MACWORLD

The Macintosh Magazine

October 1989 \$3.95

Canada \$4.95

DESKION PUBLISHING/MACWORLD DESKTOP

by Dan Littman and Tom Moran

DTP SERVICE BUREAUS

How to Find the Right One

32-Bit Color for QuickDraw—At Last In a move that pro-

CLIP ART BUYER'S GUIDE

45 Companies' Woducts color in graphics applications, Apple has finally released its version of QuickDraw for 16-, 24-, and 32-bit color graphics

Third Annual Survey boards, The Color graphics release, which Apple and release, which Apple will pro-COLOR PREPRESS upgrade through dealers and

online bulletin boards, pro-

vides a standard way for ap-**10 BEST INITS** Editors' Choice Play graphics using over 16 plications to create and dis-

Since the previous version of QuickDraw was limited to 256 colors, few software applications could take advantage of 24-bit color because each 24-bit am

QuickDraw allocates 8 bits for 1 color of alpha, or transparency, inc. mation, Although



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

File Edit Formula Format	Data Optio	ns Macro	Window		
	nancials-MS	Excel 1.5	doc		
Selected Five - Year Financial	Data				
In thousands, except employee and p	per share data)				
	7000		1000	25.00	1001
	1988	1987	1986	1985	1984
Revenue and Costs					
Net Revenues	\$432,806	\$318,663	\$309,266	\$239,656	
Cost of Revenues	79,809	165,570			
R and D	79,809	52,361			
Sales/Marketing	87,680	88,108			
Gen Admin	27,653				
Income from Operations	\$157,855		\$142,756		
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				
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				
Total Assets	\$304,690	\$190,323	\$124,164	\$71,615	\$65,327
Current Liabilities	34,423		11,599	5,077	9,940
Long-term Liabilities	4,578				
Stockholder's Equity	265,689				
Total Liabilities and Equity	\$304,690	\$190,323	\$124,164	\$71,615	\$65,327



So have we. Introducing Microsoft Excel 2.2.

In 1985, not long after the Macintosh was unveiled, Microsoft Excel became the most compelling reason to buy one.

Within minutes, it became a standard on the Macintosh. Before we knew it, a full 9 out of 10 Macintosh spreadsheet users were

swearing by it. Not surprisingly, they still are. But, of course, we

Used to be, IMB was enough. Now with Microsoft Excel 22, you; our take full advantage of the 8 megs in today's most powerful Macrotoshes.

But, of course, we weren't satisfied to leave weren't satisfied to leave well enough alone—and

Microsoft Excel version 2.2 has come to the small screen. In a big way.

In mathematical terms, 2.2 is greater than 1.5. In technical terms, your spreadsheets aren't limited to 1MB of memory—version 2.2 makes the most of even 8meg machines.

Which translates into spreadsheets of

outrageous proportions.

Equally outrageous: 40% faster calculations—thanks to advanced intelligent recalc.

As for presentation? Version 2.2 also lets you highlight data in ways well worth highlighting: You can pick up to 256 different fonts per sheet, including up to six styles and eight colors. You can change row height. You can shade. And basically pack your documents

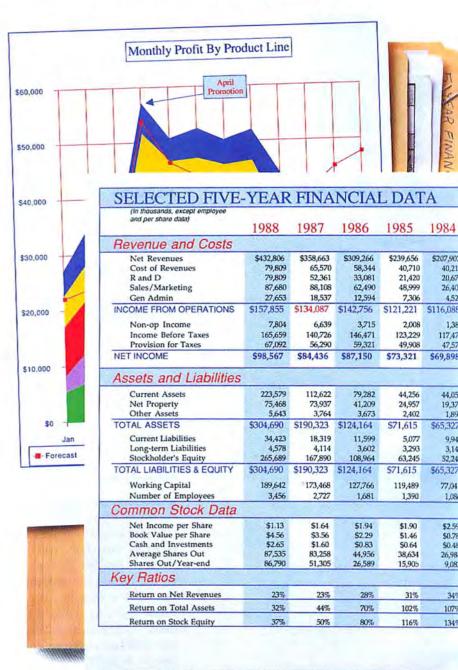
with more visual punch than ever before.

Microsoft Excel version 2.2. Another improvement designed to make Mac*enthusiasts even more enthusiastic.



Something 90% of you are already used to. And you other 10% easily can be.





MACWORIT

The Macintosh® Magazine

October 1989

Whether you desktop-publish a large magazine like Macworld or a two-page newsletter, you'll find this issue a must-read, from choosing a laser printer (p. 120) to doing color prepress (p. 146) and finding the right service bureau (p. 154). (Photo by David Bishop.)

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ColorScript 100 Model 10. More Best-Laid Plans Managing project managers.

Saving the Rain Forest on Laser Disk Hypermedia ecology project. Hey, Mac, Call Your Office Command-



Contact information for products in this issue.

ing the Mac from afar.

Government Style SGML comes to the Mac.

Packing Lots of Memory in a Small Space 4MB memory modules. ■ But Does It Do Symbols? AI for the Mac. ■ Accelerating 24-Bit Color Radius's QuickColor board. • Cool, Clear Water Controlling desalinization with the Mac. • Schlumbering Giants Highly specialized CAD. ■ The Visual Almanac Educational multimedia at Apple. ■ For Cosmic Kids (of All Ages) HyperCard-based adventure. ■ MacPaint Meets Tesla Lightning as art. ■ Flicker-free Color for the SE/30 E-Machines' 72Hz monitor. ■ Have Mac, Will Travel NexSys portable. ■ Survey: What's Your Bottleneck? Most cite processing power.

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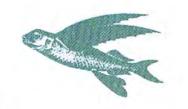
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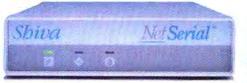
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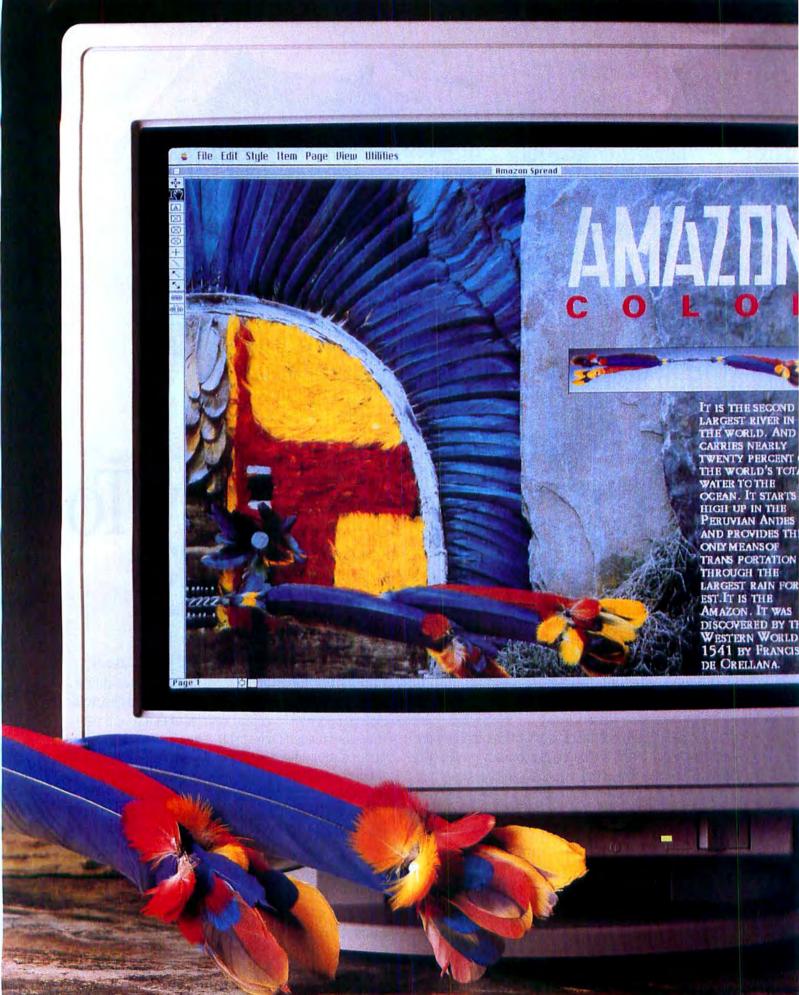
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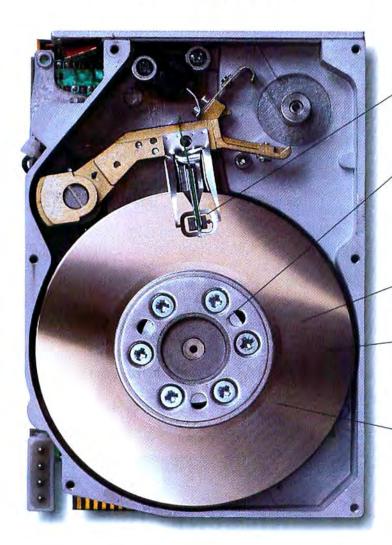
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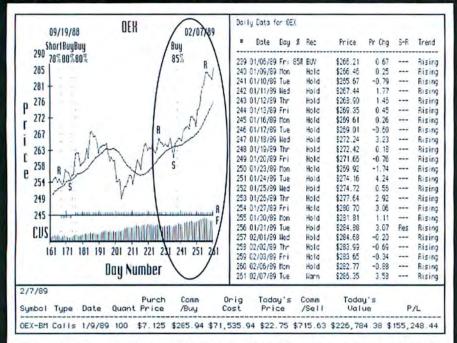
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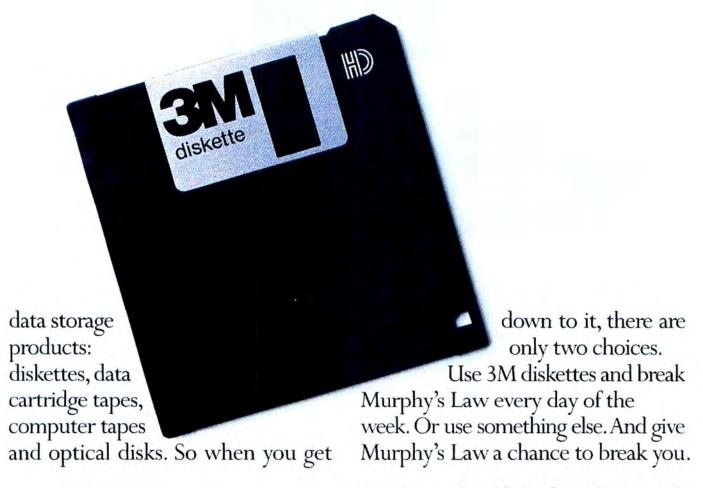
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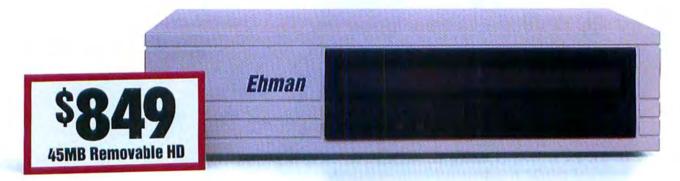
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MAC BULLETIN

INDUSTRY NOTES Apple Interface Suit Narrowed

A San Francisco court has ruled that 1985 license agreements between Microsoft and Apple invalidate most of Apple's copyright infringement claims in its suit against Microsoft and Hewlett-Packard. Other look-and-feel questions, and the basic issue of copyrighting interface design, remain to be decided.

Apple Cuts SE Prices, Adds FDHD

Apple recently cut the suggested retail price of all 68000-based SEs by \$300 and added the 1.4MB FDHD SuperDrive to the SE models, which had previously had 800K drives. The FDHD drives permit the transfer of data files between Macs, DOS machines, PS/2s, and Apple II systems, all on the same floppy disk.

Micron to Distribute Memory through Microamerica

Micron Technology one of the few U.S. makers of DRAM chips for general sale, has begun selling its line of memory upgrades through Microamerica. The products include the Xceed line of memory boards for Macs.

Softsel to Distribute Nodem LAN Interface

Softsel Computer Products has agreed to distribute Adaptec's Nodem LAN interface unit, a device for linking Macs to Ethernet LANs. Because the Nodem connects to the SCSI port, it can support all Macs from the Plus up.

The Source Hangs Up

CompuServe Information Service has purchased The Source Telecomputing. The online messaging and database giant has shut down The Source and incorporated its 53,000 customers. At press time, CompuServe was deciding which Source databases it would provide access to.

300-dpi Color Printers Start Under \$7000

Seiko Instruments U.S.A. announced its QD-5500 series of single-user and network 300-dpi printers, which range from low-end monochrome systems to three- and four-color devices in both single-user and network print-serving models. A monochrome, single-user printer with 1MB of RAM is priced at \$6995. A four-color network server version that contains 6MB of RAM and can output letter- or tabloid-size paper will sell for \$13,995. The printers include 35 outline fonts and are compatible with 32-bit QuickDraw. Single-user versions were slated to ship in September, with network versions to follow in October. For more information, call Seiko Instruments at 408/922-5800.

MultiSync Monitors Connect to Macs or PCs

NEC Home Electronics (U.S.A.) has introduced three monitors that can work with either the Mac II family or with IBM PCs and compatibles. The \$3699 MultiSync 5D is a 20-inch color display that works with VGA, 8514/A, or Mac II controllers at resolutions up to 1280 by 1024. The \$1799 MultiSync 4D is a 16-inch monitor that works with the same controllers at resolutions up to 1024 by 768. The \$349 MultiSync GS2A is a 14-inch gray-scale display. NEC expects to begin shipping all three monitors in September. For more information call NEC at 312/860-9500.

PLI and Xyxis Ship Erasable Optical Drives

Peripheral Land Inc. (PLI) and Xyxis Corporation have both begun shipping erasable optical disk drives. PLI's device, called Infinity Optical, is based on a Sony magneto-optical drive. Infinity Optical's media can be formatted in sectors of either 512 bytes or 1024 bytes. The 512-byte format stores 573MB on both sides of the disk and has an average access time of 75ms. The 1024 format stores 625MB with a 90ms access time. A one-drive version has a suggested retail price of \$5495, and a two-drive configuration lists for \$10,995.

The Xyxis drive, called the XY600RW, stores up to 600MB with an average access time of 61ms. It lists for \$4995. For more information call PLI at 415/657-2211, or Xyxis at 612/944-8288.

Maynard Enters Mac Market with Three Tape Drives

Maynard Electronics Corporation, a longtime player in the IBM PC backup arena, has announced three tape drives for the Mac. The MaynStream 60, 150, and 2200HS can store 60MB, 150MB, and 2200MB, respectively. All three come with software that lets users choose from a variety of options, including using Boolean logic to define what will be backed up. Now shipping, the 60MB drive lists for \$1595, the 150MB model for \$1895, and the helical-scan 2200MB version sells for \$7495. For more information, call Maynard at 407/331-6402.

Interleaf Slashes Price of Publishing Software

Interleaf has reduced the price of Interleaf Publisher, its text-and-graphics publishing software, from \$2495 to \$995. Designed for the Mac II, Interleaf Publisher includes word processing, graphics manipulation, and automated desktop publishing capabilities. Interleaf is working on a version for 68030-based Macs. For more information, contact Interleaf at 617/577-9800.

Microsoft Office to Ship on CD ROM

A version of The Microsoft Office—a bundled set of the latest versions of Excel, Word, PowerPoint, and one Microsoft Mail node—should now be available on CD ROM with all the documentation in HyperCard format and with special search algorithms to facilitate finding information. The tutorials take advantage of CD ROM's capabilities by, for example, using Farallon ScreenRecorder tapes in (continues)

INDUSTRY NOTES

Mac Consultants to Enforce Standards

The Macintosh Consultants Network is formulating plans to ensure that its members follow the Network's code of ethics and is establishing procedures to resolve disputes between consultants and their clients. For more information, call MCN at 206/453-2729.

Symantec: Q1 in the Black

Symantec closed its first quarter after going public last spring with profits of \$1.24 million on income of \$11.2 million. This compares with a loss of \$490,000 on income of \$8.8 million for the same period in 1988.

GCC Sets Up Direct Sales Channel

Mac hardware pioneer GCC Technologies has launched a direct sales campaign to market its peripherals through mass catalog mailings. Under the new program GCC is offering overnight shipping for S9, a 30-day "no questions asked" money-back guarantee, extended business hours, and longer warranties. The company has also added a toll-free number (800/422-7777) for orders and free technical support.

MacGuide Magazine Closes

The August issue of Denver-based MacGuide was the magazine's final issue. Last spring, the quarterly Mac product catalog had attempted to relaunch as a vertical marketoriented monthly.

SuperMac to See Light of Day

SuperMac Technology has signed a national distribution agreement with ComputerLand. ComputerLand has 818 stores, and the two companies expect sales of SuperMac products to reach \$10 million the first year.

MGMStation Changes Hands

Micro CAD/CAM, the publisher of MGMStation, has been absorbed by Aura Systems, a firm specializing in electromagnetics, electrooptics, microwave technology, and expert systems. MGMStation CAD and MGMStation CAD/CAM are being renamed auraCAD and auraCAD/CAM, respectively. For more information, contact Aura Systems at 213/337-1406.

place of static screen shots to demonstrate features in action. The CD will also come packed with clip art and Excel templates from the Heizer catalog. The Microsoft Office lists for \$949; if each product were bought separately they would run about \$1300. This offer will be available until the end of the year. For more information, contact Microsoft at 206/882-8088.

PageMaker Add-on to Simplify Database Publishing

A new product developed by Aldus employees will automatically assign style attributes and other formatting to tab-delimited text files as it imports them into PageMaker. The new program will be able to flow information from spreadsheets and databases into PageMaker designs and will be able to merge data fields to produce form letters, mailing labels, and other complex documents.

Aldus is not publishing this product. At press time, the publisher had not set a name for the new product, but expected to ship it in September. It will probably list for \$149 and come with a selection of templates. For more information contact Benware at 206/547-9623.

Now with Twice the Security

ASD Software is preparing two products to provide security to Mac users and administrators. Version 2.0 of FileGuard adds password protection for accessing files and volumes; creating, copying, and changing files; copying or launching applications; and other controls. FileGuard 2.0 alters low-level SCSI information, application code, and files so that a protected hard disk remains secure even when attached to a different Mac or started up from a floppy.

A hard disk backup program called Twins will maintain a mirror image of one hard disk on another hard disk, making a backup available immediately in case of a crash. Twins can be set to run at shutdown, at intervals, or in real time. ASD plans a later version of Twins that will add the ability to keep two mirror-image backups, as mainframe computers generally do.

Both products should be available now. FileGuard 2.0 will list for \$249, and a network version is under development. At press time, Twins' price had not been set. For more information, contact ASD Software at 714/624-2594.

1stAid Software's Second Line of Defense

The publishers of 1 stAid Kit and Anti-Virus Kit are planning two new disk- and file-protection products. Complete Undelete keeps a record of the directory path for up to the last 500 deleted files, allowing you to retrieve deleted files. A single CDEV manages installation, space allocation, and recovery, and a special feature makes the drive delay overwriting deleted sectors.

Sector Collector helps recover data from disk sectors that have gone bad and then collects bad sectors into a dummy file, preventing the drive from trying to write to them again. This saves the user from having to reinitialize a hard disk after a sector goes bad.

Both Sector Collector and Complete Undelete should be available now for \$49.95 each, or bundled with 1stAid Kit for \$159.95. The bundled set will integrate the two products into the 1stAid Kit shell. For more information, call 617/783-7118.

Adding It Up

Version 2.0 of Symantec Utilities for Macintosh (SUM), which should be available now, provides a still-simpler shell and simplifies the series of questions that walk you through recovering a disk. The new version also integrates into the SUM shell a backup program written by the same company that wrote Redux, and an encryption program.

SUM 2.0 will list for \$149.95. SUM 1.0 owners, will be able to upgrade for \$39.95. For more information, contact Symantec at 408/253-9600.

