page-layout programs. The new version's support for color is valuable for interpreting results, and color makes data graphed in three dimensions easier to see. The new version also adds general linear model support and has a simplified interface.

The new GeoQuery improves on the original's ability to generate map-based reports from geographical data. It can work with data in multiple files at the same time and imports data five times faster than the old version. The new GeoQuery can work with imported scanned maps and can layer maps so that, for example, it could sandwich a road map between a landforms map and a report generated to show likely flood spots based on rainfall

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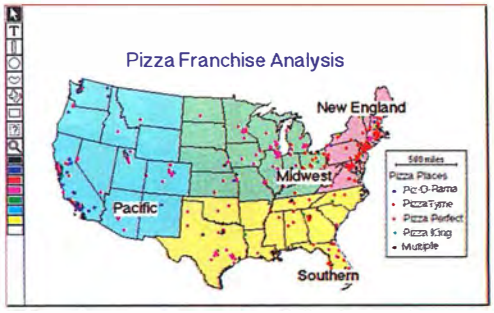

A GeoQuery analysis showing areas dominated by competing pizza parlor chains.

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Circle 196 on reader service card

data. The new version also fills in an annoying gap by giving you the ability to set up groups of regions at one time instead of having to set individual regions manually.

GeoQuery also adds CL/1 support, which will simplify using data stored on a VAX. Odesta expects to have both products available at the Boston Macworld Expo in August. For more information, contact Odesta in Northbrook, Illinois, at 312/498-5615.—*D. L.*

Do Successful Candidates Double-Clique?

Last spring, the familiar curtained enclosures and punchcard ballots for Stanford University's student elections were replaced by rows of Macs displaying on-screen ballots. This was all made possible by a HyperCard program, written by sophomores Ed Sun and Sandy Aronson of Stanford Data Solutions, and installed on 62 computers set up at several locations on campus. Attending every Mac was a poll watcher who activated the program for each voter and explained the voting procedure if necessary. There wasn't much to explain, however; the program presented a series of screens listing constitutional amendments, budget items, candidates for various elected positions, and so on. Voters simply clicked a button for each choice, or filled in a name for a write-in candidate.

Each student's ballot was stored on the voting-booth Mac's hard disk; the files were then collected on floppies and fed to a tabulation program on another Mac. To guard against accidental data loss, each ballot was also printed out in encoded form after it was filled in.

DRAKE SOREY

Election software developers Ed Sun (left), and Sandy Aronson (right), with election commissioner Steve Krauss.

Because the program can be tailored to future elections, on-screen voting at Stanford will now be less expensive than renting traditional voting booths. It's more efficient, since you can undo a choice and click another button at any time during the voting process. And, unlike a written ballot, the Stanford program informs you if you do something illegal—such as selecting too many candidates—that would invalidate a portion of the ballot. Finally, the results of the Mac-based election were tabulated much faster. According to Sun, about 95 percent of the results were ready within an hour after the polls closed, versus a tabulation time of five days last year.

Although this year's election went without a glitch, Aronson and Sun hope to improve their program. They're looking into using a touch screen and may speed up the program by writing it in C instead of HyperTalk. They also hope to write a general version that could be used for other elections and for surveys.

—*Erfert Fenton*

Infrared Light "Cables" Cut Network Costs

For flexible, modular network connections that are easy to install and reconfigure, consider the Photolink infrared cabling system from Photonics. Designed for open office environments, Photolink includes four connectors and supports a Mac in each of four cubicles. The Photolink, typically installed at the top of the intersection of the four cubicles, then communicates with other Photolinks by bouncing its invisible infrared beam off the ceiling.

Unlike some other infrared network products, Photolink is so sensitive that users need not mount reflectors on the ceiling. The infrared beam is wide enough not to be affected by dust, smoke, and the like.

Photonics decided to make Photolink strictly a cable replacement and not a LAN, so you won't have to learn another network operating system. To help with initial setup or subsequent aiming problems, a network-traffic signal-LED on Photolink flashes when data is being transmitted or received.

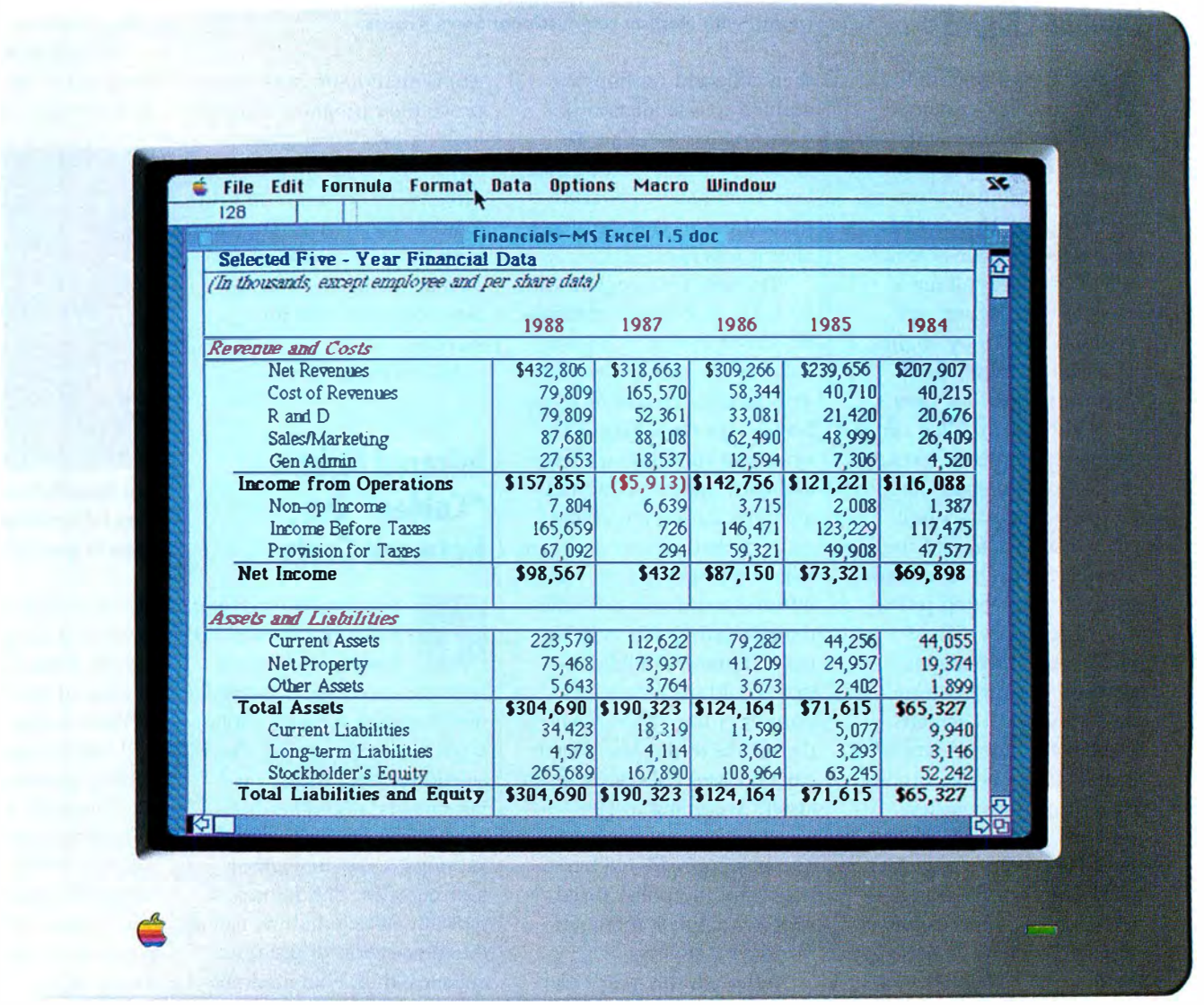
Photolink will be available initially for AppleTalk/LocalTalk devices, with a subsequent version for ASCII/ANSI (RS-232C) computers or terminals. Both versions will operate at the full rated speed of their respective interfaces and will connect to installed cabling systems.

The Photolink cabling system uses infrared light to connect Macs in groups of four.

Photolink will begin shipping in September at a retail price of $995, or about $250 per node. For more information, contact Photonics Corporation in Campbell, California, at 408/370-3033.—*T.M.*

(continues)

90% of Macintosh spreadsheet users have been working on this program.



Selected Five - Year Financial Data

(In thousands, except employee and per share data)

	1988	1987	1986	1985	1984
Revenue and Costs					
Net Revenues	$432,806	$318,663	$309,266	$239,656	$207,907
Cost of Revenues	79,809	165,570	58,344	40,710	40,215
R and D	79,809	52,361	33,081	21,420	20,676
Sales/Marketing	87,680	88,108	62,490	48,999	26,409
Gen Admin	27,653	18,537	12,594	7,306	4,520
Income from Operations	**$157,855**	**($5,913)**	**$142,756**	**$121,221**	**$116,088**
Non-op Income	7,804	6,639	3,715	2,008	1,387
Income Before Taxes	165,659	726	146,471	123,229	117,475
Provision for Taxes	67,092	294	59,321	49,908	47,577
Net Income	**$98,567**	**$432**	**$87,150**	**$73,321**	**$69,898**
Assets and Liabilities					
Current Assets	223,579	112,622	79,282	44,256	44,055
Net Property	75,468	73,937	41,209	24,957	19,374
Other Assets	5,643	3,764	3,673	2,402	1,899
Total Assets	**$304,690**	**$190,323**	**$124,164**	**$71,615**	**$65,327**
Current Liabilities	34,423	18,319	11,599	5,077	9,940
Long-term Liabilities	4,578	4,114	3,602	3,293	3,146
Stockholder's Equity	265,689	167,890	108,964	63,245	52,242
Total Liabilities and Equity	**$304,690**	**$190,323**	**$124,164**	**$71,615**	**$65,327**

To learn more, call for the Microsoft Excel 2.2 brochure, (800) 541-1261, Dept. J72. Customers in Canada, call (416) 673-9811. Outside North America, call (206) 882-8661. ©Copyright 1989 Microsoft Corporation. All rights reserved. Microsoft and the Microsoft logo are registered trademarks and *Making it all make sense* is a trademark of Microsoft Corporation. Macintosh and Mac are registered trademarks of Apple Computer, Inc.

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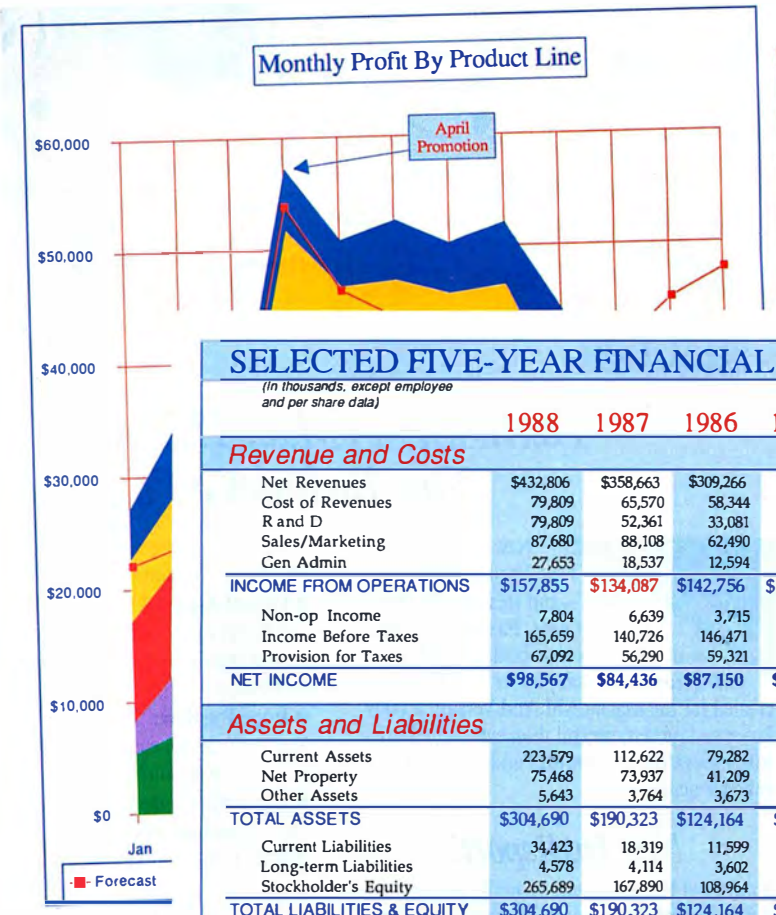

SELECTED FIVE-YEAR FINANCIAL DATA

(In thousands, except employee and per share data)

	1988	1987	1986	1985	1984
Revenue and Costs					
Net Revenues	$432,806	$358,663	$309,266	$239,656	$207,90
Cost of Revenues	79,809	65,570	58,344	40,710	40,21
R and D	79,809	52,361	33,081	21,420	20,67
Sales/Marketing	87,680	88,108	62,490	48,999	26,40
Gen Admin	27,653	18,537	12,594	7,306	4,52
INCOME FROM OPERATIONS	$157,855	$134,087	$142,756	$121,221	$116,08
Non-op Income	7,804	6,639	3,715	2,008	1,3
Income Before Taxes	165,659	140,726	146,471	123,229	117,4
Provision for Taxes	67,092	56,290	59,321	49,908	47,5
NET INCOME	$98,567	$84,436	$87,150	$73,321	$69,89
Assets and Liabilities					
Current Assets	223,579	112,622	79,282	44,256	44,0
Net Property	75,468	73,937	41,209	24,957	19,3
Other Assets	5,643	3,764	3,673	2,402	1,8
TOTAL ASSETS	$304,690	$190,323	$124,164	$71,615	$65,32
Current Liabilities	34,423	18,319	11,599	5,077	9,9
Long-term Liabilities	4,578	4,114	3,602	3,293	3,1
Stockholder's Equity	265,689	167,890	108,964	63,245	52,2
TOTAL LIABILITIES & EQUITY	$304,690	$190,323	$124,164	$71,615	$65,32
Working Capital	189,642	173,468	127,766	119,489	77,0
Number of Employees	3,456	2,727	1,681	1,390	1,0
Common Stock Data					
Net Income per Share	$1.13	$1.64	$1.94	$1.90	$2.5
Book Value per Share	$4.56	$3.56	$2.29	$1.46	$0.7
Cash and Investments	$2.65	$1.60	$0.83	$0.64	$0.4
Average Shares Out	87,535	83,258	44,956	38,634	26,9
Shares Out/Year-end	86,790	51,305	26,589	15,905	9,0
Key Ratios					
Return on Net Revenues	23%	23%	28%	31%	34
Return on Total Assets	32%	44%	70%	102%	107
Return on Stock Equity	37%	50%	80%	116%	134

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Apple Announces IBM Mainframe Connections

Apple has announced key communications products that allow Macs with the NuBus to access both traditional IBM 3270–type mainframe systems and machines in IBM's Systems Network Architecture (SNA) environments.

Three boards based on Apple's Network Communications Processor (NCP), an intelligent communications coprocessor, give Macs access to the three physical layers most commonly used in IBM communications environments. Apple's TokenTalk NB board lets NuBus-equipped Macs connect via the Token-Ring networks. The Apple Coax/Twinax board lets a Mac connect with 3270-type equipment via a coax cable, and with 5250 (System 3X) communications equipment via a twinax connector and yet-to-be-announced third-party software. Apple's Serial NB Card, when used with Apple's MacAPPC software, lets a Mac connect to SNA systems using IBM's serial SDLC protocol. The Serial NB Card contains two high-speed (64-kilobits-per-second) and two lower-speed (19.2-kilobits-per-second) serial ports. Each of the three boards contains its own 68000 processor and RAM, and runs its own multitasking operating system. Because the NCP is a self-contained coprocessor, it handles communications tasks without burdening the Mac's CPU.

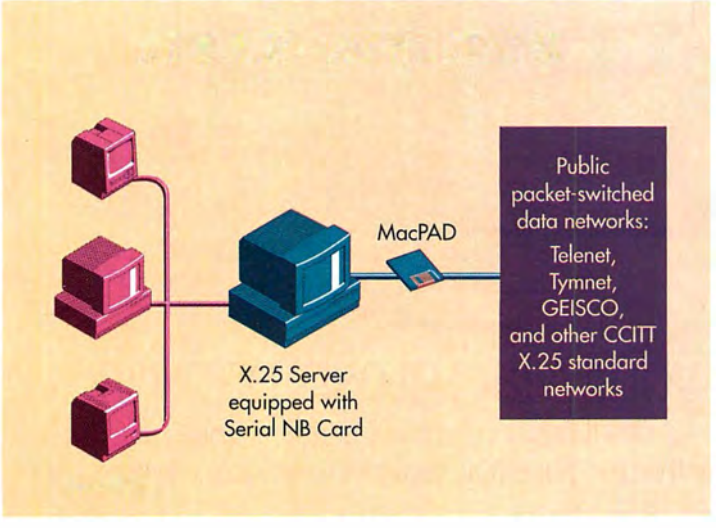
The Coax/Twinax board, when used with MacDFT software, emulates a 3270 terminal running a single CUT (Control Unit Terminal) session or up to five simultaneous DFT (Distributed Function Terminal) sessions. The new Apple 3270 products will compete with similar products from Digital Communications Associates' MacIrma product line and Avatar's MacMainframe series.

Apple's Serial NB Card can be run with either of two Apple packages. MacAPPC software lets the Mac connect with other SNA-connected machines via the LU 6.2 and PU 2.1 peer-to-peer protocols. The second configuration is a first for the Mac: Apple's X.25 Server and MacPAD software, used with the Serial NB Card, let the Mac connect to public packet-switched data networks like Telenet and GEISCO in the United States, and to various networks in Europe, Canada, and Australia that conform to the CCITT X.25 standard. The X.25 Server software lets a Mac act as a network server for the X.25 network. Other Macs would access the X.25 services via the AppleTalk network. The packet assembly/disassembly (PAD) software on the server creates outbound data packets or unpacks incoming data packets from the X.25 network.

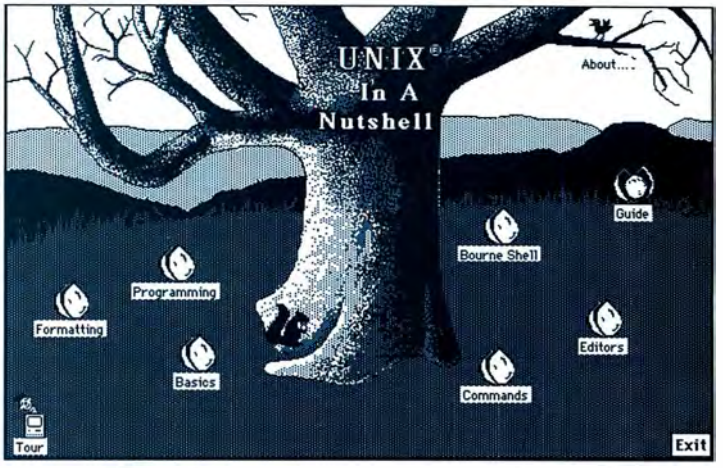
The Apple Coax/Twinax board with MacDFT software, scheduled to ship in the third quarter of 1989, will sell for $1495. The Serial NB board will also be available then for less than $1200. Both boards will be available from qualified Apple dealers.

The MacAPPC version 1.1 software will sell for $2500. The X.25 Server and MacPAD client software package will be available in the third quarter of 1989 for $800. Both products will be available from APDA and qualified systems resellers.

—David Ushijima



Using Apple's Serial NB Card, X.25 Server, and MacPAD software, for the first time Macs can connect to X.25 data networks.



UNIX in a Nutshell is a HyperCard-based guide for learning the complexities of UNIX.

A Different Kind of UNIX Shell

To the Macintosh user, UNIX can seem forbidding. Its unforgiving command line–driven interface, vast set of features, and voluminous documentation tend to make the uninitiated despair. So, what better way to prepare than with a gentle HyperCard guide?

UNIX in a Nutshell, a two-disk shareware stack written by Dale Dougherty and published by O'Reilly & Associates, opens up in a peaceful meadow under the shade of a gigantic tree. Several nuts lie about in the grass; click on one and you're led to a stack chock-full of information about UNIX. There are six primary stacks covering the basics, commands, formatting, text editors, programming,

(continues)

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and two common shells: the Bourne Shell and C Shell. In addition, another stack explains how stackware works and how to navigate the Nutshell stacks. It's the best guide to browsing HyperCard I've ever seen.

UNIX in a Nutshell allows you to leave bookmarks throughout the stacks to keep track of where you've been; it even provides pop-up windows to jot down a few notes about **ipcrm**, **S ls /lib/libc***, **sdb [-w][-W][objfile [corefile [dir]]]**, or other UNIX denizens you meet on your journey. Too bad Dougherty had to use HyperCard for developing this tour instead of something that runs under UNIX. Someday soon you may be able to work in UNIX protected by a shell as friendly as HyperCard, but for now this is a pretty comfortable ride.

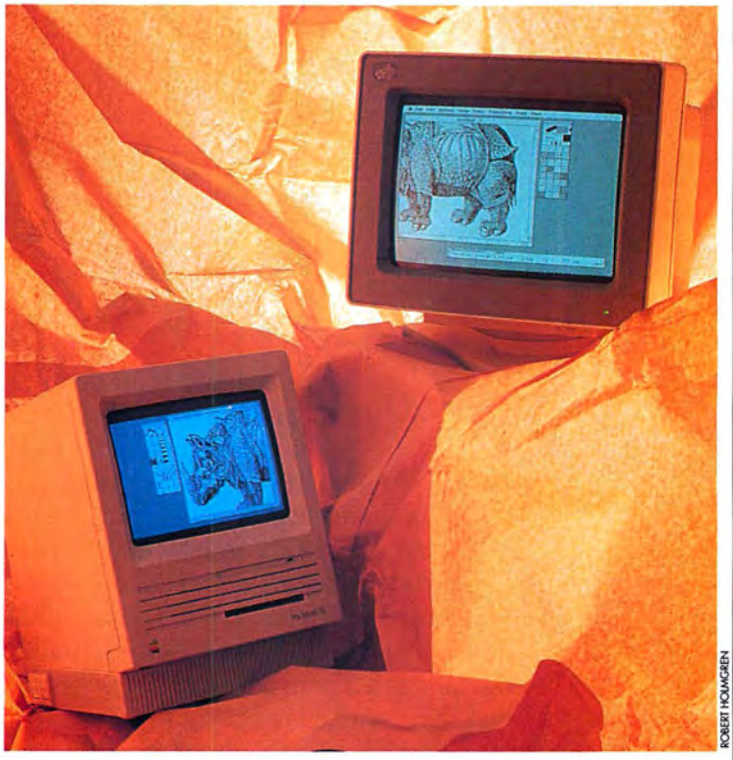
For more information, contact O'Reilly and Associates at 800/338-6887.—*D.L.*

Alien Monitors Plugged In to My Mac!

If you'd like to hook your Mac up to almost any monitor—including a VGA, TTL, or multisynching display—then take a look at DisplayServer from Lapis Technologies. DisplayServer is an add-in board that currently comes in two versions, one for the SE, the other for the Mac II series. Once the board is installed, you can hook an SE to an external monochrome monitor. DisplayServer can also drive your sole monitor on any member of the Mac II family, or you can add as many DisplayServers and monitors as you have available NuBus slots.

The boards are based on a new semiconductor technology called LCA (Logic Cell Array). DisplayServer's LCA chip is programmable, so you can load new drivers and driver updates into the board from disk.

The boards come with two small, interchangeable connector boards: the first connector board includes one connector for Apple monochrome monitors and another connector for TTL monitors; the second connector board has one connector for VGA and another for TTL. All the connectors can support multisynching monitors, depending on their connector.



ROBERT HOLMGREN

The DisplayServer card can support an external TTL, multisynchronous, or VGA monitor (shown above).

DisplayServer supports a wide variety of configurations. You can use one monitor as the only display for your IBM PC or PS/2, then unhook it and use it as your second monitor with an SE or II. If you work in a large enough organization, you may find you can recycle IBM-compatible monochrome monitors that have been replaced with color displays. And DisplayServer also gives you access to the generally less expensive monitors of the IBM PC and PS/2 worlds.

DisplayServer for the SE lists at $449, and for the NuBus version at $499. Both are scheduled to ship in August. Lapis Technologies is in final design stages of accelerated versions of the first two DisplayServer boards, and plans to offer a third DisplayServer version for the DirectSlot in the SE/30. For more information, call Lapis Technologies in Alameda, California, at 415/748-1600. —*T.M.*

Wallaby's Laptop Bounds into the Ring

While the world waits for Apple to get its laptop act together, Wallaby Systems plans to unveil its own alternative at MacWorld Expo in mid-August. What's unusual about the Wallaby Laptop System is that it is a complete, free-standing Mac compatible that can connect to a Plus or an SE and accelerate those systems with its own 16MHz processor. It also adds its system RAM to that of the Apple system, so that a user has access to as much as another 4MB. The connection requires the installation of an add-in board to the Plus or the SE (Wallaby recommends that a dealer do the installation for the Plus).

The portable's backlit LCD offers 640 by 400 resolution and can also work as a second display for the Mac. Laid out like the SE keyboard, the portable's full-size keyboard incorporates Alps Electric Company's IsoPoint pointing device instead of a mouse. The IsoPoint is a thin cylinder that fits below and parallel to the space bar, so you can roll it and slide it back and forth with your thumb.

The basic system includes the LCD screen, keyboard, 1MB of RAM, an 800K floppy disk drive, a removable and rechargeable battery, and an external combined battery charger and AC power supply. Wallaby Systems expects that the portable's retail price will be $2995. Options include a mouse, RAM disk, SCSI cable, and a hard disk

(continues)

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drive, which must replace the floppy drive. Another option is a 1.4MB floppy drive. (Both the 800K and 1.4MB floppy drives can read and write Apple and IBM files.)

Demonstration versions of the Wallaby Laptop System should be available in the fourth quarter of 1989, with quantity production slated for the first quarter of 1990. For more information, call Wallaby Systems in Boulder, Colorado, at 303/444-4606.—*T.M.*

AppleTalk: Bigger and Better

If your AppleTalk networks have been getting out of hand, Apple's latest version of AppleTalk protocols will probably prove to be just what the doctor ordered. AppleTalk 2.0 lets you create networks of more than 254 devices while making it easier to split the network into pieces that are more manageable.

Many of the changes will be invisible to the network user, who will probably just notice that some things happen faster, to the tune of a 20 to 30 percent improvement in performance. That's due to the better handling of the protocols' processing overhead.

Apple's new AppleTalk Internet Router is a software-only solution for splitting large networks into smaller nets to localize network traffic. Much like Infosphere's Liaison, it runs in the background and can be used to install AppleTalk on both serial ports rather than on just the printer port. The router can also handle routing among up to eight network connections, such as between EtherTalk and TokenTalk boards in a Mac II—providing a simple way to connect Macs on Ethernet and LaserWriters on LocalTalk, for instance.

Apple has also upgraded its EtherTalk software to maintain compatibility with the new features of AppleTalk 2.0. In addition, version 2.0 of AppleShare PC for linking MS-DOS micros to an AppleShare server is now available. Its most important feature is its ability to work with PC Ethernet boards that conform to the MLI interface, such as 3Com's Etherlink series. —*Dave Kosiur*

Smart Paper

Most optical character recognition (OCR) products scan typed or typeset documents for text entry, but one company is targeting a different market niche.

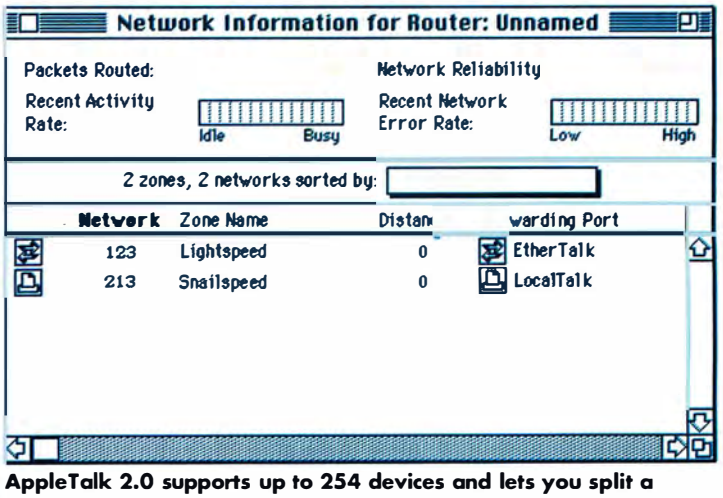
Datacap's Paper Keyboard, a handwriting recognition system for data entry, scans hand-printed forms and extracts the data for entry into a database or spreadsheet. It's designed to be a paper surrogate for a keyboard in situations where taking along a computer might not be feasible—a physician visiting patients, for example, or a salesperson out in the field. The user can fill out forms by hand on-site and later deliver, or even fax, them for scanning and exporting to a spreadsheet or a database.

The Paper Keyboard reads scanned handwritten forms and converts them to database-ready format.

Scanning hand-printed forms for export into computer files is nothing new, but until now it required a mainframe or minicomputer with special hardware and specially printed forms. Paper Keyboard, by contrast, is software-only and works with most scanners. With Paper Keyboard you can design your own forms using any page-layout or forms-design software. A special domino-like character that Datacap provides has two dots to act as guides when you fill out a form with block letters. Blank forms can be printed on any Mac-compatible laser printer.

It takes Paper Keyboard 30 to 35 seconds to scan and recognize a full-page form. Datacap claims that its system reads computer type with 98 percent accuracy and handwritten data with 75 percent accuracy; unrecognized characters are assigned to an editable exceptions report.

Paper Keyboard is MultiFinder-compatible, requires 2MB of RAM, and sells for $1750. For more information, contact Datacap in Yonkers, New York, at 914/423-7925. —*Mary Margaret Lewis*



AppleTalk 2.0 supports up to 254 devices and lets you split a large AppleTalk network into smaller, more manageable pieces.

UNIX Network News

With version 2.0 of EtherTalk, Apple has now included support for A/UX—providing improved ways to access UNIX systems. Apple is also preparing MacX, which will allow Mac users to run X Windows applications without installing A/UX. (X Windows is becoming one of the prime platforms for windowing on UNIX systems, and its support was recently included in A/UX version 1.1.)

Even though X Windows lacks the feature-laden interface associated with the Mac, MacX provides the regular look-and-feel of Mac windows (resizing, moving, zooming) for manipulating X

(continues)

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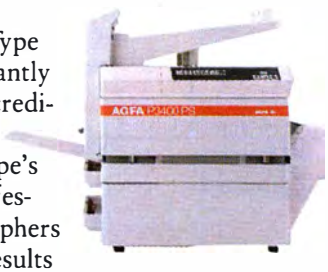

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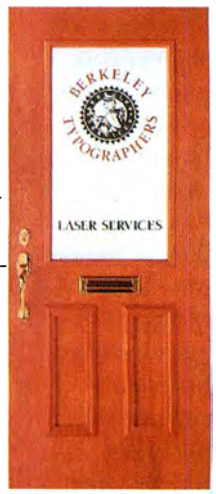

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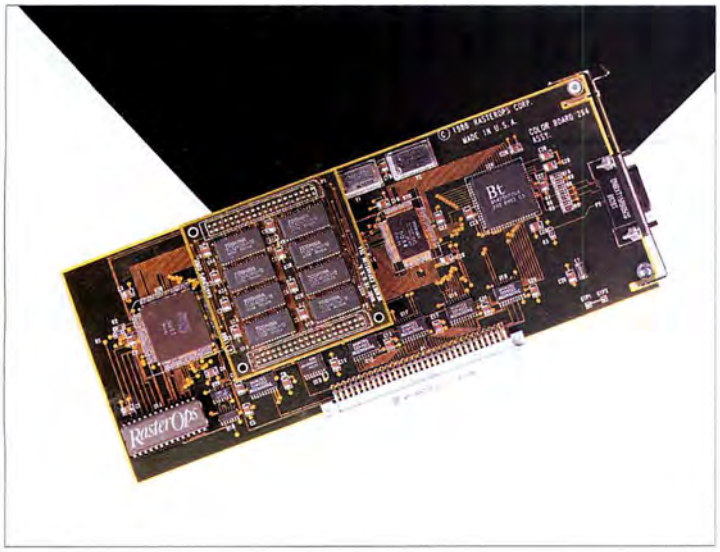


RasterOps's ColorBoard 264 is the first 24-bit color board with a suggested retail price that's less than $1000.

Windows. MacX also supports cut and paste from X Windows using the Clipboard, as well as both monochrome and color modes.

Network connections for MacX can be set up with AppleTalk as well as with DECnet implementations from third-party vendors. MacX is due to ship by year's end, for less than $300.
—*Dave Kosiur*

24-Bit Color Board Breaks Price Barrier

RasterOps has already begun production of a 24-bit color display board that will retail for under $1000—a dramatic price breakthrough, considering the current $3000 to $4000 price of comparable boards. The result of a year of development, the ColorBoard 264 uses several surface-mount VLSI devices to achieve its low price and high degree of integration. It will be available in versions for the Mac II family and the SE/30.

Kieth Sorenson, president of RasterOps, feels that 24 bits is the future and that 8-bit boards will be gone in two years. The new board will bring the cost of a 24-bit color system clown within reach of even relatively inexpensive software applications, according to RasterOps. "A Mac II with a 24-bit board is now cheaper than an IBM 386 machine with a Targa 16 board," says David Smith, RasterOps's vice president of engineering. The board will begin shipping in quantity after its announcement at Macworld Expo in August.

The basic ColorBoard 264 board supports 8 bits only, but users can upgrade it to 24 bits with a simple 1MB video RAM piggyback board. RasterOps expects that the 8-bit version will cost less than Apple's $650 8-bit board, which is not expandable to 24 bits.

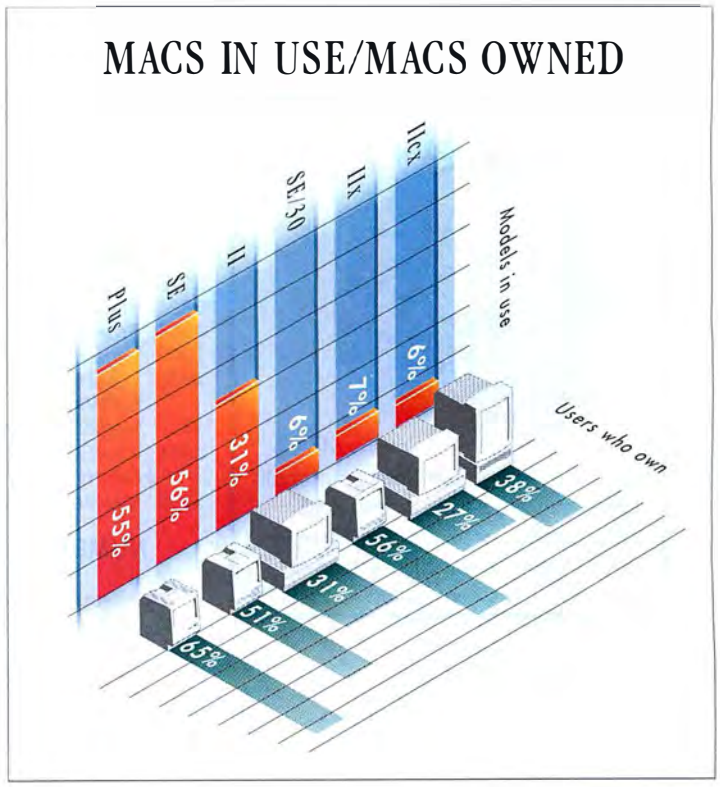
Completely compatible with 32-bit QuickDraw, the ColorBoard 264 supports 640 by 480 resolution in 1-, 2-, 4-, 8-, and 24-bit modes. It is designed primarily for 13-inch Mac monitors such as those available from Sony, NEC, Mitsubishi, Toshiba, and Apple. ColorBoard 264 supports the block transfer mode of the NuBus, but only in conjunction with a bus master board that has block transfer capability. For more information, call RasterOps Corporation in Santa Clara, California, at 408/562-4200.—*T.M.*

Reader Survey: Macs at Home

This month 520 subscribers responded to our survey, telling us what hardware and software they own or use. Amazingly, almost as many of you own SE and Mac II series machines (46 percent) as own earlier models (54 percent). Fully 69 percent of you now own hard disks, and at-home laser printer ownership has climbed to 17 percent.

Survey response suggests that you've got the applications to match: word processor users among you number 97 percent; 77 percent of you use graphics applications; 70 percent use spreadsheets; 48 percent use communications software; and 44 percent do page layout.

Finally, all that hardware and software is being put to good use: of the multitude of people working with word processors, half are processing words from 5 to 24 hours a week; a third of the spreadsheet, graphics, and page-layout users are spending 5 to 24 hours a week with those applications; and 20 percent of the communications software users are on-line 5 to 24 hours a week.—*D.L.*



Mac users by model and ownership by users. Note that among high-end Mac users the SE/30 and the IIcx have the highest ownership levels. This may reflect their relatively low prices.

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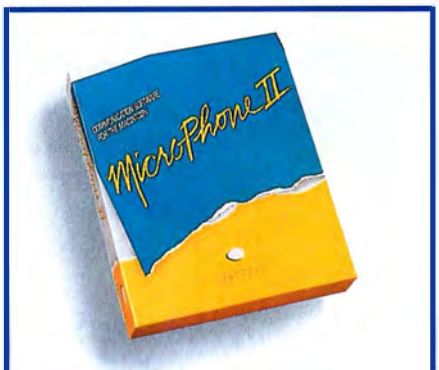

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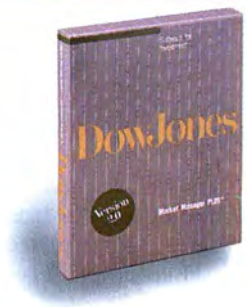

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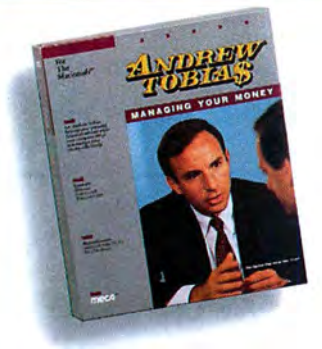

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4578	68 American	125.
4579	69 ITC Serif Gothic	179.
4817	70 Century Expanded	95.
4818	71 Serifa	179.
4819	72 Caslon Open Face	63.
4820	73 Frutiger	239.
4821	74 Centennial	239.
4822	75 Stemple Garamond	125.
4823	76 Weiss	125.
4824	77 Garamond 3	125.
4825	78 Univ News Comm/Greek	95.
4826	79 Avenir 1	179.
4827	80 Avenir 2	179.
4828	81 Walbaum	125.
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5239	84 Concorde	125.
5240	85 Gothic 13	95.
5241	86 Cochin	$125.
5242	87 ITC Bauhaus	125.
5243	88 Sabon	125.
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5247	92 Post Antiqua	95.
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5249	94 Linoscript	95.
5250	95 VAG Rounded	125.

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1330	Freehand 2.0	349.
4751	Persuasion 1.0	375.
1331	PageMaker 3.01	389.

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1195	Fontographer 3.0 *(CP)*	219.

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4465	DTP Advisor 1.0	47.

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4839	Vivid Impressions	67.
1576	1 Bodoni	46.
1587	2 Sans Serif	46.
1588	3 Ritz	46.
1589	4 Monterey	46.
1590	5 Calligraphy	46.
1591	6 Prelude	46.
1592	7 Coventry-Zephyr	46.
1593	8 Dorovar-Gregorian	46.
1594	9 Cyrillic	46.
1577	10 Bodoni Ultra	46.
1578	11 Sans Serif Bold	46.
1579	12 Sans Serif Extra Bold	46.
1580	13 Gatsby Light	46.
1581	14 Micro	46.
1582	15 Micro Extended	46.
1583	16 Galileo Roman	46.
1584	17 Campanile-Giotto	46.
1585	18 Alexandria	46.
1586	19 Jott	46.
4204	20 Gazelle & Kells	46.
4205	21 Paladin-Abalene	46.
4206	22 Collegiate	46.
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4836	Headline Pack *(Vol. 10-12)*	129.
4837	Modern Pack *(Vol. 7, 14-18)*	189.
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4841 Cliptures: Business 2 . . . . . 85.
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2199 MacRecorder 2.0 . . . . . 164.
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2619 Image Studio 1.5 . . . . . 275.
4709 LetraStudio 1.0 . . . . . 275.
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★Postcraft Int'l. ... 60 day MBG
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4621 QuarkStyle 1.0 . . . . . 175.
3230 Quark XPress 2.1 . . . . . 495.
★Softstream Int'l., Inc. ... 60 day MBG
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3532 Certificate Library . . . . . 18.
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4500 Springboard Publisher 1.0 . . . . . 109.
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Bantam Publishing
1403 Complete HyperCard Handbook . . 23.
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4968 HyperBible *(New International)* 1.0 179.

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5166 SmallTalk/V Mac 1.0 . . . . . 129.
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4115 MacGallery *(HyperCard format)* . . . 27.
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5435 HyperOne 1.0 . . . . . 29.
4233 Icon Factory 1.0 . . . . . 29.
5089 Script Library 1.0 . . . . . 29.
5090 Silver Screen 1.0 . . . . . 40.
4265 Script Expert 1.0 . . . . . 45.
5434 Intelligent Developer 1.0 . . . . . 225.
Individual Software
4719 101 Scripts & Buttons Hypercard 1.0 . 36.
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4317 Aztec SDB . . . . . 65.
4316 Aztec C UniTools . . . . . 65.
4069 Aztec MPW C 3.6B . . . . . 99.
4075 Aztec C + SDB 3.6B . . . . . 99.
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5440 HyperHIT 1.0 . . . . . 125.
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4495 Family Matters 1.0 . . . . . 28.
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3421 THINK Pascal 2.0 . . . . . $89.
3420 THINK C 4.0 . . . . . 149.
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1338 Reports! 1.2 . . . . . 69.
4638 Focal Point II 1.0 . . . . . 117.
★TML Systems ... 30 day MBG
3548 TML Source Code Library II 1.1 . . . 39.
4989 TML Pascal II 3.0 *(w/o MPW 3.0)* . . . 57.
3549 TML Pascal II 3.0 *(w/MPW 3.0)* . . . 109.
Trendware
5203 Stack Cleaner . . . . . 29.
5202 HyperTools #1 1.02 . . . . . 52.
5199 HyperTools #2 1.03 . . . . . 52.
True BASIC, Inc.
3587 True BASIC 2.01 . . . . . 59.
3573 Arithmetic . . . . . 35.
3571 Algebra Utilities . . . . . 35.
3575 Calculus Utilities . . . . . 35.
3580 Pre-Calculus *(with Trigonometry)* . . . 35.
3583 Scientific Graphics Tool Kit . . . . . 49.
★Zedcor ... 60 day MBG
3985 ZBASIC 5.0 . . . . . 95.

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1016 Tempo II 1.02 . . . . . 79.
★Berkeley Systems ... 30 day MBG
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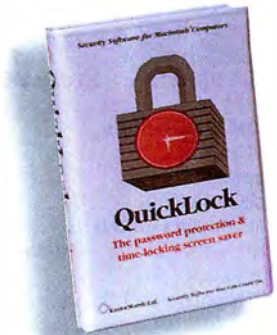
Borland
1510 Sidekick 2.0 . . . . . 68.
★Bravo ... 30 day MBG
5404 SPAMM . . . . . 49.



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5041 PC Tools Deluxe Mac 1.1 ..... 46.

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4287 PYRO! 3.3 *(screen saver)* ..... 15.
3954 PowerStation 2.5 ..... 35.
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5178 FastBack II 1.0 ..... 108.

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4803 Virex 1.41 ..... 59.

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4084 On Cue 1.3 ..... 35.

Ideaform

2419 DiskQuick 2.10 ..... 27.
2420 MacLabeler Plus 3.0 ..... 42.

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2592 MacSafe 1.08C ..... 87.

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5442 PictureBook ..... 40.

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4848 INITPicker 1.0 ..... 27.
4210 Screen Gems 1.0 ..... 42.
2913 Redux 1.5 ..... 52.

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4503 MultiClip 1.01 ..... 51.

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3175 HFS Backup 3.0 ..... 54.

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3783 myDiskLabeler w/Color 2.9.1I..... 29.
3784 myDiskLabeler w/LaserWriter 2.9.1LI. 34.
3780 ImageWriter II Label Pack *(Qty. 216)* 16.
3781 LaserWriter Label Pack *(Qty. 216)* .. 20.
4976 Sticky Business 1.0.6 ..... 95.

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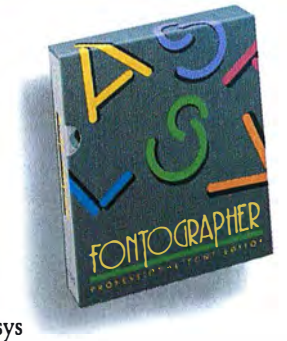
5177 XTreeMac 1.0 ..... 52.



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1324 FullWrite 1.0 ..... 259.

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1129 MacWrite II ..... 185.

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1767 Comment 2.0 ..... 59.
1768 Coach Professional 3.0C ..... 115.

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2684 WorksPlus Spell 2.0 ..... 57.

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4870 Electronic WordFinder 220 ..... 75.

★Microsoft ... 30 day MBG

2885 Write 1.0 ..... $79.
4969 Word 4.0 ..... 249.

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4602 EndNote 1.2.1 ..... 75.

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3790 Lookup 1.0C ..... 30.
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3792 Spellswell 2.0G ..... 45.
4693 QuickLetter 1.0 ..... 73.

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4255 Super Studio Session 2.0 ..... 69.
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1460 String Quartet ..... 14.
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4832 Sound Effects ..... 14.

Bright Star Technology

1402 Alphabet Blocks 1.0 ..... 30.
3961 Talking Tiles 1.0 ..... 69.

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4314 Type! 1.0 ..... 19.
1423 Jam Session 1.1 *(CP)* ..... 30.
1422 Geometry 1.2 *(CP)* ..... 59.
4067 Calculus 1.2 *(CP)* ..... 59.
1426 Physics *(CP)* ..... 59.

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4483 Perceive 1.0 ..... 50.

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FastNet LAN 020–Combines the speed of the 68020 accelerator with the convenience of FastNet connectivity to create a powerful workstation from your Mac SE. *See line listing.*

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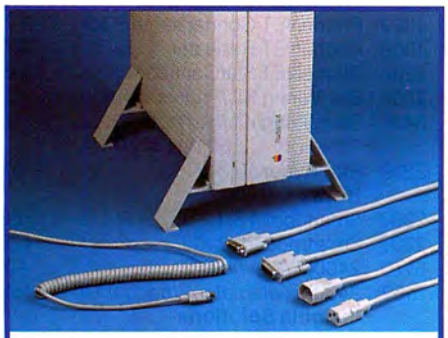

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Mac II Stand & Cable Kit–Everything you need to get the Mac II off your desk and out of your way. Monitor and keyboard extension cables allow you to position your monitor up to eight feet away from your CPU . . . . . $65.

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4619 Mavis Beacon Typing 1.2B *(CP)* . . . 33.
1846 Deluxe Music Construction Set 2.5 . 84.

First Byte

5294 The Puzzle Storybook 1.0 *(ages 3-8)* 27.
5293 Dinosaur Discovery Kit 1.0 *(ages 3-8)* 27.
3941 SmoothTalker 2.1 . . . . . 33.
3935 Speller Bee 2.0 . . . . . 33.
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2277 TimeMasters 1.0 . . . . . 22.
2276 KidsTime 1.2 . . . . . 26.
4334 NumberMaze 1.0 . . . . . 26.
2273 ConcertWare+ 4.0 . . . . . 38.
2271 ConcertWare+ MIDI 4.0 . . . . . 78.

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2670 Reader Rabbit 2.1 *(CP)* . . . . . 31.
5453 Talking Math Rabbit 1.0 . . . . . 31.

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2748 The Perfect Score: SAT 1.0 . . . . . 32.

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5094 E6 Linking Spreadsheets . . . . . 29.
5095 E7 Advanced Spreadsheets . . . . . 29.
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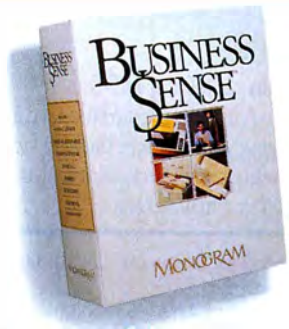
3753 Fraction Action *(CP)* . . . . . 27.
3755 MacRobots *(CP)* . . . . . 27.
3754 Read-A-Rama *(CP)* . . . . . 32.



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5127 Manhole *(CD ROM)* . . . . . 35.
4490 Might & Magic *(CP)*. . . . . 35.
4592 Zork Zero *(CP)* . . . . . 35.

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4474 Fellowship of the Ring *(CP)* . . . . . 24.

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4099 Shufflepuck Cafe *(CP)*. . . . . 24.
4965 Auto Duel *(CP)* . . . . . 27.
1421 Ancient Art of War *(CP)* . . . . . 27.
4540 Ancient Art of War at Sea *(CP)*. . . . . 27.
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4966 SimCity 1.1 *(CP)* . . . . . 29.

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1544 Ferrari Grand Prix *(CP)* . . . . . 32.
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2268 Crystal Quest 2.2T . . . . . 25.
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4064 Chuck Yeager Flight Simulator ..... 32.
4588 Life & Death *(CP)* ..... 32.
4945 The Hunt for Red October ..... 32.

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2037 Sub Battle Simulator ..... 29.
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5253 The Puzzle Gallery ..... 27.
2765 Fool's Errand *(CP)* ..... 32.
2767 Harrier Strike Mission II *(CP)* ..... 32.

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4083 Balance of Power 1990 *(CP)* ..... 30.
3987 Colony *(CP)* ..... 30.
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2743 Crossword Magic *(CP)* ..... 30.
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2751 Uninvited *(CP)* ..... 30.
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4320 MacGolf Classic *(CP)* ..... 53.
4212 MacCourses ..... 20.
4321 Lunar Rescue *(CP)* ..... 34.
4517 Road Racer *(CP)* ..... 39.

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3501 Apache Strike ..... 32.
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4001 Solitaire Royale *(for Mac II)* ..... 19.
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4472 Tetris *(color version)* ..... 24.
3462 PT-109 ..... 26.
3460 GATO ..... 26.
3459 Falcon 2.0 ..... 31.

★Spinnaker ... 30 day MBG

2328 Sargon IV *(CP)* ..... 29.

★Springboard ... 30 day MBG

4988 Hidden Agenda ..... 36.

★SubLogic ... 60 day MBG

4698 Jet *(CP)* ..... 32.

NETWORKS & COMMUNICATIONS

★Abaton ... 30 day MBG

4589 InterFAX Modem ..... 349.

★CE Software ... 60 day MBG

5174 QuickMail *(5 user Pak)* ..... 175.
5173 QuickMail *(10 user Pak)* ..... 259.

Chang Labs ... 60 day MBG

Rags to Riches 3 Pak Special—One of the Mac's first and best accounting packages. Includes AR, AP, & G.L. Buy before Sept. 30, 1989, and receive your choice of Professional Billing or Inventory Control FREE! ..... $289.

★CompuServe ... 60 day MBG

1676 CompuServe Information Service ..... 24.
1673 CompuServe Navigator 3.0 ..... 45.
1674 Standard Service/Navigator Bundle 59.

Connect, Inc.

5445 MacNet ..... 47.

★DataViz ... 60 day MBG

1823 MacLink Plus/PC 4.0 ..... 139.
4842 MacLink Plus/Translators 4.0 ..... 115.

★Dove Computer ... 60 day MBG

4939 FastNet III ..... 450.
4938 FastNet SE ..... 450.
4937 FastNet SCSI ..... 925.

★Dow Jones ... 30 day MBG

5295 News/Retrieval Membership Pack. 24.
1785 Desktop Express 1.03 ..... 95.

★Farallon Computing ... 30 day MBG

4208 Timbuktu 2.0.1 ..... 65.
4866 Timbuktu Remote 1.0.1 ..... 195.
4867 Timbuktu 30-Pack 2.0.1 ..... 1325.
2201 TrafficWatch 1.08 ..... 135.
2202 PhoneNET to LocalTalk Adapter ..... 9.
2203 PhoneNET PLUS *(DIN-8)* ..... 35.
2204 PhoneNET PLUS *(DB-9)* ..... 35.
5251 PhoneNET CheckNET ..... $65.
4869 PhoneNET Connector 10-Pack ..... 215.
4868 PhoneNET Repeater ..... 325.
2206 PhoneNET StarController ..... 1095.
2205 Star Wiring Kit *(Punchdown)* ..... 65.
5455 Star Wiring Kit *(Harmonica)* ..... 65.

★Freesoft ... 60 day MBG

2219 Red Ryder 10.3 ..... 52.

Hayes

2300 Smartcom II 3.1 ..... 88.
2307 Smartmodem 2400 ..... 429.
5170 2400M *(internal)* ..... 419.
5169 2400M *(internal w/Smartcom II)* ..... 459.

Insignia Solutions

4089 SoftPC 1.3 ..... 249.

Intel Corporation

5119 2400 Baud External Modem ..... 179.

★Lamir ... 30 day MBG

4984 Acknowledge 1.0 ..... *special* 289.

★Microsoft ... 30 day MBG

2875 Microsoft Mail 1.37 (1-4 users) ..... 195.
2872 Microsoft Mail 1.37 (5-10 users) ..... 325.
2873 Microsoft Mail 1.37 (11-20 users) ..... 489.
2874 Microsoft Mail 1.37 (21-32 users) ..... 625.

★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 1.5 ..... 225.

★Shiva ... 30 day MBG

3444 NetSerial X232 ..... 279.
4347 NetBridge ..... 349.
4942 TeleBridge ..... 349.
3443 NetModem V2400 ..... 439.

★Software Ventures ... 30 day MBG

3454 MicroPhone 1.5 ..... 115.
3455 MicroPhone II 3.0 ..... 219.

★Solutions Int'l. ... 60 day MBG

4308 BackFAX *(reqs. Apple FAX modem)* ..... 125.

★Synergy ... 30 day MBG

3130 VersaTerm 4.0 ..... 89.
3131 VersaTerm-PRO 3.0 ..... 175.

★TOPS ... 30 day MBG

4188 TOPS Teleconnector *(DIN-8)* ..... 29.
4189 TOPS Teleconnector *(DB-9)* ..... 29.
3726 TOPS for DOS 2.1 ..... 115.

Digitalk ... 60 day MBG

SmallTalk/V Mac 1.0—The original object-oriented development environment. Extensive manual and tutorial. Easy integration with other languages. Complete toolbox access. MultiFinder friendly ..... $129.

"The Warranty From Hell."

Dear MacConnection,

When I tried to boot my new *ThunderScan* program from MacConnection, all I got was a fearsome bomb. I'd heard horror stories about mail order, and thought, great, it's my very own double feature: "Night of the Undead Hardware" and "The Warranty From Hell."

But, I called your toll-free Technical Support Line. I explained the problem to Paul, who suggested there was a ROM incompatibility problem. He confirmed this diagnosis with Thunderware. The solution was shipped to me. No "Warranty from Hell." Just a pleased customer who will definitely use you again.

Stephen Leigh
Cincinnati, OH

1-800/622-5472

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Just for the record, all the ads in this series feature photographs of real live MacConnection customers and the real live letters they wrote us. Really!

money-back guarantee.

High Density Disks

★Verbatim ... 30 day MBG

3773 3½" HD Disks *(1.44 Meg)* ..... $32.
3298 **Sony** 3½" HD Disks *(1.44 Meg)*... 32.
2793 **MAXELL** 3½" HD Disks *(1.44 Meg)* 32.

Tape Cartridges

3943 **3M** DC2000 ..... 25.
3944 **3M** DC600A ..... 29.

ACCESSORIES

★Avery ... 60 day MBG

4864 Disk Labels 3½" *(Qty. 250)*..... 13.
5392 Disk Labels—Laser 3½" *(Qty. 630)*. 29.
5403 Address Labels 17/16" x 4" *(Qty. 1000)*... 9.
4865 Address Labels 3½" x 15/16" *(Qty. 3750)* 15.
4811 Transparencies 8½" x 11" *(Qty. 50)* 22.
4813 Round Lables 3½" (Qty. 150)..... 7.
4812 Laser Labels ½" x 1¾" *(Qty. 2000)* . 7.
4807 Laser Labels 1" x 2⅝" *(Qty. 3000)* . 24.
4808 Laser Labels 1½" x 4" *(Qty. 1400)* . 24.
4809 Laser Labels 2" x 4" *(Qty. 1000)*... 24.
4810 Laser Labels 8½" x 11" *(Qty. 100)* . 24.

★Computer Coverup ... 60 day MBG

1722 ImageWriter LQ Cover ..... 8.
1723 ImageWriter II Cover ..... 8.
1720 Mac Plus Cover..... 10.
1724 Mac SE Cover..... 10.
1725 Mac SE Ext. Keyboard Cover Set .. 10.
4657 LaserWriter II Cover..... 10.

★Goldstein & Blair ... 30 day MBG

2267 *The Macintosh Bible* (2nd Edition).. 20.

★I/O Design ... 30 day MBG

2379 MacLuggage Imageware II..... 49.
2376 MacLuggage Macinware Plus .... 64.
2381 MacLuggage Macinware SE..... 75.

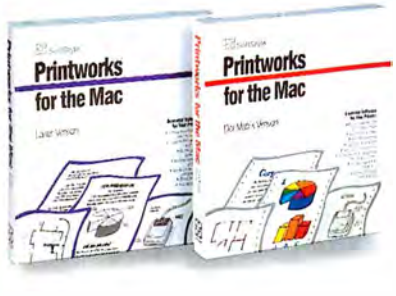
Kalmar Designs

2531 Teakwood Roll-top Case *(holds 45 disks)* 14.
2532 Teakwood Roll-top Case *(holds 90 disks)* 21.
2533 Teakwood Roll-top Case *(holds 135 disks)* 31.

★Kensington ... 30 day MBG

MacConnection carries the entire line of Kensington's accessories. Partial listing below.

2577 Mouseway Pad..... 8.
2569 Mac SE Ext. Keyboard Cover Set ... 9.



Softstyle

Printworks–Laser version provides compatibility with HP and other Lasers. Dot matrix version prints faster and in color on the Imagewriter.

Printworks 3.5 (Dot Matrix) ..... $43.
Printworks 3.6 (HP Laser)..... $85.

2558 ImageWriter II Dust Cover..... $9.
2589 Universal Printer Stand..... 15.
2545 Universal Copy Stand..... 22.
2573 Tilt/Swivel *(platinum)*..... 22.
4126 LaserWriter II Dust Cover..... 17.
4971 Modem/FAX Protector 20..... 25.
4973 Power Tree 20..... 27.
4974 Power Tree 50..... 54.
2559 Apple Security Kit..... 34.
2568 Maccessories SuperBase..... 34.
2585 Printer Muffler 80 ..... 43.
4070 System Saver SE..... 52.
2566 System Saver Mac *(platinum)* ..... 64.
2567 System Saver Mac *(beige)* ..... 64.
2546 A-B Box *(DIN-8)* ..... 64.
2556 Maccessories Anti-Glare Filter..... 33.
5064 Apple Color Monitor Polarizing Filter 65.
5065 Full Page Display Polarizing Filter .. 65.
5066 Two Page Display Polarizing Filter . 135.
4941 Mac II Monitor Stand..... 65.
4643 Mac II Stand and Cable Kit ..... 65.
2561 MasterPiece Mac II ..... 105.
5229 PowerBacker 330..... 269.
5230 PowerBacker 800..... 749.
5228 PowerBacker 1200..... 949.

Logitech ... 30 day MBG

ScanMan–Add scanned graphics to documents quickly and conveniently. Scanned images can be saved in TIFF, Compressed TIFF, PICT, and MacPaint formats. ScanMan works on the Mac Plus, SE, and II..... $349.

★MacConnection ... 60 day MBG

4623 Solid Oak Disk Case, made by New England craftsmen *(holds 90 disks)*.. 29.

★Mobius Technologies ... 60 day MBG

4470 Fanny Mac QT ..... 60.

★Moustrak ... 60 day MBG

Available in blue or gray.

2694 Moustrak Pad *(standard 7" x 9")* ... 8.
2692 Moustrak Pad *(large 9" x 11")*..... 9.
2693 Moustrak Pad L/F *(9" x 11")* ..... 10.

Ribbons

Available in black, blue, brown, gold, green, orange, purple, red, silver and yellow.

3255 ImageWriter II Ribbon..... 4.
3261 ImageWriter II 4-Color Ribbon..... 9.
3270 ImageWriter II Rainbow Six Pack... 20.
3260 ImageWriter LQ Black Ribbon..... 17.
4011 ImageWriter LQ 4-Color Ribbon ... 20.

★Sopris Softworks ... 60 day MBG

4171 Mac SE Std. Keyboard Cover *(navy)* .. 15.
4019 Mac SE & Ext. Keyboard Cover *(navy)* . 15.
4017 ImageWriter II Cover *(navy)* ..... 11.

SuperMac Technology

DataFrame Drives feature automatic data encryption and password-lockable SCSI partitions for faster operation, protection from accidental deletion, and virus attacks. Includes DiskFit, SuperSpool, & SuperLaserSpool. *See line listing.*

4168 ImageWriter LQ Cover *(navy)* .... $13.
4018 LaserWriter II Cover *(navy)*..... 17.
4012 High Trek ImageWriter II carry case. 49.
4013 High Trek Mac Plus carry case .... 59.
4014 High Trek Mac SE & ext. kybd. case 69.

★Targus ... 60 day MBG

3618 ImageWriter II Carry Case..... 49.
3617 Mac Plus/SE Carry Case..... 59.
4015 Mac SE & Ext. Kybd. Carry Case .. 75.

OUR POLICY

- We accept VISA and MASTERCARD.
- No surcharge added for credit card orders.
- Your card is not charged until we ship.
- If we must ship a partial order, we never charge freight on the shipment(s) that complete the order.
- No sales tax.
- All U.S. shipments insured; no additional charge.
- APO/FPO orders shipped 1st Class Mail.
- International orders U.S. $250 minimum.
- Upon receipt and approval, personal and company checks now clear the same day for immediate shipment of your order.
- Corporate P.O.s accepted subject to credit approval.
- COD max. $1000. Cash or certified check.
- 120 day limited warranty on all products. Defective software replaced immediately. Defective hardware repaired or replaced at our discretion. All items subject to availability. Prices subject to change without notice.
- To order, call us anytime Monday through Friday 9:00 to 9:00 EST, or Saturday 9:00 to 5:30 EST. You can call our business offices at 603/446-7711 Monday through Friday 9:00 to 5:30 EST.

SHIPPING

Continental US: Barring massive computer failures and other natural or unnatural catastrophes, all credit card orders phoned into MacConnection weekdays by 8 PM EST will ship Airborne the same night for delivery the next business day (i.e. not Saturday or Sunday), 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.

with our 30-60 day

Olduvai
PLUS 1.1–HyperCard compatible multimedia software toolkit. Supports 256 colors, animation, cards of any size, irregularly shaped buttons, word buttons, full text styling, database fields, and more . . . . . $115.

4598 TOPS FlashBox . . . . . 125.
3725 TOPS Repeater . . . . . 129.
3723 TOPS Mac 2.1 . . . . . 145.
3720 TOPS Flashcard . . . . . 159.
3724 NetPrint 2.0 . . . . . 119.
4714 InBox Starter Kit 2.2 . . . . . 149.
4715 InBox Connection Mac 2.2 . . . . . 49.

★Traveling Software ... 60 day MBG
3729 LAP-LINK Mac 2.0 . . . . . 83.

INPUT/OUTPUT

Caere
4476 OmniPage 2.0 . . . . . 559.

★Cutting Edge ... 30 day MBG
3988 CE 105ADB Keyboard w/QuicKeys . 135.

★Datadesk ... 30 day MBG
1818 HyperDialer . . . . . 24.
1819 MAC-101 Keyboard *(beige)* . . . . . 139.
1820 MAC-101 Keyboard *(platinum)* . . . 139.
1821 MAC-101 Keyboard *(ADB)* . . . . . 139.

★Kensington ... 30 day MBG
2576 Turbo Mouse for Mac Plus 3.0 . . . . 109.
2547 Turbo Mouse ADB 3.0 . . . . . 109.

Koala
2593 MacVision 2.0 . . . . . 219.

★Kraft Systems ... 60 day MBG
2600 3-Button QuickStick . . . . . 39.
4082 3-Button QuickStick ADB . . . . . 51.

Kurta
2604 IS ADB 8½" x 11" Tablet . . . . . 255.
5161 IS ADB 12" x 12" Tablet . . . . . 385.
5162 IS ADB 12" x 17" Tablet . . . . . 625.
2605 Cordless 4 Button Cursor . . . . . 65.

★Logitech ... 30 day MBG
5082 ScanMan Mac . . . . . 349.

★LYNX Computer ... 30 day MBG
1211 LYNX Trackball . . . . . 65.
1212 LYNX Trackball ADB . . . . . 65.

★Microseeds Pub. ... 60 day MBG
4843 WristMac 1.0 . . . . . 149.
5018 WristMac Executive 1.0 . . . . . 199.

★Mobius Technologies ... 60 day MBG
4846 MultiScreen . . . . . 315.

★Mouse Systems ... 30 day MBG
2808 A+ Mouse . . . . . 63.
2809 A+ Mouse ADB . . . . . 83.

★Nutmeg Systems ... 30 day MBG
4849 LCD Interface *(Kodak DataShow)* $399.
2993 15" Monitor for Mac II . . . *special* 799.
2992 15" Monitor for Mac Plus . . . . . 999.
2994 15" Monitor for Mac SE . . . . . 999.
4002 19" Monitor for Mac Plus . . . . . 1349.
4096 19" Monitor for Mac SE . . . . . 1349.
4097 19" Monitor for Mac II . . . . . 1349.

Olduvai Software
5138 Read-It! OCR Personal 2.0 . . . . . 99.
3034 Read-It! OCR 2.1 . . . . . 249.

★Orange Micro ... 30 day MBG
4488 Grappler Spooler . . . . . 39.
3036 Grappler C/Mac/GS 2.0 . . . . . 79.
4076 Grappler LQ 1.5 . . . . . 103.
4487 Grappler LS 1.0 . . . . . 103.

★PTI/DataShield ... 30 day MBG
4845 MacDirector . . . . . 109.

SoftStyle
3282 Printworks 3.5 *(Dot Matrix)* . . . . . 43.
3281 Printworks 3.0 *(Daisywheel)* . . . . . 56.
3283 Printworks 3.6 *(HP laser)* . . . . . 85.

Summagraphics
4298 BitPad Plus ADB . . . . . 325.

★Thunderware ... 30 day MBG
3648 ThunderScan 5.0 with PowerPort . 189.
4994 LightningScan . . . . . 409.
3645 Mac II Power Accessory . . . . . 45.

MEMORY & DRIVES

1 Meg SIMMs . . . . . call

★Cutting Edge ... 30 day MBG
3989 800k External Disk Drive . . . . . 149.
5133 20 Meg Hard Drive . . . . . 439.
3990 30+ Meg Hard Drive . . . . . 499.
3991 45+ Meg Hard Drive . . . . . 549.
5275 65+ Meg Hard Drive . . . . . 629.
5276 80+ Meg Hard Drive . . . . . 739.
5456 45 Meg Removable Drive . . . . . 999.

★Dove Computer ... 60 day MBG
1802 Dove Tool Kit . . . . . 15.
1801 SCSI Interface/Port . . . . . 109.
5103 Mac II Power Pack *(includes Marathon 030 32MHz Accelerator, four 1 Meg SIMMs, and RamSnap)* . . . . . 1799.
1807 MacSnap 524E . . . . . 189.
1809 MacSnap 524S . . . . . 239.

Targus ... 60 day MBG
Mac SE & Ext. Keyboard Case–Made of a dust & water-resistant material as strong as Cordura but smoother so it won't wear out clothes. Closed-cell foam protects against jolts. . . . $75.
ImageWriter II Carry Case . . . . . 49.

1811 MacSnap 548E . . . . . $419.
1812 MacSnap 548S . . . . . 479.
1800 MacSnap 2SE . . . . . 319.
1797 MacSnap Plus 2 . . . . . 319.
1804 MacSnap 2S . . . . . 369.
1805 MacSnap 4S . . . . . 729.

Datadesk ... 30 day MBG
MAC-101 Keyboard–Includes macro program, Masterstrokes, to assign keystrokes and mouse clicks to 15 function keys. Beige, platinum, or ADB version . . . . . $139.
Foreign keyboards are also available . . . . . call

ACCELERATOR BOARDS
1793 MaraThon 020 MSE1 . . . . . 429.
1794 MaraThon 020 MSE2 *(1 Meg)* . . . . . 719.
1795 MaraThon 020 MSE3 *(math chip)* . . 599.
1796 MaraThon 020 MSE4 *(1 Meg/chip)* . 899.
5192 MaraThon 020 MSE5 *(4 Meg)* . . . . 1269.
5193 MaraThon 020 MSE6 *(4 Meg/chip)* 1449.
4663 MaraThon 030 Accelerator 32 MHz. 969.

ACCELERATORS (020) W/ETHERNET
5391 FastNet LAN 1 . . . . . 1125.
5390 FastNet LAN 2 *(1 Meg)* . . . . . 1499.
5389 FastNet LAN 3 *(math chip)* . . . . 1349.
5388 FastNet LAN 4 *(1 Meg/chip)* . . . . 1724.
5387 FastNet LAN 5 *(4 Meg)* . . . . . 2175.
5386 FastNet LAN 6 *(4 Meg/chip)* . . . . 2399.

Epson
5132 40 Meg Raw Drive *(25ms)* . . . . . 436.
5204 70 Meg Raw Drive *(25ms)* . . . . . 586.

★LaCie, Ltd. ... 30 day MBG
4983 Maxcie Internal Drive Kit . . . . . 59.
4982 Maxcie External Drive Kit . . . . . 189.

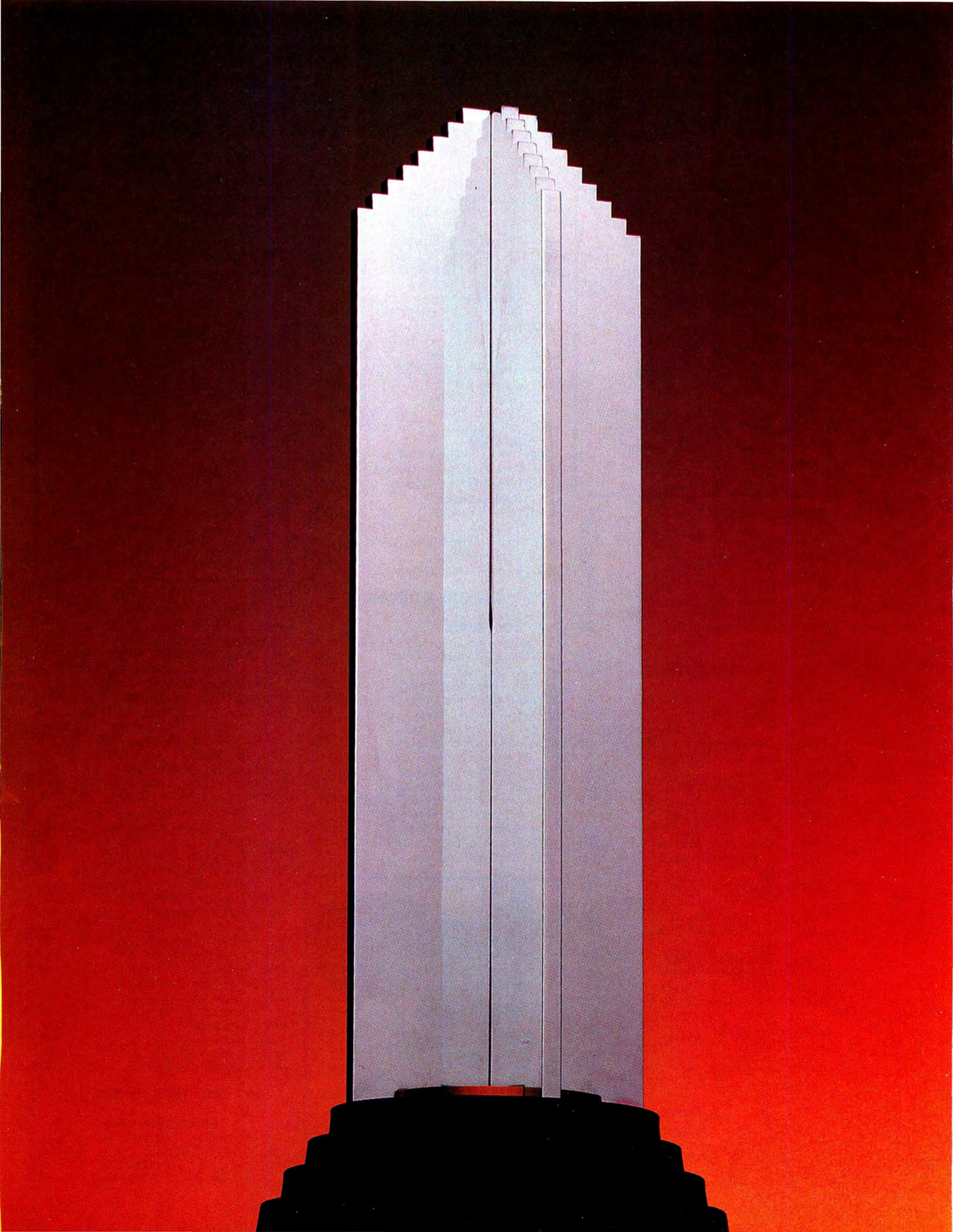
★PCPC ... 30 day MBG
3177 HD-WSI *(Apple HD-20 to SCSI)* . . . 199.
3189 MacBottom HD 45 SCSI . . . . . call
4658 MacBottom HD 84 SCSI . . . . . call

SuperMac Technology
5452 Dataframe 20 . . . . . 599.
5447 Dataframe XP 30 . . . . . 749.
5448 Dataframe XP 60 . . . . . 1059.
5449 Dataframe XP 100 . . . . . 1419.
5450 Dataframe XP 150 . . . . . 1949.
5451 Dataframe XP 330 . . . . . 2849.

STORAGE MEDIA

Double Sided Disks

★Verbatim ... 30 day MBG
3772 3½" DS/DD Disks . . . . . 15.
3297 **Sony** 3½" DS/DD Disks . . . . . 15.
2792 **MAXELL** 3½" DS/DD Disks . . . . . 16.



World Class

MACINTOSH AWARDS

Macworld readers vote for their favorite Macintosh products

BY SUZANNE STEFANAC

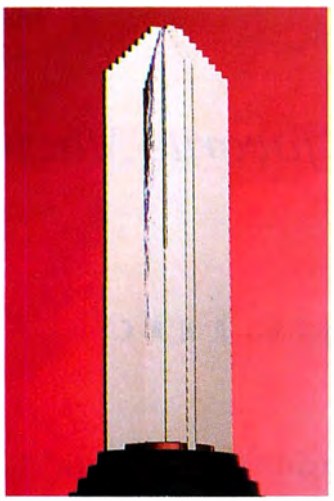
Once a year, we turn the tables around at Macworld and ask our readers to tell us which products they like the best. The ballots are in for our third annual World-Class Macintosh Contest, and on the following pages, we've listed the highest-scoring products in each of 42 categories.

PHOTOGRAPHS BY FRED STIMSON

The feedback from our readers is invaluable, and we'd like to thank everyone who took the time to fill out the survey and send it back. As in the previous two years, we drew three names at random from among the ballots, and thanks to the generosity of the first-place vendors, each of the three selected readers receives a package full of the top products. The lucky grand-prize winner is the recipient of most of the winning software and hardware products. The first runner-up wins most of the software packages, and the second runner-up receives a selection of the winning software programs.

The Winning Readers

Our grand-prize winner, John Blinke, has gradually upgraded his 128K Mac to a Plus with 4MB of RAM. An electrician at the Ford Sterling Manufacturing Plant in Sterling Heights, Michigan, Blinke is also a ham radio enthusiast and a free-lance desktop publisher. He first purchased his Mac to assist in the production of a civil defense bulletin; and more recently, with the help of PageMaker, SuperPaint, and Microsoft Word, he has produced several other brochures and newsletters, including one for ham radio operators. Blinke looks forward to spending even more hours on this type of project now that he has an office stocked with World-Class Macintosh products.



Douglas Hoff, our first runner-up, was formerly a personal computer trainer and consultant for Hughes Aircraft in the radar systems group. Now living in the northern California town of Guerneville, Hoff uses his Mac SE and Mac Plus, along with a Qume ScripTen laser printer, to do programming and desktop publishing consulting. His most recent project was a notebook for wine tasting.

Our second runner-up, Mike Anzalone, a Mac enthusiast for more than four years, lives in Monroe, New York, and works for Eastern Scientific, a firm that designs and sells laboratory interiors. One of his projects, a HyperCard stack showing how fume hoods work, is a particularly effective sales tool. Anzalone and his wife, Carol Anne, who uses the Mac to create ads for the yellow pages, have a Mac 512KE, Mac Plus, Apple Hard Disk 20SC, Cutting Edge external drive, ImageWriter II, Practical Peripherals modem, and the Thunderware scanner.

The Winning Products

On the following pages, winners appear at the top of each category list followed by products that scored a significant percentage of the votes. *Others* signifies the combined percentage for the remaining votes—the higher the percentage, the greater the number of other contenders in that category. Since readers rarely voted in every category, the percentage of respondents for each one is noted. While the results can't be construed as an endorsement by *Macworld* magazine, they clearly reflect the preferences of our readers.

In the hardware categories, most of this year's first-place winners duplicated last year's triumphs. Apple's ImageWriter II topped the dot matrix printer category for the third year in a row and the AppleColor High-Resolution RGB Monitor retained its lead. Radius swept the black-and-white monitor category as its Full Page Display, Two Page Display, and GrayScale Display monitors placed first, second, and third. Members of Jasmine's Direct Drive series won in both the under- and over-80MB categories. Other repeat performances included Hayes's Smartmodem series, DCA's MacIrma, Thunderware's ThunderScan, Kensington Microware's TurboMouse, and Hewlett-Packard's HP 7475A plotter.

New faces in the winner's circle included Mass Microsystems' Data Pak series in the alternative mass storage category, RasterOps's ColorBoard 104 for best graphics board, and the QMS ColorScript-100 for best color printer. Apple's LaserWriter IINTX pulled ahead in the laser printer category.

Similarly, more than half of the software awards went to last year's winners. Among those maintaining strong leads in their categories were Microsoft Word and Excel, Silicon Beach's SuperPaint, Aldus's PageMaker, Symantec's More, and Claris's MacProject. Claris's FileMaker and Acius's 4th Dimension once again tied for the database award.

We broke the graphics programs into three categories this year—black-and-white paint, color paint, and drawing/illustration/animation, which allowed readers to add SuperMac's PixelPaint and Adobe Illustrator 88 to their list of World-Class products. In a couple of upsets, PowerPoint and Cricket Graph exchanged first and second places in the presentation graphics category and Think's Lightspeed C beat HyperTalk for favorite programming language.

A few new products did manage to make the list. Wingz was voted Most Promising Newcomer; the Symantec Utilities for Macintosh (SUM) package took honors in the utility disk and file category; and Finale from Coda Music Software was favored by our musically inclined readers. Beyond Dark Castle tied with Falcon for best game.