Microsoft Fixes Excel 2.2 Bug

A bug in early copies of Microsoft Excel version 2.2 causes formulas cut from one cell and pasted into another cell to sometimes fail to update references to other cells. The buggy version's creation date and modification date are both May 5. (To check this, in the Finder select Excel on the locked, unaltered original floppy—don't use a working copy—and choose Get Info from the File menu.) Microsoft will send the free bug-fix, whose modification date is May 19, to registered owners who request it by calling product support at 206/454-2030.



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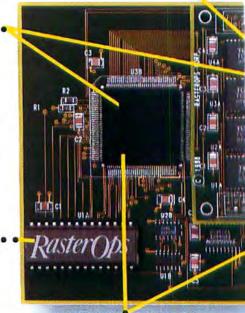
Barrier: Providing professional color capability to Macintosh®users at a price everyone can afford.

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.

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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.



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.

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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.

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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.

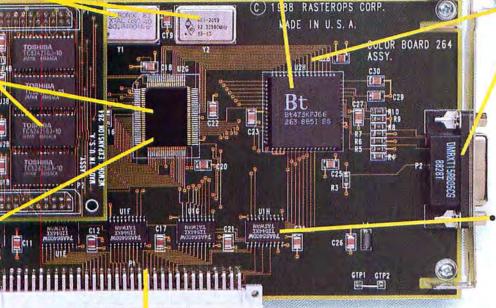
Breakthrough: Circuitry that automatically senses which monitor you are using and switches automatically from 66.7 Hz to 30 Hz. You just plug in your Apple-compatible monitors, the board will take care of the necessary adjustments.

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.

RasterOps Literature Package For your nearest dealer and literature on the most advanced Macintosh graphics products, call: **Information Hotline:** 1-800-952-6300. Dept.X24



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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.



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It's true. La Cie's Panther PDX, Qume's CrystalPrint Publisher and Jasmine's DirectPrint are the same printer. We agree that it's an unbeatable printer for today's desktop environment. That's why we're selling it.

But don't take our word for it, take MacWEEK's, MacUser's and La Cie customers.

MORE PRINT QUALITY

"Tom Elliot, editor in chief of Research Magazine, liked the printer so much that be recommended it.

Clay Andres, MacWEEK, June 1989

The Panther PDX is an ultra highspeed PostScript-compatible printer that brings extra value to the desktop and occupies less space.

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Tom Elliot, Editor in Chief, Research Magazine MacWEEK, June 1989

The advanced Casio LCS engine produces blacker blacks, finely detailed type characters and halftones at 300 dpi resolution.

All your jobs come out crisp and clean, because there are no scan lines like the LaserWriter output.

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"The time difference was amazing."

Len Kaufman, Avionics System Manager, Naval Aviation Depot MacWEEK, June 1989

MORE FOR LESS

"La Cie sells the same printer for \$1000 less."

MacWEEK, June 13, 1989

COMPANY	PRODUCT	\$3,499*	
La Cie	Panther PDX		
Qume	CrystalPrint	\$4,499	
Jasmine	Direct Print	\$3,495	
Abaton	Quickstep	\$4,495	

*Includes \$1,000 package of fonts from Casady and Green.

La Cie's Panther PDX uses a highspeed Weitek RISC chip. This highspeed RISC chip makes the Panther run 5 times faster than the Apple's LaserWriter IINT and 40 times faster when printing mixed text and graphics. The Panther speeds past the LaserWriter IINTX—even with a hard drive. In fact, the Panther PDX is one of the fastest printers on the market today.

MORE FOR YOU

"Then I saw the Panther PDX at the La Cie booth and bought it with \$1000 worth of fonts for \$1000 less."

Len Kaufman, Avionics System Manager MacWEEK, June 1989

La Cie is even including \$1000 worth of FREE fonts from the Casady and Green library for all customers who purchase the Panther PDX. That is 84 fonts in 22 volumes.

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Desktop Publishing Update

Making progress
despite disappointments

by Jerry Borrell



t has been a long six months since we began producing *Macworld* through electronic means. A time during which we have matured in our use of the tools and learned about the limitations of electronic publishing technology. Our travails have been made more difficult by the evolution of the new design we put in place in the May issue. The type was too small in places, and our pages at times seemed distracting due to overuse of different page elements to break up the dense content of the articles. Our designers needed time to learn to use the power of page composition software effectively.

We felt all of the problems, much more than most of our readers. In fact, the lack of reader response to our changes was—deafening. Still, we knew our work was being observed. *Elle*, a magazine with our size format, even sent a team of designers to study how we work. Our sins may have been multitudinous, but the onlookers were asking how we were making our mistakes.

Today we are at a stage where designer Dennis McLeod brings full page proofs (minus illustrations) to content and approval meetings with the editorial staff. We view layouts of various sections of the magazine at an early stage, when it is

possible to make changes fairly painlessly. Our designers' demand for Laser-Writer IINTX output has outgrown the one machine in the department. We use our QMS ColorScript 100 to evaluate color type, illustrations, even cover concepts. We've installed the first of the 24-bit color boards from Super-

Mac Technology that drive Apple's 13-inch monitor, and we are testing the under-\$1000 board from RasterOps that does the same. Our copy editors are even being equipped with full page displays, so they can make changes to electronic forms of manuscripts.

Just in time for our September issue we implemented a beta version of the 24-bit

color extension for PageMaker, called PageMaker Color Extension. Soon thereafter, swearing could be heard at odd hours, bouncing off cubicle walls. Certainly the extensions were a boon in allowing us to specify tint (mechanical or process) colors directly within PageMaker, and in potentially saving us time and money in the stripping phase of page composition, but we ran into problems. A number of pages within the first set came up missing color in type and images. At times, entire pages disappeared during processing cycles on the Linotronic. One particular set of tricky issues revolves around color type that's knocked (reversed) out of a black background, requiring a workaround in order to make an effective trap for the type.

We've had better results with the Barneyscan Slide Scanner, which gives us the ability to look at 35mm images incorporated into page layouts. Unfortunately, most of our images come from professional photographers who use 125mm film, and we still have no way to scan those in-house and must rely on traditional service bureau methods (a Crosfield laser scanner). But for departments and news sections that use the lower-quality transparencies, the Barneyscan offers new potential to graphic artists evaluating page designs.

VISIONARY

Another long-awaited event, our test of the Scitex Visionary system, finally happened. The appointed day came and a group of us trooped down to Balzer/ Shopes, a local color-separation supplier, to test the future. Truth to tell, it ain't what it's cracked up to be. But let's start at the beginning. I have been looking for one source that can produce type, continuoustone separations, mechanical color separations, and separations of graphics files (PICT, EPS). Currently we have these things done at four separate places. In addition, I dream of a single, reliable source of these materials. No more standing in line waiting for some quarterly newsletter to roll off the Linotronic at a service bureau. DTP doth strange bedfellows make.

(continues)

8-bit upgrades invade Apple.



It takes less than thirty minutes for an 8-bit Abaton Upgrade to invade your Apple scanner. And once the upgrade is in place, you'll see more detail in your scanned images. Details that won't show up on a 4-bit scanner.

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look as good on your computer as they do on paper. And you'll see more of the richness and subtlety of the original photo when the scanned image is printed on a phototypesetter. Which means that you can use your scanned images as final art.

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If you want more gory details on Abaton's 8-bit Upgrade Invasion, call Abaton at *1-800-444-5321*. And let Abaton make your ideas easier to publish.



End Users Circle 131 on Reader Service Card Dealers Circle 107 on Reader Service Card But I digress. I envisioned Visionary and the more recently announced VIP (Visionary Interface to Postscript) as a mythical product floating in a bed of clouds, bathed in a golden light, that would really make life easier. Follow the yellow brick road—you get the picture. I really wanted this stuff to work, but every time I called to set up a meeting to test it, people were . . . uh, out, call again. The Wizard is busy, go away. No, not that bad.

However, I was beginning to wonder.

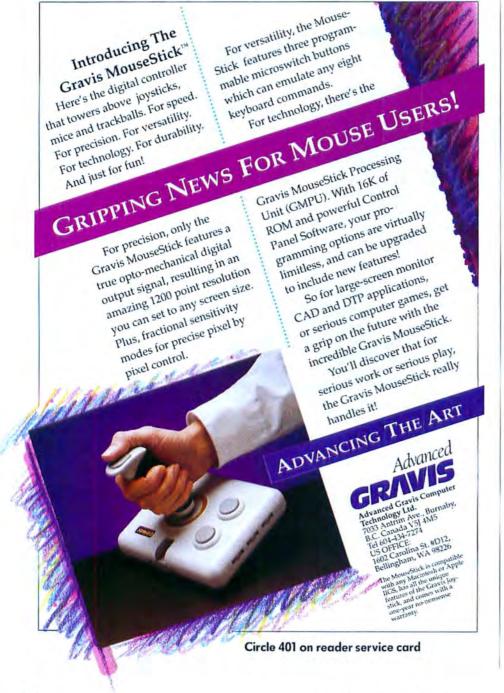
On the day of the test, a group of us wandered into the room where gleaming new Visionary products reside. We saw the Visionary workstation (a Mac II) replete with VIP software, 8-bit RasterOps monitor and color video board, QuarkXPress software, the gateway station (in this case, a Mac II with a 19.2 kilobaud modem), and the Scitex assembly station (designer furniture hooked up

to a freezer-size box with a couple of printed circuit boards in it). The assembly station uses proprietary Scitex software that does the actual color touch-up work and page composition, readying the data to be sent to the Scitex film plotter. Not evident were the laser film scanners, too big to fit in this already jammed room.

Earlier we'd sent the specifications for our pages and our grid to Balzer/Shopes, and one of the staff had prepared an XPress version of our electronic page grid to accept the text and pictures that we brought with us. First we tested graphics files with VIP and discovered that Visionary would not accept more than 256 colors in EPS files (another dialog box: too many colors!). The riposte came that we could have our illustrators use fewer colors. Our response (after five years of working with Mac-based illustrators, watching their skills with computer graphics slowly mature) was that the tools should not limit the creativity of the illustrators, and perhaps Scitex should figure out how to get its system to read all the color fills and gradients that PostScript can create.

Next we tried to "VIP" our encapsulated PostScript PageMaker files—that is, to have the VIP software convert the files to a bitmapped image that Visionary can use. The first problems were unrecognized PostScript strings or field errors in the dialog box, related to the custom fonts that we had designed in Fontographer. VIP could not read them, so we had to return to the original PageMaker files and laboriously change the type to fonts recognizable to VIP.

You can imagine our feeling as the realization slowly dawned that Visionary could not read the encapsulated Page-Maker files directly, instead using VIP to create uneditable bitmaps. Scitex bundles VIP with specific machines. So someone at the service bureau would have to convert all our files to the Visionary system. And given the problems with both type and graphics, I was not encouraged by the likelihood of having to spend hours on the phone trying to help the VIP operator figure out the problems with our pages. The answer to the more troublesome question of what the pages will look like (continues)



MicroPhone II version 3.0

A "Stunning" Achievement in Software Engineering

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

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

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

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

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

Color options. MicroPhone II lets you assign color icons to your scripts, thus turning the *icon bar*, shown here, into your control panel. The icon bar can be scrolled,



resized and placed vertically or horizontally anywhere on the screen, awaiting your next click. Choose icons from the large collection provided with the software, or create your own.

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

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

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once they've been sent through VIP must await the results of tests still being run at press time.

At the end of the day we still had not pulled film for the feature spread that we were working with, but we were generally positive. The advantages of better text resolution, some improved graphics files, a superior quality of film (denser, silverbased), and mechanical color from a single source are encouraging. Stay tuned.

INTERNATIONAL CONNECTIONS

One bright note regarding electronic publishing at *Macworld* has been our increasing success in communicating with our sister publications. There are now *Macworld* magazines published in Australia, Sweden, the United Kingdom, Denmark, and Taiwan (as an insert in *PC World Taiwan*). Japan is likely to follow with a publication in 1990. Both the Australian and UK magazines are connected

to our offices via 2400- and 9600-baud links, respectively. They use Farallon's Timbuktu Remote and log onto our network, where they access E-mail, text, and graphics files for use in producing their own magazines. Australia's Osmund Iversen has been particularly successful—he even beat us out with our own story on the IIcx last March. The United Kingdom's Ian Winter uses many of our *How To* departments in the British *Macworld*, complete with their Illustrator and Free-Hand illustrations.

WHAT DO WE REALLY NEED?

We're doing a lot and thinking about the future, but we need some help from the vendors. Barço's announcement of screen calibration software for the Mac could help. Having several screens in the design group calibrated (using the same RGB colors) would help. Having the screens calibrated to CMYK color schemes would be even better, but that is nowhere on the horizon. Color Studio is finally out, as are new versions of Lightspeed and PhotoMac for color prepress work. Erasable optical drives promise to alleviate our storage problems with files for 24-bit color illustrations (7MB to 12MB for each small photograph). New color printers are bringing prices down. Seiko's new B-size printer is under \$10,000, and QMS has a new A-size color printer in the same price range. The necessity for transmission within production and design zones on the network will dictate that we go to Ethernet soon.

What we really need is software that displays CMYK color swatches on the screen in a verisimilitude of color from a known color system such as Munsell or Pantone. Then we need that incorporated into Illustrator et al., so that we can actually see our output on an RGB screen. We also need a 125mm scanner. The list goes on and on.

Despite all the disappointments and holes, the winter of 1989/90 will, I believe, prove to be the time when we move from "maybe we could do color" to "we're doing color prepress work on the Mac." (I know some do already—Macworld needs higher quality.) And desktop publishing is about to go through another explosive growth period.



More Rave Reviews for the #1 SQL Database.

Oracle for Mac Solves DBMS Puzzle

 $SQL/HyperCard\ Combo\ Produces\ Sophisticated\ Applications$

mont, Calif., recently rounded out the list of platforms supported by the company's relational database manage-

The new Mac DBMS teams the power of Oracle's Structured Query Language (SQL) with HyperCard's customizable and easy-to-use interface.

This combination allows Mac developers to create sophisticated applications that appear simple to users unique software development opportunity unavailable on any other platform, including the PC, according to early corporate users we contacted.

In addition, users said, the network version of Oracle for the Mac allows the advantages of the HyperCard interface to serve as a front end to existing corporate relational databases residing on other platforms, such as mainframes and minicomputers.

Consequently, the Mac software has great potential for su

Oracle for Macintosh

DBMS Brings New Power and Face to Mac Application Development

WHAT CORPORATE BUYERS LIKE

- Offers SQL capabilities
- Uses HyperCard to mask
- complexity of database applications Serves as front end to relational databases on other platforms
- · Can link different Oracle database platforms with network version
- Provides good documentation and

"ORACLE for Macintosh is a welldesigned product ... a programmer can, with just an hour's training, create a database on a host with a simple Macintosh interface in three minutes-honest." *** MacUser, June 1989

"ORACLE for Macintosh is exciting for companies that have Oracle (or DB2) databases on a mainframe and want a practical Mac data entry and development system." Mac Week, March 14, 1989

"Get yourself a copy of ORACLE for Macintosh and get a flexible toolkit that can be molded to solve just about any database problem." MacGuide Magazine, June 1989

oping database management systems to connect departmental Macs to larger systems. Jeff Menz, a systems analyst for a scientific R and D organization is current. scientific R and D organization, is current ly using Oracle for Macintosh to develop a system that will give the company's numerous Mac users access to an Oracle datherous mac users access to an Oracle database running on a VAX. Using the networking version, Menz will link departworking version, menz will link depart-mental AppleTalk networks to the VAX over a TCP/IP network.

Oracle Provides the Groundwork The key benefit of Oracle's product is "all the fundamental technical work—the protocols, the compatibility with the AppleTalk network—has been done by Oracle," Menz said. "I just have to half the HyperCard interfere and do the build the HyperCard interface and do the

database design work.

The result will be an Oracle relationaldatabase application on the VAX with a
HyperCard front end that Mac users feel
HyperCard front end that Mac users feel comfortable with, he explained. Also, the company will have one logical relational database instead of numerous fragmented local databases. This allows tighter security, improved data integrity and better per formance, he added.

COMPATIBILITY - PORTABILITY - CONNECTABILITY

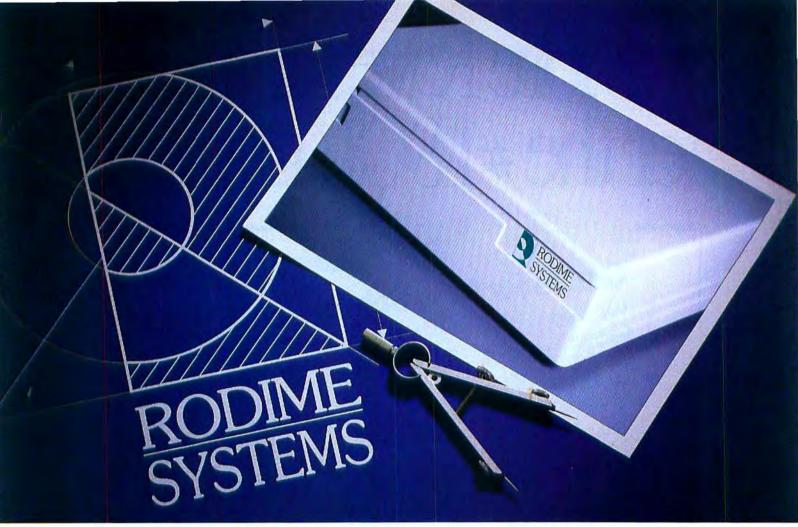
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Dan Shafer, Author of Hypertalk Programming Guy Kawasaki, President of ACIUS, developers of 4th DIMENSION

Stand alone version licensed for developers only. Requires Macintosh SE or II with 2 Megabytes of RAM. 5 Megabytes hard disk space, floppy disk drive, and HyperCard Includes 50-day installation support, ORACLE database, Hyper'SQL (HyperCard Interface), SQL*Plus, OCL and Pro*C (Macintosh Programmer's Workshop is required for programming usage), System Stacks and Example Stacks. Full networking version is 1999 and includes SQL*Net (for database communications), Ayric, 427-0, DECNET, CTePL poport, Aliss Systems 15 Store IDECRE protocol and drivers and Kinter's TCPort TCPLP protocol and driver. Accessing database software on other machines requires a separate protocol handler and gateway software for the other machine. Call for additional information.



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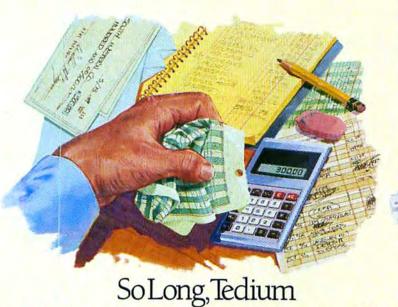
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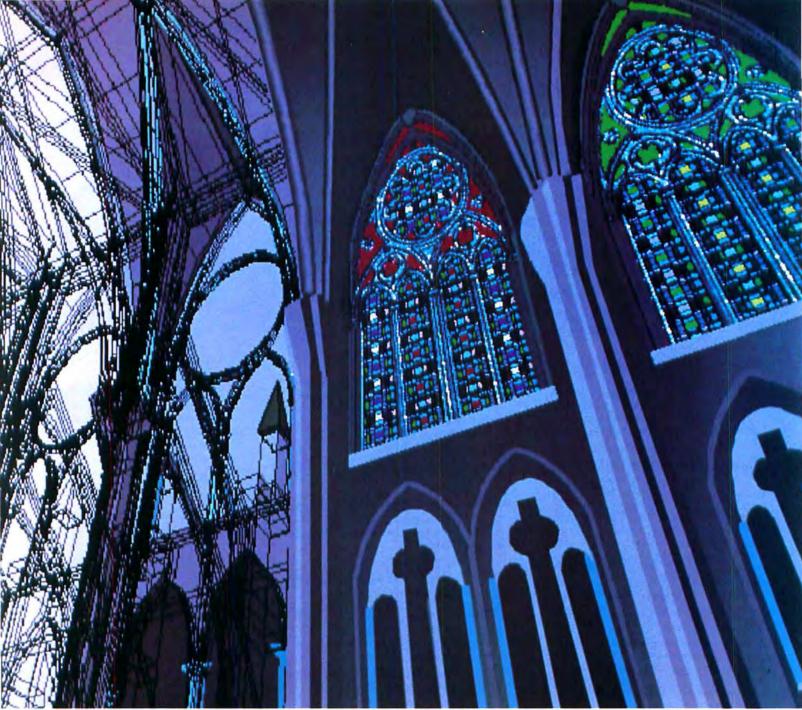
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Model created with ModelShop by Mark Van Norman, rendering by Sandy Chase using Studio8" and LaserPaint".

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LETTERS

A forum for Macworld readers

The Real Waldo

N ice coverage of video in the June issue ["Star Quality"], but I have one correction to make: the Waldo was not invented and certainly not named by Jim Henson. It was first described and named by science fiction master Robert Heinlein more than 40 years ago. He wrote a short story called "Waldo" about a brilliant, handicapped, and irascible scientist not unlike Stephen W. Hawking. In order to overcome his handicap, Waldo builds a space station (no gravity) and outfits it with armatures that allow him to manipulate the outside world. Now that [the Waldo] is becoming a reality, it's important to give credit where it's due. Seth Godin

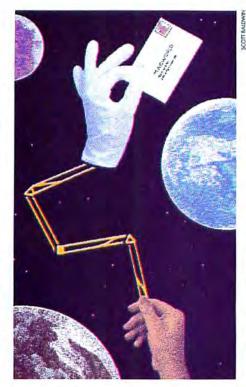
Seth Godin Mount Vernon, New York

Jim Henson's character was in fact derived from the science fiction story. Thanks for setting the record straight.—Ed.

Taking a Stand

've just read Deborah Branscum's article in your May issue [Conspicuous Consumer]. As one of those swindled by Liss, I'd like to express my feelings, not so much about Liss as about your magazine one of Liss's primary means of reaching the public.

You tell us that Atlanta's Better Business Bureau had been receiving calls about Liss



as early as January 1988, and you imply that if we were wise consumers we'd have checked this out and been forewarned. Yet your magazine carried Your Mac Source ads at least through April.

A magazine that trumpets its services to its readers should regularly monitor the performance of its advertisers, both by keeping in touch with the appropriate agencies and by soliciting comments from readers. A warning to an advertiser from a magazine, which has the power to make improper conduct widely known, has a lot more clout than a complaint from an individual cus-

tomer—or even a large group of them. Jeff Faria Hoboken, New Jersey

We forward reader complaints to advertisers and other vendors in an attempt to resolve disputes. Macworld's advertising department stopped accepting ads from Your Mac Source after it became apparent that customers were not receiving products they had ordered. —Ed.

Getting Up to Speed

n "Ten Ways to Speed Up a Mac" [April 1989], the author says "You can also accelerate a Mac SE by transplanting the Mac II's

68020 processor and 68881 coprocessor." Does this mean I can simply replace chips on the SE board, or do I need to buy an accelerator board? I have 4MB of memory I don't want to lose.

Kenneth C. Beck via CompuServe

You do need one. Chances are your 4MB of RAM has 120-nanosecond chips and will work with an accelerator. Or buy an accelerator that can use the RAM on the SE system board, as discussed in "Processors: Is Faster Better?" (Macworld, March 1989). —Ed.

Added Dimensions

Y our June 1989 article on animation, "Move It!," contains several inaccuracies. The product comparison chart lists our entire Dimensions line of software at \$2500. While this is correct, the only product needed for imaging and animation is Dimensions Presenter, which retails for \$495. The Export/Import section of the chart fails to list Presenter's support for the PICS animations format. Presenter imports as well as exports MacPaint files and accepts 3-D files from a variety of other programs and formats, including DXF, VersaCAD, and Super 3D. Eric Hardman Visual Information Development

Corrections

La Puente, California

In "Insights on ReadySetGo 4.5" (August 1989), the power search-and-replace tip should read: "To search for or replace a tab character, type dl (Option-d followed by t) in either the Find or Replace text fields. To search for or replace a return character, type dl or dl (Option-d followed by t or n)."

Truevision (800/858-8783) makes three NuBus boards that provide 32-bit color capability: the NuVista 1M, the NuVista 2M, and the NuVista 4M, which offer 1MB, 2MB, and 4MB of RAM, respectively (Macworld News, June 1989). All three support 1, 2, 4, 8, 16, and 32 bits per pixel.

The phone number for (continues)

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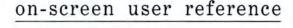
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guide called MacSync Valet."

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Home Electronics (USA) Inc. 1-800-FONE-NEC.



Advanced Logical Software (Where to Buy, July 1989), maker of Anatool, is 213/653-5786.



Featured on our August 1989 cover (but unattributed) was this photo of the RasterOps 24-bit color display.

Neglected Fonts

fert Fenton's otherwise fine article in the May issue

about PostScript fonts ("Enhancing PostScript Fonts") neglected to mention our collection of over two dozen Hebrew PostScript fonts that are compatible with our Hebrew-English word processing and page-layout products, Rav Ktav, AllPage, and MacKtav. Several of these fonts are also available in formats compatible with English applications. Alan Rosenbaum Davka Corporation Chicago, Illinois

Pascal Comparisons

W e appreciate the positive review of Think's Lightspeed Pascal 2.0 in your June issue, but we would like to correct a few inaccuracies that may confuse your readers.

The add-on tutorial you mentioned, Just Enough Pas-

cal, was included with Pascal only during a special introductory period. It lists for \$75.

You state that "it's difficult to predict which compiler will produce better object code from your source, especially for large programs." Actually, code generation can be compared using several standard benchmarks or by building a large project. Think Pascal has a two-pass optimizing compiler that, according to our benchmarks, consistently generates smaller, faster code than TML Pascal for any project, small or large.

Your review commented on TML's customer support but did not indicate whether you had tested our support as well. Symantec provides free phone support, a forum on CompuServe, and a 30-day, money-back guarantee for all its products.

Julie Bingbam

Julie Bingham Symantec Corporation Bedford, Massachusetts

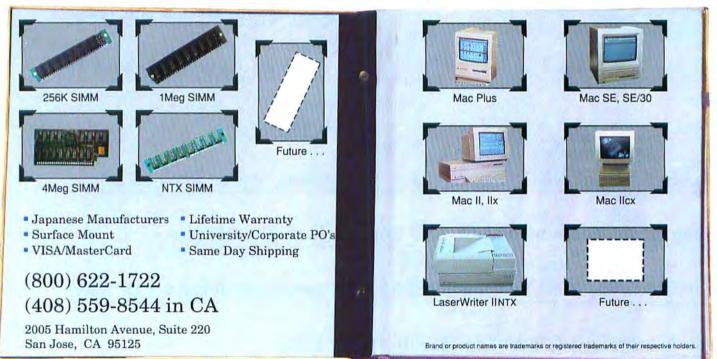
Compilation results on real applications (compiled code size 200K to 400K), which typically include text handling and graphics manipulation, show more variation in size and execution speed than those for the small numerical benchmarks on which Symantec bases its claim.—Ed.

Macworld and DTP

Your May 1989 issue begins with your explanation of the change to DTP to produce your magazine [Commentary]. In explaining your reasons for using PageMaker, you say that "PageMaker was an emotional favorite with many of the designers." You go on to suggest that Quark may be a less-(continues)



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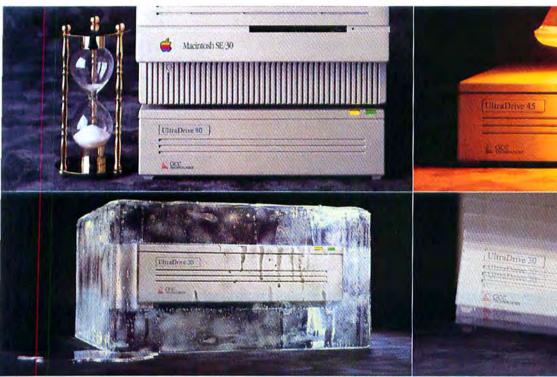
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than-stable company and that you chose to go with an "older, larger company."

I'd like to point out that I was using Quark products before PageMaker was a glint in
anyone's eye. Quark is one of
the oldest Apple developers
in existence, and it published
what is still an emotional favorite with many Apple II
users, Word Juggler. Quark
also created the first typesetting program for a personal
computer—Typeface (for the
Apple III).

You have done Quark a disservice in judging its stability by the size of its advertising revenues rather than looking at the whole picture. Ralph Pollock
ImageSetters Electronic Publishing Service Center

North Hollywood, California

Desktop Divergence

As a typographer and desktop publisher, I must loudly protest Jim Heid's conclusions ["Page-Layout Contenders," April 1989]. The article is not only misleading, but quite inaccurate. QuarkXPress, Page-Maker, and ReadySetGo shouldn't even be in the same category, let alone be compared as equals (or nonequals, as the author suggests).

PageMaker is perfect desktop-publishing software, while ReadySetGo and QuarkXPress are typographical programs best suited for use in a printmedia industry such as advertising, in-house typography, and related areas.

Those of us in the industry rely on absolute typographic control, such as a full range of point sizes, vertical and horizontal text distortion, and the ability to expand and condense type, type in half-point increments, adjust leading in half-point increments, reverse type, and overlap letters.

Why shun all the typographical control we've had in the past? After all the years I've spent learning typography, I'm certainly not willing to settle for less.

Cyndie L. Shaffstall MS Graphics Tucson, Arizona

The RAM Gulper

must comment on Erfert Fenton's article "Brushes with Color" in the May issue.

I was appalled by her complaint about the measly 690K that Studio/8 requires, but there was no mention of the real memory hog—PixelPaint. This RAM gulper wolfs down a whopping 1757K. On my 2MB Mac II, that left just 48K of memory.

My point is that the article is somewhat misleading and incomplete. First, if you don't have at least 4MB of RAM, forget about PixelPaint. Second, the chart on page 153 should have a row indicating the amount of memory required by each application.

Gary D. Van Aken

Littleton, Colorado

We were referring to the amount of hard-disk real estate Studio/8 takes up, but you have a point that many graphics programs are RAM hogs. Although you complain that PixelPaint 1.1 takes up 1757K, Studio/8's application memory size is 2200K. We encountered no memory problems with any of the paint programs we tested, but then we were using a 5MB Mac II. —Ed.

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The First Virtual Screen

acworld's May 1989 issue included a comparison of noncolor monitors for the SE and the Mac II by Bruce Webster ["Getting Down to Black & White"], which stated that Radius pioneered the idea of the virtual screen on the Mac. We were the first to bring a virtual screen to the Mac with our software product, Stepping Out. Stepping Out II is an effective big screen that many Mac users are choosing to use with graphics, desktop publishing, CAD, and word processing. I believe it would be in your readers' interest to include a description of Stepping Out in an overview of add-on monitors.

Joan Blades Berkeley Systems Berkeley, California

Full-Featured Printing in HyperCard

The predicament faced by David Watson, who set up his database in Hyper-Card only to discover that it has limited reporting capabilities ("Database Showdown," June 1989), struck a responsive note. When I read the article, I had just finished the final version of a HyperCard external function that adds fullfeatured printing to Hyper-Card, including the ability to mix text and graphics with external PICT files. The XFCN (called Xprint) was designed to do exactly the kinds of tasks Watson was unable to do without a more sophisticated Hyper-Card printing interface. Xprint is part of a package

of new HyperCard functions and idea stacks that retails for \$29.95. Sam Thornton Stak-X Software

Developing with Excel

Fairfield, Nebraska

read with great interest "Developers Using Excel" [Macworld News, May 1989]. As developers, we at Spreadware feel that, because of its installed user base and capabilities, Excel has been the only software worth supporting with sophisticated products. This may change with the introduction of Full Impact and Wingz.

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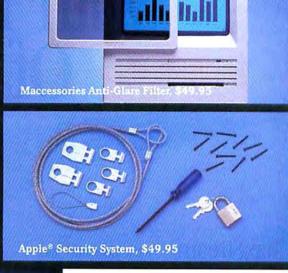


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ART BEAT

by Deborah Branscum

This column examines the tools and the talent behind Macworld's graphics

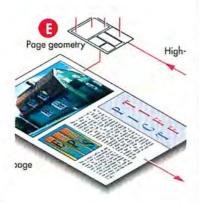
Artist: Senior design associate Arne Hurty joined Macworld earlier this year after winning the first Aldus FreeHand design competition. He began using the Mac and FreeHand in 1987 at Radian, an environmental consulting firm.

Tools: Macintosh II, slide scanner, Aldus FreeHand, image processing software.

How It Was Done: Hurty created three charts for our cover story to illustrate how different prepress systems work. For each chart he created icons, text, and sample pages within FreeHand. One nice effect is the black-to-white shadow under the page mock-up, produced by using a graduated fill underneath a tint box that will overprint the shadow.

Once most of the chart elements were in place, Hurty used a slide scanner to scan a color 35mm slide to complete the page mock-up. He saved the image as two EPS files. One file was a low-resolution, 36K image used by designers for placement. The second file was a high-resolution, 1.7MB image, and represented the quality of output generated by high-end systems.

Hurty used a beta version of an upcoming image processing program to open the EPS files. He created process color separations and selected



halftone screens and values and saved the files. He also created two low-resolution color screen images, for placement and positioning.

Hurty placed the two lowresolution images into the FreeHand illustrations. There he stretched and rotated them. Because the images within the FreeHand chart are linked to the original scanned EPS files, any changes to the screen images are reflected in the larger EPS images output by the service bureau.

"What attracted me to FreeHand was its superior typographic capability," says Hurty. "It has an intuitive interface and I love the way you can access color editing through other dialog boxes." Still, the program has some drawbacks. "There are a lot of menus and submenus to accommodate all these features, and few keyboard shortcuts," he says. One workaround is using QuicKeys, a macro program that, according to Hurty, "nicely complements Free-Hand's interface."

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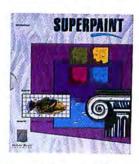
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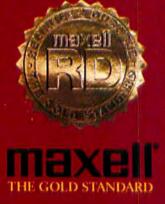
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oor Robertson Reed Smith. While in charge of the computing department for Macy's department store in San Francisco, he was infected by HyperCard fever and began working on a set of scripting tools after hours. After a number of all-night hypersessions, Smith finally finished his masterwork, which he released to the bulletin boards as Stack Starter. This was a marvelous collection of resources, buttons, sounds, and icons, many of them ani-

mated. Best of all, the program allowed even novice scripters to add these delights to their personal stacks.

Smith wanted many people to reap the advantages of his routines; although he copyrighted his work, he distributed it freely, with the sole caveat that he did not want his effort to find its way into commercial software. "I wanted it shared," he says. "If it became commercial, people might feel they couldn't use it."

So why do we call this generous and creative fellow *poor* Robertson Reed Smith? Well, one day he heard some shocking news. Someone told him that parts of Stack Starter were included in a commercial product called 101 Buttons and Scripts, published by a company

called Individual Software. Smith bought a copy of the \$70 product and, indeed, found many of his icons and doodads in the program. The fact that the package gave him credit for the work he'd done was small comfort; he certainly didn't recall authorizing Individual Soft ware to use his stuff. Worse, the documen-

tation encouraged users to take anything on the disk and use it in commercial software—exactly what Smith didn't want.

Smith hired a lawyer to write a letter to Individual Software, asking the company to stop using his work. He made other demands of the company, ranging from reimbursement for legal fees to placing ads in trade magazines informing users of the situation. The company eventually met some of his demands, and version 1.1 of 101 Buttons and Scripts has none of Smith's work.



But Smith is unhappy that no advertisements were placed. He sees that the damage has been done—his icons appear in numerous stacks, some of them copyrighted by others. He's even sat through product demos at user group meetings where developers showed programs that used his work. What should have been an invigorating experience for him—sharing his work with others in the spirit of altruism and HyperCard idealism—has been a terrific disappointment.

STACKING THE DECK

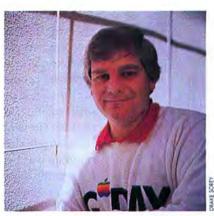
One of the recurrent joys of the Macintosh software community is the rich bounty of goods distributed by an ad hoc samizdat consisting of bulletin boards, user group disks, and informal networks of passalong. But there are problems with this charming underground. As this case shows, the unauthorized redistribution of programs is one of them.

As I investigated the issue, it became clear that these are not simple cases of heroes and villains. Take the Stack Starter incident. To be sure, Robertson Smith was wronged. But after talking to the presumed villains who nabbed his work, I am not prepared to call them ill-intentioned. The key figure in this turns out to be a person much like Smith, a HyperCard fanatic named Craig Ragland who runs a small company in Seattle called Interactive Design. His impetus was virtually identical to Smith's-compiling a toolkit to aid prospective stack makers. His approach was different, though: he planned a commercial product (though a relatively inexpensive one) that would make use of some of the hot tools being distributed over the nets by authors like Smith. Working with a publisher called Macropac, he began collecting the components of what (continues)



When shareware becomes a free-for-all

by Steven Levy



Robertson Reed Smith, shareware author.

would become 101 Buttons and Scripts. Among the people he spoke to was Smith.

But apparently the conversation was mutually misinterpreted. Ragland says he felt Smith gave him a verbal go-ahead to use stuff from Stack Starter. Smith says Ragland expressed vague interest in using some of Stack Starter, and left only with a promise to follow up in writing. In any case, Ragland did not send any paperwork to Robertson Smith, an omission for which he accepts responsibility. "A large part of the blame falls on my shoulders for not being organized," he says.

Things became more complicated when the putative publisher of 101 Buttons sold its catalog to another company, Individual Software of San Carlos, California. Its president, Jo-L Hendrickson, had no idea that part of the software he was about to sell actually belonged to Robertson Smith: the first he heard of it was in the

letter from Smith's lawyer. He says he immediately had the software rewritten, but he did not think it was necessary to meet all of Smith's demands.

Everybody is unhappy. Smith feels that not enough was done to notify the people who bought the first version. Hendrickson feels he acted responsibly, and that Smith should stop griping, already. Ragland feels a little guilty for not being more professional. "I wish I had a magic wand to change everybody's version to the right one," he says. "I had the purest motivations—to point to a great product."

Ragland's lament has the ring of truth to it. Why not give exposure to software that, after all, was originally offered to the underground in an attempt at the widest distribution possible? Well, for one thing, not all authors want a "real" publisher to handle their work. And when publishers assume that anything they find on bulletin boards is fair game for distribution, the situation is ripe for misunderstanding.

THE CASE OF SCSI TOOLS

Take the case involving Personal Computer Peripherals Corporation (PCPC), which makes the popular MacBottom hard disk. To add value to its drives, the company produced a utility called SCSI Tools, with some neat optimization and checking techniques. Besides providing the program free with each drive, PCPC sold it separately. This was fine, until the company produced an upgrade and during the testing process placed the software on a bulletin board. "It subsequently came to our attention," says the company's marketing honcho, Robert Leeds, "that the program was being offered on a disk sold by a company selling 'Almost Free Software for Macintosh Computers,"

The company was Educorp in Solana Beach, California, a business that sells, at low prices, hundreds of disks full of Macintosh software, mostly public domain and shareware programs. PCPC quickly issued a letter asking the offending reseller to stop distributing its program, and to notify those who purchased it that they were holding an unauthorized copy of a proprietary program.

(continues)



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*Partial list

This occurred in October 1988. In April of the following year, at the Macworld Expo in the nation's capital, Leeds said he saw an Educorp catalog and was dismayed to discover that it still listed SCSI Tools.

I called the founder and president of Educorp, an articulate fellow named Vahe Guzelimian, who submits that his company performs a useful service. He charges an average of \$5.72 for a floppy disk that might have ten programs on it, mostly shareware and public domain programs. Educorp has a reputation for having the most extensive and current collection of software from the underground (an estimated 10,000 programs), and its sources range from bulletin boards, to author submissions, to users who send in stuff they come across. Guzelimian insists that despite paying a fee for the disks, Educorp buyers pay their shareware charges

at least as often as those who receive the software through other means. And if Educorp makes a small profit, why not? "We work very hard, and we do a very good job," he says. But this raises questions. Is Educorp careful when redistributing software, and are the authors always consulted?