A Final Look

While this year's World-Class roster contains few new names, one could hardly conclude that the Mac market is standing still. Many of the winning products are actually significant upgrades to last year's entries. Each year's inventory of World-Class products offers further testimony to the strengths and potential exhibited by the Macintosh community.

We want to once again thank all the readers who participated in this year's contest and we anticipate an even greater response next year. In particular, we'd like to thank Larry Wilson of the Wilson Research Group for his cheerful and meticulous tabulation of the ballots. ■

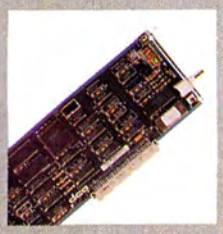
HARDWARE

Product, Manufacturer	% of votes

ALTERNATIVE MASS STORAGE

Data Pak series, *Mass Microsystems*	**16**
800K External Drive, *Apple Computer*	7
MegaDrive series, *Jasmine Technologies*	6
DirectTape, *Jasmine Technologies*	5
Others	66
Total	100

(18% of respondents voted in this category)



COMMUNICATIONS BOARD

MacIrma, *Digital Communications Associates*	**15**
EtherPort SE/II, *Kinetics*	9
Macintosh II EtherTalk Interface Card, *Apple Computer*	7
MacMainFrome series, *Avatar Technologies*	6
EtherTalk Interface Card, *Apple Computer*	3
Others	60
Total	100

(4% of respondents voted in this category)

CPU UPGRADE

Radius Accelerator 25, *Radius*	**21**
Radius Accelerator 16, *Radius*	16
DayStar 33/030 Accelerator II, *DayStar Digital*	10
Others	53
Total	100

(14% of respondents voted in this category)

DIGITIZER/SCANNER

ThunderScan, *Thunderware*	**40**
Apple Scanner, *Apple Computer*	21
JX-450, *Sharp Electronics Corporation*	5
HP ScanJet, *Hewlett-Packard*	4
Others	30
Total	100

(23% of respondents voted in this category)

DISPLAY—BLACK AND WHITE

Radius Full Page Display System, *Radius*	**34**
Radius Two Page Display System, *Radius*	26
Radius GrayScale System, *Radius*	5
SilverView, *Sigma Designs*	3
Nutmeg 19+, *Nutmeg Systems*	3
Others	29
Total	100

(18% of respondents voted in this category)

DISPLAY—COLOR

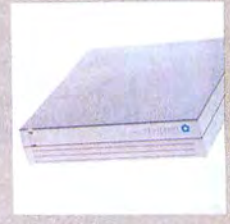
AppleColor High-Resolution RGB Monitor, *Apple Computer*	**37**
Radius Color Display System, *Radius*	11
SuperMac 19-inch Color Trinitron Monitor, *SuperMac Technology*	10
Others	42
Total	100

(15% of respondents voted in this category)

GRAPHICS BOARD

ColorBoard 104, *RasterOps*	**31**
Spectrum/24, *SuperMac Technology*	14
Spectrum/8 Series II Color Video Card, *SuperMac Technology*	11
NuVista 4M, *Truevision*	10
NuVista 2M, *Truevision*	2
Others	32
Total	100

(7% of respondents voted in this category)



HARD DISK (80MB OR LESS)

Direct Drive series, *Jasmine Technologies*	**23**
DataFrame XP series, *SuperMac Technology*	7
Apple Hard Disk series, *Apple Computer*	6
MacBottom HD SCSI Drive series, *Personal Computer Peripherals Corporation*	6
Radime Plus series, *Radime Systems Division*	3
Others	55
Total	100

(45% of respondents voted in this category)

HARDWARE

HARD DISK (ABOVE 80MB)

Product, Manufacturer	% of votes
Direct Drive-100, *Jasmine Technologies*	**30**
BackPac 100, *Jasmine Technologies*	10
InnerDrive-100/SE/II, *Jasmine Technologies*	8
Direct Drive-140, *Jasmine Technologies*	5
Direct Drive-160, *Jasmine Technologies*	2
Others	45
Total	100

(16% of respondents voted in this category)

INPUT DEVICE

Product, Manufacturer	% of votes
Turbo Mouse and Turbo Mouse ADB, *Kensington Microware*	**38**
Apple Mouse, *Apple Computer*	9
A+ Mouse, *Mouse Systems Corporation*	8
Mac-101 Enhanced Keyboard, *DataDesk International*	8
Apple Extended Keyboard, *Apple Computer*	6
Others	31
Total	100

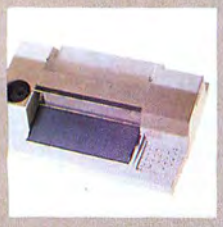
(20% of respondents voted In this category)

MODEM

Product, Manufacturer	% of votes
Smartmodem series, *Hayes Microcomputer Products*	**23**
Practical Modem, *Practical Peripherals*	13
Apple Personal Modem, *Apple Computer*	8
Others	56
Total	100

(26% of respondents voted in this category)

PLOTTER



Product, Manufacturer	% of votes
HP 7475A, *Hewlett-Packard*	**21**
HP Draft Master, *Hewlett-Packard*	14
HP 7550A, *Hewlett-Packard*	8
HP DraftPro, *Hewlett-Packard*	8
1023 Artisan, *CalComp*	7
Others	42
Total	100

(4% of respondents voted in this category)

PRINTER—COLOR

Product, Manufacturer	% of votes
QMS ColorScript-100, *QMS*	**30**
Tektronix Color Image Printer 4693D/DX, *Tektronix*	15
ImageWriter II, *Apple Computer*	11
HP PaintJet, *Hewlett-Packard*	11
Others	33
Total	100

(9% of respondents voted in this category)

PRINTER—DOT MATRIX

Product, Manufacturer	% of votes
ImageWriter II, *Apple Computer*	**73**
ImageWriter LQ, *Apple Computer*	12
ImageWriter, *Apple Computer*	9
WriteMove, *GCC Technologies*	2
Others	4
Total	100

(35% of respondents voted in this category)

PRINTER—LASER

Product, Manufacturer	% of votes
LaserWriter IINTX, *Apple Computer*	**34**
LaserWriter IINT, *Apple Computer*	26
LaserWriter Plus, *Apple Computer*	11
LaserWriter II, *Apple Computer*	5
LaserWriter, *Apple Computer*	4
Others	20
Total	100

(38% of respondents voted in this category)

MOST PROMISING NEWCOMER

Product, Manufacturer	% of votes
Mac SE/30, *Apple Computer*	**26**
Mac IIx, *Apple Computer*	8
REO-650, *Pinnacle Micro*	4
DirectPrint, *Jasmine Technologies*	4
Others	58
Total	100

(18% of respondents voted in this category)

SOFTWARE

BUSINESS ACCOUNTING

Product, Manufacturer	% of votes
Insight Accounting Series, *Layered*	17
Business Sense, *Monogram Software*	10
MacMoney, *Survivor Software*	8
Simply Accounting, *Bedford Software Corporation*	8
Dollars & Sense, *Monogram Software*	5
Others	52
Total	100

(15% of respondents voted in this category)

BUSINESS PRESENTATION GRAPHICS

Product, Manufacturer	% of votes
PowerPoint, *Microsoft Corporation*	34
Cricket Graph, *Cricket Software*	16
Aldus Persuasion, *Aldus Corporation*	10
Cricket Presents, *Cricket Software*	10
Others	30
Total	100

(25% of respondents voted in this category)

CAD

Product, Manufacturer	% of votes
MiniCad+, *Diehl Graphsoft*	14
VersaCAD/Macintosh Edition, *VersaCAD Corporation*	14
Dreams, *Innovative Data Design*	9
MacDraft, *Innovative Data Design*	8
MacDraw, *Claris*	8
PowerDraw, *The Computer Shoppe/Engineered Software*	7
Others	40
Total	100

(14% of respondents voted in this category)

COMMUNICATIONS—GENERAL

Product, Manufacturer	% of votes
Red Ryder, *The FreeSoft Company*	45
MicroPhone, *Software Ventures*	19
Smartcom II, *Hayes Microcomputer Products*	10
VersaTerm, *Abelbeck Software*	5
Others	21
Total	100

(30% of respondents voted in this category)

DATABASE MANAGEMENT

Product, Manufacturer	% of votes
FileMaker, *Claris*	24
4th Dimension, *Acius*	24
FoxBase+/Mac, *Fox Software*	12
Double Helix II, *Odesta Corporation*	7
HyperCard, *Apple Computer*	5
Others	28
Total	100

(40% of respondents voted in this category)

DESK ACCESSORY

Product, Manufacturer	% of votes
Suitcase, *Fifth Generation Systems*	21
DiskTop, *CE Software*	13
Word Finder, *Microlytics*	6
QuickDex, *Casady & Greene*	5
Others	55
Total	100

(45% of respondents voted in this category)

DESKTOP PUBLISHING

Product, Manufacturer	% of votes
PageMaker, *Aldus Corporation*	66
ReadySetGo, *Letroset USA*	18
QuarkXPress, *Quark*	12
Others	4
Total	100

(48% of respondents voted in this category)

DRAWING/ILLUSTRATION/ANIMATION

Product, Manufacturer	% of votes
Adobe Illustrator 88, *Adobe Systems*	29
MacDraw, *Claris*	24
Aldus FreeHand, *Aldus Corporation*	17
MacroMind Director, *MacroMind*	9
Canvos, *Denebo Software*	5
Others	16
Totol	100

(43% of respondents voted in this category)

EDUCATION/TRAINING

Product, Manufacturer	% of votes
HyperCard, *Apple Computer*	21
Typing Tutor, *Simon & Schuster Computer Software*	9
Reader Rabbit, *The Learning Company*	8
KidsTime, *Great Wave Software*	6
Others	56
Total	100

(14% of respondents voted in this category)

SOFTWARE

FILE SERVER

Product, Manufacturer	% of votes
TOPS, *Sun Microsystems (TOPS Division)*	**44**
AppleShare, *Apple Computer*	35
MacServe, *Infosphere*	4
SilverServer, *La Cie*	3
Others	14
Total	100

(13% of respondents voted in this category)

GAMES

Product, Manufacturer	% of votes
Beyond Dark Castle, *Silicon Beach Software*	**12**
Falcon, *Spectrum HoloByte*	**12**
Crystal Quest, *Casady & Greene*	9
Dark Castle, *Silicon Beach Software*	8
MacGolf, *PCAI*	6
Tetris, *Spectrum HoloByte*	5
Others	48
Total	100

(42% of respondents voted in this category)

INTEGRATED PACKAGE

Product, Manufacturer	% of votes
Microsoft Works, *Microsoft Corporation*	**88**
Microsoft Excel, *Microsoft Corporation*	5
HyperCard, *Apple Computer*	2
Others	5
Total	100

(25% of respondents voted in this category)

MICRO-TO-MAINFRAME COMMUNICATIONS

Product, Manufacturer	% of votes
VersaTerm-Pro, *Synergy Software*	**25**
Red Ryder, *The FreeSoft Company*	12
MacMainFrame series, *Avatar Technologies*	5
MacIrma, *Digital Communications Associates*	5
Mac240, *White Pine Software*	4
Others	49
Total	100

(10% of respondents voted in this category)

MUSIC

Product, Manufacturer	% of votes
Finale, *Coda Music Software*	**22**
Studio Session, *Bogas Productions*	11
Deluxe Music Construction Set, *Electronic Arts*	10
ConcertWare+MIDI, *Great Wave Sotware*	10
Others	47
Total	100

(13% of respondents voted in this category)

PAINT—BLACK AND WHITE

Product, Manufacturer	% of votes
SuperPaint, *Silicon Beach Software*	**60**
MacPaint, *Claris*	17
Canvas, *Deneba Software*	6
FullPaint, *Ashton-Tate*	5
Others	12
Total	100

(43% of respondents voted in this category)

PAINT—COLOR

Product, Manufacturer	% of votes
PixelPaint, *SuperMac Technology*	**37**
SuperPaint, *Silicon Beach Software*	15
Studio/8, *Electronic Arts*	14
Canvas, *Deneba Software*	12
GraphistPaint II, *Aba Software*	5
Others	17
Total	100

(20% of respondents voted in this category)

PERSONAL FINANCE/TAXES

Product, Manufacturer	% of votes
MacInTax, *SoftView*	**34**
MacMoney, *Survivor Software*	20
Quicken, *Intuit*	16
Managing Your Money, *Meca Ventures*	13
Dollars & Sense, *Monogram Software*	11
Others	6
Total	100

(32% of respondents voted in this category)

PROGRAMMING LANGUAGE

Product, Manufacturer	% of votes
Think's Lightspeed C, *Symantec Corporation*	**29**
Think's Lightspeed Pascal, *Symantec Corporation*	14
HyperTalk, *Apple Computer*	14
Turbo Pascal, *Borland International*	12
Others	31
Total	100

(25% of respondents voted in this category)

SOFTWARE

PROJECT MANAGEMENT

Product, Manufacturer	% of votes
MacProject II, *Claris*	**65**
Micro Planner Plus, *Micro Planning International*	18
Focal Point, *TenPoint0 (Activision)*	5
AEC Information Manager, *AEC Management Systems*	3
Others	9
Total	100

(12% of respondents voted in this category)

OUTLINE PROCESSING

Product, Manufacturer	% of votes
More II, *Symantec Corporation*	**58**
Acta, *Symmetry Corporation*	23
Microsoft Word, *Microsoft Corporation*	6
MindWrite, *Access Technology*	5
Others	8
Total	100

(18% of respondents voted in this category)

SPREADSHEET

Product, Manufacturer	% of votes
Microsoft Excel, *Microsoft Corporation*	**85**
Full Impact, *Ashton-Tate*	5
Wingz, *Informix Software*	4
Microsoft Works, *Microsoft Corporation*	2
Others	4
Total	100

(51% of respondents voted in this category)

STATISTICS/MATH

Product, Manufacturer	% of votes
StatView II/ StatView SE+ Graphics, *Abacus Concepts*	**44**
Mathematica, *Wolfram Research*	25
DataDesk Professional, *Odesta Corporation*	8
Systat, *Systat*	7
Others	16
Total	100

(13% of respondents voted in this category)

UTILITIES—DISK AND FILE

Product, Manufacturer	% of votes
Symantec Utilities for Macintosh (SUM), *Symantec Corporation*	**40**
Copy II Mac, *Central Point Software*	7
DiskFit, *SuperMac Technology*	6
DiskTop, *CE Software*	5
DiskExpress, *ALSoft*	5
Others	37
Total	100

(40% of respondents voted in this category)

UTILITIES—PROGRAMMING

Product, Manufacturer	% of votes
ResEdit, *Apple Computer*	**20**
QuicKeys, *CE Software*	14
TMON, *ICOM Simulations*	9
Others	57
Total	100

(9% of respondents voted in this category)

WORD PROCESSOR

Product, Manufacturer	% of votes
Microsoft Word, *Microsoft Corporation*	**66**
WriteNow for Macintosh, *T/Maker*	13
MacWrite, *Claris*	7
FullWrite Professional, *Ashton-Tate*	5
WordPerfect for the Mac, *WordPerfect Corporation*	4
Others	5
Total	100

(75% of respondents voted in this category)

MOST PROMISING NEWCOMER

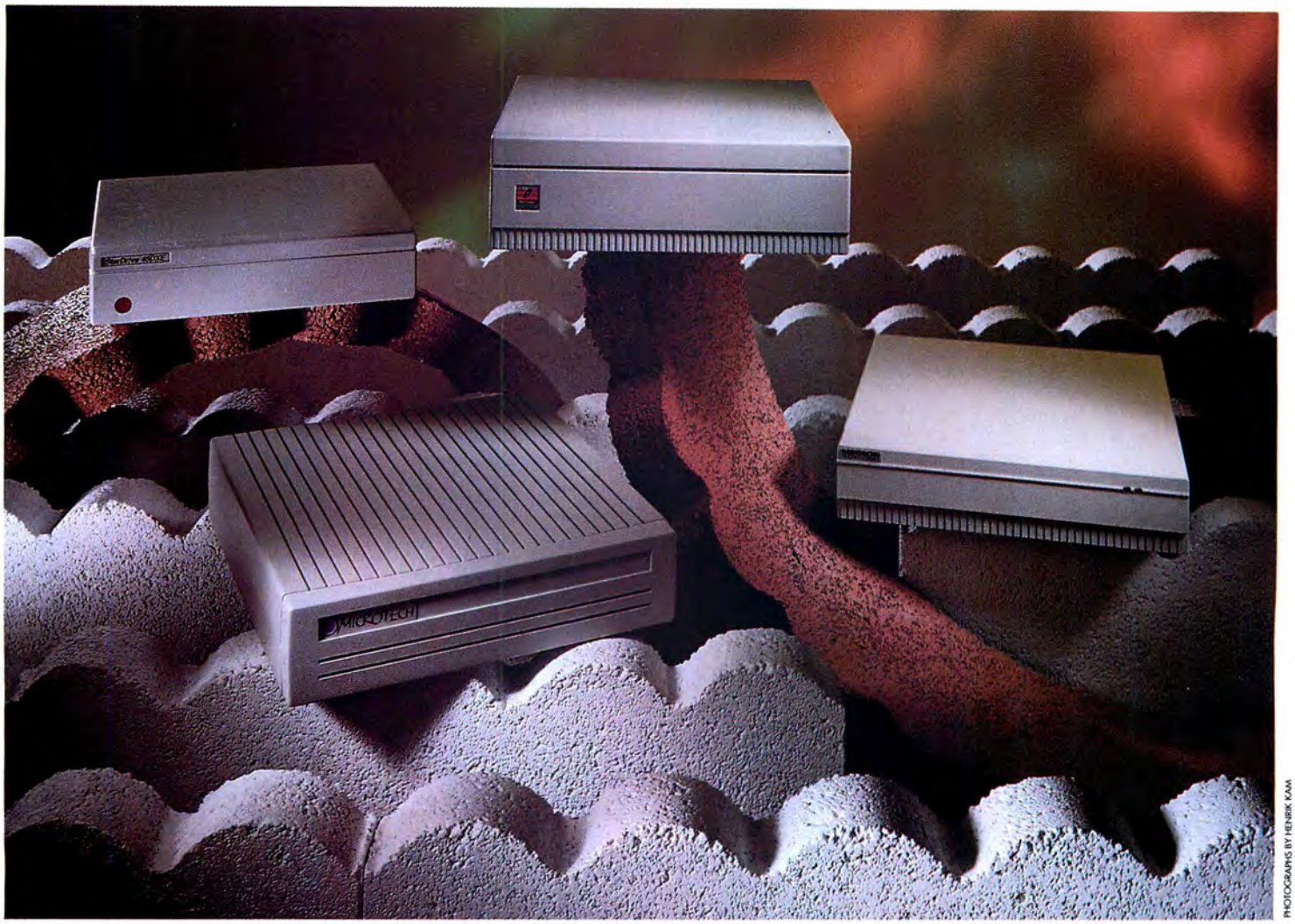
Product, Manufacturer	% of votes
Wingz, *Informix Software*	**12**
Digital Darkroom, *Silicon Beach Software*	4
OmniPage, *Caere Corporation*	3
Aldus FreeHand, *Aldus Corporation*	3
Finale, *Coda Music Software*	3
Mathematica, *Wolfram Research*	3
Others	72
Total	100

(26% of respondents voted in this category)

TURNING 40

Macworld Labs tests 28 medium-capacity hard disks

by Cheryl England Spencer



PHOTOGRAPHS BY HENRIK KAM

Ruby, MicroNet, Microtech, and Mirror offer fast Quantum ProDrive–based units.

The first Macintosh hard disks weren't perfect. For instance, in order to use the older CMS drives you had to start up from them—a seemingly innocuous requirement. But the software that defragmented files had to be started from a floppy. This catch-22 kept you from optimizing the hard disk.

Today, Macintosh hard disk technology is more mature; the major problems have been solved and hard disks have become a commodity. You can choose from among several dozen disks. Plug one in, wait for it to start up, and you're ready to work.

Hard disks are so pervasive that *Macworld* had to narrow the original plan to test all drives in the 40MB to 60MB range to testing only 40MB to 45MB drives just to keep the number of products manageable. Even then, Macworld Labs tested drives from 22 companies for a total of 28 products. These figures don't include products that did not arrive in time to be tested.

Looking for Differences

Other than speed, price, and software, there is very little to distinguish one hard disk from another. In our laboratory tests with a Macintosh II and an SE, vendors that used a Quantum ProDrive, the P40S, clearly had the fastest products (see "Speed Tests"). Several of these hard disks can be had for under $700, which is less than half the list price of the most expensive unit we tested.

Don't worry that you'll get a rude shock by buying an inexpensive hard disk—you won't get to the end of the all-you-can-eat-for-$2 salad bar to discover that dressing costs an extra $5. All the units we reviewed include everything you need to get up and running, such as cables, power cords, terminators—even technical support. They all include basic software for formatting the hard disk, updating drivers, and for testing the drive's ability to read and write data correctly. If the drive doesn't automatically set its interleave to match your type of Macintosh, vendors provide software and instructions so that you can set the interleave ratio.

I suggest that you narrow your choice down to a few hard disks based solely on performance or price. Then you only need to consider a few factors such as design, type of termination, utility soft-

FINDING A HARD DISK

	Apple Computer	Aristotle Industries	CMS Enhancements	Crate Technology	Cutting Edge	Dolphin Systems Technology	Dolphin Systems Technology	Ehmon Engineering
Product	Apple Hard Disk 40SC	Hardpac Mac 40	MacStack 45	MacCrate 40	XL45+	Integra-40	Dolphin IL-46	Ehman 45 Hard Disk
Price	$1299	$1095	$1295	$755	$799	$995	$995	$529
Formatted capacity	39.3MB	42.3MB	46.6MB	44.5MB	46.6MB	41.4MB	46.6MB	46.6MB
External	yes	yes	yes	yes	yes	yes	no	yes
Internal	SE, II	no	SE	SE, II	SE, II	II	SE, II	SE, II
OEM	Quantum Q250	Quantum P40S	Seagate ST157N	Maxtor LXT	Seagate ST157N	Seagate ST251N	Seagate ST157N	Seagate ST157N
PHYSICAL SPECIFICATIONS								
Dimensions (h x w x d, in inches)	3.1 x 9.7 x 10.5	2 x 4.65 x 7.25	3 x 9.75 x 10.5	3.33 x 10 x 10.88	2.3 x 9.7 x 9.8	3 x 10 x 10.5	n/a	2.3 x 9.7 x 9.8
Weight (in pounds)	9	2.2	3.5	8.4	4.5	8	3	4.9
Fits under SE	yes	no	yes	yes	yes	yes	n/a	yes
Has fan	yes	no	yes	yes	yes	yes	n/a	yes
Case construction	plastic	plastic	metal	metal	metal	metal	n/a	metal
Horizontal or vertical placement	horizontal	either	either	either	either	horizontal	n/a	either
Terminator type	external	internal	internal	internal	internal	internal	internal	internal
Terminator included	no	yes	yes	yes	yes	yes	yes	yes
Removable internal termination	n/a	no	yes	yes	yes	yes	yes	yes
Number of extra power outlets	0	0	0	0	0	0	n/a	0
SCSI address change	recessed switch	rotary dial	DIP switches	jumpers	pushwheel	DIP switches	jumpers	pushbutton
SCSI connectors	25/50	25/25	25/50	25/25	25/25	25/25	n/a	25/25
Cable length (in inches)	18	18	18	72	72	36	n/a	72
Cable included	yes	yes	yes	yes	yes	yes	n/a	yes
UTILITY SOFTWARE								
Password protection	no	no	no	no	no	no	no	[2]
Partitioning	no	yes	no	no	no	yes	yes	no
Backup software	HD Backup	DiskManager Mac	HDBackup	HDBackup	HDBackup	HDBackup	HDBackup	PC Tools
MISCELLANEOUS								
Warranty	90 days	1 year	1 year	2 years	2 years	1 year	1 year	2 years
Claimed access time (in ms)	30	19	32	28	28	38	38	28
Benchmark access time (in ms)	27	[3]	34	34	34 (SE)	42	32.5	32

Prices and specifications are for external hard disks, unless there is only an internal model. Internal hard disks are usually a bit cheaper than externals.

Internal compatibility includes all forms of the Macintosh SE and Macintosh II. Benchmark access times were run on a Macintosh II unless otherwise noted.

1) Jasmine BackPac fits on back of Macintosh SE or Plus.

2) File encryption.

ware, and warranty. Even then, you'll probably end up with a list of several products that you would be perfectly happy to own.

Inside and Out

Many vendors provide external and internal versions of their hard disks. Internal units are a bit cheaper than external ones and they don't take up any extra desk space. Also, when you start up the Mac, an internal hard disk always powers up at the same time—you don't have to worry about flipping any extra power switches.

Theoretically, internal hard disks should also be more reliable than external ones, since they do not have a separate power supply that can fail before the drive itself fails. But internal units generate heat in an already hot environment, and you can easily jolt them when you move the Macintosh. Even more frustrating, if an internal hard disk breaks, you have to either take your Macintosh in to the dealer or become handy with a screwdriver on the Mac II or with a Torx wrench on the SE.

If you opt for an external hard disk, design will play a large part in your choice. A hard disk's design may be its sole distinguishing factor in a pile of work-alikes. Some external units are mounted so that you can place them horizontally or vertically on your desk. Some, such as Liberty's 40MB hard disk, La Cie's Cirrus 42, Everex's Impact 40 Plus, Maxcess's V Series 40, Western Digital's Preference Hard Disk AP, and Aristotle's Hardpac Mac 40, are small enough to snuggle unobtrusively next to a Macintosh.

The FX/40 from GCC Technologies is tall and long and sits next to the Mac. The Tallgrass 4000 series of hard disks are also tall and long, but the additional height is designed to hold an extra Tallgrass drive or a tape backup. You can have one of these options installed when you buy the hard disk or at a later date.

The majority of hard disks fit under an SE or Plus, some more neatly than others. These products, which come close to matching the Apple Hard Disk 40SC's width and depth, can also hold up an

Everex Systems	GCC Technologies	GCC Technologies	Jasmine Technologies	Jasmine Technologies	La Cie	Liberty Systems	MacProducts USA	Maxcess
Impact 40 Plus	FX/40	FI/40	DirectDrive 40	BackPac 40	Cirrus 42	Liberty 40	MagicDrive 46	V Series 40
$1199	$1129	$899 (II), $979 (SE)	$699	$799	$699	$749	$649	$1125
40.3MB	41.3MB	40.2MB	40.3MB	40.3MB	39.9MB	40.3MB	46.6MB	42MB
yes	yes	no	yes	yes	yes	yes	yes	yes
SE, II	no	SE, II	SE, II	no	no	no	SE, II	SE, II
Quantum P40S	Seagate ST251N	Quantum P40S	Quantum P40S	Quantum P40S	Quantum P40S	Quantum P40S	Seagate ST157N	Quantum P40S
2.5 x 6 x 10.5	8.3 x 3.9 x 13.23	n/a	2.5 x 9.5 x 10.5	[1]	6 x 3 x 9	5 x 2 x 7	2.5 x 10 x 11	6.5 x 3 x 8
5	8.2	3.4	4	4	<5	2.7	5.8	4.8
no	no	n/a	yes	[1]	no	no	yes	no
yes	yes	n/a	yes	yes	yes	no	yes	yes
plastic	plastic	n/a	plastic	plastic	plastic	metal	metal	metal
horizontal	vertical	n/a	either	n/a	either	vertical	horizontal	either
external	external	internal	internal	internal	internal	internal	internal	internal
yes	yes	yes	yes	yes	yes	yes	yes	yes
n/a	yes	no	yes	no	yes	by company	yes	yes
0	0	n/a	2	0	0	0	4	0
pushbutton	software	software	pushbutton	fixed	software	pushbutton	jumpers	rotary switch
25/50	25/50	n/a	25/50	25/25	25/25	25/50	25/25	25/50
12	18	n/a	24	n/a	18	18	72	20
yes	yes	n/a	yes	n/a	yes	yes	yes	yes
yes	[2]	[2]	yes	yes	yes	yes	no	yes[2]
yes	no	no	yes	yes	yes	yes	no	yes
HDBackup	GCC Backup	GCC Backup	Redux	Redux	DS Backup	no	HDBackup	no
1 year	1 year	1 year	2 years	2 years	1 year	1 year	1 year	2 years
19	40	19	19	19	15	19	28	19
22	40	22 (SE)	21	21 (SE)	21.5	22	32	[3]

3) We didn't receive the hard disk in time to benchmark it.

4) These hard disks do not support SCSI evaluator.

Jasmine, Rodime, Storage Dimensions, and La Cie drives include the best software we tested.

Apple 13-inch Macintosh II monitor. But you'll find that the monitor's back or front feet hang off the edge of the unit. You shouldn't have any problems with such a stack, but it's not the ideal way to place a monitor. If you want to put a Macintosh II monitor comfortably on top of a hard disk, you'll need a slightly longer unit, such as Relax's Hard 46 Plus (13 inches deep) or a swivel stand.

One hard disk with a very different design is Jasmine's BackPac 40. This slender unit attaches to the back of a Macintosh Plus or SE, just like a small backpack. At first it's a little disconcerting not to be able to see any LEDs light up as you use the drive, but once you get used to it, you'll love having the BackPac off your desk and out of your way. As another plus, you can leave the BackPac attached to the Mac and still fit the whole thing into most carrying cases.

Electricity and Heat

If you opt for an external hard disk, you have just opted to increase the number of power switches you have to fumble for every time you turn on the Macintosh. Relax's Hard 46 Plus and MacProducts' Magic Drive 46 offer a handy set of four power switches on the front of the hard disk. Each switch is connected to a power outlet on the back of the unit. You can attach a peripheral to each outlet and, by flicking the Master switch, turn on all of the devices at once. Other products offer additional power outlets in back for attaching the Macintosh and a peripheral or two.

FINDING A HARD DISK (continued)

	Maxcess	MicroNet Technology	Micotech International	Mirror Technologies	Mirror Technologies	PCPC	Peripheral Land	Procom
Product	E Series	Micro/Stack 40	Novo 40	M40	M40+	MacBottom 45	PLI Turbo 50 External	HiPerformance
Price	$1075	$945	$649	$597	$697	$1295	$1095	$1195
Formatted capacity	42MB	40.3MB	40.2MB	41.4MB	40.3MB	44.6MB	46.6MB	45MB
External	yes	yes	yes	yes	yes	yes	yes	yes
Internal	SE, II	SE, II	SE, II	SE, II	SE, II	no	SE, II	SE, II
OEM	Quantum P40S	Quantum P40S	Quantum P40S	Conner CP340	Quantum P40S	Seagate ST157N	Seagate ST157N	Pracom
PHYSICAL SPECIFICATIONS								
Dimensions (h x w x d, in inches)	2.4 x 9.5 x 9.75	3.13 x 10 x 10.38	3 x 9.6 x 10.5	2.5 x 9.7 x 10.85	2.5 x 9.7 x 10.85	2 x 9.7 x 9.5	2.4 x 9.75 x 9.75	2.25 x 9.63 x 10.25
Weight (in pounds)	5.9	8.75	6	6.5	6.5	4.75	7	6
Fits under SE	yes	yes	yes	yes	yes	yes	yes	yes
Has fan	yes	yes	yes	yes	yes	yes	yes	yes
Case construction	metal	metal	plastic	metal	metal	plastic	metal	plastic
Horizontal or vertical placement	horizontal	either	horizontal	either	either	either	either	either
Terminator type	internal	internal	internal	internal	internal	internal	internal	internal
Terminator included	yes	yes	yes	yes	yes	yes	yes	yes
Removable internal termination	yes	yes	no	yes	yes	yes	yes	switch selectable
Number of extra power outlets	0	0	0	1	1	0	0	2
SCSI address change	DIP switch	DIP switches	pushbutton	pushbutton	pushbutton	pushbutton	rotary dial	rotary dial
SCSI connectors	25/50	25/50	25/50	25/50	25/50	25/25	25/50	25/25
Cable length (in inches)	20	36	24	18	18	18	18	24
Cable included	yes	yes	yes	yes	yes	yes	yes	yes
UTILITY SOFTWARE								
Password protection	yes[2]	no	no	no	no	no	no	no
Partitioning	yes	no	no	no	no	no	na	no
Backup software	no	no	DS Backup	HDBackup	HDBackup	HFS Backup	TurboBack	SoftBackUp
MISCELLANEOUS								
Warranty	2 years	1 year	5 years	1 year	1 year	2 years	1 year	1 year
Claimed access time (in ms)	19	40	19	29	19	28	28	28
Benchmark access time (in ms)	[3]	22	21	40	22	31	35	[3]

Prices and specifications are for external hard disks, unless there is only an internal model. Internal hard disks are usually a bit cheaper than externals.

Internal compatibility includes all forms of the Macintosh SE and Macintosh II. Benchmark access times were run on a Macintosh II unless otherwise noted.

1) Jasmine BackPac fits on back of Macintosh SE or Plus.

2) File encryption.

GCC, PCPC, and (of course) Apple have been longtime players in the Macintosh peripheral market.

Most external hard disks include a fan that dissipates heat—and makes the unit a bit noisier. Without a fan, however, most drives would burn up. Internal hard disks use the same cooling scheme as the Macintosh they're in, whether it's the Plus's ventilation or the SE's fan.

An external hard disk that doesn't have a fan, however, is not necessarily less reliable than one that does. For instance, the Liberty drive is basically a Quantum drive with a ventilated metal case around it. The metal acts as a heat sink, drawing heat away from the drive. If this drive had a plastic case, then it would probably overheat. Instead, the unit becomes only slightly warm to the touch after a few hours of operation.

THE TERMINATOR

Since most vendors assume that a hard disk is the first SCSI device, most hard disks are internally terminated. (The first and last SCSI devices must be terminated. Terminators act like shock absorbers to keep the pulses of data from being reflected to their source.) On many hard disks you can easily remove the terminators with a pair of pliers, without voiding the warranty.

Western Digital and Procom have clever solutions to the termination problem. With Western Digital's Preference Hard Disk AP, the same switch on the back of the drive that determines the SCSI address can also be used to set termina-

Relax Technology	Rodime	Rodime	Ruby Systems	Ruby Systems	Storage Dimensions	Tallgrass	Westcom	Western Digital
Hord 46 Plus	Rodime 45 Plus	Cobra 45	StorDrive 45	StorDrive 40	MacinStor 45-ZFP	Tallgrass 4000	Westcom WE40	Preference Hard Disk AP
$1145	$1299	$1399	$908	$952	$1449	$1395	$570	$999
46.6MB	43.4MB	46.7MB	46.6MB	40.3MB	44.3MB	43MB	40.3MB	38.2MB
yes	yes	yes	yes	yes	yes	yes	yes	yes
SE, II	SE, II	SE, II	SE, II	SE, II	SE, II	SE, II	SE, II	no
Seagate ST157N	Rodime R03000S	Rodime R03000T	Seagate ST157N	Quantum P40S	Maxtor LXT	Rodime R0030005	Quantum P40S	Western Digital
2.5 x 10.2 x 11	2.9 x 9.76 x 10.4	2.4 x 9.7 x 10.4	2.25 x 10 x 10.5	2.25 x 10 x 10.5	3 x 9.7 x10.5	7.6 x 4.8 x 9.3	3 x 10 x 10.5	3.1 x 6.79 x 8.08
7	6	5.5	11	11	7.4	10	4	5
yes	yes	yes	yes	yes	yes	no	yes	no
yes	yes	yes	yes	yes	yes	yes	yes	yes
metal	plastic	plastic	metal	metal	metal	metal	metal	plastic
either	either	either	either	either	either	either	either	either
external	internal	internal	internal	internal	external	internal	internal	external
yes	yes	yes	yes	yes	yes	yes	yes	yes
n/o	yes	yes	yes	yes	n/o	yes	yes	switch selectable
4	0	2	1	1	0	0	0	0
pushbutton	rotary dial	pushbutton	recessed switch	recessed switch	rotary dial	rotary dial	DIP switch	rotary dial
25/50	25/50	25/50	25/50	25/50	25/50	25/50	25/50	25/25
24	24	24	24	24	12	48	24	18
yes	yes	yes	yes	yes	yes	yes	yes	yes
no	no	yes	yes	yes	[2]	no	yes[2]	no
no	yes	yes	yes	yes	yes	yes	yes	no
Relax & Save	Fastback	Fastback	HDBackup	HDBackup	PC Tools	no	HDBackup	HDBackup
1 year	1 year	1 year	1 year	1 year	1 year	3 years	2 years	1 year
40	45	18	38	19	29	28	21	28
34.5	23	13	30	21	28.33	[3]	[3]	30

3) We didn't receive the hard disk in time to benchmark it.

4) These hard disks do not support SCSI evaluator.

Aristotle, Everex, Maxcess, Liberty, and Western Digital offer small, easily carried drives.

tion. For instance, if you set the switch to any number between 0 and 6, then you have set the SCSI address and have activated termination. But if you set the switch to numbers 8 or 9 or letters *A, B, C, D,* or *E,* then you have set the SCSI address, but have *not* activated termination. Procom's HiPerformance external hard disk uses a simple on/off switch to select termination. These units are, therefore, good ones to select if you anticipate moving the hard disk from Macintosh to Macintosh in a large organization.

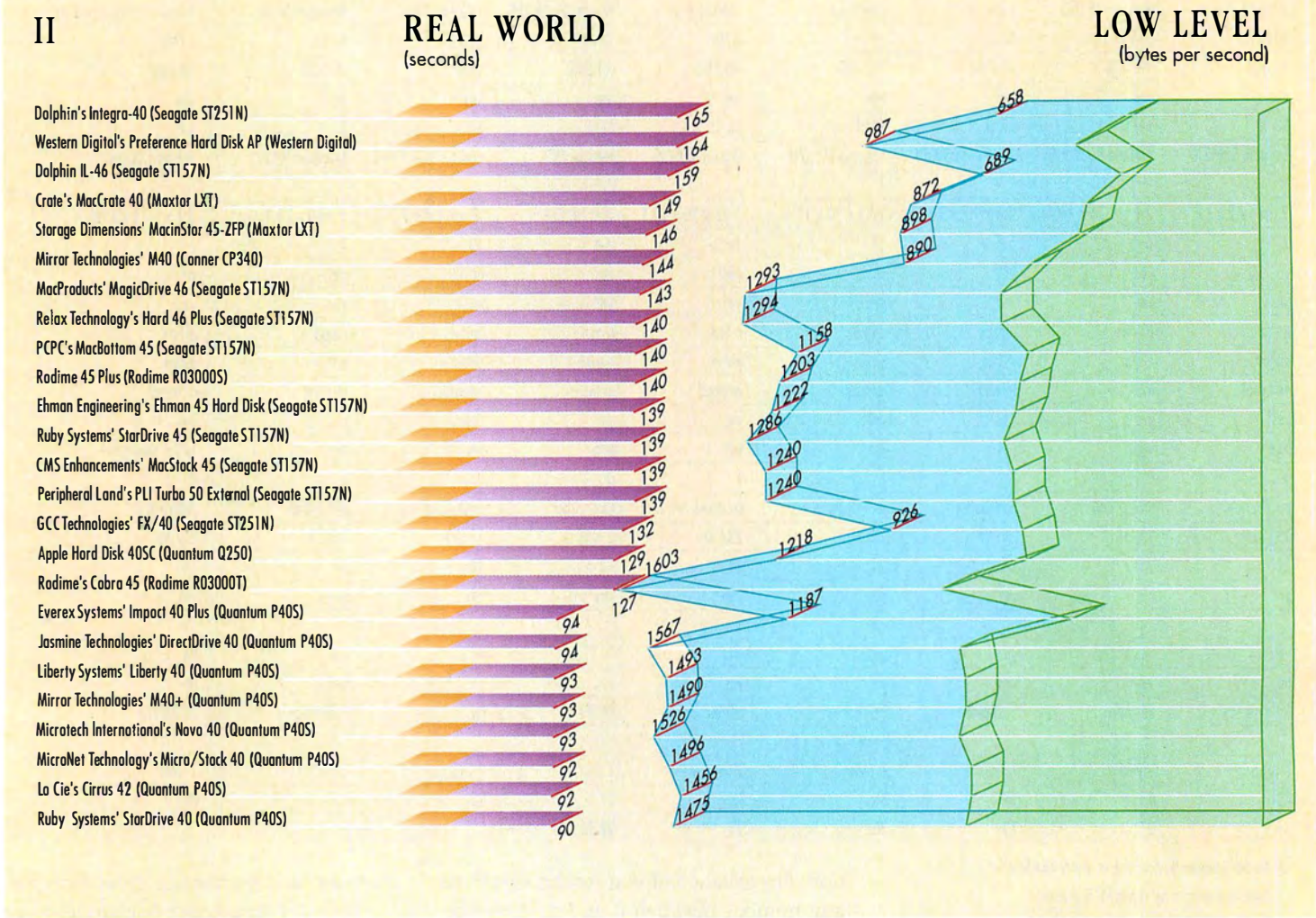
The Extras That Count

A great many hard disks will have the performance you require, a design you find pleasing, and a price you can afford. That's when extras like utility software, manuals, and warranties come into play.

Software that vendors include ranges from bare-bones diagnostic tools and Apple utility software such as the notoriously slow and simple HDBackup (Apple, Cutting Edge, MicroNet, Mirror, Crate, MacProducts, and Western Digital) to professional-caliber, comprehensive backup and hard disk–management utilities (Jasmine, La Cie, Rodime, and Storage Dimensions). Some vendors—such as MacProducts and Mirror—make up for their lack of drive-specific software by including several megabytes' worth of public domain software.

Many people who use hard disks in the 40MB-to-45MB-capacity range won't need partitioning software—a hard disk management utility that divides a hard disk into volumes, each of which displays

SPEED TESTS



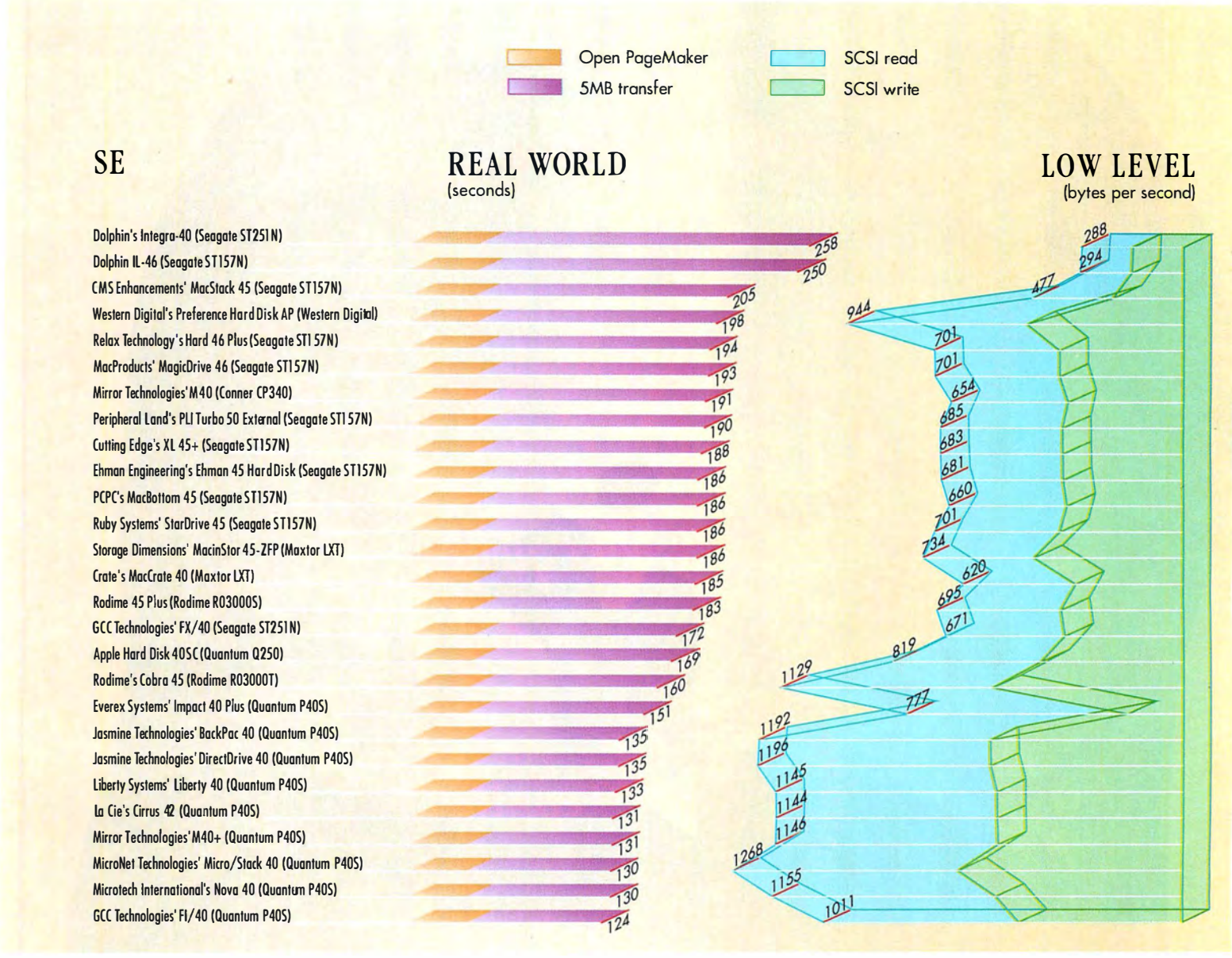
In Macworld Labs' Real World speed tests, hard disks based on a Quantum P40S mechanism proved fastest. The Low Level tests, which measure raw performance, don't necessarily agree with the Real World tests, however. The most striking example is the Cobra, which placed first (that is, transferred the most bytes per second) on the Low Level test on a Mac II. In the more important Real World tests, the Cobra finished second to the speedy Quantum P40S drives.

an icon on the desktop. But if, for instance, you are a software developer, you may have 2000 or more small files to store. The Finder can't keep track of that many files unless they are divided up and placed in separate partitions. For these users, partitioning software is a must. You may also want partitioning software if organizing your work by volumes appeals to you. But be forewarned—if you change a partition (for instance, change its size), you must reformat the hard disk.

Like partitioning software, manuals can be something you simply ignore or they can be a real help, especially to first-time Macintosh users. The best manuals not only explain how to install the hard disk and use its software, but also give new users background on Apple's Hierarchical File System (HFS) and offer hints on disk organization and backup. Jasmine and Everex are examples of two companies that provide excellent manuals.

Warranties range from Apple's measly 90 days to Microtech's outstanding 5 years. Most companies offer a 1-year warranty for parts and labor, while a few offer 2-year warranties.

A warranty won't mean much, however, if the company isn't around to honor it. Already there are more hard disk vendors than the market can support. GCC Technologies and PCPC were the first to introduce hard disks, and they are still producing quality products. Everex, Western Digital, Tallgrass, and Storage Dimensions (whose parent company is Maxtor) are new to the Macintosh market, but these are large companies with a wide base of experience in other computer storage markets.



In comparison to their competitors, some drives, such as those by Crate and Storage Dimensions, ranked better on an SE than on a Mac II. Others, such as CMS Enhancement's MacStack, fared worse. Still, Quantum P40S-based drives proved fastest overall.

What to Buy

What, then, do I recommend? The Quantum-based hard disks from Ruby Systems, MicroNet, La Cie, Mirror, Microtech, Liberty, Jasmine, and Everex were the best performers; all but the Everex retail for under $1000. In many cases, that price point beats slower Seagate-based units.

Of these hard disks, the Jasmine and La Cie products were my favorites. Both sport relatively low prices, excellent manuals, and well-thought-out designs. Jasmine's software includes several megabytes' worth of shareware, drive management programs, and two of the best commercial utility products available: Symantec Utilities for Macintosh (a file-recovery, disk-protection, and partitioning utility) and Redux, a fast (and almost fun) backup utility. La Cie also offers complete drive-management software as well as a program that lets you share hard disks over AppleTalk.

This doesn't mean there's no reason to consider any of the other drives. The Seagate ST157N drive mechanism included in many products offers 46MB compared with Quantum's 40MB. If you are on a tight budget, therefore, a drive like Ehman Engineering's $529 Ehman 45 Hard Disk becomes a real price-per-megabyte bargain ($11.35 per MB) even compared with an inexpensive Quantum drive such as La Cie's Cirrus 42 ($17.52 per MB).

Or you might like the carrying handles on GCC's FX/40. And, now that Apple has dropped the price on its Hard Disk 40SC to a reasonable level, you may want to stick with the Apple logo. In the end, you'll base a buying decision on speed, price, and quite frankly, your emotional reaction to a drive. ■

See *Where to Buy* for contact information.

MICK WIGGINS

Words, Words, Everywhere

A look at the world of Mac word processors

In the beginning was not the Word, but rather MacWrite, a revolutionary word processor that came bundled with the first 128K Macs. Prior to MacWrite, word processor users were an elite crew. Even for simple operations, they were forced to memorize obscure control sequences and to insert type-style formatting codes into character-based displays; higher-end document functions required learning a virtual programming language. MacWrite's innovations were echoed in many subsequent Macintosh word processors, and in some non-Mac ones as well.

Innovative as MacWrite was at first, users gradually compiled an impressive wish list. Among the desired enhancements and extensions were the ability to open many documents at once; a fast spelling checker and access to a thesaurus; style templates for convenient formatting; accurate on-screen document previewing; greater control over printing; easy generation of outlines, tables of contents, and indexes; keyboard equivalents for menu commands; the ability to automate frequently used procedures; and easy file exchange

BY CHARLES SEITER

among the various new formats as well as for Mac-to-PC files.

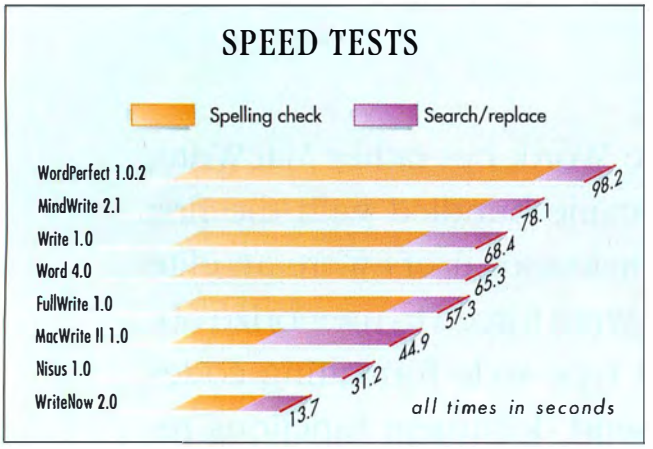
Numerous word processing packages currently attempt to fill all or part of this wish list. To assist readers in sorting through the features included in the latest versions of popular Mac software, a state-of-the-word report follows.

A New Animal: MacWrite II 1.0

A completely new program from Apple's software spin-off, Claris Corporation, MacWrite II resembles Microsoft Word or T/Maker's WriteNow more than it resembles the original MacWrite. Needless to say, Claris has resources, and it has done many things right in this new offering. It is safe to assume that the omissions of high-end features (indexing, macros, drawing tools) were marketing decisions.

New pluses include the ability to open multiple documents, a font- and style-specific Find command, extended type-style options, and Stationery—a style-sheet equivalent for short documents. With MacWrite II, you can juggle columns and insert footnotes, as well as specify right/left page setup and define precise line spacing. Color text and the ability to place graphics in MacPaint or PICT format are also supported.

The capability to exchange formatted files with the original MacWrite, WriteNow, and Microsoft Word 1.0 and 3.0 will be a boon to many business users. Help topics are included in a HyperCard stack (using Symmetry's HyperEngine program) that can be accessed from within MacWrite II. And it's the best help system on the planet for a word processor: you simply click on the appropriate simulated MacWrite screen. MacWrite II is not as slow as you might expect, given its size. Nearly ten times larger than the original MacWrite (MacWrite II requires at least a Mac Plus), it performs most tasks two to four times faster than MacWrite version 4.6 or later versions. However, as the search-and-replace test results show, this still isn't particularly brisk (see "Speed Tests"). MacWrite II's spelling checker, on the other hand, is still one of the fastest around.



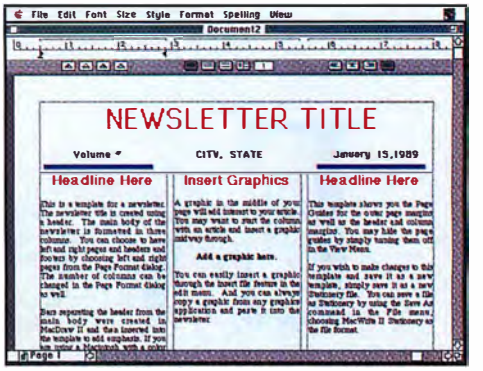
Speed Tests
Each of the eight word programs was tested on a Mac II with 2.5MB RAM and a 40MB hard disk. To test spelling checker speeds, each program looked for the same four mistakes in a 50K document. The search-and-replace test required that each program look for and replace four keywords in the same document. The results are measured in seconds.

Bottom Line With MacWrite II, Claris has made a serious attempt to dominate the under-$300 market. While this version is not a particularly elegant implementation, it offers most of the features MacWrite users have wanted for years. High points include nice layout features and superior file exchange. Low points include the fact that the program is larger, slower, and more expensive than several of its competitors.

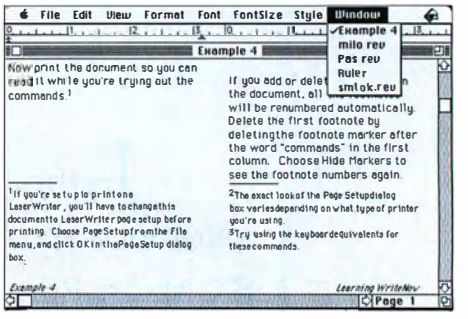
Writer's Choice: WriteNow 2.0

WriteNow was the first real wish-list fix for MacWrite. Developed by T/Maker, it was fast, easy to learn, had a fast spelling checker, and handled lots of open documents that could be as long as you wished. WriteNow soon became a favorite with writers; for example, I used WriteNow to write this article because of its simplicity and speed.

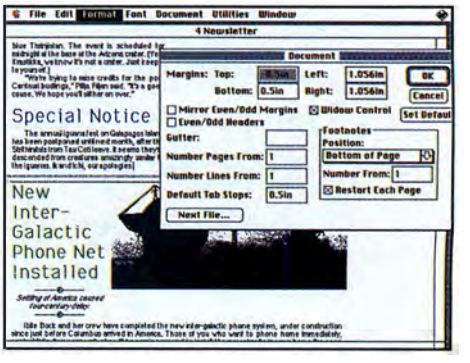
Among the improvements in WriteNow 2.0 are import and export for text-only, MacWrite, and Microsoft's RTF (Rich Text Format) interchange formats. (Direct Word



Splashy MacWrite II 1.0
MacWrite II, with minimal links to the original MacWrite, shows off some of its new capabilities in this splashy newsletter layout. To accommodate multiple documents and extended formatting capabilities, even the menu bar has changed.



Easy Writer
WriteNow's simple menu organization speaks well for the program's ease of use. What can't be shown in a static illustration is the program's superior speed and stability, particularly with long documents.



As You Like It
The Format menu in Word 4.0 now controls all formatting features, including those previously assigned to Page Setup under File. Keyboard shortcuts, preference defaults, and the menus themselves are user configurable.

conversion is promised in the near future.) Flexible line spacing and provisions for handling from one to four columns are available, along with a somewhat tiresome ruler-based substitute for style sheets.

WriteNow is locked in a competition with MacWrite II (see "Word Features at a Glance"). Claris clearly studied WriteNow before releasing its new program, and MacWrite II provides many similar features, as well as improvements of its own. In the course of feature matching, however, Claris produced a much larger program; while WriteNow occupies a little more than 100K and runs comfortably on a 512K Mac with floppies, MacWrite II needs 576K. You could, in principle, run MacWrite II on a two-floppy Mac Plus, but with System, program, spelling checker, and Help on board, you'd only have about 20K left over for your own files.

Bottom Line WriteNow is compact, fast, and very good at what it does. And it is an exceptionally pleasant program to use. High points include speed and a simple interface. The low point is that it has no document-organizing tools.

Still Ahead: Word 4.0

With the possible exception of the New York City subway system, few works of the human mind have evoked such a curious combination of nagging complaint and near-universal daily use as Microsoft Word. Although version 3.01 had more species of bugs than an Indonesian rain forest, Microsoft gradually corrected the situation over time, and 1989 sales figures show Word as the dominant high-end Mac word processor.

Microsoft Word was the first Mac word processor to incorporate many of the longed-for options. Competitors continually attempt to outperform Word, but version 4.0 reflects a serious effort to hold on to this market. Basically, if you are already familiar with Word's style sheets and have set up your own glossaries and user dictionaries, you will find the enhancements in the newest Word sufficient to erase any traces of features envy.

The new Format menu, for example, now handles *all* formatting through a Document command, and the Utilities menu controls search and replace, spell checking, indexing, and other nonformat operations. The Help facility has been upgraded and can also now be invoked from the Windows menu.

Because menus, commands, and keystrokes have been made user-configurable, you can assign your own keyboard shortcuts and insert any command in any menu. This could produce chaos in a multiuser environment ("Hey, what happened to Find in Utilities? Did some %#$@ move it again?!"), but it does let individuals truly personalize their word processors.

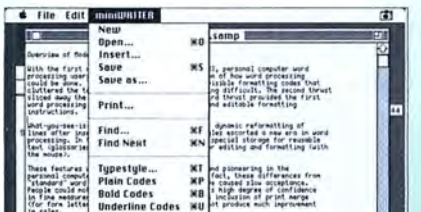
Much more WYSIWYG, version 4.0 substitutes Page View for 3.0's View (now called Galley View) allowing headers, footers, and all other printing items to appear on screen, with big gray page breaks. Extending page-layout capabilities, Word 4.0 lets you import graphics directly—bypassing the Clipboard—and they can be positioned as either movable

AND MORE WORDS

As commercial word processors add more and more features, many users find that they can't operate a word processor and another application under MultiFinder on a 1MB or even a 2.5MB Macintosh. Other people don't need kerning, columns, and automatic tables of contents—they just want to key in some text. For many of these users, a compact desk accessory may be the answer.

miniWriter

The simplest desk accessory "word processor" is miniWriter, a shareware program developed by Dave Dunham. Available through most bulletin boards and user groups, it packs about 80 percent of the most commonly used word processing functions into about 25K. Using miniWriter's single menu, you can choose a font, insert a type-style code (easily interpreted by most other word processors), or combine documents with the Insert command. This program was a pioneer in offering "smart quotes," and it even gives you line, word, and character counts. If you use the program, you are respectfully requested to send $12 to Maitreya Design, P.O. Box 1480, Goleta, CA 93116. Considering that this price is less than the sales tax on most word processors—and that miniWriter is exceptionally useful in many contexts—it's a request that deserves to be honored.



ExpressWrite

A more ambitious commercial program is ExpressWrite from Exodus Software. A DA, it needs about 70K to operate, but it includes a nice mail merge facility and a Stationery option that works like a style sheet for small documents. ExpressWrite has MacWrite-style rulers and font control, and an interface that allows you to use menus, key commands, or an icon bar for the commands. Complex formatting is not this program's strongest point, but if you do little more than dash off letters to people, ExpressWrite is a better choice than most full-scale word processors.

QuickLetter

Still more ambitious is QuickLetter from Working Software, a DA behemoth that takes up a whopping 160K. In exchange, you get the usual Macintosh writing functions plus graphics import, the efficient Spellswell spelling checker, and, as with ExpressWrite, you can store frequently used formats as Stationery. Formatting text for letterhead is a cinch with fast and easy control over all margins and line spacing, plus you have page preview capability. The only catch in this delightful scheme is that all these conveniences result in a program whose size and cost ($124.95) begin to approach those of "real" word processors.

WORD FEATURES AT A GLANCE

	Microsoft Write 1.0	MacWrite II 1.0	WriteNow 2.0	MindWrite 2.1	Microsoft Word 4.0	FullWrite Professional 1.0
Company	Microsoft	Claris	T/Maker	DeltaPoint	Microsoft	Ashton-Tate
Price	$125	$249	$195	$195	$395	$395
				$250 (w/ Express)	$250 (w/ Express)	
Default under MultiFinder	384K	590K	400K	750K	512K	1124K
Maximum number of open documents	16	7	available memory	available memory	22	available memory
Macros					AutoMac	
Undo levels	1	1	1 plus Revert to	1	1	1
Keyboard equivalents	•	•	•	•	•	Walkdown mode
Mail merge		•	•		•	•
Outlining				•	•	•
Indexing					•	•
Table of contents				•	•	•
Footnotes	•	•	•	•	•	•
Endnotes	•	•			•	•
Tables					•	
Color text		•			•	•
Nonstandard type styles	0	4	2	0	4	8
Text flow					•	•
Kerning						•
Spelling checker	•	•	•	•	•	•
User dictionary	•	•	•	•	•	•
Thesaurus		•			•	•
Search and replace font/size		•	•			•
Search and replace nonprinting	•	•	•	•	•	•
Search and replace wildcard	•	•	•	•	•	•
Multiple footers/headers		•			•	•
Odd/even footers/headers	•	•	•	•	•	•
Page preview	•	•			•	
Edit in preview		•			•	
Automatic repoginotion		•	•	•	•	•
Right/left pages		•	•		•	•
Sidebars						•
Columns	in layout	10	4	tabs	22	user defined
Snaking	•	•	•		•	•
Side-by-side	•				•	•
Drawing tools					includes SuperPaint	•
Graphics resizing	•	•	•	•	•	•

or fixed elements with the text flowing around the fixed positions.

A Tables command lets you define cells arranged in columns and rows, and they can be boxed or not. This is particularly effective now that Word is actively linked to Excel. A Word document can thus contain a formatted, automatically updated bit of spreadsheet.

Bottom Line Microsoft is willing to bypass users who insist on kerning (supported by FullWrite and WordPerfect), but it will fight for every other scrap of market share. Word 4.0 was shipped much later—and much more bug-free—than anyone would have reasonably expected. The program is fast and smooth, and contains a carefully considered array of power features. High points include automatic links to Excel and SuperPaint. Low points? Word 4.0 files are not compatible with page-layout programs. To place 4.0 documents in desktop publications, they must be saved in Word 3.0 format, losing any 4.0 enhancements such as tables. According to Microsoft, the responsibility for finding a solution to the problem is up to the developers of the page-layout programs.

SHORT AND SWEET: WRITE 1.0

As a glance at "Word Features at a Glance" shows, Word's undernourished little

WordPerfect 1.0.2	Nisus 1.0
WordPerfect	Paragon Concepts
$395	$395
600K	1200K
available memory	available memory
•	•
1	300 (default)
•	•
•	in macro
•	
•	•
•	•
•	
•	
•	
3	7
	•
•	
•	•
•	•
•	•
•	•
•	•
•	•
•	•
•	•
•	•
•	•
•	•
24	user defined
•	•
•	•
	•
•	•

brother, Microsoft Write, has been deliberately feature-deprived. Inappropriate for serious office use, Write was conceived as a low-cost personal word processor for low-end users.

When it was introduced in 1987, Microsoft Write was certainly a plausible alternative to MacWrite. It juggles up to 16 documents and it can keep track of footnotes. Besides being the cheapest word processor on the market, it has its own spelling checker, it lets you preview pages, and it can print in columns. And Microsoft has a generous upgrade-to-Word pricing strategy.

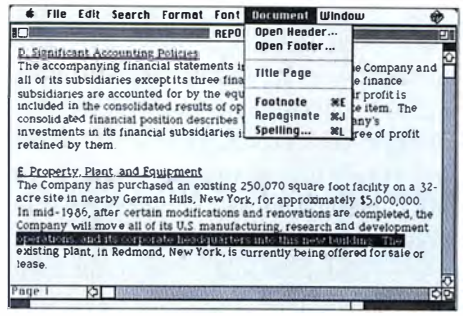
Bottom Line Write's market problem is that all competing lower-cost word processors have been furiously upgraded while Write stood still. Perhaps the program should be called Student Word. It has just enough features for completing term papers, but it's underpowered for most business uses. Its high point is its good footnote handling. Its low points are its sluggish pace and many limitations.

Getting Organized: MindWrite 2.1

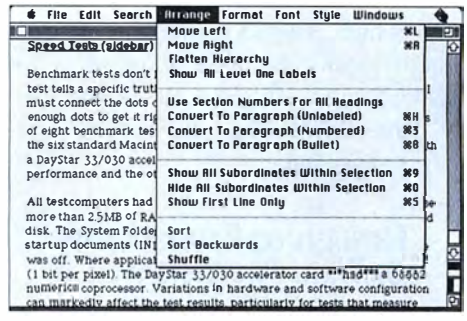
For people who create lots of structured documents, MindWrite is the word processor of choice. Contracts, business plans, and the type of manuals that have sections called "1.4.1.1 Activating the Neutron Emitter" are all produced more easily with MindWrite than with any of the other programs mentioned here. This is not to say that the outliners in Word and FullWrite and WordPerfect aren't just fine; the difference is that MindWrite is *based* on an outlining format. First you define a structure, and then you fill in the blocks of text.

Standard word processing functions (spell checking, search and replace, and graphics and font management) are all supported, but the organizational aspects of document handling are uniquely well served. You can drag an automatically numbered section to a new place in a document and all the sections will be neatly renumbered to accommodate the change. For revision tracking, you can request an option that shows all changes since the last Save. You can view the outline of your document in a separate window while you work on an individual section. Finally, you can export your document to PageMaker for final layout using a special filter—MindWrite's developer, Access Technology (now DeltaPoint), wisely decided to leave page layout to the professionals.

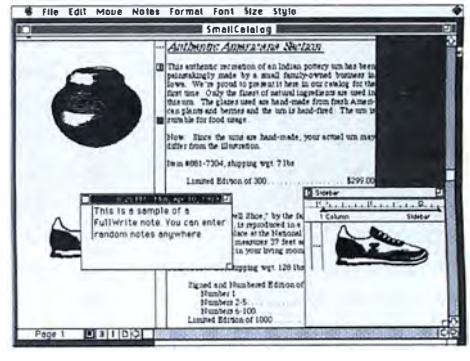
MindWrite Express is a set of additional filters that let you import and export documents to most other Macintosh word processors, as well as to standard



Simple and Easy
Write's short Document menu displays, by omission, the difference between it and Word: in the name of ease and simplicity, fewer document-management features are available.



Level-Headed Organization
MindWrite bases its document-organization scheme on an outlining model. You can access the options in the powerful Arrange menu by using a series of simple mouse actions.



Note This
Besides combining high-end document-management capabilities with medium-strength page-layout and graphics facilities, FullWrite includes unique Note and Sidebar features.

word processors for the IBM PC, Wang, and VAX computers as well. Whenever the target word processor supports outlining, the outline structure is preserved during import/export. This facility means that MindWrite is valuable even in an office dominated by another standard word processor. In such a case, a reasonable procedure would be to do all document organization and draft preparation in MindWrite, and export copies to the office standard for final drafts and special printer-ready versions. If you have to write anything longer than a few pages, it's a very helpful program to have.

Bottom Line Designed around its outlining function, MindWrite is a solid word processor with a good spelling checker and a special utility that allows file exchange to dozens of other programs. It gets high points for handling of structured documents. Its low point is for layout features, although this is effectively addressed through the special interface to PageMaker.

Emphasis on Professional: FullWrite Professional 1.0

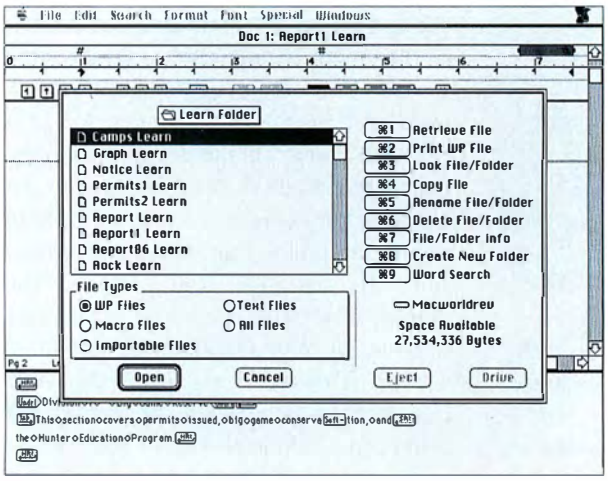
FullWrite, the first program designed to provide real competition to Microsoft Word, had the doubtful distinction of winning industrywide vaporware awards for more than a year before its release. When it finally did arrive, under the corporate wing of Ashton-Tate, it was easy to see the reason for the many delays. This program contains *every* feature a user might associate with a word processor—and more.

"More" means, principally, page-layout and graphics tools. FullWrite can flow text (or columns of text) around objects, kern letter pairs, and adjust the position of text blocks by inches, centimeters, picas, points, and pixels. To get more control over printed output you would have to use a dedicated page-layout program like PageMaker or QuarkXPress. In addition, FullWrite includes a simple MacDraw-like tool palette for creating lines, boxes, and other shapes, and for manipulating document graphics. If you are producing a small newsletter and for some reason are allowed only one piece of software, FullWrite is likely your best choice.

High-end users will appreciate the competent outlining, indexing, table of contents, footnote, and endnote features. A Note feature lets you scatter the electronic equivalent of Post-it notes throughout a document. Small nonprinting Note icons mark each note after it is closed. A Sidebar feature lets you place boxed text and graphics on a specific page, or you can float it next to tagged text. While this may prove a valuable layout tool for some users, actual placement of the sidebar is an awkward process.

Ashton-Tate claims that FullWrite will run on any Mac that can make 1MB available to the program. For optimum performance, however, you should run the program on a Mac II with more than 2MB of RAM, a fast hard disk (to take advantage of FullWrite's virtual memory capability), and a large-screen display if you plan to lay out multipage brochures or documents with much artwork.

Bottom Line FullWrite has every word processing feature you could want, and page-layout capabilities to boot. It demands high-end hardware, which is why it's made only modest inroads into Word's empire. It gets high points for completeness, the sidebar feature, and built-in drawing tools; low points for leisurely performance.



Beyond Finder

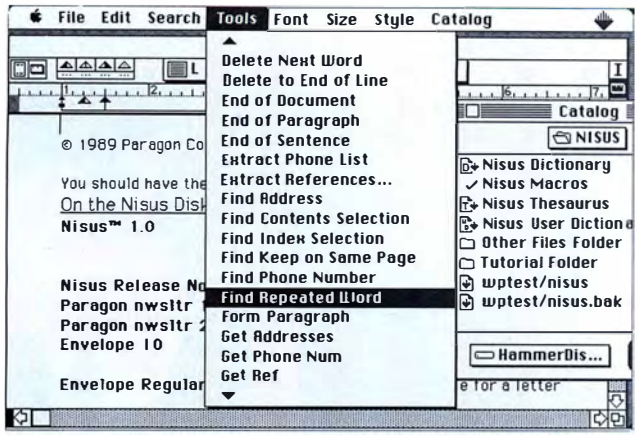
File management is a standout feature in WordPerfect, a program that borrows many features from its successful counterpart in the MS-DOS world. This screenshot illustrates the application's efficient within-program replacement for the Finder.

From the Other Side: WordPerfect 1.0.2

In the MS-DOS world, WordPerfect is the leading word processor, maintaining a comfortable lead over WordStar and the PC version of Microsoft Word. WordPerfect Corporation's obvious goal for its Mac program was intersystem compatibility; it was successful, but sometimes at the expense of Mac-ness. Originally released as a buggy "trial package" (WordPerfect Corporation tried out a novel sell-beta-programs-for-cash strategy), WordPerfect for the Mac got off to a rocky start. But agonizing release delays and problems are virtually part of the pedigree of all complex Mac word processors; the current product is formidable.

While it's clearly the program to get if you have the lone Mac in an office full of WordPerfect-using PCs, ex-MacWrite users will find the learning curve fairly steep, and parts of the WordPerfect interface are decidedly non-Mac-like. The program does offer some strong features, however. Besides familiar document-organization features—outlining, index, table of contents, footnotes, endnotes—it includes a particularly sophisticated merge facility. In addition to WordPerfect's exhaustive set of keyboard equivalents, it is possible, with practice, to write a great variety of text-manipulation macros. The spelling checker is slow, but because it makes a minimal number of unnecessary stops and because more often than not it suggests the "correct" word, it is the best of those tested.

Evidence of a fresh perspective is apparent in the way the program's File Management options let you organize work without having to resort to the desktop. You can open, close, rename, and copy files; create new folders; change file attributes and search for a key word through all files in a folder. This emphasis on file management is a bigger selling point in the MS-DOS world, with its miserable file-handling environment, but Mac users ap-



Macro Scope

Although Nisus comes with more than 50 macros, you can, with effort, create additional ones. They appear automatically in the Tools menu.

preciate it too, as the popularity of DA utilities like DiskTop indicates.

Tiny buttons at the bottom of the screen provide another nonstandard touch. Used to change common text styles, they are a small, useful implementation that extends the Mac interface. In short, there is much about WordPerfect that strikes a Mac user as odd, but it's all there for a good reason. The program gets more impressive with use.

Bottom Line WordPerfect Corporation's concern for intercomputer compatibility (WordPerfect runs on everything from an Amiga to a VAX) has loaded the program with non-Mac idiosyncrasies. Sales are respectable because WordPerfect dominates most PC offices. It scores high points for file management, and for its spelling checker and layout features. Its low point is definitely the long learning curve.

Simply Amazing Indeed: Nisus 1.0

"And now for something completely different," as the Monty Python troupe used to say. Advertised quite truthfully by Paragon Concepts as the "amazing word processor," Nisus represents a new perspective on word processing. With its popular programmer's editor, QUED/M, as a starting point, Paragon has not simply produced another "MacWrite Plus" program. Many of the powerful text-manipulation tools that give UNIX its popularity in other computing environments appear here as Nisus features—keyword search (and search and replace) on unopened files and programmable text-pattern matching (GREP, for UNIX fans) are two examples.

Macros, defined in a programming scheme with nearly the scope of LISP, appear when implemented in the Nisus Tools menu. While this setup results in an unwieldy scrolling list, it does mean that *any* complex action is potentially just a mouse-click away. Paragon has implemented many of the standard features of other word processors (mail merge, for example) as macros rather than bolted-in features. An array of keyboard equivalents, some fairly complex, supports macro development.

Nisus includes outline and table-of-contents generation, cross-referencing, and an index generator based on a pattern matcher. Layout capabilities include columns, page preview, text-flow around objects, and the rather uncommon ability to superimpose text and graphics. The option-loaded spelling checker can do wonderful things for you, once you get your User Dictionary properly established. A palette of drawing tools is also included, in the unlikely event that you feel you're not getting your money's worth. A handy file-management window is also provided; and despite Nisus's uniqueness, its program file can be exchanged with those of MacWrite and Microsoft Word, or opened as text (minus formatting) by any other program.

The question is this: Who needs another high-end word processor, particularly one whose main strength is pattern-matching and macros? The answer is probably to ask another question. Who maintains a database that's mostly text? Journalists and researchers, and secretaries who must keep track of dozens of short to mid-length documents, will find it easy to use Nisus to navigate the sea of data represented by this quantity of text. It's easier to use another program for page layout, but Nisus's capacity for flexible searching through a document file "database" and its array of editable clipboards make it a valuable research-and-retrieval package. It's like having a set of data and text utilities grafted onto a full-featured word processor.

Bottom Line Nisus is a hacker's daydream of a word processor, infinitely programmable but still rough in spots. It's hard to imagine an office full of secretaries demanding to switch to Nisus, but it could be used to automate most repetitive tasks. High points include macro extendability as well as super search and replace and graphics handling. The documentation is definitely a low point, inadequate for this program's complexity. (For more on Nisus, see *Reviews* in this issue.)

Word Wrap-Up

At this point in Mac software evolution, it has become routine for basic word processors to offer last year's luxuries as standard features. Spelling checkers and column layout, for example, are now expected in even the simplest packages. Users want programs to be able to read the files of nearly any other program. At the high end, the market is currently deciding how many page-layout features belong in a word processor, and nearly every word processor feature that has been developed for any computer can now be found on the Mac. The programs have enough personality that it's easy to pick the one that matches your requirements, but it's remarkable how competitive pressures have forced all programs into becoming solid general-purpose performers. The challenge now facing developers is to devise ways to tap the power of memory-loaded 68030 machines to deliver real benefits, rather than mere complexity, in the next generation of programs.

See *Where to Buy* for contact information.

***Charles Seiter** has been comparing word processing programs since the first days of the Macintosh. He's particularly interested in text processing and programming languages for text processing.*

The GREAT E-MAIL PUZZLE

The coming generation of electronic mail will be vastly different from the past one. Will you be ready for it?

RON CHAN

by Dave Kosiur

When electronic mail (E-mail) programs first emerged for the Macintosh, Mac users were tied together in small Mac-only local area networks (LANs). Now Macs are linking to IBM PCs, Digital Equipment Corporation VAXes, UNIX computers, and IBM mainframes. To keep up with those networking capabilities, E-mail vendors are offering new services to Mac users—remote access, multiple-zone access, and gateways, to name just a few. Just as networking options have become more complex and bewildering, so too have E-mail alternatives.

The concept behind E-mail is actually quite simple; the underlying mechanisms, however, are fairly complex. Providing the growing sophistication of E-mail while maintaining ease of use (and ease of administration) is the puzzle vendors are trying to solve for the new generation of Mac E-mail systems.

Right now, Mac users are in a transition period between the first generation of E-mail programs and that next generation. QuickMail version 2.0 from CE Software, just-released Microsoft Mail version 2.0, and InBox version 3.0 (soon to be released by TOPS) are second-generation E-mail products. Dayna Communications has announced its E-mail package, DaynaMail. Some of the major IBM PC powers, 3Com and cc:Mail, also offer mail systems that support the Mac (see "E-mail: The Players").

The new generation of mail software attempts to deal with old problems as well as to offer new capabilities (see "Once Burned, Twice Shy?"). Let's take a look at the issues currently being addressed by vendors. At the same time, we'll see how different vendors are solving the E-mail puzzle with new services.

Large Networks and Outside Calls

More so than rain, sleet, or snow, network zones have been the bane of E-mail systems. To work over large networks that contain more than one mail server, E-mail systems should have a *store-and-forward* capability.

With store-and-forward systems, two mail servers don't have to be actively linked for you to send mail to someone on another server. You simply create and address mail as if the recipient were on the same server you are. The local server sees to it that mail is forwarded to the recipient on the other server the next time the servers communicate with each other. Most E-mail packages—InBox, Microsoft Mail, QuickMail—now use store-and-forward mechanisms for handling mail over zones or multiple servers.

The opposite philosophy of store-and-forward is *direct connection.* With this system, you have to select the server that you want the mail to go to, which means that you must know what server handles whose mail. Unless the administrator of another server makes available to you a list of mail users handled by that server, you can't send mail to those users. Obviously, this system gets cumbersome when you're on a large network with multiple mail servers. The only E-mail system that still follows this philosophy is cc:Mail.

When you're out in the field, lugging your Mac or an MS-DOS laptop computer, accessing the E-mail system may be even more critical. A store-and-forward E-mail system works well for remote access, but you'll need access in the first place to take advantage of it.

Remote access to Mac E-mail takes two forms. There's the normal extension of AppleTalk networking protocols to remote access (see "Networking from a Distance," *Macworld,* June 1988). Using a modem and a serial-to-AppleTalk converter—such as Solana Electronics' S-Server or Shiva's NetSerial—you can provide dial-in AppleTalk access to the network.

Because the dial-in user appears as part of the network, any E-mail package works in this configuration. The only difference is that E-mail operation is slower. Modems can't send and transmit data as

E-MAIL: THE PLAYERS

Product	Company	Clients	Servers	Server Type	Gateways
cc:Mail	cc:Mail	Macs, PCs	Macs, PCs, AFP-compliant*	direct connection	Soft-Switch
DaynaMoil	Dayna Communications	Mocs, PCs	Mocs, PCs	store-ond-forword	Soft-Switch
InBox	TOPS	Mocs, PCs	Macs	store-and-forword	Soft-Switch, custom
Microsoft Mail	Microsoft	Macs, PCs	Macs, AFP-compliont*	store-and-forward	Soft-Switch, Pacer, Aliso, custom
QuickMail	CE Software	Mocs, PCs	Mocs, AFP-compliont*	store-and-forward	INET, StarNine, custom
3+Mail	3Com	Macs, PCs	3Com	store-and-forward	Soft-Switch, custom

*Other computers running server software compatible with Apple's AppleShare Filing Protocol (AFP) can be used as mail servers.

fast as LocalTalk cables can.

CE Software offers another approach with QuickMail. QuickMail server software can control a modem directly attached to the server. To access the E-mail system, you use the QuickRemote application to create messages and call the server. QuickRemote then talks to the server and automatically sends your mail and receives any messages addressed to you. Using QuickRemote sidesteps the need to use the modem for carrying AppleTalk protocols, which have a lot of overhead, thereby improving the response of the mail system.

E-Mail Connections to Beyond

Networking Macs and PCs has become so popular that E-mail packages need to support mail exchange between both types of computers. At the same time, LAN-based E-mail must connect with larger corporate E-mail systems, such as those on DEC VAXes, UNIX workstations, or IBM mainframes (see "Reaching Out").

Originally, only InBox was available in a PC version as well as a Mac version. With the proliferation of mixed Mac-and-PC networks in corporations, all the E-mail vendors mentioned in this article now offer both Mac and PC versions of their mail software.

While all of the mail packages we are covering offer client software for the PC (what you need in order to send and receive messages), not all of them allow you to install mail servers on a PC. Only cc:Mail and DaynaMail let you do so, by employing Action Technologies' Message Handling System (MHS) protocols.

Particularly when starting from the Mac side of the market, developers are offering easy-to-use interfaces for PC users. Usually the PC mail packages function as stand-alone applications or as terminate-

ONCE BURNED, TWICE SHY?

A once-common complaint of E-mail programs was that their desk accessory (DA) sizes made using mail difficult on floppy-based Macs and on Macs with minimum amounts of memory. InBox allowed you to run the DA partly in memory and partly on disk, a configuration called Disk Resident Installation. But you still needed space—either on disk or in memory.

QuickMail and the new version of InBox allow you to keep some of the program code out of memory; QuickMail even lets you transmit the added resources from the server for further economy. This can make it easier for you to run E-mail on a floppy-based laptop, for instance.

Another problem with early E-mail systems was the way the mail server handled messages. For example, InBox did not automatically recover the disk space freed by deleted messages, leaving a very fragmented disk. You had to run the Administrator program to compress the mail files and make the disk more usable.

InterMail, the predecessor to Microsoft Mail, did not release space to the hard disk after files were deleted, either. Rather, it simply maintained the message database at the maximum size. At times, the message database got so large it caused a server crash. Microsoft finally released a utility program with version 1.37 of Microsoft Mail that allowed the mail administrator to compress the message database.

The new versions of InBox and Microsoft Mail have adopted different ways of storing messages and recovering disk space automatically. QuickMail, on the other hand, uses the standard Mac Hierarchical File System for storing mail. As a result, the Mac's operating system is responsible for recovering disk space.

A popular E-mail feature is using file attachments to transfer files to the addressees. InBox, QuickMail, and cc:Mail permit you to attach multiple files to a mail message. cc:Mail even allows you to include direct screen shots from PCs, as well as text and graphics files. Meanwhile, Microsoft Mail inexplicably maintains its one-file-per-message limit.

One problem that's hung around, even with the new E-mail systems, is setting up the mail server. Most systems let you choose between a background or a dedicated server. Unless you're working in a very small network, don't try to set up any mail server as a background server on someone's Mac. There's just too much activity associated with E-mail for the server to act as a workstation too. The only place to take advantage of background server capabilities is on an AppleShare server.

and-stay-resident (TSR) programs, which are similar to desk accessories on the Mac.

Corporate Mail

Linking LAN-based E-mail and corporate mail systems—on mainframes, for instance-—can be considerably more complicated. In a perfect world, any mail messages and files can be sent to and read on any computer. In our world, however, *Mail gateways* act as intermediaries between incompatible mail systems; gateways translate one type of mail format into another, whether the mail originates on a Mac or on a mainframe.

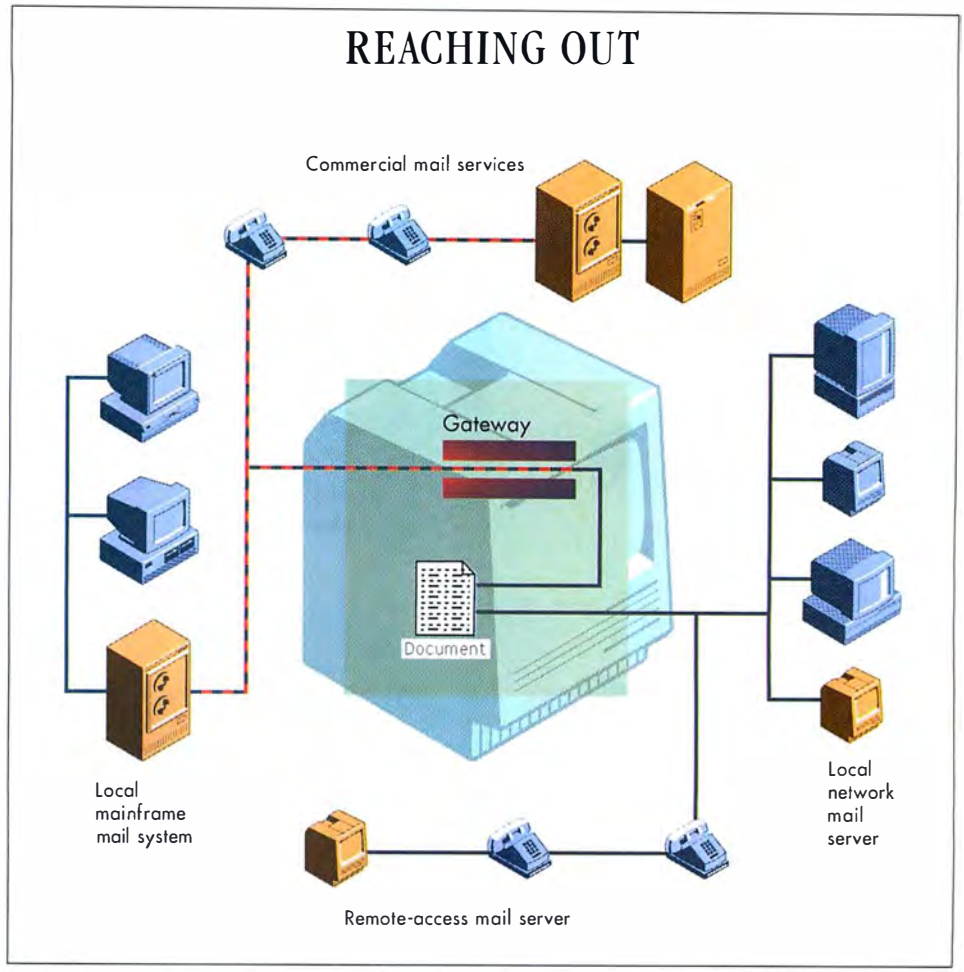
You must pay special attention to the mail gateway you use. To start, let's consider the functions of a mail gateway based on the components of any mail item. Each mail item consists of an envelope, which includes addressing information, and one or more enclosures, which may be text or graphics.

The gateway must first be able to translate the address on the envelope to one that's compatible with the mail system you're sending to. Then the gateway must also know how to handle the enclosed files. The way that a gateway handles file translations can affect the integrity of your documents, as we'll see shortly.

Most corporations have one of two reasons for linking LAN-based E-mail to mainframe-based E-mail: (1) they want free two-way exchange of mail between LAN users and mainframe users; or (2) they want the mainframe system to become the hub, or central unifier, for all of their LANs.

In the first case, you should ensure that any files originating on one computer can be properly translated to usable files on any other type of computer on the network. Some gateways are designed to translate a foreign file into a format common to the mainframe's operating system and then translate the document back into a suitable format when the message is sent back to a LAN (see "Opening the Gates"). If some files cannot be translated, there should be a way to notify the recipient that the files are unreadable.

If, as in the second case, you're simply interested in using the corporate mail system as a conduit for passing E-mail between LANs, then a gateway that doesn't translate enclosed files to and from a mainframe file format is the way to go.



With the new E-mail systems, a Mac user can send and receive mail from both local mail servers and other servers (like mainframe computers) via mail gateways. Either networks or modems can make the link.

Differences in the formatting and graphics content of documents, for example, can cause notorious problems. If two E-mail systems don't support the same document formats, some information will be lost in the translation process. At present, the E-mail packages that use their own message-addressing and delivery protocols outnumber those that use a common format (see "Standard Mail").

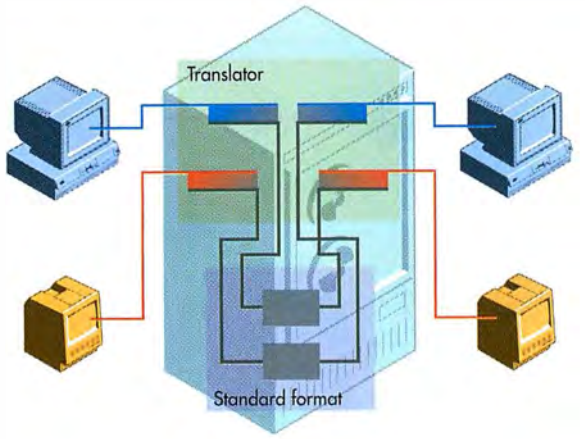
The vendors have done one of two things. Some—for example, Microsoft, CE Software, Dayna—have made arrangements for linking into preexisting mail gateways from vendors like Soft-Switch or INET. Others are working with third-party vendors to develop specific computer–mail-system gateways. For example, Microsoft, Alisa Systems, and Pacer Software are developing a VAX connection; CE Software worked with StarNine Technologies for a UNIX mail gateway.

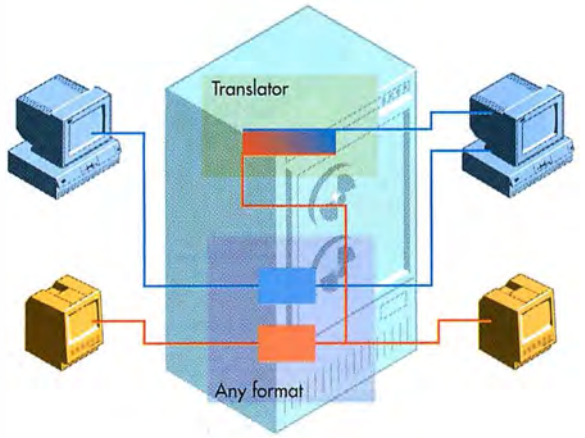
Another use of gateways is connecting to commercial E-mail systems, such as AppleLink, CompuServe, EasyPlex, and MCI Mail. Microsoft Mail and QuickMail allow you to generate addresses for users on other mail systems, use those addresses once, or keep them in your address list for future use. Both products can then dial up the other mail service and pass on messages, just as gateways do for directly linked computer systems.

Work Savers

Consider this—you're in an application working on a file and you want to send that file to someone, why should you run a mail DA or program to send the file? Why

OPENING THE GATES





Not all E-mail gateways handle file translations the same way. The top diagram shows a gateway that translates a document twice: both to and from a standard format (usually that of a mainframe). The bottom diagram shows a gateway that only translates a document once: to a form readable by a recipient's computer.

not just send the file from within your application, just as if you were printing to a LaserWriter or sending a fax? Add to this capability the power of store-and-forward, and two Macs wouldn't even have to be connected all the time to exchange files.

By providing standard interfaces, E-mail software developers are making it easier for other programmers to integrate the use of mail as a data carrier in their own applications. The programmers need worry only about how they want their applications to interact with the mail system. As a user, you just have to make sure that the application and the E-mail system were designed for each other (see "Apple Plays Post Office).

Microsoft is now the leader in tying together E-mail and applications, including the ability to send and read mail from within Word 4.0; the same options are planned for Microsoft Excel 2.2 (see "Getting the Data Through"). TOPS will provide a developer's tool kit so application developers can include hooks for InBox within applications. CE Software may offer similar services in conjunction with a company like Claris. Unfortunately, this division of the market will probably cause users more grief than relief until one or two E-mail systems win out over the others.

Action Technologies' MHS, a programming interface for networkwide commu-

STANDARD MAIL

International standardization of mail protocols is a significant step in the direction of plug-and-play E-mail. The Consultative Committee for International Telegraph and Telephone has been working on a message-handling standard called X.400 for some time now.

The basic idea behind the X.400 protocol is this: if you have two (or more) E-mail systems that support X.400 protocols, the systems can exchange messages. The addresses and the messages will be transferred from one system to the next, ultimately negating the need for mail gateways.

Many developers have announced their support for the X.400 protocols. But while some commercial products using X.400 have started to ship for other computer systems, none are currently available for the Macintosh. Nor are any Macintosh E-mail vendors offering X.400 gateways that would allow Macs to communicate with available X.400 systems. Retix Corporation recently developed an X.400 E-mail package for IBM PCs and plans to offer a Macintosh version in the near future.

Don't expect X.400 to be the final solution, however. Imagine an international company with tens of thousands of employees scattered all over the world. How do you send mail electronically to one of the 100 C. Smiths listed in the company directory? Can you pare down a list of 10,000 names to a more manageable search size? These questions are being addressed by another set of protocols currently under development, called X.500. Unfortunately, it will probably be some time before X.500 directory protocols have any impact on large national or international mail networks.

nications, offers similar capabilities to PC users. Both DaynaMail and cc:Mail support MHS on Macs as well as on PCs. However, no other available Mac applications directly access MHS. Because Novell includes MHS as part of its NetWare for the Mac server software, MHS will probably first affect Macs attached to NetWare servers. This may stir Mac developers to add MHS support to their applications.

Return to Sender, Address Unknown

As networks and E-mail systems grow, the size of an address list can become overwhelming. Each system has its own way of dealing with the problem. Microsoft Mail now provides a global mail list to all users. Each server automatically propagates and updates its list when other servers are connected. If a server is out of communication for more than a specified amount of time, its addresses are removed from the mailing list.

On the other hand, cc:Mail uses a distributed approach that requires manual updating of mail lists. In cc:Mail the address lists and mail files stay on a server, but the actual mail program resides on each Mac or PC. The administrator of each server must ensure that the server's address list is made available to other servers for mail to pass between them.

In larger companies, it's likely that networks are broken down into zones. So, the E-mail system must be able to deal with complex networks by making mail sent across zones transparent. Linked workgroups in multiple zones may have led to problems in the past, but transparent support for multiple store-and-forward servers alleviates that problem.

No Junk Mail

E-mail can be a tremendous asset to networked users. The new generation of E-mail for the Mac carries with it the standard advantages and also brings a new level of user transparency. Not only that, but E-mail can span a local workgroup, an entire company, or the globe.

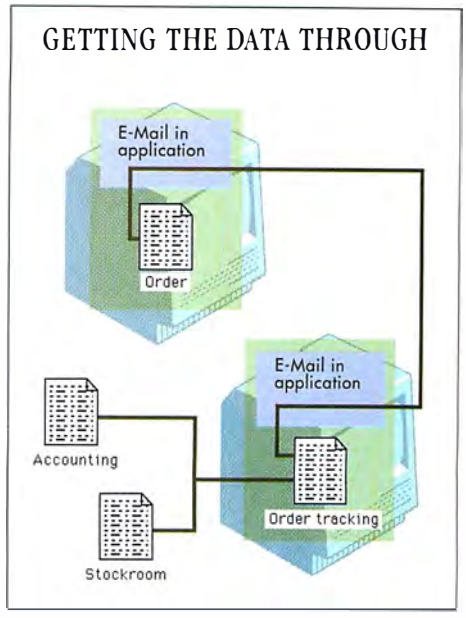
Here are some strategies for dealing with E-mail and its latest offerings. First, if you're already using an E-mail system, plan on upgrading sometime this year. If you're part of a small workgroup or company, you'll quickly discover the advantages of better handling of disk space and server resources.

Second, if you're planning on expanding your mail services, take a serious look at how different workgroups will communicate. For a complex network, nothing beats servers using the store-and-forward mechanism. The frustration you save just might be your own.

Third, determine if all parts of your network have to be in constant communication with each other. A server that periodically sends messages and the enclosed files to a remote server may be a sufficient link between workgroups. If you follow this route, see if the server can alter its routine for urgent messages. (But be forewarned: once you impose a priority system for E-mail, almost all users think their mail should have a high priority, which is self-defeating.) Or, look at a gateway to a commercial service as another way to link offices. Make sure that the service can handle binary files if you plan to transfer Mac files back and forth.

Fourth, if you're in a big company, see if you can leverage off of the power of your corporate systems. Whether you want to use the mainframe system merely as a conduit to other LANs or as a way to get mail to employees without Macs, check what the gateways do to your documents. Make sure that mail can move—to, as well as from, the mainframe—otherwise your communications will break down.

See *Where to Buy* for contact information.



Incorporating E-mail into an application such as Microsoft Excel allows users to set up a simple transaction-processing system. A completed order can be transmitted with the E-mail system into master stockroom or accounting worksheets for updates.

APPLE PLAYS POST OFFICE

Apple revealed in May that its new System 7.0 will include E-mail as a component. Apple's plan for its E-mail system has two parts. The first part is to develop a store-and-forward architecture. The second is to develop an API (application programming interface) for its message-handling system, so that third-party developers can incorporate the Apple mail system into their own applications. Much of the Apple message-handling system resembles the X.400 mail specification, although it is not, in fact, an X.400 mail system.

Apple's own entry in the E-mail market will probably offer fewer features than the E-mail products offered by third parties such as CE Software, Microsoft, and TOPS. Apple's E-mail system will also require System 7.0, restricting the use of Apple's mail application. (For more information on the new System, see "Here Comes System 7.0," *Macworld*, August 1989.) However, Apple's publication of its mail system specifications will enable third-party developers to take advantage of Apple's developments.

Dave Kosiur, *a* Macworld *contributing editor, is the publisher of* Connections, *an international newsletter concerned with Macintosh networking.*

MIDI SEQUENCERS: Greatest Hits

BY CHRISTOPHER YAVELOW

✦ ✦ ✦

Will newcomers Vision and Portrait turn Master Tracks Pro and Performer into golden oldies?

If you're a musician who owns a Macintosh, you probably already know the value of a MIDI (musical instrument digital interface) sequencer. Sequencers are the programs that enable musicians to record keystrokes played on a synthesizer keyboard and then to edit their performances in a multitude of ways. The resulting *sequence* can be used in performance to play the music back through any number of MIDI-equipped instruments, or it can be exported to a notation program and turned into sheet music. With synthesizer prices as low as they are, even casual hobbyists are using MIDI sequencers with their Macs.

This will be remembered as the year when Macintosh sequencer software took a great leap forward in power and convenience. For the past few years Mac sequencing has been dominated by two programs, Mark of the Unicorn's Performer and Passport Designs' Master Tracks Pro. These stalwarts have recently undergone substantial upgrades (to versions 3.0 and 3.3, respectively), but the developments that are really shaking up MIDI-land are the releases of two new programs, Opcode Systems' Vision and Resonate's Portrait. These programs set a new standard for sequencing flexibility and control, and promise to seriously challenge the relative monopoly Performer and Master Tracks have enjoyed. Another recent arrival is an émigré from the Atari camp—Dr. T's KCS Level II, with its Programmable Variations Generator. This program also brings some intriguing capabilities to the field of Macintosh sequencing.

WHAT'S NEW?

Most program features offered by these state-of-the-art sequencers are either brand new or improved from the ground up. In the past, editing music on the Mac was a tedious matter of typing data into a dialog box or text listing (see "List Editing in Per-

former"), or clicking on individual notes in a graphic "piano-roll" display to bring up their parameter boxes (see "Graphic Editing in Master Tracks"). Now both Vision and Portrait have made editing practically every musical parameter—not just notes and controllers—as simple as drawing with the mouse. These two newcomers even offer a choice between text listing and graphic data display.

The following is a rundown of some of the most significant advancements that the three new sequencers have introduced. Some of these improvements have also made their way into the recent upgrades of Performer and Master Tracks.

▪ *Software configuration and personalization.* The developers of Vision and Portrait have made every effort to enable users to customize the programs to suit individual working methods. For example, Vision permits saving Input Maps, Transpose Maps, and user-configured Instruments in a Setup File. You can set other global preferences as well, such as Favorite Controllers, note Naming Conventions (middle C = C^3 or C^4), and many display options. Portrait's setup file even lets you specify what menu items (with user-definable keyboard shortcuts) are displayed and how many program modules are loaded (more about this later).

▪ *Sensible names for instruments and sounds.* People with large synthesizer setups will like both Vision's and Portrait's pop-up menus that address instruments by actual name rather than by channel number. Carrying this further, both enable you to change the current *patch* (sound) by indicating the name of the patch rather than its number. Most instruments have 128 patches available at any given moment, so you might have 4096 sounds (128 x 32 channels) online at a time.

▪ *User-definable program control via MIDI.* The ability to map sequencer controls onto little-used keys of the MIDI controller was first introduced in Master Tracks Pro. Now Vision has extended this idea to its logical conclusion. You can assign any Macintosh keyboard action (or group of actions, if you use QuicKeys) to any key on one of your synthesizers. This saves you from moving back and forth between the musical keyboard and the Mac's keyboard. Because you might have only a single MIDI keyboard for playing notes, Vision offers a MIDI Shift key, which toggles the MIDI keyboard's remote Macintosh-control functions on and off.

▪ *Step recording, with independent control over duration and velocity.* Step recording is the option to enter notes out of time, so to speak: first you tell the Mac what rhythmic value to assign to the note or notes you're about to enter, and then you play the note or string of notes as slowly or unrhythmically as you want. Using this method, it's easy for even a single-finger keyboard player to put together a sequence that sounds as if it were played by a conservatory graduate. MIDI sequencers have offered step recording from the very beginning, but the second generation provides much greater flexibility. Performer and Master Tracks Pro, for example, permit step recording only when the notes' rhythmic values equal the distance between each note. The three newcomers enable you to do such things as step record eighth-notes that are a quarter note apart. Vision and KCS even let you enter pitches without regard to rhythm and then map a rhythmic sequence onto the pitches.

▪ *Real-time loop recording (drum-machine style).* Both KCS and Vision offer this type of input, long available on drum machines and some synthesizers. In loop recording, a passage keeps repeating and every note you play gets added to the loop the next time through. KCS and Vision provide controls for rejecting or accepting the last take or takes without stopping the looped playback.

▪ *Capturing a volume mix-down of a sequence.* While MIDI sequencing is often compared to analog tape recording, and most software sequencers' control panels emulate those of hardware recorders, the final mix-down stage of analog recording was not addressed by early sequencers. All three second-generation packages take advantage of the little-exploited MIDI volume parameter (con-

CHRIS CALLIS

JAN HAMMER, musician, composer, and winner of multiple Grammy awards:

"People often ask what is my favorite instrument. For me, it's the whole studio—and the MIDI sequencer is the nerve center of this instrument."

troller #7, for you experts). The programs allow you to manipulate software volume faders (analogous to the sliders you might find on a mixing board) during playback. This volume data is recorded into a file for an automated mix-down, or fine-tuning.

▪ *Expanded event-selection criteria.* How fast you can isolate the musical events you want to edit will, in the long run, determine how efficiently you can work. Perhaps the most significant advance along these lines was the shift-click-drag method of selecting discontiguous events, first introduced by Performer. Portrait extends this option across multiple tracks. Another revolutionary method for delineating the scope of an edit region also first appeared in Performer: that of Boolean operators (such as AND, OR, NOT) applied to pitch, velocity, and durational parameters. Vision and KCS add more constraints to Boolean selection, even offering context-sensitive options. Once the program identifies a selection that meets all other conditions, the context-sensitive controls look at the notes surrounding the event to ensure that they meet specified criteria. And at long last Vision selects notes based on their metrical placement, that is, where they fall relative to the beat or bar. In this way, you might add an accent to all the third beats of bars within a specified region (see "IFs, ANDs, ORs, BUTs").

▪ *Enhanced and simplified editing operations.* Some new features seem so obvious that one wonders how we've gotten along without them for so long. For example, Performer and Portrait let you touch a note or group of notes with the mouse to get instant aural feedback during editing. Cut, Copy, Paste, and Merge operations have been expanded in Performer and Master Tracks Pro to include Snip (delete and close up), Insert (or Splice), and Repeat (a specified number of times). The three new sequencers add several more desirable operations, such as the ability to repeat to fill a specified area and to scale pasted music to fill a specified area. Because a single event can require many little tweaks before it's in the groove, Portrait has come up with a user-definable Touch Tool, which can be configured to perform many operations at a single touch (see "One-Touch Edits"). KCS achieves similar capabilities using editing Presets, as well as macros to chain the Presets. Following the lead of the audio world, Vision has introduced several forms of nondestructive editing, including quantization that preserves the original unquantized data, and a type of track "cropping" that mutes playback at a specified point without erasing notes that follow.

▪ *Humanization.* Quantization, or automatic rhythmic correction, has always been attacked for producing inhuman exactness in playback. Negating this machinelike accuracy is another problem that was first addressed by Master Tracks Pro, with its specifiable degree of rhythmic randomness. The newer sequencers provide greater control over this type of randomness and extend its application to a greater number of parameters—for example, to volume. Vision, Portrait, and Performer permit more humanized and natural input through postperformance determination of the beat and/or barlines (a feature first seen in Coda's Finale). With this option you can record music as expressively as you desire rather than playing along with a metronome click. Even when the beats and bars align perfectly, additional options exist for retaining and applying a tempo map of sections with accelerandos, decelerandos, and rubato.

▪ *Pitch remapping and automatic harmonization.* In the past, if you wanted to change a sequence from a major to a minor key, you had to spend hours looking for just those notes that would be different, and then alter each one individually. Harmonizing a melody used to be a complex operation requiring you to copy music onto new tracks, transpose the new tracks, and then merge the harmonies back onto the original tracks. The three new sequencers under discussion all offer options for globally or selectively remapping pitches or automatically harmonizing a melody. Vision excels in the pitch remap area, providing a single command to remap pitches or constraining melodies to any scale, mode, or custom collection of any number of notes. Portrait shines in the harmonization area, with options for both diatonic harmonization of a melody (each chord will be slightly different) and chromatic harmonization (parallel chords).

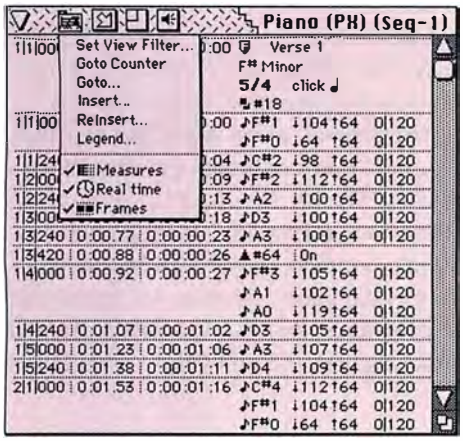
▪ *Generating variations (algorithmic transformations) of musical material.* Opcode's earlier sequencer provided for some controlled randomness in so-called generated sequences, and these features have been enhanced in Vision. Over KCS's longer history these operations have evolved to encompass roughly half of the program—an area aptly named the PVG, or Programmable Variations Generator. In the realm of algorithmic composition (not to be confused with interactive composi-

MAX AGUILERA-HELLWEG

BOB EZRIN, composer and legendary producer of Pink Floyd, Yes, Lou Reed, Peter Gabriel, and many more: "In the same way that the telephone revolutionized communication by making it real time, MIDI sequencers have bypassed the old Morse code of notation and rendered musical expression virtually instantaneous."

tion), no other commercially available programs come remotely close to wielding the level of power that KCS provides.

▪ *Opening and chaining multiple files or sequences.* If you like to conceive of music in sections or chunks, or if your compositions contain any repetition, you now have the option to chain various subsequences together into one long composition. Vision implements this feature particularly well; chaining subsequences is as simple as typing their letter names—for example, *a, a, b, a, b, c, b, c, d, c, d, d* (in Vision, sequences and subsequences have both a user-defined name such as Verse One and a letter name). Typing these letters either triggers the associated subsequences immediately or places them in a queue for later playback. The resulting subsequence chain may be captured into a new sequence containing the sum of all the parts.



List Editing in Performer

Performer's list-editing window carries this approach about as far as it can go. Displayed are (from the top) a reference marker, key, meter, metronome click, patch change, and note data. Reading from left to right: measure, beat, tick, real-time, SMPTE frame, event type, note name, key-down velocity, key-up velocity, and duration.

▪ *Playback enhancements.* All the new developers have followed Master Tracks Pro's example by synchronizing a scrolling display of the music with playback and offering direct synchronization to MIDI Time Code (the latter is a very accurate method of locking a hardware audio- or videotape recorder to a software sequencer). The new programs also offer a feature like Master Tracks Pro's chase-controllers-and-patch-change option. This feature comes into play when you start a MIDI sequence from any point other than the beginning of the music. With Chase enabled, the sequencer looks backward along each track to determine exactly what controllers and patches should be in effect at that specific point in time.

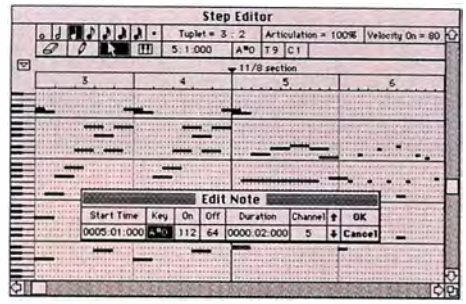
▪ *Importing and exporting Standard MIDI Files.* All packages now output to Standard MIDI File Format (officially ratified by the International MIDI Association). This means that all Macintosh MIDI data is interchangeable with just about all programs that deal with musical notes. Because all second-generation music-notation packages can now import these Standard MIDI Files, users have complete freedom in mixing and matching their sequencer of choice with their favorite notation package.

For all the shared features noted above, each of the programs under discussion has qualities and options that make it unique. Some of these special features are so intrinsic to an individual's personal approach to music making that a purchasing decision may rest upon their presence or absence. In the following wrap-ups, I'll concentrate on identifying the ingredients that might sway you toward choosing one of these offerings.

PERFORMER

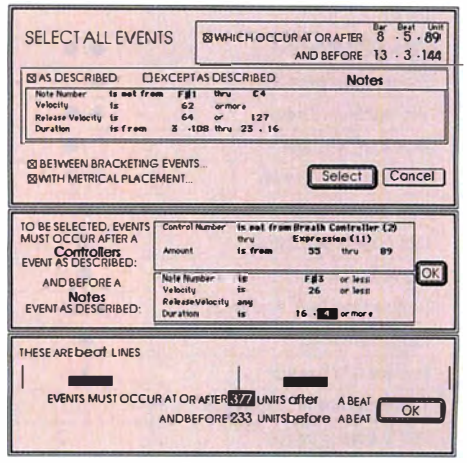
Although Performer may seem to be rendered obsolete by the current spate of professional MIDI sequencers, there are still several operations that distinguish it from all others. First and foremost, the latest version of Performer carries the idea of humanization to the concept of accelerando and decelerando. Where the other packages offer linear (exponential) increases and decreases of tempo, Performer adds logarithmic and S-curve tempo changes (see "Change Tempo").

Performer is still the only sequencer that easily permits nested loops, any number per track. And separate regions on any number of tracks may loop simultaneously. Loops can also be cut and pasted. A nested loop might play measures 17 to 22 three times within a large



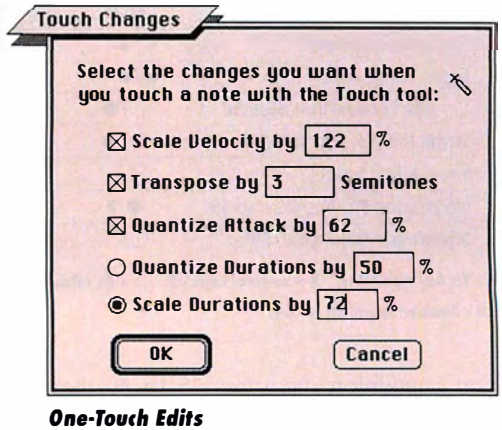
Graphic Editing in Master Tracks

Master Track's Step Editor window illustrates typical piano-roll notation. Pitches are indicated on the y axis and duration is indicated as a solid horizontal bar. Notes can be drawn here with the pencil, roughly edited, or precisely edited by clicking on a note to bring up its text parameter editing box.



IFs, ANDs, ORs, BUTs

If you need to find a particular passage in a composition of some 20,000 events, Vision's Select dialog should do the trick. Clicking on boldface text in any of these windows accesses a pop-up menu.



One-Touch Edits

You configure Portrait's unique multifunction Touch Tool with this dialog. Touching a note in Portrait's graphic display with this tool causes all the indicated edits to occur simultaneously.

MIDI SEQUENCERS, PART I

	KCS Level II	Master Tracks Pro 3.3	Performer 3.0	Portrait	Vision 1.1
GENERAL					
Price	$349	$395	$495	$495	$495
# of sequences per file	126	1	RAM	1	26+
# of tracks per sequence	48	64	RAM	240	99
# of sequences playing at once	126	1	1	1	RAM
# of MIDI channels	16	32	32	32	32
Smallest division of beat	1/240	1/240	1/480	1/480	1/480
Tempo range (in beats/minute)	10–999.9	10-300	20-400.9	20–500	5–500.99
Online help	○	○	○	●	●
Minimum requirement	512KE	1MB	1MB	1MB	1MB
Name: instrument, patches	○/○	○/○	○/○	●/●	●/●
notes, import	○/○	○/○	○/○	●/○	●/●
INPUT					
1-channel/multichannel	●/●	●/●	●/●	●/●	●/●
Real-time loop/quantized	●/○	○/●	○/○	◗/○	●/○
Step record/step duration	●/●	●/○	●/○	●/●	●/●
Draw notes/type notes	○/●	●/●	●/●	●/●	●/●
Punch in and out/overdub	●/●	●/○	●/●	●/●	●/●
Notes and rhythms separately	●	○	○	○	●
Chain/Capture subsequence	●	○	○	●	●
Expand loops to track	●	○	●	○	●
Edit Sysex data (max. # of events)	●(5K)	○	●(RAM)	Δ	●(1K)
Capture volume mix	●	○	○	●	●
Keyboard remote control	◗	◗	○	○	●
Variable metronome click, tap click	○/○	●/○	●/●	●/●	●/●
Real-time remap controls	○	○	○	Δ	●
PLAYBACK					
Chase controllers/patches	○/●	●/●	○/○	●/●	●/●
Define pickup measure	○	○	○	○	●
Initialize track with patch	○	●	○	●	○
Loop: sequence, track	●/●	○/●	●/●	●/Δ	●/●
region, nested	●/●	○/○	●/●	○/○	○/◗
Randomize/transpose loop	●/●	○/○	○/○	○/○	●/○
Scroll window w/playback	◗	●	○	●	●
Trigger/transpose/gate	●/●/○	○/○/○	○/○/○	○/○/○	●/●/●
From keyboard/from sequencer	○/●	○/○	○/○	○/○	●/●
Sync to: MIDI time code/MIDI clock	○/●	●/●	○/●	Δ/●	●/●
Sync with direct timelock	○	○	●	○	○
Import/export MIDI files/w/metaevents	●/◗	●/○	●/●	●/○	●/●
Import/export Pro Composer/DMCS	○/○	○/○	●/○	○/●	●/●

● = Yes, fully implemented; ◗ = Somewhat supported; ○ = No, missing, not supported; Δ = Feature under construction; RAM = Dependent on available memory.

loop containing measures 15 to 30 that plays twice (measures 17 to 22 would end up being played 6 times).

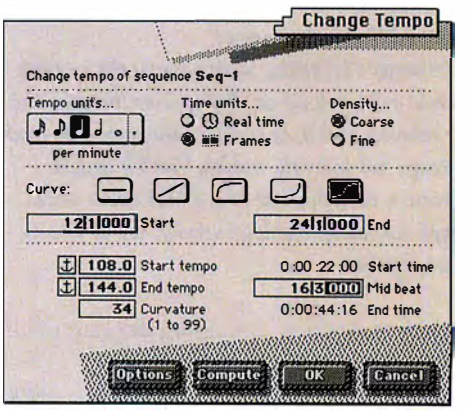
Performer is unique in providing an elegant, editable overview of all controller (that is, non-note) data.

MASTER TRACKS PRO

Some people will trade all the bells and whistles offered by the new sequencers for Master Tracks Pro's Song Editor window because of the type and speed of editing that can be achieved there. The Song Editor is an overview in which each measure that contains events is represented by a little black box, and empty measures are empty boxes. If you click on a black box, it expands to show a piano-roll display. You can see more of your composition at a glance and your screen isn't cluttered with minute details, nor do you need to calculate all the beginning and ending points of edit regions. You merely click and drag over the desired tracks and measures. Most edit operations can be carried out in this overview at a speed that leaves the competitors in the dust, although only contiguous regions defined by measure boundaries may be selected (see "See Songs").

Master Tracks Pro is the only sequencer that supports quantization on input—that is, as the notes are performed in real time. If you have a rough idea of the smallest rhythmic value you're likely to play, this option can eliminate the time-consuming operation of quantization.

In general, many users find that they can move around much more quickly in Master Tracks Pro than in Performer. Passport's continuing commitment to a simple, intuitive user interface is reminiscent of days gone by when having to read a program's manual was considered a strike against the software. Passport has



Change Tempo

Performer's powerful tempo-editing dialog. Selecting an S-curve tempo increase results in an accelerando that gets faster at the indicated midpoint, in this case, measure 16 beat 3. Just as the midpoint is elastic, so is the curve controlling how gradual or extreme the constituent accelerandos will be. The anchors by the start and end tempos are used to lock those values.

thought out this approach to such perfection that even online help is unnecessary.

KCS Level II with PVG

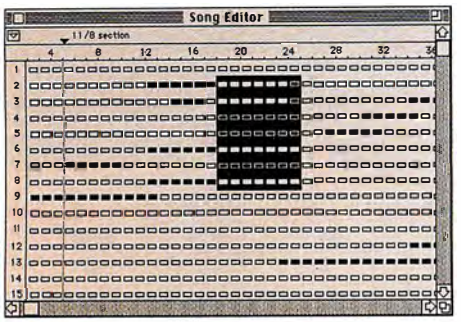
Dr. T's KCS Level II originated on the Commodore 64, migrated to the Apple II, and then moved to the Atari before being ported to the Macintosh. You've got a lot of history there, but unless your computer involvement underwent a similar evolvement you're going to have to learn an entirely new interface; this sequencer makes no attempt whatsoever to adhere to any of the standard Mac conventions (see "An Interface Only an Atari User Could Love"). If you're unfamiliar with the Apple II or Atari way of doing things, get set for a long learning curve. However, the rewards of taking the time to adapt to the KCS environment may outweigh your interface prejudices if you happen to need some of the features unique to this product, and there are many.

The heart of KCS's uniqueness is its Programmable Variations Generator, which takes music you have played or otherwise entered into KCS and composes variations on it based on transformational rules that you program. Imagine setting loose a little programmable agent who will examine your music for patterns, events, phenomena, and other collections of data that match a seemingly endless number of criteria you can establish, or that fall within a specified distance from other events that fulfill additional conditions. The agent then determines if these events are protected from certain types of edit alterations by other equally elaborate restrictions. When the sought-out music is located, the agent proceeds to vary this material, recursively if desired, in ways that may be influenced by coexisting local or global conditions; the possible variations encompass practically any transformation you might imagine. Transformations range from the strict modification of data according to your own set of rules to the introduction of controlled randomness and Gaussian (statistical standard-deviation) procedures, and even to the complete restructuring of the higher-level form of the composition. And that's just the tip of the iceberg. It's not for the faint-

MIDI SEQUENCERS, PART II

	KCS Level II	Master Tracks Pro 3.3	Performer 3.0	Portrait	Vision 1.1
SELECTION					
By highest or lowest/by proximity	●/○	○/○	●/○	●/●	●/●
By specific data type	●	◗	●	●	●
Extract group from chord	●	○	○	◗	◗
Discontiguous within 1 track	○	○	●	●	●
with limits/anywhere	○/○	○/○	○/○	●/●	●/●
Boolean IS, NOT, OR, AND	●	◗	◗	○	●
Comparatives (=, ≠, ≤, ≥, range)	○	○	●	○	●
Metric position/bracketed	Δ/●	○/○	○/○	○/○	●/●
EDITING					
Graphic/event list/simultaneous	Δ/●/○	●/◗/○	●/●/○	●/●/○	●/●/●
Multiple: windows, files, sequences	○/○/○	○/○/○	●/○/●	○/●/●	●/○/●
Overview: notes, measures, controllers	○/●/○	○/●/○	○/○/●	●/◗/◗	Δ/○/○
Multifunction tool/macros	●/●	○/○	○/○	●/○	◗/◗
Edit during playback	○	○	○	●	◗
Touch note to hear	●	○	●	●	●
Paste/merge/repeat	●/●/●	●/●/○	●/●/●	●/●/●	●/●/●
Repeat to fill/scale paste	●/○	○/○	○/○	●/●	●/●
Snip/Insert (or splice)	●/●	●/●	●/●	●/●	●/●
Slide/crop without erase	●/○	○/○	●/○	●/○	●/●
Set to value/odd, subtract constant	●/●	●/●	●/●	●/●	●/●
Scale/limit minimum or maximum	●/●	●/●	●/●	●/●	●/●
Randomize/invert (other than pitch)	●/●	◗/○	○/○	○/○	●/○
Continuous-control data: thin/smooth	●/○	○/○	●/○	●/●	●/◗
generate/reassign/draw	◗/◗/○	●/●/◗	●/●/●	●/●/●	●/●/●
Tempo: exponentiol/logarithmic/S-curve	●/○/○	●/○/○	●/●/●	●/○/○	●/●/○
Link patterns (sequences)	●	○	○	○	●
Track effects: volume/pan	○/○	○/○	○/○	●/●	●/◗
delay/transpose	●/○	○/○	○/○	●/●	●/●
Remap to key/to mode/to custom scale	●/●/●	○/○/○	○/○/○	●/◗/●	●/●/●
Diatonic/chromatic transpose	◗/●	○/●	○/●	●/●	◗/●
Disable transpose on track/on channel	○/●	○/○	○/○	○/○	●/○
Invert (pitch)/retrograde	●/●	○/○	●/●	●/●	◗/●
Harmonize diatonic/harmonize chromatic	●/●	○/○	○/○	●/●	○/◗
QUANTIZATION					
Attack/Release	●/○	●/●	●/●	●/○	●/○
Durations	●	●	◗	●	●
Deflom/extend to next attack	○/●	○/◗	●/●	○/●	○/●
Nondestructive quantization	○	○	○	○	●
Set sensitivity/set strength	●/○	◗/●	●/●	◗/●	●/●
With track shift/with swing	●/●	●/○	●/○	●/◗	●/●
Sort rhythms/orpeggiote	●/●	○/○	○/○	○/○	○/○
Postdeterminotion of beat, tempo mop	◗/◗	○/●	●/●	●/○	●/●
retain tempo mop/top tempo mop	◗/◗	○/○	○/●	●/●	●/●
Fit to time/scale time by %	○/●	●/○	◗/●	●/●	●/○
retain durations	●	○	◗	●	◗
Change meter	○	●	●	●	●
Slide beats	●	○	●	●	●

● = *Yes, fully implemented;* ◗ = *Somewhat supported;* ○ = *No, missing, not supported;* Δ = *Feature under construction.*

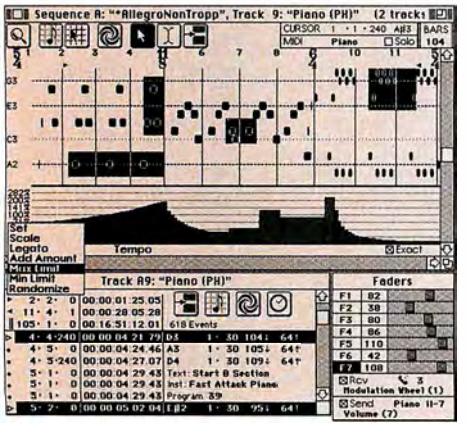


See Songs

Master Tracks Pro's Song Editor provides the most effective overview of a MIDI sequence I've ever seen. Empty measures are symbolized by empty boxes; measures that contain notes are indicated by black boxes. This window lets you view a large portion of music and edit it with great speed.

An Interface Only an Atari User Could Love

KCS's interface evolved from the Commodore to the Atari to the Mac, but it retains Atari graphics. The only familiar Mac items are the scroll and title bars. This figure shows the note list of an imported MIDI File.



Double Vision

Graphic List, Strip, and Fader editing in Vision. Discontiguous note selection in the graphic view is immediately reflected in the text listing and vice versa. The central Strip Chart displays key velocity, duration, tempo (as in this example), markers, program changes, text, lyrics, cue points, instruments, or any MIDI controller data. Most of the options in the left hand pop-up menu are available for any type of data.

of-heart, but the resulting variations can often be extremely musical.

VISION

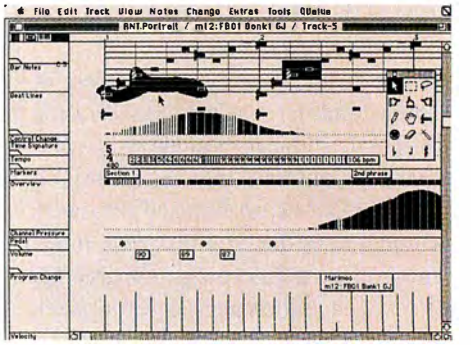
By far the most comprehensive and feature-laden sequencer to hit the market, Vision still manages to maintain an unexpected ease of use. There is so much new territory here that it's hard to know where to begin. At the top of the list is Vision's option for designating a group of MIDI channels as an instrument. Throughout the program, you deal with these virtual instruments wherever you would normally deal with MIDI-channel assignments. Virtual instruments can have a number of attributes, including the ability to silence other instruments, an automatic pitch reassignment map, a don't-respond-to-transpose flag (essential for drum tracks), a MIDI channel and serial port assignment, a velocity fader assignment and scaling factor, and a default transposition. As if that weren't enough, because each virtual instrument can consist of a group of devices, you can define as an *overflow* instrument. This means that when the polyphonic range (how many notes a particular synthesizer can play at once) of the music exceeds the range of one device, the remaining notes overflow onto the next device making up that instrument.

You may also address individual sounds by name rather than number, and Vision allows you to import these names from your patch librarian. Calling up an instrument (via a pop-up) also calls up its current library of patch names. This feature means you get a menu of actual sound names wherever you might have traditionally referred to a sound by a patch number. This will be of extreme importance both to people with large setups and to those with small setups but large libraries of patches (like my neighbor who has a library of 16,000 patches for his DX7 alone). You can also give notes names, such as snare drum and door slam.

Vision's Zone Maps, along with the already-described ability to assign program functions to a MIDI keyboard, are both innovative solutions to the problem of having only two hands. Among other things, Zone Maps make it possible to divide a single MIDI keyboard (or controller) into several regions, each corresponding to a different instrument.

Vision provides for as many as 32 software faders (see "Double Vision"). Each fader can do up to three things: control tempo, control loudness of any number of instruments, and send any MIDI controller (except pitch bend or aftertouch) to any instrument. Furthermore, you can manipulate each fader with the mouse or from the keyboard, or you can have faders respond singly or in groups to an external hardware fader or slider. Because some of these actions may be recorded into a sequence, Vision becomes an automated mixing program of considerable power.

A seemingly minor but extremely powerful item is the Mogrify button—another successful interface improvement. Practically every window of Vision has



Look What They've Done to My Song

Portrait can visually represent almost any type of musical data. Just over half the available special data staves appear here. Two types of discontiguous selection are shown on the piano-roll staff: the lasso tool in the first measure and the rectangular selection box in the second. The overview staff in the center of the screen displays the overall density of MIDI data.

one. Clicking on it pops up a menu of all the relevant items from the Do and Edit menus that are applicable to the situation.

All these innovations are, simply put, pure elegance above and beyond the call of duty, and the kind of thing that is likely to generate a barrage of thank-you notes directed to Opcode.

PORTRAIT

Portrait's modular approach is likely to start a revolution in user-configurability.

The Resonate Music Workshop comprises a set of modules that work like intercommunicating desk accessories that are always open. So far, these include Channel Setup, Data Painter, MIDI File Translator, Mixer, Name Editor, Phrase Library, and Help. The user chooses which ones Portrait loads at start-up.

Like Vision, Portrait allows users to refer to synthesizers and patches by name, although unlike Vision, the user must manually type in all the patch names. Instruments in Portrait cannot have individual attributes, but you can accomplish some of the same results by assigning instruments to sequence tracks and then assigning global effects to those tracks. Each Portrait track has a global volume, pan (left or right speaker if your synthesizer responds to it), transpose, and delay setting.

Portrait keeps track of many libraries, such as device names, patch lists, and channel setups, so it comes as no surprise that Phrase Library is one of the program's modules. Clicking on an item in the Phrase Library opens all the windows associated with that phrase. The compositional implications of having an online database of one's musical ideas are staggering.

Portrait permits more types of data to be displayed at one time than the other sequencers I looked at, and fortunately the program includes a window that displays all tracks simultaneously. In this window you can discontiguously select an arbitrary group of events, anywhere, on any of the tracks—a very desirable feature.

Finally, and somewhat remarkably, Portrait is always in record mode, so if you find yourself playing along with a take and realize you forgot to press the record button, have no fear, everything is constantly being saved in a record buffer.

Portrait makes very effective and innovative use of pop-up sliders, keyboards, palettes, menus, and faders, but program interaction sometimes slows down because you need to select different cursors from a floating tool-palette to edit different types of data. A better approach would be an intelligent cursor that would switch to the appropriate tool depending on the data being edited (see "Look What They've Done to My Song").

Closing Notes

Make no mistake, each of these sequencers provides all the features required by professionals. Where they differ is in the bells and whistles (and occasional fireworks) and in their approach to displaying and manipulating data.

As the display and manipulation of musical ideas become more and more hierarchical, you may need to examine your conceptual model of musical composition. What you discover may lead you to Master Tracks Pro, Vision, or Portrait, each of which offers a somewhat different way of zooming out to higher levels of abstraction in order to manipulate musical ideas as separate objects. Some of these programs place more importance on one or another musical parameter (pitch, rhythm, volume, duration, or timbre). If rhythm is more important to your personal aesthetics than pitch, make sure the program you choose prioritizes this element.

Editing is another area to consider. Your musical language and personal style depend largely on how you vary your material, so you must first be able to easily identify and select the scope and type of data you wish to manipulate. It may or may not be possible to create music within a framework that permits only linear and local change rather than discontiguous or global selection.

When it comes to buying the right program for your skill level, I would steer anyone who isn't a serious musician toward Master Tracks Pro (Passport also markets a scaled-down Master Tracks Jr. for absolute beginners). Speaking for myself, I will be using Vision for the time being (partly because it's impossible to predict what modular components will eventually become available for Portrait). When I need regional loops (not an entire track), nested loops, logarithmic or polynomial changes of tempo, or manipulation of tempo using real-time variables, I will transfer the music to Performer.

Creative productivity in the world of computer-assisted composition is directly related to the consistency, efficiency, speed of operation, and modality of the software's controls, particularly with respect to editing. While the Macintosh can't help you if you don't have any ideas to start with, you do want it to assist you in shaping your ideas into communicative music. The programs compared in this article can certainly accomplish that. ■

CHRIS CALLIS

SUZANNE CIANNI, composer, recording artist, and sound designer for such accounts as Coca Cola and General Electric: "We used to have to overcome obstacles [when using sequencers], but we have no excuses anymore."

See *Where to Buy* for contact information.

Christopher Yavelow *is a Hollywood-based, award-winning, computer-assisted composer who sampled his daughter's birth cry into his Kurzweil 250 in lieu of taking those photographs your friends usually bore you with.*

Signed, Sealed, and Delivered

ADDRESSING THE ISSUES

by Lawrence Stevens

If you print a letter on the ImageWriter or LaserWriter but address the envelope with your Bic, your correspondence loses that professional edge. Making the effort to address envelopes and mailing labels with the Mac can save you time and improve the appearance of your correspondence.

Sure, you can use a word processor or spreadsheet to address envelopes and manage mailing lists (see "The Old-Fashioned Way"). But several standalone applications, desk accessories, and HyperCard stacks—all of which are available for under $100-can help save you the repetitive task of copying the mailing address from your letter, or writing a return address by hand. Many of these envelope-addressing and labeling programs even allow you to create an address list by importing information from spreadsheets and databases.

Envelope Desk Accessories

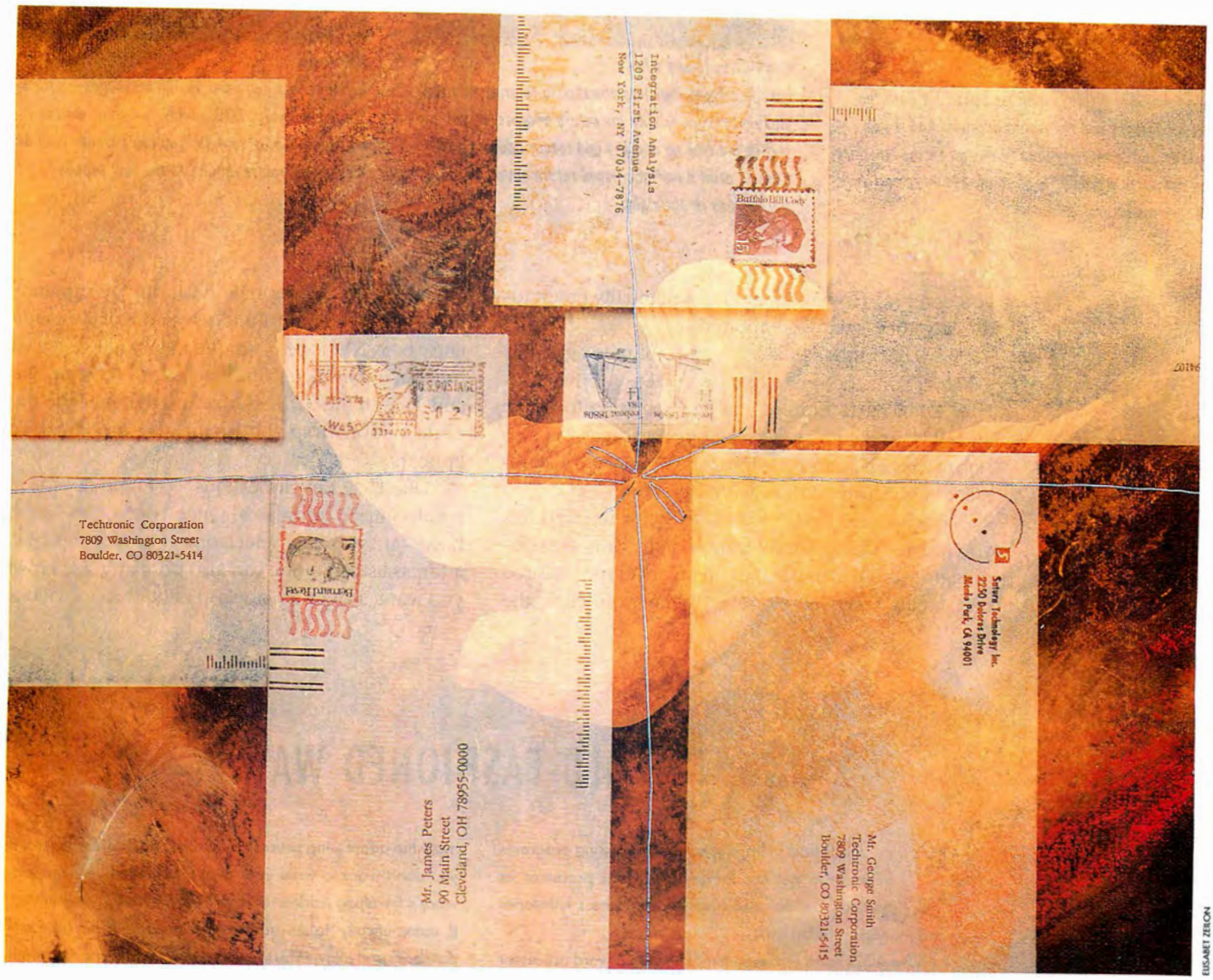
Desk accessories (DAs) offer you the freedom of printing envelopes from the desktop without quitting the application you're using. These DAs automatically line up the addresses in the right places; and they usually provide extras, such as remembering the return address, working with imported address lists, or letting you paste graphics into the return address area.

In addition to envelopes, Labels and Envelopes 1.4 from Eastgate Systems ($15) also prints Rolodex cards, mailing labels, and 3-by-5-inch cards. The program doesn't, however, print a return address. To use this DA, all you have to do is select the format you want and type the address into a window. You can also import address lists from text-only files.

Kiwi Software's DA, Kiwi Envelopes 2.03, addresses one envelope at a time (see "Kiwi Envelopes"). The application does not store address lists, nor does it import lists, and you can only use it for standard business- or personal letter-size envelopes. However, this shareware program is easy to use and it's free—a hard price to beat.

It costs $8 to become a registered Kiwi Envelopes user. In return, you receive a booklet that contains registered user secrets, as well as a simple HyperCard stack, Kiwi Addresses, which works with Kiwi Envelopes. Unlike Labels and Envelopes, Kiwi Envelopes can print return addresses; it lets you store two return addresses: one for business, another for home. You can also customize font and style settings, and print a logo by cutting and pasting Paint or Draw documents into the return address window. (For more information on Kiwi Envelopes, see *Reviews, Macworld,* June 1988.)

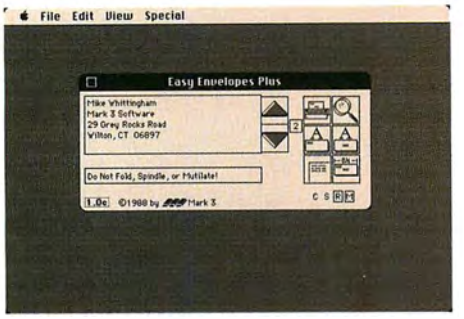
If you're looking for a desk accessory that stores addresses, Easy Envelopes Plus ($69.95) from Preferred Publishers holds up to 99 addresses—albeit not in alphabetical order. There are three ways you can locate stored addresses: by scrolling through the list, by searching the list for any set of characters, or by typing a label number in a dialog box. (Easy Envelopes Plus assigns each address a label number when



EUSARET ZERON

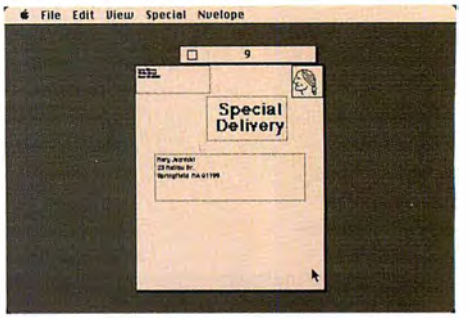
Kiwi Envelopes

Kiwi Envelopes displays address boxes for both the mailing address and the return address. And if you want to add a company logo or design on the envelope, you can paste a graphic in place of, but not along with, the return address.



Easy Envelopes Plus

Easy Envelopes Plus lets you choose to print only the mailing address or only the return address, or you can switch the mailing address and return-address positions to print a self-addressed return envelope using the buttons on the right.



NVelope

NVelope lets you print special messages—such as Special Delivery, COD, and First Class—on the envelope. Unfortunately, you can't create your own messages; you're limited to the few supplied by the program.

you enter it.) However, you must manually enter addresses; they can't be imported.

Easy Envelopes Plus lets you print messages and graphics on the envelope (see "Easy Envelopes Plus"). For each address you can specify a font size and style, and choose from among messages, such as "First Class Mail" and "Do not x-ray." You can also replace the return address with a graphic.

NVelope 1.0 from Paul Mace Software ($69) lets you change the size and location of the print areas by dragging and resizing boxes on an envelope pictured on screen (see "NVelope"). When you click the mouse on the appropriate location, the program displays either the return-address or the mailing-address entry box. NVelope is unique in including an easy-to-use, but incomplete, zip-code list. If you select the city and state in the address box and then choose the Zip Code option from the menu, the proper zip code appears.

Like Easy Envelopes Plus, NVelope doesn't allow you to import addresses. Once you've entered them, however, you can select one from the alphabetical address list. NVelope can also print any size envelope you want, as well as labels in bulk. But since it doesn't

THE OLD-FASHIONED WAY

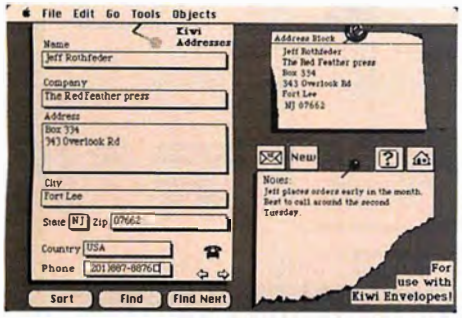
You don't need to have specialty addressing programs in order to get out the mail. A word processor or spreadsheet can also help you to address envelopes and manage mailing lists.

Developing an envelope template with a word processor is a trial-and-error process, but you can do it. Create a page the size of an envelope (4 by 9 1/2 inches for most business-size envelopes). Then, type the return address in the upper-left corner and the mailing address where you want it to appear on the envelope. Adjust your settings by printing on test envelopes. (Make sure you select Manual Feed from the Print dialog box.) When you're happy with the way the envelope looks, save the settings and type X's into the template to show where addresses should be.

If your application has macro capabilities, you can automate the addressing process by writing an address macro. If you don't want to write your own Excel macro, Heizer Software's Envelope Addresser is well worth the $15 investment. It automatically takes address information from an Excel database and allows you to select and sort the names you want printed (last name, zip code, street, and so on).

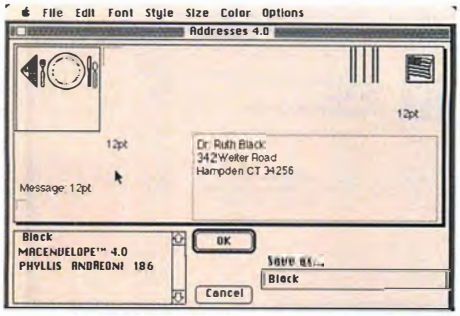
Envelope Addresser is smart enough to combin grouping city, state, and zip code information store columns into one line of the address. And the macro sk fields rather than including them as blank spaces.

Another option for those who need strong sorting abilities is to store lists in Microsoft Excel, and print labels with Heizer's Mailing Label Macro ($15). Mailing Label Macro is similar to Heizer's Envelope Addresser, except it can print all selected labels automatically.



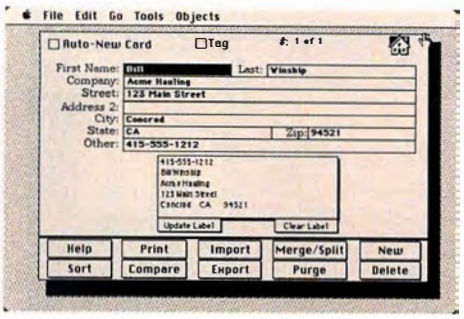
Kiwi Addresses

Each Kiwi Addresses card contains a note section (which does not print) and room for a telephone number. You can dial that number from the stack if the Macintosh is connected to either a modem or automatic dialer.



MacEnvelope

You can circumvent MacEnvelope's alphabetizing problems by telling the program how to save records. For example, you can specify that the program should store the address of Dr. Ruth Black under Black instead of under Dr.



Mailing Labels

Mailing Labels lets you merge two or more lists together or split a list into two or more lists. You can purge all records, a specified range of records—for example, card five to card ten—or get rid of all tagged records.

import lists or sort labels, I'd recommend it more for printing envelopes than for labels.

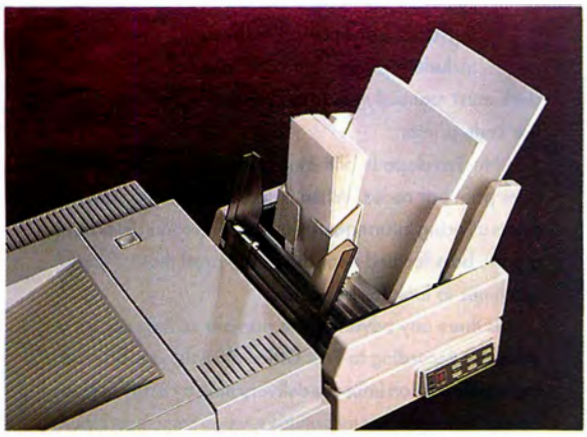
Working with HyperCard

If you store addresses in the address stack that comes with HyperCard, you can use any of the DAs mentioned above with that address stack. Just copy the text from an address card and paste it into the DA.

Alternatively, you can use Envelope 1.0, a freeware HyperCard stack by David Eilers that allows you to do basically the same thing. Envelope supports a variety of envelope sizes, as well as 3-by-5-inch and 4-by 6-inch cards.

I found the best way to use Envelope is to create a linking button to it in the address stack's background. That way you can travel to Envelope with a click. If you're a HyperCard tinkerer—as I am—it's fun and easy to customize Envelope with linking buttons, special effects, graphics, and sound.

The Kiwi Addresses stack, a companion to the Kiwi Envelopes DA, is similar to HyperCard's address stack but features multiple address fields that let you sort by any field—something you can't do with the standard Apple HyperCard stack (see "Kiwi Addresses"). Kiwi Addresses combines fields and removes blank ones to create a single address record. A button in the stack lets you paste Kiwi Addresses records, one at a time, directly into Kiwi Envelopes.


ROBERT HOLMGREN

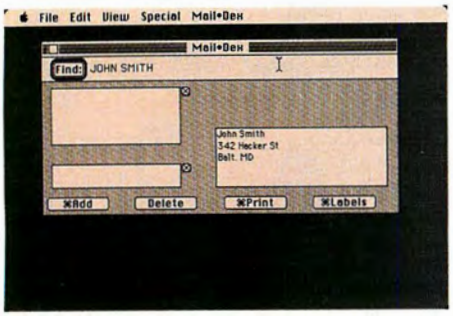
Printing envelopes usually means choosing Manual in the Print dialog box and feeding envelopes through the printer one at a time. By installing an envelope feeder, such as BDT Products' LaserFeeder, you can choose Automatic and print up to 50 envelopes at a time.

Stand-Alone Addressers

There are two stand-alone Mac envelope addressers. InfoLogic Software's InfoLogic Envelope 1.1c ($37) is a good choice if you use unusual envelope sizes. Unfortunately, other than that, the program has little to recommend it. It doesn't save addresses—not even the return address—nor does it allow you to import graphics.

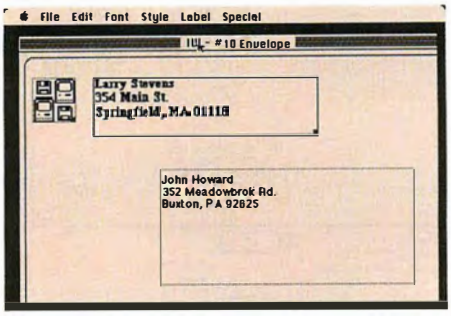
MacEnvelope 4.0 from Synex ($89.95), meanwhile, offers you a lot of useful features in return for giving up the convenience of a DA. It offers better storing, sorting, and importing features than most desk accessories. It also prints bar codes on the envelopes (see "Bar Codes Speed Up Delivery"). Finally, MacEnvelope can sort by zip code, which allows you to take advantage of reduced postal rates for bulk mailing.

Unlike Easy Envelopes Plus and NVelope, MacEnvelope doesn't limit you to prepared messages on the envelope; it lets you create your own. It is the only program that lets you include a graphic along with a return address. (You can even specify the graphic's location on the envelope.)



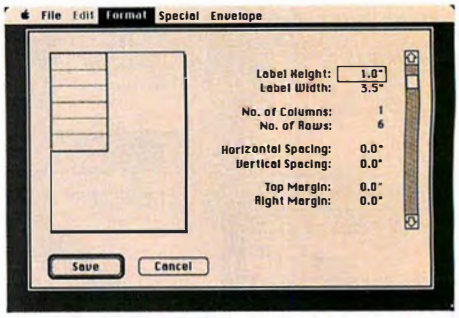
Mail Dex

Mail Dex allows you to search for all records containing specified characters, and then print those records on labels. Since nothing below line 5 of text in a Mail Dex record gets printed on a label, you can use that area for search category codes.



FastLabel

FastLabel's Text field holds addressee information. The Global field contains data that won't vary—such as a return address—and an Icon field lets you place icons as logos. A fourth field, Spine, prints upside-down text for such things as cassette labels.



Label Manager

You can use Label Manager to print any size label by formatting its on-screen display to match your label. You can specify the height and width of, as well as horizontal and vertical spacing between, labels. It also allows you to save label formats.

MacEnvelope can import address lists and store an unlimited number of addresses alphabetically. One problem, however, is that the program generally alphabetizes entries by the first letter. This means that it stores them by the first name or, worse, by titles such as Ms. or Dr. You can solve the problem (see "MacEnvelope"), but you may find the extra step tedious if you've just imported 500 names.

LABEL THIS

Pressure-sensitive labels are probably more convenient than envelopes for sending out a large mailing. With labels, you can print a long series of addresses without having to attend to the printer. The only disadvantage is that labels require more manual work (sticking them on the envelopes). But that still takes less time to do than feeding a thousand envelopes into your printer.

Standard mailing labels range in size from 2 3/4 by 7/16 inches to 5 by 2 5/16 inches, and come in several formats: one, two, three, or four across, with or without pin-feed holes. Before selecting a label format, be certain the label sheets fit your printer. All standard four-across and some three-across mailing label sheets are 13 inches wide—too large for the ImageWriter II.

Like envelope programs, mailing-label programs come in several forms: DAs, HyperCard stacks, Excel templates, and stand-alone programs. Heizer Software's HyperCard stack Mailing Labels ($15) is a full-featured utility that lets you perform sorts on all fields, in any order. For example, you can sort by the first word of a field, the last word of a field, or the first or last character of a field (see "Mailing Labels").

Although Mailing Labels doesn't automatically delete duplicate cards, it does let you compare four consecutive cards at a time so you can delete duplicates. When you're ready to print, you specify the label size by using a tool to draw a rectange the size of the desired label. After selecting the size, you can print all labels, a range of labels, or tagged labels only. If you want the convenience of a DA, consider Mail Dex from Mission Accomplished Software Services ($49.95). You can either type addresses directly into Mail Dex, or use Mail Dex Translator, a separate program bundled with Mail Dex, to import tab-delineated files. When you import a file of addresses,

BAR CODES SPEED UP DELIVERY

Preprinted bar codes eliminate one step in processing letters at the post office. If an envelope does not include a printed bar code (most don't), a postal clerk must manually enter the addressee zip code into a bar code printer.

MacEnvelope is one Mac addressing program that does print bar codes. When it does, it also automatically prints a Facing Information Marking (FIM code). FIM codes are the bars located near the stamp area that tell postal machines to look for bar codes.

Is there any advantage to pre-bar coding single envelopes? According to Post Office officials, pre-bar coding envelopes can improve delivery time by a day in some cases. During the winter holidays, when some post offices fall behind, pre-bar coding an envelope may save you more than a day.

you can rearrange the fields for all records at once—for example, combine first and last name on a line.

Each Mail Dex file can hold up to 2500 records, and you can create as many files as you want. To print labels, all you have to do is open the particular Mail Dex file—they all appear on the DA's Mail Dex menu—choose the type of label, and select print (see "Mail Dex"). The easiest way to use Mail Dex is by grouping together records that you're likely to want to print together. That way, you avoid having to select individual records to print.

One step up from Mail Dex in price and functionality is FastLabel 1.2.1, a stand-alone program from Vertical Solutions ($79.95). FastLabel distinguishes itself in one major area—formatting ability. Each label can contain four fields, each of which can be moved, resized, and formatted (see "FastLabel"). Like Mail Dex, FastLabel allows you to rearrange records of text imported into the Text Field, which holds address information.

While the version of FastLabel I worked with didn't allow me to import MacPaint documents, a new version—which should be out by the time you read this—will. In addition, the new FastLabel will contain a small complement of drawing tools. When this version becomes available, FastLabel will create the most attractive labels of any product in its price range.

If you're more concerned with sorting ability than with graphics, Label Manager 3.0 from Preferred Publishers ($25) is a stand-alone program that has some powerful sort features (see "Label Manager"). You can import label information by name, address, phone, state (two letters), and key fields.

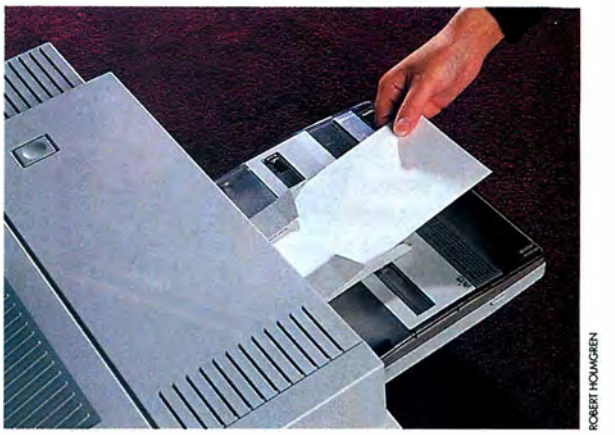
Key fields are special coding fields that don't print. You can use them, or any other field—such as zip code or state—to sort the list. For example, you can select all occurrences in any field that match or don't match a specified set of criteria, or that include a certain phrase or number. To select labels for printing, either drag the cursor across the records you want while holding down the mouse button or click on individual records.

An Unromantic Solution

Addressing envelopes may never become your favorite thing to do, but the right tools can make sending out the mail less of a chore. Whatever your work habits, you can choose among several quick, easy—and best of all—inexpensive ways to get your envelopes addressed.

Remember, you don't have to run an envelope through a printer to produce a computer-printed address. A surprising number of people forget that you can fold letters so that the address shows through a window envelope. A window envelope doesn't give a letter that personal touch—in fact, people may assume you're sending them junk mail—but for everyday business transactions it's an expedient and satisfactory solution. The windows on these envelopes are a little over 1 inch high and 4 1/2 inches wide, large enough for a five-line address.

If you want a less institutional look, and you address three or four envelopes a day, try a desk accessory. I recommend Easy Envelopes Plus. It gives you the most capabilities for your dollar, and like all desk accessories, it gets the job done with minimal disruption of your work in progress.



ROBERT HOLMGREN

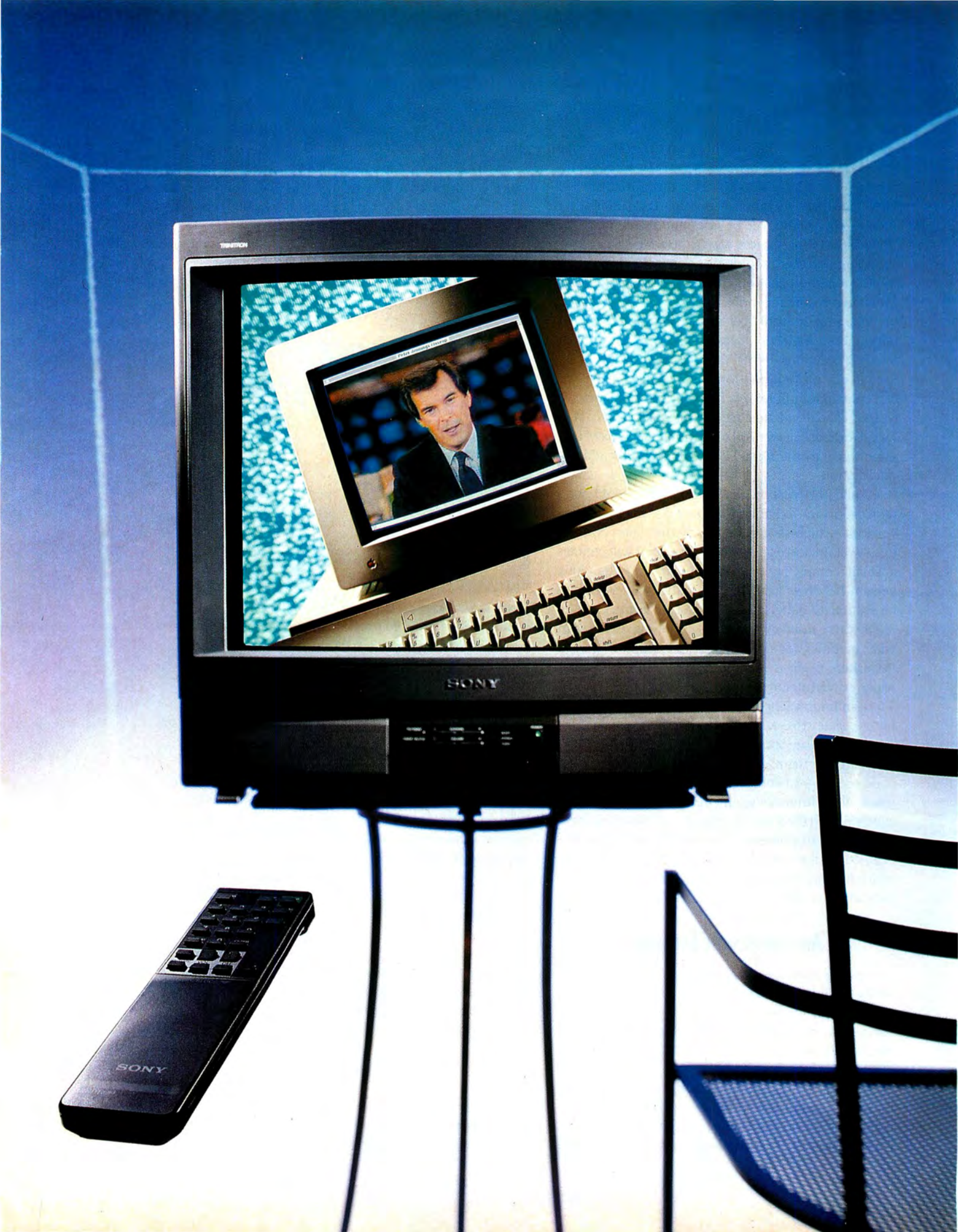
To print an envelope on a LaserWriter II, you simply position it in the manual feed guide. The stamp corner of the envelope should be closest to the printer, with the bottom edge of the envelope on your left.