"It's a small problem," Guzelimian says, admitting that "periodically" authors find Educorp distributing their software against their wishes, or at least without permission. In the case of SCSI Tools, Educorp pulled the program immediately, he says.

Still, I find something troubling about the methodology of a company like Educorp, which routinely redistributes programs for profit, often without consulting the author. Guzelimian says that before using a program, his company will closely examine the dialog box to see if the author specifically forbids redistribution. If in doubt, he will attempt to contact the author. This is sometimes a difficult task, because often the only clue to the author's whereabouts is an address on some obscure E-mail system. But usually Educorp has no contact with the author. "Our policy is that if we had to write a letter to every one of the seven or eight thousand people whose programs we distribute, it would take us at least one more employee, cost us more, and cost our customers more," says Guzelimian.

Some people think that expense would be well justified. Certainly a shareware author named Mark Chally is among them. He cried foul when he discovered that his menu-customizing utility, HexFlags, was included in an Educorp offering. He says that when he contacted Guzelimian to demand its removal, he did not get immediate satisfaction. Guzelimian points out that the utility was labeled "WhoCares-Ware," so as far as he was concerned, there was no indication that Chally would object to distribution. Both parties admit there was some misunderstanding. Chally has gone public with his complaints, posting them on bulletin boards. "All we probably did was misunderstand his intentions," says Guzelimian. "He asked us to remove the program and we did." (continues)



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A BINARY BIND

As problems go, unauthorized redistribution of publicly distributed software is not as alarming as, say, the demise of the rain forest. But I think that the problem is significant, inasmuch as it points to the increasing ambiguity of intellectual property rights in an electronic age. The legal rights of the parties are often unclear. Guzelimian told me that his biggest problems come not with reluctant shareware authors, but with things like fonts. Who can tell if anyone holds a copyright on them? Then there are problems in distributing scanned images. Do the original pictures belong to the individuals who scanned them, or were they taken from copyrighted photos and drawings?

It's easy to say that people are entitled to credit and remuneration for their work, but in a dawning age of instant information transfer, how freely should we be able to move digits around? Because in this tremulous new information age, both ideas and creations are bound into binary bits.

Meanwhile, this is what Robertson Reed Smith has learned from his experience: "Nobody respects your rights in software unless you charge money for it. What kind of incentive is there for a person to try to do the best job he can on a piece of software and make it available free of charge, if others simply take it and put their names on it?"

As this column went to press, Guzelimian announced a new Educorp policy: The company will contact shareware authors before redistributing their products "in every case where there's an address given," he says. "If the authors don't respond, we'll assume they want it distributed."

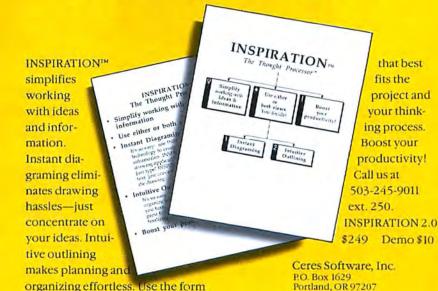
The last word on this has yet to be written, and it is only one issue in an increasingly puzzling conundrum. The law is already several laps behind the reality. Meanwhile, we're waiting for the philosophers who will stake out some moral high ground in a future marked by digits.

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

Turn the page to see what's developing between Ashton-Tate and Apple.

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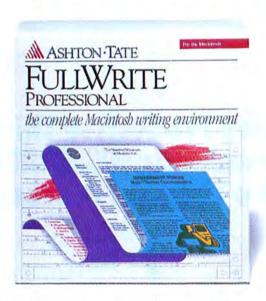
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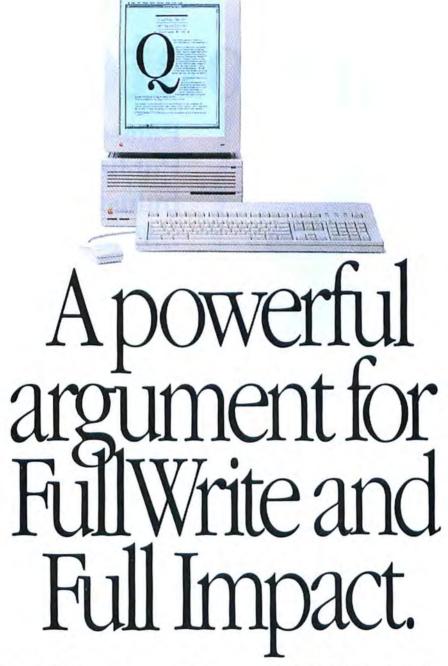
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Circle 418 on reader service card

ebecca Krieg first knew something was wrong when two fingers on her right hand began to tingle and feel numb. But she thought it was the temporary result of understaffing where she worked. As a copy editor for the *Lexington Herald-Leader*, in Kentucky, Krieg worked 12-hour shifts, pounding away at the keyboard as she edited stories against deadline. By early 1988, "my entire right hand would go numb and turn purple," she says. The first doctor she saw told her

to compensate by using her left hand. Soon, it too was throbbing with

pain. A second doctor diagnosed the problem as carpal tunnel syndrome and pulled Krieg off the job.

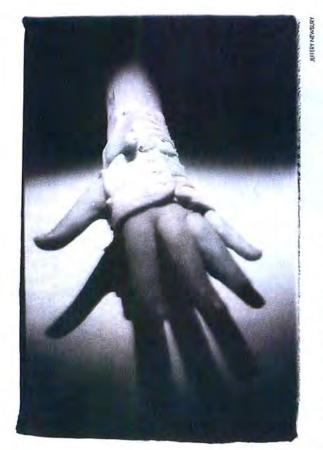
Carpal tunnel syndrome, a painful and potentially crippling ailment, gets its name from a tunnel-like space within the wrist that contains tendons and a nerve that passes impulses from the brain to the hand. Repeated stress or trauma can cause the tendons to swell and press painfully on the nerve. Over time, the nerve can be

she says. The first doctor she says. When It Hurts to compensate the left hand.

Guidelines for healthier computing

to Hug

by Deborah Branscum



damaged, and victims may lose the ability to grip objects or even to use their hands.

Carpal tunnel syndrome is just one of many musculoskeletal inju-

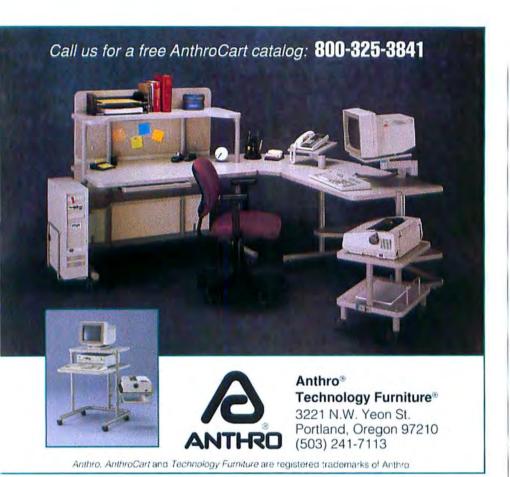


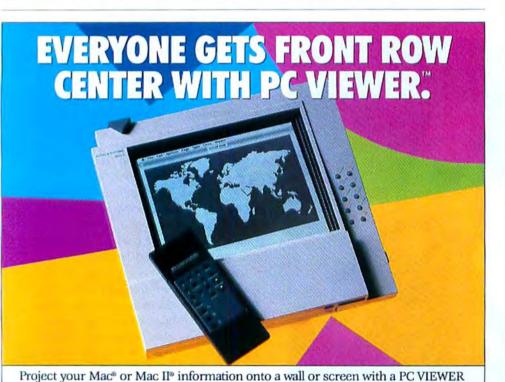
ries that fall under the rubric of cumulative trauma disorder, also known as repetitive strain injury or repetitive motion disorder. Cumulative trauma disorder encompasses back and upper-body injuries shared by workers across all industries—from auto workers to supermarket cashiers to meat trimmers to office workers. The disorder is popping up wherever people are asked to work like machines—to repeat a particular movement, using small muscle groups, over and over again. Our bodies aren't built for this kind of wear.

Cumulative trauma disorder is "the number one occupational hazard of the nineties," according to California Representative Tom Lantos, who heads the Congressional Employment and Housing Subcommittee. At a hearing held in June, expert witnesses testified that the disorder is on the rise and is expected to make up fully half of work-related injuries over the next decade. Morton Bahr, president of Communications Workers of America, said that 30 to 60 percent of VDT operators surveyed by his union have symptoms of what some have dubbed "the industrial disease for the information age."

"When you walk into a comfortable-looking office, with people sitting in front of VDTs, you don't see a problem," said Lantos. "The danger comes unseen and unnoticed until it's too late."

It's too late for Rebecca Krieg. She was a good copy editor, so highly valued that she was promoted despite her diagnosis. Now she wears braces on her hands. Even after months of physical therapy, "I'm not able to edit," she says. "I don't know what the future holds." Still, Krieg is lucky. Unlike some employers, who fight workers' compensation claims or fire disabled workers, the *Herald-Leader* has given her a new job. But she remains frustrated. "Now I feel like I can't contribute," she *(continues)*





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says, describing how she still needs help at work for certain tasks. "I have to fight the feeling that I have no value."

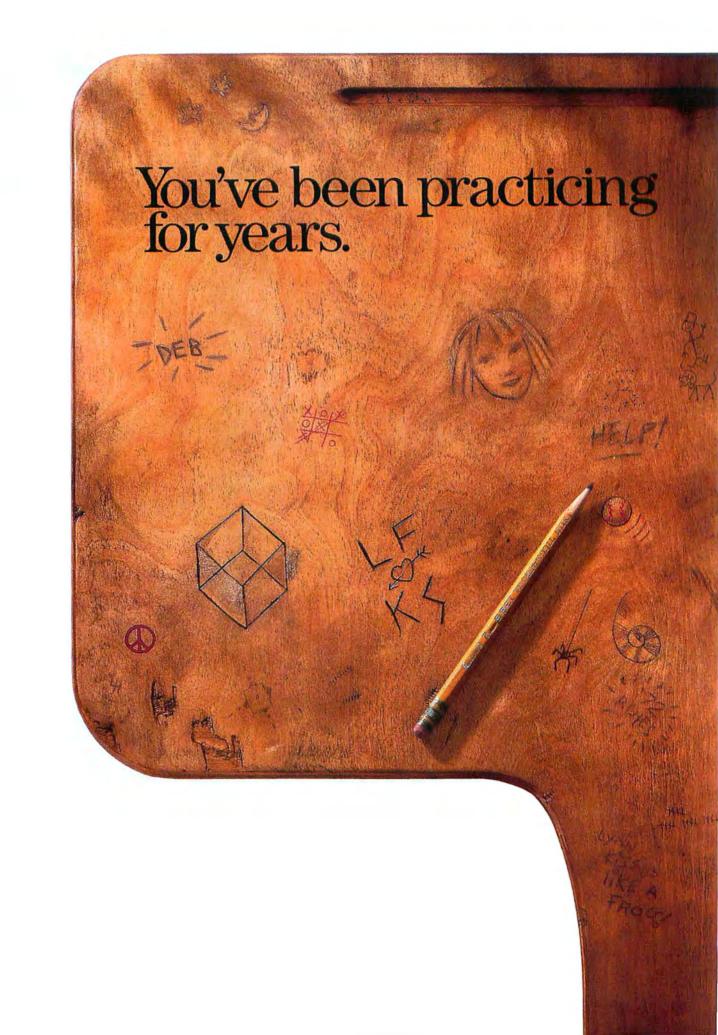
According to the Newspaper Guild, more than 200 employees at the *Los Angeles Times* are showing signs of cumulative trauma disorder. "One morning I woke up with an incredible shooting pain between my elbow and shoulder," says one reporter, who asked not to be identified." I couldn't believe how painful it was. I couldn't even lift my arm." Management at the *Times* has responded to the widespread problem by bringing in adjustable computer tables and new keyboards. There's a video about the ailment for employee viewing, and new chairs with better support are available on request.

"We have a wonderful computer system. But they didn't figure out what the ergonomics were, and we're now paying the price," says the reporter, adding that management should be applauded because the paper is obviously concerned about the problem. But are the company's best efforts enough? "A couple of people I know have problems in the upper arm, some in the wrist, some in the back, and some in the neck. The feeling now at the *L.A. Times* is that we're all going to be crippled; it's just a matter of when."

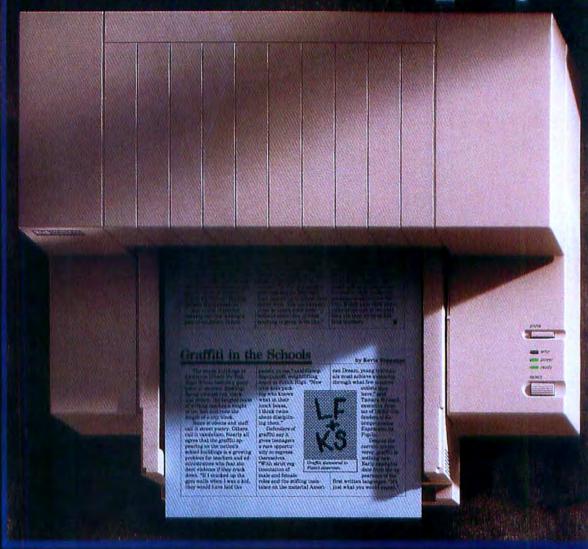
Rebecca Krieg used an Atex publishing system at the *Herald-Leader*. The reporter at the *Times* works on a system called Coyote. Denise Caruso, a columnist for the *San Francisco Examiner*, uses a Macintosh.

"Two months ago I noticed that I couldn't move my fingers more than an inch in the morning," says Caruso. "I'd had problems with tendinitis before, but this was much worse than anything I'd ever experienced." It was diagnosed as the early stages of carpal tunnel syndrome. Fortunately, it's not too late for Caruso; splints, drugs, and time off from work should undo the damage. But unless she is able to adapt her work to her body, the problem may crop up again.

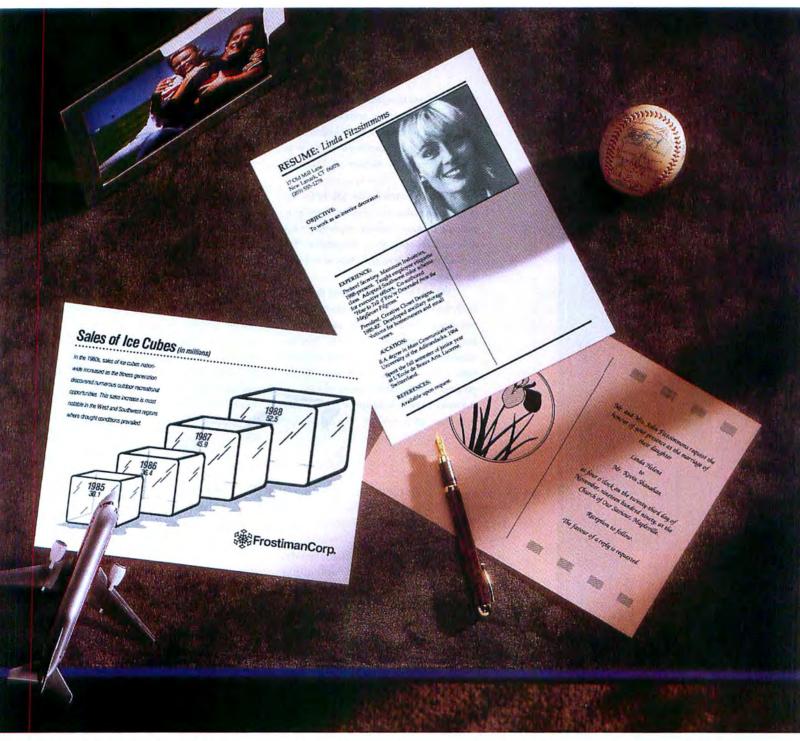
Barbara Silverstein is an ergonomist with the University of Michigan Center for Ergonomics and School of Public Health; she's also an expert in cumulative trauma disorder. This disorder shouldn't be an (continues)



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SERVICE HEROES

've been using MacRecorder for well over a year now, and lately I've had some problems where I had to carefully plug in the microphone to get it to work," writes Ken Abrams of Chapeau Software Services. Abrams wanted to open the box for a simple solder job to fix the problem. But when he called Farallon Computing's customer service department for directions on opening up the product, the technician said opening the box would void the warranty.

"When I said that I figured the warranty had expired, he said something that truly amazed me: 'Well, yes, our warranty technically only lasts one year, but we consider any MacRecorders that we have sold to be still under warranty.' Rather pleased with Farallon's point of view on the matter, I packaged up the unit and sent it to them at 2 p.m. on Monday. I then received a completely new unit, documentation, and disks (with updated software) at 1:30 p.m. on Wednesday." Good work, Farallon.

Dove Computer went well beyond the call of duty for Philip Hagopian of Merrimac, Massachusetts. When the old Mac-Snap 1MB upgrade in Hagopian's Fat Mac failed recently, he shipped the board to Dove. It came back three and a half weeks later, repaired at no cost. Then, while reinstalling the MacSnap board, Hagopian snapped a pin leg on a Dove SCSI board in the machine. "In three weeks I received another package from Dove," he writes. "Both the 1-meg upgrade and the SCSI board warranties have long since expired. Yet Dove Computer repaired both boards without asking for 1 cent. Thank you, Kim Johnson [quality control manager] and thank you Dove Computer Corporation."

issue for casual computer users, says Silverstein, but "people who use computers day in and day out need to worry about it. When you use a computer, you tend to be keying the entire time. We think these jobs aren't forceful because we're not lifting things. But it takes four times more force to pinch things than to grip them."

It's unclear why so many office workers are now becoming afflicted with this disorder. The national Occupational Safety and Health Administration (OSHA) has only one ergonomist on staff and virtually no studies of its own to either track or explain the increase among computer users. Some suggest that typing on a typewriter helped prevent carpal tunnel syndrome, for example, because typists had to stop periodically to change paper. Now data-entry clerks are hitting up to 12,000 to 14,000 strokes per hour, with few breaks. And reporters who once went to the library for research and took notes by hand are doing it all via their computer keyboards.

Without in-depth studies of the problem and established standards for computer work, there is no foolproof way to stave off the disorder. But experts in the field do offer several suggestions.

■ Take preventive measures. When Rebecca Krieg was still a copy editor, her coworkers ranged in height from 5 feet 5 inches to more than 6 feet, yet everyone worked at tables and chairs of the same height. Adjustable table height and adjustable chairs with low-back support are ideal for marathon computer users. If you can't adjust table height, an adjustable chair and foot support may at least help.

When you work at the keyboard, type with your arms straight and parallel to the floor, rather than curling your hands down or up, which contributes to carpal tunnel syndrome. Wrist rests can hep support your arms and keep them straight. Your display should be able to tilt and swivel. (There are products that let you mount a compact Mac so that it does both.) When using a mouse, keep your elbow no more than 60 degrees above your side. "If you're holding the elbow up for long periods of time, you cut off the circulation to your *(continues)*

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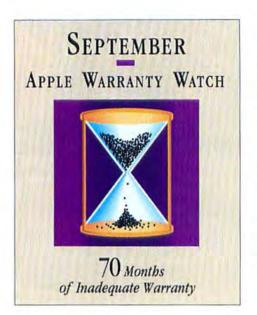
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rotator cuff tendons," says Silverstein.

Silverstein would like to see breaks designed into work schedules, since she believes that people simply don't take breaks otherwise. Although I can't imagine the practice catching on quickly, she suggests that randomly shutting down computers for a minute and a half might be one solution. She also suggests organizing jobs so that people must get up periodically and do something that doesn't require keying. In the meantime, take frequent ten-minute breaks from your keyboard to file or return phone calls.

• Don't ignore symptoms. Pay attention to your body. Seek medical treatment if your hand hurts or your shoulder aches. Carpal tunnel syndrome's most common symptoms include numbness, tingling, and burning sensations in the fingers and hand. Other problems may occur in the shoulder, neck, arm, and back.