In terms of getting your envelopes addressed, HyperCard-based addressers like Envelope don't really have an advantage over DAs, and DAs are more convenient. And you can use DAs with non-HyperCard applications as well.

If you send out a more substantial amount of mail, and you address all your correspondence at one time, for example at day's end, the stand-alone program MacEnvelope is your best bet. The new version of MacEnvelope prints addresses on labels as well as envelopes; this new utility makes MacEnvelope the most useful program of its kind. If you need to send out a large mailing, pick the mailing label program that best fits your work habits. ■

See Where to Buy *for contact information.*

Lawrence Stevens, *a Springfield, Massachusetts–based writer, no longer has any excuse for not writing to his mother.*


TRINITRON
SONY
SONY

Mac TV Tools

A sweep of hardware products that can turn a Mac into a low-end video workstation

BY LON POOLE

Television is coming to the Macintosh, and the Macintosh is coming to television. The past year has seen a rash of video product announcements, and many of these new frame grabbers, encoders, scan converters, genlocks, and other devices have even shipped. Apple president and CEO John Sculley has been showing HyperTV (television in a Macintosh window) since last winter, and Mac developers are promoting desktop video and multimedia in hopes of creating another megamarket like desktop publishing.

The problem with this analogy is that publishing is child's play compared to video. A Macintosh, some software, and a LaserWriter make you a desktop publisher, while making any but the most amateur video production usually involves a variety of people with specialized skills and (at a minimum) tens of thousands of dollars in equipment. This is not to say, however, that the abilities the new raft of Mac video products provide to put color Mac graphics and text on videotape and to bring video images into the Mac are trivial. In the video world, a Mac II with even $100,000 worth of equipment is an inexpensive workstation. The advent of Mac video technology promises to cut costs for established network professionals, as well as to empower those in the video business who don't have the money for prime-time equipment.

Uses for a Mac video workstation might include the following:

- recording computer graphics, text, and animation on videotape
- capturing video images or sequences on the computer for a variety of uses
- combining computer graphics with live or recorded video
- editing videotape

PHOTOGRAPH BY MICHAEL LLEWELLYN/'88 VOTE ABC NEWS INTERACTIVE

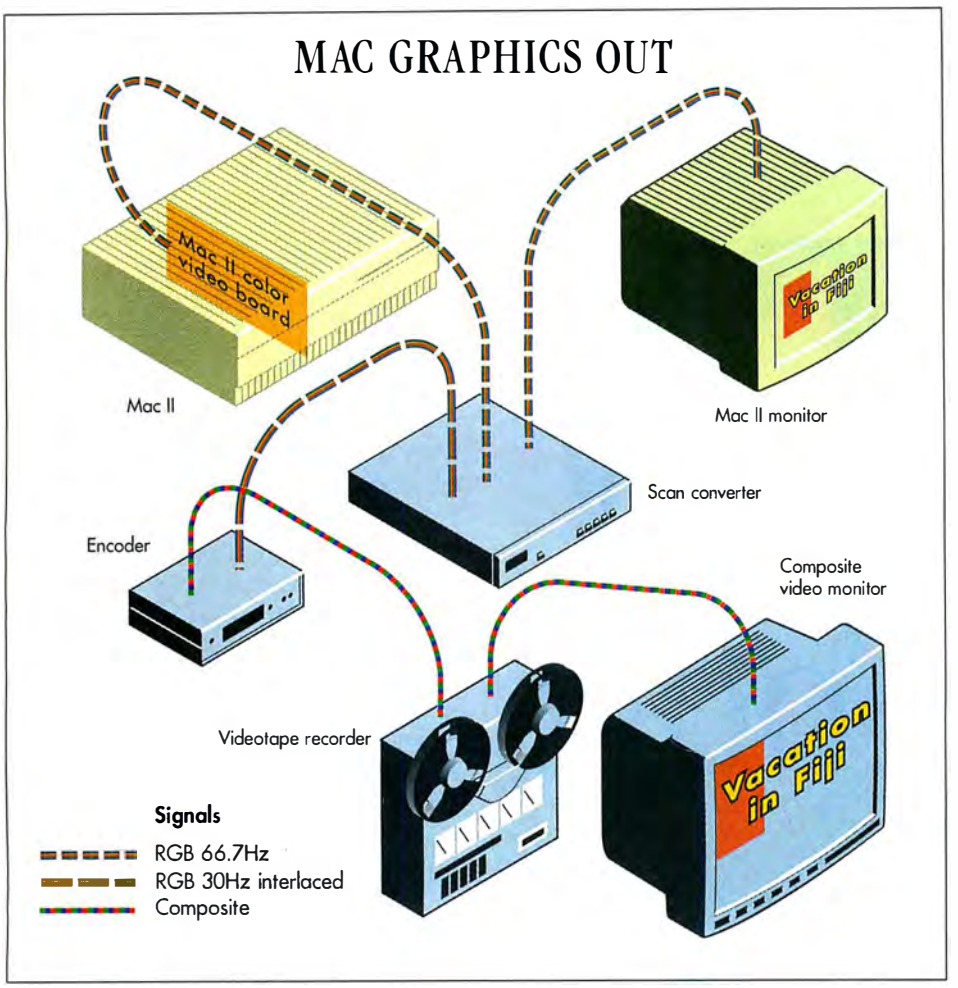
This article describes hardware you can use with a Macintosh to create desktop video systems for the first three of these tasks. For the story on editing videotape and on how video and film producers have used the Macintosh, see "Star Quality" in *Macworld,* June 1989.

Almost all Macintosh video hardware requires one of the Mac II models. The video hardware either plugs into NuBus slots or connects to a Mac II color display board, which in turn plugs into a NuBus slot. The Mac II you use for a video system should have at least 2 megabytes of RAM, a 40MB hard disk, and an Apple-compatible color monitor and color display board. You'll need more RAM to use MultiFinder or to digitize large images in full 24-bit color, which provides 16.7 million simultaneous colors. In addition, you'll need much more disk storage if you intend to save many digitized color images (more on digitizing later).

To understand what the video hardware does and why you need it, you must know something about the similarities and differences between a Mac II display and a video picture.

Incompatible Standards

Television was never designed to display fine lines, sharp-edged graphics, or radical changes in color and brightness—all of which Macintosh users take for granted. So it's not surprising that the quality of Mac graphics and text deteriorates when you display or record it on even the best television equipment. Single-pixel horizontal lines flicker badly when shown on television. Single-pixel vertical lines, diagonal lines and edges, and some black-and-white patterns appear in a rainbow of colors, a condition called *color crawl.* Intense colors, especially reds, bleed horizontally past their borders. Diagonal lines develop stair steps. These flaws are seldom apparent on network TV because television professionals carefully compose scenes, choose wardrobe, and create graphics and text to minimize their occurrence (despite these precautions, if you watch closely you will see color crawl in a sports announcer's herringbone jacket, or bleeding edges around a candidate's red tie).



In this basic system, an external scan converter and encoder transform Macintosh graphics coming from Apple's color-display board to television timing. The converter passes the unconverted Mac graphics to a Mac II monitor. The converted and encoded picture is sent to a videotape recorder, which has a composite video monitor attached. The Mac II monitor is where you perform your work (manipulate dialog boxes, for example) while the composite monitor shows the quality of the recorded picture.

Flaws occur when Mac graphics are displayed or recorded on television equipment even though the Mac and television use similar methods of displaying images. Both achieve the illusion of continuous motion by displaying many images, called *frames,* each second. Both paint, or *scan,* each frame in thin horizontal lines on a picture tube. The problems arise because the Mac and television scan the lines in a different sequence, and they scan frames at different rates.

A Mac II display board scans the lines sequentially, starting at the top of the screen. Apple's color display board scans a complete frame in about 1/66 second. Television scans each frame in two segments: the TV's projection guns first scan all the odd-numbered lines and then start back at the top and scan all the even-numbered lines. The segments created by the separate passes are called *fields,* and this method is called *interlaced video.* Television equipment used in the United States, Canada, and Japan scans each field in 1/60 second, making the total time to scan one frame 1/30 second. This standard, known as *NTSC* (National Television System Committee), is used in over 40 percent of the world's television sets. Most Western European countries and many others use a standard called *PAL* (Phase Alternation Line). France, Eastern European countries, the Soviet Union, and others use variations of the *SECAM* (Sequential Couleur à Memorie) standard. Both PAL and SECAM scan a frame in 1/25 second.

On top of dissimilarities in scan rate and interlace, television and the Mac II transmit pictures differently. Television combines all the components of a picture—color *(chrominance),* brightness *(luminance),* and timing *(synchronization* or *sync)*—into one composite signal. *Composite video* is the chief culprit in color bleeding. For better color control than that offered by video, the Mac II separates the red, green, blue, and timing components. Some higher-quality television equipment uses separate RGB components, like the Mac II, but interlaces them at television scan rates. This is called *RGB video,* or *component video.* A third type of signal, *S-Video,* uses separate chrominance and luminance signals to achieve nearly the same image quality as RGB video. Super-VHS (S-VHS) and other recording formats use this type of signal.

In addition to the other problems, the Mac II picture is too big for most televisions to display. You may have noticed that the Mac II picture does not cover the entire picture tube, a condition called *underscan.* Televisions do the opposite; they *overscan,* so that some of the picture is lost at the edges of the screen. A few products can compensate for the underscan/overscan conflict. Otherwise, Mac graphics you want to show on TV should not use the edges of the Mac screen; a 15 percent overscan allowance is customary.

You must address all these differences in order to successfully display or record Mac II graphics, animation, and text on television equipment.

Recording Mac Graphics

The Mac is a great tool for creating animation, but the usual method of distributing animation is not on disk but on videotape or film (see "Taking It to Tape: Animators' Experiences"). The Mac can also be used to create static graphics and titles for live-action video. Here again, the graphics and titles must be recorded on videotape. To record Mac graphics, animation, and text on television equipment, you need a scan converter and an encoder, a video recorder, a composite video monitor, and a multiscan or other RGB monitor that displays video. With most

TAKING IT TO TAPE: ANIMATORS' EXPERIENCES

At an informal meeting earlier this year, several video and film professionals discussed their experiences creating animation on a Mac II. Most have tried recording their work on videotape, with varying results.

Lynda Weinman is a free-lance effects animator in the film industry. To her, recording animation on videotape is a very important process, but not a simple one. "It's misleading for people to think all it takes to get Mac graphics out to video is a genlock board and MacroMind Director," she warns. To produce professional animation, which may include complex images that can't be displayed or recorded in real time, you need a video recorder that will record single frames, and animation software that will output them. Weinman continues, "Director lets you output a frame at a time, but you have to click the mouse to advance the frames. We need software that prerolls the tape and advances the animation a frame at a time automatically." This need is TapeOp's raison d'être, but Weinman would like to see tape controls built into animation applications.

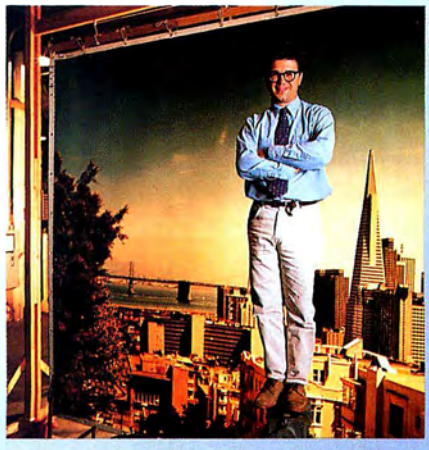
Jay Roth and Mark Granger are designers of computer graphics, animation, and software. They are developing a 3-D animation application, called Spotlight, with video output in mind. It has the built-in video recorder controls Weinman wanted, and it takes advantage of features in the NuVista board. Because Roth and Granger have a NuVista board, many people have come to them hoping to record VideoWorks animation on videotape. "Boy, are they disoppointed when they see what NTSC does to their images," says Roth. "We tell them to invest in an encoder and an NTSC monitor so they can see what colors work before they get to the taping stage." They also stress the importance of reviewing your work after taping it, because a video recorder can decrease image sharpness and add speckles.

Don Smith is a director at Colossal Pictures in San Francisco who has recorded Mac animation on videotape for broadcast television commercials. He output some VideoWorks animation to NTSC video using a RasterOps board, and experimented with the video using a Quantel Harry (a $1 million video graphics and editing system). Smith recalls, "I thought I could just split the two interlaced fields and reassemble them in Harry to eliminate flicker." But animated objects didn't appear reliably on the same field in every frame. That is, an object might appear on the even-numbered scan lines in one frame and on the odd-numbered scan lines in the next frame. Smith concludes, "There was no way to fix it. If you can't control flicker, then converting Mac animation to video in real time is a problem."

Rand Weatherwax, an independent composer-producer, works on video projects ranging from logos for network television to music videos to interactive performance pieces for performers such as Graham Nash. Weatherwax uses MacroMind Director to mock up ideas and then outputs them to videotape via a Julian Systems Genlock Converter board. One way he copes with flicker in titles and line drawings is to print them on paper and then scan the prints using an Apple scanner. "Scanning softens the single-pixel lines and edges enough to reduce flicker," he says. This technique also lets him use PostScript fonts and font-effects applications to make titles he couldn't get any other way.

CYNTHIA MOORE

Animator Lynda Weinman



DRAKE SOREY

The Colossal Don Smith

Marney Morris is president of Animatrix, in Palo Alto, California, which does Mac-based specialty animation as well as animated interactive demos, displays, and presentations. She reports good results from using high-end scan converters and encoders from RGB Technology and Faroudja Labs, but not as good as from aiming a video camera at the Mac screen. "We changed the scan rate of the Mac display and then shot in video directly off the screen. Putting the Mac screen and the camera at opposite ends of a black tube took care of glare," she explains.

Also, Animatrix designs animation to accommodate the tearing and other problems that can occur when displaying real-time animation. "You do have to design with the limits of the system in mind," Morris cautions.

—Stuart Cudlitz

products, the RGB video monitor takes the place of an Apple color monitor, but you still need an Apple color display board or equivalent. The diagram "Mac Graphics Out" shows one setup for recording the Mac II picture.

Scan Converters and Encoders Scan converters transform the Mac's noninterlaced RGB display signal into an interlaced signal timed for television. Each type of scan converter is designed to work with a particular color display board or its equivalent. Most work with the standard Apple 8-bit color display board. Two converters, Julian Systems' Genlock Converter and Computer Friends' TV Producer Pro board actually connect inside the Mac II to a special socket that must be

COLOR VIDEO PRODUCTS

	Personal Vision	ColorBoard 224/SFX* and 232/SFX*	ColorCapture	ColorFreeze-24	ColorSpace FX*	ColorSpace II	FrameGrabber 324N and 324NC	Genlock Converter
Manufacturer	Orange Micro	RasterOps	Data Translation	Computer Friends	Mass Microsystems	Mass Microsystems	RasterOps	Julian Systems
Price	$2599	$4395/$6595	$2995	$1999	$2995	$1995	$2495/$2995	$999
MAJOR FUNCTIONS								
Output Mac graphics to TV		•	•			•		•
Capture TV video images	•		•	•	•	•	•	
Show TV in Mac window	•				•			
Overlay Mac graphics on TV		•	•			•		•
Encode RGB to composite		•	•			•		•
Decode composite to RGB			•			•	• (324NC)	
Video display board		•				•		
INPUTS/OUTPUTS								
Mac display		out						in
RGB video	in	in	out		out	in/out	in	
Composite video	in (B&W)	out/in	3 in/1 out	in	3 in	in/2 out	in (324NC)	in/out
S-VHS		out/in					in (324NC)	
Through NuBus (to display card)	out						out	
Through SCSI (from digitzer)								
External trigger	in		in	in		in		
Overlay key						in/out		in/out
CAPTURE								
Capture speed (color, 640 x 480)	1/30 sec.		1/30 sec.	1/5 sec.		1 sec.	1/30 sec.	
Save as PICT2, TIFF	both		TIFF	both		both	both	
Image enhance	•			•		•	•	
OTHER FEATURES								
Maximum color depth	24-bit	24-bit	16-bit	24-bit	24-bit	8-bit	24-bit	8-bit
Overlay key		color/luminance				color		luminance
Antiflicker filter								
Corrects over/underscan		•				•		
Zoom and pan	•	•	•	•				
Programmable	•	•	•			•	•	
PAL (Europe)	•	**	**	soon	•	•	**	
Notes		3	4	5	6			7

1 Requires 32-bit QuickDrow, utility software, and special cable to display video.

2 Requires modification to output NTSC or PAL signals.

3 Model 232 works only with 640 x 480 monitors; 224 works with high-resolution monitors.

4 Outputs and overlays single frames, not continuous motion.

5 ColorFreeze currently requires TV Producer; $2600 for both.

6 Requires ColorSpoce II.

7 Requires modified Apple color video board.

8 Price depends on onboard RAM: 1/2/4 MB.

** Prereleose; specifications may change slightly.*

*** PAL or NTSC models ovoiloble.*

soldered to the Apple color display board. They use this connection to change the timing of the display board to conform to the television scan rate. Other converters, such as RGB Technology's Videolink 400, digitally convert the Mac II display signal outside the Mac II.

Some boards, such as the NuVista and the ColorSpace II, combine the functions of a scan converter and a display board. Instead of generating the usual noninterlaced Mac pictures, they directly generate an interlaced Mac picture at the television scan rate.

The Apple color display board can also directly originate a television-compatible picture. To do this, you need the Macintosh II Video Card Utility software and 32-bit QuickDraw software, both of which come on Apple's Color Disk, available from your dealer. This setup, which Apple does not officially support, reportedly provides medium-quality video without a scan converter, though I have not tried it. RasterOps has announced another board—the ColorBoard 264—that will directly display video, but in 24 bits. At a projected price of $995, this will cost considerably less than other boards with comparable abilities.

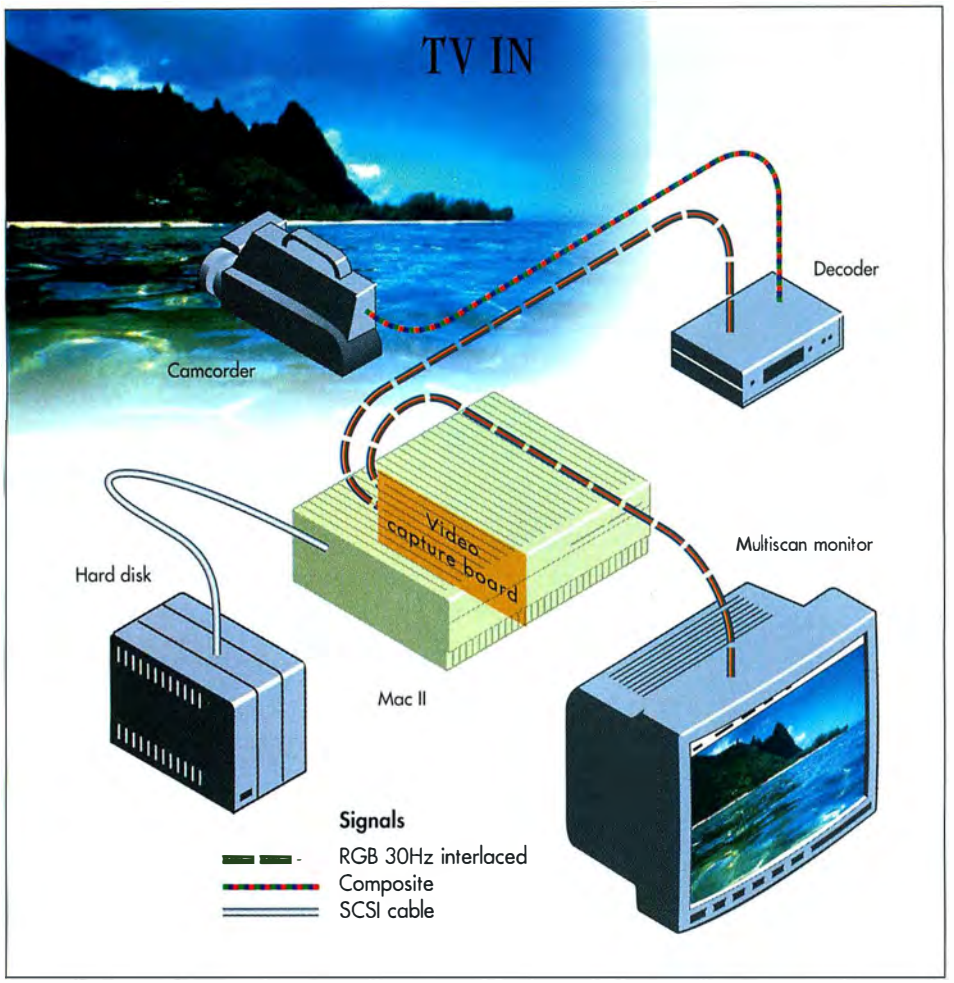
Macintosh II 8-bit Video Card	NTSC Converter	NTSC Converter	NuVista	ProViz Color Video Digitizer	ProViz ColorVideo Converter	RGB Decoder	Spectrum/8 II	TV Producer Pro	Videolink 400 & 400/Genlock	VIDI/O Box
Apple	Julian Systems	Orange Micro	Truevision	Pixelogic	Pixelogic	Julian Systems	SuperMac	Computer Friends	RGB Technology	Truevision
$648	$599	$799	$3370/$5000/ $7500	$1695	$595	$499	$1895	$1500	$9995/$11,495	$995
•	•		•				•	•	•	
			•	•						
			•							
			•					•	• (Genlock)	
	•							•	•	•
		•			•	•		•		•
			•							
	in/out		in					in	in/out	
		out	in/out	in	out	out	out	out	out	in/out
out	out	in			in	in		in/out	in (Genlock)/2 out	in/out
					in					in/out
				out						
			1/30 sec.	1 1/5– 40 sec.						
			PICT2	both						
				•						
8-bit	8-bit		24-bit	24-bit			8-bit	8-bit	24-bit	
			color					color		
• (B&W)									•	
									•	
			•							
			•							
			•	**			**	**	**	
1, 2			8				2	7		

Scan converters are sometimes called encoders because they include the function of an encoder. Encoders combine the separate components of an RGB signal from either a Mac color display board or professional video equipment, into a single composite signal. Separate encoders are also available for the highest quality composite signal. The table "Color Video Products" lists converters, encoders, and other products that include one or both functions.

Quality of scan converter output varies, as the wide price range of scan converters suggests. Expensive converters maintain color fidelity, sharpness, and registration better than inexpensive converters. For example, the premium-priced Videolink 400 has a filter that eliminates flicker. One indication of quality is the type of connectors used. BNC connectors and coaxial cables maintain a cleaner video signal than RCA connectors and shielded cables. Another test of quality is whether recorded output can be re-recorded, which is a normal part of the videotape editing process. In theory, converters and encoders that meet all the specifications of the so-called RS170A standard will produce a broadcast-quality signal; in practice, however, this claim on product literature is no guarantee.

Monitors Viewing the output of an encoder on a video monitor lets you check your graphics, animation, and text for flicker, overscan, color fidelity, position, and other problems. To do this, you need a composite television monitor. Any home TV set that has a video-input jack can function as a low- to medium-quality composite monitor; look for an RCA jack labeled Video In or something similar.

Although the composite monitor enables you to "proof" your final product, you will probably want to do your work



This system inputs video from a camcorder for digitizing and saving on a high-capacity hard disk. This camcorder outputs a composite signal that a decoder then splits into the RGB components the color video capture board requires. The capture board digitizes the camcorder images, displays them on a multiscan monitor, and saves selected images on a hard disk. The multiscan monitor serves as the main Mac II screen when the system is not being used to capture video. Other configurations are possible.

on an RGB video monitor because of its better color and sharper image. The RGB video monitors most common in computer work can synchronize with a range of scan rates, hence the names *multiscan* monitor and *multisync* monitor. You need one that can scan at the NTSC rate (horizontal 15.734kHz and vertical 29.97Hz interlaced), and in most cases at the Apple color display board's rate (horizontal 35kHz and vertical 66.7Hz noninterlaced) as well. Examples include the Sony CPD-1302 and the Mitsubishi Diamond Scan, both of which cost nearly $1000. Some multiscan monitors don't work at the television scan rate, but only in the range of computer scan rates popularized by IBM PC display boards. Most monitors made specifically for the Macintosh, such as the Apple color monitor, scan at a fixed rate and won't work with television timing.

Video Recorders A wide range of videotape recorders can be connected to the scan converter or encoder. You can record composite video on normal VHS, Beta, and 8mm VCRs; however, the picture quality these units yield with Mac II graphics and text is disappointing. Excluding consumer equipment, the format most widely used outside broadcast studios is the ¾-inch VCR, also known as U-matic. Its image quality is not as good as the broadcast formats but is satisfactory for most commercial uses. The cost of such machines ranges from $6000 to $18,000. A relatively new recording format, S-VHS, can equal or exceed the image quality of ¾-inch VCRs. S-VHS VCRs for editing cost about $6500, and camcorders cost about $2000. The best tape decks record on 1-inch open-reel tape and cost $30,000 to $100,000. Betacam and M-format machines provided nearly the same quality, particularly their latest incarnations, Betacam SP and M-II. These machines record on ½-inch tape cassettes and cost between $14,000 and $40,000.

The ultimate picture quality comes from digital video recorders. An Abekas A64, with two banks of hard disks, each of which records 32 seconds of video, costs $160,000. You can also digitally record Mac graphics directly onto 8mm videotape cartridges using an $8000 Genius GigaPix, which attaches to any Macintosh SCSI port. The GigaPix records single frames from any Mac application and animation sequences from applications such as Super 3D, Swivel 3D, and MacroMind Director. A service bureau can copy up to 50 seconds of digital video from your 8mm videotape to any videotape format for $120 to $250.

Because the Macintosh may take more than 1/30 second to render an animation frame, especially in 24-bit color, it's often useful to have a video recorder that can record one frame at a time. The GigaPix system has single-frame recording capability, and single-frame video recorders are available in all tape formats. The single-frame recorder may need a separate VTR controller, a device that advances, starts, and stops the tape as each frame is ready for taping. TapeOp, forthcoming from Master Digital, is a software solution for this problem. The program displays and records sequences from PICS and PICT2 documents automatically, one frame at a time. It can use the NuVista board to display a digitized image of the frame being recorded, and it has drivers to work with several recorders.

Capturing Video

Instead of exporting the Mac picture to videotape, you may need to import video pictures to the Mac. For example, you could use still frames from live or recorded video for pictures in printed works or for storyboards. To display video on a Mac II, and to save individual video frames

on disk, you need a video source, a video capture device, and a monitor that works with the video capture device. Also, you may need a *decoder,* extra disk storage, and a composite video monitor. The diagram "TV In" shows one of many equipment configurations for capturing color video pictures on a Mac.

Video Capture Devices Otherwise known as digitizers, these devices convert television's analog video signal to numbers for use in the Macintosh. Capture devices that can digitize in real time—30 frames per second—are called frame grabbers.

Part of the digitizing process involves matching colors in the image to a palette of available colors. The number of available colors is determined by the amount of memory allocated to each pixel in the image. For example, 24 bits per pixel provides 16.7 million colors. The Apple color board provides 8 bits per pixel, for 256 colors. Capture devices can digitize in 24-bit color even if the Mac II does not have the hardware and system software necessary to display in 24-bit color. (Specifically, a Mac II needs a 24-bit color board and Apple's 32-bit QuickDraw to display in 24-bit color.) The 24-bit color image can be displayed using as much color depth as the Mac II has, and can be saved to disk for later use on another Mac II that has a 24-bit color board. The ColorSpace II, ColorFreeze-24, and Pro-Viz capture devices all include software that *dithers,* or blends, the colors in a 16- or 24-bit image for smooth color transitions on an 8-bit display.

The software that comes with capture devices saves digitized images individually on disk as various document types including PICT2 and TIFF. Regardless of document type, digitized color images take up a lot of disk space. Figure 250K to 350K for a full-size 8-bit image, and 600K to 1MB for a 24-bit image.

Several capture devices display the digitized television picture on an Apple color monitor, others on an RGB video monitor, and some on a composite video monitor. A few give you a choice of monitor type. Orange Micro's Personal Vision board takes a unique approach, displaying continuous live or recorded video at 15 frames per second in a window on an Apple color monitor that's connected to an Apple color display board.

In addition to digitizing video, capture boards such as the NuVista, the ColorSpace II, and the ColorCapture function as basic color display boards. They work like other Mac II color boards except that they use multiscan monitors instead of Apple color monitors. The NuVista can also display Mac graphics, animation, and text—but not video—on an Apple color monitor.

Video Sources Some capture devices let you use either a composite video input or an RGB video input; others accept only RGB video. If your video source supplies a composite video signal and your capture device requires an RGB input, you can use a decoder to split the composite signal into RGB components. Video sources include all the video recorders already described plus videotape players, video cameras and camcorders, and videodisk players. Some videotape recorders do not output a stable signal. The signal can be stabilized by connecting a device called a time base corrector between the recorder and the genlock device.

Mixing Mac Graphics with Video

In addition to recording animation alone on videotape, you can combine it with live-action or recorded video and make your own *Roger Rabbit.* More typically, you can take static or animated titles created with Mac applications and lay them over video. To overlay Mac II graphics, animation, and text on video, you need a video source, at least one monitor, and a *genlock* device (all of this equipment except the genlock has already been described). If you want to record overlaid video, you also need a video recorder. For a diagram of a sample video overlay system, see "Mac Graphics over TV."

Genlock A genlock synchronizes the signals from a Mac II display and a video source to prevent image tearing, roll bars, and other distortions. The genlock includes the function of a scan converter, since it transforms the Mac II display to video. Like plain scan converters, genlocks may also include encoders to combine the components of an RGB video signal into a composite video signal. The genlock may also be included as part of a video capture board or it may be separate.

In addition to synchronizing signals, the genlock combines the Mac graphics with the television picture. To superimpose a Mac-generated title on live video, for example, the genlock displays the text but none of its surrounding background. In place of that background, the genlock shows the live video. With some genlock systems, you pick a key color in the Mac display to indicate which parts of the image the device should suppress. This method is called *chroma-key* or *color-key.* Other genlocks use a key level of brightness, a method called *luminance-key.*

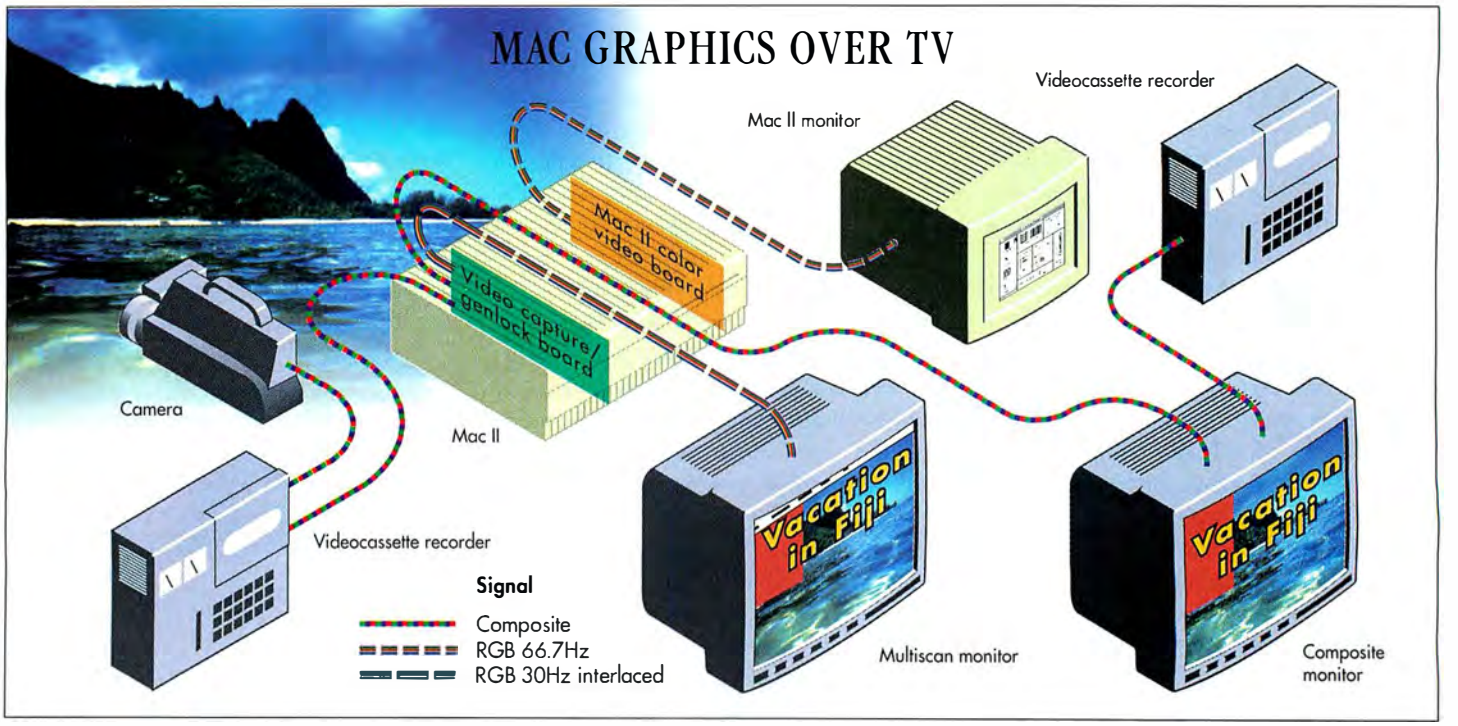
Animation Overlay

Actors interact with Macintosh animation in this multimedia presentation created by Animatrix for Tops. Animatrix began by preparing rough animation on a Mac using VideoWorks. To preview the timing and positioning of the animation with respect to the taped action, the crew used a ColorSpace II board to capture the video and overlay it with the rough animation. Once the animation had been finalized, it was taped using a Videolink 400 scan converter and a Betacam SP video recorder. Animatrix finally overlaid the taped animation on the taped live action using professional equipment at a postproduction facility.

Several genlocks are capable of blending Mac graphics with video so that both pictures appear together, like a double-exposed photograph. The ColorBoard 224 and ColorBoard 232 (both with the SFX option) and the NuVista are capable of 256 levels of transparency. This enables video effects such as dissolves and fades.

Putting Desktop Video to Work

Picking the video equipment and software you need is time-consuming and



Here a color video capture board with genlock capability overlays a Mac II picture on input from a video cassette recorder. The board displays the combined picture on both a multiscan monitor and a composite video monitor. A second videocassette recorder is connected to the composite monitor to record the combined picture. A third monitor, this one a standard Mac II monitor, is connected to its own Mac II display board and displays desk accessories, toolbox windows, and so on. Other configurations are possible.

difficult. The many products have overlapping capabilities and vary a great deal in quality. Video professionals regard top-of-the-line items, such as the NuVista genlock/capture board and the Videolink 400 scan converter, highly. I tried out these two products as well as Julian Systems' Genlock Converter, Mass Microsystems' ColorSpace II, Data Translation's ColorCapture, Computer Friends' ColorFreeze-24 and TV Producer Pro, and Truevision's VIDI/O Box. Although I didn't use any products enough to pass judgment on their performance, it was clear that most of them could stand refining from a consumer standpoint.

TV Window

The video dip showing in this HyperCard window was digitally recorded using prerelease software and a NuVista board. The duration of the dip is determined by the amount of RAM on the board. For example, 4MB provides 9.5 seconds of 8-bit color video at 7 frames per second.

For example, some of the more expensive products require you to supply your own software to get full access to their features. As cases in point, the ColorCapture and NuVista boards do not provide software that uses their overlay capabilities. To be fair to the companies that make these products, I suppose their prices place them out of the consumer market. Perhaps pros and semipros expect to write their own software.

On the positive side, vendors are constantly upgrading and augmenting their software, and developers are reportedly at work on application programs that make special use of particular products. PhotoMac, an application recently introduced for processing and retouching images, is one such product. It can use a ColorCapture board to import single frames of video or to export single frames of Mac graphics to video. The one product I tried that did seem relatively evolved was the moderately priced ColorSpace II.

Desktop video is still very much on the cutting edge—some call it the bleeding edge—of Macintosh technology. The hardware exists, but there's no PageMaker for desktop video—no software that makes it easy for amateurs to turn out respectable productions. Given the complexity of video production, there may never be. For video pros and semipros, however, the desktop video picture looks interesting, and the future is downright bright.

Editor's Note: *As this issue went to press* Macworld *learned about another video product, the Scion Image Capture Board. The Scion sells for $1495, digitizes a 24-bit image in 3 seconds, and saves files as PICT2 and TIFF.* ■

See *Where to Buy* for contact information.

Lon Poole *is a* Macworld *contributing editor and author of* Mac Insights *and* HyperTalk, *both published by Microsoft Press. He hopes soon to watch reruns of* Sea Hunt *in a window on his Mac screen.*

PHOTOGRAPH BY DRAKE SORFY/VIDEODISK IMAGE FROM "SPACE SHUTTLE," SPACE DISK VOLUME THREE, 1989 OPTICAL DATA.

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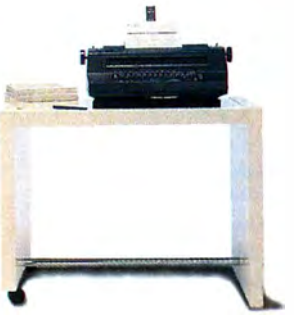

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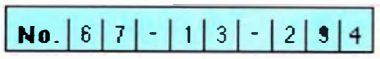

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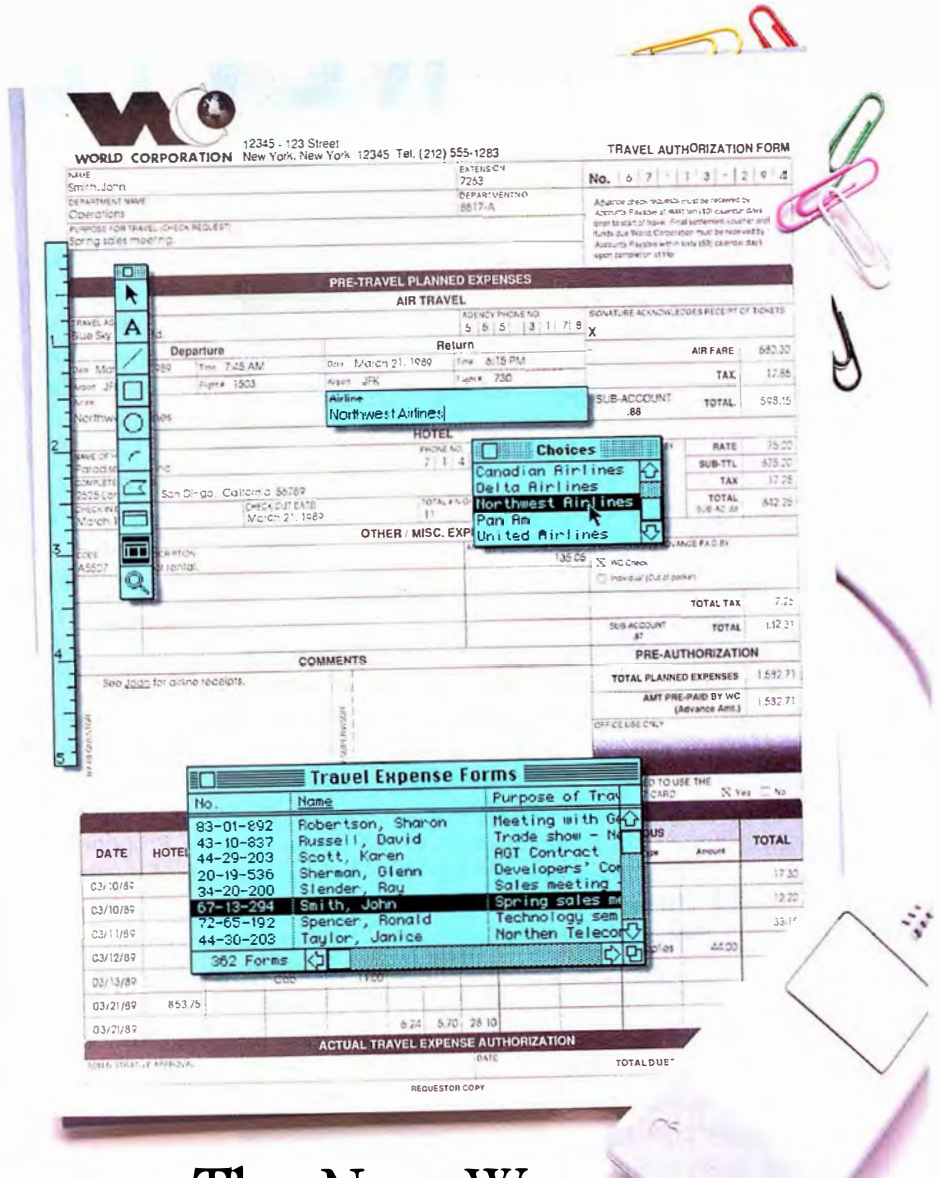

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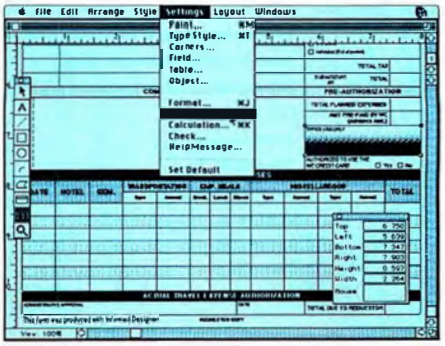

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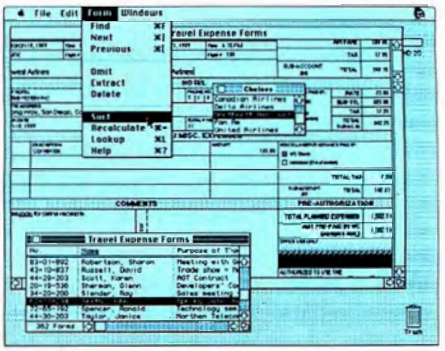

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REVIEWS

ABATON QUICKSTEP
JASMINE DIRECTPRINT
LA CIE PANTHER PDX
QUME CRYSTALPRINT PUBLISHER

PostScript-Compatible Printers

Pros: *Print faster than most Adobe PostScript printers; 3MB of RAM; excellent print quality; less expensive than most Adobe PostScript printers.* ***Cons:*** *Incompatible with Adobe downloadable fonts; no emulation modes; small-capacity paper tray.* ***Company:*** *Abaton, a subsidiary of Everex Systems; Jasmine Technologies; La Cie; Qume Corporation.* ***Requires:*** *Mac 512K; LocalTalk.* ***List price:*** *Abaton $4495; Jasmine $3495; La Cie $3499; Qume $4499.*

Ever since the original LaserWriter and Adobe's PostScript page-description language transformed the world's idea of what hard copy should look like, computer users have anxiously awaited printers with the same typographic talents, but faster performance and a lower price. Some PostScript clones arrived last year, but they were priced in the five-figure range (see "Where Are the Clones?" *Macworld*, August 1988).

Qume's CrystalPrint Publisher is among the first PostScript clones to deliver on the faster-but-cheaper promise. Abaton, Jasmine Technologies, and La Cie sell the identical printer under the names Quickstep, DirectPrint, and Panther PDX, respectively.

An Easy Setup

The compact, 35-pound CrystalPrint Publisher is about the size of a large toaster oven, and it is not much harder to set up. You simply remove a few shipping spacers from the print engine and install the print drum and toner cartridges. Do not wear white when installing the latter, however: toner can spill if aren't careful. For filth-free setup, you still can't beat the Canon engines in Apple's LaserWriters and the QMS PS-810 and the QMS PS-820.

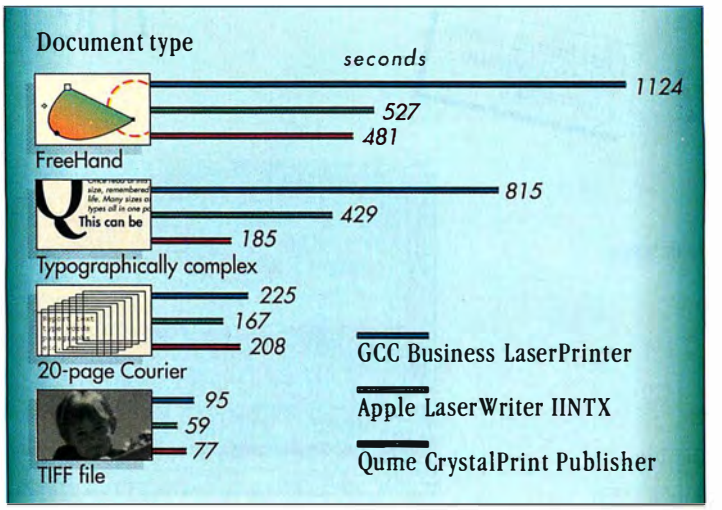
The CrystalPrint Publisher has a 6-page-per-minute (ppm) Casio LCS-130 engine that prints 300 dots per inch. Instead of aiming a laser beam at a rotating mirror to create images on the print drum, the LCS-130 uses liquid crystal shutters (LCS), a technology similar to that used in laptop computer screens and digital watches. Proponents of LCS printers say the lack of rotating mirrors makes the LCS units more reliable and eliminates distortion that can occur at the edges of pages. When viewed under a loupe, the CrystalPrint Publisher's output did show slightly less edge distortion than that of a LaserWriter II, but the difference was virtually impossible to discern with the naked eye.

The CrystalPrint Publisher provides three connection ports: LocalTalk, RS-232C serial, and Centronics parallel ports. The latter two are intended for use with IBM PCs, but I also successfully accessed the CrystalPrint Publisher from an IBM PS/2 using DayStar Digital's LT-200 LocalTalk board.

Fonts and Performance

The CrystalPrint Publisher contains the same 35 typefaces as most true PostScript printers, including the LaserWriter IINT and IINTX. Bitstream created the fonts for Qume. There are some almost imperceptible differences between these and Adobe's fonts, but their character widths match well. Thus, a CrystalPrint Publisher makes a fine proofing device if you plan to print final output on true PostScript typesetters.

Unless you want to use Adobe downloadable fonts, that is. Adobe fonts are stored in an encrypted format that can be decoded only by an Adobe PostScript interpreter. The CrystalPrint Publisher can use downloadables from other firms, including Bitstream and Casady & Greene,



Clone Performance *Qume's CrystalPrint Publisher performed well against the competition. All tests were performed on a 2MB Mac II, without MultiFinder, using LaserWriter driver version 5.2. All times are in seconds.*

STAN MUSILEK

Clockwise from upper left: La Cie Panther PDX, Jasmine DirectPrint, Abaton Quickstep, Qume CrystalPrint Publisher

but its inability to use Adobe fonts is a slap in the typeface—and your ability to exchange documents with other users or typesetting service bureaus is hampered.

At the heart of an Adobe PostScript interpreter is a 68000 or 68020 microprocessor. The CrystalPrint Publisher's interpreter uses a RISC (reduced instruction set computer) processor, whose internal instructions are streamlined for improved performance. This printer is billed as a speedier alternative to an Adobe PostScript printer, and generally, it's true. The CrystalPrint Publisher blows away one of its closest-priced competitors, GCC Technologies' $4199 Business LaserPrinter (see "Clone Performance").

But contrary to advertised claims, the CrystalPrint Publisher isn't always faster than a LaserWriter IINTX. Thanks to its 8-ppm engine, the IINTX printed a simple Courier document faster (the CrystalPrint Publisher has a 6-ppm engine). The IINTX also printed a scanned image 30 percent faster than the CrystalPrint Publisher.

Speed is important, but reliability is vital, and that's where the CrystalPrint Publisher falls flat. When printing a typographically complex document created in Microsoft Word 3.0 or 4.0, the printer hung roughly 50 percent of the time. The problem occurred on all four versions of the printer. Qume says that this problem will be corrected in the next version (3.0) of the printer's ROM, due for release in July. Contact Qume, Abaton, Jasmine, and La Cie for the upgraded ROM's price and availability.

Another CrystalPrint Publisher drawback is that its paper tray holds a mere 100 sheets, versus the 200-sheet tray in a LaserWriter II. And there's no manual-feed slot, so forget about envelopes and odd paper sizes.

Is It Worth It?

If the CrystalPrint Publisher cost less, I would be less hesitant to recommend it as an economical alternative to a true PostScript printer. But at $3495 (Jasmine's price), I'm not sure that the printer offers enough incentive to forgo Adobe downloadable fonts, especially given its spartan paper-handling features. For about $700 more, GCC's Business LaserPrinter offers an Adobe interpreter, a manual-feed slot, a 150-sheet paper tray, and a SCSI port for adding a font-storage hard disk. Another (admittedly slower) alternative is NEC's SilentWriter LC-890, which some mail-order houses sell for as low as $3300.

If you're willing to overlook the CrystalPrint Publisher's shortcomings, you should buy La Cie's version. For $4 more than Jasmine's price, you get the entire Casady & Greene downloadable font library. That's over 80 fonts—enough to take some of the sting out of not being able to use Adobe fonts.

It's been said that cloning PostScript is like shooting at a moving target: a bull's-eye is nearly impossible, but you can get close. With its swift performance and excellent compatibility with PostScript-supporting software, the CrystalPrint Publisher gets awfully close. But you need to weigh its flaws against its lower price and decide whether close is good enough.
—*Jim Heid*

See Where to Buy or circle 701 (Quickstep), 745 (DirectPrint), 751 ((Panther PDX), or 798 (CrystalPrint Publisher) on reader service card.

MACROMIND DIRECTOR 1.0

Animation and Multimedia Presentation Tool

Pros: *Improved point and animation tools include many automated functions; object-sensitive help file.* ***Cons:*** *Animation and sound files are extremely large.* ***Company:*** *MacroMind.* ***Requires:*** *Mac Plus; 2MB for color; System 6.0.2. Hard disk recommended.* ***List price:*** *$695.*

With the introduction of Director, MacroMind retains its hold on the lead, and further refines the art of Macintosh animation. Like MacroMind's earlier product, VideoWorks II, MacroMind Director is based on traditional animation techniques yet manages to cut some remarkable new paths of its own. Director can create simulations, storyboards, and presentations by melding images, graphics, text, and sound. Major improvements in both the handling

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and generation of artwork streamline and simplify the production of animation.

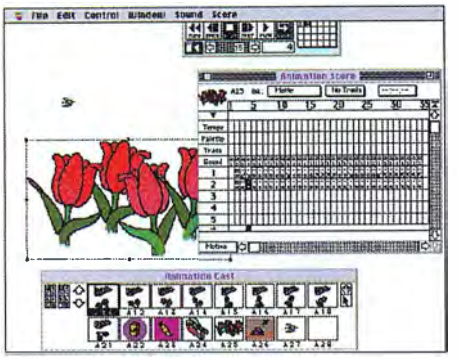
Staging Events

You can carry out all the steps of creating an animation within a single platform that can be easily output to devices such as color printers, video projectors, and slide makers. Essentially, MacroMind Director demonstrates the same intelligent interface as VideoWorks II. It handles 2-D animations as composited images by placing multiple drawings in layers that traditional animators call *sprites* (a sprite is a simple animating image within a larger static or moving background). By layering multiple animating elements, Director is more like traditional cel animation than other programs are.

Old-time animators will take to Director like fish to water, while newer initiates will welcome the well-written, nearly-700-page documentation, which includes copious examples and tutorials. Having added dozens of new features, the folks at MacroMind found it necessary to reassign the program's keyboard shortcuts, but the excellent object-sensitive help file is useful for familiarizing users with these new shortcuts. Shift-Option turns the pointer into a question mark with crosshairs. Just place the crosshairs over a troublesome item, click, and a dialog box tells you all about it. For those of you who just can't adjust, checking the appropriate box under Preferences revises the shortcuts to match those of VideoWorks II.

Director consists of two modules working together. Overview, the presentation module, enables you to assemble a series of externally produced documents (such as MacPaint and PICT graphics) with animations made inside Director. Transitional effects, such as dissolves and screen wipes, can be added to the sequences to produce a seamless presentation.

Animation is created in the second module, Stage. Images are stored in a database called the Cast. To animate a series of images you position successive cast members on the Stage and record them in the Score. Director's Score is an editable record, similar to a musical score, of all cel activity in the animation over time. Additional information, such as pacing, sound, and transitional effects, can also be stored here.



The Score

To create and edit your animation you use the Score window. The first four channels keep track of the palettes, tempo, transition, and sound special effects. The numbered channels (bottom panel) show an editable record of the cast members' animation over time.

Art That Moves

In VideoWorks II, artwork imported from other applications had to travel via the Clipboard or Scrapbook to the Cast. Director's Cast allows you to import entire scrapbooks directly, circumventing a lot of cut-and-paste commands. Scrapbooks, color palettes, and sound files as well as PICT, MacPaint, and PICS formats can all be imported to Director's new Cast window. Another timesaving command, Cast to Time, allows you to select a sequence of cast members from the Cast window and move it into the Score, and thus into the animated sequence.

Improvements in the handling of cast members include an extended display that lets you simultaneously view (depending on screen size) up to eight rows of cast members. Also, a nifty hand tool has been added that lets you move cast members to new positions within the Cast window and automatically update the Score to reflect those changes. Cast maintenance has been improved by the addition of two commands: Delete Unused Cast eliminates all members not used in the Score, releasing valuable memory for your animation; Clean Up Cast eliminates empty positions. You'll really appreciate these maintenance commands when you consider that an 8-bit color animation/sound file can easily run to 600K or 800K.

Auto Animate, arguably the handiest of all the new features, makes it possible to quickly create bar charts, zooming text, scrolling banners, credits, and other animated text effects. You simply choose Auto Animate under the Edit menu, select an effect, type in your message, and bingo—your text flies across the Stage into your animation.

Knowing the Score

The Score has a number of improvements over VideoWorks that help create the illusion of motion. The In-Between Special command is used to move cast members in a nonlinear fashion across the Stage. Instead of simply traveling in a straight line between two points, In-Between Special can arrange a path that carries your players through several points that describe a curve, joining them smoothly into one line. This makes it easy to articulate the irregular path of an object, such as a bird in flight, by selecting the key points in the bird's trajectory and letting Director automatically fill in the intermediate positions. This curve-fitting technique eliminates hours of frame-by-frame positioning of individual cells. Additionally you can select *eases,* which add a touch of realistic acceleration and deceleration to an object's movements. The user can designate, in frames, just how fast an object will ramp up to speed and how fast it will begin to slow to a halt.

The Space to Time command lets you superimpose a sequence of cast members together in a single frame so you can check relative positions before distributing them across several frames in a single channel. This command is especially useful for animating objects that have a particularly continuous motion, such as a bouncing ball.

Fresh Paint

Director's paint program has been enlarged to offer control over color palettes, as well as a wider selection of tools including single or multiple easels, customizable airbrush, gradient effects, and an eyedropper tool for matching colors. In addition, the Previous and Next arrows at the top of the tool menu let you produce a flip-book effect, enabling you to see a

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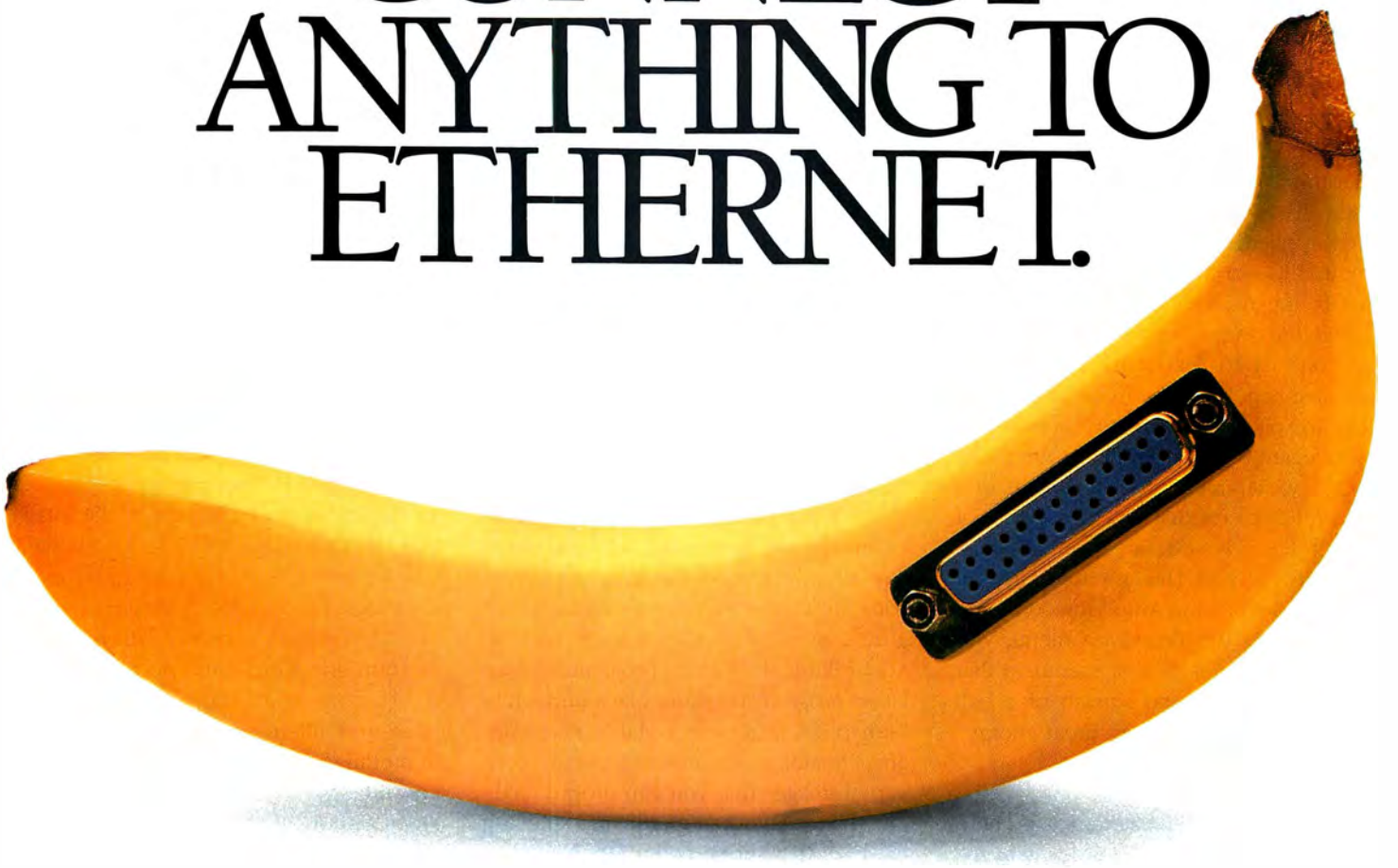

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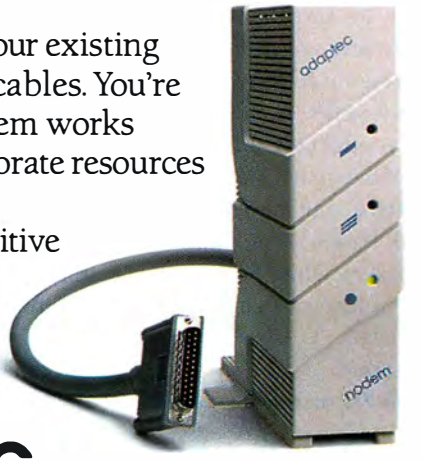

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sequence of cast members before actually committing them to the animation.

Reverse, flip, rotate, distort, slant, perspective, darken, lighten, trace edges, and smooth are all available under the Transform menu. The Auto Transform feature is a personal favorite. After you have applied a transformation—for example, flip—to a cast member, you can specify the number of steps it takes to change the original cast member into the new one. Auto Transform then creates cast members for those in-between positions and places them in the cast window. One elegant use of this function would be to add what animators call *stretch and squash* to objects that are the subject of great force. The classic example, illustrated in the first Director tutorial, is a bouncing ball. Using Auto Transform and Distort under the Transform menu, you can make a series of cast members that depict the stretch and squash of a ball hitting a hard surface with great energy.

Sounds Good, Too

Sound from audio digitizers such as Farallon Computing's MacRecorder can be imported directly into the Cast for inclusion in an animation. The big noise here, however, is Director's musical instrument digital interface (MIDI), which enables the user to trigger MIDI devices, such as a sequencer, at specific points throughout the animation.

All in all, Director shows that even a good program can be improved. What's most impressive is MacroMind's evident desire to be at the center of the desktop-video revolution. Appendix C of Director's manual gives an exceptionally clear explanation of what it takes to convert a computer's output to broadcast video. Director's sophisticated animation tools make it an ideal program for power users in multimedia industries such as film production, video production, and advertising. This does not mean that MacroMind excludes the hobbyist, but rather that it intends to cover all bases of the expanding multimedia market while simultaneously defining the future of that market.

—Stuart Cudlitz and Donald Matthew Smith

See Where to Buy or circle 763 on reader service card.

ADOBE STREAMLINE

Bitmap Graphics Converter

Pros: *Makes quick conversions from bitmap to PostScript with reasonable accuracy; creates files for use in many PostScript-compatible programs; offers numerous tracing options.* ***Cons:*** *Loss of detail with outline feature; controls can be confusing.* ***Company:*** *Adobe Systems.* ***Requires:*** *Mac Plus; scanner.* ***List price:*** *$395.*

Another miracle tool for the graphic artist? Another piece of the puzzle for electronic designers and production artists? Adobe Systems has already graced the graphics world with the PostScript page-description language, rivers of PostScript fonts, and the Adobe Illustrator drawing program. Adobe's latest program converts black-and-white bitmapped images to editable PostScript art. Streamline promises accurate converted images that you can drop directly into a page layout or modify in a drawing program that supports the EPS format.

Streamline functions as a sophisticated autotrace tool, transforming TIFF and PICT files into PostScript images. Autotrace is an important feature of PostScript drawing programs like Illustrator 88 and Aldus FreeHand 2.0. Streamline, therefore, could be seen as an expensive addendum to Illustrator 88's less versatile autotrace tool—but for high-volume production work it has more powerful applications. Streamline's speed and ability to accurately convert batches of files in a single session merit its definition by Adobe as an "automated production tool."

So What's to Streamline?

An Adobe Streamline conversion is only as good as the file it comes from; it won't render a PostScript image with satin-smooth lines and glorious detail from a 72-dpi bitmapped image. An artist tracing by hand from a 72-dpi template in Illustrator 88, compensating intuitively for line breaks or loss of detail, could do a better trace than either Illustrator 88's autotrace or Streamline.

A mechanical drawing of considerable complexity, scanned in at 300 or 600 dpi, can be accurately converted by Adobe Streamline in the time it takes Illustrator 88 or FreeHand to open. The converted image might require fine-tuning once it is brought into your drawing program, but it definitely beats coaxing along an autotrace tool or starting from scratch.

Cruise Controls

Your first choice when converting a piece of bitmapped line art with Streamline is between Outline, Centerline, and Outline-and-Centerline tracing. Outline is designed for black-and-white art with filled areas, like the figure in "Stealing Bases." It traces an outline of each element in the image and fills that shape with black or white.

Centerline is best for more technical drawings. It traces along the center pixel of each line and can render a drawing with uniform line weight and no filled areas.

To convert an original that has both lines and filled areas, the Outline-and-Centerline option creates stroked paths and filled areas based on the Number of Steps option. If the widest line in your drawing is 6 points and the Number of Steps is set at 6, then any line up to a 6-point weight will be a stroked path; lines heavier than 6 points are outlined and filled.

A number of other controls are available in the Conversion Options dialog box. Streamline can create PostScript drawing with straight lines or curved lines; the default setting is a mixture of both. Another path to more anchor points—and tighter conversion control—is the Match Bitmap Tolerance option. A looser tolerance setting more exactly matches the

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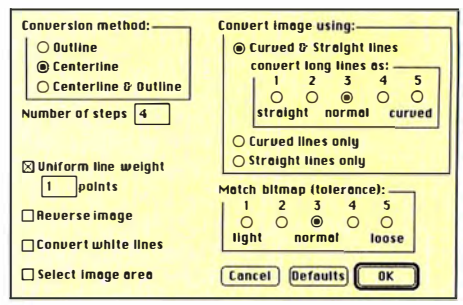

Cruise Controls

A number of options let you optimize Streamline's tracing to suit the image you wish to convert.

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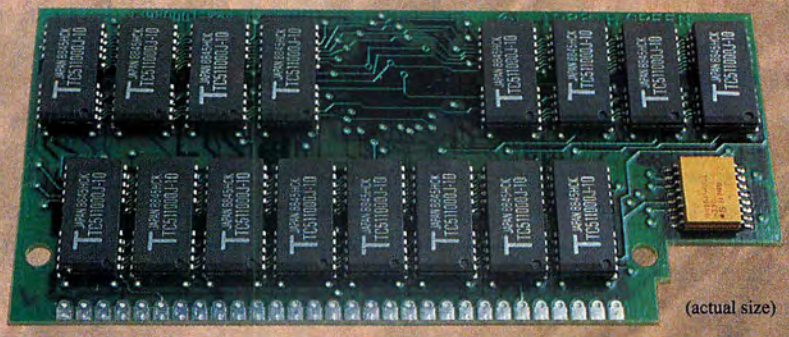

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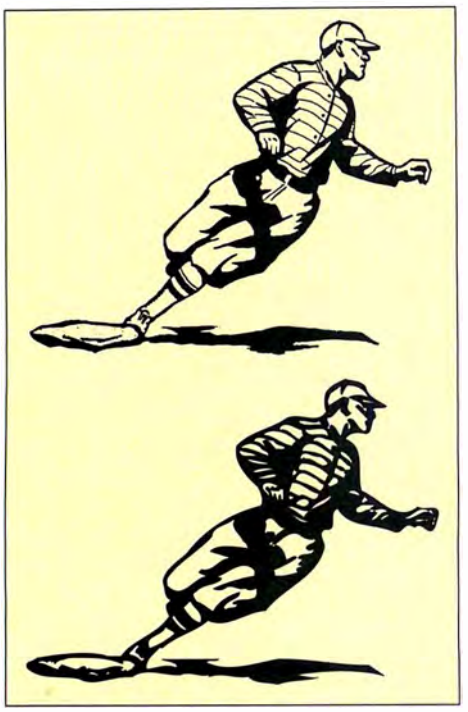

Stealing Bases
The top image was scanned at 300 dpi. At bottom, you'll find Streamline's conversion using the Outline option and default settings.

bitmapped image and softens jags or flaws.

You can select an image area for conversion, just as you can select a scanning area on your original. The Select Image Area option is automatically activated if the file you select is too large to convert with available RAM.

A Noise Level setting lets the outlining tool skip scattered pixels from dust or extraneous marks that rode in on your scan; but it might do so at the expense of smaller details, so you can set it to ignore hunks of noise up to 8 pixels. For example, if your original image contains details as small as 2 pixels, you would set the Noise Level at 2 to ignore anything smaller than 2 pixels.

Adobe Streamline's interface is extremely easy to use, but there is a learning curve created by the number of possible control combinations and their effect upon the PostScript image you want. The "Stealing Bases" image came through the conversion process on the default Outline settings as a workable image with a slight loss of detail. Using the Outline-and-Centerline option with various control settings, the image looked like a sketch from Picasso's notebook. It takes some experimenting to master your conversion options.

The documentation is straightforward and simple—too simple in some respects, as it covers the range of options with only a perfunctory troubleshooting checklist at the end. It unabashedly discusses difficulties that might ensue when working with Streamline conversions in drawing programs other than Adobe Illustrator. You'll appreciate the helpful section on improving speed performance.

A Miracle Tool?

There's plenty to nitpick about with Streamline if you take a single detailed drawing and expect both a precision conversion job *and* a piece of art you can drop into a newsletter. Because of its batch processing capability, Streamline can take a hundred complex renderings of speedboat engines and create PostScript files that need some, but not much, adjustment. Or it can take a hundred illustrations of endangered birds and create PostScript files that are ready to use. For volume production of technical drawings, CAD/CAM illustrations or informal clip-art–style images, Streamline makes an exciting addition to the graphics software market.—*Annie Jenkel*

See Where to Buy or circle 702 for contact information.

DATAPRODUCTS LZR-1260

High-Performance PostScript Printer

Pros: *Faster than LaserWriter IINTX; includes 4MB memory and high-speed engine; accepts font hard disk; excellent paper handling.* ***Cons:*** *No external hard disk connector.* ***Company:*** *Dataproducts Corporation.* ***Requires:*** *LocalTalk-equipped Macintosh.* ***List price:*** *$7995.*

If you're thinking about buying a LaserWriter IINTX, don't—at least not until you see the Dataproducts LZR-1260. The LZR-1260 costs a bit more, but it gives you a print engine that can keep up with its high-performance PostScript controller.

The NTX has received well-deserved praise for its fast controller, which boasts a 68020 microprocessor running at 16.66MHz, versus the 12MHz 68000 in the NT and most other PostScript printers. But, while the NTX's Canon SX engine is eminently reliable and easy to set up, its 8-pages-per-minute (ppm) printing speed often can't keep up with the controller. In the PostScript world, it's unusual for the controller to wait for the engine. With the NTX, it's almost common.

STAN MUSILEK

The Dataproducts LZR-1260.

The LZR-1260 also uses a 16.66 MHz, 68020-based controller offering the same 35 Adobe fonts as the NTX, but the LZR-1260 talks to a 12-ppm Toshiba print engine. Combine that with its superior paper-handling features, and you have what may be the best high-performance 300 dpi laser printer available.

And Perhaps the Biggest

The LZR-1260 has many fine attributes, but portability isn't among them. The printer comprises two separate components: an 85-pound print engine, and a 22-pound, Mac II-sized controller unit, which sits beneath the engine or mounts vertically on the floor. On the back of the controller unit are RS-232C serial, AppleTalk, and Centronics parallel ports. The Centronics port is intended for IBM PCs, although if your office mixes Macs and PCs, you may want to equip your PCs with LocalTalk boards to avoid having to switch between the printer's AppleTalk and Centronics modes.

The LZR-1260 isn't as easy to set up as an NTX. Instead of sliding a toner-and-drum cartridge into place, you have to grapple with a disposable drum, a devel-

(continues)

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5120

The one on the right is easier to publish.

The image on the right is a copy.

We scanned the photograph on the left with an Abaton Scan 300/GS 8-bit scanner, dropped it into our favorite desktop publishing program, and produced the image on the right using a phototypesetter.

At first we were all a little leery. How can a $2200 scanner for the Mac reproduce photographs well enough to run in an ad? The answer lies in the design of the Abaton Scan 300/GS. It's an 8-bit scanner capable of capturing 256 shades of gray, so it gathers 16 times as much information from a photograph as a 4-bit scanner. That means more of the subtlety and richness of the original black-and-white photograph is preserved in the scanned image. And the Abaton Scan 300/GS even comes with Letraset's Image Studio software, so you can clean up, change, or rearrange your image easily.

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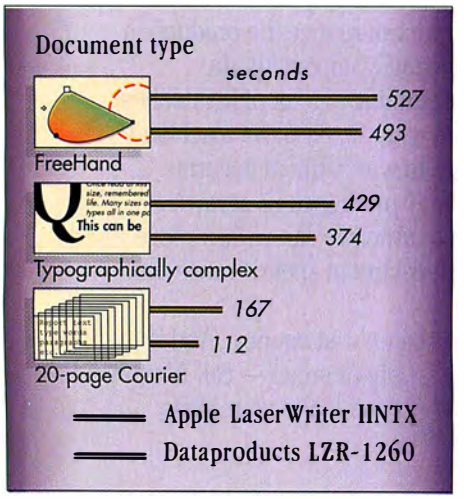
oper cartridge, a toner cartridge, and a fuser cartridge. Once you've tackled the installation, however, routine care and feeding is easy. Simply snap a new toner cartridge into place every 5000 pages or so; the other consumables have life spans ranging from 10,000 pages for the drum to 80,000 pages for the fuser cartridge.

As for the life span of the engine itself, the LZR-1260's is rated at 600,000 pages, with a 25,000 page-per-month duty cycle. The NTX, by comparison, is rated at 3000 pages per month, with a 300,000-page life span. These values can be as inaccurate as the EPA's mileage readings. Still, they do reflect the construction of—and the manufacturer's confidence in—the print engine.

The LZR-1260 sports a data entry keypad for switching between print modes and adjusting communications settings. While an NTX owner fumbles through the manual to find the proper settings for the printer's six unlabeled DIP switches, an LZR-1260 user can tap a few keys and see the results on a liquid-crystal display (LCD) that also keeps you informed during print jobs. LCD status displays aren't new; Texas Instruments' OmniLaser printers use them, as does NEC's SilentWriter 890. But unlike the aforementioned scribes, the LZR-1260 also offers flashing status lights similar to a LaserWriter's. Thus, you don't have to walk across the room to see what the printer is up to.



LZR-1260 versus NTX
Dataproducts' LZR-1260 outperforms the LaserWriter IINTX, and offers superior paper-handling features and a heavier-duty print engine. All tests were performed on a 2MB Mac II, without MultiFinder, using LaserWriter driver version 5.2. All times are in seconds.

As more programs in the IBM world support PostScript, emulation modes are becoming less important. But for the record, the LZR-1260 can emulate the Hewlett-Packard LaserJet Plus but lacks the Diablo 630 emulation mode offered by the NTX and most other PostScript printers.

A high-performance PostScript printer isn't complete without a SCSI hard disk, which holds downloadable fonts and extends the size of the printer's font cache, thus boosting performance when printing typographically complex documents. The LZR-1260 can accommodate a hard disk, but it must be installed within the controller. Although you can't plug an external SCSI drive such as Apple's Hard Disk 20SC into the printer, Dataproducts sells a 20MB internal hard disk for only $895.

Performance and Paper

On the *Macworld* test track, the 1260 beat the NTX in every event (see "LZR-1260 versus IINTX"). The performance difference was especially great in the 20-page Courier document test, reflecting the LZR-1260's faster print engine.

Not only will LZR-1260 users get their copy faster, they'll also feed the printer less frequently. The LZR-1260 offers a 250-page paper cassette, versus the NTX's 200-sheet tray. Other paper-handling options are available, including an $895 two-tray feeder with a 500-sheet capacity, and a $995 feeder that holds 100 envelopes.

The LZR-1260's output looks as good as any 300-dpi output I've seen. The printer's Toshiba engine produces rich, solid black areas and is equally adept at rendering fine serifs and hairline rules.

At $7995, the LZR-1260 retails for $1396 more than the NTX, but it includes 4MB of RAM as standard equipment, versus the NTX's 2MB. A 4MB NTX sells for roughly $7100 (depending on memory costs), so the net price difference is only about $895. That's a small price to pay for the extra performance, superior paper handling, and longer-life engine that the LZR-1260 provides. Simply put, there's no good reason to consider a LaserWriter IINTX over the Dataproducts LZR-1260.—*Jim Heid*

See Where to Buy or circle 716 on reader service card.

SCANJET PLUS

Gray-Scale Flatbed Scanner

Pros: *Scans from DA; line-art, dithered, 4-bit, and 8-bit gray-scale scanning; five halftone dithers plus diffusion dither; resolution/scaling in 1-dpi/1 percent increments; offers vertical and horizontal resolution scaling settings, contrast and brightness controls, live preview scan with zoom, negative and mirror scanning; includes DeskPaint.* ***Cons:*** *No gray-scale editing software; no explicit gamma-curve control; separate SCSI interface; separate power supply.* ***Company:*** *Hewlett-Packard.* ***Requires:*** *Mac Plus; hard disk; SCSI cable.* ***List price:*** *$2190.*

Six months ago if someone asked which gray-scale scanner to buy, it wasn't an easy question to answer. The $2090 Hewlett-Packard ScanJet offered some of the nicest software (in DA form, at that), rivaled only by AppleScan in ease of use. But the ScanJet only captured 4 bits per scan point—enough for most laser output, but insufficient for top-quality Linotronic output. For 8-bit scanning, you had to use Microtek Lab's MSF 300G, at $3495.

The answer was easy for a couple of months, after HP announced its incredibly low-priced ScanJet Plus—the ScanJet with 8 bits per scan point and upgraded versions of DeskScan and DeskPaint. Then it got tough again, when Microtek dropped the price of its competitive MSF 300G to $2195, including both SuperPaint and Digital Darkroom—an image-editing duo worth close to $600 retail.

The $1799 AppleScanner is also a viable competitor, based on a couple of features and its bundled HyperScan software, in spite of the fact that it's a 4-bit scanner and has limited control over resolution.

The ScanJet Plus is flexible. You can set resolution in 1-dpi increments, and scaling in 1 percent increments. You can do a quick preview scan, and select the area you want to capture. Click on Zoom, and it repreviews your selection at a larger size so you can select exactly the area you want to scan.

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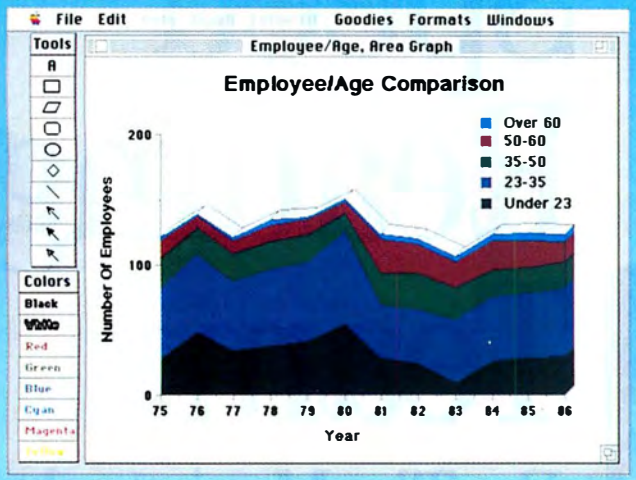

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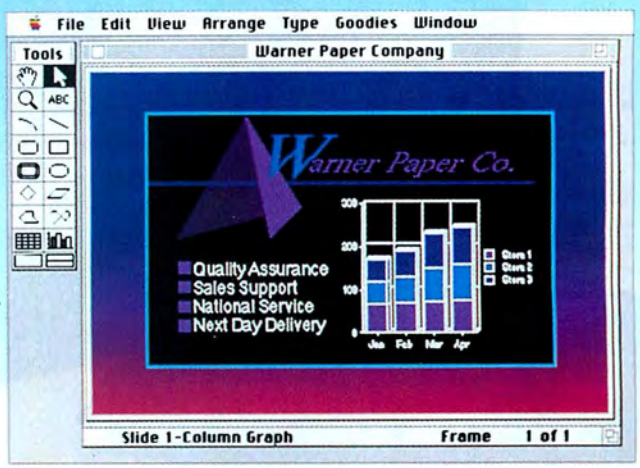

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STAN MUSILEK

ScanJet Plus from Hewlett-Packard

The live preview (you can turn it off if you want) lets you see any changes in the image on screen as you modify the scanning parameters—gray-scale, dither, or line art; negative or mirror scanning (but not active rotation); contrast; and brightness. The contrast control is grayed out in line-art mode. The brightness control lets you adjust the black/white threshold with immediate on-screen feedback—useful when a source image is on colored paper.

When you have an image the way you want it, select Final, and DeskScan scans the image with the settings you've chosen. You can scan to a file (TIFF, PICT, EPS, or MacPaint), to the Clipboard (limited by memory), or to the printer. Scanning directly to the printer is handy when you're trying to get an image just right, because the on-screen feedback is limited by screen resolution. You can even use the ScanJet Plus as a slow but capable copy machine (a print spooler is recommended), or scan directly to the AppleFax (if it's selected in the Chooser).

Many people have moved to gray-scale scans because you can size them in a page-makeup program without getting the ugly patterns that result when you size dithered, bilevel halftones. Gray-scale files get huge, though, so your disk space gets eaten up, and printing can seem to take forever. With the ScanJet Plus's scaling and resolution control, you can quickly and easily grab a bilevel, dithered halftone at the right size and resolution to avoid patterns and save a lot of disk space compared to using gray-scale files. The scanner will even interpolate dots beyond its optical 300-dpi limit if you want to enlarge an image.

Say you have a 1-by-1-inch image, and you want to print it at 1.3 by 1.3 inches at 300 dpi. You can set the scanning resolution to 300 dpi, and the scaling to 130 percent, and DeskScan does the arithmetic for you. It effectively captures 390 dpi and enlarges the image, resulting in 300 dpi.

The scaling/resolution trade-off is the most confusing thing about working with scans, but DeskScan makes it easy. You can build your own resolution presets (even with different horizontal and vertical resolutions), a preset for working with AppleFax is included.

DeskScan is a DA, so you can scan from within a page-makeup program. Because you've already determined the final image size, you can achieve the same laser quality as with a gray-scale image, but with the small file size of a dithered halftone. You can even avoid the extra file on disk by scanning to the Clipboard and pasting onto the page. If you want to size an image onto the page, though, or print to a Linotronic, you can always select a gray-scale scan (it's your choice—either 4 or 8 bits).

DeskScan offers six different dither patterns, including Diffusion (similar to Digital Darkroom's Advanced Halftoning), which yields excellent results at 300 dpi.

The ScanJet Plus manual and DeskScan's detailed, context-sensitive online help are top-notch. From SCSI setup to gray-scale scanning, everything is explained.

What's Missing

The ScanJet Plus doesn't have everything you might want, however. AppleScan, for instance, can automatically print a test sheet by scanning a selected area repeatedly, using different contrast and brightness settings—a real timesaver in getting dithered halftones just right. With DeskScan, you must scan to the printer multiple times.

You can't adjust the actual gamma curve with DeskScan. Changing contrast and brightness achieves the same effect, but the ability to choose or create a gamma curve can yield better images with less work.

The ScanJet Plus comes with DeskPaint, an impressive, full-featured, black-and-white paint program in a DA. If you want gray-scale editing or image manipulation, though, you'll need ImageStudio or Digital Darkroom.

Because the SCSI interface and the bulky power supply that drives the interface are separate, you end up with two extra cables and two extra boxes cluttering up the office.

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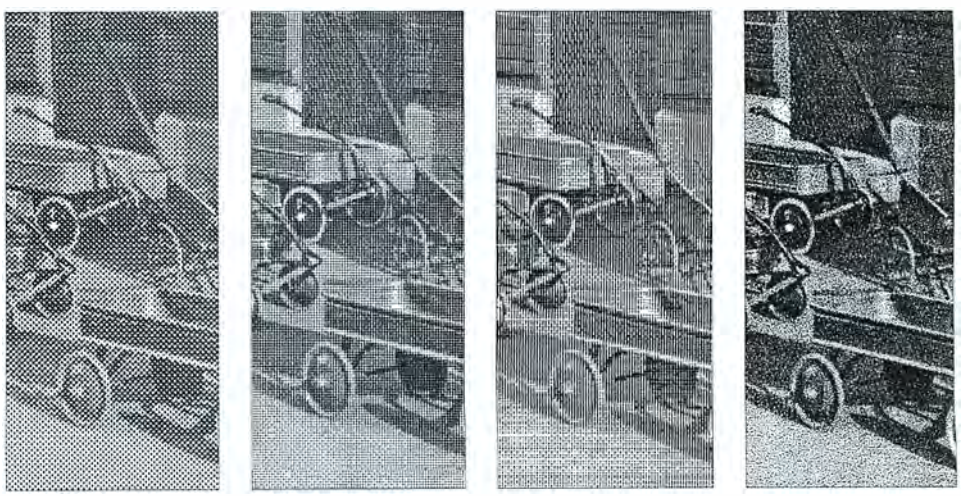

Laser Graphics

Four of DeskScan's six dither methods, scanned and printed at 300 dpi. The first is Normal Halftone mode, which produces a fairly standard laser halftone. The second is Fine Halftone, which provides more clarity with some loss of gray levels. The third, Vertical Line, provides more clarity than Normal Halftone with good detail in vertical lines. Diffusion—which doesn't attempt to mimic a traditional halftone (a difficult task at 300 dpi)—provides perhaps the best rendition.

When it's time to buy a tape backup system for your Mac, you'll have a choice from roughly 15 different products, gadgets, novelties and doodads.

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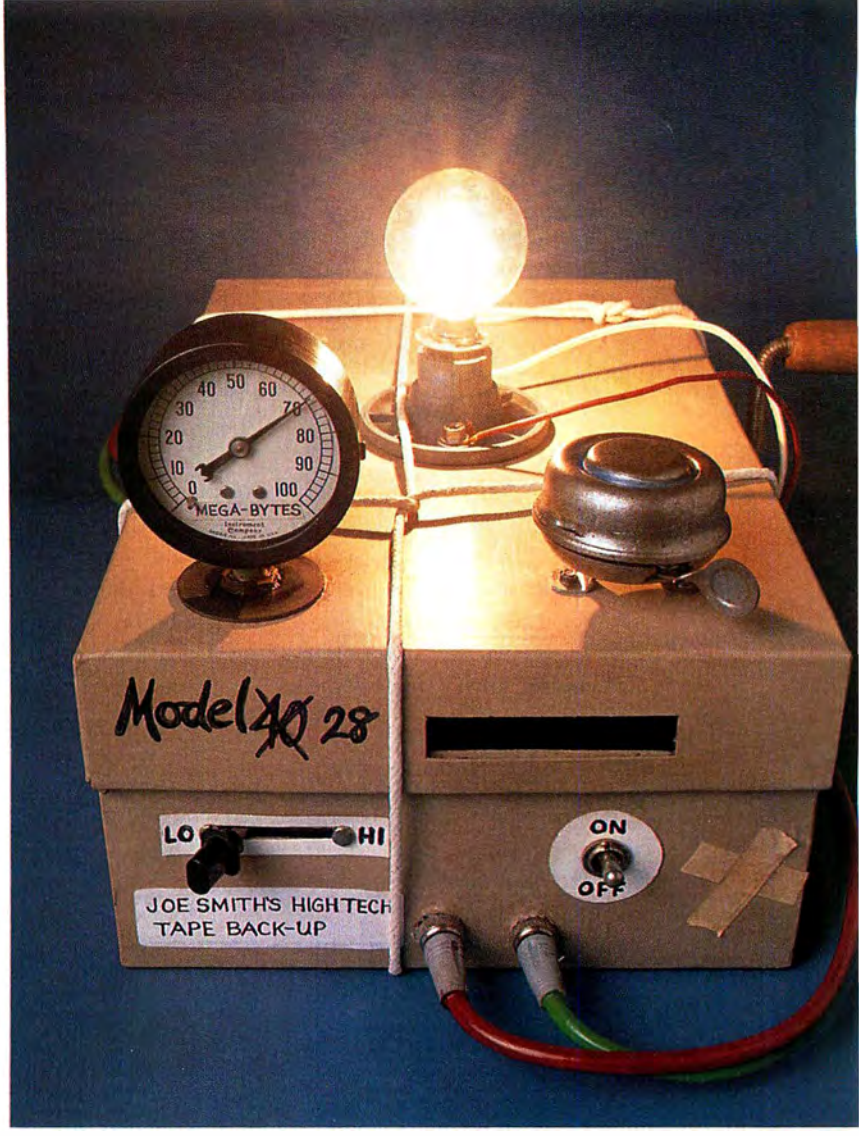

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But let's face it, when we conceived our newest tape backup system we had to prove ourselves all over again. We found the best Mac engineers around and started from the ground up. The result? MaynStream. By Mac users, for Mac users.

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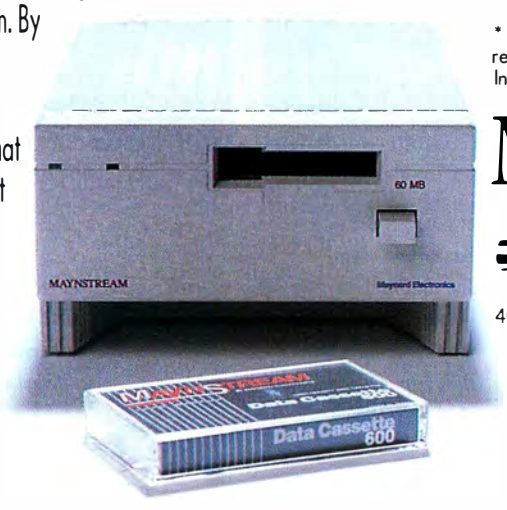

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What's the Answer?

The choice of which 8-bit gray-scale scanner to buy is difficult once again, but not as bad as it used to be. You could buy the $2195 MSF Microtek 300G with limited resolution and scaling increments and top-of-the-line image-editing tools bundled with the scanner. Or you can buy the $2190 ScanJet Plus with its great scanning DA and black-and-white DA paint program, and if you need it, buy ImageStudio or Digital Darkroom by mail for $200 or $300.

Unless you need HyperScan for getting images into HyperCard easily, the ScanJet Plus is the most flexible scanner on the market. And if you include the additional cost of Digital Darkroom or ImageStudio, it's only two or three hundred dollars more than its closest competitor.—*Steve Roth*

See Where to Buy or circle 803 on reader service card.

SOFTPC 1.3

Software MS-DOS Emulator

Pros: *Well-designed software PC.* ***Cons:*** *Mildly puzzling installation.* ***Company:*** *Insignia Solutions.* ***Requires:*** *Mac SE with 68020 or 68030 accelerator board or Mac II; 2MB RAM; hard disk. 5MB recommended.* ***List price:*** *$399.*

It's a real programming triumph that SoftPC 1.3, in simulating an IBM PC/XT in a window on the Mac screen, is bug-free, fast, and unimaginably tolerant of PC software.

Here's how it works. SoftPC resides in a standard Mac folder that displays, besides the SoftPC application icons, icons for MS-DOS–formatted hard disks (the folder itself is a special "drive" that is used in file transfers). Installation requires more knowledge of DOS conventions than is typical of Mac users; those who don't knowenough about DOS to at least follow FDISK procedures might be confused. You start and quit programs according to the usual DOS conventions, (Insignia includes the MS-DOS 3.3 and GW BASIC manuals from Microsoft to help you communicate with the PC). Using SoftPC

View on Another World

Here SoftPC runs Borland's PC word processor Sprint. The emulated CGA (Color Graphics Adaptor) screen on an Apple RGB monitor looks considerably sharper than typical real CGA displays on IBM PCs.

is nearly the same as using a hard-disk-based, 640K RAM PC that you somehow embedded in the Mac. Miraculously, everything works, including assignment of CGA colors, mouse usage where appropriate, even sound and graphics.

Glitchlessness

Lotus 1-2-3 version 2.01 ran perfectly on SoftPC, even using a separate PrintGraph disk in an FDHD drive. There were no problems running dBase III, WordPerfect 4.2, or even WordStar 2000. Keyboard maps that are provided in the small SoftPC manual detail equivalents for function keys and other special keys. I also tried the Crosstalk XVI communications program, Sprint, which offers complex emulation modes for other word processors, a proprietary data-graphing program that only runs under Microsoft Windows 1.04, and a set of Turbo Pascal programs (version 5.0) that perform printing and COM (communications) port tricks. Two popular memory-resident programs (the MS-DOS approximation of DAs), SideKick and Tornado Notes, also worked perfectly. In short, no readily available piece of commercial software was able to cause the slightest difficulty for SoftPC.

But Is It Fast?

Speed is not a strong point of software emulators, but SoftPC is at least respectable. In a composite test using a Mac IIx and based on Lotus recalc and search-and-replace in a long WordPerfect 4.2 document, SoftPC runs like a 5.5MHz PC. This is fine compared to the stock XT speed of 4.77MHz, not sparkling compared to Turbo XT's 8MHz, and pretty draggy compared to the performance of a 12MHz AT. Speed on an SE with a 16MHz Radius accelerator, however, was equivalent to that of a 5.1MHz emulation.

But the point of SoftPC is compatibility not speed (if you want to run blazing recalcs on a Lotus file on your IIx, just translate them into Excel, do your work there, and translate them back when you're finished). With SoftPC, you can bring a Mac into a PC-dominated office and use any specialized PC software the office requires while keeping the Mac intact for your own favorite applications.

Details

SoftPC runs best on a IIx, IIcx, or SE/30, simply because the FDHD drive is so convenient for reading 3½-inch MS-DOS disks. For other systems, there are third-party drives that let you read these; SoftPC explicitly supports the DaynaFile and Apple 5¼-inch drives. Insignia provides a utility called SlavePC, which lets you load software and data files from the floppy drive on an IBM-type PC, while controlling the PC drive directly from the Mac. This option is wretchedly slow, but it does work, as long as you have a MacLink-style cable or can make one from the pinout diagram provided.

Printed output can be directed to an ImageWriter or LaserWriter with PC software that is configured for an Epson FX-80 printer. But because the Mac communications port is physically different from the typical DB25 COM1: on a PC, SoftPC doesn't support hardware handshaking communications protocols or hardware copy-protection devices. SoftPC also comes with a smaller and slightly slower variant that emulates a 256K RAM PC, for memory-constrained Macs.

Increased Access

Insignia has produced a wonderful product that will also be a useful product (one adjective does not always imply the other) for anyone who wants to run MS-DOS software without a hardware investment. Whenever interoperable software is available (for example, Microsoft Works on

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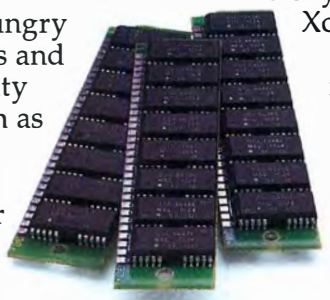

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Mac and PC), it will give you better performance than an emulation for equivalent tasks and should be your first choice. For most common tasks, there is a Mac program that can read MS-DOS files and is probably superior to the original MS-DOS application. But SoftPC gives you access to the very wide world of specialized MS-DOS programs, makes your Mac office-friendly to nearly every workplace in North America, and can even offer you hours of amusement as you try (and fail) to find programs it can't run. If you have a 68020- or 68030-based Mac and need to run MS-DOS software, SoftPC is exactly what you want.—*Charles Seiter*

See Where to Buy or circle 806 on reader service card.

DELUXE MUSIC CONSTRUCTION SET 2.5

Music Notation and Composition Tool

Pros: *Low-cost; high-quality; easy-to-use; MIDI compatible.* ***Cons:*** *Limited number of musical symbols and staves; lacks part-extraction for printing individual instrument parts.* ***Company:*** *Electronic Arts.* ***Requires:*** *Mac 512K.* ***List price:*** *$129.*

Since I last listened in on it a couple of years ago, Electronic Arts' Deluxe Music Construction Set (DMCS) has been through a few upgrades; it's now an excellent standard-notation alternative to pricey behemoths like Professional Composer and Finale. Improvements such as a wider selection of musical symbols, more staves, and MIDI capabilities make DMCS version 2.5 a great tool for the Mac composer.

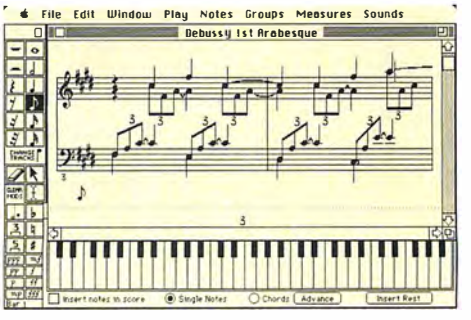
Music Deluxe Redux

One of the key improvements is the increase in the number of bracketed staves a piece can have (meaning that they're intended to be played simultaneously), from 8 to 32. Each staff can hold two separate musical lines, so your piece can have up to 64 lines, plenty for most orchestral compositions.

While DMCS 2.5 sports a number of additional musical symbols, the selection is still a bit on the scanty side. From the palette, you can choose rhythmic values covering the range from whole notes to 32nd notes (and rests); dots for lengthening rhythmic values; sharps, flats, and naturals; triplet and quintuplet brackets; and dynamic markings from pianississimo to fortississimo. Other important symbols, including crescendo, decrescendo, tie, slur, and repeat are available from the Groups and Measures menus. Unlike earlier versions, DMCS 2.5 lets you enter dual tie marks (connecting tied notes both above and below the note heads) and place beams over rests.

Of course, the program still lacks many symbols that some composers won't be able to live without, like double sharps or flats, trills, and pedal markings. But because the program now supports Adobe's Sonata font and includes the screen version of it, you can add all sorts of symbols by typing them in as text anywhere in the score—although they have no effect on playback. In version 2.5, new rulers make placing text characters just where you want them a good deal easier.

DMCS is both watchful and forgiving. When you enter too many beats in a measure, the program alerts you visually by graying out the extra notes or rests. But it doesn't force you to remove them, and it will still play and print your piece. As you'd expect in a low-end product, there is a limit to how far you can bend the bars of convention—while you can place traditional key signatures anywhere in your music, for example, you can't create your own signatures with unorthodox mixtures of sharps and flats.



Arabesque

The quarter note in the lower left of the score window can be placed on the staff with a mouse click. The tool palette along the left side of the screen, the keyboard, and a MIDI keyboard provide other ways to enter notes on the score.

High Scoring

An important DMCS strength has always been the ease with which you enter your electronic score. To suit any taste, the program provides a variety of methods for accomplishing this often tedious task: you can click on a note or a rest with a particular rhythmic value in a screen palette and then position that note on the staff to enter pitch; you can use the Mac keyboard to select a rhythmic value and then click on a graphic that looks like a piano keyboard for pitch entry; or you can enter pitches from a real MIDI keyboard. And unlike some other scoring programs, DMCS doesn't force you to accept its decision about where a note should go—if you want it somewhere else, just drag it there. This simplicity and flexibility makes scoring with DMCS at least as easy as using any of the high-priced programs.

For playback, the program can drive the Mac's built-in four-voice synthesizer, and DMCS includes a large number of prefab sounds and a waveform editor for building your own. Obviously, you can't hear any more than four musical lines at a time with a Mac-only setup. Hook up a capable MIDI synthesizer or two, though, and this limitation is removed. Now DMCS lets you separately assign each musical line to any of the 16 MIDI channels, for true high-quality polyphony. With either playback method, you can turn individual staves on or off; change tempo or volume while the music plays; and set play style, such as legato or staccato, on a note-by-note basis. And DMCS can exchange files with MIDI programs so that you can print scores from sequencer improvisations, or use DMCS to add difficult-to-play passages to a sequence by scoring them in standard notation.

DMCS also provides an adequate set of page-layout controls for desktop music publishing, but don't expect your manuscripts to stand up to the scrutiny of a musicologist. You have control over margins, the distance between staves, and the number of measures per line (this last setting applies to the entire score). The

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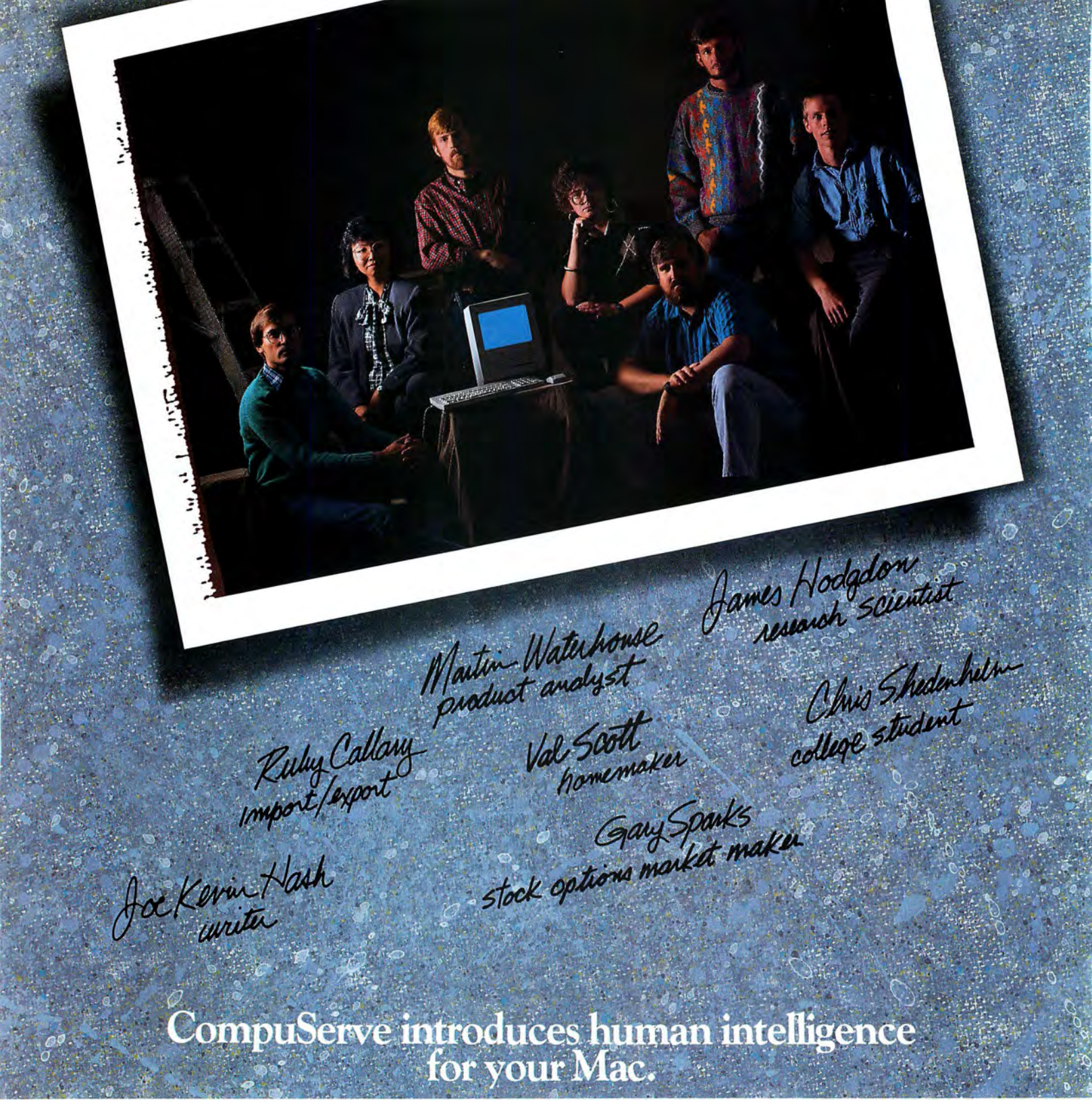

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biggest cosmetic problem I experienced was with note stems—they're all the same length, and stems from notes on adjacent staves tend to crash into one another. With an ImageWriter, DMCS produces eminently readable printed works; with a PostScript printer and the Sonata font your scores look beautiful, even if they won't pass a typesetter's muster.

What's missing? Now that DMCS can handle orchestra-size scores, probably the most pressing need is the ability to print the parts for individual instruments separately. As it is, printing is an all-or-nothing affair. It would also be nice to be able to drag any symbol around in the score—not just notes and rests—for placement just where you want it. And the program could stand some online help, particularly since the changes in version 2.5 aren't reflected in the manual.

DMCS is the only game in town if you're interested in using the Mac to write music in standard notation, and you aren't ready to fork over several hundred dollars for a high-end program. Whether you're just getting started with music, or you're a seasoned composer with an urge to test the waters of computer-aided composition, DMCS makes an excellent choice. —*Steve Cummings*

See Where to Buy or circle 718 on reader service card.

KODAK DATASHOW PRESENTATION REMOTE

Desktop Presentation Remote-Control Device

Pros: *Frees presenters from the tyranny of the keyboard; easy to install and use.*
Cons: *Does not control mouse pointer; not completely compatible with all presentation software.*
Company: *Eastman Kodak.*
Requires: *Mac SE.* ***List price:*** *$245.*

Presentation graphics software is changing the way people give presentations. These programs can produce on-screen, interactive slide shows with special effects that simply aren't possible with static media. While presentation software has the potential of making speeches and lectures more animated and lively, it can also make otherwise dynamic speakers seem dull and mechanical if they're tied too closely to the computer. The Kodak Datashow Presentation Remote is a hand-held remote control device that allows speakers to control their computer presentation from a distance of up to 35 unobstructed feet, freeing them from the tyranny of the keyboard.

The Kodak Datashow Presentation Remote system consists of a battery-powered remote controller—similar to those used with TVs and VCRs—and a mouse-shaped receiver to pass the remote infrared signals on to the Mac via the standard Apple Desktop Bus. You'll find it easy to install the receiver: just plug it in to your unused ADB port on the keyboard or on the back of the Mac and aim the receiver in the general direction of the person who'll be doing the presentation.

The remote controller has 18 buttons: four arrow keys, ten numbered keys, and four special-purpose keys. Two of the arrow keys advance the presentation to the next slide; the other two go back. The N key followed by a number tells the computer to proceed directly to that number slide. The SEL key followed by a number selects a special effect. The Remote offers several such effects: you can invert the display, turn the pointer on or off, show or hide a bullet-chart detail, or turn the automatic control of the slide show on or off.

The Fine Print

Unfortunately, these special functions only work if the presentation software has built-in hooks to support them. A software-compatibility chart, included in the package, details the compatibility of nine software packages: PowerPoint 2.0, More II 1.0, StandOut 1.0, Cricket Presents 1.0, Aldus Persuasion 1.0, MacroMind Director 1.0, Dubl-Click's ArtRoundUp 2.0 (a graphics DA included with the WetPaint clip art collection), FGM MacBriefer 1.0, and HyperCard 1.2. I tested the Kodak Datashow Presentation Remote with six of the nine software packages, and found the software-compatibility chart to be accurate.

Only More II supports all of the functions listed on the device; Persuasion's compatibility is limited to moving forward and backward through a slide show, and Cricket Presents supports only forward, backward, and random access. The other packages support most, but not all, of the special effects, according to the software-compatibility chart.

HyperCard is a special case. For most stacks, the Kodak Datashow Presentation Remote can only be used to move forward or backward, card by card. Since there's no way to control the location of the mouse pointer with the Remote, you can't click buttons to maneuver through complex, nonlinear stacks. But if the stack includes an external command called Hyper-XRemote (not included with the Kodak Datashow Presentation Remote, but available from Zone1 Software), you can activate the Remote's special effects and even write scripts to simulate pushing HyperCard buttons.

On with the Show

Does the Kodak Datashow Presentation Remote really make a difference in presentations? Since I've started using the Remote with More II and a Kodak Datashow Projection Pad in my class of over 200 students, I'm no longer bound by my

(continues)

STAN MUSILEK

The Kodak Datashow Presentation Remote weighs only 4½ ounces and is powered by two AA batteries (included). It can transmit an infrared signal up to 35 unobstructed feet and operates on ADB available power.

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equipment. Instead of fumbling with overhead transparencies or a computer keyboard, I roam around the front of the auditorium, glancing at the big screen only when I move to the next display; the Kodak Datashow Presentation Remote lets me focus on my audience. Compared to the cost of TV remote controllers it seems a bit expensive, but it's hard to argue with its utility. It has found a permanent home in my carrying case.—*George Beekman*

See Where to Buy or circle 749 on reader service card.

TELEFLEX 1.5.2

Phone-Handling System

Pros: *Extremely flexible software; easy-to-use scripting system; good tutorial and sample scripts.*
Cons: *Manual doesn't address configuring equipment following the initial test; requires dedicated Mac if not running under MultiFinder.*
Company: *Magnum Software Corporation.*
Requires: *Mac Plus; hard disk. 2MB RAM recommended.* ***List price:*** *Version 1.6 $2995.*

At their simplest, phone-handling systems route calls to an appropriate department and handle voice mail. Taken to their limits, such systems can screen calls by listening for and responding to touch-tone passwords, automatically forward important messages to another number, and conduct surveys or remind clients of upcoming appointments by placing calls from a database of names and numbers—all without human intervention. Unfortunately, because of their expense (frequently in the $100,000 range), you're likely to find these systems in use only by large companies. With the introduction of the Teleflex system, however, many small businesses can now have these same capabilities at an affordable price.

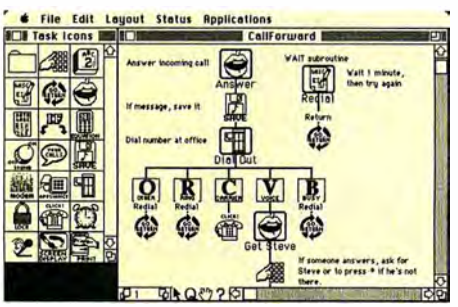
The Teleflex System

The Teleflex unit is a special-purpose, Hayes-compatible 300/1200–baud modem that connects to the Macintosh's sound port and either the printer or modem port. The unit is also connected to your telephone wall-jack, but a separate RJ-11 jack can connect your phone directly into the unit. Additional outlets are included for an external speaker (although the Mac's sound port works nicely) and an optional microphone.

All Teleflex activities are controlled by programs called scripts. Several working scripts are provided on disk—including examples of voice mail, a survey, and an order-entry system. Each script has a test mode that lets you see how it works without actually using the phone. The samples are well thought out and are invaluable aids to designing and debugging your own scripts. Teleflex comes with extensive software tools that allow you to make complex scripts that automate virtually any phone-handling activity—receiving incoming calls, placing outgoing calls, or any combination of the two.

Adventures in Scripting

Once you're ready to build a script, you run Teleflex Creator, which opens the Script Editor (see "The Teleflex Editor"). Creating a script is similar to programming with Double Helix II. You drag task icons from a palette and set options for each task by clicking your way through the icon's dialog box or typing. Getting a script to flow correctly requires logic, practice, and attention to detail. Luckily, Magnum has preset the task options so they already handle most common situations. It only takes an occasional glance at the manual and the online help to get past most obstacles. You don't have to be a programmer to create scripts, although it



The Teleflex Editor
Scripts are created and edited in the Teleflex Editor. Each script is designed in the form of a flow chart with lines between task icons. Like many programming languages, Teleflex also allows you to have subroutines (Redial) and named icons (Answer) that can be addressed with GoSub and GoTo commands.

STAN MUSILEK

The Teleflex phone-handling system

definitely helps to be able to think like one. Experience with a language such as BASIC will prove invaluable in understanding programming concepts like subroutines, error trapping, and so on.

Teleflex also allows you to record and edit speech and sounds to create customized messages. You can record through the telephone or a microphone, and you manipulate these sounds just as you do standard text files, by cutting, deleting, and pasting sound fragments. You can create Macintalk sounds from any text file, translate them phonetically to better emulate the human voice (the spelling looks funny, but words sound fine) and then tweak them to produce more appropriate inflections. You can then use any sound (Macintalk or recorded) to build your messages; you can even create Voice Merge files, which are customized with variables like Mail Merge files. Once sounds have been created, they can be reused and imported into as many scripts as you like. If you've forgotten what some sound files do, Teleflex includes N.S. Sound Player, a sound player DA.

Teleflex is able to differentiate between a voice, a dial tone, a busy signal, and touch-tone input, and can be programmed to make suitable responses to each—on a busy signal, for instance, it might hang up, wait one minute, and then redial. Once Teleflex detects a voice, most scripts will ask for a touch-tone signal from the caller to tell the script how to proceed. A script might suggest pressing one number to leave a message, another to transfer to a different department, or ask callers to hold if they wish to speak to an operator. You can also put a secret

(continues)

Disposable

There are a lot of removable storage systems that work today but are expensive disposable systems tomorrow. There will probably be a lot more.

There are a lot of fly-by-night mass storage companies that are here today but gone tomorrow. There will undoubtedly be a lot more.

There are a lot of "crash and burn" "at your own risk" "unbootable" and "unreliable" storage systems out there. There will frightfully be a lot more.

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code number in the script that, when it's pressed, immediately transfers you or a coworker to a routine for message playback, editing, or deletion—allowing you to check on messages or even change a script via telephone.

Making It Work

After you have saved and compiled a script, and it's ready for testing, you launch a second program called Teleflex Runner which takes a minute or two to read the script into memory. Teleflex can also be programmed to handle almost any type of situation—including responding to user errors or hardware problems such as a full disk. To protect a system from unexpected power shutdowns, you can set Teleflex as the start-up application; that way you can be sure that Teleflex is still handling the phones in the morning, even if there has been a shutdown in the middle of the night.

With Teleflex, imagination is the real limit. A manual two to three times the original's size would still scarcely hint at what you can do with Teleflex's 12 disks of software. Even after adding in the cost of a dedicated Mac and hard disk, Teleflex is a bargain for its intended purpose. *—Steven Schwartz*

See Where to Buy or circle 815 on reader service card.

PERSONAL ANCESTRAL FILE 2.1

Genealogy Program

Pros: *Fast; easy to use; inexpensive.* ***Cons:*** *Limited date format; limited search capacity; no user-defined fields.* ***Company:*** *Church of Jesus Christ of Latter-Day Saints.* ***Requires:*** *Mac 512K.* ***List price:*** *$35.*

Developed and marketed by the Church of Jesus Christ of Latter-Day Saints, Personal Ancestral File (PAF) was designed to make it easy to record, manage, and share genealogical information, or to create files for submission to the Church's Ancestral File. At $35, PAF is one of the least expensive genealogy programs available. It is also one of

the fastest and easiest to use.

I and two friends evaluated this program. One of us was an experienced genealogist but a novice Macintosh user, one an intermediate at both (me), and one a novice genealogist but an experienced Macintosh user. All three of us enjoyed using PAF and found it very useful, although we did find several areas for improvement in its standard forms and in its support of flexible searching and sorting functions.

A Welcome Addition to the Family

PAF is actually a collection of three separate programs: Family Records, which enables you to record genealogical information about your family; Research Data Filer, which enables you to enter information about individuals who may or may not be related, and to document your sources and other research information; and PAFcom, a communications program that provides a way to easily transfer and receive genealogical information electronically.

PAF is very easy to set up. Its supporting documentation is well organized and easy to understand, and includes a clear, concise quick-reference guide. There are two levels of on-screen help—brief prompts that define any given entry or activity, and full explanations of both fields and functions.

Family Records, the genealogical research program, is organized around Individual and Family records. You record information about birth, christening, death, and burial for each relation. Family records contain fields for husband, wife, marriage information, and children. When you add individuals to a Family record, their information is linked to that record. Entering a person as a parent of one family and also as a child in another links the families together, and they are listed in the Pedigree Chart that PAF generates.

We were easily able to enter four generations in our family's file. Entering up to 10 individual names relating to the current file on the Recall menu makes it easy to return to a person's record without having to search for it. And the Pedigree Overview enables you to print out a Pedigree Chart with up to eight generations of ancestral information, a real help in maintaining internal organization and consistency in your work. It is also possible to print an alphabetical list of all individuals and a Descendant Chart beginning with the oldest ancestor.

Another nice feature allows you to add up to 11 full pages of notes for each person in a family's file. These notes can be selected individually for inclusion in the printouts of family group records, or they can be printed out in full with each data sheet. These printouts are very clear and professional-looking; the charts are well laid out, easy to read, and easy to understand. The ability to either show on screen or print alphabetical lists, numerical lists, or Pedigree Overview charts is very helpful, and being able to print all related Family Group Sheets with an Individual's Pedigree Chart is a real treat. However, we would have liked to have the same on-screen and print options for the Descendant Chart as well, since many genealogists routinely exchange information and require printouts of such related groups of family records.

Life between the Lines

The first real problem that we encountered with PAF was that it accepts only exact dates; you cannot enter something like "between 1835 and 1845." This inability to reflect correctly all known information on our printed records seemed inappropriately restrictive. Much family research, after all, deals with such imprecise dates and time periods.

We found another annoying idiosyncrasy when we had to account for one of

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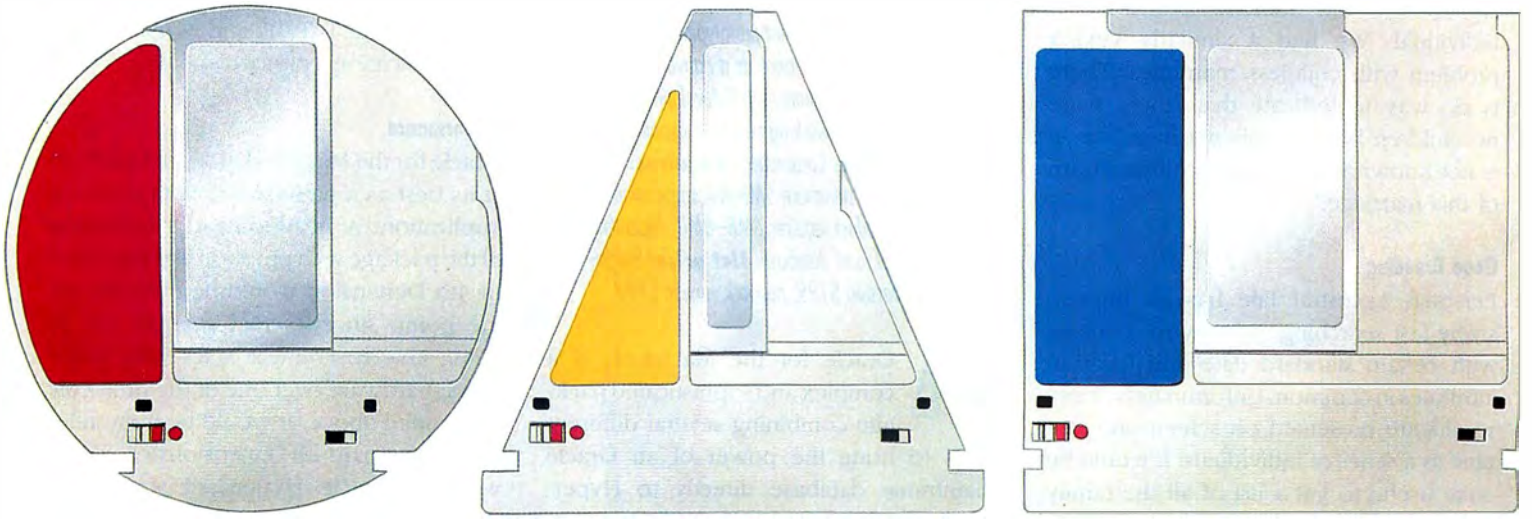
Do You Have The Standard...



The Infinity Optical Disk

You may not know that there is an ISO-standard for optical storage. This compatibility standard is essential for data interchangeability between second source vendors.

But some companies have jumped on the "optical bandwagon" with no knowledge of removable technology and have come out with non-standard devices.

Fitting a non-standard optical disk into another drive is like fitting a square peg in a round hole.

Luckily, there is one peripheral company that has been making removable drives since 1985 — PLI. And now the removable experts at PLI have introduced the Infinity Optical.

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our unmarried ancestors. Try as we might to enter "none" into her Spouse field on the Family record (leaving it blank would have implied that we did not know who her spouse was), the program refused to accept this information until we fabricated a spouse for her named None. Unfortunately, None then appeared on both our alphabetical and numeric listings as an individual. We had a similarly vexing problem with childless marriages. There is no way to indicate that "there were no children born of this marriage" or "it is not known if there were children born of this marriage."

Good Breeding

Personal Ancestral File has an impressively fast searching capacity for persons with certain standard date and location attributes in common. Unfortunately, these results are presented on screen one at a time as a series of individuals. It would be quite useful to get a list of all the family members who meet a given criterion. PAF also lacks user-definable fields for recording such things as occupation, religion, or military service. While this information can be entered in the notes, PAF's search feature can only look in the standard fields, so it is impossible to identify groups of individuals with any nonstandard attributes in common.

PAF's other two programs, Research Data Filer and Personal Ancestral File Communications, are equally well implemented and useful additions to a genealogist's toolkit. PAFcom makes it easy to share your data with other genealogists by including an Export option that creates a GEDcom file (a standard format for exchanging genealogical information), and a utility that converts the multiple-file format used in the MS-DOS and CP/M versions of Family Records into the single file the Macintosh version of PAF uses.

Genealogical research, like most families, is more about exceptions than rules, and it would be difficult to design a product that met everyone's needs. All things considered, Personal Ancestral File is a good, solid genealogical program for family research, more than worth its low cost.—*Jack Long*

See Where to Buy or circle 789 on reader service card.

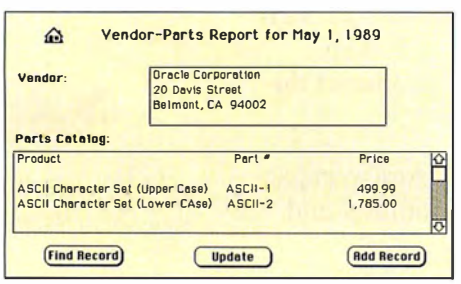
ORACLE FOR THE MACINTOSH 1.0

Database Development Package

Pros: *Only HyperCard-Oracle connectivity platform on the market; good network performance; useful design tools; excellent prototyping environment.* ***Cons:*** *Slow performance as a native database; missing some SQL functions; Pro C development requires patch disk; networking version is expensive.* ***Company:*** *Oracle Corporation.* ***Requires:*** *Mac SE; hard disk with minimum 5MB disk space available. Installed product requires 6MB–8MB, depending on size of local database.* ***List price:*** *Single-user version $199; network version $999.*

Oracle for the Macintosh is a complex and sophisticated package combining several different tools to bring the power of an Oracle mainframe database directly to HyperCard's back door. It is perhaps more important though to note what Oracle for the Macintosh is not. It isn't a power-user tool, nor is it a spreadsheet application or a productivity tool (although it can be used to create these applications and many others). In fact, Oracle defies categorization because there's nothing like it on the Mac market.

To do anything really useful with Oracle for the Macintosh you will need to know the rudiments of basic database design, Oracle's Structured Query Language (SQL), and HyperCard scripting. Fortunately, Oracle provides a rich environment in which to learn all three. Familiarity with Macintosh Programming Workshop can also come in handy.



Vendor Report
The Header-Detail report is shown in HyperCard. You use the Developer's HyperTalk script to connect this card to a native or networked Oracle database.

The developer's version of Oracle is a kind of appetizer: the more you use it, the more likely you are to think that your company needs to develop on (or buy) an Oracle relational database management system (RDBMS). If you're already using an Oracle database at your office, you'll need the networking version, which supports DECNet, TCP/IP, and asynchronous communications protocols.

Performance

Oracle for the Macintosh does not perform at its best as a native Macintosh database application. A head-to-head comparison of the package with products like FoxBase+ or 4th Dimension would be quite beside the point, since its real strength lies in being able to connect Macs with mainframe hardware over one of the protocols mentioned above. It would be more relevant to compare 4th Dimension or FoxBase with an Oracle HyperCard stack connected to a mainframe or minicomputer Oracle database. Connected to an Oracle RDBMS on a mainframe, Oracle for the Macintosh demonstrates powers that stand-alone Mac database programs won't have any time soon. Even though Oracle for the Macintosh can handle large databases residing on several computers, it is never going to seem very fast on a HyperCard Mac.

What's Inside?

The developer's version consists of seven disks containing the Oracle RDBMS kernel, related files, several HyperCard stacks, and an Oracle INIT. The networking version has two additional disks that contain Kinetics's TCPort, Alisa Systems' DECNet Driver, and Oracle's connectivity software and asynch protocols. The developer's version requires 5 megabytes of storage space. To accommodate installation and growth you should have at least an additional 2MB of RAM available.

Installation of the product is somewhat painstaking. Before you do anything, be sure to read the System Release Bulletin. This hastily assembled document tells you about some known bugs in the system and their workarounds.

(continues)

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Once you've installed the database, you can start playing with the HyperCard scripts. The Stackware manual provides a good introduction both to the stacks and to Oracle itself. Primer, Network, and Reference manuals are also included.

The Error Codes Stack is sometimes frustrating for TCP/IP network users because many frequently encountered TCP/IP error codes have been omitted. The System Stack allows you to create tables, and to perform general database administration and network and table maintenance. One shortcoming is that the SQL Lab does not support all of Oracle's SQL commands. Particularly frustrating is the absence of the Describe command in the SQL Lab.

Designing Applications for HyperCard

The heart of Oracle for the Macintosh lies in the execsql XCMD. Because HyperCard is a flexible and rapid prototyping tool, you will probably create your first application by passing the SQL command from within HyperTalk. Developers can also use the Pro C compiler to execute SQL statements from within compiled C code. Unfortunately, you must currently get a patch disk from Oracle Corporation before you can use this facility (this bug should be fixed in version 1.1).

It is also theoretically possible to pass SQL commands to an Oracle database via execsql in MacApp, Pascal, or C applications. Given the relative complexity of these approaches, the most convenient route is to start with HyperCard.

The creation of Oracle database tables is a fundamental and necessary step. Oracle doesn't allow much dynamic flexibility once a table is defined; changing column data types for tables that already contain data can be difficult.

For example, suppose you want to implement a simple inventory database consisting of two tables. The Vendor table will contain vendor-specific data (like name, ID, and address). The Parts table will contain inventory records.

One of the primary reports from this Vendor-Parts database would be a Header-Detail report (see "Vendor Report"). If you want to retrieve a vendor's name and address, and place all of the parts listed for that vendor into a scrollable field, you must execute the following SQL commands in HyperTalk.

```
Select Count from Parts where VendorID ="ID" ¬
    into Rows
```

Once the user has typed in a vendor name (or ID), this statement goes out to find the number of rows in the Parts table. The SQL count command returns an integer value. (An important assumption here is that a given part is supplied by only one vendor.)

```
Select PartName, PartID, Part$ from ¬
    Parts into "&&": line n of scrollable field: ¬
    where VendorID = "ID"
```

This SQL Statement retrieves the first record from the Parts table and puts it into the first line of the scrollable field.

```
repeat with x=1 to row
    execsql "Get next row"
    add 1 to x
end repeat
```

The last SQL command retrieves the remaining rows (the number of which we got from the first statement). The System and Demo stacks offer examples of HyperTalk scripts.

Wrapping It Up

To create a HyperTalk interface to Oracle for the Macintosh that's easy to use, you must use lengthy HyperTalk scripts. For complex applications, the size and speed of HyperTalk becomes the bottleneck in performance.

Reporting has always been a weakness for vanilla HyperCard. This becomes even more of an irritation when HyperCard works with a real database. Acius has promised that the new version of 4th Dimension for Oracle will have the execsql rewritten as an external procedure. This should make it easier to create and maintain reports, although the user interface will be less flexible.

Overall, Oracle for the Macintosh is a solid foundation for connecting Macs with Oracle databases. No other database vendor has yet provided a Macintosh connection to its RDBMS. Most important, this product represents a serious recognition of the Macintosh presence in the world of mainframe databases.

—Jeffrey J. Menz

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NISUS 1.01

Word Processor with Graphics Capabilities

Pros: *Powerful text-editing, search-and-replace, and macro capabilities; integrated drawing facilities, spelling checkers, and thesaurus; multiple undos; multiple editable clipboards.* ***Cons:*** *No automatic hyphenation or footnotes; sluggish screen refresh; limited keyboard shortcuts; inadequate tutorial.* ***Company:*** *Paragon Concepts.* ***Requires:*** *Mac Plus; second disk drive.* ***List price:*** *$395.*

The cover of the Nisus manual boldly calls this program "the amazing word processor." The list of more than 50 features on its packaging certainly makes Nisus sound amazing. In fact, Nisus might have the longest list of features of any word processor on the market. Many of these features, such as repeatable undo command, multiple editable clipboards, and search and replace in unopened files, would be welcome additions to any other word processor on the market. Even with this spectacular array of features, however, Nisus lacks too many basic functions to be considered world-class.

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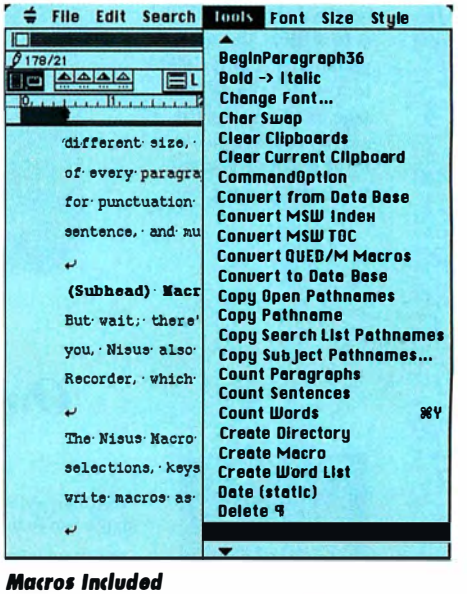
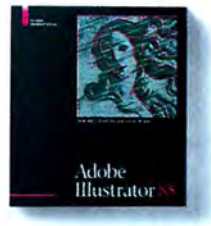
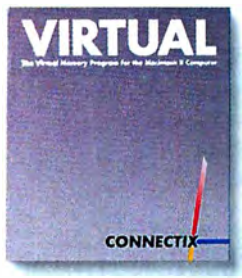


Macros Included

Macros are easy to create in Nisus, and over 50 predefined macros are included with the program. You can easily assign them to ⌘-key equivalents.

NOW YOU CAN RUN , , , ,  AND ALL AT ONCE.

ALL YOU NEED IS 

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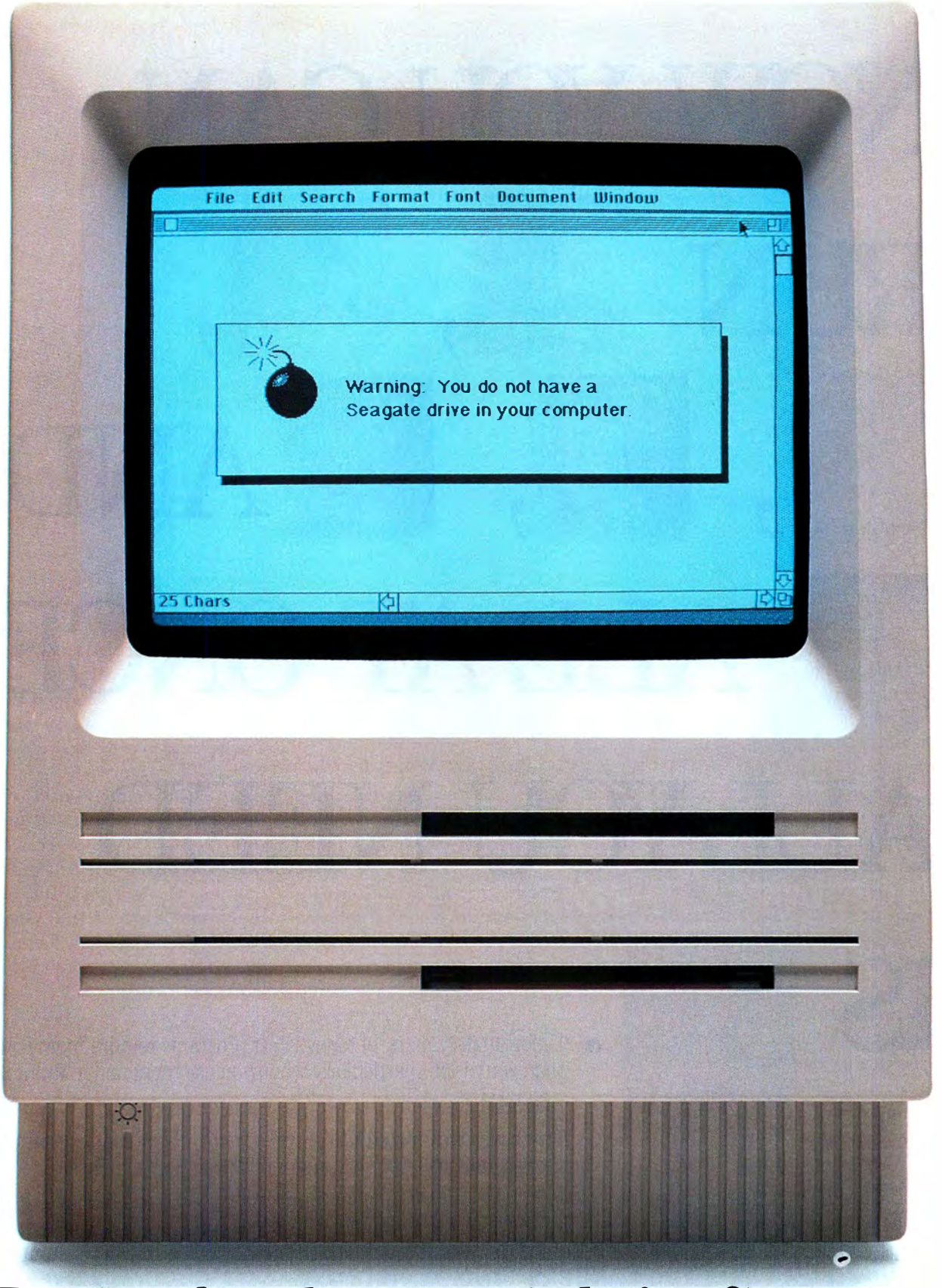

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Features? We Got Features

Multiple undos might be the best of the innovative and unique ideas that abound in Nisus. In most programs, you can only undo your last action. Nisus lets you decide how many iterations of undo you want. It is configured to remember the last 300 actions but is capable of remembering the last 32,767 actions, depending on available RAM. How many times have you wanted to undo an action that wasn't undoable? With Nisus, that will never happen again.

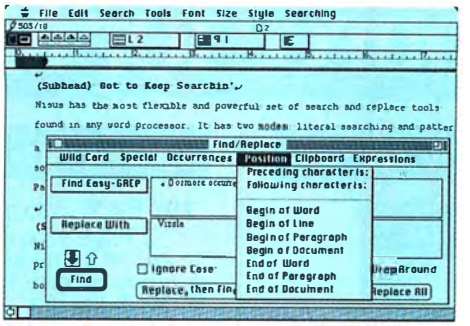
In addition to automatically saving your work at intervals that you define, Nisus also lets you create a backup file and save it into any folder on any mounted disk, every time either you or the program performs a Save. Pretty slick.

Nisus has the most flexible and powerful set of search-and-replace tools found in any word processor. It has two search modes: literal searching and pattern matching. Literal searchs find a word, phrase, or sequence of characters, and you can even restrict a search to words in a specific font, style, or size. Pattern matching is a little more sophisticated. It uses a language called GREP (Global Regular Expression Parser) and predefined symbols called metacharacters. Nisus uses a simplified subset of GREP, Easy-GREP, which is built into the Find dialog box, providing pull-down menus to make pattern matching easier (see "Searching with Easy-GREP").

Using Easy-GREP, you can find text in a particular size, font, or style and replace it with the same text in a different size, font, or style; change the first character of the first word of every paragraph to a specific size, font, or style; check your document for punctuation errors; find all capitalized words that don't begin a sentence, and much more. Because the program keeps an entire document in RAM, it's also incredibly fast. Unlike in Word, the Find dialog box in Nisus supports cut, copy, and paste.

But Wait—There's More

Nisus also includes a powerful macro language and an easy-to-use Macro Recorder, which can automate repetitive tasks. You can easily assign any macro to a ⌘-key combination. Unfortunately, unlike Word (or macro programs such as Tempo II and QuicKeys), Nisus won't let you use the Option, Control, Shift, or numbered function keys (the last two on extended keyboards) in its macros.



Searching with Easy-GREP

Nisus's powerful search-and-replace dialog box has pull-down menus to make finding and replacing easy.

Even so, the Nisus Macro Language is extremely powerful and can execute menu selections, key commands, or mouse clicks. You can either write macros as text or record by selecting Record Macro from the Tools menu. Over 50 macros are shipped with Nisus (see "Macros Included").

What's Wrong with This Picture?

Nisus has most of the features you expect from a top-of-the-line word processor: all standard styles plus double underlining, condensed, expanded, boxed, strike-through, and special user-defined styles; intelligent cut and paste; a variety of tabs and tab leaders; multiple columns; a spelling checker and thesaurus; a glossary; and macros.

So, what more could you want? Many menu items lack keyboard equivalents. Nisus provides a way—using a Preferences dialog box—to assign your own keyboard shortcuts, but you can only add ⌘-key equivalents, and many of these have already been assigned.

Style sheets are also sorely lacking. Nisus allows you to create user-defined styles, but these only include character formatting such as font, boldface, underlining, and point size. Style sheets, like those used in Word and PageMaker, also contain information about indents and tabs. The omission of true style sheets is, in my opinion, the biggest problem with Nisus. Of course, you could create a macro to format paragraphs any way you like, but that's more work than I feel is necessary.

Hyphenation is also a problem. Although Nisus has a relatively complete spelling dictionary, there's no way to automatically hyphenate a document. More disturbing is the fact that even if you add hyphens manually, words don't break at the hypen. The only way to get a word to break at a hyphen is to add a space after it. For example, the word *Mac-intosh* won't break at the hypen unless you type **Mac-** (space) **intosh**.

Other limitations include the lack of automatic footnotes (according to a Paragon representative, automatic footnotes will be added in the next major release); a somewhat sluggish response to typing, particularly at the bottom of the screen; and the fact that Nisus cannot open Word documents if they were saved using the Fast Save option.

The 15-page tutorial is too brief and the rest of the manual, while thorough, is more complex than it needs to be. The Easy-GREP and Macro chapters are particularly complicated. An intermediate and/or advanced tutorial dealing with these topics would be a welcome addition.

Finally, I encountered one nasty bug in versions 1.0 and 1.01. If you select more than a few words of text and then select Thesaurus from the Tools menu, you'll experience a spectacular crash.

Nisus is a diamond in the rough. Many of its features can't be found in any other word processor, and its powerful search-and-replace and macro functions will be valuable to heavy word crunchers. Indeed, for many writers, Nisus will be the perfect word processor—powerful and easy to customize. The lack of style sheets and hyphenation, however, make it unsuitable for much of the work I do as a free-lance writer.

On the brighter side, Paragon seems responsive to its users. Automatic footnoting will be added to the next major release, and true style sheets are being considered for the future. In spite of the current version's shortcomings, Nisus could, one day, turn out to be the word processor we've all been waiting for.
—*Bob LeVitus*

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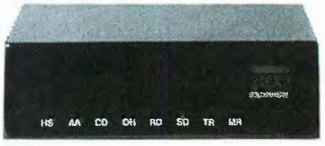

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DRAWING TABLE 1.0

Drawing Program

Pros: *Packaged with clip art; binds text to curves and shapes; offers on-screen preview; great scaling options; cursor shape indicates task being performed; saves arrangements of multiple windows.*
Cons: *No autoscroll; Undo is often disabled; each block of text is limited to one font and style; Alignment and Grouping functions are limited.*
Company: *Brøderbund Software.*
Requires: *Mac Plus.* ***List price*** *$129.95.*

Drawing Table is an exciting drawing program that's one of the least expensive around. It offers some truly innovative and sophisticated features and includes a terrific collection of public domain library symbols. However, it lacks some basic functions.

Palette and Tools Tour

The palette of tools in Drawing Table (DT) is clear and simple—a movable one-row strip. Among its neat newcomers is an arc tool that creates 90-degree quarter ovals and circles, which can then be converted to polygons for further manipulation. Because virtually any object can be converted to a polygon, the palette holds new tools for moving, adding, and deleting points of a polygon; a menu selection toggles polygons between Open and Closed, Smooth and Unsmooth (see "Arc to Pie Conversion"). Finally, at the bottom of the palette are icons for Rotation and Duplication (isn't ⌘-D easy enough.

Overall Surface of the Drawing Table

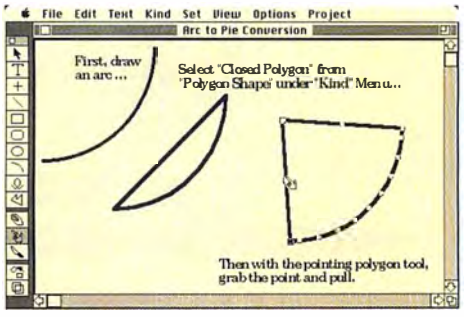
DT's clear Introductory Tour is help deciphering the program's cryptic titles (such as Kind and Set instead of Object and Arrange).

DT offers you six arrangemen for viewing any number of multiple windows, and you can save these arrangements, preserving the zoom level and view in each window—an invaluable feature for users who share a machine.

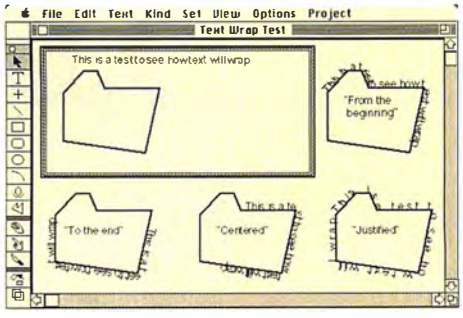
And no more unpleasant surprises such as thinking that you are resizing an object only to find that you moved it instead, or accidentally starting a new text block when you intended to edit existing text. DT's cursors actually change shape to identify the task that you are about to perform. Called Cursor Feedback, it puts to shame guess-what-you're-about-to-do pointers and I beams.

In another DT innovation, when you move the cursor over an object, a selection rectangle appears around that object. In the process of moving around the screen, however, the constant pulsing from one rectangle to another soon becomes annoying. Perhaps in the next version just the "handles" around the object could pulse. Fortunately, in the meantime this feature can be disabled.

The absence of autoscrolling is also annoying; to select objects larger than the viewing window you must zoom out. Furthermore, if the selection rectangle extends beyond the edge of the window, the selection is voided.



Arc to Pie Conversion
Does this pie look like a polygon? Changing this arc to a polygon does not physically change its profile; instead it increases your ability to transform its shape and combine features with other objects. Here I created a perfect pie wedge starting with the arc tool.



Binding Your Text Test
To bind text, first define a polygon, visible or invisible, that indicates a path for your text to follow. Select the text and the path, and choose one of the options for binding text. In this test I applied each Bind Text option to the same text and path.

Rearranging Objects and Text

Drawing Table allows only one font and style per text block, although the capability to handle multiple text styles within a text block is in the works.

It's best to create new objects using the default settings and then access multifeatured dialog boxes to initiate several changes at once. Combining the power of the multifeatured attribute boxes with the ability to copy style to another object can save time when creating design formats.

The program's most sophisticated feature is the ability to bind text to the perimeter of any shape that you convert to a polygon (see "Binding Your Text Test"). You can even combine text wrap with stretches and distortions. If you want to further edit the text, however, you will have to reapply all special-effects formatting.

Advanced scaling features include options for scaling objects by decimals or fractions; scaling fonts, lines, and borders; and positioning and placing scaled objects. There is also a multitude of creative distribution and alignment functions, but you can't align objects if any of them are locked, making aligning a new object to an almost completed drawing risky.

Some functions disable the Undo option. In the case of grouping objects, for instance, you might lose hours of work since grouping reorders the layers of a drawing but won't let you change back. Until these functions are improved, you should *save a lot* and do your final alignments and groupings in another program.

Priced below the competition, Drawing Table is a program packed with innovation and potential, not to mention free clip art. Still, despite the creativity that went into its complex features, Drawing Table remains weak with regard to certain standard drawing program features. If Brøderbund integrates such features as autoscrolling, alignment to locked objects, a more flexible undo function, and the ability to combine multiple text styles within one block into the next release of this product, the rest of the market had better watch out.—*Sharon Steuer*

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Circle 295 on reader service card

TGRAF-07/MAC 1.12.B.02

Tektronix 4107 Emulation Software

Pros: *Full-color emulation of Tektronix 4107 graphics; supports color hard copy of screens as well as black-and-white conversion for LaserWriters.* ***Cons:*** *Supports only Macintosh II Video Card and SuperMac's ColorCard; supports only AppleColor High-Resolution RGB Monitor; requires additional program for file transfers.* ***Company:*** *Grafpoint.* ***Requires:*** *Mac II; 2MB; AppleColor monitor; 256-color video board.* ***List price:*** *$995.*

Although there are many terminal-emulation programs for connecting a Mac to a mini or a mainframe, the number of graphics terminal emulators is much smaller. Grafpoint has addressed this shortcoming by introducing TGRAF-07, the first emulator that enables a color Mac II to act as a Tektronix 4107 graphics terminal.

Terminal or Computer?

I tested TGRAF-07 over 9600-bps asynchronous connections to both a VAX minicomputer and an IBM mainframe. TGRAF-07 faithfully emulates the Tektronix 4107 command set, including zoom and pan control, and I had no problem using standard commercial programs like SAS/Graph and custom-written programs that used Tektronix commands.

TGRAF-07 does not emulate the Tektronix 4107 terminal down to the letter, but it should suffice for most applications. And Grafpoint is forthright about the omissions; it provides a list of the Tektronix commands not supported by TGRAF-07, most of which are concerned with controlling 4107 terminal peripheral output.

First-time users of TGRAF-07 should pay special attention to which standard communications and graphics parameters for the terminal's operation are set in the Setup mode and which ones are set via the program's menus. Some parameters, such as baud rate and parity, can be set with either the Setup mode or the Comm menu, for example. However, only one set of parameters can be saved.

TGRAF-07 lets you connect the Mac to another computer in two different ways. First, there's the standard asynchronous connection via either a direct line or a modem; the program connects at speeds of up to 57,600 bps. Second, if the Mac is part of a DECnet network running on Ethernet, you can use TGRAF-07 through the virtual terminal support offered by TSSnet.

Staying Conventional

At first glance, TGRAF-07 looks like any other Mac-based terminal-emulation program. However, it doesn't follow all of the usual Mac conventions, and that can produce some confusion. For example, if you select a desk accessory when you're in TGRAF-07, the entire menu bar is grayed, leading you to think that no menu functions are available. Although TGRAF-07 has very few ⌘-key equivalents for its menus, they can be used to cut and paste graphics to the Mac Clipboard.

TGRAF-07 also uses as much of the Mac screen as possible, in order to be compatible with the regular Tektronix screen. However, the emulator's display window has no scroll bars, so you can't resize the window and set it aside to attend to something else.

TGRAF-07 is compatible with MultiFinder. If you leave TGRAF-07 running while you switch programs using MultiFinder, you won't see a window—instead, TGRAF-07 displays a small box with a drawing of a Mac II and the name TGRAF-07. Clicking on that box brings you back to TGRAF-07 from any other program running under MultiFinder.

Save That Picture

You can copy a mainframe-generated color graphics display to the Clipboard in PICT format for use in other Mac programs. Although TGRAF runs only on a Mac II with color support, you can save the color display as a black-and-white image. The default configuration converts the background to white and all colors except the background to black. If that's not good enough, you can use the Tektronix HCMAP command to designate which colors should be converted to black and which to white. Unfortunately, because HCMAP is a Tektronix command that's part of the Setup mode, you don't get any visual feedback of the color changes until you use the Copy Graphic (b&w) option and view the graphic in another application.

Window on a Mainframe
TGRAF-07 enables you to access any mainframe graphics program that generates Tektronix graphics commands. This screen shot illustrates a session with an IBM mainframe using the SAS/GRAPH Statistics and Mapping program. Both the map and the product data sets are stored on the mainframe.

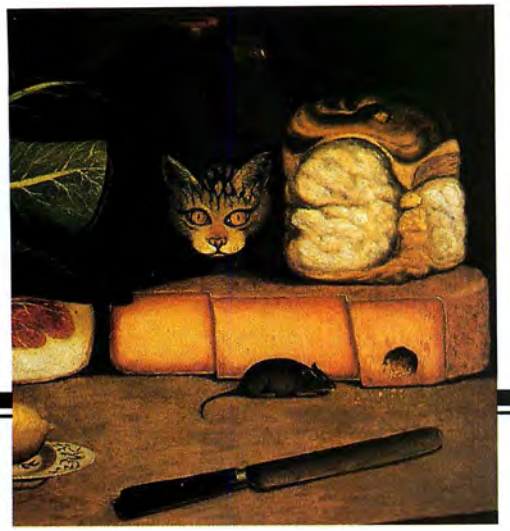
Because the 4107 terminal relies on special commands to generate its graphics, you can also save Tektronix graphics by having TGRAF store a series of Tektronix commands in a Mac file.

Sorry, No Transfers Allowed

TGRAF-07 is a fine emulator of the Tektronix 4107, but it lacks features usually found in other emulators for the Mac. For instance, although TGRAF allows you to send a stream of ASCII characters to the host, you can't transfer files using an error-checking protocol like Xmodem or Kermit (a public-domain file-transfer program from Columbia University). TGRAF-07 does come with a Mac version of Kermit, but I don't like having to rely on two different communications programs to complete a job. Taking into account this limited functionality for handling file transfers, I think TGRAF is over-priced. If you don't need all the features of 4107 emulation (such as zooming and panning of an image) and can make do with something like 4105 emulation, I'd suggest VersaTerm-Pro as a more cost-effective solution for obtaining and manipulating mainframe graphics.

—Dave Kosiur

See Where to Buy or circle 816 on reader service card.



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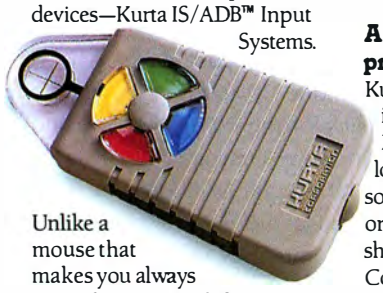

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Circle 83 on reader service card

MACBLAST 8.1

Mac-to-Mainframe Telecommunications

Pros: *Easy to use; fast proprietary file-transfer protocol.* ***Cons:*** *Inadequate documentation; no keyboard remapping on terminal emulations.*
Company: *Communications Research Group.*
Requires: *Mac SE.* ***List price:*** *$195.*

If you expect to connect your Mac to a variety of mainframes and minicomputers on a regular basis, you might want to take a look at MacBlast, which provides a unified link to a bevy of them—the DEC VAX and PDP, AT&T UNIX systems, WANG VS, Data General MV/AOS, IBM mainframes, the HP3000, and others. MacBlast also provides a scripting language for creating custom telecommunications routines, X.25 support, and a fast full-duplex proprietary file-transfer protocol. Its terminal talents include DEC VT52, 100, and 220 emulation as well as a TTY mode.

While MacBlast can accommodate most mainframe links, its short list of supported modems and some minor oversights in its terminal emulation implementations may require that you tweak the product a bit to fit your specifications.

Contained on a single disk, MacBlast takes only a minute or so to install. The program's interface is easy to use; you can click through a configuration, right up to dialing a system. You configure a link from the Setup menu, which contains five dialogs: general, connection, communications port, terminal, and file transfer. First you enter a description of the setup file, for example, "Connect to sales office"; the name of a script file (if any) to be executed; and the name of the log file you'll be using for a record of the session. Then you enter passwords, user ID, type of system you're calling (VAX, HP3000, VMS, UNIX), and the phone number. Next you select the port you're using, the baud rate, and settings for parity and protocol in the Communications Port dialog.

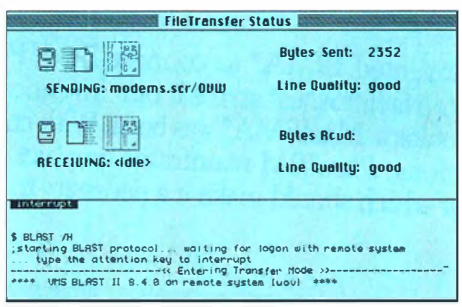
The terminal dialog displays choices for the DEC VT52, 100, and 220 terminals and a simple TTY terminal. You can select options to set local echo on, turn line feeds on or off, and set the line delay timing. MacBlast does support keyboard remapping on the DEC VT220 terminal emulation, but because there are no equivalent keys on the Macintosh keyboard, you must refer to the MacBlast manual for the corresponding key combination.

The information from all five dialogs is saved in one file when you select Save Setup. On subsequent connections selecting Load Setup and entering the name of the setup file will dial the system using the previously specified parameters. Once online, the program shifts to terminal mode, where commands for sending and receiving files can be initiated. During the transfer, a status screen reports on the line quality as well as the number of bytes being transferred.

Blasting Away

MacBlast supports Xmodem and the proprietary MacBlast file-transfer protocols. In sending and receiving files, I found the MacBlast protocol to be approximately twice as fast as Xmodem, speeding up file transfers by using a proprietary file-compression routine to compress data before it is sent. MacBlast's fast file-transfer capabilities can represent substantial savings on your phone bill, as well as a reduction in time spent sending files. If you use the MacBlast protocol, however, the host computer must use it too (versions are available for over 30 different minicomputer and mainframe operating systems).

If for any reason during a file transfer the connection is dropped, MacBlast can resume the transmission at the point of failure when you reconnect, resending only the data that wasn't received in the first place. And if you're really in a hurry, you can send and receive files simultaneously using the full-duplex file transfer.



Status Report
During a file transfer, MacBlast's file-transfer status screen reports the line quality and number of bytes sent.

MacBlast Scripting Language

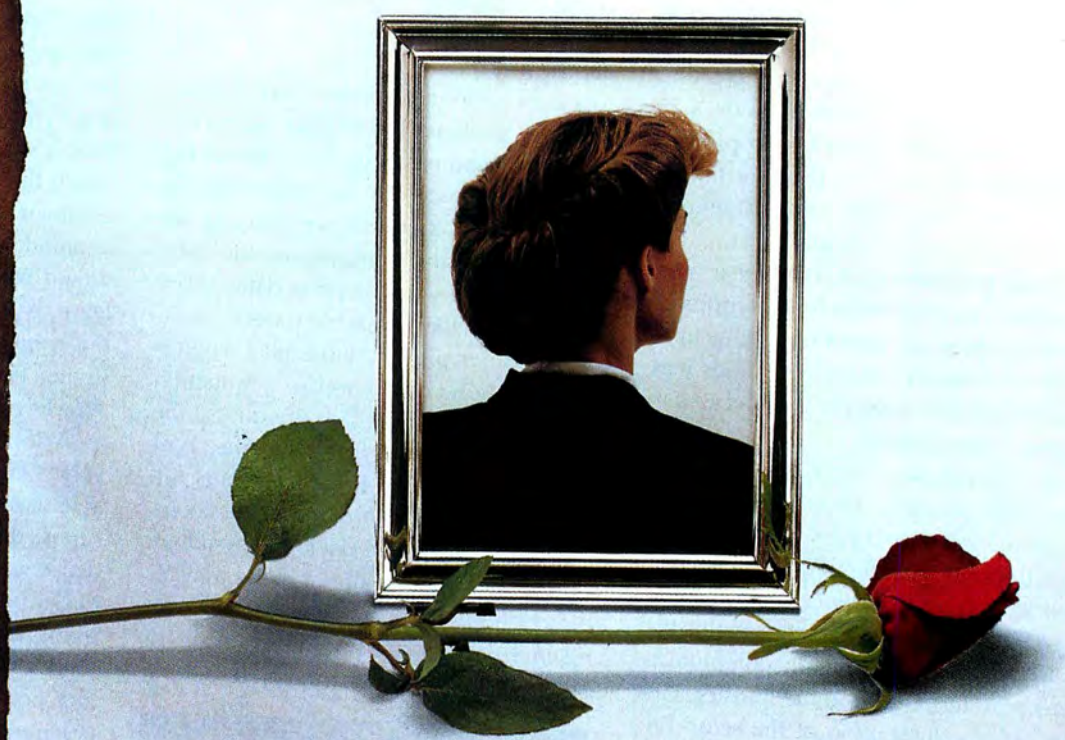
You can create sophisticated communications routines with the MacBlast scripting language. Well within its capabilities are applications for dialing up a mainframe from the field, uploading data, dialing another mainframe, and downloading data. You can use MacBlast's language to eliminate much of the repetitive reentering of commands needed to perform regular tasks. Its language syntax is similar to BASIC's, including commands for IF-THEN logic, GO TO flow control, string control, and commands for passing status information as well as for opening and reading files. Some of the commands, though, such as COMP_LVL (for turning on and off file compression) and @7BITCHN (for specifying 7 bits per channel) are not exactly easy to understand or remember. You'll find some examples of how these commands are used in the manual, but additional examples of useful routines would make MacBlast scripting easier to learn. A simple script editor is provided, but you can use any editor capable of saving text-only files, such as Microsoft Word or MacWrite.

With the exception of the Hayes and Hayes-compatibles, the modems that MacBlast supports (that is, the ATT2412 series, the ATT4000, Concord 224 Autodial, Concord 296 Trellis, Telebit FastLink, Microcom 9600, Racal Vadic 3451, and Racal Vadic 9600) are not typical of the kind of modems you're likely to find attached to a Macintosh. And just what is covered under Hayes compatible, which frequently varies as to degree of compatibility, is not detailed in the MacBlast documentation. It would have been better to list which Hayes compatibles were tested and are supported.

As a first shot at the Macintosh telecommunications market, though, MacBlast offers some formidable features. Its mainframe and minicomputer connectivity talents—along with the speedy MacBlast protocol—offer a good value.—*Ken Smith*

See Where to Buy or circle 754 on reader service card.

Before Adding MacIRMA To Your Workstation Communications File, Remember That Necessity Isn't The Only Mother Of Invention.



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PC WEEK

DCA Enhances Mac-to-Mainframe Offering

New MacIRMA Emulation Board Includes Background File Transfer

By Tara Sexton

Digital Communications Associates Inc. (DCA) last week expanded its Macintosh-to-mainframe connectivity options with a new version of its MacIRMA 3270 terminal-emulation board.

The MacIRMA 1.2, which is compatible with the Apple Macintosh II, IIx, SE, SE/30 and Macintosh IIcx, announced last week, offers a wide range of new [illegible] including background file

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DCA (MacIRMA)

'A Announces API fo
ac Irma Card Users

bert Snowdon Jones

PC WEEK

Mac-to-Mainframe Connectivity

Using the Mac as a Front-End Processor to an IBM Host

Company's financial data

3270 coaxial connection

MacIRMA board

MacIRMA API software

Accesses host-based data and generates monthly financial reports

Using Digital Communications Associates' MacIRMA board and software tool kits from DCA and Apple, programmers can create custom applications in which the Mac serves as a front-end processor to the host. An application might, for example, let the Mac automatically collect host-based financial information, produce monthly financial reports. The Mac could access the [illegible], compile it in a graphical format, automatically send the [illegible] a predetermined list of [illegible]

DCA's Mac Irma Graphics permits users to access IBM mainframe graphics applications from the Mac II and Mac SE, cutting and pasting between those applications and Mac programs.

JUDITH PISHNERY

DCA Unveils Graphics Emulation for the Mac

Lets Users Access IBM Mainfram[illegible]

BY LAURIE FLYNN

Mac users are no longer locked out of IBM mainframe graphics applications after last week's announcement of emulation software from DCA Inc.

The program, called Mac Irma Graphics, is used with DCA's Mac Irma card for the

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PROTOTYPER 2.0

Software Development Tool

Pros: *Can quickly design an operating mock-up of a program and generate source code in C or Pascal; handles buttons, icons, pictures, scroll bars, menus, pop-up menus, radio buttons, and check boxes.* ***Cons:*** *Generated code not optimized; inconvenient to make changes once you start programming; designs applications only.* ***Company:*** *SmethersBarnes.* ***Requires:*** *Mac Plus; second disk drive.* ***List price:*** *$295.*

When Prototyper 1.0 was first introduced in 1987, Macintosh software development suddenly became much easier. Where once you had to construct windows, buttons, and scroll bars using Pascal or some other programming language, with Prototyper you could actually draw them on the screen, just as you might draw pictures with MacDraw. Even better, Prototyper would also write the skeleton of a program for you, saving hours of programming time. There were a few things missing, though. For example, Prototyper created only Pascal programs, and it didn't include some newer Macintosh features such as hierarchical menus and pop-up menus. And some things were still difficult or awkward to do.