"Go to a doctor as soon as possible," says Silverstein. "The longer you wait, the less chance there is that conservative treatment will work." Unfortunately, it's possible that your health care worker may not recognize the disorder. Carpal tunnel syndrome is often misdiagnosed as arthritis, according to the Safety and Health Program of the United Food and Commercial Workers Union. But unlike arthritis, carpal tunnel syndrome affects the thumb and first three fingers, not the entire hand. Still, word is getting out and physicians are becoming educated about these injuries.

 Urge Congress to take action. Barbara Silverstein is pushing for an OSHA panel of experts to study cumulative trauma disorder. She wants OSHA to establish a standard for job design and ergonomics that employees and companies can use to combat this disorder. But one ergonomist at OSHA can't do the job alone. Ask your legislators to support resources for an OSHA study and job-design guidelines. In the absence of real information, some companies are feeding workers vitamin B. or implementing five-minute exercise periods because they are desperate to do something, but these measures haven't solved or prevented the problem.

Krieg lives alone. She needs help to clean her house, buy groceries, make dinner. She can't even hold a coffee cup with one hand. Other victims say they can't comb their hair or pick up their children. "It affects every part of your life," said Krieg when she testified in June before the Congressional Employment and Housing Subcommittee. "I can't even hug someone without pain."

For more information about ergonomics and computer use, read The VDT Book: A Computer User's Guide to Health and Safety. This great 48-page booklet covers health issues associated with VDT use and offers solutions to common problems. It's yours for \$6 (includes postage and handling) from the New York Committee for Occupational Safety and Health, 275 Seventh Ave., 25th Fl., New York, NY 10001. The Electronic Sweatshop is a lively \$4 read about VDT work and the electronics industry and includes a resource list. Order it from the Center for Investigative Reporting (415/543-1200). For a more technical approach, Improving VDT Work and VDT Health and Safety are available from Ergosyst for \$15 and \$32, respectively. Ergosyst can be reached at 913/842-7348.

I love happy endings. Individual readers (not vendors) should send 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 try to help. If your user group is sponsoring an event, please get in touch. Attention Mac-only dealers: I'm compiling a list, so let me know that you're out there.

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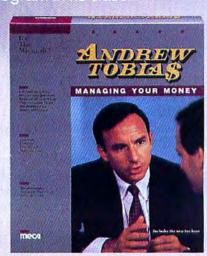
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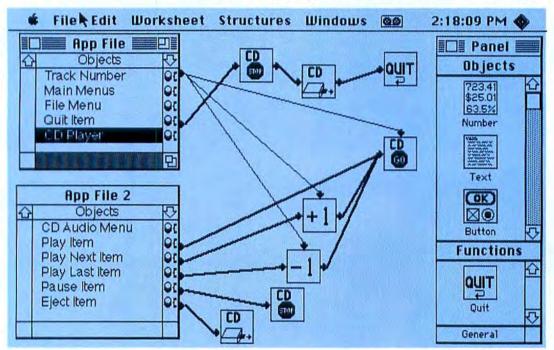


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s predicted, this has been a year of change in the Macintosh world. We've received new Mac models, new options, and the first hints of a new operating system. Apple, of course, hopes that these new goodies will get you to rush down to your local computer shoppe and charge up a storm.

But most of you reading this magazine already have Macintoshes. Indeed, many

of you stretched your budget to get your current machine-there is

just no way you're going to abandon it and buy a new one at list price. Or is there? With System 7.0 and all its mouthwatering goodies just around the corner, you need to start choosing one of three options: stay put, upgrade, or start over. This month I'll make my suggestions to those of you who have a Mac 128K, 512K, 512KE, Plus, or SE (the classic, compact Macs). Next month I'll advise Mac II

The major impetus behind the need to update your equipment comes from Apple's System 7.0 plans, which were previewed to the press and developers in May. System 7.0 appears to stretch the Macintosh into a much more capable

> machine, but at the expense of memory and processor power. You'll need a minimum of 2MB of RAM to run the new System, and many of its more desirable features-virtual memory support for MultiFinder, interapplication communications, 32-bit color support, more accurate on-screen text

positioning, and scalable outline fonts, for instance-will place additional demands on your system, particularly on the processor. Running System 7.0 on a 2MB Mac Plus with a 20MB hard disk will work, but you'll be forgoing some of the new software's better features (virtual memory won't work without a 68030 or a 68020/ 68551-combination processor, for ex-

ample). In fact, you might find that your Mac Plus acts even more sluggish than it does today if you try to make System 7.0 do too much on too little a machine.

Don't underestimate how much change System 7.0 will produce (or how long it will take to get here). In my talks with developers, I've found that they all want to be ready to take advantage of many of the new features the minute they're available (best guess: March 1990). System 7.0 has already caused developers to rethink portions of the user interface (quick, how do you specify 21-point type?). As developers learn more, I'm sure they'll find other things to change in their programs. as well.

My initial evaluation of what Apple has said about System 7.0 leads me to several conclusions about the minimum Macintosh machine needed to run it effectively: 4MB of RAM, an 80MB hard disk, and a 16MHz 68030 processor. Sounds a lot like a Mac IIx, doesn't it? Yup, and that's the challenge facing owners of the older compact Macs, so without further ado, let's deal with them model by model.

DEALING WITH MATURE MACS

Those of you who, like me, have been with the Mac since the beginning have already been through one pretty dramatic change: the switch to HFS (Hierarchical File System) and the Mac Plus ROM set (128K ROM chips). When Apple introduced the Plus back in 1986, the changes in the hardware and operating system were substantial enough to warrant making a big investment in upgrading our machines. I remember paying a little over \$1000 for my 128K-to-Plus upgrade. For that, I got the HFS file format and new system software, a keyboard with arrow and other additional keys, a ROM change, twice the floppy storage capacity (from the original 400K to the current 800K drives), a SCSI hard disk port, and 512K of additional memory (I had already added memory to my original Mac).

It was a good thing I made the change, too. Many software developers stopped supporting the old 128K Mac within a matter of months. If you're one of the few folks out there who still have an original (continues)

Macs, They Are just no way yo and buy a new there? With Sys watering goodi

Should you stay put, upgrade, or start over?

by Thom Hogan





128K or 512K Mac, I salute you-you're a pioneer. I sure hope that you enjoy what you've got, since virtually every new (nongame) software product I've seen in the last year won't run on your machine. And this trend will simply get worse. For the time being, Apple still offers extended care for these older machines, but that won't last forever. When Apple runs out of inventory of old 400K drives and logic boards, you can expect it to bow out of the support picture for 128Ks and 512Ks, just as the company did with the original Apple IIs. It's hard to predict when this might happen-it could be tomorrow, it could be several years away.

It's still possible to find authorized dealers who remember the 128K-to-Plus

upgrade and will still do the work for you. The only problem is that the street price of the Plus has dropped to about \$1250 (at least here in the San Francisco Bay Area), which isn't much more than the upgrade. Thus, my suggestion to you 128K and 512K owners is to byte the big one, reach

My suggestion
to 128K and
512K owners:
reach deep into
your wallet and
buy, at least,
a new Plus

deep into your wallet (or credit limit), and buy—at the least—a new Plus. Believe me, the difference in using the original MacWrite on a 128K Mac with floppies and using MacWrite II on a Plus with even a small, slow hard disk is phenomenal. If you value your time and sanity, upgrade now.

What about third-party upgrades for the original Macs? It's still possible to find MegaMax and other 1MB memory upgrades for the 128K. But I see several problems with bolting additional memory onto a 128K or 512K Mac. First, the power supply in those machines is highly suspect, and not likely to like the additional load the added memory or options will make (and yes, Apple *bas* improved the Plus's power supply lately to make it much more reliable). Second, virtually all of the companies producing such options are small, and the failure rate among them has

been high—thus, you may find that support for your upgrade disappears sometime in the near future. And third, you're still stuck with the original ROM chips, which means that most software being introduced today won't work on your machine regardless of how much memory it's got.

Conclusion for Mac 128K and 512K owners: Live with what you've got or buy a new machine.

THE PLUS'S PLUSES

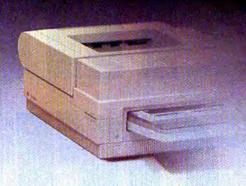
If you've got a Mac Plus, you're in better shape. A Plus can easily be upgraded to 2MB or 4MB of RAM, and a wealth of third-party support exists for other memory options. Dove, for instance, has several add-on memory products that work well, don't force you to throw away your current SIMMs, and are easy to install.

Better still, several companies make very good accelerator boards for the Plus. My favorite has been the basic Radius accelerator (no coprocessor), which does a good job of speeding up most basic tasks, like word processing and databases. What Plus owners really need, however, is a 68030-based accelerator. As I write this. Dove and Microtech have announced such boards for the SE-I'm sure we'll see some announcements of similar products for the Plus soon. Take a close look at these addons-despite their high price-because they'll bring you megabytes of virtual memory with System 7.0. On the other hand, don't rush out and buy a 68030 accelerator today-wait until you can verify that it does indeed work with System 7.0.

It's also pretty easy to find full-page monochrome monitors for the Plus. What you won't find are color monitor options, DOS coprocessors, internal modems, and the like. No big loss there, at least for the majority of us. Color is not much use unless you're into multimedia or sophisticated graphics production; you can buy a cheap IBM PC clone and MacLink Plus if you want to use DOS files on your Mac; and external modems are cheap and plentiful. Besides, System 7.0 really doesn't provide much additional support for any of these options—the real advantages of System 7.0 lie elsewhere.

(continues)





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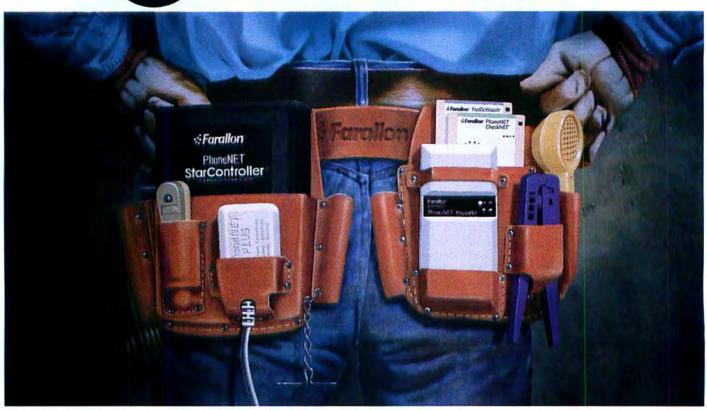
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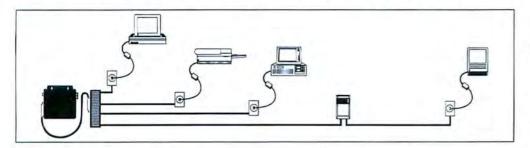
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Circle 291 on reader service card.

Conclusion for Plus owners: You should upgrade to at least 2MB (preferably 4MB) of memory in the very near future so that you can switch to System 7.0 when it appears. If you can afford it, get a 68030 accelerator *after* you've made the switch to the new operating system—it'll give your old machine some new snap, which it'll need to make full use of the font-scaling and other new abilities in System 7.0. Be sure to add a fan when you add all this new hardware to your Plus. My favorite is the diminutive (and quiet) Fanny Mac, available from Mobius Technologies (415/654-0556).

SE OWNERS HAVE MORE CHOICES

Mac SE owners have all the same options Plus owners do, plus a few more. If you've

got the bucks (expected to be about \$2500 as I write this), your best bet is to accept Apple's offer to upgrade your SE into an SE/30. It's clear that the 68030 is Apple's choice of processor for virtually all future machines. Part of the reason is that it supports virtual memory. System 7.0

For you SE
owners, the
best bet is to
accept Apple's
offer to upgrade
your Mac into
an SE/30

will let you set up your SE/30 so that it thinks it has up to several gigabytes of main memory (assuming you have a correspondingly large hard disk on which to spool the information, of course). If you're a heavy MultiFinder user, you'll be unhappy if you can't take advantage of the virtual memory abilities in System 7.0. Moreover, once developers start making use of the IAC (interapplication communications) functions in System 7.0, you'll want to run multiple programs simultaneously. These benefits are all on top of the basic speed improvements and additional disk capacity you'll get by upgrading your SE to an SE/30; heck, even your current hard disk will run faster with the new system board installed.

Conclusion for SE owners: Upgrade to an SE/30. Short of that, add memory and consider getting a high-performance accelerator like the Radius 25MHz model, which outruns a stock Mac II on most tasks. The downside to getting a non-68030 accelerator is that you won't be able to use the virtual memory abilities of System 7.0. In time, inexpensive 68030 accelerator options are likely to appear as well, but it's hard to predict when and for how much at this juncture.

WHAT YOU DON'T NEED

For the time being, you don't need to consider upgrading your 800K drives to 1.4MB. Plus and SE owners can always add a 1.4MB external floppy in the future, if necessary. The same logic applies to hard disks: what you have now is probably fine, but if it turns out that it isn't, you can always add another one externally.

You also don't need to buy a color display, or even a bigger monochrome display. For right now, the 9-inch monitor in the Plus and SE will still work with all noncolor software products. SE/30 owners have a slight advantage in that they can directly upgrade to Mac II–compatible color displays, but personally I think that external displays defeat the whole reason to buy a compact Mac Plus or SE in the first place.

You don't need to buy a new printer. In fact, if you've got a LaserWriter SC, the scaling outline fonts in System 7.0 will actually give you PostScript-like text abilities. The same applies, albeit at lower resolutions, to any ImageWriter model you currently have. Your current keyboard and mouse are also just fine. Any modem or other peripheral you have should work just fine with the new System (some will get additional capabilities!).

To summarize: You'll need 2MB or more of RAM and a faster processor—preferably a 68030—to take full advantage of System 7.0. If you've already got them, congratulations; you've succeeded in anticipating the changes. If not, you've got some serious thinking ahead of you.

Thom Hogan is president of Macreations, developer of Tycho; publisher of The Macintosh II Report; and author of The Programmer's Macintosh Sourcebook (Microsoft Press, 1989).

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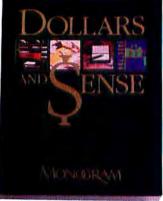
Designed specifically for the Macintosh IIX, plugs into the existing 68030 socket and features a Motorola MC68030 microprocessor, operating at 32 MHZ, has a built-in Paged Memory Management Unit available for A/UX systems. Improves in-tensive applications, and other processordemanding operations. (accelerators)

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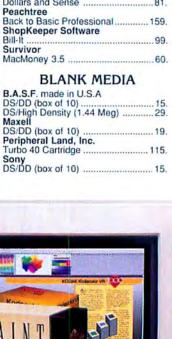
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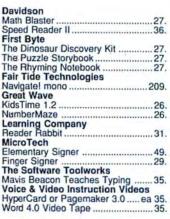
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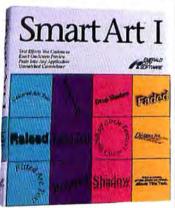
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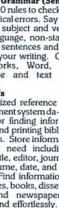
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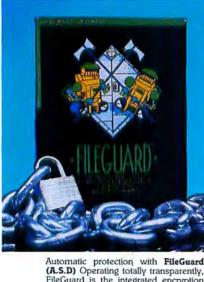
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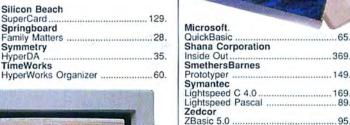
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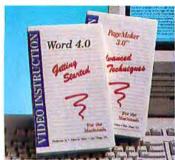
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XCAL (Trendware Corporation)

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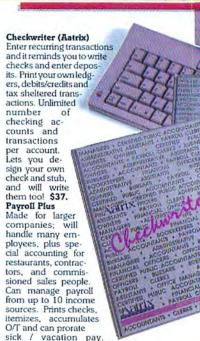
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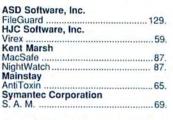
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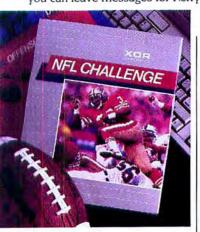


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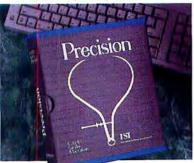
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MACWORLD NEWS

by Dan Littman and Tom Moran

Color PostScript Output for Under \$10,000



QMS has begun shipping the first 300-dpi printer listing

for less than \$10,000 that uses Adobe PostScript. The Color-Script 100 Model 10 is also the first printer to use Mitsubishi's new G370 thermaltransfer print engine, which can produce up to 16.7 million colors. You can choose an all-black ribbon, a threecolor ribbon (with cyan, magenta, and yellow), or a four-color ribbon (with cyan, magenta, yellow, and black). A typical page prints in about 15 seconds, using the black ribbon; with the three-color ribbon, it takes less than a minute; with the four-color ribbon, about 70 seconds. The printer accepts cut-sheet paper and transparencies.

The printer's controller includes a 16MHz 68020, 4MB of RAM, 1MB of ROM, and 35 resident typefaces. With that amount of RAM, the Color-Script 100 Model 10 can produce letter or A4-size output. The 1MB and 4MB memory options support legal-size output and additional virtual memory for downloadable fonts and for special imaging



The QMS ColorScript 100 Model 10, the first 300-dpi PostScript printer to cost under \$10,000, is a thermal-transfer device.

on the larger output sizes. QMS is also offering an HP-Graphics Language plotterlanguage emulation for \$199.

The QMS ColorScript 100 Model 10 lists for \$9995. The memory expansions list for \$595 for 1MB and \$1495 for 4MB. For more information, call QMS in Mobile, Alabama, at 800/631-2692.

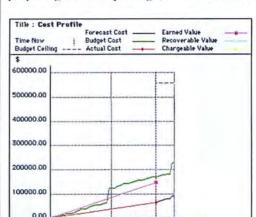
-Tom Moran

More Best-Laid Plans



When Micro Planning International began marketing project-

management software for the Apple II in 1980, the company was already established as a project-management consulting firm. It continued consulting and developing software, later releasing MicroPlanner for the Macintosh. Now the company is preparing a \$1995 package,



called Micro Planner X-Pert, which adds the ability to manage concurrent projects with shared resources.

X-Pert can share data across a network, and is designed to compile and analyze data fed in by multiple project or subproject managers who use the standard version of Micro-Planner, X-Pert can handle 10,000 tasks and 200 resource categories, and it allows data entry and display in several formats, including precedence, arrow, and table formats. It performs earnedvalue analysis to show how a project's progress compares with its cash flow. It provides four kinds of resource leveling, the results of which can be compared: earliest start, latest start, deadline critical, and resource critical. Micro Planner X-Pert has an enhanced report-designing environment and incorporates (continues)

Among the many charts and graphs Micro Planner X-Pert generates is this one showing a project's earned value analysis.

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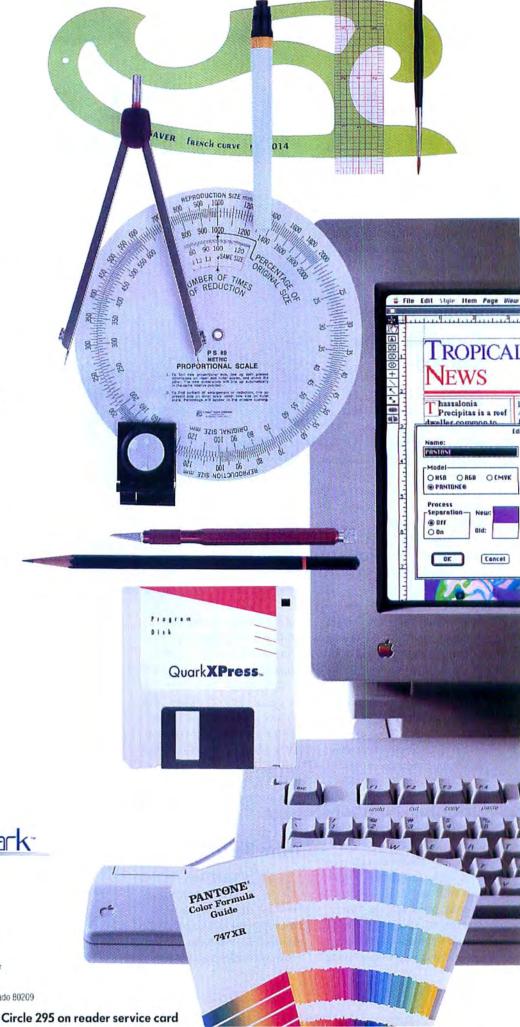


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the functions of the Project Exchange application for mainframe and minicomputer data interchange; an A/UX version is available now and a Microsoft Windows version is in the works that will provide transparent file-sharing between Macs and computers running Windows.