SmethersBarnes has released Prototyper 2.0, a new version complete with new features and a bigger manual. It also costs a bit more. Was it worth the wait?

Software Design

Because it requires an understanding of how the display will communicate with the user and how the user will respond to it, the user interface has always been the most challenging part of a Mac program to design. Prototyper is a tool that helps software designers define the user interface. You can create pull-down menus, windows, and dialogs in which you place buttons, check boxes, scroll bars, and lists. You can then specify, to a limited degree, how these objects behave. For example, you can specify that the menu item New will open a window, or that the button marked OK will close a dialog box.

Once your prototype works the way you want it to, Prototyper writes the skeleton of the program. Version 2.0 generates source code for Lightspeed Pascal, MPW Pascal, TML Pascal II, Lightspeed C, and MPW C 2.0 and 3.0. In addition, Prototyper generates both the source file for RMaker, Apple's resource compiler, and a fully compiled resource file containing all the window and control definitions. With the look-and-feel part of your program written automatically, you need only write the part of the program that does the real work: number crunching, database filling, or picture drawing.

Learning with a Professional Tool

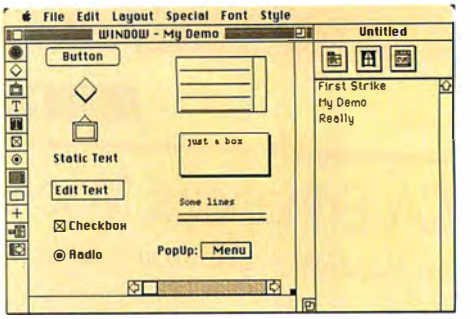
Prototyper 2.0 lets professional software designers or developers quickly sketch out the overall appearance and behavior of a program. You can, for example, select from six window styles, and five dialogs and alerts.

Prototyper provides you with a complete palette of objects—including push buttons, icons, pictures, static text and data entry fields, check boxes, radio buttons, scrolling lists, and scroll bars—that can be placed in your windows. You can also draw a variety of lines and boxes.

For a programmer or developer, the code generated by Prototyper is a convenient base upon which to build an application. Prototyper produces a collection of program modules: one for each window or dialog; two to handle the menus; and one for the main event loop, which handles nearly all the toolbox events, passing them to the appropriate window modules for handling. For example, the main event loop will recognize a mouse-down event and pass it to the window in which the mouse button was clicked. Having this code automatically generated eliminates a lot of programming time.

Nothing's Perfect

Even a tool like Prototyper 2.0 has its drawbacks. Although the program skeleton that Prototyper creates will work under MultiFinder, it does not take advantage of MultiFinder's advanced features, such as multitasking. In addition, while the prototype might have behaved properly, the resulting application might not. For example, the flashing insertion point in a data entry field might not flash the way it's supposed to. The generated code, though consistent and easy to understand, is ugly. In many cases, Prototyper creates repetitive blocks of similar code rather than combining them all into a single do-loop. And finally, Prototyper can create only applications. If you are building a desk accessory or driver, you're on your own.



Prototyper Window Layout
On the far left is the palette. Scattered across the face of the window are the various objects that you can create.

These are, however, minor problems easily corrected by any programmer. For most developers, the problem of updating the design is more serious. Few designs are perfect on the first attempt. If you refine your prototype and regenerate the code, you will have to redo any changes you had made to your previous version. This can be tedious and can aggravate any mistakes you might make, such as miskeying a line or omitting a function call. Still, it's easier and cheaper to make changes to code that works than to rewrite major chunks.

Tantalizing Possibilities

Overall, Prototyper 2.0 is an improved version. In addition to its new features such as hierarchical and pop-up menus, many of version 1.0's features were refined. It is now easier to position windows and buttons precisely, and you have more options for defining how controls behave. The problems, though annoying, are minor.

Actually, Prototyper's biggest problem might be user expectation. Given any application that provides this much power and flexibility, we always want more.
—*Ken Takara*

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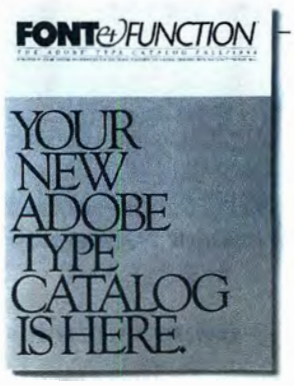

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MACINTOSH COMMUNICATIONS PACKAGE

2400-Baud Modem and Software

Pros: *Minimizes the hassles of getting online; five-year warranty.* ***Cons:*** *External power supply.* ***Company:*** *Practical Peripherals.* ***Requires:*** *Mac 512KE.* ***List price:*** *$299.*

Using a modem to connect the Mac to another computer can be an endlessly fascinating adventure. But dealing with mysterious terms like baud, parity, stop bits, X–On, and X–Off can also make it a long and confusing journey for the novice. Sometimes the confusion starts before you even get home from the store, especially if the salesperson isn't sure what cable should go with the modem you're buying. Practical Peripherals has tried to make the process as painless as possible with its Macintosh Communications Package. The package contains a 2400-baud, Hayes-compatible modem, a cable that you can connect to any Mac, and Software Ventures' MicroPhone 1.5, an excellent program.

Putting It Together

Setting up the Communications Package is a snap. Practical Peripherals has included a clear, step-by-step installation guide specific to the Communications Package, the operating manual is fairly well written, and technical information is presented in a straightforward manner. The modem is designed to sit under a desk phone. Seven LEDs indicate modem status. Modem configuration is done via software, instead of with DIP switches, and the settings are stored in nonvolatile RAM, so they are remembered even when the modem is switched off. The modem cable supplied is actually a cable and an adapter; together they connect the modem to a Macintosh Plus, SE, or II. To use the modem with a 512KE Mac, you just remove the adapter from the end of the cable. The only thing that I found annoying about the hardware was the modem's external power supply. It's a square box with a plug on it that invariably takes up two spaces on your plug strip. Included in the modem package are trial subscriptions to CompuServe and the Electronic Official Airline Guide.

Copying the MicroPhone software from the master disk to a floppy or a hard disk completes the setup. MicroPhone 1.5 comes with the Macintosh Communications Package. Upgrades to MicroPhone II are available from Software Ventures.

MicroPhone 1.5 is an excellent, full-featured telecommunications program. Considered one of the best in its class since its release in 1985, the program is easy to use, powerful, and comes with a good manual. The manual is showing signs of age, though, and could stand to be updated to address newer Macs and advances in the field. MicroPhone has good scripting capabilities, which allow you to completely automate online sessions. The Watch Me function records your actions and replays the session automatically. The software comes with several documents programmed to access some of the different online services like CompuServe, MCI Mail, The Source, Delphi, and Dow Jones News/Retrieval Service.

On the Wires

The modem worked flawlessly with MicroPhone and also with several other communications programs, including Red Ryder, Smartcom II, Connect, and CompuServe Navigator.

The inclusion of the cable and proven, excellent software makes the package a good value.—*Tom Negrino*

See Where to Buy or circle 759 on reader service card.

STAN MUSILEK

Practical Peripherals' 2400-baud modem

SNAP 3.0

2-D CAD for Architecture and Engineering

Pros: *Commands and file format similar to Intergraph; reference files for group work; fast redraw; virtual windows; digitizer support; stroked and raster text; built-in plotter support (and cross-hatching); accounting and bill of materials information; EPS and PICT export.* ***Cons:*** *Nonstandard Mac interface (lacks tool palettes and some standard Mac menu choices); color choices few and difficult to access; no 3-D features; no IGES or DXF support; limited tangent and line styles.* ***Company:*** *Forthought.* ***Requires:*** *Mac Plus, 1MB RAM. Mac II and hard disk recommended.* ***List price:*** *$395.*

From the first moment Snap appears on the monitor, it doesn't look much like other Macintosh CAD programs. In some ways, it doesn't even resemble a Macintosh program at all.

Unusual Interface

In contrast to the average CAD package, Snap does not have tool palettes with icons for manipulating and drawing objects. Although operations are normally executed from the pull-down menus, Snap's operations are modified with user definable options, which also deviate from Mac standards. Print is not in the File menu, for instance, and there's a separate Output menu for selecting the output device (printer, plotter, or PICT file) and page setup. Nor can you select Cut, Copy, and Paste from an Edit menu. Instead, these commands are built into Modify, Fence, Text, and Geometry menus. Even the drawing actions differ from common Mac drawing practice. Instead of clicking on a starting point and then dragging to another set point to create an object, you click on a first point, click on a second point, and then often have to click again to confirm your choices.

These deviations from the Mac interface standard are not random. Snap takes its cue from the popular mainframe/minicomputer/workstation CAD software made by Intergraph. Although not a well-known

(continues)

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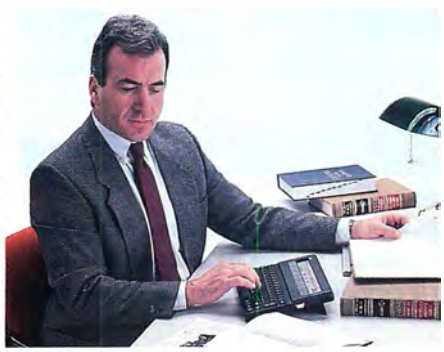

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name in personal computer circles, Intergraph is often ranked as second only to IBM in selling CAD software for larger systems. Snap's command set is similar enough to Intergraph's that training on Snap can ease you into using Intergraph software. Translating files between Snap and Integraph is clean and complete. (That cannot be said for the somewhat loose IGES standard used as a go-between for other CAD packages.) Forthought sells Snap+, an IGES translation utility, for $195.

I found Snap difficult to use at first, partly because I am accustomed to the MacDraw-style interfaces of other graphics programs. Sooner than I expected, however, I caught on to the Snap style and liked it—though I do miss the tool and color/fill pattern palettes.

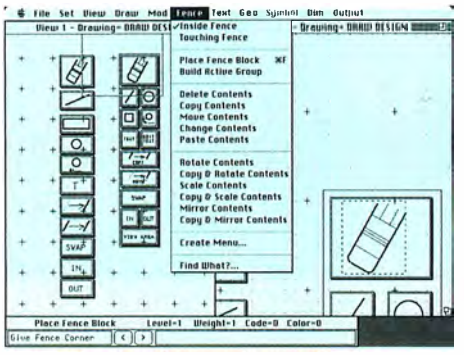
Sophisticated Commands and Unique Features

After learning the basics—how to use the Draw menu to draw lines, boxes, arcs, ellipses, and the like with both mouse input and typed numeric values—I discovered some sophisticated commands and some unique features.

The sophisticated category includes stroked (vector) or raster text; auto-dimensioning; cross-hatching; filleting, trimming, and tangent drawing; snapping to selected points on the grid; and rotating, mirroring, and scaling objects. The Symbol Library menu lets you create and use nested object symbols. There are also a number of plotter options and controls built into Snap (some programs only tack them on as a utility). With version 3.0 you can import or export PICT files and export EPS format. Snap also supports the QMS ColorScript 100 color PostScript printer. Finally, you can export tab-delimited files for use in bill-of-materials work.

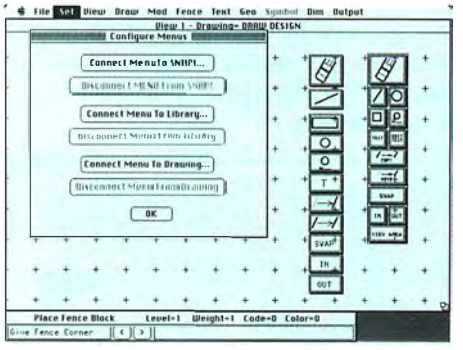
One unusual feature allows you to track the number of hours spent on a drawing as well as employee, job, and department numbers. Snap's Reference Files feature lets you create up to five drawings to use as overlays on a single background drawing. (Intergraph systems allow up to 32 overlays.) These overlays are above and beyond the 64 layers or *levels* you can have in each drawing. In addition, Snap provides *seed files*, which you can save with your own settings for drawing units, accuracy, custom menus, and symbol libraries—that act as the cornerstone for future drawings. What's more, while drawing you can jump back and forth between two different views of a single sketch and set each view at a different zoom value. You can also simultaneously show two views on a single screen or on two different displays.

If you use Snap's Virtual Windows option, each view is saved as a bitmap, and switching between views is nearly instantaneous. Virtual Windows does use more memory, however, and can be a bugbear if you are set for 256 colors but have only a few megabytes of RAM. Even though Snap 3.0 asks for 873K, I allowed 1500K when first starting, and I could not start Snap on a 5MB Mac II until I cut back on the number of colors I wanted and turned off the virtual windows.



Fences

Although Snap lacks typical Mac interface tools such as scroll bars, it does have efficient and practical handles for manipulating a drawing, including a Fence menu (with commands for copying, scaling, rotating, and mirroring) and two views with different zoom values of a single drawing.



Menus

Snap 3.0 can employ new graphic menus for digitizers or on-screen use. You draw the menus and then link them to a drawing, a symbol library, or to Snap itself.

Snap now handles Kurta ADB tablets and lets you create your own digitizer menus. You can also create menus for use on screen. You can attach a menu—such as the tool palette menu—to Snap itself, to a particular drawing, or to a library.

A unique Snap feature, as far as I know, is the Fence menu. You can draw a marquee around an area of a drawing and then copy, move, delete, rotate, or scale that area. Version 3.0 adds the capability to search within a fence for drawing parts such as lines, buttons, text, and groups.

Assets and Liabilities

Although Snap supports full color, the colors are not easy to use. (I found Snap's color features limited and difficult to get at, though adequate for standard drafting tasks. With the right hardware, however, you can choose from a full 256-color palette.) Some of the other drawing commands—such as the tangent command, which can only draw to a given point, not to an arc or another object; or the limited choice of line styles, widths, and terminators—are not as complete as in other drawing programs. And not offering any 3-D capabilities whatsoever is a liability—particularly in architectural and mechanical drawing applications.

Snap 3.0 is fast, is written in MacForth, and has all the basic commands you'll need for 2-D sketching. Its similarity to Intergraph programs, along with its optional file-conversion utility and drawing-group features such as Reference Files and Accounting Data File, make it a natural for large corporations and Intergraph shops. Cross-hatching, fencing, numeric input (which AutoCAD users will like), powerful symbol libraries, dimensioning commands, and customization for tablets will appeal to drafters in any environment. (Desktop publishers will like the EPS output.) The interface boasts fast redraw times, virtual windows, and automatic repetition of commands. However, Snap's different look from other Macintosh drawing programs might hamper your ability to get up to speed quickly. And if you're

(continues)

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interested in IGES or DXF file work, you won't find support here. Snap could also use some online help information. The manual is thorough and does have a lengthy tutorial, but it does not explore some of the more sophisticated and unique features of the program.

But $395 is a reasonable price for a professional CAD program; I recommend Snap to large groups that have experience with Intergraph and have existing Intergraph files, and to others willing to live with an unusual interface and no 3-D abilities.—*Phillip Robinson*

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NEAR MISS 1.0

Air Traffic Control Simulator

Pros: *Challenging game, requires thinking ahead; many levels keep interest alive.* ***Cons:*** *Sameness of tasks renders game one-dimensional.* ***Company:*** *Simon & Schuster Computer Software.* ***Requires:*** *Mac 512K.* ***List price:*** *$39.95.*

Two 747s, each carrying a full load of passengers, soar at 3000 feet, blissfully unaware of each other—even though in another 30 seconds they will converge at the same point. Not to worry. The faithful air traffic controller has them on the screen and calmly directs one to make a 45-degree turn.

It goes like clockwork, so I lean back in my chair and rest a few seconds. That's a mistake. No sooner has the plane turned from one hazard than it slams into a mountainside with a crash that can be heard clearly in the control tower. A metallic voice announces my mistake, and a box display offers me the choice of resigning or being fired. The game works with voice and sound on a Mac 512K, Plus, and SE. On the II, you get color and sound, but no voice.

In real life, one such lapse could undo a career's worth of good work; but playing Near Miss, you can at least start over. And as you gain experience, you feel as if you've actually qualified for duty—stiff neck, sore eyes, and all.

In Near Miss, players direct as many as 60 jets, propeller planes, and helicopters. Some must take off and land, while others must simply be vectored safely through your jurisdiction. But in the meantime, you must guide your charges around mountains and towers, away from stormy weather, and clear of restricted zones.

On the Job

The game's display is split between a radar grid on the left side of the screen and the Air Traffic Schedule on the right listing all flights expected on your shift—with altitude, current heading, and final destination. Below this are control boxes for changing altitudes and ordering turns from 45 to 180 degrees.

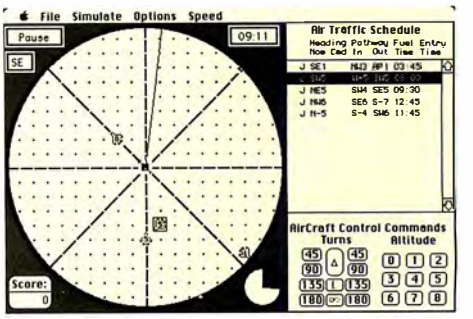
At the outset, you determine the difficulty of the job by setting the weather conditions, the hazards to be faced, and the number of planes and helicopters in the air. Depending on how you configure the game, up to five airports will be in your jurisdiction.

Strategy

The key to success is advance planning. Study the Air Traffic Schedule and get a vision of where planes will be. That way you can steer them well clear of each other before the situation becomes critical. Some situations will be easy—a jet might come in from the south at 3000 feet and have to leave via the north at 5000. No problem. You simply click 5 in the altitude control box at the bottom of the screen to take the jet up to 5000 feet.

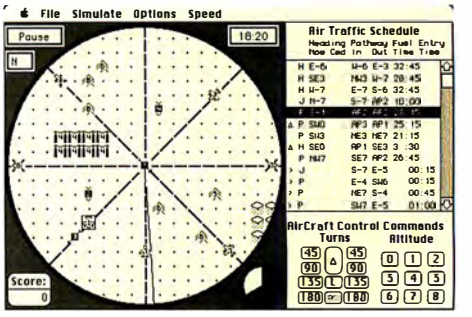
The best plan is to take care of the simple flights first, and then weave the more difficult flights around them. It's tempting to steer planes toward the center of the screen, where just one turn puts them on final course. But it's better to avoid congestion by routing as many flights as possible along more leisurely pathways.

Just getting flights to their final destinations isn't enough. Points will be deducted if you fail to avoid bad weather, restricted zones, and other planes. It's vital to remember jets travel twice as fast as propeller planes and four times as fast as helicopters. This holds true not just for forward



Wrong Heading

Two jets at 5000 feet, on course for a near miss. On the right is a listing of all expected flights with altitude, current headings, and final destinations. Below is the control box, where you change altitudes and order turns.



Flying High Now

At the more advanced level, helicopters, prop planes, and jets must be maneuvered around mountains and towers as a thunderstorm moves in from the southeast. The radarlike screen displays the aircraft currently in the controller's jurisdiction. Numbers on the planes, hill, and towers show their elevation or altitude.

speed, but for altitude changes and turns. For example, it takes a jet 15 seconds of game time to turn 45 degrees or climb or descend 1000 feet. A propeller plane does the job in 30 seconds and a chopper in a full minute.

But Is It Captivating?

At the more complex levels, Near Miss really gets hairy. The multitude of options provide more than enough challenges to keep you playing for weeks. At the same time, the similarity of the various tasks renders the program somewhat one-dimensional. After gaining basic proficiency, a player might not be captivated enough to keep coming back.

—*Robert Buderi*

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WINDOW SHOPPING

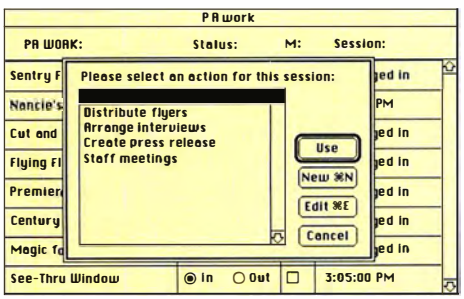
by Lawrence Stevens

This month, I look at a program to help you keep track of time, a business forecasting program, two helpful utilities, and a tutorial on Persuasion

TimeMinder

A number of recent studies have shown that executives rarely know exactly how they use their time. In many cases, so much of the day is spent sitting in useless meetings, dealing with unimportant interruptions, and looking for things, that the average business person spends only about 35 percent of the day doing productive work. If you want to keep track of how you while away your hours, either for increasing productivity or for billing purposes, TimeMinder ($299) can help.

The program can be configured in different ways. If, for example, you wanted to use it for billing, you would create a separate file for each client. Each file contains a list of projects, consisting of activities, for which you may specify hourly rates. As you go through the day, you tell the program when you are working on an activity by clicking the timer button in either the TimeMinder program or the DA



TimeMinder Timer Window
You can turn the TimeMinder timer on and off. In the above example, the In radio button for the See-Thru Window account was clicked. The program displays a list of activities. When you have finished working on the activity, you again go to this window and click the Out button. The program keeps track of how much time you have spent on this activity.

RON CHAN

(see "TimeMinder Timer Window").

When you are ready to invoice, open the customer's file and choose Print Invoice. The program then prints—on a customized form—a bill that either lists or summarizes all projects and activities.

TimeMinder also provides a wide range of reports. TimeMinder can summarize the time, costs, and profits for each project, or generate a list of all projects that meet certain criteria. For example, you can see all projects whose total time, costs, or number of sessions are equal to, less than, or greater than a particular number. You can view a listing of all projects due on a certain date or those that require a specific activity. Most of the data contained in the reports can be displayed or printed as a line, pie, scatter, or bar graph.

The program automatically posts invoiced amounts to a ledger. If you enter customer payments as they are received, the ledger can also provide a list of all outstanding bills.

TimeMinder is similar in function and price to Timeslips III by Northedge Software, except for one basic difference: TimeMinder assigns a separate file to each client, allowing you to store an unlimited number of clients; Timeslips III's data is stored in the program itself, and you are limited to 2000 clients.

If you don't expect to juggle more than 2000 clients at one time, Timeslips III is more convenient. For example, to print bills with TimeMinder, you have to open each client's file individually and print that client's invoice. Because Timeslips III stores all the data in the same place, it enables you to print all your clients' bills in one operation.

Powermenus

The more I use my computer, the more I yearn for ways to save seconds and minutes by installing such things as macros, autodialers, and function keys. But even so, it's hard for me to believe that Powermenus ($79.95), which makes the menu bar appear wherever the cursor is, will really save me a significant amount of time. First of all, moving my cursor up to the menu bar never seemed very time-consuming. Second, with Powermenus you must either triple-click or Option-click to make the menu appear; you also have to wait a split second for the menu bar to drop, so I doubt that using it is any faster than moving the cursor to the top of the screen.

Powermenus does come bundled with eight simple but useful Powergadgets. One, called Alarms, signals and displays a reminder message on the screen at a specified time. Applications (which works only with MultiFinder), DAs, and Win-

(continues)

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WINDOW SHOPPING

by Lawrence Stevens

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TimeMinder

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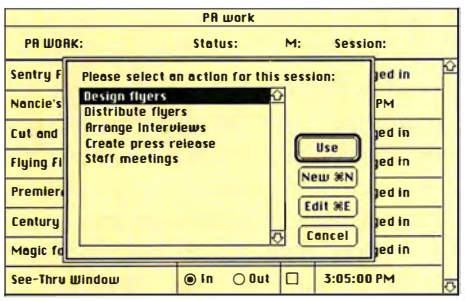


TimeMinder Timer Window

You can turn the TimeMinder timer on and off. In the above example, the In radio button for the See-Thru Window account was clicked. The program displays a list of activities. When you have finished working on the activity, you again go to this window and click the Out button. The program keeps track of how much time you have spent on this activity.

RON CHAN

When you are ready to invoice, open the customer's file and choose Print Invoice. The program then prints—on a customized form—a bill that either lists or summarizes all projects and activities.

TimeMinder also provides a wide range of reports. TimeMinder can summarize the time, costs, and profits for each project, or generate a list of all projects that meet certain criteria. For example, you can see all projects whose total time, costs, or number of sessions are equal to, less than, or greater than a particular number. You can view a listing of all projects due on a certain date or those that require a specific activity. Most of the data contained in the reports can be displayed or printed as a line, pie, scatter, or bar graph.

The program automatically posts invoiced amounts to a ledger. If you enter customer payments as they are received, the ledger can also provide a list of all outstanding bills.

TimeMinder is similar in function and price to Timeslips III by Northedge Software, except for one basic difference: TimeMinder assigns a separate file to each client, allowing you to store an unlimited number of clients; Timeslips III's data is stored in the program itself, and you are limited to 2000 clients.

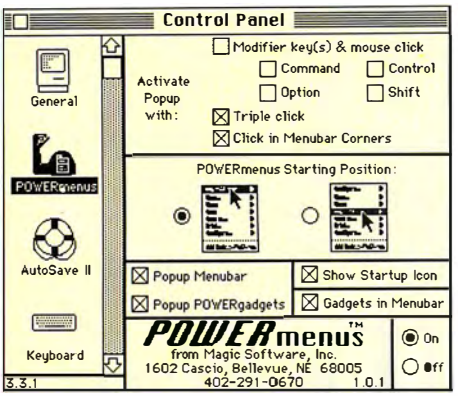
If you don't expect to juggle more than 2000 clients at one time, Timeslips III is more convenient. For example, to print bills with TimeMinder, you have to open each client's file individually and print that client's invoice. Because Timeslips III stores all the data in the same place, it enables you to print all your clients' bills in one operation.

Powermenus

The more I use my computer, the more I yearn for ways to save seconds and minutes by installing such things as macros, autoclialers, and function keys. But even so, it's hard for me to believe that Powermenus ($79.95), which makes the menu bar appear wherever the cursor is, will really save me a significant amount of time. First of all, moving my cursor up to the menu bar never seemed very time-consuming. Second, with Powermenus you must either triple-click or Option-click to make the menu appear; you also have to wait a split second for the menu bar to drop, so I doubt that using it is any faster than moving the cursor to the top of the screen.

Powermenus does come bundled with eight simple but useful Powergadgets. One, called Alarms, signals and displays a reminder message on the screen at a specified time. Applications (which works only with MultiFinder), DAs, and Win-

(continues)



Powermenus Control Panel Screen

The top part of the Powermenus Control Panel lets you specify what action you need to take to make the menu appear. For example, the menu can drop when you hold down the mouse button and press the Shift key, or the menu can appear when you triple-click. You can make the menu appear to the right of the cursor or above it.

dows let you choose applications, DAs, and windows from the Powermenus. Dialer stores a list of names and telephone numbers and dials numbers through a modem. Notes is more convenient than the standard notepad DA because the first line of each note appears in the Powermenus menu. And Time displays the date and time in that Powermenu. PowerControl takes you to the control panel without going through the Apple menu.

If you're tired of moving that mouse around, this can help. As for me, I think my wrist can use the exercise.

AutoSave II

AutoSave II ($49.95) periodically saves your work and will activate any function that can be accessed through an Option-key combination. You merely specify how often you want the action performed.

Personally, I rarely have trouble remembering to save my work regularly, and I prefer to do it at my convenience—say, when the phone rings—rather than periodically when I might be about to input an important thought. But if you tend to lose data because you don't save regularly, the program is worth $49.95.

LearnPersuasion

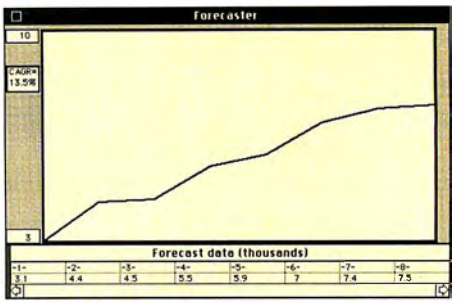
Personal Training Systems has a new audio training series. This one is for Persuasion, Aldus Corporation's desktop presentation program. The modules in the series—Beginning Persuasion, Intermediate Persuasion, Creating AutoTemplates, and Creating Artwork—take you from basics to advanced concepts in four relatively painless 90-minute sessions. You need a copy of Persuasion, a hard disk, and a tape recorder. Each module contains audiocassette lessons, a disk containing practice Persuasion files, and a Command Summary Card.

The only problem with audio training in general is that it is more difficult to fast forward past the things you already know than it is to skim through paragraphs of a book. The lessons are clear and move logically from the simple, general functions to more difficult and specialized ones. More experienced Macintosh users, who normally pick up many of the functions of a program just by experimenting with the menu bar, might find the methodical LearnPersuasion structure agonizingly slow at times, but beginning Mac users will find it an excellent tutorial. Such things as opening files by double-clicking at the Open window, replacing text by highlighting it and retyping, and moving screen elements by dragging are all second nature to experienced Macintosh users. And they may find it frustrating to have to listen to these detailed explanations. This, however, is a general problem inherent to this method of teaching. It's not specific to LearnPersuasion, which is an ideal product for anyone who learns better by listening than by reading or experimenting.

Forecaster

Many programs on the market can create a line graph out of a series of numbers such as a sales forecast. Now there is a program that does the opposite. With Forecaster ($69.95), you draw a line chart, and the program turns it into a table (see "Using Graphics to Make Business Predictions").

This approach is useful when you want to use a graphic tool to help create a forecast. Suppose you want to predict the sales volume over the next 12 months of a product that you just brought to market. Most new products start off slowly, followed by a steep incline as the product gains acceptance, and ending with a level



Using Graphics to Make Business Predictions

With Forecaster, you draw a line to represent your educated guess of the market trends. The program uses your graph to generate a table, which appears at the bottom of the screen. The boxes at the lower and upper left of the chart represent the low and high values, each of which you can change by clicking in the box. You also specify the number of data points—the above screen shot has eight. The CAGR box at the left of the chart displays the compound average growth rate, which is calculated by the program.

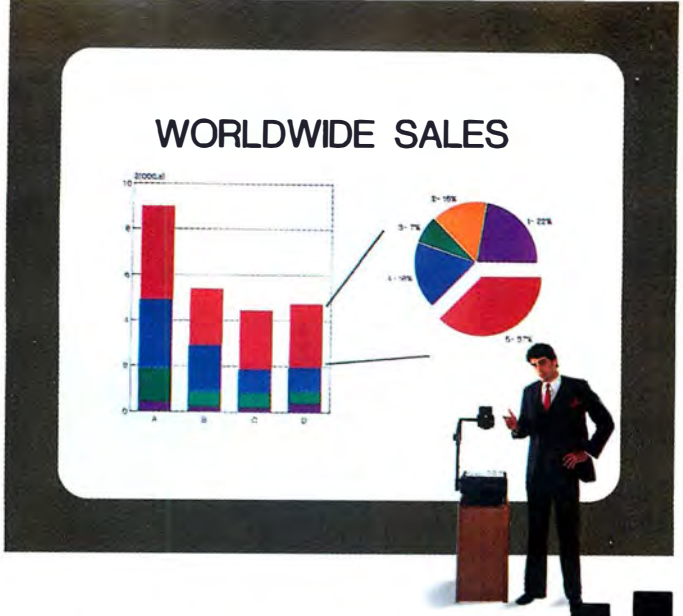
period as the market becomes saturated.

With Forecaster, you draw a line to represent your educated guess of how you expect the market to go. The program turns your guess into a series of numbers, which can be copied and pasted into a spreadsheet for further massaging and output.

As an alternative to copying and pasting, you can save the data as text, and then open it with your spreadsheet. The only reasonable way to use Forecaster, however, is with MultiFinder, which allows you to toggle back and forth between Forecaster and a spreadsheet. Because Forecaster uses only about 140K of RAM, even if you only have one megabyte of RAM, you can use Forecaster along with your spreadsheet under MultiFinder by lowering the memory resources of the spreadsheet. The Out-of-Memory dialog box tells you how much memory is available. You must adjust the spreadsheet accordingly (through the Get Info box in the Finder). After you do this you won't, of course, be able to create a large spreadsheet, but you only need a few rows to work with Forecaster.

If you have to create quick-and-dirty projections, Forecaster is an excellent product.

See Where to Buy or circle 819 (TimeMinder), 793 (Powermenus), 705 (AutoSave II), 752 (LearnPersuasion), or 729 (Forecaster) on reader service card.



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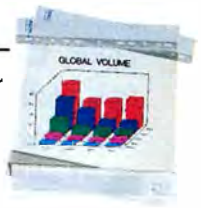

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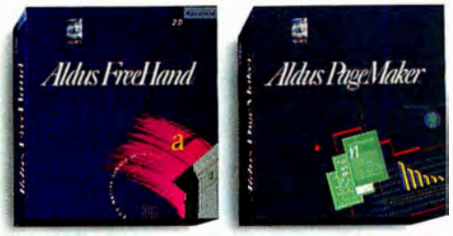

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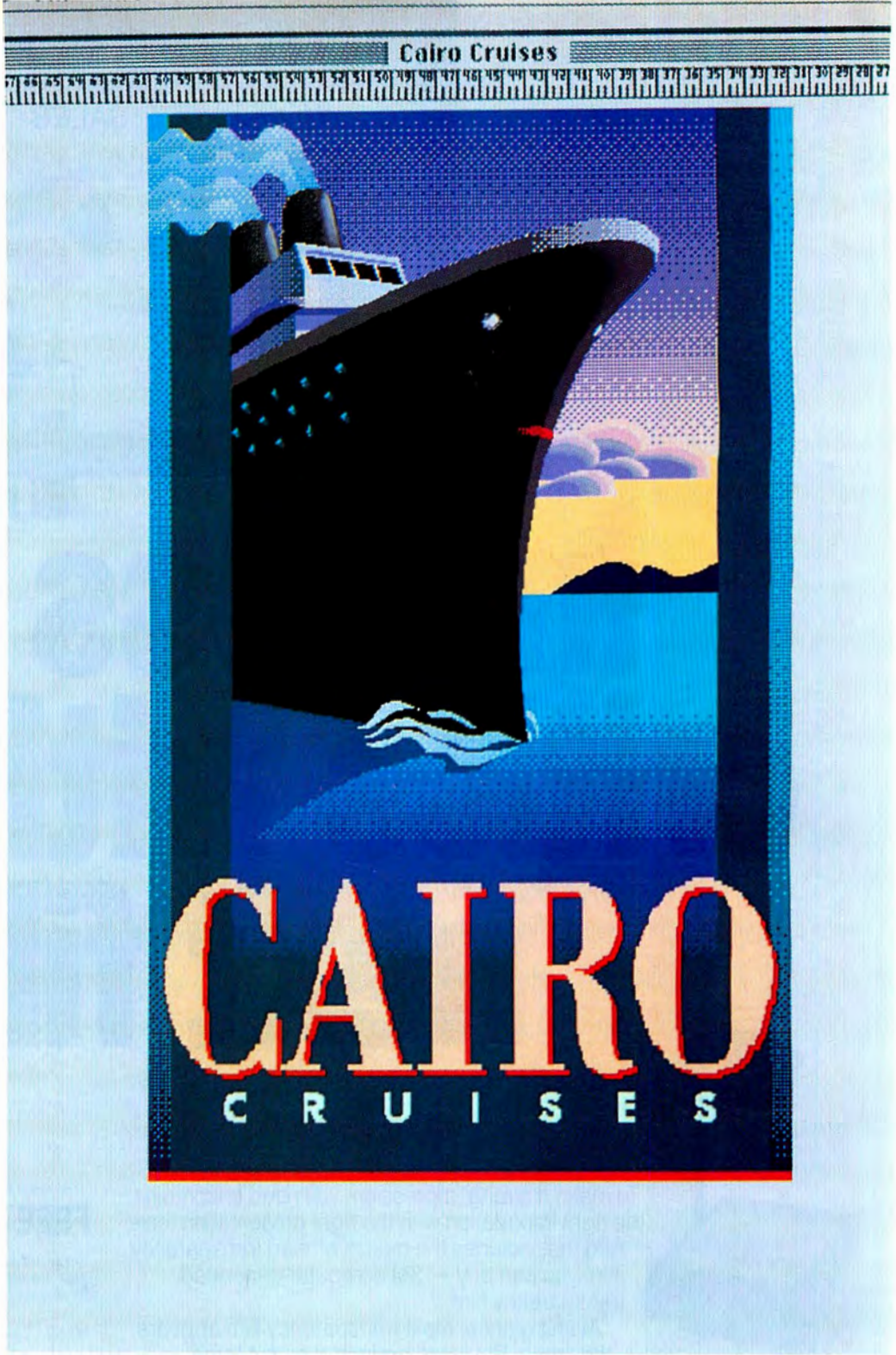

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No one wants to pay for bells and whistles they don't need. But that's what most people do when they buy a new computer.

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The truth is, the basic technology behind computers hasn't changed much since the PC and Macintosh were introduced several years ago. And the basic things people need computers for—communications, word processing, accounting—haven't changed much either. What's changed is the price.

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NEW PRODUCTS

Edited by
Mary Margaret Lewis

This section covers Macintosh products formally announced but not yet evaluated by Macworld. All prices are suggested retail. Please call vendors for information on availability.

HARDWARE

ColorBoard 108+/SE30

Color video board for the Mac SE/30. Standard 8-bit display board has extensions that display up to 256 colors or shades of gray on 19-, 16-, or 13-inch monitors. $1895. RasterOps, 408/562-4200.

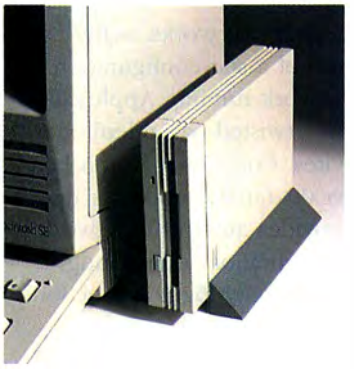
ColorBoard 108+/SE30

Datacase Hard Disk Subsystems

Datacase is an external disk drive enclosure with dial-up SCSI ID selector that supports 3½- or 5¼-inch hard disks from 20MB to 80MB in size. Datacase i is an internal subsystem for the Mac SE and II that supports all 3½-inch, 20MB to 80MB form-factor hard disks. Datacase $195; Datacase i $60. Heart Data, 818/998-1691.

800K External Floppy Drive

A 3½-inch external floppy drive for the Mac 128K, 512K, Plus, and SE. Can be mounted vertically or horizontally. $265. Fujitsu, 408/432-1300.



800K External Floppy Drive

Ether+

SCSI-to-Ethernet adapter for use with the Mac. Connects to the SCSI port and becomes part of the SCSI peripheral chain. $495. Compatible Systems, 303/444-9532.

FlexFax Modem

Unit that functions as a 2400-bits-per-second data modem, sends and receives faxes at 9600 bps. Automatically receives facsimile or data transmission in background mode. $1095. Circuit Research, 603/880-4000.

Forte

Production slide-maker that is both IEEE- and SCSI-compatible. Creates images at 2000, 4000, and 8000 lines of addressable resolution. Comes with 35mm bulk camera module that produces 750 images. $36,995; with bulk-load camera $44,995. Agfa Matrix, 914/365-0190.

HP DeskWriter Printer

QuickDraw-based laser-quality printer compatible with a variety of QuickDraw-based business software. Has capacity for font scaling, and prints at 300 dpi on plain paper. $1195. Hewlett-Packard, 800/752-0900.

HP DeskWriter Printer

Lab-NB

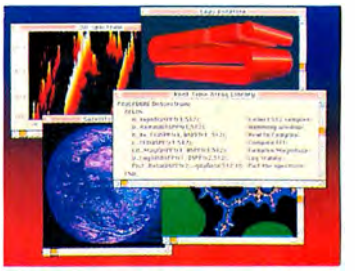
Multifunction data-acquisition board for the Mac II. Has analog, digital, and timing I/O capabilities. $695. National Instruments, 512/250-9119.

Light Writer

Image-projection board that displays handwriting; works in conjunction with multisync LCD projection panel Looking Glass. Lets you write over or highlight an image projected from any personal computer, but requires Looking Glass. $1295; with Looking Glass $3295. Chisholm, 408/559-1111.

LisaDac

Sound-synthesis board for the Lisa/Mac XL. Extends the Lisa's emulation of the Mac to include full sound capabilities. $139.95. Neville & Steele, 214/238-9812.



MacDSP24MC

MacDSP24MC

24-MFLOPS floating point accelerator board for the Mac II. Includes 256K of zero-wait-state static RAM. $5995. Spectral Innovations, 408/727-1314.

MegaWriter PS

PostScript-compatible, laser-quality printer that uses LCD image processing and a 32-bit RISC processor. $4295. Dass Group, 818/882-7021.

Model 895 Laserfeeder

Six-bin, autofeeding paper and envelope system for use with the Apple LaserWriter IINT and IINTX. Has five paper bins that store up to 220 sheets each and an envelope bin that stores up to 60 envelopes. $3595. BDT Products, 714/660-1386.

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NB-A2000 NuBus Board

Mac II data-acquisition board capable of 1 million-samples-per-second throughput to main memory. Can be used with its LabView or NB LabDriver software to develop electronic test and measurement applications. Board $2995; NB LabDriver software $295. National Instruments, 512/250-9119.

NB-A2000 NuBus Board

PCMacterm

Mac-to-PC remote communications software. Allows a Mac to access a PC running PCAnywhere III, and to run the PC's software and peripherals. PCMacterm with PCAnywhere III $244; PCMacterm $99. Dynamic Microprocessor Associates, 212/687-7115.

Proxima Data Display MultiMode

LCD panel that projects computer-generated data and graphics to a large screen. Works with Mac II and IBM PC. $2199. Computer Accessories, 619/457-5500.

Switch/2

Autoloading unit that duplicates 3½-inch and 5¼-inch disks. $4995. Ventuno, 415/651-1934.

Tefax System Model RA2110M

Unit that combines the functions of a fax machine, scanner, line printer, modem, and computer interface. Has built-in copier, and thermal print head. $1495. Relisys, 408/945-1062.

Tefax System Model RA2110M

TurboStar

Engine that works as the hub of a star-configuration network running AppleTalk over twisted-pair telephone wires. Contains a Motorola 68000–family processor that provides automatic network configuration, monitoring, and activity-logging functions. $1795. Nuvotech, 415/331-7815, 800/232-9922 outside California.

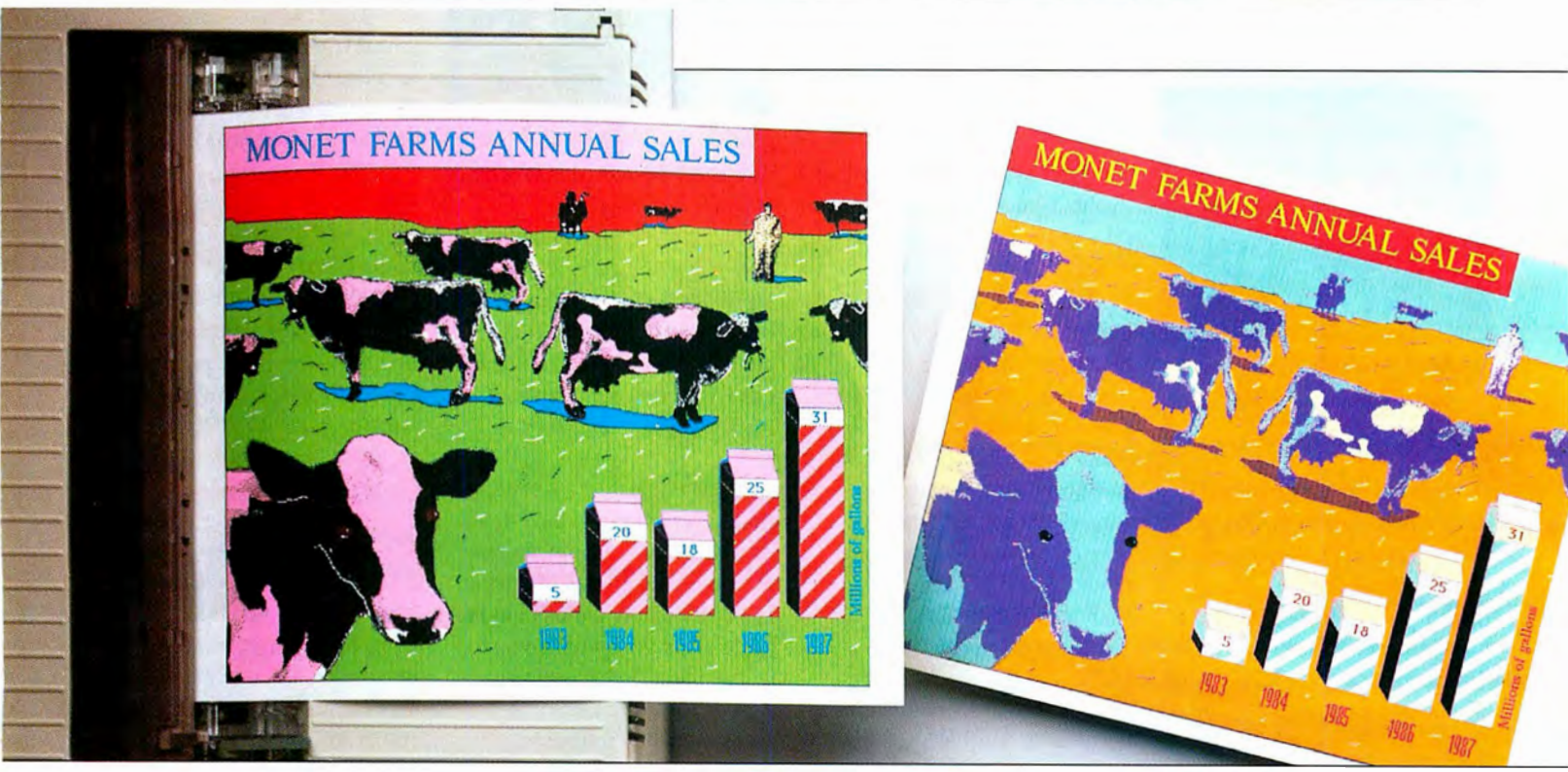
2400MII Plus

Internal modem for the Mac II. Combines 2400-baud operation with MNP-5 (Microcom's network protocol) for automatic error-correction, and throughputs up to 4800 baud. $449. Prometheus Products, 503/624-0571.

SOFTWARE

AppMaker

Tool that programs menus, windows, dialogs, and alert messages. Lets the user generate source code in Pascal or C for selected modules or for an entire application. 512K min. memory. $295. Bowers Development, 508/881-7307.



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

Audio Cassette Labeler

Labeling software for audio-cassettes. Lets you print labels with information such as artist, company, recording year, and up to 12 song titles for each cassette side. 512K min. memory. $49.95. Baudville, 616/698-0888.

Camouflage

Encryption/decryption software that incorporates National Bureau of Standards' Data Encryption Standard (DES), and an optional proprietary encryption method. Allows for variable password length of up to 16,384 characters. 512K min. memory. $349. UsrEZ Software, 206/353-0181.

The Complete HyperCard Buyer's Stack and Guide

A 700K stack listing all major commercial stackware that is available to date. Includes descriptions of each stack and shows screen shots of products. 1MB min. memory. Free on CompuServe and GEnie; $10 by mail. Digital Media Publications, 617/494-8196.

Computerized Class Bookkeeping: Accounting Package

General ledger, accounts payable, accounts receivable, inventory control, check and invoice printing package with journals and ledgers in spreadsheet format. 1MB min. memory. $1295. Absolute Solutions, 800/633-7666, 800/458-3399 in California.

Cricket Drawmaster

Object-oriented drawing application with color support and access to PostScript effects. Includes text processor and ability to create documents as large as 55 inches by 55 inches. 1MB min. memory. $295. Cricket Software, 215/251-9890.

Cricket Drawmaster

The Dinosaur Discovery Kit

Story-making software for children ages 3 to 8. Children select graphic icons that turn into spoken words and parts of pictures to illustrate a developing story. Comes with Dinosaur Coloring Book and Match Game. 1MB min. memory. $39.95; site license $250. First Byte, 213/595-7006, 800/523-8070 outside California.

The Dinosaur Discovery Kit

Duxbury Braille Translator

Software that translates phonetically based English Braille literary code, computer Braille code, and textbook-style formatting suitable for publishing. 512KE min. memory. $495. Duxbury Systems, 508/486-9766.

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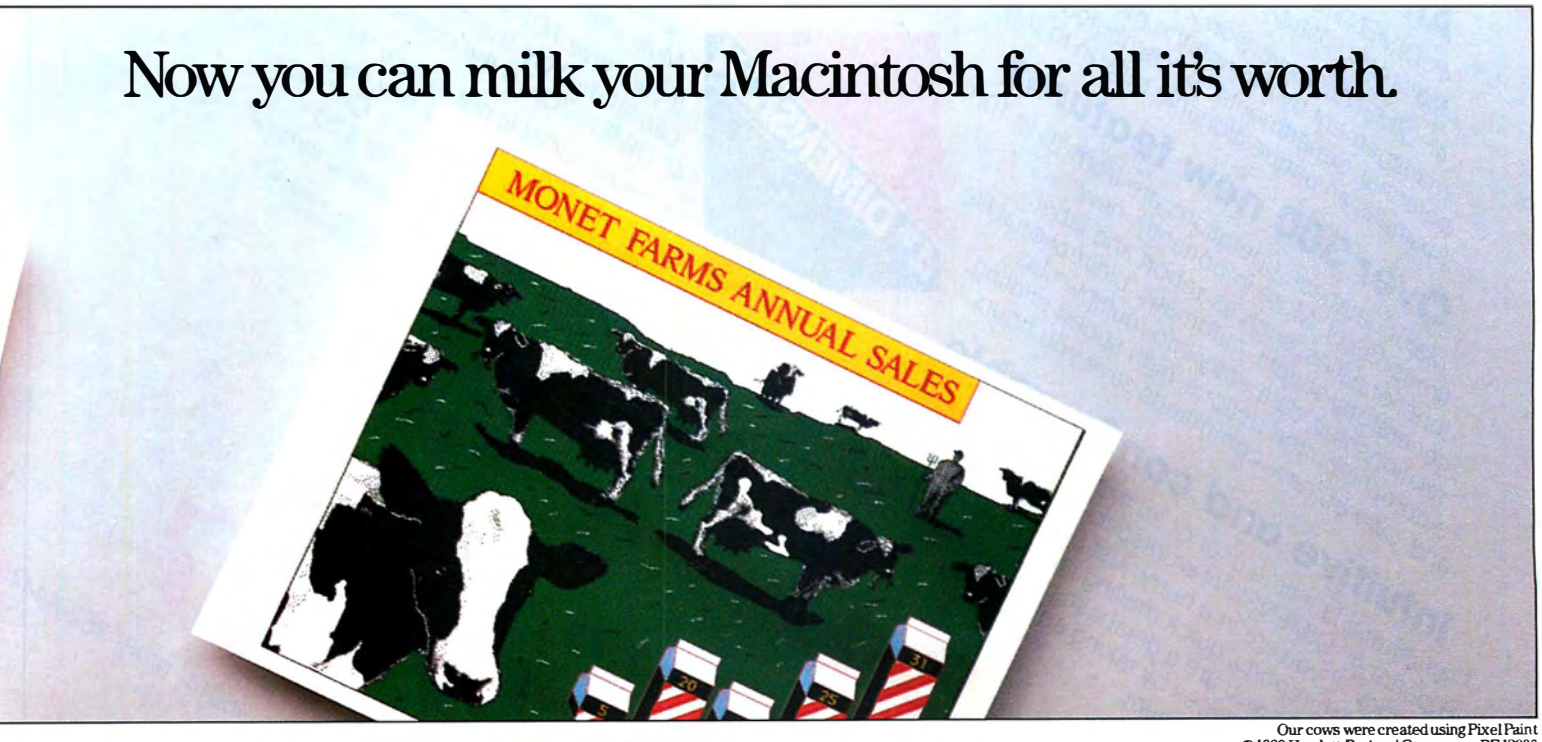
Now you can milk your Macintosh for all it's worth.



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patrick chédal

DynoDex

Paper and software system designed to create Filofax-, DayRunner-, and Day-Timer–compatible directories. Comes with preperforated paper for producing binder-compatible pages. Prints pages front to back. 1MB min. memory. $139. Portfolio Systems, 800/729-3966.

DynoDex

The Electronic Whole Earth Catalog

CD ROM version of *The Whole Earth Catalog*. Contains more than 3500 entries on a wide array of topics. Runs under HyperCard. $149.95. Broderbund Software, 415/492-3200.

EquiMac

Horse-farm management software for keeping daily records; storing health, pedigree, and breeding information; and producing schedules for showing, racing, or billing for the horse-breeding industry. 1MB min. memory. $695. Equine Computer Software, 812/354-2223.

Exporting Guide for Business

HyperCard stack that contains information about state, federal, and private sources of assistance for business export. 1MB min. memory. $159.95. Aardvark Development Labs, 713/872-8085.

Formulator

Equation processor that integrates mathematical expressions with text. Comes with built-in text editor. 1MB min. memory. $149.95. Icom Simulations, 312/520-4440.

Hard Disk Deadbolt

Security software utility designed to protect applications and data files from unauthorized access. Allows for background file encryption within MultiFinder. 512K min. memory. $89.95. FWB Software, 415/474-8055.

HB Music Copyist

Music-notation software with Mac interface that can be used with major MIDI-compatible synthesizers. Acts as input engine for HB Music Engraver publishing system. 1MB min. memory. $199. H.B. Imaging, 801/225-7222.

HyperSearch

Set of XCMDs that provide indexing and searching capabilities for multiple HyperCard stacks. Supports Boolean search operators and has HyperTalk option. 1MB min. memory. $99.95. Discovery Systems, 614/761-2000.

In-Out

System designed to take the place of magnetic sign-in and sign-out boards for employees. Keeps track of the comings and goings of office personnel, has message section, and runs on network. 1MB min. memory. $69.95. Aardvark Development Labs, 713/872-8085.

James Clavell's Shogun

Game in which player takes on the role of Blackthorne, a 16th-century English sea pilot

(continues)

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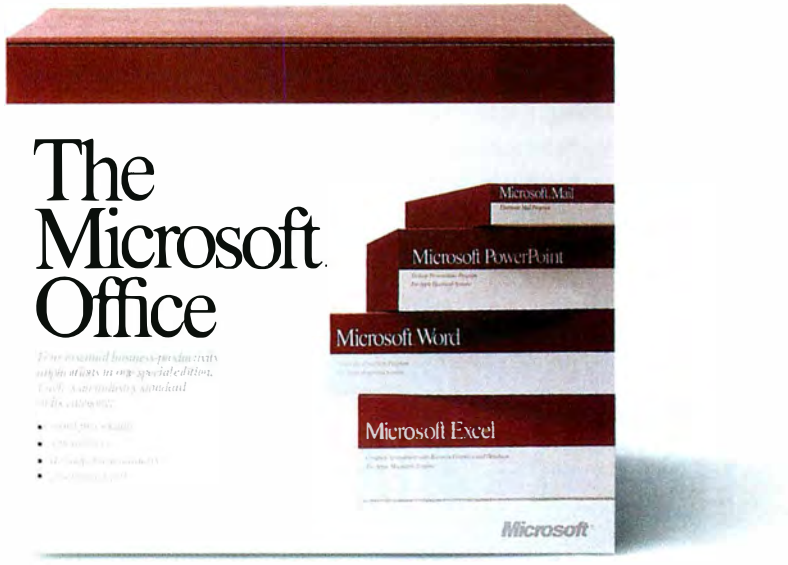

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who has embarked on an uncharted route to Japan, and finds himself in the upper echelons of feudal Japanese society. Graphics are in the style of 16th-century Japanese art. 512K min. memory. $59.95. Infocom, 415/329-0800.

James Clavell's Shōgun

KeyPlan

Project-management program that builds network and bar graphs, charts project elements in a line-graph format, and generates lists of elements in a project. Designed for both individual and small-business users. 1MB min. memory. $449. Symmetry, 602/844-2199.

Laser Award Maker

Laser Award Maker

Software for producing awards, certificates, notices, and coupons. Compatible with all laser printers. Comes bundled with paper samples. 1MB min. memory. $129.95. Baudville, 616/698-0888.

Least Squares Analysis

Mathematical analysis program designed to fit curves to data points. Fits up to 10th-order polynomials, fits bell curves, and handles up to 1800 data points. Accepts text files. 512K min. memory. $75. Drews Programs, 303/442-6957.

LetterPower

Book and disk of 400 model business letters. Letters can be accessed on disk by number, edited to suit your needs, and printed out for mailing. 512K min. memory. $99.95. Round Lake Publishing, 203/431-9696.

MacAC

Linear analog circuit simulation package that lets the user graphically enter and edit an analog circuit, perform analyses to investigate circuit characteristics, and display or print results in graphs or tables. 1MB min. memory. $149.95. San Juan Software, 206/525-9269.

MacAtlas Presentation Pack

Collection of maps in PICT format that can be used with a variety of presentation programs. Includes maps of the world, maps of world regions by country, U.S. maps by state and by county. 1MB min. memory. $199. MicroMaps Software, 609/397-1611.

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CD ROM that contains listings and some reviews of all known Mac products with descriptions, version num-

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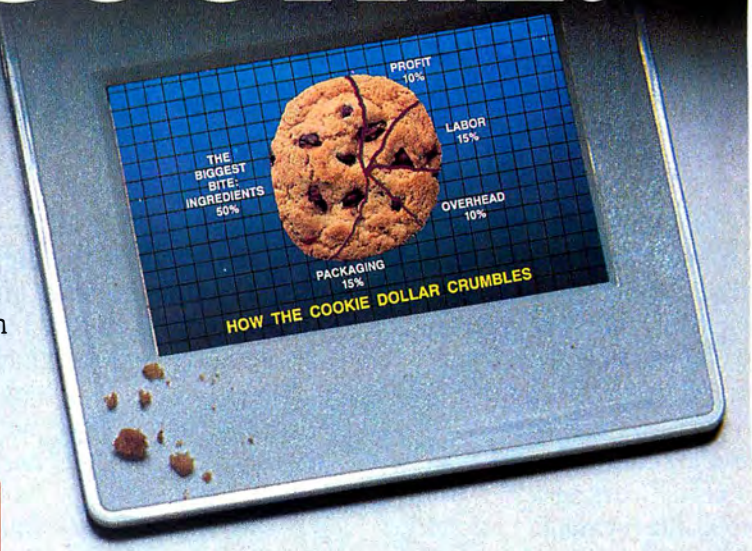

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bers, list prices, and compatibility and contact information. Listings are accessed through the HyperCard stack HyperGuide CD. $99.98 per disk. *MacGuide Magazine*, 303/877-9100.

NMR
Nuclear magnetic resonance spectral-simulation program. Supports all naturally occurring isotopes for the first 103 elements and simulates scalar and dipolar coupling. 512KE min. memory. 512KE or larger $275; 68881-specific version $375. Calleco Scientific Software, 303/493-8573.

Paper Keyboard
Handwriting-recognition software that extracts data from hand-lettered forms and exports it to a database or spreadsheet. Can be used with any scanner. 2MB min. memory. $1750. Datacap, 914/423-7925.

Pixymbols 8051

Pixymbols 8051
PostScript font of astrology and astronomy symbols for use on LaserWriter and PostScript-compatible printers and typesetters. 512KE min. memory. $125. Page Studio Graphics, 602/839-2763.

Planit
Planning software for teachers. Includes five sections: Day Book, Calendar, Plans, Resources, and Help. 1MB min. memory. $124.95. Amberon, 416/470-2313.

Preditor
Programming text-editor that allows rectangular column editing and has a programmable macro command language. 1MB min. memory. $90. Evatac Software, 503/644-4606.

Pro-Search
Search aid software for formulating search strategies and other interactions with Dialog information service. Includes information about databases available through Dialog. Supports Boolean search operators. Updated quarterly. 512K min. memory. $295. Personal Bibliographic Software, 313/996-1580.

The Puzzle Storybook
Software that introduces children to a Picture Library from which they can choose backgrounds, friends, moving objects, and buildings to create new pictures, make puzzles, or illustrate stories. 1MB min. memory. $39.95. First Byte, 213/595-7006.

The Puzzle Storybook

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Collection of 40 résumé formats in Microsoft Word. Different formats address specific job situations. Comes with a manual of tips and

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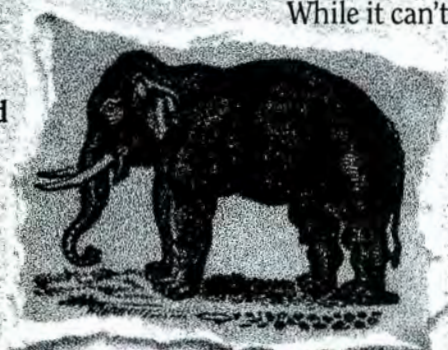

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suggestions on writing résumés. 512KE min. memory. $49. A Lasting Impression, 617/721-2037.

RFPManager.pm
PageMaker-based templates enable architects and engineers to produce all Federal forms in the 254 and 255 families on a Mac. 1MB min. memory. $229. Wordscapes, 415/968-8737.

Rhapsody
Music sequencer that stores, manipulates, and plays back musical information using the MIDI protocol. 512K min. memory. $149. Gateway Software, 619/434-0823.

SAM (Symantec AntiVirus for Macintosh)
Virus protection, detection, and elimination software. Includes an INIT that provides run-time protection, plus the SAM Virus Clinic, which detects a virus and gives you the option of deleting the file or attempting to repair it. 512KE min. memory. $99.95. Symantec, 408/253-9600.

School Administrator's Assistant
HyperCard application that provides calendar/activity planner and built-in two-week reminder of important events for school administrators. Address and telephone directory dials phone numbers and keeps a cumulative record of calls. 1MB min. memory. $79. Chancery Software, 800/663-8831.

SPAMM
Software utility to speed mathematical computations on the Mac. Acronym stands for System Program for Accelerated Macintosh mathematics. 512K min. memory. $79. Bravo Technologies, 415/841-8552.

Term v6.1
Version of Term Communications Software that includes A/UX emulation. Allows users running A/UX on the Mac to perform file transfers and terminal emulation on a network supporting other computers running UNIX. 512K min. memory. Single-user version $195; multiuser version $350. Century Software, 801/268-3088.

Theorist
Algebra program that lets scientists and mathematicians enter, manipulate, and store equations. Supports Greek letters with the Option key on the Mac keyboard. 1MB min. memory. $129.95. Alan Bonadio Associates, 415/282-5864.

Tim Berry's Forecaster
Business forecasting software that can be used as an add-on to Mac spreadsheets. Program shows compound growth rate for each forecast. Works as a stand-alone application runs under MultiFinder. 128K min. memory. $69.95. Palo Alto Software, 415/325-3190.

Unix in a Nutshell
HyperCard-based reference for Macintosh users of UNIX systems. Uses interactive graphics and hypertext features for cross-referencing and for performing keyword searches. 1MB min. memory. $49.95. O'Reilly & Associates, 617/527-4210.

(continues)

we'd better have them.

document, which can be viewed and annotated without the original application.

Let's say you've just finished a layout and submitted it for approval. You send your supervisor an electronic printout (a computer file that looks exactly as if you printed it). After review, they make comments directly on the SuperGlue file (using a computer version of Post-it® notes).

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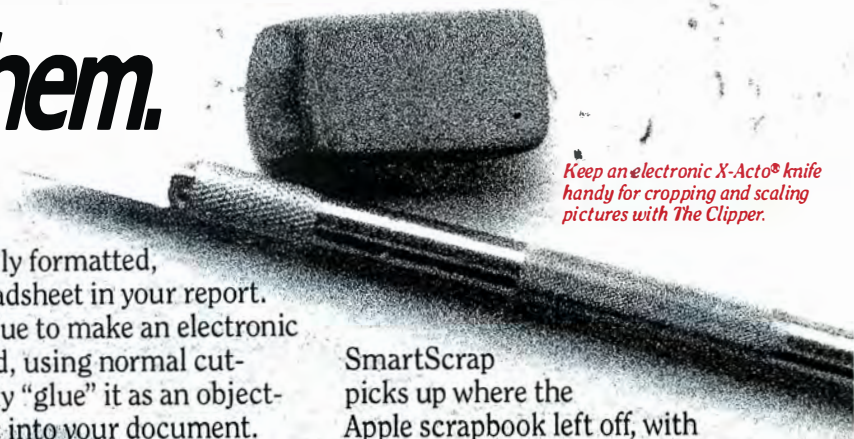
You want to incorporate a fully formatted, multi-page spreadsheet in your report. You use SuperGlue to make an electronic printout of it and, using normal cut-and-paste, simply "glue" it as an object-oriented graphic into your document.

SmartScrap improves upon the Apple Scrapbook and The Clipper™ adds cropping and scaling tools.

OK, SuperGlue II won't fix china. But it will allow you to create electronic printouts of just about anything.



Keep an electronic X-Acto® knife handy for cropping and scaling pictures with The Clipper.

SmartScrap picks up where the Apple scrapbook left off, with multiple scrapbooks, scroll bars, a visual Table of Contents, and Marquee and Lasso. The Clipper provides cropping and scaling tools to any program you're using.

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Post-it® is a registered trademark of the 3M Corp. Suggested retail prices: SuperGlue II—$119.95; The Curator—$139.95; SmartScrap & The Clipper—$89.95

Virtual '030

Software that extends the virtual memory for the Mac SE/30, IIx, and IIcx, enabling them to run all standard application software with 8MB of virtual memory with a minimum of DRAM installed. 1MB min. memory. $295. Connectix, 415/324-0727.

Voyager Video DA

Desk accessory that lets you control a laser disk while working in any Mac application. Has still-frame, search, slow, scan, fast-forward, and reverse functions. 1MB min. memory. $49.95. The Voyager Company, 213/451-1383.

The WeedStack

HyperCard stack of weed information on more than 200 species found in the United States. Contains noxious-weed information and glossary of botanical terms. 1MB min. memory. $149.95. Scientific Software, 314/993-8586.

ACCESSORIES

Computer Paper on Rolls

Halloween and Happy Birthday themes have been added to the Banner Band collection of computer paper rolls. $11.95. Banner Band, 800/333-0549.

DataFixx

User-applied thermodynamic fluid that makes a floppy disk last up to eight times its normal working life per treatment. $19.95 (includes applicator). The Last Factory, 415/449-9449.

Discoasters

Beverage coasters designed and packaged to look like 3½-inch floppy disks. Coasters have rubber base, are available in a selection of colors and patterns, and are sold in mixed sets of six. $14.95. The Computer Giftware Company, 818/500-7857, 800/543-7326.

Discoasters

Laser-Fix

Service kit for laser printers and ImageWriter printers. Contains treatment fluid and applicators that let you treat the primary feed rollers on the laser printer as well as service the platen on the ImageWriter. LaserWriter II kit $39.95; kit for all other Macintosh printers $29.95. J. B. Marketing, 800/228-1383.

Lockette

Floppy-drive lock with tubular key that attaches to Mac 512KE or Plus. Needs no tools for installation. $16.95. Z-Lock Manufacturing, 213/372-4842.

Macintosh Shipping Cases

Macintosh Shipping Cases

Heavy-duty cases for shipping personal computers and

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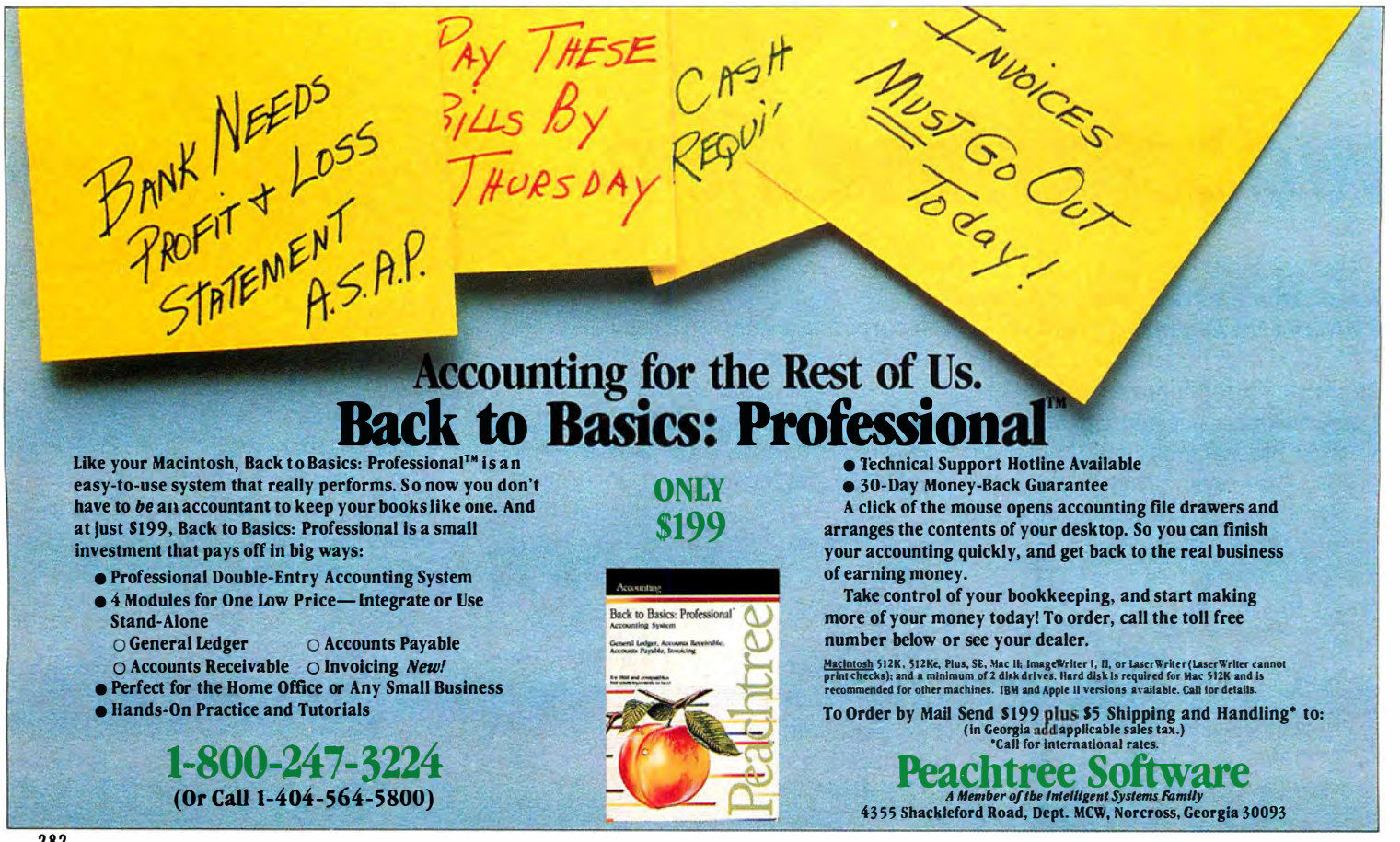

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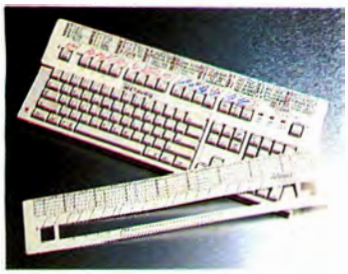
accessories. Made with aluminum frame, fiberglass side panels, and steel corners. $150 to $350. Western Container and Case Company, 800/882-7112.



MacTemplate

MacTemplate

Laminated vinyl template for the extended Mac keyboard. Has guide-registration peg holes for keyboard positioning, and permanently printed black grid matrix to help user keep track of keyboard-selected functions and function-key assignments. $15. Electrodiagnostics, 817/927-7857.

The Ultimate Music Box

Computerized tape-recording of classical pieces composed by Beethoven, Haydn, Bach, Handle, and Cherubini for musical instruments that no longer exist. Sounds have been recreated using the Mac SE. $6.95. Product Concepts, 215/828-1826.

BOOKS & VIDEOS

The BBS Bible

Directory of bulletin board systems nationwide. Lists more than 5000 BBSs by area code and by interest. Updated annually. $24.99. Bubeck Publishing, 215/287-6356.

Expert Advisor: Adobe Illustrator

Illustrated guide to Illustrator 88. Serves as a reference to commands, and provides tips and suggestions for applications. Written by Diane Burns, S. Venit, and David Smith. $22.95. Addison-Wesley Publishing, 617/944-3700.

Learn FileMaker

Self-paced modular training package for Claris's database-management software, FileMaker. Audiocasette and disk-based course. Comes in four modules, beginning through advanced. $49.95 per module. Personal Training Systems, 408/559-8635.

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A 96-page catalog with information on the latest MIDI software, synthesizers, through boxes, SMPTE devices, cables, books, videos, and accessories for Macs, IBM PCs, and a variety of other personal computers. Two-year subscription $5. Digital Arts & Technologies, 203/874-9080.

Tricks of the HyperTalk Masters

A 616-page guidebook for HyperTalk scripters, edited by The Waite Group. Covers tricks, tools, and general scripting advice from a variety of HyperCard developers. $24.95. Hayden Books, 317/298-5400. M

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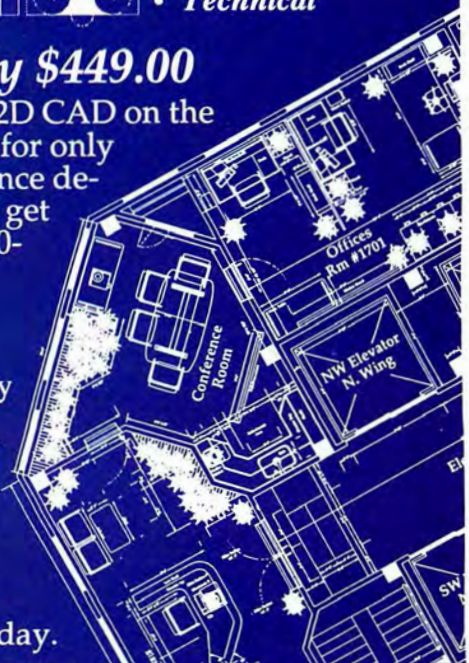

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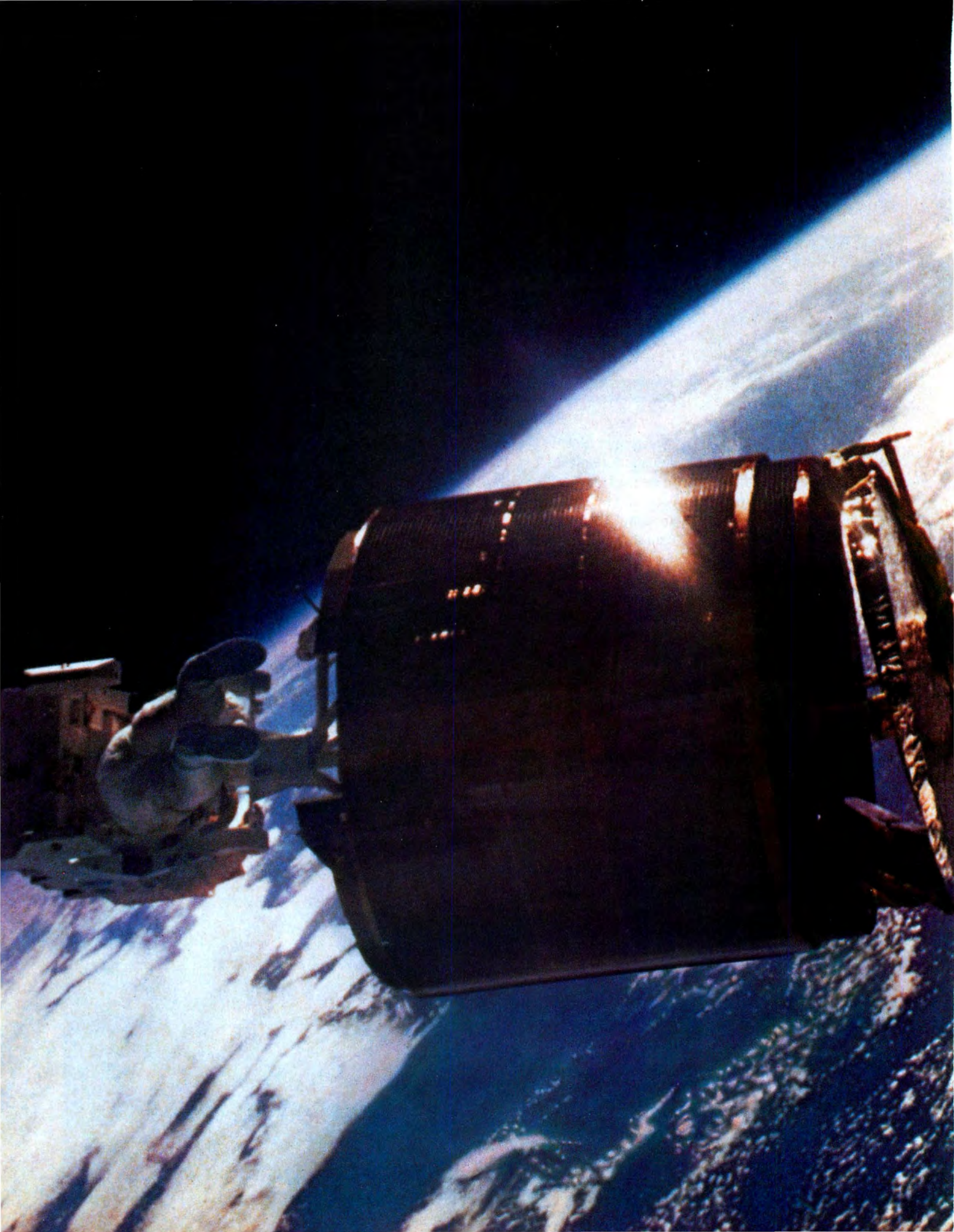

Aside from being a tad easier to install than a satellite, the Hayes Smartmodem 2400M™ for the Macintosh® II and Smartcom II® for the Apple® Macintosh make up the most advanced communications system you can put inside a Mac.®

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

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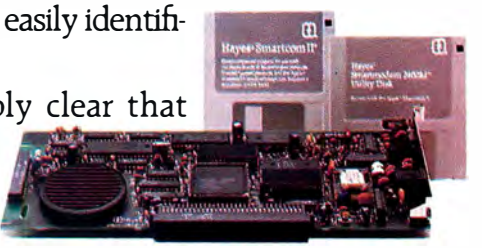
a modem of their own. This makes for extremely efficient office communications.

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.

Hayes®

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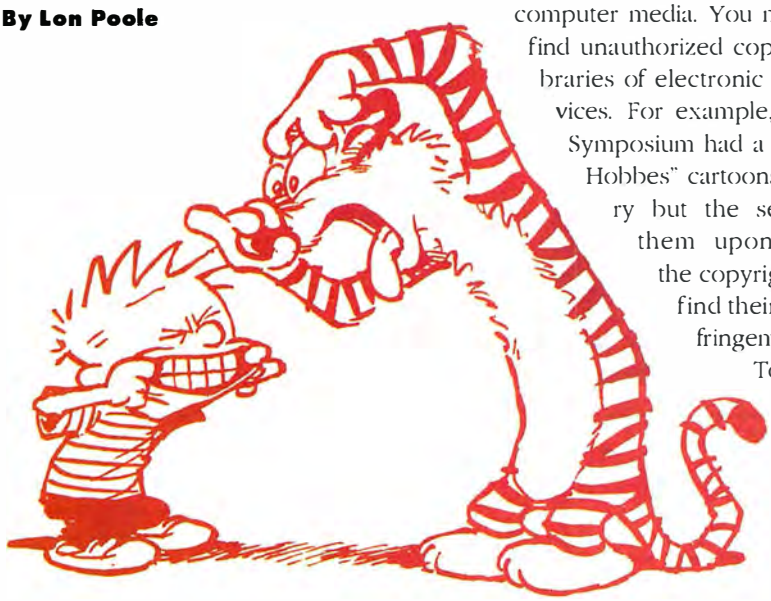
Quick Tips

Copyright ethics, placing artwork for position only, automatic caption numbering, and more

By Lon Poole



There seems to be an endless supply of methods for eliminating compression at the top of a page printed on an ImageWriter II. If none of the techniques previously published here have worked for you, B. Freer Freeman of Arlington, Virginia, has another suggestion. He believes the problem occurs only after you've manually cranked the paper up or down; for example, when hand-feeding a single sheet of paper or when inserting the first sheet of pin-feed paper. To eliminate the squashed line, he presses the Line Feed switch on the printer after any hand adjustment.

USING COPYRIGHTED MATERIAL

Q Where can I get clip art of the comic strip "Calvin and Hobbes," by Bill Watterson? How can a person sort through the piles of available clip art to find specific subjects and items?

Jay Warner
Racine, Wisconsin

A According to Bill Watterson's publisher, Andrews and McMeel (a Universal Press Syndicate affiliate), there is no legitimate source for "Calvin and Hobbes" clip art. Watterson's contract prohibits his publisher from distributing his work on computer media. You may occasionally find unauthorized copies in the file libraries of electronic information services. For example, Connect's Mac Symposium had a few "Calvin and Hobbes" cartoons in its file library but the service removed them upon learning that the copyright holder might find their presence an infringement of copyright.

To use copyrighted work—picture, writing, film, music—you must request permission in writing from the copyright holder. The only exception is the use of brief excerpts to illustrate or buttress your work, such as quoting for purposes of criticism (the *fair use* doctrine). And it's probably OK to scan a picture and paste it into a letter to your mom. But distributing a document or a stack that infringes a copyright is unethical whether you charge for it or not. Get permission or use public domain material. (Anything published in the United States before 1906 can safely be assumed to be in the public domain. Most European works, and works published in the United States after 1977, are copyrighted for 50 years after the creator's death.)

You can request permission to reprint a specific "Calvin and Hobbes" cartoon in a paper publication, such as a newsletter or annual report. The one-time use fee ranges from $35 to $250, depending on the purpose and circulation of the publication. Write to Mary Gillaspie, Permissions Director, Andrews and McMeel, 4900 Main St., Kansas City, MO 64112, or call 816/932-6700. State the publication from which you want to make the copy, its publication date, the page number on which it appears, and how you wish to use it.

For an overview of 35 clip art collections, see "The Clip Art Collector" in last October's *Macworld*. The Electronic Clip Art Company (6376 Quail Run, Kalamazoo, MI 49009; 616/375-8996) publishes and updates the *Electronic Clip Art Digest*, a $129 loose-leaf catalog of images from 30 Macintosh clip art companies that shows each image's location on disk.

DATING WORKS

Q After upgrading to version 2.0 of Microsoft Works, I found that dates in my spreadsheets suddenly changed to numbers. For example, Jan 89 became 31047. After some experimentation with dates and arithmetic, including leap years, I found that 31047 is the number of days between January 1, 1904, and January 1, 1989. One solution is to type a quotation mark (") before the date, which forces Works to treat the date as text. Why does Works now change dates to numbers?

Rodney G. Parrish
Fort Myers, Florida

(continues)

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AWorks 1.1 spreadsheets did not support date and time calculations, but Works 2.0 spreadsheets do. For example, you could store dates in two cells and put in a third cell a formula that subtracts one from the other to calculate the number of days between them. Works 2.0, like Excel, stores a date and time as a serial number, which is the number of days since midnight on January 1, 1904. The time of day is the fractional part of the number. For example, 31047.5 is noon on January 1, 1989. This method of reckoning dates from 1904 is standard on the Macintosh.

When you enter any text that Works 2.0 recognizes as a date or a time, it automatically converts the text to a serial number. If the date is in a cell whose format is General, Works 2.0 displays the serial number. To have Works 2.0 display a date instead, use the Set Cell Attributes command in the Format menu to change the format to Date Short, Date Medium, or Date Long. For more information, see pages 280 and 316 through 318 of the Works 2.0 user's guide.

ELDERLY MAC PLUS HANGS ON START-UP

QMy newly acquired Mac Plus sometimes hangs on start-up. I tried checking the ROM version as outlined in the September 1988 issue of *Macworld* ["News from Apple," *Mac Bulletin*], but my results did not match the ones you described. How can I determine whether an old ROM is causing my start-up trouble?

André Ouimet

Nepean, Ontario, Canada

AA bug in the ROM (permanent memory) of an old Macintosh Plus causes the computer to hang unless all connected SCSI devices are switched on. Apple fixed the bug and installed a corrected ROM in all Mac Plus computers built after November 1985. (Apple knew about the bug before it introduced the Macintosh Plus in January 1986, but shipped flawed Macs before the end of November 1985 anyway. If this seems callous, remember that few SCSI disks were available until mid-1986.)

You can determine the age of a Mac Plus, and hence the version of the ROM

```
>
400000   4D1E  EEE1  0040  002A  0075  6000  0056  6000
400010   0750  6000  0044  6000  0016  0001  76F8  4EFA
400020   2BFC  0000  0000  0000  0000  6000  0016  1080
400030   4DFA  0006  6000  0D40  6600  00FC  538F  200F
400040   66EE  4CF9  0101  00F8  0000  0C80  55AA  AA55
400050   6610  43FA  000E  4ED0  4CB9  0007  00F0  0000
```

ROM Age

The original Mac Plus ROM won't let the Mac start up unless all SCSI devices are on. To check the ROM vintage, press the Interrupt half of the Programmer's Switch and type the command DM 400000. If the Mac responds with EE in the beginning of the third column, as shown here, it has the original ROM.

originally installed in it, by checking the serial number. A Mac Plus with a serial number that begins F609 or lower was built with the original ROM. The serial number starts with a letter that identifies the factory where it was made, either F for Fremont, California, or C for Cork, Ireland. The next digit corresponds to the last year of the fiscal year of manufacture, such as 6 for 1986. (Apple's fiscal year begins October 1.) The next two digits specify in which week of the fiscal year the Mac Plus was made. The next three characters are the serial number. The rest, starting with the letter M, is the model number.

The serial-number test is not infallible, because the ROM may have been replaced. For the final word on the ROM version, you can check the ROM's signature by using the programmer's switch, a plastic accessory that comes with the Macintosh Plus and installs on the left side of the machine near the bottom rear corner. With the Mac Plus switched on, press the part of the programmer's switch labeled Interrupt. But be careful not to press the part labeled Reset, or you'll restart the Mac. By pressing the Interrupt switch you bring up a dialog box containing a greater-than symbol (>) in the upper-left corner. Type **DM 400000** and press Return. If the first two characters that appear in the third column are EE, then you have an original ROM (see "ROM Age"). If those characters are EA or anything else, then you have a revised ROM. To return the Mac to what it was doing before you pressed the Interrupt switch, type **G** and press Return.

UNDO WRONG START-UP DISK

Tip: If you mistakenly insert the wrong start-up disk, you can eject it by pressing the mouse button before the smiling Mac icon appears. You have 10 to 40 seconds between switching on the Mac and the appearance of the icon.

Guy Yariv
Rochester, New York

During the delay between switching on the Mac and the appearance of the Mac icon, the Mac is testing its RAM. The test takes longer on slower Macs and on those with more RAM. To bypass the RAM test, press the mouse button as you switch on a 512K, Plus, or SE.

AUTOMATIC WRITING

Tip: FullWrite can number figures, tables, equations, and other items; and it automatically renumbers items and references to them as you move them within a document. The Classify command numbers an item, and Insert Citation puts a reference to the item in the text, such as "see Figure 2." The FullWrite reference manual explains the procedure (see pages 5-21 to 5-27). But it doesn't tell you how to create a caption that automatically renumbers if you move the item it goes with. For example, if you move your second figure to the beginning of your document, you want FullWrite to renumber the caption as well as all text references to the figure. You can achieve this by inserting a short citation (such as "Figure 2") as a caption or part of a caption on a line adjacent to the figure. However, you must remember to move that line whenever you move the figure.

A better solution is to create a sidebar at the point you want the figure or other item to appear, paste or otherwise place the item in the sidebar, and classify the item. Also in the sidebar put a short citation as a caption (or part of a caption).

(continues)

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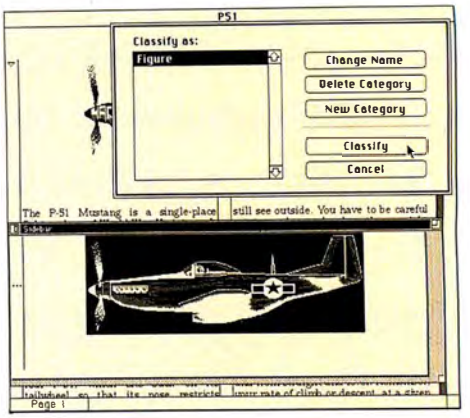

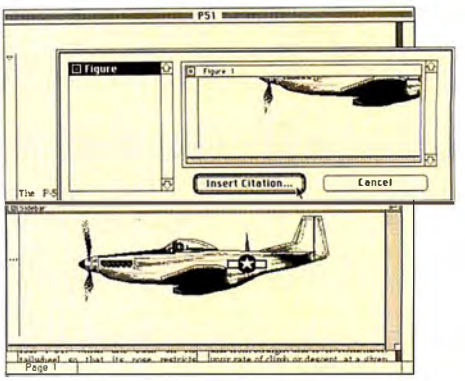

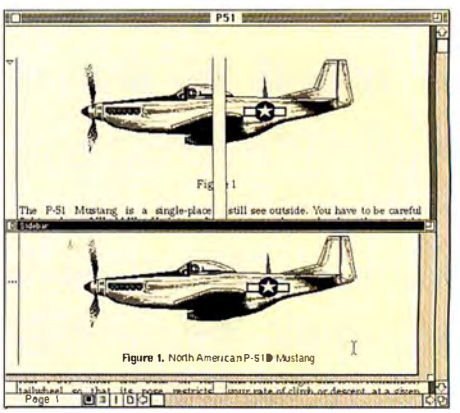

Numbered Caption

To make a figure with a numbered caption in FullWrite, first create a sidebar, place the figure contents in the sidebar, and classify the contents (top). Next, insert a citation in the sidebar (middle). Then type any caption text and make any changes to the text font, style, and size (bottom).

Now moving the sidebar moves the item with its caption and automatically changes all references to the item, including its caption (see "Numbered Caption").

John Shepard
River Falls, Wisconsin

It's easy to accidentally assign more than one number to one item—to have one figure be Fig. 3, Fig. 4, and Fig. 5, for example.

(continues)

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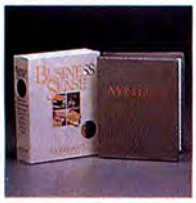

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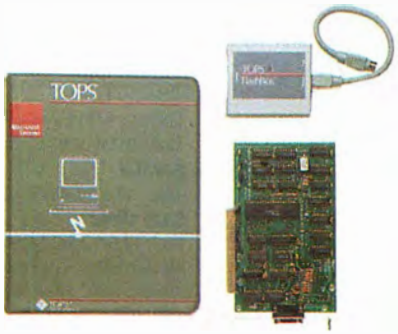

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System Saver Mac Fan ..... 64.
Turbo Mouse - for all Macs ..... 109.

Kraft
Joystick - for all Macs ..... 49.

Mac Packs - *Gray, Navy, or Wine*
ImageWriter Bag ..... 45.
Mac Plus/SE Bag ..... 55.
Mac SE Bag Xt (Extended Keyboard) ..... 69.

Mac Zone
7 Outlet Noise & Surge Protector .... 24.
Mouse Pad - Black, Blue, Gray, Red ..... 6.
SCSI Tester ..... 39.
Mac Tool Kit w/Grounding Strap ..... 15.

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Fanny Mac (Beige or Platinum) ..... 59.

MSC Technologies
A+ Mouse (512k & Plus) ..... 65.
A+ Mouse ADB ..... 85.

Orange Micro
Grappler C/Mac/GS ..... 78.
Grappler Mac LQ ..... 99.
Grappler Mac LS ..... 99.
Grappler Spooler ..... 38.

ScanCo
Mac Table w/Cabinet (w/Shipping) ..... 445.

Sony Disks
40 Meg Dc-2000 Tape Cartridge ..... 23.
Double Sided - 10 Pack ..... 14.
Double Sided - Bulk (Units of 50) .. ea. 1.29
High Density - 10 Pack ..... 36.
High Density - Bulk (Units of 50) ... ea. 3.25

TEAC
60 Meg Backup Tape (Ct600h) ..... 19.

Williams & Macias
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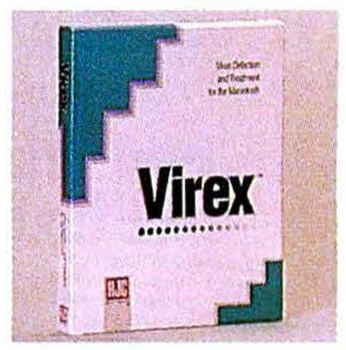

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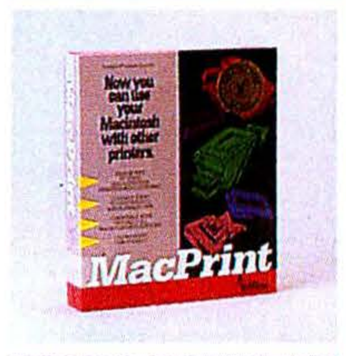

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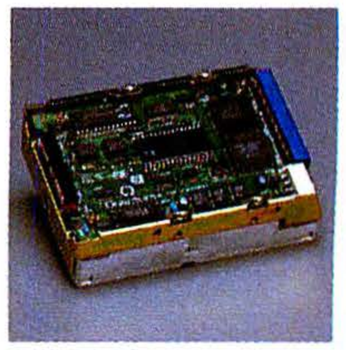

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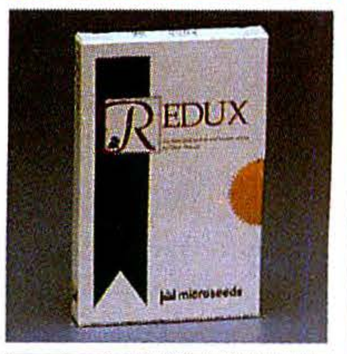

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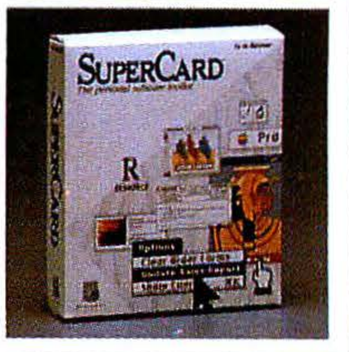

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Fast Forms Construction Kit ..... 98.
Preferred Publishers
DAtabase ..... 72.
Vantage ..... 55.
ProVUE
Panorama ..... 202.
Quark
QuarkStyle ..... 175.
XPress 2.1 ..... 495.
Silicon Beach Software
Digital Darkroom ..... 249.
Silicon Press ..... 48.
Super 3D 2.0 (Color) ..... 297.
Super Card ..... 134.
Super Paint 2.0 ..... 128.
SmethersBarnes
ProtoTyper 2.0 ..... CALL
Software Ventures
Microphone 1.5 ..... 109.
Microphone II Version 3.0 ..... 219.
Solutions
backFax ..... 125.
Curator ..... 74.
SmartScrap & The Clipper 2.0 ..... 45.
Super Glue 1.05 ..... 48.
SuperMac Software
Disk Fit 1.5 ..... 53.
Network Disk Fit ..... 198.
PixelPaint 2.0 ..... 229.
Sentinel 2.0 ..... 88.
SuperLaserSpool - Multi User (1 to 5) ..... 235.
SuperLaserSpool 2.0 - Single User ..... 78.
SuperSpool 5.0 ..... 53.
Survivor Software
MacMoney 3.1 ..... 60.
Symantec
Just Enough Pascal ..... 48.
Lightspeed C 3.02 ..... 159.
Lightspeed Pascal 2.0 ..... 83.
MacSQZ! 2.2 ..... CALL
More II ..... 249.
S.A.M. (Symantec AntiVirus for Macintosh) ..... 65.
S.U.M. (Symantec Utilities for Macintosh) ..... 65.
Symmetry
Acta Advantage ..... 64.
HyperDA 1.1 ..... 34.
Picture Base 1.2 & PB Retriever ..... 54.
T/Maker
WriteNow 2.0 ..... 109.
TML Systems
TML Pascal II 3.0 (w/MPW 3.0) ..... 109.
TOPS
InBox Personal Connection 2.2 ..... 44.
InBox 2.2 Starter Kit ..... 148.
NetPrint 2.0 ..... 117.
TOPS DOS ..... 117.
TOPS MAC ..... 145.
Traveling Software
Lap-Link Mac 2.0 ..... 82.
True Basic
3-D Graphics Toolkit ..... 45.
Business Graphics Toolkit ..... 45.
Scientific Graphics Toolkit ..... 45.
True Basic 2.01 ..... 55.
U.S. Micro Labs
FontSizer ..... 65.
WordPerfect Corp.
WordPerfect 1.02 ..... 185.
Xerox *(DataCopy)*
AccuText ..... 745.
Zedcor Inc
DeskPaint/DeskDraw 2.0 ..... 65.
ZBasic 5.0 ..... 98.

Hardware

Abaton
InterFax 12/48 Fax/Modem ..... 305.
Quick Step CrystalPrint Publisher 3295.
Scanner 300/GS (8 Bit - 256 Grays) ..... 1495.
Scanner 300s (4 Bit - 16 Grays) ..... 1198.
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Smart One 2400 Baud Modem ..... 165.
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CDC 135 Meg (3 1/2" Drive) ..... 1795.
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CMS
MacStack 20 ..... 399.
MacStack 30 ..... 545.
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Daystar Digital
16MHz 030 Accelerator SE ..... 975.
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Daystar 33/030 Accelerator II or IIx w/Math Co-Processor ..... 5280.
Lt 200 Mc LocalTalk Board ..... 279.
Lt 200 PC LocalTalk Board ..... 179.
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Flipper 44mb Removable ..... 1075.
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FastNet III ..... 545.
FastNet LAN/020 ..... 895.
FastNet SCSI ..... 749.
FastNet SE ..... 365.
FastNet SE/30 ..... 375.
MacSnap 524 (512k to 1mb) ..... 192.
MacSnap 524e (512kE to 1mb) ..... 189.
MacSnap 524s (512kE to 1mb w/SCSI) ..... 240.
MacSnap 548 (512k to 2mb) ..... 432.
MacSnap 548e (512kE to 2mb) ..... 419.
MacSnap 548s (512kE to 2mb w/SCSI) ..... 479.
SCSI Port Adapter ..... 109.
Marathon 020 Accel.SE - 16 MHz
MSE1 (Accelerator only) ..... 584.
MSE2 (...w/1mb) ..... 720.
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Marathon 030 Accelerator for Mac II - 32MHz ..... 975.
Farallon
PhoneNet - DIN-8 or DB-9 ..... 34.
PhoneNet - DIN-8 (10 Pack) ..... 224.
Repeater ..... 298.
Star Controller ..... 1145.
Irwin
Excelerator XI 25 MHz ..... 1280.
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2 One Mb SIMMs (100 Ns) ..... CALL
256k SIMMs (120 Ns) ..... CALL
Magnavox
Color Monitor 14" Analog ..... 535.
Motorola *- Math Co-Processor*
68882 - 16MHz ..... 293.
68882 - 25MHz ..... 425.
68882 - 33MHz ..... 695.
NEC
CD Rom Drive ..... 845.
NEC MacSync 14" Color Monitor ..... 675.
Nuvotech
Turbo Bridge ..... 339.
Turbo Net - DB-9 or DIN-8 ..... 21.
Turbo Net ST - DB-9 or DIN-8 ..... 29.
Orchid Technology
Fax Modem 9600/9600 ..... 448.
Mac Sprint II, Cache Card ..... 249.
Dsicom Technologies
MacBest 20 External ..... 439.
MacBest 30 External ..... 525.
MacBest 40 External ..... 589.
MacBest 60 External ..... 685.
MacBest 80 External ..... 695.
MacBest 90 External ..... 965.
MacBest 170 External ..... 1695.
MacBest 30 Internal Mac SE/II ..... 425.
MacBest 45 Internal Mac SE/II ..... 489.
MacBest 60 Internal Mac II ..... 555.
MacBest 80 Internal Mac II ..... 625.
MacBest 90 Internal Mac II ..... 865.
MacBest 150 Internal Mac II ..... 1398.
MacBest 170 Internal Mac II ..... 1595.
MacBest 300 Internal Mac II ..... 1995.
MacBest 600 Internal Mac II ..... 2885.
PLI *(Peripheral Land, Inc.)*
Infinity 40 Turbo Removable ..... 1235.
Infinity 40/40 Turbo Removable ..... 2195.
TurboFloppy 1.4 ..... 339.
Quantum *(Internal Hard Disks)*
Quantum 40 ..... 439.
Quantum 80 ..... 790.
Quantum 105 ..... 998.
RasterOps
Colorboard 108+ ..... 1249.
Colorboard 108+/SE/30 ..... 1439.
Colorboard 104 (24 Bit Color) ..... 3895.
Colorboard 224 (32 Bit Color) ..... 4295.
RasterOps/Trinitron 19" ..... 3398.
TrueCapture 324 ..... 1995.
Sharp
JX 450 Color Scanner ..... 5895.
Shiva Corporation
Net Serial ..... 289.
NetBridge ..... 289.
NetModem V2400 ..... 455.
TeleBridge ..... 348.
SummaGraphics
Bit Pad Plus (12" X 12" Tablet - ADB) ..... 324.
SupraCorp.
Supra Modem 2400 Baud ..... 145.
Syquest
Infinity 44 Cartridges Unformatted 115.
Taxan *(Eddy Award Hon. Mention)*
Crystal View II ..... 1395.
Crystal View SE ..... 1395.
Crystal View SE/30 ..... 1395.
Ultra Vision 1000 Color ..... 1395.
Telebit
T-1000 9600 Bps Modem ..... 699.
T-2000 19,000 Bps Modem ..... 1199.
T-2500 V.32 w/P.E.P.
19,000 Bps Modem ..... 1299.
Thunderware
Lightning Scan ..... 405.
ThunderScan 5.0 ..... 188.
TOPS
TOPS Flash Box ..... 122.
TOPS Flash Card (for TOPS DOS) ..... 162.
TOPS Repeater ..... 125.
TOPS Teleconnector - DB-9 or DIN-8 ..... 36.
U.S. Robotics
2400 Baud Modem ..... 348.
9600 Hst Baud Modem ..... 685.
Xerox *(Datacopy)*
Datacopy 730GS (Gray Scale Scanner) ..... 1545.

Entertainment

Access Software
World Class Leader Board 4.0 ..... 27.
Accolade
4th & Inches, Hardball, Mean 18 ea. 27.
Brøderbund
Ancient Art Of War or War At Sea ..... 26.
Autoduel, Moebius, Shufflepuck ..... 23.
Sim City 1.1 ..... 27.
Where In The...
...U.S.A. Is Carmen Sandiego? ..... 27.
...World Is Carmen Sandiego? ..... 27.
Bullseye Software
Ferrari Grand Prix ..... 32.
P-51 Mustang Flight Simulator ..... 31.
Casady & Greene
Crystal Quest 2.2 ..... 25.
Crystal Quest 2.2 w/Critter Editor ..... 41.
Centron
Casino Master B & W ..... 44.
Casino Master Deluxe Color ..... 49.
Data East
Super HangOn ..... 26.
Discovery Software
Arkanoid ..... 26.
Electronic Arts
Bard's Tale ..... 32.
Chessmaster 2000 ..... 28.
Chuck Yeager's Advanced Flight Trainer ..... 31.
Mediagenic
Cosmic Osmo ..... 45.
Manhole ..... 30.
Manhole - CD ..... 35.
Might & Magic ..... 35.
Quarterstaff ..... 29.
Shanghai ..... 15.
Universal Military Simulator ..... 29.
Microprose
Pirates! ..... 32.
Microsoft
Flight Simulator 1.02 ..... 32.
Miles Computing
Fool's Errand ..... 31.

To remove on extra classification number, use the Browse command to go to the line that contains the extra classification. Then look in the icon bar for a classification-mark icon next to that line. (If the icon bar contains only an ellipsis, double-click on it to expand the icon bar and see the multiple icons attached to the line.) Once you've selected the classification-mark icon you want to remove (double-click on a classification-mark icon to bring up a dialog box that identifies it), choose Clear from the Edit menu.

SPOT COLOR FPO

Tip: I often scan photos or artwork and use them in PageMaker for position only (FPO) when I am printing proofs. Before the final printing, I need to drop out the scanned pictures. Running text around an irregularly shaped picture presents a problem, because the text fills in the void when I remove the picture. I solve this problem by assigning the picture a color that I'm not using. Then I print the document, specifying the Spot Color Overlays option. The hole remains shaped as I need it and I throw away the color overlay.

Cynthia Tinapple
Worthington, Ohio

FROZEN INK

Tip: It's convenient to buy printer ribbons in large quantities, but after a while, unused ribbons dry out. To avoid this, wrap them tightly in plastic bags and put them into the freezer. Be sure to thaw a frozen ribbon at least 30 minutes before using it. Never, never, never place a frozen ribbon into your printer.

Tom Asimos
Texarkana, Texas

RECOVERING AN UNRECOVERABLE DISK

Tip: To save space on my hard disk, I archive most of my older documents to floppies. When I tried to open one Word document I archived, I got an Unrecoverable Disk Error message. The document looked OK in the Finder, but MacTools verified that it contained several corrupted blocks. Afraid I might lose more files, I used FastCopy (part of PC Tools Deluxe from Central Point) to make a sector copy of the floppy. FastCopy skipped the bad sectors (blocks), and Word was able to open the copied document as text. Some data and all the formatting were missing, but that was a small price to pay considering the alternative—completely retyping a lengthy document.

Tom Knepher
Morro Bay, California

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 294-8078). All published submissions become the property of Macworld.

Lon Poole answers readers' questions and offers advice in this monthly column. Many of the tips he's collected can be found in Mac Insights *(Microsoft Press, 1986). His most recent book is the quick reference guide* HyperTalk *(Microsoft Press, 1988).*

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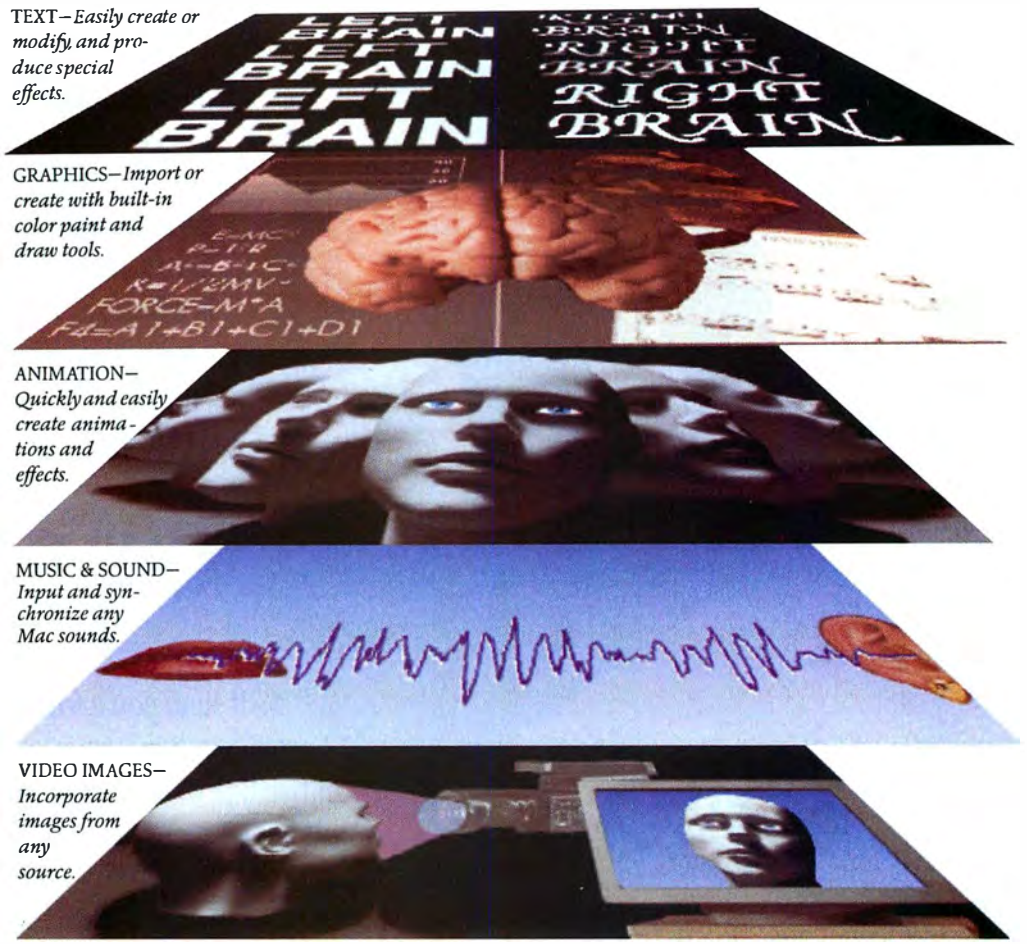

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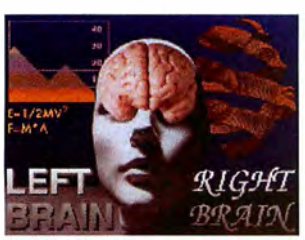
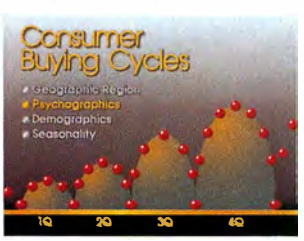


Create multimedia simulations to help people grasp abstract or complex concepts.



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Circle 285 on reader service card

Getting Started with Animation

Make it move with this introduction to Macintosh animation

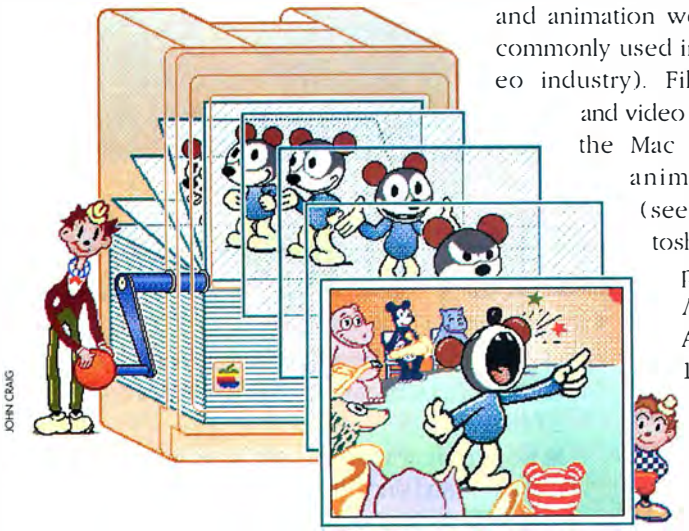
by Jim Heid

Animation is everywhere—and it has been since newspaper cartoonist Winsor McCay thrilled turn-of-the-century theatergoers with his Gertie the Dinosaur cartoon. So novel were McCay's efforts that audiences "suspected some trick with wires," he later wrote.

Today's public is less naive but remains enchanted by watching inanimate objects take on lives of their own. Animation is hot, and computer animation is helping to fuel the fire. Enter the Mac, stage left. The Mac's sharp graphics and fast processor make it a natural platform for creating moving pictures. This month, I explore the concepts and challenges behind animating on the Mac and spotlight some animation products. For more details on the products discussed here, see "Move It!," *Macworld*, June 1989.

WHY ANIMATE?

You might think the only people who could benefit from Mac animation are in the entertainment business. There's no denying that Mac animation is making show biz inroads. Advertising agencies and production houses use Mac programs to mock up animations that will be created on broadcast animation equipment such as the Quantel Paintbox (a broadcast titling and animation workstation commonly used in the video industry). Filmmakers and video artists use the Mac to create animated art (see "Macintosh Masterpieces," *Macworld*, August 1989). Television stations use Mac animations for on-screen graphics.



But the truth is, you don't have to have delusions of Disney to use an animation program. Consider the following scenarios.

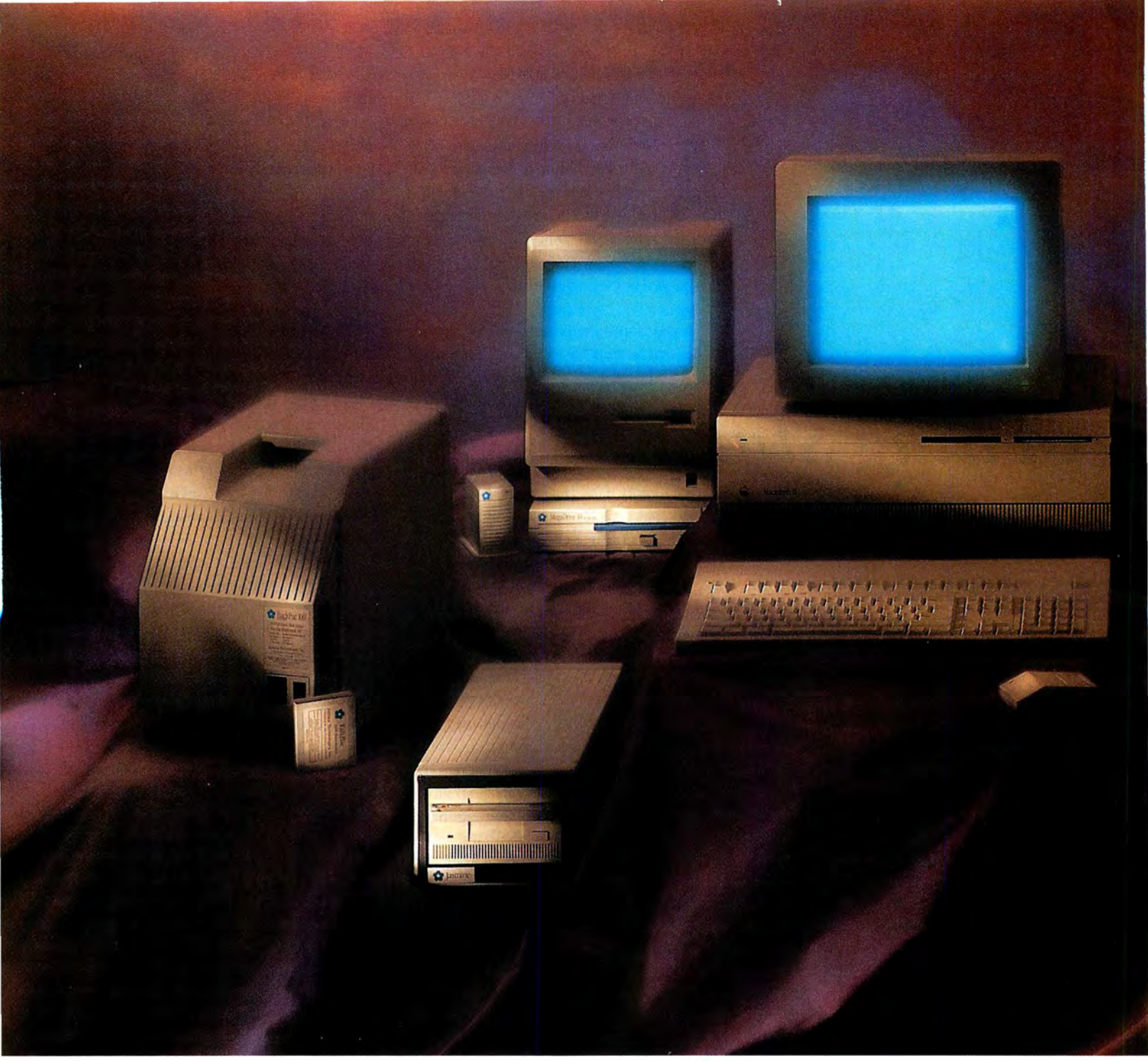
- To explain the benefits of solar water heaters at a trade show, a marketing manager for a solar heating firm uses an animation program to create a moving diagram in which blue (cold) water enters a solar collector, is heated (it turns red), then flows into a storage tank. This is followed by animated charts and graphs that show how much money and energy customers will save. The complete presentation runs continuously at the show booth.
- A history teacher wants to show how events combined to create the Cuban missile crisis. Instead of scrawling time lines on blackboards, he creates an animation that uses maps of Cuba and the United States to depict the key events: the missiles arriving on Cuban soil, the spy photos, the naval blockade. The result is more engaging than a lecture and reinforces the geography and timing behind the crisis.
- An architect bidding on a project creates an animated walk-through that lets clients look at the building from various angles and that simulates entering the lobby from the central courtyard. The clients can better visualize the final product than they could by examining blueprints.

FRAME BY FRAME

Smooth animation requires that the viewer see at least 16 images, or *frames*, per second. That's easy for any Mac, but creating the frames themselves is, for the most part, your job. Some programs can automatically create certain types of animation, but creating a realistic moving picture still takes time and effort.

The most basic animation package is Beck-Tech's MacMovies. You use a paint program such as MacPaint to create each frame, then you compile the frames into a *movie*, MacMovies' term for a single document file containing the images, compressed to use less disk space. You can play the results at up to 30 frames per second, and you can distribute movies

(continues)



At Jasmine, the state of the

■ 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. $4995.

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■ 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.

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CREATING A HYPERCARD ANIMATION

To try this tutorial, you must set your HyperCard user level to the Painting level or above. Use the Home stack's arrows to get to the User Preferences card, click the Painting button, then return to the Home stack's first card.

PHASE 1: CASTING CALL

First, you need a character. For this exercise, use the small dog in the Mac's pictorial Mobile font.

1. In HyperCard's Home stack, click the Art Ideas icon. When the Art Ideas index appears, click the entry that reads *Font—Mobile*.
2. Open the Tools menu and activate the selection tool.
3. Find the small black dog (it is on the top row, near the right edge of the card), and select it by enclosing it within the marquee. Don't select any extra space below the dog's feet.
4. Choose Copy Picture from the Edit menu.

PHASE 2: CREATE A NEW STACK

Now you're ready to create the stack that will contain the animation.

1. Choose New Stack from the File menu.
2. Uncheck the Copy Current Background box by clicking within it, then type a name such as *Animation Test*, and press Return.

Before pasting the dog into place, you must create a background.

3. Choose Background from the Edit menu (or ⌘-B).

(Stripes appear in the menu bar to indicate you're working on the background.)

4. Open the Tools menu and select the line tool.
5. Hold down the Shift key to draw a horizontal line from one end of the card to the other. This line will be the street upon which your silicon pooch will stroll.
6. You're finished with the background, so choose Background from the Edit menu again.
7. Add the dog to the scene by choosing Paste Picture.
8. Drag the dog (gently, please) until it's at the left edge of the card. *Do not deselect the dog; keep it within the marquee.*

PHASE 3: CREATE THE FRAMES

Now you're ready to create each frame. To do so, you will repeatedly move the dog, copy it to the Clipboard, create a new card, and paste the dog into the new card.

1. Choose Copy Picture from the Edit menu to put the dog and its new position on the Clipboard.
2. Choose New Card from the Edit menu or press ⌘-N.
3. Paste the dog into the new frame from the Edit menu or use ⌘-V.
4. Hold down the Shift key and drag the dog slightly to the right.
5. Copy the dog's position by pressing ⌘-C.
6. Repeat Steps 2 through 5 at least 20 times. The more frames you create, and the smaller the movements in each frame, the slower the dog will appear to move.

PHASE 4: ACTION!

1. Return to the first card in the movie by choosing First from the Go menu.
2. Display HyperCard's message box by choosing Message from the Go menu or by pressing ⌘-m.
3. In the message box, type ***show all cards*** and press Return.

Disney it isn't, but it's a start. From here, you might spruce up the background and add more characters. You might also create a background button whose script shows the movie for you (see "Roll 'Em").

Remote-Control Painting

You can use HyperTalk scripts to control HyperCard's painting tools. This script selects the dog (assuming it's near the left edge of the card and 1⅛ inches from the bottom), drags it to the right, reverses its direction, and drags it to the left.

```
on mouseUp
    choose lasso tool
    click at 25,270 with commandKey -- lasso the dog
    set dragSpeed to 200 -- adjust for desired speed
    drag from 25,270 to 490,270 -- move the dog
    doMenu "Flip Horizontal" -- turn the dog around
    drag from 490,270 to 25,270 -- move it back
    doMenu "Flip Horizontal" -- turn it around again
    click at 0,0 -- deselect the dog
    choose browse tool -- restore the browse tool
end mouseUp
```

```
on mouseUp
    show all cards
end mouseUp

on openStack
    lock screen -- turn screen updating off
    show all cards -- load images into memory
    unlock screen -- restore screen updating
end openStack
```

Roll 'Em

The top script, when attached to a background button, will show all the cards in a HyperCard stack when the button is clicked. For faster animation, add the bottom script to your animation stack.

along with a Beck-Tech projection program called, logically, Projector.

MacMovies is easy to learn and use, and at $99, it's an inexpensive way to test the animation waters. Note, however, that the program's current release, called Volume I, does not run on the Mac II or the SE/30 and has minor (that is, easily bypassed) problems with System 6.0. Beck-Tech says MacMovies II will fix the incompatibilities and add color support and additional features; look for it late this year or early next.

CEL MATES

More ambitious animation programs—such as MacroMind Director and its lower-priced cousin, VideoWorks II---electronically recreate the techniques behind *cel animation*, the conventional film animation technique patented in 1914 (by another newspaper cartoonist, Earl Hurd) and still used today. With cel animation, a background is drawn or painted on paper, over which are laid transparent sheets of celluloid containing only those components of the frame that have moved since the previous frame. The resulting composite is photographed, a new cel is laid in place, and the process is repeated. Cel animation saves animators time and effort by eliminating the need for them to redraw the background for every frame (as Winsor McCay did for all 10,000 frames of *Gertie the Dinosaur*.)

In Director (as well as in VideoWorks II), the components of an animation—backgrounds, animated objects, sound effects, and so on—are stored in the Cast window. The Cast window is a cinematic database, an electronic casting office that holds the audio and visual cast of characters in an animation. You add a cast member to an animation by dragging it from the Cast window to the *stage*, or by using the Score window, which graphically depicts the events in the animation (see "In the Director's Chair").

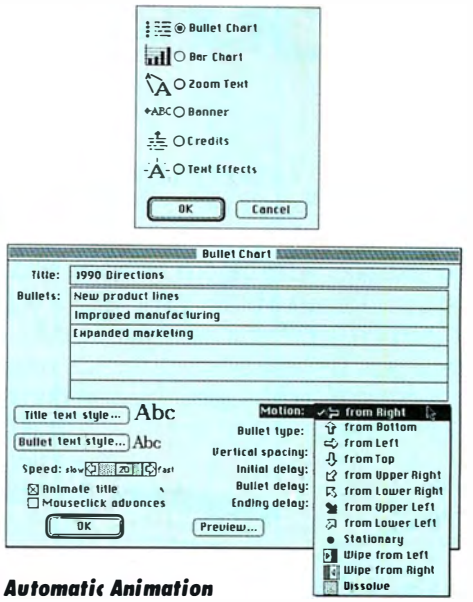
If all this sounds complex, it can be. Fortunately, Director provides a host of labor-saving features for creating animated titles, bar charts, bullet charts, and other special effects (see "Automatic Animation").

Director also offers the computer animator's best friend, an *in betweening*, or *tweening*, feature. Tweening lets you animate without crafting every frame by hand. You create the first and last frames (the *key frames*) of a sequence, specifying the beginning and ending appearance of an object, as well as the total number of frames desired for the sequence. Director does the rest, creating the specified number of frames and moving the object from one frame to the next.

There's far more to Director than I've described here. For creating a computerized cast, the program provides color painting features that rival those of SuperMac's PixelPaint. It has impressive sound features, which I'll describe later. And it can exchange images and even entire animation sequences with other programs. That latter talent lets you combine Director with three-dimensional drawing programs to create 3-D animations.

In the Director's Chair

MacroMind Director stores the components of an animated sequence—objects, sounds, backgrounds, and so on—in the Cast window (bottom right). Behind the Cast window, the Score window graphically depicts the events in the sequence. Behind the Score window is the Stage, where the animation takes place.



Automatic Animation

MacroMind Director provides labor-saving features that create animated titles, bar charts, and various text effects. After selecting the desired effect in the Auto Animate dialog box (top), you specify the text style, animation speed, and other options (bottom). Here, the From Right option, which causes each bulleted item to slide into place from the right edge of the screen, is selected.

NO SPECIAL GLASSES NEEDED

Much of today's computer-generated animation creates the illusion of three dimensions. A network logo spins toward you, its letters thick and glittering as though cast in platinum. A telephone company commercial takes you on a fantastic voyage through the circuits of a fiber-optic network. Seen on a big screen, 3-D animation can almost give you motion sickness.

Three-dimensional animation is also complex enough to give a computer headaches. Simulating depth, lighting, and shading requires time-consuming calculations that tax even the fastest Macs. For example, a Mac II takes over 10 seconds to display the image shown in "The Third Dimension." Multiply that figure by the number of frames needed for smooth animation (at least 16 per second), and the time factor behind 3-D animation becomes all too real. Consequently, no Mac 3-D graphics program provides real-time animation features. You can't draw a car, for example, and watch it move as you move the mouse.

But if you're patient, you can still create stunning 3-D animations. Many 3-D programs let you create animation sequences that you can save and play back or import into VideoWorks or Director for further embellishment. You'll find animation-oriented features in numerous 3-D programs, including Advent's SpaceEdit, Dynaware's DynaPerspective, Visual Information's Dimensions Presenter, Paracomp's Swivel 3-D, Silicon Beach Software's Super 3D, and two new companion programs to MacroMind Director,

(continues)

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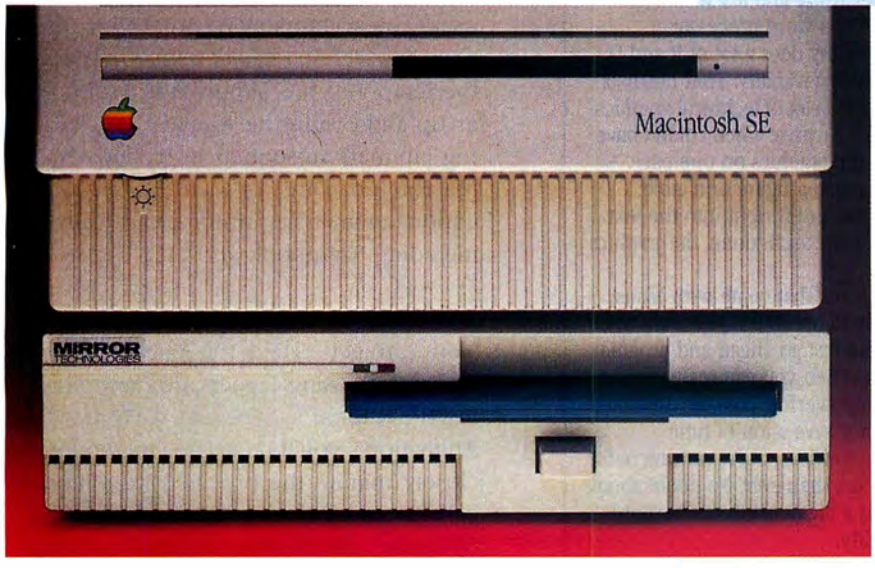

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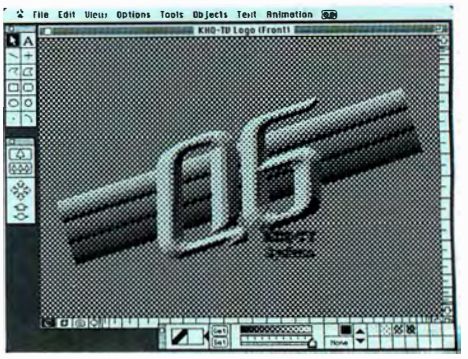
currently in development and code-named 3DWorks and RenderWorks.

The most basic way to create frames for 3-D animation is to alternate between moving the objects (or *the camera*, the 3-D world's term for your vantage point) and issuing a command that saves the screen in a graphics format such as MacPaint or PICT. You can then move the resulting frames into Director, VideoWorks, or HyperCard.

An easier alternative to this move-and-save process is to use a program's tweening feature to create frames. Some programs provide a variation on the tweening theme by allowing you to specify not just the beginning and ending key frames but also *intermediate frames*. These let you use a program's tweening talents to create more complex animation sequences, such as entering a building, turning left, then climbing stairs.



The Third Dimension
With 3-D programs such as Silicon Beach's Super 3D (shown here), you con create animations that provide the illusion of three dimensions. Like most 3-D programs, Super 3D can save animated sequences in files that you can import into VideoWorks II or MacroMind Director.

You can save the frames generated by a tweening session in a number of ways. Some programs, including Super 3D and Dimensions Presenter, let you save frames in a document that you can play back using an accompanying projection program. Swivel 3-D lets you save frames in the Scrapbook file. Super 3D also supports an up-and-coming file format for exchanging animation sequences called *PICS*. MacroMind Director can import (and export) animations in numerous formats, including Scrapbook and PICS.

ANIMATING WITH HYPERCARD

You can get a feel for Mac animation techniques using HyperCard. By following the tutorial in "Creating a HyperCard Animation," you'll be using a method that closely mimics the process of traditional cel animation; it's also similar to the frame-by-frame animation techniques you can use in VideoWorks and Director. Another technique that usually provides faster animation than the frame-by-frame approach is to create HyperTalk scripts that select objects and move them on the screen. One such script is shown in "Remote-Control Painting."

The best way to add animation to stacks is to create it using VideoWorks and then use MacroMind's Play VideoWorks driver to play them from within a stack. A driver for playing Director animations is also in development.

(continues)

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WHAT ABOUT TALKIES?

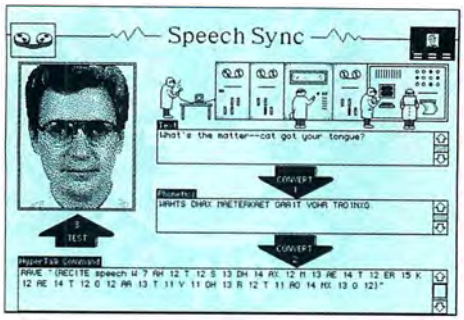
The extent to which you can add sound to an animation depends on your animation program, on the nature of the sound, and on your Mac's memory and storage capacities. MacroMind Director has the most impressive audio capabilities of any Mac animation program. Director can use Apple's Macintalk speech driver to produce synthesized speech, and it includes a library of synthesized sound effects. Some are convincing, but most have a decidedly electronic sound to them.

A better way to sound off is to exploit Director's ability to play back sounds that you digitally record, or *sample,* using Farallon Computing's MacRecorder, the Impulse Audio Digitizer, or Digidesign's professionally oriented Sound Tools system. Director can also control music synthesizers by transmitting commands using the musical instrument digital interface (MIDI). If you have a sampling keyboard such as an Ensoniq Mirage or EPS, you can use the keyboard to record high-fidelity sound effects and narration and trigger the audio by having Director transmit MIDI commands to the keyboard. (For MIDI details, see "Music for Beginners," *Macworld,* April 1989.)

Animators using HyperCard or Silicon Beach's SuperCard can include synthesized and sampled sound in animations, too. And by combining HyperCard with Bright Star Technology's HyperAnimator, you can create animated talking heads whose mouth movements are synchronized with sampled or Macintalk-generated speech (see "Read My Lips"). Bright Star's SuperAnimator, which should be available by the time you read this, is an animation system designed to take advantage of SuperCard's color features.

NO BARGAIN MATINEES HERE

With its digital audio, color, and 3-D capabilities, the Mac makes a mighty impressive screening room. Unfortunately, the price of admission is high. Sophisticated animation and 3-D drawing programs are costly, and they have nearly insatiable hardware appetites. MacroMind Director, for example, retails for $695 and needs a minimum of 2MB of memory for color work; 4MB or 5MB is a more reasonable amount, especially if you use sampled sound. To transfer your work to videotape, add a specialized video board that outputs video signals in the NTSC format used by consumer and professional video gear. Throw in a hard disk for storing your movies, and you may not be able to afford popcorn.



Read My Lips

You can use HyperAnimator with HyperCard to synchronize the mouth movements of this talking head with digitized or Macintalk-generated speech. HyperAnimator's Speech Sync mode converts text into phonetic codes and creates the HyperTalk commands needed to play back digitized sound. The numbers in the HyperTalk command represent timing values that control for how many sixtieths of a second each mouth and facial expression appears.

But I don't want to discourage would-be animators on a budget. If you're content to create black-and-white animations and view them on screen (or even film them frame by frame from the screen), you can get by with a smaller system. Many of the programs I've discussed run—or at least trot—on a 1MB Mac Plus. And if you have HyperCard, you already have a serviceable animation program.

Some traditionalists in the animation world decry computer animation, just as some musicians deride synthesizers and MIDI. I'd hate to see traditional cel animation disappear, but I also enjoy the distinctive, ethereal look that 3-D computer animation provides. Computer animation combines the magic of moving pictures with the art and science of mathematics and technology. Winsor McCay would have loved it. ■

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

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Jamille
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Leawood BOLD
Leawood BOLDITALIC
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Liberty OUTLINE
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Souvenir
Souvenir ITALIC
Souvenir DEMI
Souvenir DEMI ITALIC
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Stone Inf. MEDIUMITALIC
Stone Inf. SEMI BOLD
Stone Inf. SEMI BOLD ITALIC
Stone Inf. BOLD
Stone Inf. BOLDITALIC
Stone Sans MEDIUM
Stone Sans MEDIUM ITALIC
Stone Sans SEMIBOLD
Stone Sans SEMI BOLD ITALIC
Stone Sans BOLD
Stone Sans BOLD ITALIC
Stone Serif MEDIUM
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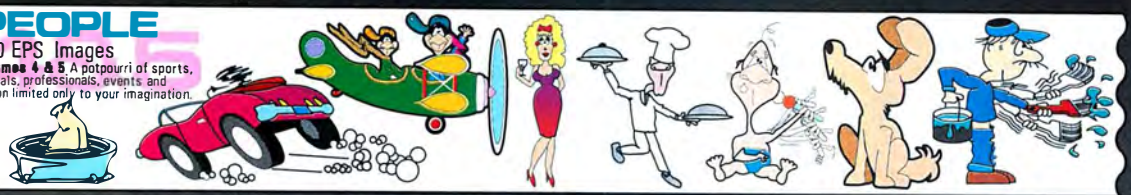

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This ad - color and all - was created with Image Club clip art and typefaces using a Mac II, PageMaker 3.0.1, Illustrator 88 and FreeHand 2.0. Color separations were output as negatives on a Linotronic.

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Insights on FreeHand 2.0

Techniques for enhancing your creativity while reducing your work time

by Simon Tuckett

When the object-oriented drawing program Aldus FreeHand hit the market in late 1987, it sported a name that barely described just one of its capabilities. Now version 2.0 has added a powerful autotrace feature, TIFF image manipulation and printing, extensive text controls, and many other useful features.

But because FreeHand provides so many options and so much technical control over images, you might have trouble finding the most efficient way to draw. The following tips will help novices and experts alike to create the images they are after more quickly and effectively. Our thanks to Arne Hurty, *Macworld* senior design associate, and Michael Reiher, Aldus software support technician, for their help in shaping this column.

USING LAYERS EFFECTIVELY

Think of a FreeHand document as a series of 200 layers, with layer 200 on top, layer 100 in the middle, and layer 1 on the bottom. Imagine each layer as a sheet of clear acetate. You can move objects between layers using the Set Layer command (⌘-hyphen). Moving an object to layer 200 (⌘-hyphen) places it over all other artwork. Moving it to layer 1 puts it underneath anything on layers 2–200. Remember, the commands Bring to Front and Send to Back apply only to the layer on which a selected object sits.

By assigning different parts of an illustration to different layers, you can significantly reduce your work time (see "Layering for Speed"). Use the Layer Control command in the View menu to show only the range of layers on which you want to work. Because other layers and their contents are temporarily hidden, the program doesn't waste time redrawing them every time you make a change.

SETTING DEFAULTS

You can create your own default settings by replacing the existing template called Aldus FreeHand Defaults with a new template using the same name. Any new document that you create is automatically set up as an untitled copy of the template.

KEYBOARD COMMANDS

Users of Aldus PageMaker or Adobe Illustrator 88 will find that some of the most common commands in those programs also work in FreeHand. For example, FreeHand uses the spacebar to bring up the grabber hand, and ⌘-W to display a complete image in a window—commands that are both used in PageMaker. Like Illustrator, FreeHand uses the Option key to toggle between zooming in and out. With any of the image-modification tools (scale, shear, reflect, and rotate) selected, you can access a dialog box by pressing the Option key while clicking in the drawing window. There, you can specify the actual parameters of the modification you're making.

It's helpful to memorize as many keyboard shortcuts as possible since many are tucked away in hard-to-locate hierarchical menus. It's much easier to use keyboard shortcuts like ⌘-F and ⌘-B for popular commands like Bring to Front and Send to Back than to search them out in the menu bar. Don't forget that ⌘-Z does much more than the normal Undo function. By resetting the levels of Undo in the Preferences dialog, you can retrace up to your last 99 steps in the program. But the more Undo levels you have, the less memory you'll have for the drawing.

(continues)

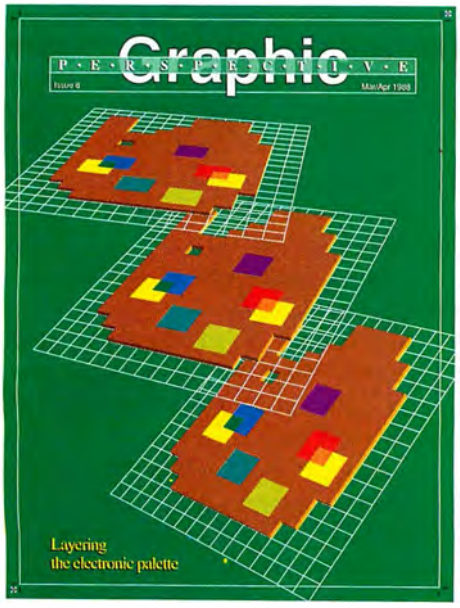
To instantly stop a screen redraw, press ⌘-. (period). Another handy shortcut involves the Tab key—use it to deselect an object when you don't want to bring up the pointer tool.

CLONES AND DUPLICATES

Cloning an object places a copy directly over the original. The Duplicate command copies an object but offsets it to the lower right by some 12 pixels. The offset duplicate will snap to a grid if the grid increment is larger than 10 points. Transformation functions such as skew, scale, and rotate that are performed on the duplicate will be performed again on subsequent duplicates. For example, if you duplicate a circle and skew it 15 degrees, each duplicate of the previous duplicate will be skewed an additional 15 degrees.

TEXT CONTROLS

Because it's difficult to remember which button-modifier key combinations perform which functions on a text block, it's helpful to make a chart of some of the most commonly used keyboard shortcuts to keep beside the Mac as a quick reminder (see "Text-Control Combos").



Layering for Speed
For this illustration, I assigned each of these "electronic palettes" to a different range of layers so that I would need to work with only a small range of layers at a time. Because FreeHand did not have to redraw the entire illustration each time I changed a small part of it, my work time was greatly reduced.

CLICK AND DRAG	None	Option	Shift and Option
Corner handles	Change wrap	Condense/expand type	Scale type
Top and bottom handles	Change leading	Change leading	Change leading
Left and right handles	Change letter spacing	Change word spacing	Inadvisable!

Text-Control Combos
Use this cross table as a reminder of which effects you get from using the various button/modifier key combinations on text blocks.

When you're about to create a text block, clicking and dragging horizontally tells the program in advance how wide you want a text block to be.

POSITIONING FRACTIONS

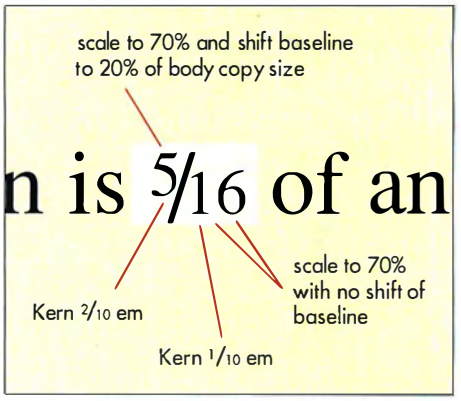
To set a fraction within a block of copy, select the first number in the fraction in the Text dialog box, set it at 70 percent of the body copy size; adjust the baseline to about 20 percent of the point size; kern (⌘-Backspace) the slash $^{2}/_{10}$ of an em, kern the next character $^{1}/_{10}$ of an em, and set it at 70 percent of the body copy size (see "Fractional Output").

TEXT ON A PATH

To join text to a path, select a path and a text block and type ⌘-J or select Join Elements in the Element menu under Special. Once text and path are joined, text attributes can be changed by opening the Element Info window (⌘-I) and clicking on the Edit Text button.

Once you've joined text to a path, if you try to scale the text/path combination the text won't scale unless you group the joined text and its path. But if you ungroup these elements, the text reverts back to its original size. The only way to avoid that is to scale the text and the path independently before you join them.

Remember that by changing the alignment of text to ragged left, ragged right, or centered, you can have it sit at either end or in the middle of the path. Justified type will be word-spaced along the path. If you want to set type evenly around a circle,



Fractional Output
The kerning tool in the Text dialog lets you quickly and efficiently position a fraction inside a text block.

start the line of type with a space in order to keep the first and last letters from crashing into each other (FreeHand ignores spaces at the end of a line).

Type joined to a circle sits by default on the outside of the circle. If you want to set type inside a circle, select the path before joining the elements and use the reflection tool to flop it. Then select both elements and join them.

UNCLUTTERING A DRAWING

If a drawing is getting complicated and you want to move some of the elements out of the way, you can group and temporarily hide a series of objects by sending the group to a hidden layer. When ungrouped from that hidden layer, each object returns to its original layer.

Another way to get unwanted elements out of the drawing area is to select them and use the Move command (⌘-M) to send them out of the drawing area (it's best to choose an even number of inches that will be easy to remember). To move

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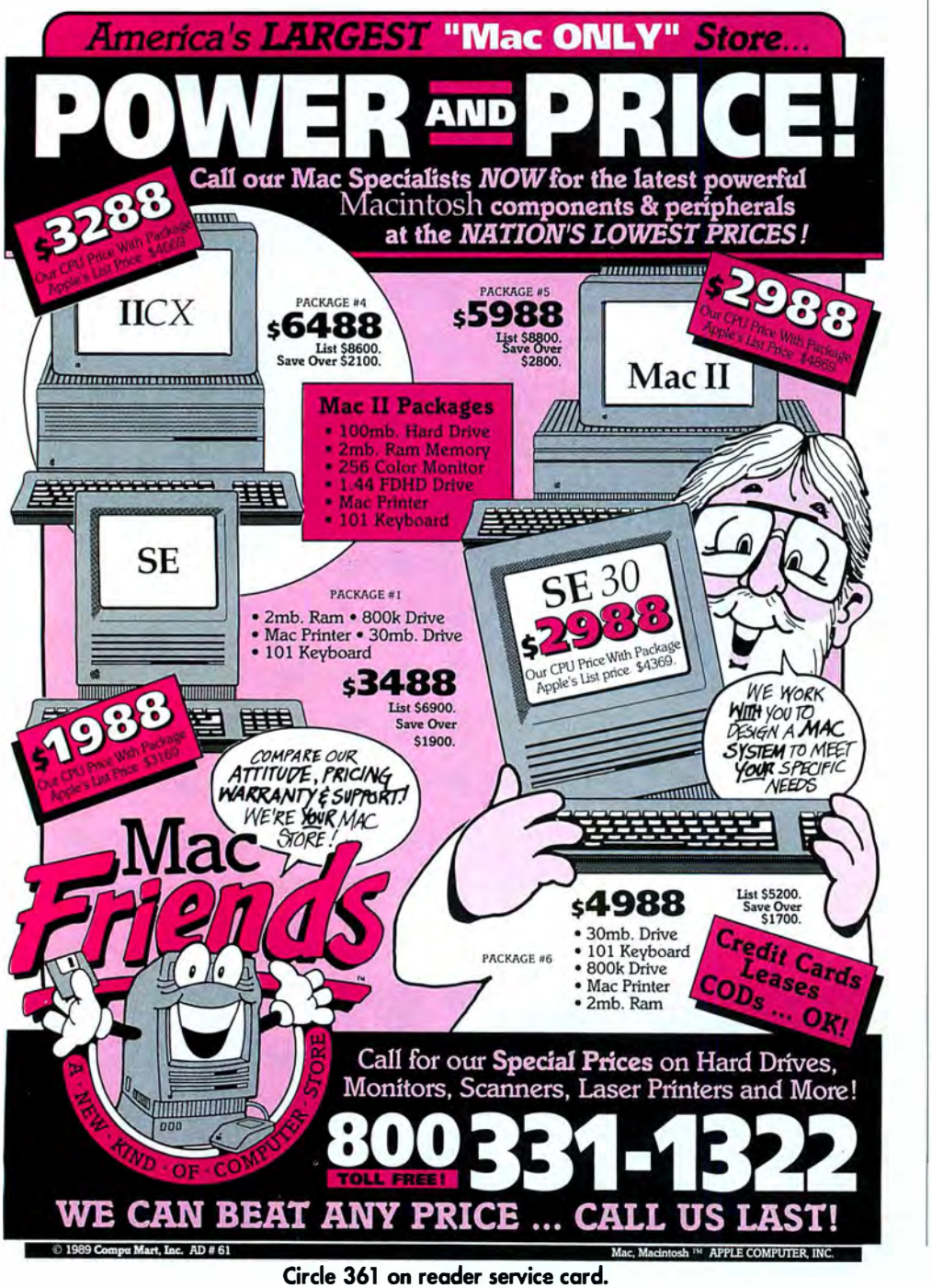
them back, reverse the process.

To create a visible grid, first set the grid size in the Document Setup dialog box (under the File menu). For example, set the grid at 5 points and then, using the line tool, draw a vertical line and, while it is still selected, choose Basic from the Line menu. In the dialog box that appears, name the line Grid. Use the Send to Layer command to send the selected line to Layer 0 and then clone it. Use the pointer tool to move the clone one grid unit to the right, and then use the duplicate command to create another copy farther away. Do this progressively across the page using ⌘-D. Do the same for a horizontal line, but this time draw the initial line at the top and move the clone down. Anything on the background layer (Layer 0) appears in gray. You can use the Layer Control command to either hide or show the grid.



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PAGE ALIGNMENT

To center artwork on the page, first group the artwork. Draw a rectangle the same size as the page and lock it. Select all and choose Alignment from the Element menu (⌘-/ [slash]), then click Vertical: Center and Horizontal: Center. Click OK, unlock the page outline, and then delete it.

FREEHAND TOOL

Using two of the three control points (corner and curve), the freehand tool creates a path that interprets the line you've drawn. To control how accurately FreeHand interprets your line, double-click on the freehand tool and modify the two sliders (curve fit and corners), which determine how many control points are used. To create a straight line using the freehand tool, keep the mouse button down and press the Option key at the point you want the straight segment to start and let go at the point you want it to stop.

If you have a problem connecting the first and last points of a path, either Get Info on the path and check the Closed checkbox or select one of the end points and move it directly above the first point, click on the path, and Get Info again to make sure it has closed. To progressively remove points in an open path, use the delete key on a selected end point: delete until you have gone back to the point where you want to branch off.

COMBINATION TOOL

If you press the Option key while drawing a curve point, you can create a cusp; if you press the ⌘ key while dragging, you can move the selected point around. This means that you can draw an entire path without stopping to edit.

PATH EDITING

Select an ungrouped path and use any of the path tools to place a point along the path. When joining different paths, you must place the end points for both paths within the existing snap-to distance before selecting Join Elements under Special from the Element menu (⌘-J). The program joins all selected paths with points positioned directly over other points.

To pull bezier control handles from a

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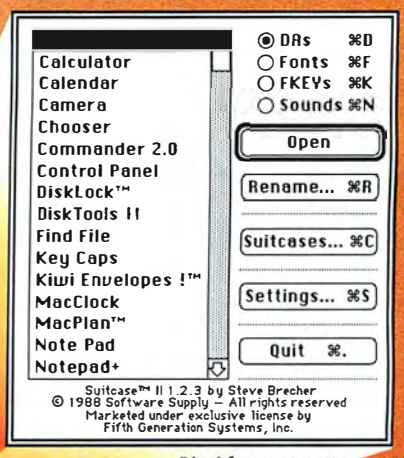

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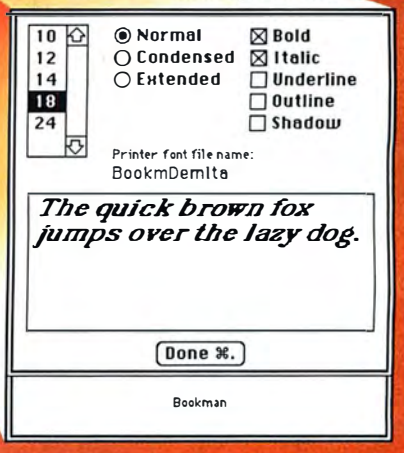

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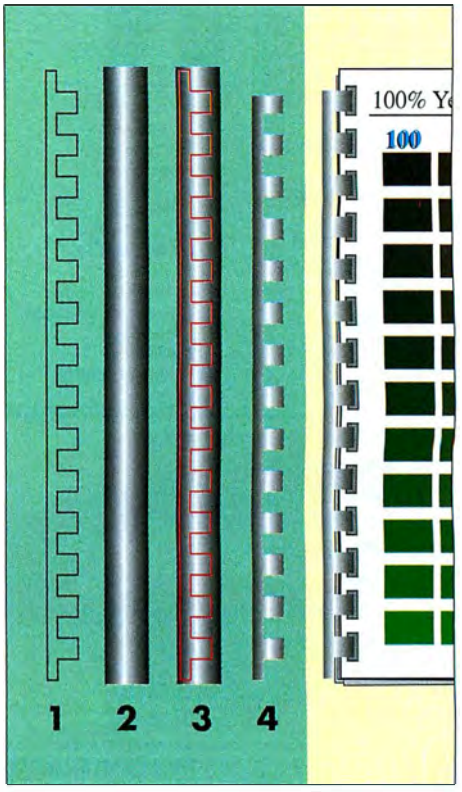
corner point, use the pointer tool while holding down the Option key to click and drag from the corner point.

PASTE INSIDE

The ability to paste text, paths, or simple elements inside closed paths is often overlooked. Here's how you'd use it to simulate Cerlox binding (see "Elements within Paths"). With the grid on and set to increments of about 5 points, use the corner-point tool to create a path that steps back and forth in a series of crenellations. Then with the grid turned off, draw two side-by-side rectangles (with Line set to none) that together are slightly wider than the comb outline, and simulate a glossy highlight by filling them with shades that graduate from dark at the outside to light at the center. Position the comb outline over the two rectangles, and select and cut them from the document.



Elements within Paths
To produce the Cerlox binding comb in this illustration of a printer's color book, you first draw a stepped path (1). Next create a cylinder using two rectangles side by side (2). Position the comb over the cylinder (3). Then cut the cylinder from the document, select the comb, and Paste Inside (4).

Select the comb outline and choose Paste Inside from the Edit menu. The graduated shades then appear inside the path to give the appearance of a Cerlox binding comb with a reflective surface. To reposition the rectangles, select the comb and choose Cut Contents from the Edit menu.

AUTOMATIC TRACING

The Trace tool works best on large, bold graphic elements. If the Trace tool is not working to your satisfaction at the size you want (nuances in the outline are not being traced accurately enough), try enlarging the element to be traced three or four times (by using the scale tool, holding down the Option key, and clicking in the drawing window). Try autotracing a high-contrast bitmap that has been imported and scaled up three or four times for better resolution. But unless the bitmap is simple, the file that FreeHand creates

(continues)

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The power and performance of big system CADD...MicroStation Mac

Intergraph introduces MicroStation Mac – microCADD software merging the power of 2D/3D engineering design software with the ease of the Macintosh user interface.

Multiple-screen graphics

MicroStation Mac supports a maximum of eight separate views of a design. These are resizable and can be placed on any of up to six graphic screens, the maximum supported by the Macintosh. This allows for better display flexibility, resulting in more productivity and less design time.

Reference files

MicroStation supports 2D and 3D design and reference files so a user can attach up to 32 design files to the current file for reference. Reference files can reside locally or be accessed remotely over a network, thus allowing users working on the same project to view all the files simultaneously.

Fully Intergraph-compatible

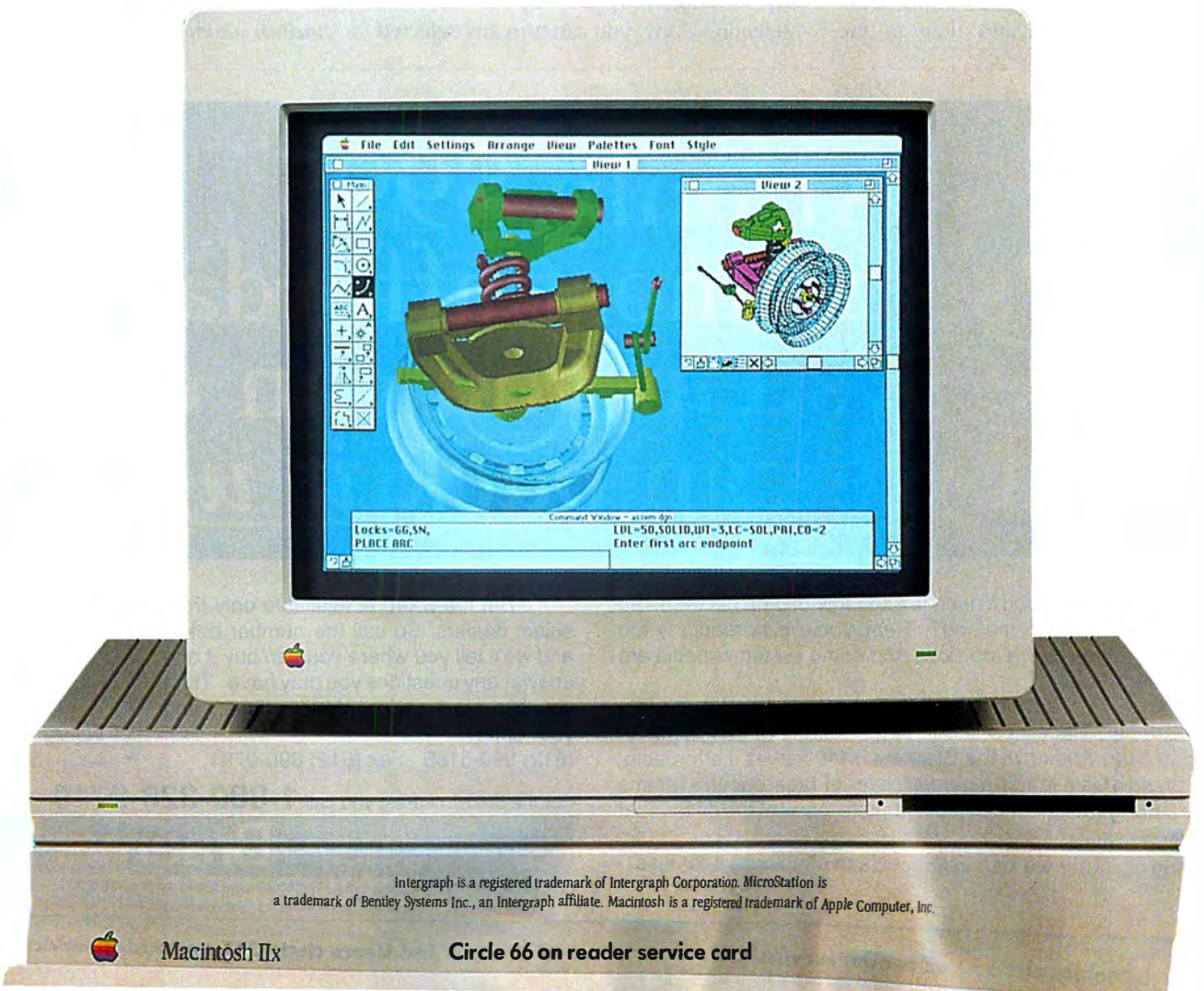
Files are maintained in the same binary format on every platform so that MicroStation/IGDS files can be freely transferred between the VAX, PC, Intergraph workstation, and Macintosh with no translation required.

With over 450 commands and features to meet your design needs, MicroStation Mac exemplifies the most complete functionality of any CADD package available for the Macintosh, making MicroStation Mac your best choice for design needs.

For further information on MicroStation and the Intergraph Education Center and Reseller programs: in the U.S., call 800-345-4856; in Alabama only, call 800-345-0218; outside the U.S., contact an Intergraph sales office.

INTERGRAPH

Image showing the Apple Macintosh user interface.



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Macintosh IIx

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will be huge, so you should avoid tracing complicated bitmaps, such as patterns or maps. Delete unnecessary points to reduce the size of the file. When deleting, select small chunks rather than large areas and delete them as you go, because the selection process slows considerably as the area gets larger. If the tracing looks good, group it immediately.

To trace a scanned TIFF file, first import it using the Place command. Then with the file selected, choose (⌘-I) and posterize the image with only two gray levels showing by clicking on the Black and White radio button and then dragging across the vertical bars in the graymap. Click on the Apply button frequently to see how your modifications are changing the image. When the image looks right, click OK and drag the autotrace tool over the image to trace it.

One way to quickly find the desired scale factor for resizing a complicated shape or object is to trace an outline of the shape with the freehand tool and then scale the outline. To do that, select the scale tool, and click and drag in the window until the outline is the right size. Use the Shift key while dragging if you want a proportionate scale. After you've finished scaling, and before doing anything else, hold down Option and click anywhere in the drawing window. The Scale dialog box appears showing the most recent scale factor. Delete the outline after you've used it to determine the proper scale factor.

Now select the artwork you want to scale, and with the scale tool selected, press the Option key and click in the drawing window. Use the same scale factor you jotted down to scale the complex object. Before clicking OK, decide whether you want any of the lines in the complex shape to lose their predetermined style. If you do, merely group everything to be scaled. If you want lines to retain their style, keep them ungrouped and make sure the Lines box in the scale dialog stays unchecked.

EXPORTING FILES

By holding down the Option key and selecting Copy, you can turn any selected art into a black-and-white PICT bitmap with embedded PostScript commands. You can paste the bitmap into a program such as Microsoft Word 3.02 and print at the resolution of your PostScript printer.