Micro Planner X-Pert runs on a Mac Plus but is optimized for the Mac II series. For more information, call Micro Planning International in San Francisco at 415/788-3324.

-Dan Littman

Saving the Rain Forest on Laser Disk



In a remote laboratory in Southern California's San

Jacinto Mountains, an ambitious hypermedia project is taking shape. Michael Hamilton, director of the James San Jacinto Mountains Reserve and an assistant professor of biology at the University of California at Riverside, has long been interested in using computers in the field of ecology. With the help of Apple's Interactive Video Toolkit, he has created a HyperCard interface for his project: the Macroscope Ecology Laserdisc.

So far, the disk contains about 25,000 images, many of them pictures or films of flora and fauna found in the James Reserve, a biological field station operated by the University of California. The stack offers information on the items pictured, as well as references to books and articles.

"The challenge was to create a generic interface to enter the database, then



Michael Hamilton looks to the future of the world environment with his Macroscope Ecology Laserdisc.

provide specialized information for different types of users," says Hamilton. For example, a biologist might be interested in how many of a particular species of plant are found in a given area, while a fire fighter would need to know how flammable the vegetation in that area was under certain wind conditions. Hamilton's interactive videodisk can accommodate both of these users, among others.

At the University's urging, Hamilton is expanding the videodisk so it can also function as a general-purpose tool for teaching ecology. This year, he's heading for Venezuela with what he calls a portable multimedia-development workstation: a video camera for motion footage; a still-video camera for single frames; and a Mac Plus with a 40MB hard disk,

HyperCard, MacRecorder, and MacGIS, a mapping program developed at the University of Oregon. With this arsenal he can photograph live plants and animals in their native habitat, key the location to a map, record animal sounds, and index the entry in HyperCard. Hamilton expects to record 3000 images in various ecosystems in Venezuela, from tropical forests to the Andes. Hamilton's recording technique will give researchers a more complete picture than they'd get from jars full of specimens. In the rapidly disappearing tropical forests, he points out, "the more information we can capture using multimedia techniques, the better off we'll be."

For more information on the Macroscope Ecology Laserdisc project, contact Michael Hamilton at the James San Jacinto Mountains Reserve, P.O. Box 1775, Idyllwild, California 92349; 714/659-3811.

—Erfert Fenton

Hey, Mac, Call Your Office



You're cruising along the freeway heading for a weekend get-

away, when suddenly you realize you forgot to fax a memo that's still on your desk at the office. So you pick up your car phone and dial your Mac. Over the phone you ask it to retrieve a copy of the document from your database and fax it to your client. The Mac responds using either MacinTalk or a digitized voice system. By the time you hang up the phone, the facsimile is on its way and so are you.

All this may sound pretty futuristic, but the technology is already here. Articulate Systems, whose existing Voice Navigator lets you operate the Macintosh through spoken commands, went a quantum leap further when they recently introduced a telecommunications version of the product.

The new product, internally code-named Executive Server, has 2400-baud modem and Group 3 facsimile capabilities. The system uses the same external 9-by-9-inch SCSI box as the Voice Navigator. The speaker-dependent speech driver software recognizes up to 200 or 1000 discrete utterances, depending on the model. Although the program comes bundled with word lists for 20 commonly used programs, it can be trained to work with any Mac (continues)

How to Find *User Friendly* Training For the Macintosh Computer

Universities, Major Corporations, Government Agencies, School Districts, and Small Businesses Find A Low-Cost Macintosh Training Solution

by Randall D. Smith

"I just can't find quality, low cost training for the Macintosh computer. I don't have the time, nor the money to waste on train-

ing gimmicks."

I must admit I felt the same way when I bought my Macintosh computer. I was like a lot of first time owners who simply popped in the disks and figured out the basics on my own. After having used an IBM for three years I was thrilled to be able to accomplish the Mac basics without taking a six month course!

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

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

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

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

I guess I wasn't the first person to find themselves in this situation. Right now there are literally thousands of companies buying Macs for employees who don't know the first thing about advanced applications.

MacAcademy was created to fill the training gap. This specialized Macintosh training course was designed to give Mac users a "jump-start" on the most popular business courses.

"those who have worked with the Macintosh for a while can learn to use their applications better and gain Macintosh skills from MacAcademy's program."

MacWEEK July 25, 1989

MacAcademy boasts many unique features: Instructors: Instead of sales people or programmers we feature only top business executives who use the Mac daily in their businesses. Format: Two full days of instruction on the Mac, Excel, Word, FileMaker, Page-Maker, and HyperCard. Schedule: Attendees can design their own personalized schedule by choosing between 18 different, 2 hour workshops. Price: While others charge up to \$1200 for workshops, we offer two full days for only \$249. Location: MacAcademy is held in top hotels in business centers across the U.S. Emphasis: MacAcademy places training emphasis on techniques and business applications of the featured software.

The Results. Over 20,000 people have recently attended MacAcademy. On a scale of 1 to 5 they have given the experience a 4.6. Companies who have attended include GE, Kodak, GTE, MIT, Honeywell, NASA, Boeing, Citicorp, Kinko's Graphics, Mobil Oil, Gillette, TRW and over 1,000 additional corporations.

"MacAcademy Macintosh crash course gets and A+."

Texas HiTech Review June 1989

MacAcademy

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For More Information Call: 904-677-1918 or FAX 904-677-6717. MacAcademy 477 S. Nova Rd. Ormond Beach, FL 32174.

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application. And you train the system to recognize your voice or a group of voices by creating a voice-options file.

The Voice Navigator model that recognizes up to 200 commands lists for \$1295; the 1000-command model lists for \$1795. An under-\$2000 Executive Server telecommunications version should begin shipping in the fourth quarter. For more information, call Articulate Systems in Cambridge, Massachusetts, at 617/876-5236.

- Mary Margaret Lewis

Government Style

Software for publishing highly technical material such as documentation for Trident submarines and B-1 bombers is coming soon to a Mac near you.

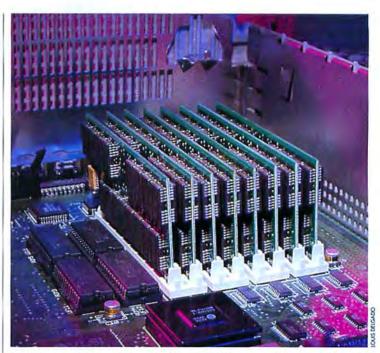
Starting in 1990, the United States Department of Defense will phase in requirements for defense contractors to provide all completed weapons systems with documentation that meets CALS

(Computer-Aided Acquisition and Logistics Support) standards, and Agfa Compugraphic has already developed a document-production system for the Mac that implements Standard Graphics Markup Language (SGML), the text-management subset of CALS. Other government agencies will follow the DOD's lead over the next few years, and most industries developing technical documentation on the Macintosh (or on any other platform) will be forced to adopt the CALS standard.

As Agfa describes it, SGML "separates the structure of a document from its style of presentation." It can be thought of as a complex set of style sheets, but instead of describing what a document looks like, it describes what each part of a document is: table of contents, chapter titles, subheads, illustration captions, mathematical equations, page or column margins, and so on. This generic labeling simplifies the process of integrating parts of a documentation set submit-



Tags in this CALS-compliant document describe parts of the document; formatting can later be assigned to each part.



Multi-Inline Memory Modules from PSI let you pack up to 32MB of RAM into a Mac II, IIx, or IIcx.

ted by subcontractors who use incompatible computer systems, as well as the process of searching and updating documentation sets that may run to tens or even hundreds of thousands of pages. Page design for online and paper documentation can be generated independently.

Agfa Compugraphic is calling its interpretation of SGML for the Macintosh CAPS (Compugraphic Automated Publishing System) Author/ Editor. CAPS Author/Editor is available either bundled with Macs or separately; a serverbased central publishing system using a Sun/3 workstation is required for merging Mac-produced documents, and the Sun software is also available separately or bundled with a Sun workstation. Prices depend on configuration. For more information, contact Nancy Bertsch at Agfa Compugraphic, 508/658-5600, ext. 5253 .- D.L.

Packing Lots of Memory in a Small Space



For those who'd like to go beyond the 8MB memory barrier

on the Mac II, IIx, or IIcx, Pinnacle Sales International (PSI) has begun shipping a 4MB memory expansion that fits into a standard SIMM socket. Called the Multi-Inline Memory Module, or MIMM, the memory strip has 2MB of RAM on each side.

After inserting four MIMMs into the Mac, a user would have 17MB of memory to play with, or 32MB with eight MIMMs installed. However, at a suggested list price of \$8500 for four MIMMs (about \$530 per megabyte), they are likely to appeal most to users with memory-hogging applications such as high-end CAD, full-motion video, and software development. Discounts are (continues)

97



A summary of your monthly charges:

	Time
Description	1:00 6.00
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2 bulletin boards	0:05 1.00
Read today's news	0:10 3.00
Read today's news Play Stellar Emperor	0;30
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XTX99633,GEnie then RETURN. And have a major credit card or your checking account number ready. For information in the U.S. or Canada, call 1-800-638-9636. Or write GE Information Services, 401 North Washington, Rockville, MD 20850.



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Because the Mac II series is not currently equipped to address more than 8MB, PSI includes its own RAM disk software, which lets the computer treat the extra RAM as an extremely fast hard disk. When Apple ships System 7.0, ROM upgrades should be available that will let the Mac II family directly address much more than 32MB of RAM. For more information, call PSI in San Jose, California, at 408/559-8544.—*T.M.*

running Symbolics' LISP, in a window as a MultiFinder partition.

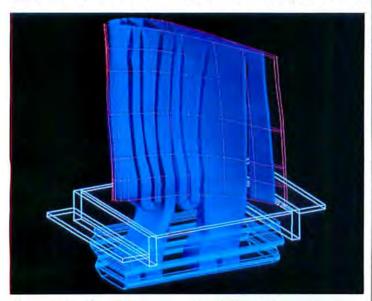
Symbolic processing provides programmers with a bigger and more sophisticated vocabulary, letting them work with symbols and objects in addition to numbers and characters. According to a Symbolics spokesperson, it's analogous to the difference between explaining something to a five-year-old, who needs definitions for basic concepts, and explaining it to

a set of rules. As the design specs change, the ICAD System user adjusts the rules, which automatically updates the drawings. ICAD's vice president of development Avram Belzer explains, "In ICAD, the design process itself is being entered into the computer. You can put in all sorts of constraints. They don't have to be geometric—they could be manufacturing constraints or customer requirements."

The ICAD System runs on Symbolics' dedicated workstations and on a MacIvory Model 2-equipped Mac II; engineers using the Mac II-based system can click back into a Mac window to use PageMaker or AutoCAD at any time.

For details about MacIvory Model 2 and complementary software, contact Symbolics in Burlington, Massachusetts, at 617/221-1000. For information about ICAD's engineering software, contact the company in Cambridge, Massachusetts, at 617/868-2800.

—Nancy E. Dunn



The Symbolics-based software used to design this jet engine part incorporates the engineers' knowledge to speed up design.

But Does It Do Symbols?

Symbolics, with its line of dedicated AI machines and software, was one of the first companies to provide computers for artificial intelligence. Now it is branching out with MacIvory Model 2, a \$16,000 set of two NuBus boards for the Mac II that effectively puts a Symbolics workstation, with a custom symbolic-processing chip

an expert who understands all the jargon. Symbolic processing is especially suitable for complex algorithms, such as those involved in microcircuit design, and for knowledge bases that require constant updating.

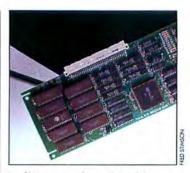
For example, ICAD is a Symbolics developer whose \$30,000-plus package for developing knowledge-based engineering expert systems is a shell that speeds up the engineering design process, and that companies can use to turn design specifications into

Accelerating 24-bit Color



A 24-bit color accelerator based on a RISC microprocessor

has been announced by Mac display pioneer Radius. The accelerator, a NuBus board called the Radius QuickColor Graphics Accelerator, works in conjunction with the company's DirectColor and GSC color display boards. QuickColor can take advantage of the bus-master capability of either display board, resulting in blockmode transfer rates of up to



Radius's RISC-based 24-bit color accelerator.

27MB per second between NuBus boards.

The accelerator uses an Acorn RISC processor with 6 MIPS of processing power to speed up graphics routines and free the Mac's CPU for other tasks. Pattern fills are up to 20 times faster, with an overall improvement in graphics speed of about 5 to 10 times depending on the application, according to Radius. The accelerator also speeds up text scrolling, image displays, and window movement. It allows the few existing 32-bit QuickDraw applications to run without modification.

QuickColor is the first in a family of Radius boards that will add capabilities in areas such as CAD, video, and multimedia. The company scheduled QuickColor to ship in July. Its suggested list price is \$795. For more information, contact Radius in San Jose, California, at 408/434-1010.

— T.M.

Cool, Clear Water



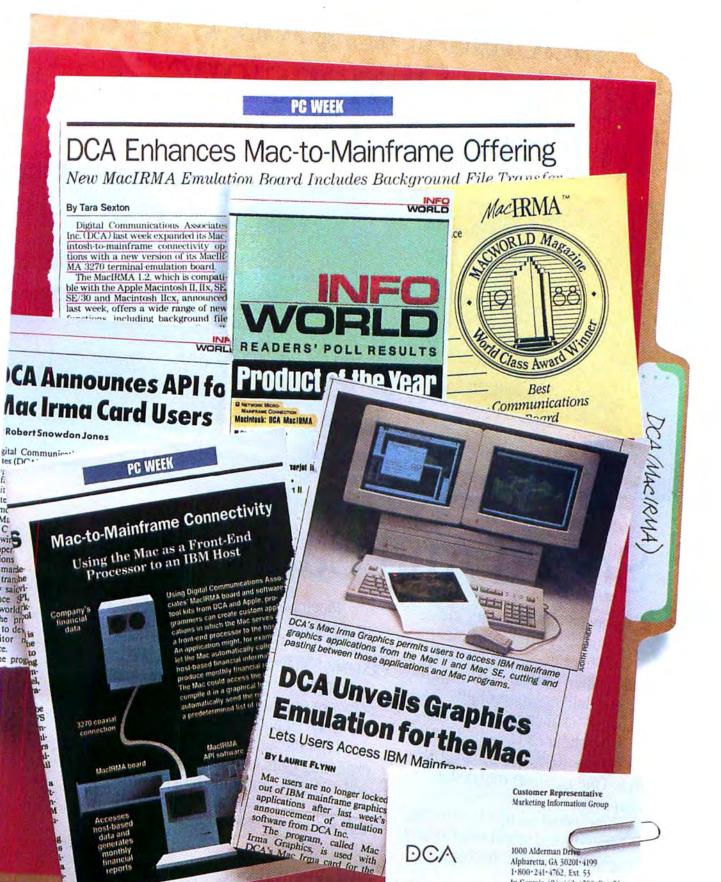
The Reliable Water Company wants desert and island com-

munities to be able to take fresh drinking water for granted—with the help of its (continues)

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Edward Fredkin, inventor of the machine instinct technique that controls desalination plants almost without human intervention.

own Mac-controlled desalination system.

Desalination, the process of making fresh water from sea water, has been around since the 1920s. Unfortunately, the desalination plants that exist today are always susceptible to operator error. What makes Reliable Water's RW-2 Seawater Desalination Plant in the Canary Islands different is its programmed intelligence, courtesy of a technology called machine instinct. The plant doesn't need a full-time operator; in fact, there are no manual valves, gauges, indicator lights, or meters anywhere in the plant. Instead, the plant is run completely by a Macintosh and a process-control software system called Rex. The only human interaction is via a touch screen on the Mac's monitor.

The term *machine instinct* was coined by Edward
Fredkin, a professor at the
Massachusetts Institute of
Technology who is also the
founder and chairman of
Reliable Water. It refers to
complex machines that
consider overall system
objectives.

In a sense, the concept of machine instinct parallels that of animal instinct. An animal has high-level instincts for eating, avoiding danger, and so on. Traditional expert systems for plant management, on the other hand, are written to perform low-level tasks like opening a valve if the pressure reading becomes too high. Such systems require a human operator to assimilate all information and decide on action.

Rex handles all these but also is programmed to recognize more sophisticated goals, even abstract ones, such as operating efficiency, machine preservation, cost control, human safety, even environmental safety. Based on sensor input, Rex can perform actions ranging from making operating adjustments to scheduling maintenance calls. Rex was written by engineers at Reliable Water using the G2 expert system shell from Gensym Corporation of Cambridge, Massachusetts.

For more information, contact Reliable Water in Billerica, Massachusetts, at 508/670-2300.

-Brita Meng

Schlumbering Giants



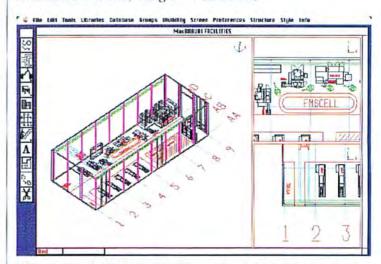
Macintosh CAD has largely been restricted to general-

purpose tools for mechanical design and architecture, but VAX CAD developer Schlumberger recently introduced two more modules in its highly specialized MacBravo series: MacBravo Facilities and MacBravo Electronics Designer.

Facilities combines a database and drafting environment to give facilities managers control over laying out floor plans and organizing the resources of a large office. plant, or institution. For example, after entering the shapes and quantities of office wall modules into the Facilities database, you can draft a new floor plan and Facilities will keep track of how many modules you've assigned and how many are still available. On a separate layer, a person sharing the database on a network could string network wiring and then cost it out.

Electronics Designer allows you to set up a waveform simulation and, using a template editor, format the design for CADAT, SABER, MacBravo SPICE, or another workstation or mainframe package that will actually run the simulation. You can start a design with generic components and later replace them with specific components from libraries of chips made by Motorola, Texas Instruments, and other semiconductor manufacturers. Electronics Designer maintains connections as you substitute chips or move components, and it lets you label components and document your design as you work.

For \$4900 per installation, MacBravo Facilities provides facilities modeling and drafting, an integrated database, and a library of about 1000 components and symbols. IGES compatibility, additional symbol libraries, and a support package are available at extra cost. MacBravo Electronics Designer costs \$1950, and a components library of all major chips and a support package are available at extra cost. Both products can be customized using a built-in programming language called (continues)



Schlumberger's MacBravo Facilities makes laying out a workspace somewhat like designing a custom database report.



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Dealer inquiries welcome.



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Circle 196 on reader service card

Flexible Interface Tool. Facilities and Electronics Designer are expected to ship this fall. For more information, contact Schlumberger in Ann Arbor, Michigan at 313/995-6000.—*D.L.*

The Visual Almanac



The Visual Almanac, an educational laser disk with a Hyper-

Card interface, was brewed up at Apple's Multimedia Lab as a design example rather than a commerical product. Educators are beta-testing it to see what they can teach with its images, video, sounds, and interactive options. Apple meanwhile is trying to decide whether to go commercial with it.

The Almanac is organized in three parts. First is Collections, a bank of 7500 images and sounds drawn from 50 wide-ranging sources, including the Bettman Archives, the Jet Propulsion Lab, and the California Highway Patrol. The Collections portion includes animals and plants, physics, geography, the solar system, American history, anthropology, daily life in

different cultures, newspaper images, historical portraits, and studies in time.