To print the smoothest graduated and radial fills, set the Print Quality radio button in the Print dialog box to Better, rather than Faster. The fills should be considerably smoother, although they're likely to take much longer to print.

SHARING THE WEALTH

If you've found a tip or a shortcut not mentioned here, spread the word to other *Macworld* readers by sending it to *Quick Tips, Macworld,* 501 Second St., San Francisco, CA 94107. Ⓜ

See *Where to Buy* for contact information.

Simon Tuckett is a graphic designer and the editor of Graphic Perspective, *a quarterly newsletter published in* Electronic Composition and Imaging—*a Canadian desktop publishing magazine.*

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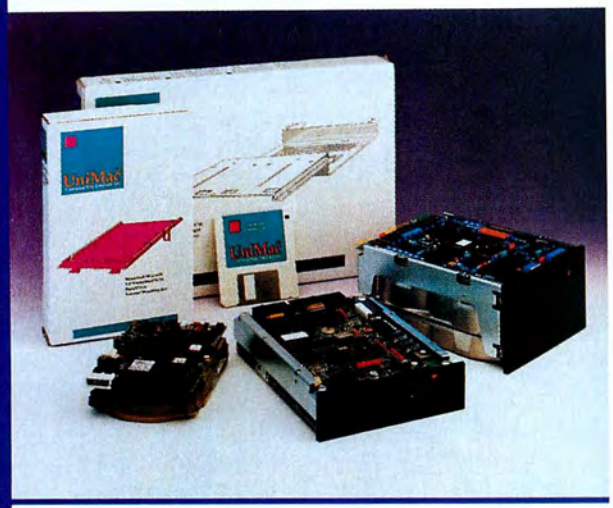
HARD DRIVES



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UPDATES

This list brings you the highlights of software updates recently received but not yet tested. The first price is the upgrade cost for registered owners; the second is the current list price.

Analog Connection WorkBench version 3.0 provides a dialog box in which you set control and data-collection parameters; provides definable icons for user-programmable functions; lets you drag groups of selected icons together on a worksheet; creates paths to hidden files; and has an invisible grid with Snap To function. Strawberry Tree Computers, 160 S. Wolfe Rd., Sunnyvale, CA 94086; 408/736-3083. $50 plus original disk; $995 new.

Bill-It version 2.0 adds the ability to do up to three different automatic monthly billings per customer; produces a file that links with LMM Production's UPS shipping software, The Shipper Plus; and lets you prepare mail merge files from customer lists within the company's original software, ShopKeeper, as well as from lists in Bill-It. This version can export all files. ShopKeeper Software, P.O. Box 38160, Tallahassee, FL 32315-8160; 904/222-8808. $29; $159 new.

Capture version 2.0 is a CDEV so you can set key sequence, and set keys to activate the program. Compatible with 32-bit QuickDraw. Mainstay, 5311-B Derry Ave., Agoura Hills, CA 91301; 818/991-6540. $15; $79.95 new.

ChromaScan version 1.1 scans images in color, gray scale, and black and white. This version has user-defined color tables and lets you rotate scans up to 90 degrees. Improved preview feature gives a clearer image of the scanner bed. Imagenesis, 901 N.E. Loop 410, #630, San Antonio, TX 78209; 512/824-1746. Free; $195 new.

EndLink version 1.1 supports four additional databases. Niles & Associates, 2200 Powell St., #765, Emeryville, CA 94608-1809; 415/655-6666. Free; $99 new.

EndNote version 1.2 now works with Microsoft Word version 4.0. Lets you create footnotes in any style text with Word version 4.0. Niles & Associates, 2200 Powell St., #765, Emeryville, CA 94608-1809; 415/655-6666. Free; $129 new.

Extender GrafPak version 3.0 supports Color QuickDraw for the Mac II and continues support for Color QuickDraw on the Mac Plus and SE. Invention Software, P.O. Box 3168, Ann Arbor, MI 48106; 313/996-8108. $30; $89.95 compiled; $189.95 full source code version new.

Insight Expert Accounts Receivable version 2.2 can import and export data; gives you the ability to customize and print charts and graphs. Layered, 529 Main St., Boston, MA 02129; 617/242-7700. Free if originally purchased after January 1989; $59 if purchased before that date; $695 new.

LetrTuck+ includes kern sets for 24 PostScript fonts. Gives you the ability to create your own kern pairs for any PostScript or typographical font. EDCO Services, 12410 N. Dale Mabry Hwy., Tam-

(continues)

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MACazine
March 1989 / page 52

"I don't know of any other Mac accounting software which contains so many features and modules for the price. . . . This program [**MultiLedger**] is packed with features."
Computers in Accounting
January 1989 / page 21

"My favorite all-around accounting program is CheckMark Software's **MultiLedger/Payroll** set. It was the simplest and most logical program I examined that provided a reasonably full set of accounting capabilities. Its price/performance ratio represents an excellent value."
Macworld
September 1988 / page 169

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pa, FL 33618; 813/962-7800. $48; $147 new.

MacLinkPlus/Wang VS version 4.0 has Wang 2110 workstation emulation and more than 50 file-transfer and file-translation facilities, for documents, databases, and spreadsheets. Provides access to any Wang word processing, data processing, or electronic mail application for authorized individuals. DataViz, 35 Corporate Dr., Trumbull, CT 06611; 203/268-0030. $45; $195 new.

MathType version 2.0 includes a new user interface using pop-up palettes, built-in macro capability, and PostScript-based output. Design Science, 6475-B E. Pacific Coast Hwy., #392, Long Beach, CA 90803; 213/433-0685. Free if originally purchased after November 1, 1988; $35 if purchased before that date; $149 new.

NuPaint version 1.0.4 supports color monitors; contains a resizable eraser; has the ability to use NuPaint's Masking Tape feature. Can mask additional areas and add them to previously taped areas before manipulating the image. NuEquation, 1701 N. Greenville Ave., #703, Richardson, TX 75081; 214/699-7747. Free; $139.95 new.

Printer Interface III version 2.0 does landscape printing of both text and graphics; can reduce the size of an entire document; and supports international and legal characters from font cartridges. Supports HyperCard and works with ASCII cartridges. DataPak Software, P.O. Box 1205, Pahoa, HI 96778; 800/327-6703. $22.50; $125 new.

Professional Image II version 2.0 works with PICT files from MacDraw II and MacDraw 1.9.5 PICT files. Uses a style file to provide consistent colors across multiple presentations. Stokes Slide Services, 7000 Cameron Rd., Austin, TX 78761-4277; 512/458-2201. $22; $149 new.

QuarkXPress version 2.1 includes baseline shift for placing selected characters above or below the baseline in .01-point increments; has optional baseline grid for aligning text baselines from column to column across a page; can increase or decrease an existing document's page size; and includes import/export filters for exchanging text with Microsoft Write, WordPerfect, and the Style Tags format. Quark, 300 S. Jackson, #100, Denver, CO 80209; 303/934-2211, 800/356-9363. Contact dealer for update policy; $795 new.

Strategic Conquest Plus version 2.0 comes on a single 800K disk; installs on a hard disk; includes several bug fixes; runs in color. PBI Software, 1155A-I Chess Dr., Foster City, CA 94404; 415/349-8765. $15 plus original disks for owners of Strategic Conquest Plus versions 1.2 and 1.3; $25 plus original disks for owners of version 1.1; $59.95 new.

TimeMinder version 2.0 lets you customize size and font of invoices; lets you select projects for which you want to create a report; features simplified method for manual time tracking; includes a detailed project report that lists projects and amount of time spent on each. Aatrix Software, P.O. Box 5359, Grand Forks, ND 58206; 800/426-0854. $50; $299 new. Ⓜ

To have products listed in this section, send upgraded software, an outline of major changes since the previous release, upgrade price, suggested retail price, company name, mailing address, and phone number to Updates, Macworld, *501 Second St., San Francisco, CA 94107.*

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Kisuaheli neumyx dok barcmope Rewitz gofella queju vinre. Esni uz balo omre rhindupu doan, Neukifa im lenin dakai herangu de sol. Olla gefeph russ nekoscha kalain, hers dokin bulai Bold

Kisuaheli neumyx dok barmope Rewitz gofella queju vinre. Esni uz bal omre rhindupu doan, Neukifa in leni dakai herangu de sol. Olla gefeph rus nekoscha kalain, hers dok Extra Bold

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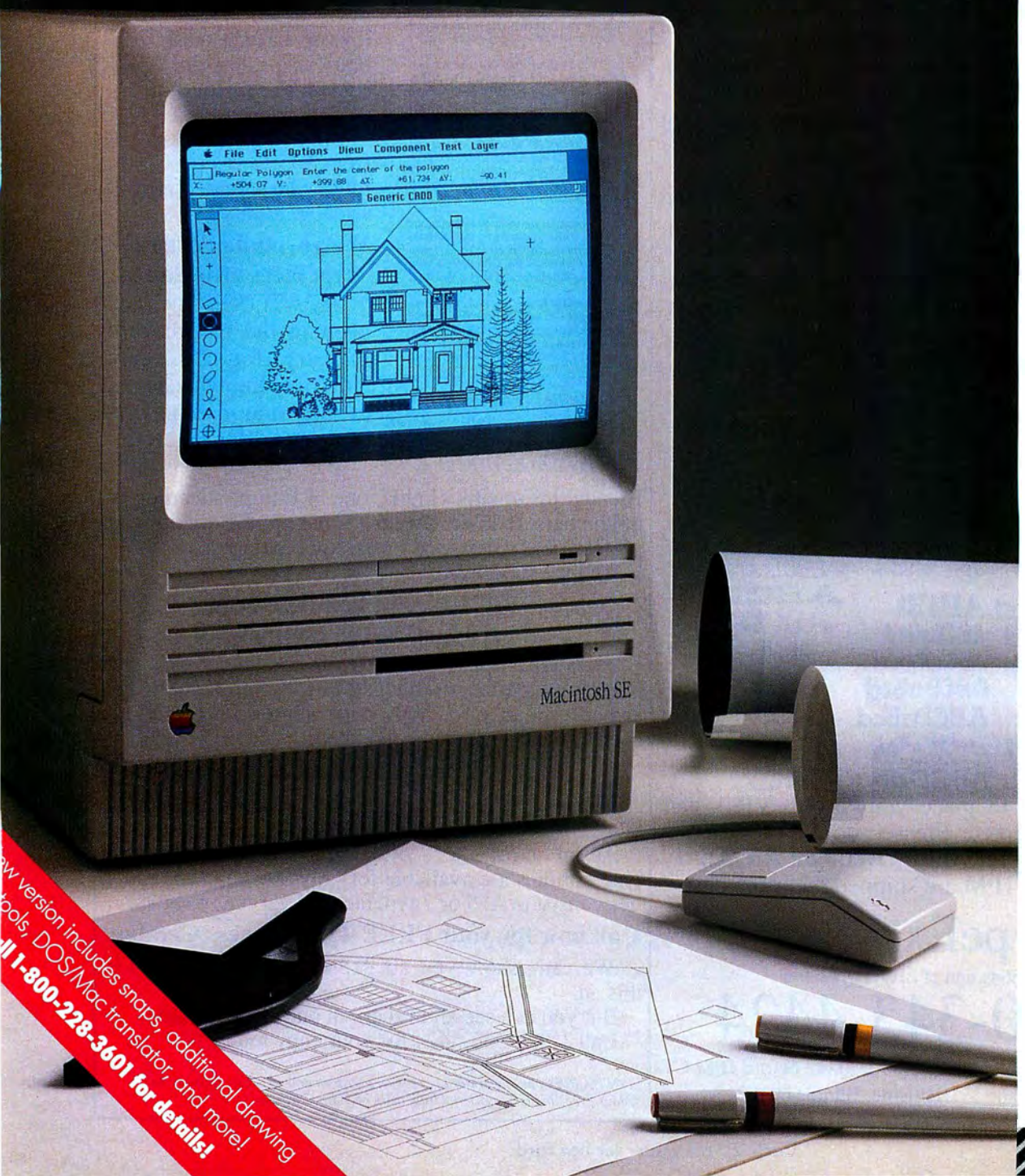

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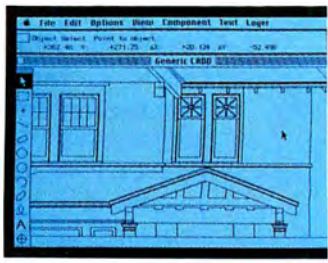

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USER GROUP DIRECTORY

A Guide to Macintosh User Groups

Looking for the latest public domain programs? Want advice on finding a dealer? Need tips on using a complicated program? Chances are a user group can help. Thanks to volunteer support, these nonprofit organizations offer tremendous resources to their members.

This guide contains selected user groups in the United States and Canada, with a special section for national and international groups. Asterisks denote organizations with a particular focus. Unless otherwise noted, the groups are Macintosh specific. Many of the telephone numbers are home numbers, so call during reasonable hours. Apple Computer's toll-free number for user groups (800/538-9696, ext. 500) is also a source of referrals. Listed here are only those public groups Macworld *was able to contact directly. Please let us know if we've overlooked your MUG.*

UNITED STATES

ALABAMA

Birmingham Birmingham Apple Group, Bill Bankson, 205/879-3956; Apple II/Macintosh.

Brownsboro Newton's Tree Apple Users Group, Paul Gulick, 205/881-6964.

Florence Quad Cities Apple Byters, Carl Powell, 205/767-2081.

Huntsville Huntsville Mac User Group, Lee W. Jones, 524 Cleermont Dr., 35801.

Montgomery Macinsteins, Steven Pollard, 205/271-1087.

Ozark Peanuts and Apples, c/o Jack Cumbie, Route 2, Box 100, 36360.

ALASKA

Fairbanks Apple Mousse, P.O. Box 80176, 99708; Apple II/Macintosh.

Sitka Sitka Apple User Group, Sonny Cropley, 907/747-8558; Apple II/Macintosh.

Soldotna Peninsula Mac User Group, Lawrence D. Rorrison, Jr., 907/283-3873.

ARIZONA

Flagstaff Mountain Macintosh Users Group, Dr. Carl Shrader, 602/774-7549.

Page Apple Cart, Warren Michelsen, 602/645-2141; Apple II/Macintosh.

Phoenix Arizona Apple User Group, 602/277-8511; Apple II/Macintosh.

Phoenix AzBUG*, 602/277-8511; business focus.

Prescott Prescott Macintosh User Group, Jeffrey Ian, 602/776-8026.

Sierra Vista Mountain View Computer Users Group, John T. Buono, 602/458-3042; various computers.

Sun City Sun Macs, Dale Miller, 602/974-9598.

Thatcher Gila Valley Apple Growers Association, Bee Lancaster, 602/428-4073; Apple II/Macintosh.

ARKANSAS

Eureka Springs Eureka Springs Apple Users Group, Frank Bland, 501/253-7380.

Fayetteville Fayetteville Apple Users Group, 451 Pharris, 72703; Apple II/Macintosh.

Sherwood Apple Rock, Tom Farley, 501/371-1283; Apple II/Macintosh.

CALIFORNIA

Alta Loma MacWomen*, P.O. Box 638, 91701; business focus.

Anaheim Anaheim Macintosh Users Group, Tina Couillard, 714/999-5141.

Arcata Sequoia Macintosh Users Group, O. J. Palmer, 707/445-3545.

Bakersfield Golden Empire Macintosh Users, 1927 Oregon Dr., 93305-4925.

Berkeley BMUG, 415/549-2684.

Berkeley East Bay Macintosh Users Group, Terry Pennington, 415/486-0147.

Burbank Mac Valley Users Group, David Lagerson, 818/882-4467.

Carmel Club Mac of Monterey, Mark Hickenbotten, 408/899-4821.

Chula Vista Chula Vista Apple User Group, William Reed, 619/426-1677; Apple II/Macintosh.

Claremont CHOMP, Jonathan Knowles, 714/621-2333.

Cupertino Apple HyperCard User Group*, 408/974-1707.

Cupertino Apple Library Users Group*, Monica Ertel, 408/974-2552; Apple II/Macintosh.

Fresno Sierra Apple Orchard, Carton Taylor, 209/439-2446; Apple II/Macintosh.

Hanford Sequoia Computer Users, Victor Coelho, 209/584-9261; Apple II/Macintosh.

Hayward HayMUG, Nick Barcet, 415/727-0779.

Hesperia Newton's Fruit User Group, Dave Steiner, 619/244-6476; Apple II/Macintosh.

Irvine Mac-in-Tosh, Hugh Faulkner, 714/583-3240.

Lindsay Visalia Mac Enthusiasts Group, Bill Drennen, 209/562-1011.

Los Alamitos West Orange County Macintosh User Group, Janet Mehl, 213/431-2848.

Los Angeles Los Angeles Macintosh Group, Jim Baird, 213/278-5264.

Los Angeles Macbuddhist*, Alan, 213/464-3599; Zen focus.

Los Angeles USC Macintosh User Group, Leonard Wines, 213/937-4082.

Merced Merced Mac, Jack Kersten,

(continues)

209/384-2422.

Modesto Stanislaus Macintosh Users Group, Tom Fitzsimmons, 209/521-0216.

Napa Napa State Hospital Apple Core, Mike Mostafanejad, 707/253-5250; Apple II/Macintosh.

Oceanside North County Appleholics, George Crofts, 619/757-6352; Apple II/Macintosh.

Palo Alto EnviroMUG*, Tim Boyd, 415/646-5946; environmental management focus.

Palo Alto Macintosh Users of ComputerWare (MUCoW), 415/496-1068.

Pleasanton Fire Service Macintosh User Group*, Battalion Chief George Withers, 415/484-8114; fire service focus.

Pleasanton Tri-Valley Macintosh Users Group, James Zuchelli, 415/426-8756.

Point Mugu The Apple Corps, Cynthia Hulsebus, 805/989-4734.

Redlands Inland Empire Mac Users Group, Dave Evans, 714/792-4746.

Redondo Beach South Bay Apple Mac User Group, Gary Fortune, 213/316-7738.

Ridgecrest Ridgecrest Apple User Group, Cyrus Roton, 619/375-9510; Apple II/Macintosh.

Riverside Professional Loma Linda University User Group, 4700 Pierce, 92505.

Roseville I-BUG*, Otto Haiungs, 916/782-5518; various computers, for visually impaired.

San Bernardino AppleJacks of the Inland Empire, Scott Zehm, 714/883-2234; Apple II/Macintosh.

San Diego San Diego Macintosh User Group, Bruce A. Powell, 619/698-1791.

San Diego South Bay Apple Users Group, Steve Palmore, 149 Kneline Way, 92114; Apple II/Macintosh.

San Francisco Gay Macintosh Users Group, Richard Burton, 415/626-2620.

San Francisco Golden Gate Macintosh Users Group, Chuck Wilcher, 415/666-6661.

San Francisco The Hispanic Computing Association*, Juan Lira, 415/824-8337; various computers, bilingual focus.

San Francisco UCSF Macintosh Users Group*, Bruce Payne, 415/476-2008, biomedical focus.

San Jose ChipMUG, Davlyn Jones, 408/298-4090.

San Luis Obispo Apple San Luis Users Group, Robin Grinnell, 805/756-2638; Apple II/Macintosh.

San Luis Obispo SLO Med-Mac Users Group*, Phillip Colbert, M.D., 805/541-6080, medical focus.

San Mateo Women's Special Interest Group*, Rita Zokaei, 415/574-8225 (business hours); various computers.

San Rafael Macs of Marin, Steven Salzman, 415/459-5707.

Santa Ana Mac Orange, Jeff Winters, 714/871-6329.

Santa Clara Association of Apple 32 Users, Hugh Six, P.O. Box 634, 95052.

Santa Clara Programming & Interfacing Enthusiasts, Inc.*, John Williams, 408/446-0858.

Sonora Mac Twain, Ross Payson, 415/533-1993.

Stockton Stockton Apple User Group, Bill Scanlon, 209/223-1535; Apple II/Macintosh.

Stockton University Mac UG, University of the Pacific, John O'Dell, 209/946-3083.

Sunnyvale Apple Professional Exchange*, Michael Bailey, 408/745-0665; corporate focus.

Thousand Oaks Conejo-Ventura Macintosh Users Group, Ed Darling, 805/584-8733.

Venice Original Apple Corps, Fred Duffy, 213/396-5515, Apple II/Macintosh.

COLORADO

Aspen Macintosh Users Group, John Lichty, 303/925-1091.

Colorado Springs Silicon Mountain Mac Users, Gregory Kelley, 719/597-2695.

Denver Mile High Macintosh Users Group, Jim Heffner, 303/869-9393.

Eastlake The Apple Resource Group, Randy Ansley, 303/451-6116; Apple II/Macintosh.

Englewood MacinTech, Michael Phelps, 303/773-6900.

Greeley Greeley Club Mac, J. Johnson, 303/352-4085.

Highlands Ranch Apple Three User Group, Carol Chrzanowski, 303/791-0887; Apple II, III, and Macintosh.

Lakewood Mac West Users Group, Brad Brehmer, 303/989-6800.

Salida Apple Computer Enthusiasts, Bob Luster, 303/539-4806; Apple II/Macintosh.

Trinidad, Mountain Branch Users Group, David Barrack, 303/846-4367.

CONNECTICUT

Bloomfield Connecticut Macintosh Connection, Samuel Steingiser, 203/242-2684.

East Hartford Hartford User Group Exchange, P.O. Box 18027, 06118; Apple II, IIGS/Macintosh.

Gales Ferry Applefield Users Group, James P. J. Lawton, 203/445-6557.

Gales Ferry Thames River Apple User Group, Warren Nordgren, 203/464-9372; Apple II/Macintosh.

Stamford MAC (Macintosh Association of Connecticut), L. Cariri, 203/325-4250.

Weston Hyperfection*, Peter Caylor, 10 Lords Hwy., 06883; HyperCard focus.

DELAWARE

Bridgeville Delmarva Apple Users Group, Barbara Chaffinch, 302/337-8009; Apple II/Macintosh.

DISTRICT OF COLUMBIA

Washington Interior Mac User Group*, DOI Information Technology Center, 202/343-4750.

Washington NASA Headquarters Macintosh Users Group*, Dave Lavery, 202/453-2720.

Washington Pentagon Macintosh Users Group*, Steve Broughall, 202/546-6044.

FLORIDA

Cape Coral Florida's Sun Coast Macintosh User Group, Joseph Urbanek, 813/772-7613.

Holiday Holiday Area Medical Mousers, Ted Sichelman, 4800 Dixie Highway, 34690.

Merritt Island Space Coast Apple Users Group, Elmer Whalley, 407/452-8357; Apple II/Macintosh.

Miami Gold Coast Mac, Dave Game, 305/665-4135.

Miami National Lisa & Macintosh Users Group, Van Martin, 305/447-7888; Lisa/Macintosh.

Naples Naples Mac Friends, Robert Demarest, 813/261-8208.

Nokomis Sun Coast Apple Club, Mark Launder, 813/355-0735; Apple II/Macintosh.

North Fort Myers Swacks, John Prickett, 813/543-6329; Apple II/Macintosh.

Port Charlotte Southwest Florida Mac User Group, James Sands, 813/625-3574.

Stuart Treasure Coast Macintosh Users Group, Paul F. Ely, Jr., 407/283-1374.

Tallahassee Tallahassee Apple

Users Group, Jeffrey Jacques, 904/385-7947; Apple II/Macintosh.

Winter Haven Polk Apple Core, Byron G. Jay, 813/293-2865; Apple II/Macintosh.

GEORGIA

Atlanta Emory Mac User Group, C. W. Hickcox, 404/727-0118.

Augusta The Augusta MacMasters Macintosh Users Group, Jacob Malone, 404/860-6818.

Valdosta South Georgia Apple Core, James Slate, 912/244-9363; Apple II/Macintosh.

HAWAII

Lihue Hawaii MUG, Thomas B. Grollman, 808-245/1633.

Pearl City Hawaii Macintosh User Group, Dale Ott, 808/456-1610.

Puunene Maui MacNuts, Judy Plummer, 808/572-0420.

IDAHO

Boise Apple Boise User Group, George Nunny, 208/344-9506; Apple II/Macintosh.

Boise Macintosh Users Group of Southern Idaho, Jim Van Dinter, 208/362-9108.

Caldwell Canyon Macintosh Users Group, Jim Smithers, 208/454-8862.

Coeur d'Alene IPHAUG, Bob Thackston, 208/664-8348.

Idaho Falls Idaho Falls Mac Users Group, Jeff Summers, 208/523-0004.

Sand Point Macintosh Construction Forum*, Melissa Donohue, 208/263-3078.

ILLINOIS

Arlington Heights Macintosh Developers Consortium*, Fred Bockman, 312/640-8082.

Arlington Heights Northern Illinois Computer Society, P.O. Box 547, 60006; various computers.

Arlington Heights Seminary Mac User Group*, Trinity Evangelical Divinity School, Paul Haroutunian, 312/948-0149; biblical focus.

Carbondale Macintosh User Group of Southern Illinois, Kelly Thomas, 618/529-5000.

Chicago American Bar Association Macintosh Users*, Daniel Kegan, 312/782-6495.

Chicago Illinois Institute of Technology/Macintosh Users Group, Bob Keeney, 312/225-6911.

Chicago Kieffer-Nolde Apple Users Group, Tom Klamm, 312/337-5500; Apple II/Macintosh.

Chicago MCsquared UG, Randell Jackson, 312/341-3654; various computers.

Chicago The Rest of Us, Robin Stern, 312/517-7171.

Chicago Tech Aids and Assistance for the Disabled (TAAD)/Committee on Personal Computer and the Handicapped*, Tom Shworles, 312/866-8195; Apple II/Macintosh.

Chicago University of Chicago Macintosh User Group, Bob Hood, 312/702-3352.

Cobden Southern Illinois Crab Apple Users Group, David Bennett, 618/893-4489; Apple II/Macintosh.

Decatur Decatur Apple Club, 217/428-8145; Apple II/Macintosh.

Elgin Plato Center Apple Users Group, Bill Swanson, 312/464-5272.

Freeburg Metro Mug, Dave Ellsworth, 618/539-5786.

Joliet Illinois Macintosh Users Group, Curtis Hieggelke, 815/744-2073.

Rockford Rockford Area Apple Users, Donald Christians, 815/968-6228; Apple II/Macintosh.

Rockford Stateline Macintosh Users Group, Terry Goodin, 815/633-9494.

Springfield Club Mac of Springfield and Environs, Randy Von Liski, 217/787-8041.

Wheaton Tau*, Richard Rann, 312/653-7640; Apple II/Macintosh, business focus.

INDIANA

Bremen Apple UG Michiana, Hal Main, 219/546-4050; Apple II/Macintosh.

Indianapolis The Apple Pickers Inc., Danice Zoller, 317/291-4042; Apple II/Macintosh.

Merrillville Northern Indiana Apple Users, Vincent Vrotny, 219/736-6929; Apple II/Macintosh.

IOWA

Burlington Apple Burlington User Group, Richard Johnson, 319/753-0846; Apple II/Macintosh.

Cedar Falls Waterloo/Cedar Falls CIA-MUG, Stephen Keve, 319/266-0634.

Cedar Rapids Central Iowa Area Macintosh User Group, Greg Arbuckle, 319/363-1242.

Creston The Tree House, Dennis Lamasters, 515/782-4315.

Des Moines Central Iowa Mac Publishers*, Joe Rosenberg, 515/274-9271; desktop publishing focus.

Des Moines Iowa Macintosh Users Group, Michael Pester, 515/279-9650.

Fairfield Macknowlia, John Hoffman, 515/472-9053.

Marshalltown Apple Seed, Bill Taylor, 515/753-9670; Apple II/Macintosh.

Pella Marion County Computer Club, Michael McGee, 515/628-9431; various computers.

Roland Roland-Story Apple Users Group, Steve Hansen, 515/388-5576; Apple II/Macintosh.

KANSAS

Dodge City Dodge City Apple User Group, Bobby Waldman, 316/227-3107; Apple II/Macintosh.

Salina Technology Resources for Special People*, Dawn Merriman, 913/827-0301; Apple II/Macintosh, for disabled persons.

KENTUCKY

Bardston Kentucky Educators Computer Users Group*, Darrell Witten, 502/348-7379; Apple II/Macintosh.

Frankfort Capital City Macintosh Users Group, Terry Clancy, 502/875-7232.

Lexington Central Kentucky Computer Society, Richard Gelbach, 606/255-3349; various computers.

Radcliff MegaMac Users Group of Fort Knox, Frank Tyminski, 502/351-8224.

LOUISIANA

Lafayette Cajun Macintosh Users Group, Mike Maher, 318/231-5633.

New Orleans Crescent City Apple Corps, Dr. James Abbott, 504/283-3819; Apple II/Macintosh.

MAINE

Bangor MacBang, Roberta Downey, 207/942-3708.

Brunswick Maine Macintosh Owners and Operators, Henry Trujillo, 207/725-8417.

Topsham Mac II Express*, Henry Trujillo, 207/725-8417; Mac II series.

(continues)

MARYLAND

Baltimore Bayview Macintosh Users Group, Mark Fleming, 301/550-1482.
Bethesda Washington Apple Pi, 301/654-8060; Apple II/Macintosh.
Berlin Worcester County Apple Club, Dr. Marsh, 301/641-3575; Apple II/Macintosh.
Columbia Columbia Apple Slice, Tim Childers, 301/997-9317; Apple II/Macintosh.
Westminster WMC MUG, Ed Holthause, 301/857-2477.

MASSACHUSETTS

Amherst UMacs, Jurgen Botz, 11 S. Prospect St., 01002.
Andover Any Body's Information Center, Ann Miles, 508/475-7411.
Boston Boston Computer Society, 617/367-8080; various computers.
Boston Boston Society of Architects*, Steven Dill, 617/267-5175; architectural focus.
Holyoke Valley Interface, Hubert E. Robert, 413/538-7000, ext. 229.
Otis AFB Cape Cod Macintosh Users Group, Capt. Hancock, 508/563-5333.
Scituate East Coast Apple Net, David Allen, 617/545-2696; Apple II/Macintosh.
Somerville Boston Computer Society Macintosh User Group, 617/876-6343.
Somerville BCS Medi-Mac*, Steven Locke, 617/625-7080; medical focus.
South Dennis Cape Cod Apple Users Group, Albert Deckel, 508/896-7286; Apple II/Macintosh.
Wellesley Babson Macintosh Users Group, David Park, 303/259-0726.
Worcester HC MUG, Michael Hallett, 508/793-2591.

MICHIGAN

Ann Arbor Domino's Mac User Group, Greg Aamoth, 30 Frank Lloyd Wright Ln., 48106.
Ann Arbor MacTechnics User Group, 313/454-1702.
Detroit MacGroup-Detroit, Terry White, 313/571-8154.
Detroit Semco Mac Pac, Frank Voss, 313/284-2816; various computers.
Flint The Flint Apple Club, Pat Bollinger, 313/732-9574; Apple II/Macintosh.
Gobles Kalamazoo Apple Computer User, Art Smith, 616/628-2927; Apple II/Macintosh.
Hancock Copper MUG, 621 Lake Ave., 49930.
Lansing Lansing Area Macintosh and Lisa Users Group, Steve Potash, 517/349-3518; Lisa/Macintosh.
Midland Mac-In-Awe Macintosh Users Group, Sheldon Levy, 517/636-0009.
Saginaw Saginaw Macintosh Users Group, Jerry Brasseur, 517/793-8797.
Traverse City Northwest Mac Users Group, George Powell, 616/941-6576.

MINNESOTA

Arden Hills Land O'Macs, Debbie Schultz, 612/481-2224.
Good Thunder MacKato User Group, Timothy Madsen, 507/278-3657.
Hopkins Mini'app'les, Dan Buchler, 612/890-5051; Apple II/Macintosh.
North Mankato Apple User Group, Barb Beebe, 507/387-3398; Apple II/Macintosh.
Rochester Rochester Area Mac Users, Paul Iverson, 507/284-2511.

MISSISSIPPI

Gulfport Apple Users of South Mississippi, Ron Lindsay, 601/831-1473; Apple II/Macintosh.
Hattiesburg University of Mississippi MUG, Mac McKay, 601/266-5067.
Natchez Natchez Apple Users Group, Mac Bryant, 601/442-8185; Apple II/Macintosh.
Oxford Ole Miss Apple User Group, Mark Ray, 601/234-3146.
Starkville Mississippi State University Microcomputer Users Group, Gene Boggess, 601/325-2079; Apple II/Macintosh.

MISSOURI

Cape Girardeau Southeast Missouri Macintosh Users Group, Sam Godwin, 314/243-0335.
Columbia MUSE, The Columbia MUG, Kevin Altis, 314/874-8657.
Jefferson City AppleJac Macintosh Users Group, Thomas R. Piper, 314/634-3102.
Saint Peters Apple Jacks of Saint Louis, Kent Wilbur, 314/441-1613; Apple II/Macintosh.
Shawnee Mission Kansas City Mac Core, Alan Mast, 816/472-7226.
Springfield Apple Squires of the Ozarks, Betty Graves, 417/882-0323; Apple II/Macintosh.

MONTANA

Bozeman About Macintosh, Greg Werner, 406/587-9447.

NEBRASKA

Hastings South Central Nebraska Apple, Barb Hohlen, 402/463-3456; Apple II/Macintosh.
Lincoln Lincoln Informed Macintosh Evangelists, Lee Erisman, 402/489-0556.
Lincoln Mackey Mouse Club, Kris Krutz, 402/466-0252.
Omaha Omaha Macintosh User Group, 311 S. 151 Cir., 68154.

NEVADA

Las Vegas MacGroup, Robert Vale, 702/735-6139.
Sparks Greater Reno Operating Group, Joan Anglin, 702/972-3146; Apple II/Macintosh.

NEW HAMPSHIRE

Etna Big Green Apple Users Group, Norm Chapman, 603/643-6676; Apple II/Macintosh.
Keene MONADNOC Mug, Gary Leighton, 603/357-4531.
Manchester The Apple Manchester User Group, Frank Morrow, 603/778-7229; Apple II/Macintosh.
Nashua Southern New Hampshire Apple Core, Tim Adams, 603/883-1655; Apple II/Macintosh.
North Conway Valley Computer Users Group, Bob Stewart, 603/356-9426; various computers.
Plymouth Pemi-Baker Computer Users Group, Henry Ahern, 603/536-3880; various computers.

NEW JERSEY

Bricktown Ocean Apple Users Group, Richard Lowenburg, 201/920-2353; Apple II/Macintosh.
Madison Jersey Amateur Computer Klub, Leanna Povilaitis, 201/377-0722; Apple II/Macintosh.
New Brunswick Amateur Computer Group of New Jersey, Keith Sproul, 201/821-9063; various computers.
New Milford Bergen County Macintosh Users Group, Judy Engelsberg, 201/262-6729.
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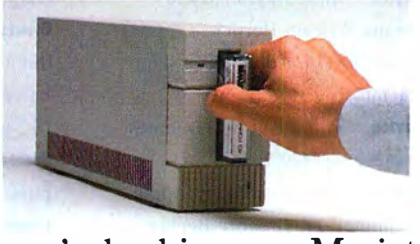

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Northfield Atlantic City Area Mac Users Group, 609/646-8151.
Red Bank Bellcore MUG, Ira Barron, 201/758-2288.
Somerville Ewing Apple Users Group, Allan Migdal, 201/874-8766; Apple II/Macintosh.

NEW MEXICO

Albuquerque Applequerque Computer Club, Kris Jensen, 505/265-6094; Apple II/Macintosh.
Las Cruces Aviation & Computer Enthusiasts*, Carl Bogardus, 505/526-5645; various computers.
Roswell Apples on the Pecos, Dan Baggao, 505/623-1234; Apple II/Macintosh.
White Sands Missile Range Las Cruces Apple Users Group, Harry McCaffery, 505/678-3410; Apple II/Macintosh.

NEW YORK

Albany Northeastern Users of the Mac, Janis Chevalier, 518/235-9142.
Bethpage MAUG, Neil Shapiro, 516/735-6960; Apple II/Macintosh.
Brooklyn Earth News*, Jonathan Gleich, 718/934-4439; Apple II/Macintosh; meets online.
Croton-on-Hudson NOW-MUG, 914/271-2155.
Hamilton Colgate University Macintosh User Group, Pete Jorgenson, 315/824-1000, ext. 742.
Liverpool MacEvangelists, Jean Armour Polly, 315/457-0310.
New Windsor Eastern Orange Mac Users Group, Fritz Kass, 914/561-4132.
New York Computer Hebrew User Group*, Michael Rand, 212/923-4825; Apple II/Macintosh.
New York DMR Group, Lyle Anderson, 212/949-6655; Apple II/Macintosh.
New York New York Mac Users' Group, 212/691-0496.
New York NYUser*, Dr. Martin Nachbar, NYU School of Medicine, Hippocrates Project, 550 First Ave., 10016; designs videos for medical students.
Oneonta MUG One, Richard D. Johnson, 607/432-0131.
Rochester Apple-Ace Computer Club, Bob Stein, 716/247-4154; Apple II/Macintosh.
Saratoga Springs Skidmore Mac Enthusiasts, John Danison, 518/584-5000.
Schenectady MECCA, Don Rittner, 518/374-1088.
Syracuse The Syracuse Apple Users Group, Richard R. Lloyd, 315/677-3660; Apple II/Macintosh.
West Nyack Crab Apple, Stephen Wulsson, 914/357-0867; Apple II/Macintosh.
West Point USMac, Capt. Joe DiGangi, 914/938-2559.
Whitesboro Upstate Apple Users Group, George Engel, 315/336-8060; Apple II/Macintosh.

NORTH CAROLINA

Fayetteville Fayetteville Macintosh Users Group, Bob Bullard, 919/867-4582.
Greensborough Triad Apple Corps, Mike Fabish, 919/855-8315; Apple II/Macintosh.
Greenville Greenville Macintosh User Group, Scott Recker, 919/355-2620.
Murphy Rural User Group, Roxanne Diesel, 704/837-8035; Apple II/Macintosh.
Raleigh North State University Apple Computer User Group, Rick Fincher, 919/787-3194; Apple II/Macintosh.
Research Triangle Park EPA-RTP Macintosh Users Group, Theresa Rhyne, 919/541-0207.
Wilmington C.I.N.N.A.M.E.N., Doug Acker, 919/392-6962; Apple II/Macintosh.

NORTH DAKOTA

Bismarck Bismarck Macintosh Society, Charles Foy, 701/255-3613.
Minot Minot Macintosh Users, David Aas, 701/857-6183.

OHIO

Bowling Green Bowling Green Macintosh User Group, Keith Bernhard, 419/372-6005.
Canton Mac2, Jill Fontana, 216/929-5341.
Cincinnati Apple Board, Jason Herman, 513/561-2225.
Cleveland CWRU Macmug, Tom Evans, 216/368-2011.
Cleveland NEO Apple Corps (North Eastern Ohio), Marvin Mazoh, 216/561-6656; Apple II/Macintosh.
Dayton Apple-Dayton Users Group, William Herrick, 513/293-8114; Apple II/Macintosh.
Dayton Wright-Patt MUG, James Coates, 513/429-2488.
Warren Mahoning Valley Apple Computer, Fr. Gregory Becker, 216/372-1159; Apple II/Macintosh.
Willoughby Northeast Ohio Apple Corps, Gerry Gentile, 216/953-4401; Apple II/Macintosh.

OKLAHOMA

Altus Altus Apple Users Group, Dave Stahre, 405/477-1533; Apple II/Macintosh.
Bartlesville Bartlesville Users of Macintosh Society, John Blaesi, 918/333-6536.
Enid Enid Appleseeds, Carolyn Watts, 405/234-3382; Apple II/Macintosh.
Lawton Southwest Oklahoma Apple Orchard, Gary Smith, 405/536-0109; Apple II/Macintosh.
Norman The Big Red Apple Group, Rex Suba, 405/329-2952; Apple II/Macintosh.
Ponca City Mac Pac, Gary Lanman, 405/762-9486.
Tishomingo Tish Apple, Jim Kennedy, 405/371-2371; Apple II/Macintosh.
Tulsa GCCA, Mike Lester, 918/835-9669; Apple II/Macintosh.
Tulsa Tulsa Users of Macintosh Society, Jim Weems, 918/252-3596.

OREGON

Astoria Lower Columbia Apple Users Group, Bob Blue, 503/325-4768; Apple II/Macintosh.
Corvallis MUG of Corvallis, Lew Nelson, 503/757-1277.
Eugene Eugene Macintosh Group, Gary Darnielle, 503/342-7928.
Grants Pass Mac Users of the Rogue Valley, Mike Barrelclift, 181 Rustic Canyon Dr., 97526.
Grants Pass Rogue Area Computer Enthusiasts (RACE), Harold Miller, 503/479-1248; various computers.
Hood River Hood River Apple User Group, John Gerstenberger, 503/354-1233; Apple II/Macintosh.
Medford Rogue Macs, Tom Pentland, 503/773-9861.
Portland Macintosh Apple Corps, 5605 N. Detroit Ave., 97217.
Portland Macintosh Business Group of Oregon*, Douglas Schryver, 503/620-0866.
Portland Portland Macintosh Users Group, Brian Seligman, 503/228-1779.
Salem Salem Macintosh Users Group, Doug Parrow,

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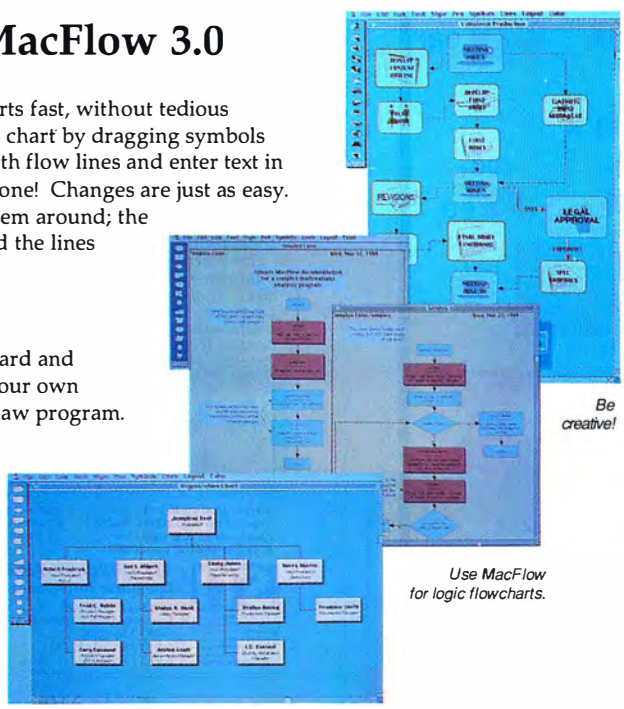

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Winston Apple Blossom Club, Terry Cooper, 503/679-8458; Apple II/Macintosh.

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Acme Apple Pits, Dean Westervelt, 412/547-4289; Apple II/Macintosh.

Allentown Air MUG, Andrew Gilicinski, 215/481-5958.

Allentown Lehigh Valley Apple User Group, Wally Ely, 215/437-0065; Apple II/Macintosh.

Bradford Macintosh User Group, Ed Stevens, 814/362-7791.

Butler Apple Butler Users Group, Bob Tait, 412/789-7031; Apple II/Macintosh.

Camp Hill Capital Area Macintosh Users Group, Jerry Britton, P.O. Box 78, 17001-0078.

Easton Eastern Pennsylvania Macintosh UG, Terry Puncliac, 215/253-4380.

Elkins Park Macintosh User Group-ers, Jason Ehrlich, 215/782-1328.

Harrisburg Keystone Apple Core, William Miller, 717/259-0827; primarily Apple II.

Hershey Hershey Apple Core, Tom Loser, 717/838-2952; Apple II/Macintosh.

Lancaster Mac Users Group, Chris Iverson, 717/295-9536.

Monaca Moon Area Users Group, Bob Davis, 115 Legoullon Ave., 15061; Apple II/Macintosh.

Narberth CPA Computer Users Group*, Ray Woodall, 215/664-6775; various computers.

Philadelphia The D Users, Michael Knauer, 215/895-2573.

Philadelphia DV & DUMUG, Melanie Hoag, 215/895-2997.

Philadelphia PennMUG, Ammar Anbari, 215/483-3367.

Philadelphia Philadelphia Area Computer Society, Ted Roth, 215/672-2706; Apple II/Macintosh.

Telford Bux Mont MUG, Glenn Groupafton, 215/723-6900.

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Providence Brown Mac User Group, Stuart Hamlyn, 401/863-1419.

Providence Rhode Island Apple Users, Gerald Heller, 401/751-7155; Apple II/Macintosh.

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Shaw AFB Apple Too, Bill Davis, 803/499-1580; Apple II/Macintosh.

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Rapid City Black Hills Apple User Group, Richard Dlugosz, 605/348-9173; Apple II/Macintosh.

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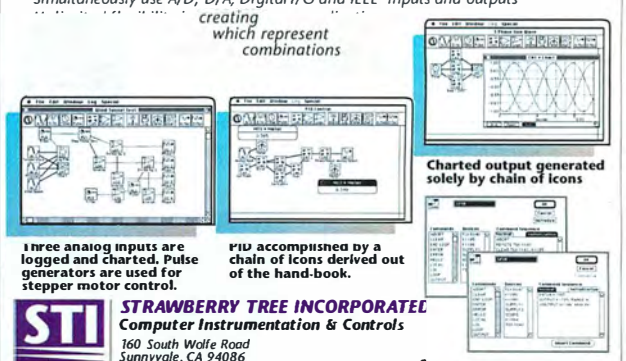

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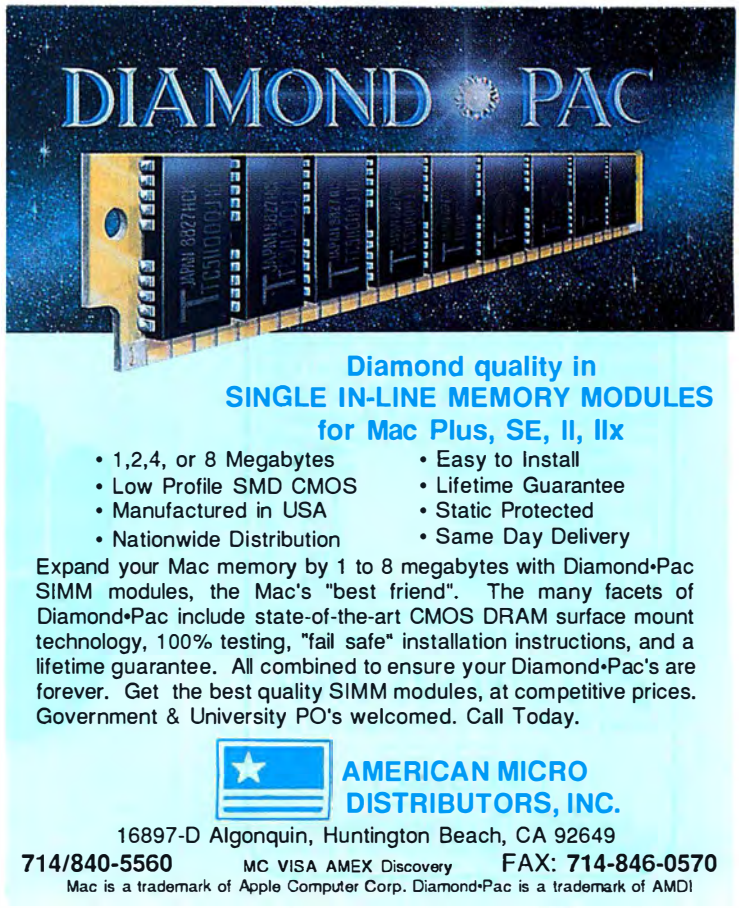

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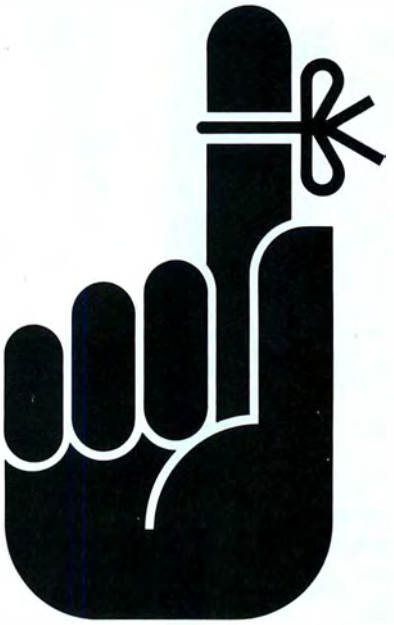

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Cheyenne The Apple Net*, Jim Hassler, 307/632-4934; Apple II/Macintosh; meets only on ham radio.

Cheyenne Wyoming Mac Enthusiasts, Doug Moench, 307/632-3668.

Jackson Jackson Hole Macintosh User Group, P.O. Box 1714, 83001.

Sheridan Sheridan Micro User Group, John E. McWilliams, 307/674-4954; various computers.

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ALBERTA

Calgary The Calgary Apple Corps, P.O. Box 8, Station T, T2H 2G7; Apple II/Macintosh.

Calgary Calgary Macintosh User Group Society, P.O. Box 665, Station J, T2A 4X8.

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Fort McMurray Fort Mac Users Group, c/o Dave Casselman, 112 Silvanus Pl., T9H 3A8.

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New Westminster MacWest Computer Society, P.O. Box 2161, V3L 5A5.

Powell River Powell River Apple Enthusiasts Club, 4637 Willingdon Ave., V8A 2N1; Apple II/Macintosh.

Victoria Victoria Macintosh Users Group, 3320 Aldridge St., V8T 4G8.

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Willowdale LOGIC—P.O. Box 696, Station B, M2K 2P9; Apple II/Macintosh.

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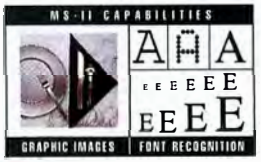

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726 **Envelope Addresser** Heizer Software, 1941 Oak Park Blvd., #30, Pleasant Hill, CA 94523; 415/943-7667.

F

727 **FastLabel** Vertical Solutions, P.O. Box 7535, Olympia, WA 98507; 206/352-2097, 800/942-4008.

728 **FI/40** GCC Technologies, 580 Winter St., Waltham, MA 02154; 617/890-0880, 800/634-9737.

Reader Service

729 **Forecaster** Palo Alto Software, 260 Sheridan Ave., #219, Palo Alto, CA 94306; 415/325-3190.

730 **45+ZFP** Cutting Edge, Inc., P.O. Box 1259, Evanston, WY 82930; 307/789-0582, 800/443-5199.

731 **FrameGrabber 324N** RasterOps Corp., 2500 Walsh Ave., Santa Clara, CA 94051; 408/446-4090.

732 **FrameGrabber 324NC** RasterOps Corp., 2500 Walsh Ave., Santa Clara, CA 94051; 408/446-4090.

733 **FullWrite Professional** Ashton-Tate, 20101 Hamilton Ave., Torrance, CA 90502-1319; 213/329-8000.

734 **FX/40** GCC Technologies, 580 Winter St., Waltham, MA 02154; 617/890-0880, 800/634-9737.

G

735 **Genlock Converter** Julian Systems, Inc., 220 Bates Ave., Ste. J, Concord, CA 94520; 415/686-4400.

H

736 **Hard 46 Plus** Relax Technology, 3101 Whipple Rd, #22, Union City, CA 94587; 415/471-6112.

737 **Hardpac Mac 40** Aristotle Industries, Inc., 3226 Beta Ave., Burnaby, BC, Canada V5G 4K4; 604/294-1113, 800/663-2237.

738 **HiPerformance** Procom Technology, Inc., 200 McCormick, Costa Mesa, CA 92626; 714/549-9449.

739 **HyperAnimator** Bright Star Technology, Inc., 1450 114th Ave. SE, #200, Bellevue, WA 98004; 206/885-5446.

I

740 **Impact 40 Plus** Everex Systems,

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48431 Milmont Dr., Fremont, CA 94538; 415/498-1111, 800/821-0806.

- **Impulse Audio Digitizer** Impulse, 6870 Shingle Creek Pkwy, #112, Minneapolis, MN 55430; 612/566-0221.

741 **InBox** TOPS, A Sun Microsystems Co., 950 Marina, Village Pkwy., Alameda, CA 94501; 415/769-9669.

742 **INET** INET Company of America, 4795 Meadow Wood Ln., Chantilly, VA 22021; 800/322-4638.

743 **InfoLogic Envelope** InfoLogic Software, Inc., 1937 Regent St., Niskayuna, NY 12309; 518/370-5510.

744 **Integra-40** Dolphin Systems Technology, 1701 E. Edinger Ave., Bldg. G, Santa Ana, CA 92705; 714/558-3220.

J

745 **Jasmine DirectPrint** Jasmine Technologies, Inc., 1740 Army St., San Francisco, CA 94124; 415/282-1111.

K

746 **KCS Level II with PVG** Dr. T's Music Software, 220 Boylston St., #206, Chestnut Hill, MA 02167; 617/969-6657.

747 **Kiwi Addresses** Kiwi Software, Inc., 6546 Pardall Rd., Santa Barbara, CA 93117; 805/685-4031.

748 **Kiwi Envelopes** Kiwi Software, Inc., 6546 Pardall Rd., Santa Barbara, CA 93117; 805/685-4031.

749 **Kodak Datashow Presentation Remote** Eastman Kodak Co., 343 State St., Rochester, NY 14650; 716/724-4000.

L

750 **Label Manager 3.0** Preferred Publishers, Inc., 5100 Poplar Ave., #617, Memphis, TN 38137; 901/683-3383.

- **Labels and Envelopes** Eastgate Systems, Inc., P.O. Box 1307, Cambridge, MA 02238; 617/924-9044.

751 **La Cie Panther PDX** La Cie, Ltd., 16285 S.W. 85th, #306, Tigard, OR 97224; 503/684-0143.

752 **LearnPersuasion** Personal Training Systems, P.O. Box 54240, San Jose, CA 95154; 408/559-8635.

753 **Liberty 40** Liberty Systems, Inc., 120 Saratoga Ave., #82, Santa Clara, CA 95051; 408/983-1127.

M

754 **MacBlast** Communications Research Group, 5615 Corporate Blvd., Baton Rouge, LA 70808; 504/923-0888.

755 **MacBottom 45** Personal Computer Peripherals Corp., 4710 Eisenhower Blvd., Bldg. A4, Tampa, FL 33634; 813/884-3092.

756 **MacCrate 40** Crate Technology, 6850 Vineland, Bldg. M, North Hollywood, CA 91605; 818/766-4001.

757 **MacEnvelope** Synex, 692 10th St., Brooklyn, New York 11215; 718/499-6293, 800/447-9639.

758 **MacinStor 45-ZFP** Storage Dimensions, 2145 Hamilton Ave., San Jose, CA 95125; 408/879-0300.

759 **Macintosh Communications Package** Practical Peripherals, 31245 La Baya Dr., Westlake Village, CA 91362; 818/706-0333.

760 **Macintosh II 8-bit Video Card** Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014; 408/996-1010.

761 **MacPaint** Claris Corp., P.O. Box 58168, Santa Clara, CA 95052; 408/987-7000, 800/334-3535.

762 **MacRecorder** Farallon Computing, 2150 Kittredge St., Berkeley, CA 95709; 415/849-2331.

763 **MacroMind Director** MacroMind, Inc., 410 Townsend St , #408, San Francisco, CA 94107; 415/442-0200.

764 **MacMovies** Lapis Technologies, Inc., 1210 Marina Village Pkwy., #100, Alameda, CA 94501; 415/548-4054.

765 **MacStack 45** CMS Enhancements, Inc., 1372 Valencia Ave., Tustin, CA 92680; 714/259-9555.

766 **MacWrite II** Claris Corp., P.O. Box 58168, Santa Clara, CA 95052; 408/987-7000.

767 **MagicDrive 46** MacProducts USA, 8303 Mopac Expwy., #218, Austin, TX 78759-8369; 512/343-9441, 800/622-3475.

768 **Mail Dex** Mission Accomplished Software Services, 10615 Bradbury Rd., Los Angeles, CA 90064; 213/870-2441.

769 **Mailing Label Macro (for Excel)** Heizer Software, 1941 Oak Park Blvd., #30, Pleasant Hill, CA 94523; 415/943-7667.

770 **Mailing Labels** Heizer Software, 1941 Oak Park Blvd., #30, Pleasant Hill, CA 94523; 415/943-7667.

771 **MasterTracks Pro** Passport Designs, Inc., 625 Miramontes St., Half Moon Bay, CA 94019; 415/726-0280.

772 **Maxcess 40E** Maxcess, 3440 Market St., #100, Philadelphia, PA 19104; 215/386-2208, 800/356-2892.

773 **Maxcess 40V** Maxcess, 3440 Market St., #100, Philadelphia, PA 19104; 215/386-2208, 800/356-2892.

774 **Message Handling System** Action Technologies, 2200 Powell St., Emeryville, CA 94608; 415/654-4444.

775 **M40** Mirror Technologies, Inc., 2644 Patton Rd., Roseville, MN 55113; 612/633-4450.

776 **M40+** Mirror Technologies, Inc., 2644 Patton Rd., Roseville, MN 55113; 612/633-4450.

- **Microsoft Excel 1.5** Microsoft Corp., 16011 N.E. 36th Way, Box 97017, Redmond, WA 98073-9717; 206/882-8080.
- **Microsoft Mail** Microsoft Corp., 16011 N.E. 36th Way, Box 97017, Redmond, WA 98073-9717; 206/882-8080.
- **Microsoft Word** Microsoft Corp., 16011 N.E. 36th Way, Box 97017, Redmond, WA 98073-9717; 206/882-8080.
- **Microsoft Write** Microsoft Corp., 16011 N.E. 36th Way, Box 97017, Redmond, WA 98073-9717; 206/882-8080.

777 **Micro/Stack 40** MicroNet Technology, Inc., 13765-A Alton Pkwy., Irvine, CA 92718; 714/837-6033.

778 **MindWrite** Delta Point, Inc., 200 Heritage Harbor, Ste. G, Monterey, CA 93940; 408/648-4000.

N

- **Near Miss (Air Traffic Control Simulator)** Simon & Schuster, 1 Gulf & Western Plaza, New York, NY 10023; 800/624/0023, 800/624-0024.

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780 **NetWare for the Macintosh** Novell, Inc., 890 Ross Dr., Sunnyvale, CA 94089; 408/747-4000.

781 **Nisus** Paragon Concepts, Inc., 990 Highland Dr., #312, Solana Beach, CA 92075; 619/481-1477.

782 **Nova 40** Microtech International, Inc., 29 Business Park Dr., Branford, CT 06405; 203/488-7744.

783 **NTSC Converter** Julian Systems, Inc., 220 Bates Ave., Ste. J, Concord, CA 94520; 415/686-4400.

784 **NTSC Converter** Orange Micro, Inc., 1400 N. Lakeview Ave., Anaheim, CA 92807; 714/779-2772.

785 **NuVista** Truevision, Inc., 7351 Shadeland Station, #1, Indianapolis, IN 46256; 317/841-0332.

786 **NVelope** Paul Mace Software, Inc., 400 Williamson Way,

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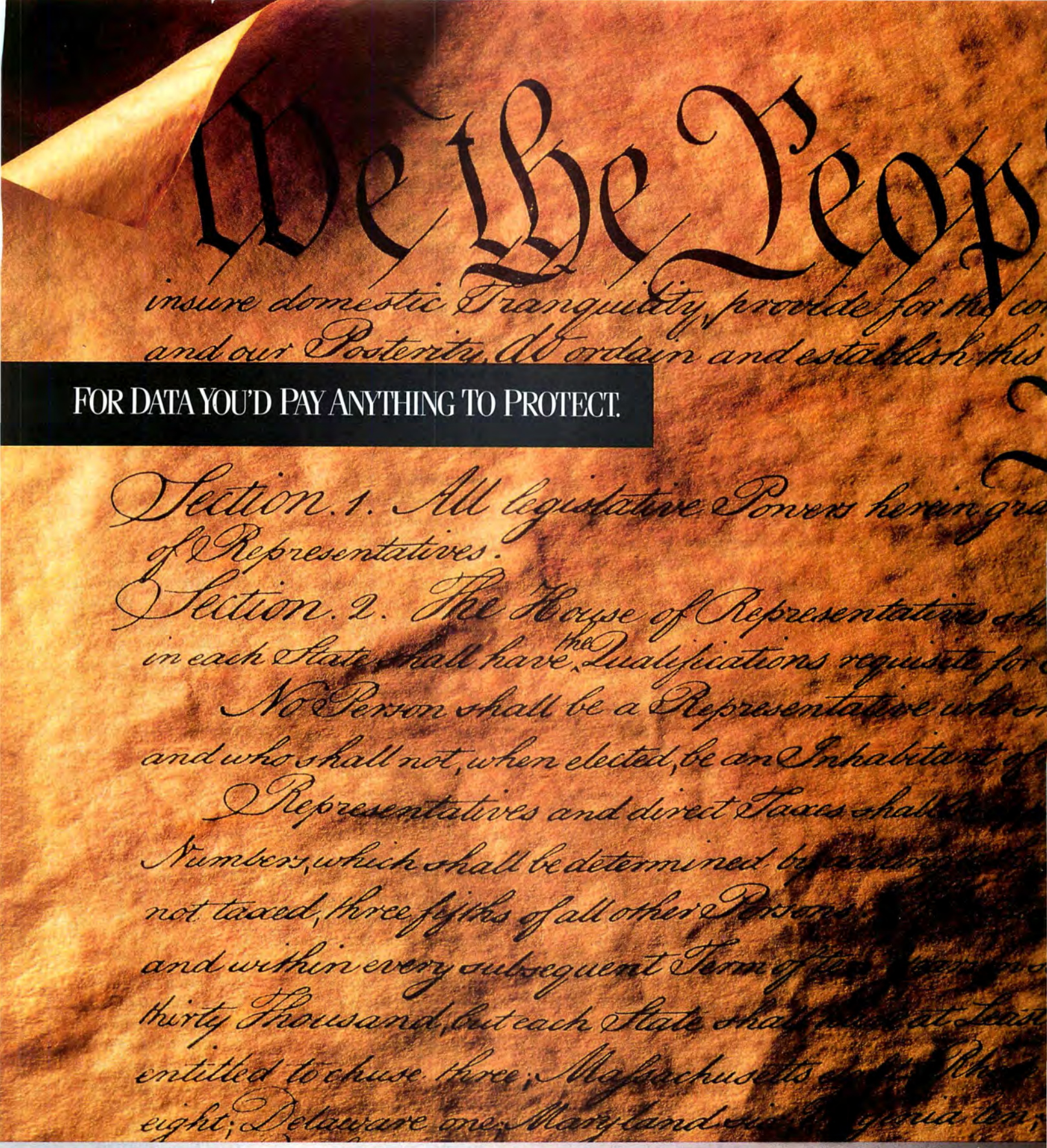

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788 **Performer** Mark of the Unicorn, Inc., 222 Third St., Cambridge, MA 02142; 617/576-2760.

789 **Personal Ancestral File** Church of Latter Day Saints/Family History Division, 50 E. North Temple St. AFOU/2WW, Salt Lake City, UT 84150; 801/240-2584.

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792 **Portrait** Resonate, P.O. Box 996, Menlo Park, CA 94026; 415/323-5022.

793 **Powermenus** Magic Software, 1602 Cascio Dr., Bellevue, NE 68005; 402/291-0670, 800/342-6243.

794 **Preference Hard Disk AP** Western Digital, Inc., 2445 McCabe Way, Irvine, CA 92715; 714/863-0102.

795 **Prototyper** SmethersBarnes, P.O. Box 639, Portland, OR 97207; 503/274-2800, 800/237-3611.

796 **ProViz Color Video Digitizer** Pixelogic, Inc., 800 W. Cummings Park, #2900, Woburn, MA 01801; 617/938-7711.

Q

797 **QuickMail** CE Software, Inc., P.O. Box 65580, West Des Moines, IA 50265; 515/224-1995.

798 **Qume CrystalPrint Publisher** Qume Corp., 500 Yosemite Dr., Milpitas, CA 90035; 408/942-4000.

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799 **Renderworks** MacroMind, Inc., 410 Townsend St., #408, San Francisco, CA 94107; 415/442-0200.

800 **Retix** Retix, 2644 30th St., Santa Monica, CA 90405; 213/399-2200.

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802 **Rodime 45 Plus** Roclime, Inc., 851 Broken Sound Pkwy., Boca Raton, FL 33431; 407/994-5585.

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803 **Scan Jet Plus** Hewlett-Packard, 19310 Pruneridge, Ave., Cupertino, CA 95014; 800/752-0900.

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807 **Soft-Switch** Soft-Switch, Inc., 640 Lee Rd., #200, Wayne, PA 19087; 215/640-9600.

808 **Sound Tools** Digidesign, Inc., 1360 Willow Rd., #101, Menlo Park, CA 94025; 415/327-8811.

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813 **Swivel 3-D** Paracomp, 123 Townsend St., San Francisco, CA 94107; 415/543-3848.

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815 **Teleflex** Magnum Software, 21115 Devonshire St., Chatsworth, CA 91311; 818/700-0510.

816 **TGRAF-07/Moc** Grafpoint, 1485 Saratoga Ave., San Jose, CA 95129; 408/446-1919, 800/426-2230.

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818 **3+Moil** 3Com Corp., 3165 Kifer Rd., Santa Clara, CA 95052; 408/562-6400.

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820 **TV Producer Pro** Computer Friends, Inc., 14250 N.W. Science Park Dr., Portland, OR 97229; 503/626-2291.

V

821 **Videolink 400** RGB Technology, Inc., P.O. Box 6129, McLean, VA 22106; 703/556-0666.

822 **Videolink 400/Genlock** RGB Technology, Inc., P.O. Box 6129, McLean, VA 22106; 703/556-0666.

823 **VideoWorks II HyperCord Driver** MacroMind, Inc., 410 Townsend St., #408, San Francisco, CA 94107; 415/442-0200.

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827 **V Series 40** Maxcess, 3440 Market St., #100, Philadelphia, PA 19104; 215/386-2208, 800/356-2892.

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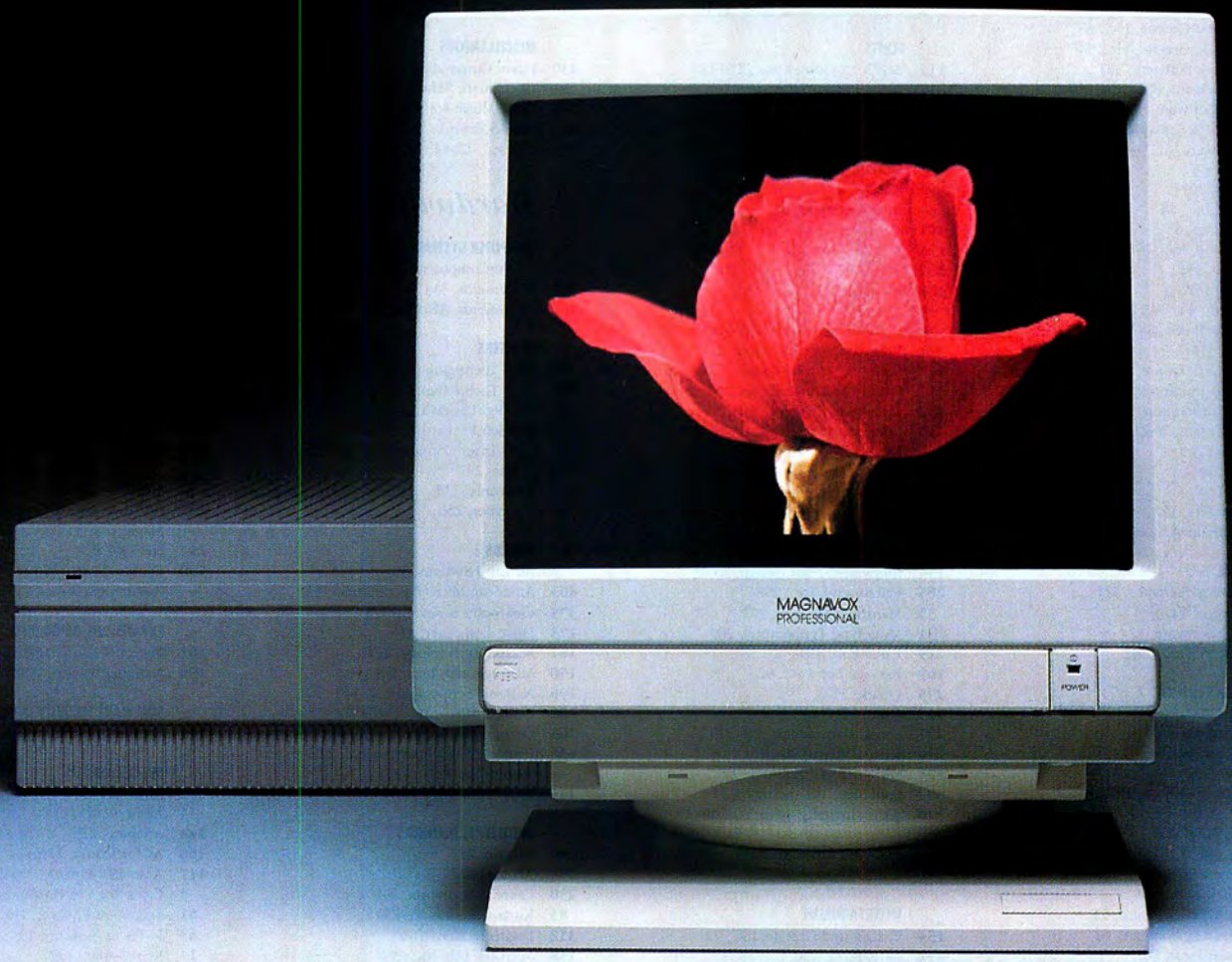

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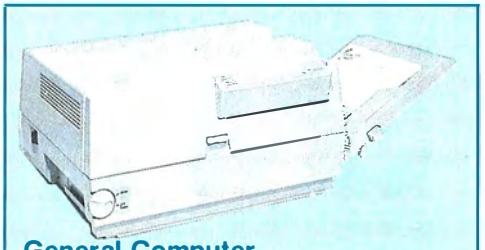

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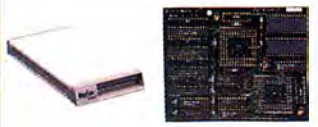

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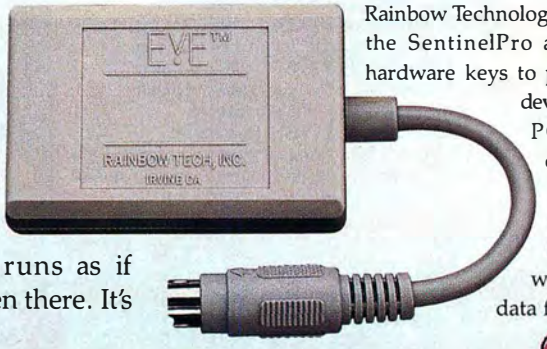

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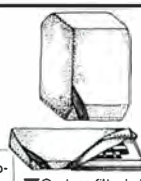

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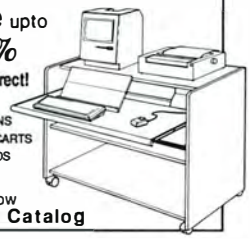

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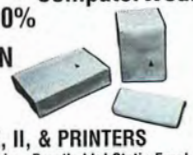

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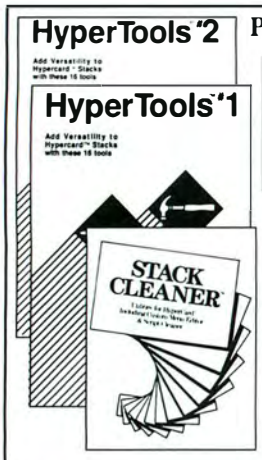

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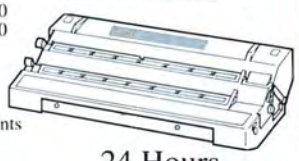

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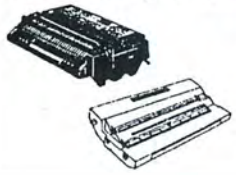

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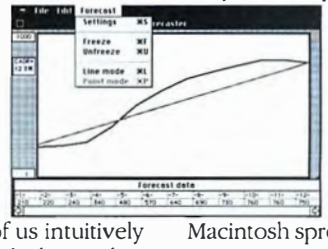

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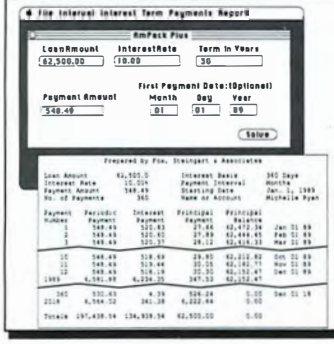

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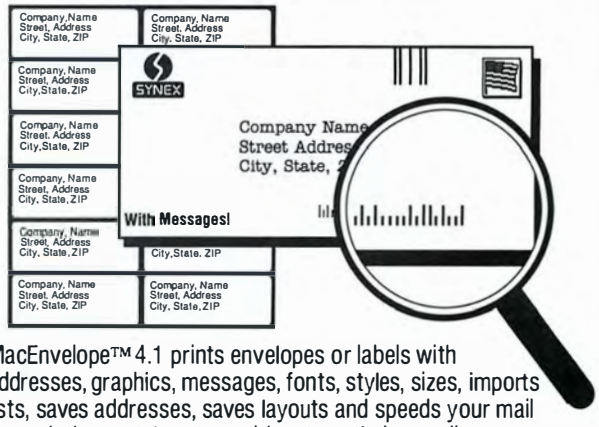

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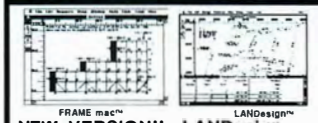

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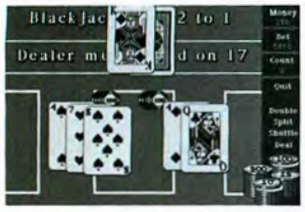

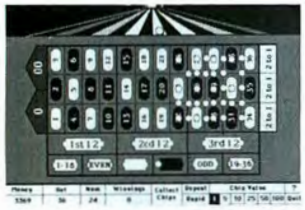

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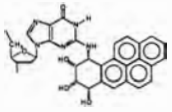

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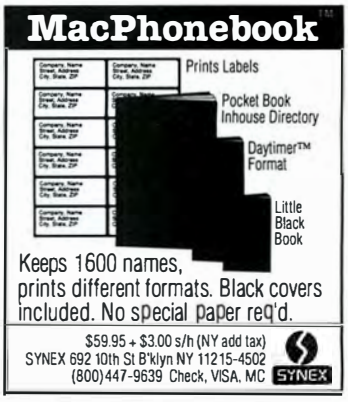

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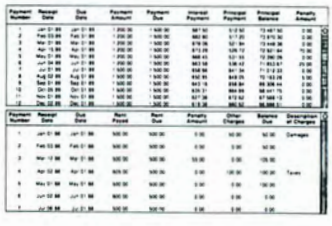

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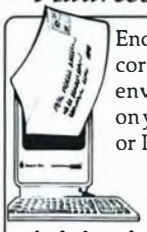

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MacWrite II	45.9 sec.	40.2 sec.	33.6 sec.	44.7 sec.	24.7 sec.
MS Works 2.0	1 min. 50.8 sec.	35.7 sec.	5 min. 13.4 sec.	2 min. 24.1 sec.	1 min. 14.5 sec.
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All tests performed starting with a 12-page text document on a Macintosh Plus with a 20 megabyte hard disk. Full repagination performed when necessary.

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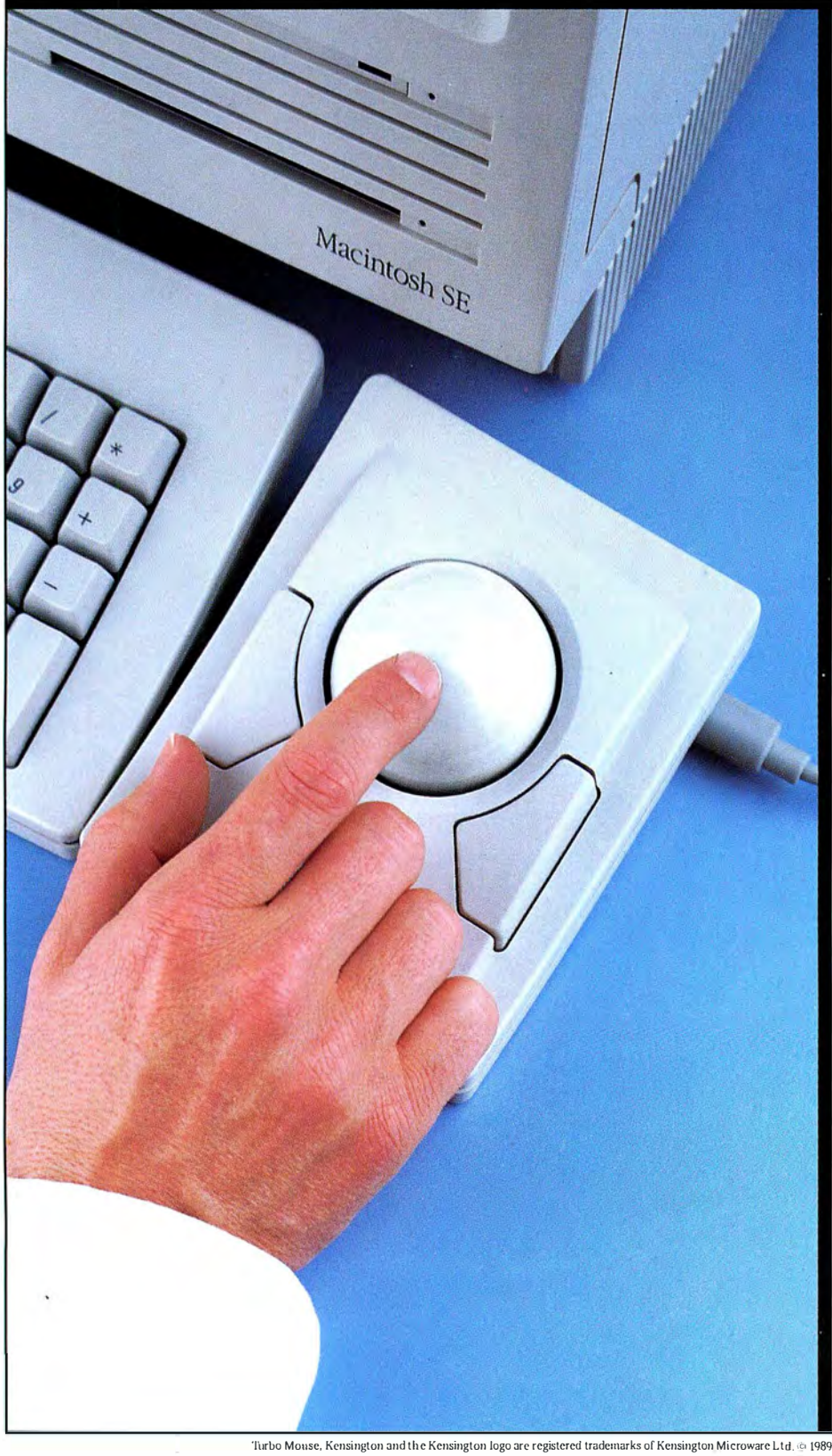

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