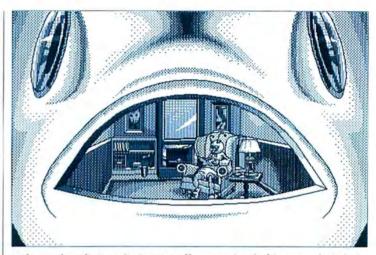
Making up the Almanac's second part is Interactive Activities, which includes such things as Planetary Highway, The Living World, Counting, International Zoo. Orchestra, Historical Atlas, Earth Cycles, and Locomotion. The idea here is that if you can see it, you can understand it. One Playground Physics activity offers live video to help high school students grasp concepts like relative motion and the conservation of angular momentum.

Apple's Multimedia Lab hopes that using the Visual Almanac will help students conceptualize as they visualize and, in the process, develop their skills in abstraction, observation and analysis, and hypothesis testing.

The third part, the Almanac's real centerpiece, is Compositional Workspace. There, searching for material with key words like China, Mars, or Native American, teachers and students can use everything on the disk, as well as their own notes, to create multimedia compositions.



Apple's Visual Almanac provides information for students and teachers to mold into multimedia compositions.



Holy Mackerel! Cosmic Osmo puffs on a pipe in his easy chair just inside the belly of the planet Holy Mackerel.

The Visual Almanac is not as comprehensive as a desk almanac, and it covers too few subjects to be a reference and too many subjects to provide depth. But it's a good lesson in multimedia itself, and it's lots of fun.

-Ann Garrison

For Cosmic Kids (of All Ages)



After Apple spent years trying to convince us that the

Mac is no toy, along comes Cosmic Osmo—a HyperCard-and VideoWorks-based adventure that'll make you forget about spreadsheets, outline fonts, and SQL hooks. Not a shoot-'em-up or even a game, Cosmic Osmo provides a universe filled with four very bizarre and amusing planets for you and your kids to explore in a little spaceship.

One planet is an enormous fish floating in space; fly into the mouth and find Osmo sitting in an easy chair, calmly flipping through a book. In his living room, you can sit down at a jam box

and tape yourself pounding on some drums; later, on another planet, you just may find your opus on a compact disk. Or zoom in and visit the world pasted together from a few sheets of construction paper; once you land, you'll discover it's very threedimensional, with a mountain off in the distance and doors leading to corridors leading to stairways leading to more doors. Maybe you'll find Osmo studying the universe through his telescope; he'll offer to let you take a peek, and you can also study the charts of his solar system and blueprints of your spaceship.

No menus are available while Osmo is running, so any kid old enough to use a mouse can play unattended and you don't have to worry about your files winding up in the Mac's Trash Can.

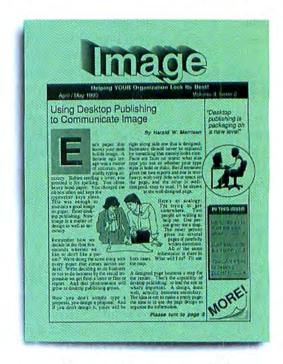
Cosmic Osmo is available now on six floppies (it requires a hard disk and Hyper-Card 1.2.2, which is provided) and lists for \$69.95. A CD ROM version is in the works that will list for about \$70, with double the number of places to explore and music (continues)

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throughout. So don't ask why there's an olive lying next to the telephone, just click on it and. . . Oh my, did you know that olives can dance? For more information, call Activision in Menlo Park, California, at 415/329-0500.—D.L.

MacPaint Meets Tesla



Artist Dave Archer gives a new meaning to the term *power*

user. In his studio in San Rafael, California, Archer paints with the unlikely combination of MacPaint, acrylics, lacquer, and a 1.5 million-volt tesla coil.

Twenty years ago, Archer discovered he could create swirling patterns by daubing paint on a pane of glass and zapping it with bolts of electricity from a tesla coil (if you've seen *Bride of Frankenstein*, you've seen a tesla coil). Over the years, Archer's abstract paintings evolved into spacescapes, with the tesla-coil–generated patterns forming galaxies and nebulas, complemented by hand-painted stars and planets.

Last year, Archer began to experiment with MacPaint, which he used on his 512K Mac to draw a series of robots. To incorporate a robot

One of Archer's latest works, Call to Adventure. Spacescapes and robots are his favorite themes.





Just another day at the electric easel for Dave Archer, whose "paintbrush" draws 1.5 million volts of power.

into one of his paintings, he prints the robot on his Image-Writer, enlarges the image with a photocopier, then has a silk screen made, and transfers the graphic to the pane of glass.

Although he has tried other graphics programs, Archer is content with MacPaint, viewing its jagged pixels as an asset. When drawing the intricate robots, he makes use of MacPaint's ability to zip in and out of FatBits. "I look at the Mac as simply another artist's tool," says Archer. "If I paint with a brush, I want that quality to show; if I paint with a computer, I want the image to look like it was created on a computer."

Archer recently purchased a Mac II, and is now experimenting with MacDraw and Claris CAD. So it looks as if the Macintosh will continue to be one of Dave Archer's graphics tools as his work continues to evolve.

-Erfert Fenton

Flicker-Free Color for the SE/30



E-Machines has introduced the TX SE/30, a high-resolution

color display subsystem for the Mac SE/30. The TX SE/30 includes a 16-inch monitor based on a Sony Trinitron tube, with 1024-by-808-pixel resolution and 72Hz refresh rate. The high resolution lets you see more lines of text or more of an image at once, and the refresh rate reduces flicker even more than display subsystems that refresh the screen at 60Hz.

The subsystem's controller shows up to 256 colors and also supports 1-, 2-, 4-, and 8-bit display modes in color and gray scale. Brightness, contrast, and magnification can be set using the included Control Panel software. The controller board has a programmable video palette, a 32-bit data path, and 1MB of video RAM for high-speed operation.

The TX SE/30 retails for \$4495, including monitor and controller board. It was scheduled to begin shipping in August. For more information, call E-Machines in Beaverton, Oregon, at 503/646-6699.—*T.M.*

Have Mac, Will Travel



NexSys Electronics showed the first production model of its

Travel Mac portable at Mac-World Expo in August. The Travel Mac is essentially a chassis that you combine with the system board, floppy disk (continues)



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NexSys's Travel Mac fits under an airline seat and uses an easel to adjust the position of its LCD screen.

drive, keyboard, and mouse from any 128K to SE/30 Mac. The result is a portable that's compact enough to fit under an airline seat.

The chassis includes a power supply that works with 110 or 220 volts AC, or with 12 volts DC from a car's cigarette lighter. The Travel Mac also incorporates two gel-cell rechargeable batteries and a connection for additional rechargeable batteries. The internal batteries last for about 2 hours and take about 12 hours to recharge. The portable system weighs about 10 pounds, including the batteries. It measures 12 inches wide by 14 inches long by 3 inches thick, or 5 inches thick when packed together with the keyboard and mouse in the black nylon carrying case.

The Travel Mac also provides a double-supertwist backlit LCD black-on-white display with 512-by-342-dot resolution, which gives the same aspect ratio as a compact Mac screen but does not use the entire 640 by 480 dots supported by the 10-inch

diagonal LCD panel.

A 2400-baud modem with a low-power mode, autoshutdown, and a complete set of status LEDs is also built in. Travel Mac includes all the standard Mac back-panel connectors, an interface for Kodak's DataShow overhead projector, and an 8-ohm speaker. NexSys included a socket for a fax/modem piggyback board that should be available in the fourth quarter.

The portable comes with instructions for the modem and for assembly, which should take about 15 minutes. The only specialized tool required is a torque allen wrench, which is included.

An optional internal 40MB hard disk lists for \$995. Prices for optional 80MB and 100MB hard disks were not set at press time.

Slated to ship by October, the NexSvs Travel Mac lists for \$1795 and comes with a 90-day warranty. For more information, call NexSys Electronics in San Francisco, at 415/255-2293.—T.M.

Survey: What's Your **Bottleneck?**



For this month's survey we asked 1000 readers where they

experience the greatest constraints on overall performance-in other words, "Show us your bottleneck." We received responses from 495 people, 480 of whom use Macs. It's important to point out that fully 66 percent of respondents who use a Mac said they were very satisfied with its performance, and another 31 percent said they were somewhat satisfied.

Among responding Mac users, 27 percent said their systems were constrained most by processor, which suggests that Apple's move to 68020 and 68030 micropro-

cessors and faster clock rates comes just in time. Next on the list of bottlenecks was mass storage, with 21 percent of respondents pointing the finger. Of those readers, 60 percent currently have 20MB drives, 15 percent have 40MB devices, and 11 percent have 80MB of storage. Accounting for less than 5 percent each were 10MB, 45MB, 60MB, and 90MB drives.

The display subsystem was the villain for 19 percent of respondents, and output devices were named by 16 percent. Input devices, such as scanners, accounted for just 3 percent. Readers said that they were frustrated by the size of displays, by the cost of output devices, and by the slowness of input devices.

-T.M.

CONSTRAINING COMPONENT/ REASON WHY What constrain

Among responding readers who had an opinion, 27 percent cited the power of their Mac's processor as the single most restraining component of their hardware and software.

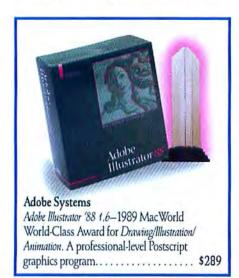
Load it into HyperCard.

What's easy to remember, has a great rap beat, and you can dance to? Our new 800 number. Give it a 10. Actually give it a 3 then another 3 then five 4's, because henceforth our new number is 800/334-4444.

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1617	Rags to Riches Receivables 3.1 119
1622	Rags to Riches 3-Pak 289
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1615	Professional Billing 2.9 239

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2609	atOnce! 1.0
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3981	FormSet 1.1
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2866	
2884	Works 2.0
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	Word, PowerPoint, and Mail) 549
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4228	. C. H.C. HODGIG HIGH I I I I I I I I I I I I I I I I
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4501	Drawing Table 1.0
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4954	
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3507	Super3D 2.0 319
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PUBLISHING & PRESENTATIONS

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5605	True Form 1.0
5606	True Form Runtime 175.
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5240	86 Cochin
5242	87 ITC Bauhaus
5242	88 Sabon
5244	
5244	89 Hiroshige
5245	91 Dom Casual
5246	
	92 Post Antiqua
5248	93 Folio
5249	94 Linoscript
5250	95 VAG Rounded 125.
5675	96 Akzidenz Grotesk 125.
5674	97 Impressum
5673	98 Bauer Bodoni
5672	99 New Aster
5671	100 Adobe Garamond 179.

5670	101 Adobe Garamond Expert Coll. \$125.
5669	102 Candida 95.
5668	103 Franklin Gothic No. 2 95.
5667	104 Utopia 179.
5666	105 Utopia Expert Collection 125.
5665	106 ITC Berkeley Oldstyle 239.
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1330	Freehand 2.0
4751	Persuasion 1.0 375.
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1195	Fontographer 3.0 (CP) 249.
	Broderbund
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
1592	7 Coventry-Zephyr
1593	8 Dorovar-Gregorian 46.
1594	9 Cyrillic



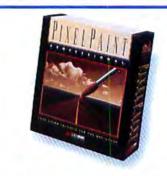
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1578	11 Sans Serif Bold 46
1579	12 Sans Serif Extra Bold 46
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1581	14 Micro
1582	15 Micro Extended 46
1583	16 Galileo Roman 46
1584	17 Campanile-Giotto 46
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4204	20 Gazelle & Kells 46
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4836	Headline Pack (Vol. 10-12) 129
4837	Modern Pack (Vol. 7, 14-18) 189
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4833	Classic Pack (Vol. 3-6, & 13) 189
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1670	Cricket Presents 2.0 285
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4840	Clintures: Rusiness 1 85

4841	Cliptures: Business 2 \$85
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4684	ScreenRecorder 1.0 129
2199	
	ICOM Simulations
5682	MacKern
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2621	Ready, Set, Gol 4.5 275
2619	
4709	LetraStudio 1.0
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*	Postcraft Int'l 60 day MBG
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4500	Springboard Publisher 1.0 109
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3635	EPS Illustrations 74
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4968	HyperBible (New International) 1.0 179
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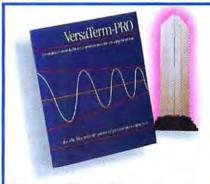
5090	Silver Screen 1.0. \$40. Script Expert 1.0. 45.
4265	Script Expert 1.0 45.
5434	Intelligent Developer 1.0 219.
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4085	TMON 2.8.2 89.
5681	HyperTMON 59.
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4719	101 Scripts & Buttons Hypercard 1.0. 36.
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4075	
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	Trendware
5203	Stack Cleaner
5202	HyperTools #1 1.02 52.
5199	
5609	XCAL 1.0 79.
	True BASIC, Inc.
3587	True BASIC 2.01 59.
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2269	QuickDEX 1.4A	31.
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1727	CalendarMaker 3.0	32.
1728	DiskTop 3.0.4	32.
4689	MockPackage Plus Utilities 4.4	32

1729	QuicKeys 1.2 \$6	5
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5040		4
5041	PC Tools Deluxe Mac 1.1 4	6
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5255	Retrospect 1.0 15	5
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3955		5
5178		
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4803		a
4000	ICOM Simulations	٥.
4084	On Cue 1.3	5
4004	Ideaform	J.
2/10	DiskQuick 2.10 2	7
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2420	Kent Marsh Ltd 30 day MBG	۷.
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3382	SuperLaserSpool 2.0 89.
3378	SuperLaserSpool 5-Pack 2.0 295.
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3379	Network DiskFit 1.5 229.
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5176	Symantec Anti-virus for Mac 1.0 95.
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3780	ImageWriter II Label Pack (Qty. 216) 16.
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1133	Word Tools 1.2 42.
	Ashton-Tate
1324	FullWrite 1.0 259.
	Claris
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 46.
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2733	Word Finder 2.0

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3422	More II 2.01 249.
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215	Practica Musica 2.1		4						73.
	Bogas Productions								
461	Studio Session 1.2 SE								46.
1255	Super Studio Session 2.0								69.
459	Heavy Metal Rock	,		ž	,				14.
1460	String Quartet								14.
1458	Country Disk								
1832	Sound Effects								
	Bright Star Technology								
1402	Alphabet Blocks 1.0	í			4	i			30.
3961	Talking Tiles 1.0		,		+		,		27.
	Broderbund Software								
1314	Type! 1.0				i			,	19.
1423	Jam Session 1.1 (CP)		•		4				30.
422	Geometry 1.2 (CP)								
1067	Calculus 1.2 (CP)								
1426	Physics 1.0 (CP)		•		+		,		59.
	Coda Music Systems								
1367	MacDrums 1.01 (CP)	,		×					31.

4400	Telceive I.O
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3987		30
2745		30
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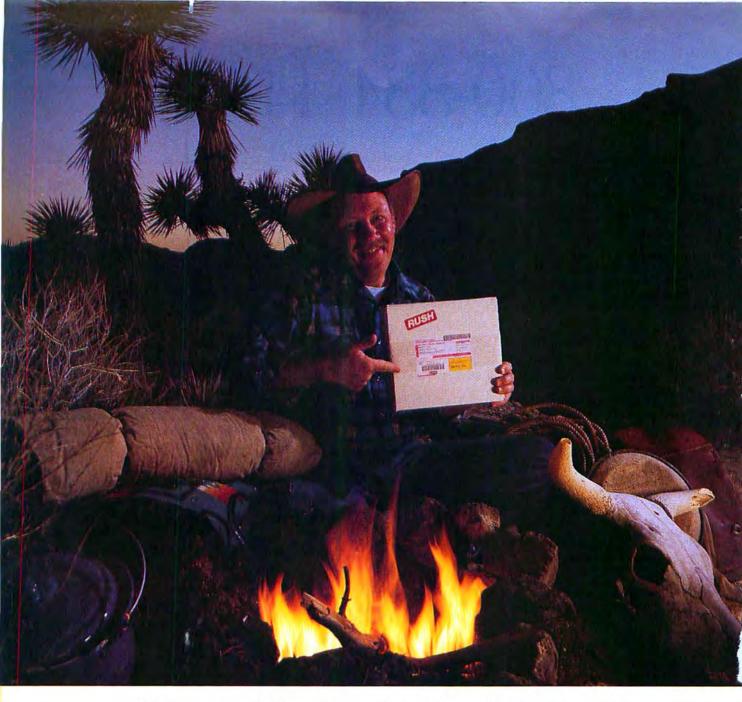
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4298	BitPad Plus ADB

,	Thunderware 30 day MBG
3648	ThunderScan 5.0 with PowerPort \$189.
	LightningScan 409.
3645	Mac II Power Accessory 45.
	MEMORY & DRIVES
	1 Meg SIMMs call
*	Cutting Edge 30 day MBG
3989	800k External Disk Drive (platinum) 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
1801	SCSI Interface/Port 109.
5103	Mac II Power Pack (includes Marathon
	030 32MHz Accelerator, four 1 Meg
1007	SIMMs, and RamSnap) 1799.
1807	MacSnap 524E
1809	MacSnap 524S 239.
1811	MacSnap 548E 419.
1812	MacSnap 548S
1800	MacSnap 2SE
1797 1804	MacSnap Plus 2
1805	MacSnap 2S
1805	MacSnap 4S 639.
	ACCELERATOR BOARDS
1793	MaraThon 020 MSE1
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.
5623	MaraThon Racer 149.
	ACCELERATORS (020) W/ETHERNET
5391	FastNet LAN 1
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)
5386	FastNet LAN 6 (4 Meg/chip) 2399.



Trubo Mouse Plus and Turbo Mouse ADB-1989 MacWorld World-Class Award for Input Devices, for the second straight year. Features dual buttons for either hand as well as a removable ball for easy cleaning. each \$109.

	Epson
5132	40 Meg Raw Drive (25ms) \$436.
5204	70 Meg Raw Drive (25ms) 586.
	IOMEGA
5552	44M Ext. Single Bernoulli II Drive. 1399.
5553	44M Ext. Dual Bernoulli II Drive 2199.
*	Kennect Tech 30 day MBG
5631	Rapport 219.
5632	Drive 2.4 359.



Innovative Data Design

Dreams 1.0-All the precision tools of the most popular CAD programs plus merging and subtraction of objects, Bezier and spline curves, custom color patterns, and much more . \$269.

4	PCPC 30 day MBG
3177	HD-WSI (Apple HD-20 to SCSI) 199.
3189	MacBottom HD 45 SCSI call
	MacBottom HD 84 SCSI call
*	SuperMac Tech 30 day MBG
5452	Dataframe 20 599.
	Dataframe XP 30 749.
5448	Dataframe XP 60 1059.
5449	

STORAGE MEDIA

Double Sided Disks

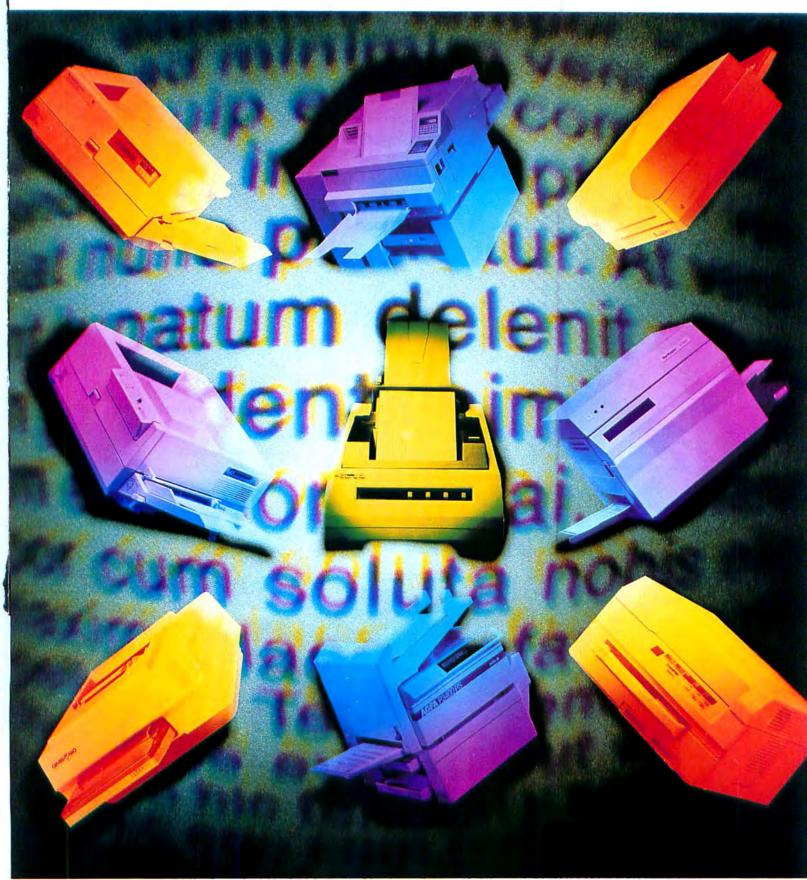
	Verbatim 30 day MBG	
3772	31/2" DS/DD Disks	15.
5035	31/2" DS/DD 3 Pakspecial	39.
	Sony 31/2" DS/DD Disks	
2792	MAXELL 31/2" DS/DD Disks	16.
	High Density Disks	

,	verbattiti 30 day MbG	
3773	31/2" HD Disks (1.44 Meg)	32
3298	Sony 31/2" HD Disks (1.44 Meg)	32
2793	MAXELL 31/2" HD Disks (1.44 Meg)	32
	Tane Cartridges	

3943 3M DC2000 3944 3M DC600A

ACCESSORIES

	Apple Computer	
1116	Black ImageWriter Ribbon	10
	Avery 60 day MBG	
4864	Disk Labels 31/2" (Qty. 250)	13
5392	Disk Labels-Laser 31/2" (Qty. 630).	29
5403	Address Labels 17/16" x 4" (Qty. 1000)	. 9
4865	Address Labels 31/2" x 15/16" (Qty. 3750)	15
4811	Transparencies 81/2" x 11" (Qtv. 50)	22



MOMELLIEWEIN

Paging All Printers

SIXTEEN MONOCHROME PAGE PRINTERS COMPARED

Which laser printer works best with the Mac? You can't answer that question without asking others: How much can you spend? What kinds of documents do you print? What are your paper-handling needs? And, is it important for the printer to have a small, partially eaten apple on its case?

Price is an obvious first concern. Among the most complex devices in an office, laser printers take a print *engine*, with enough wheels and gears to give Rube Goldberg nightmares, and combine it with a *controller* that often packs more computing punch than the Mac to which it's attached. Hardware this sophisticated is never cheap.

But making the payments can prove easier than finding the right printer for your needs. There are no Lasers-R-Us outlets where you can test a dozen units, and besides, no single printer is up to every challenge. A printer that sizzles when printing Courier-formatted manuscripts might slow to a crawl when printing a desktop published newsletter.

That's where I can help. This article rates ease-of-

installation, paper-handling features, print quality, and performance for 16 monochrome page printers. All but 2 produce 300-dots-per-inch output. Ten are driven by Adobe Systems PostScript interpreters. Two of the remaining 6, Apple's LaserWriter IISC and GCC's Personal LaserPrinter, rely on Quick-Draw, the Mac's built-in graphics routines. The last 4—Abaton's QuickStep, Jasmine's DirectPrint, La Cie's Panther PDX, and Qume's CrystalPrint Publisher—are PostScript clones that respond to Post-Script language commands without using an Adobe-created PostScript interpreter.

Rather than grouping the printers according to their driving language, however, I have sorted them by a more pragmatic category: cost. I look first at printers priced under \$3000, then at those in the \$3000–\$6000, \$6000–\$8000, and over-\$8000 ranges. Vital statistics for each printer appear in "Printer Particulars," and results of the performace tests are listed in "PostScript Printer Benchmarks" and "Quick-Draw Printer Benchmarks." For background on laser



LaserWriter II

printers and a look at laser shopping considerations (including a glimpse at Apple's new font outline technology to be included in System 7.0), see "Getting Started with Laser Printers" in this issue.

LEAST EXPENSIVE - UNDER \$3000

The two printers in this category—the Apple LaserWriter IISC and GCC Technologies' Personal LaserPrinter-handle text and graphics differently, but they do share common ground. Unlike the other printers reviewed here, both connect to the Mac's SCSI port rather than using the LocalTalk network and neither can be shared on a network (although you can add network features to the Personal LaserPrinter with GCC's \$499 PLP Share). And both use Apple's QuickDraw. While these printers are the least expensive Mac-compatible laser printers on the market, they're also the least capable, and they tend to have more software compatibility problems than the other printers reviewed here.

Apple LaserWriter IISC The \$2799 Apple LaserWriter IISC uses Canon's 8-pagesper-minute (ppm) LBP-SX print engine, the same engine used in the Apple Laser-Writer IINT and IINTX, and in the QMS-PS 810. The SX engine is popular for its high-quality output and easy installation. Popout a few protective shipping spacers, slide in a disposable print cartridge, and the engine is ready to run.

The print cartridge contains toner powder and the imaging drum and is good for roughly 4000 pages. (A new print cartridge costs \$130, but several companies offer reconditioned cartridges for less.) Because the toner is housed in the disposable cartridge, the risk of spillage is minimal.

The bottom line, however, is that Apple's IISC doesn't exploit the SX engine as well as its PostScript-based cousins. All the other print-

ers reviewed in this article, for instance, contain their own printer fonts. But the IISC, like the ImageWriter, relies on the Mac's screen fonts. To enhance resolu-

tion, the IISC's driver looks in the System file for a font four times larger than the required size, and then prints it at one-fourth that size. In order to print 12-point text, for example, the printer needs a 48-point font.

These 4x fonts devour disk space—1.4 megabytes for the complete set of Times, Helvetica, Courier, and Symbol. And the fonts themselves are typographically inferior to outline fonts. Because the IISC has no access to a true italic version of Times, for example, the driver mathematically alters the upright (roman) weight of the font, slanting it to produce an unattractive pseudo-italic. Higher-quality fonts are available from font vendors such as Bitstream and Casady & Greene, but the fact remains that the IISC is not the printer of choice for desktop typography.

The IISC does have the advantage of speed, however. Processing time for bitmapped fonts is much shorter than that required by outline fonts, and the IISC churns out text-oriented documents faster than the Personal LaserPrinter. For files with graphics, however, the gap narrows (see "QuickDraw Printer Benchmarks"). Finally, while you can upgrade a IISC to a IINT or IINTX, the upgrade prices make the total cost more than if you bought an NT or NTX to begin with.

GCC's Personal LaserPrinter Although still inconvenient at times, the Personal Laser-Printer (PLP) from GCC Technologies is a far more capable printer than the IISC. And, at \$2099, it costs \$700 less. (The PLP Plus, which includes 16 additional Bitstream fonts, costs \$2299.)

Like GCC's Business LaserPrinter, Texas Instruments' OmniLaser 2106, and the IBM Personal Page Printer II, the PLP uses the 6-ppm Ricoh 1060 engine. The engine is easy to set up, but it's not as foolproof as the Canon LBP-SX. Instead of simply

sliding a cartridge into place, you must install a drum assembly, a cleaning assembly, and a cartridge containing toner, which is prone to spillage.

Output quality is a bigger problem. While text output is excellent, dark or solid-black graphics tend to print gray and the printer's laser scan lines are clearly visible. (Canon's CX engine, used in the original LaserWriter, shared this flaw.) The Canon LBP-SX engine prints much truer blacks, and its cassettes hold more paper—200 sheets, versus the 1060's 150-sheet capacity.

Like the LaserWriter IISC, the PLP uses QuickDraw language, but the PLP handles fonts using master outlines to generate bitmapped fonts in the required sizes, much as a PostScript printer does. Post-Script printers, however, use their own processors and memories for this task, while the PLP uses the Mac's memory. During PLP print jobs, the Mac generates font bitmaps and creates a bitmapped image of the entire page and stores it on a hard disk. The Mac then transmits this full-page bitmap to the printer via the SCSI cable. Consequently, the faster the Mac, the faster the PLP.

Performance also depends on memory. When using a Mac with only 1MB of memory, you often have to print documents in two steps: create a print file, then quit the application and run a special PLP utility. Version 2.0 of the PLP's driver software offers several performance-boosting options, including the ability to use the LaserWriter IISC's 4x fonts; but as a rule, if you have a 68000-based Mac, you'll spend a fair amount of time waiting for this printer.

Patience has its rewards, however. The PLP's fonts are typographically excellent. And because the PLP uses font outlines, it doesn't need a separate screen font for each size and it can produce text in virtually any size. You can upgrade the PLP to the PostScript-based Business LaserPrinter for \$2299.

Recommendations—Under \$3000 Apple's LaserWriter IISC is best suited to outputting typographically simple documents such as manuscripts, legal contracts, and letters. The Personal LaserPrinter is slower and its output lacks the IISC's rich

blacks, but it's better for desktop publishing and other typographic applications. Both printers are prone to occasional incompatibility problems and neither offers the degree of software support that Post-Script printers enjoy.

MODERATELY PRICED - \$3000 TO \$6000

This price range contains the largest selection of printers. All are PostScript-based and many use the same engines. These midrange printers are best suited for small-to medium-size offices that don't require high-volume printing.

Apple LaserWriter IINT The best thing about the Apple LaserWriter IINT is that it can be upgraded to a LaserWriter IINTX. This is not to say there is anything actually wrong with the NT; it's just that it is a mediocre performer with a higher price tag than many competing units.

Because it uses the Canon LBP-SX engine, the \$4999 NT enjoys excellent output quality and simple setup. But the NT is slow and, unlike many of its peers, it offers no memory-expansion upgrades that would boost performance and downloadable font capacity.

The Apple LaserWriter

The Apple LaserWriter IINT is an uninspiring performer with no expansion capabilities; the QMS-PS 810 is faster and more expandable—and

GCC's Business Laser-Printer On the other hand, GCC's \$4199 Busi-

it costs four bucks less.

ness LaserPrinter (BLP) is easy to like. Not only is it one of the least expensive true Adobe PostScript printers, it includes something usually found only on more expensive printers: a SCSI port that lets you attach a hard disk, which can hold downloadable fonts and character bitmaps that have been generated from font outlines. Unlike Apple's printers, it also offers a Centronics parallel port for use with IBM PCs. And the BLP can be upgraded to 3MB of memory.

If I had my druthers, the BLP would

use a Canon engine instead of a Ricoh, but the 1060 engine isn't that bad. The text output is first-rate even if the black areas do print gray. The BLP performed quite well on the newsletter test, but its slower engine did prove a liability in the Courier document test.

IBM's Personal Page Printer II An IBM product reviewed in *Macworld?* If that surprises you, listen to this: it's not a bad printer. One point in its favor is its 16MHz 68000 microprocessor; most of the other 68000-based printers reviewed here run at 10MHz or 12MHz.

As the Roman numerals imply, the \$4999 Personal Page Printer II is IBM's second PostScript printer. The first didn't work with Macs and it worked awkwardly with IBM PCs. This time, Big Blue got it right. The Personal Page Printer II has the controller board housed within the printer; unlike its predecessor, it no longer requires a plug-in PC expansion board. And it contains an AppleTalk port that

IBM claims is "for use in mixed environments." We all know what that means.

While the Ricoh 1060 engine is standard, the Personal Page Printer's controller definitely sets this printer apart. Not

only does it have a faster processor, the Personal Page Printer comes with 43 fonts. (Most PostScript printers come with 35.) The Helvetica Narrow family is missing, but all the other fonts in the classic LaserWriter Plus mix are there, plus: ITC Korinna, ITC

Garamond Light, Helvetica Black, and Helvetica Light with oblique—all popular typeface families that many users buy in downloadable form. Not surprisingly, IBM does not include Macintosh screen fonts for the extra fonts. They are available from Adobe Systems, however.

For extra versatility when used with PCs, the Personal Page Printer II can emulate both the Hewlett-Packard LaserJet Plus and the IBM ProPrinter XL dot-matrix printer. A 2MB memory upgrade is available to boost total RAM to 4MB.

While the Personal Page Printer II officially bears a \$4999 price tag, it often sells for less. (I've seen it as low as \$3950.) And remember those extra fonts. A \$555 value, they take up no hard disk space, and they don't need to be downloaded.

NEC SilentWriter LC 890 The NEC Silent-Writer LC 890 finished poorly in nearly every benchmark, and it had the slowest processor speed (10MHz) of any Post-Script printer reviewed here. It's down for the count, right? Wrong. Dramatic discounts offered by numerous computer mail-order houses make this printer very attractive. The LC 890 lists for \$4795, but since it has been around for awhile in the DOS world, I quickly checked through issues of PC World and PC magazines and turned up three companies selling the printer for \$3199. I don't know of a cheaper way to put a PostScript printer on a desktop.

The LC 890 is one of the few PostScript printers to use an engine built by the printer's manufacturer. Rather than a laser, the NEC 890 engine uses a bank of light-emitting diodes (LEDs) to create images. (See "Getting Started with Laser Printers" in this issue for background information on nonlaser print technologies.) The engine produces deep, rich blacks, and it does an excellent job of rendering fine lines and delicate serifs. Setup isn't as easy as it is with a Canon LBP-SX, but it isn't grueling, either.

The LC 890's other strengths include a copious paper capacity—two 250-sheet paper hoppers, and an illuminated liquid-crystal display that conveys status information. The printer also comes with 3MB of RAM, providing more room for downloadable fonts.

Unfortunately, the extra memory can't make up for the controller's laggardly performance. The only test in which this printer did well was the Courier manuscript test, in which it kept pace with even the LaserWriter IINTX.

If you generally print documents that are typographically simple and you don't mind spending time to save money, the Silent-Writer LC 890 might be the printer for you. But be sure to shop around for the best price.

QMS-PS 810 The \$4995 QMS-PS 810 is



NEC SilentWriter LC 890

PRINTER PARTICULARS

	SPECIFICATIONS ge PostScript 48.1 PostScript 47 PostScript printer printer printer 68020, 16MHz 68000, 12MHz 68020, 16		Apple LaserWriter IINTX	Apple LaserWriter IISC	Dataproducts' LZR-1260	GCC'S Business LaserPrinter			
CONTROLLER SPECIFICATIONS	Tell was	and the state of							
Imaging language	PostScript 48.1	PostScript 47	PostScript 47	QuickDraw	PostScript 47	PostScript 49.2			
Imaging location	printer	printer	printer	Macintosh	printer	printer			
Processor		68000, 12MHz	68020, 16MHz	68000, 7.45MHz	68020, 16MHz	68000, 12.5MHz			
Font mechanism	outline	outline	outline	bitmapped	outline	outline			
Font location	printer	printer	printer	Macintosh	printer	printer			
Built-in fonts		35	35	0	31	39			
Accepts font-expansion hardware	no	no	yes	no	по	no			
Hard disk for font storage	included	no	optional	no	optional	no			
Bitmap smoothing	no	yes	yes	yes	no	no			
Requires hard disk—equipped Mac	no	no	no	recommended	no	no			
Works with Mac 512K/512KE	yes	yes	yes	no	yes	yes			
Amount of RAM	6MB	2MB	2MB	1MB	4MB	2MB			
RAM expansion upgrades	none	none	to 12MB	none	none	to 4MB			
Other controller upgrades	none	to IINTX (\$2099)	none	to IINT (\$2099)	none	none			
	Manufacture 1 of		F-10.	or IINTX (\$2699)					
Size of font cache	10MB ^s	200K	200K-1200K5	n/a	400K	230K			
Interfaces*	A, P, R	A, ADB, R	A, ADB, R, SCSI	ADB, SCSI	A, P, R	A, P, R			
Emulation modes	Diablo 630,	Diablo 630	Diablo 630,	none	Diablo 630,	none			
	HP LaserJet Plus		HP LaserJet Plus		HP LaserJet Plus				
ENGINE SPECIFICATIONS						My Spink			
Print engine	Minolta SP-100	LBP-SX	LBP-SX	LBP-SX	Toshiba A-739	Ricoh 1060			
Resolution (in dpi)	400	300	300	300	300	300			
Rated engine life (in pages)	600,000	300,000	300,000	300,000	600,000	180,000			
Writes white or black	black	black	black	black	black	black			
Consumable components	toner, developer,	drum, toner	drum, toner	drum, toner	toner, developer,	toner, drum,			
	imaging unit		N COLUMN TO SERVICE STATE OF THE SERVICE STATE OF T		drum	cleaning magazine			
Pages between replacement	toner, 1000;	4000	4000	4000	toner, 5000;	toner, 1500;			
allege state and a sure	developer, 30,000	A LENGTH OF COLUMN TWO			developer, 40,000;	drum, 20,000;			
	imaging unit, 30,000	Aug au Chairtean Si	1		drum, 25,000	cleaning magazine, 10,00			
Price for replacement	toner, S60 (3 tubes);	\$130	\$130	\$130	toner, \$25;	toner, S29; drum, S110;			
IN DESTRUCTION OF STREET	developer, S60;	ELSECTION COLO			developer, \$225;	deaning magazine, SB9			
	imaging unit, \$660				drum, \$295				
Maximum paper size (in inches)	8 ½ by 14	81/2 by 14	8 ½ by 14	8 ½ by 14	81/2 by 14	8 1/2 by 14			
Number of paper trays	2	1	1	1	3	1			
Self-centering manual feed	no	yes	yes	yes	yes	yes			
Paper tray capacity (in sheets)	each tray 250	200	200	200	250	150			
Optional paper accessories	legal cassette	envelope, A4, legal	envelope, A4, legal	envelope, A4, legal	envelope cassette,	none			
	1780.	cassettes	cassettes	cassettes	two-bin feeder				
List price	\$12,500	\$4999	56999	\$2799	\$7995	S4199			
	11-1-40			45	53	37			

Specifications also apply to Abaton QuickStep (\$4495), Jasmin DirectPrint (\$3495), and La Cie Panther PDX (\$3499, including Casady & Greene downloadable fant library).

Avant Garde, Bookman, Century Schoolbook, Zapf Dingbats, Zapf Chancery, Cooper Black, and Futura Extra Black.

much faster than the LaserWriter IINT and slower than the IINTX. If you want the setup simplicity and print quality of the Canon LBP-SX engine, and you can't afford the top-of-the-line IINTX, consider the PS 810.

Like the IBM printer, the QMS-PS 810 contains a 68000 microprocessor running at 16MHz. This fact, combined with QMS's

proprietary font-handling techniques, helped the PS 810 finish first among the true Adobe PostScript printers in the fontoriented benchmarks. IBM's Personal Page Printer edged it out in the FreeHand test, however.

The PS 810 provides a complete set of emulation modes and a Centronics parallel port for IBM PCs. It arrives with 2MB of RAM, and a 1MB memory expansion option is also available. In all, it's a fine printer. A recent price cut from \$5495 to \$4995 makes it the obvious choice over the LaserWriter IINTX.

Four PostStript Clones Abaton QuickStep, Qume CrystalPrint Publisher, Jasmine DirectPrint, and La Cie Panther PDX are quick, moderately priced printers that

^{&#}x27;The PLP includes Times, Helvetico, Symbol, Courier, Zapf Calligrophic (a
Palatino look-alike), and Helvetico Narrow; the Fonts Plus package adds

DEODETICETARY font-handling technique

A	GCC's Personal LaserPrinter	IBM's Personal Page Printer II	NEC SilentWriter LC 890	QMS-PS 810	Qume's CrystalPrint Publisher*	Texas Instruments' OmniLaser 2106	Varityper's VT600W†
	Ouid-Dean	PartCraint CO C	DoctCerint A7	PartScript A7	Human Carint 2 02	DestCerint A7	DarkCeriat 40
	QuickDraw	PostScript 50.5	PostScript 47	PostScript 47	HyperScript 2.02	PostScript 47	PostScript 48
	Macintosh	printer	printer	printer	printer PICC (Waitely)	printer	printer
	none (imaging occurs in Mac)	68000, 16MHz	68000, 10MHz	68000, 16MHz	RISC (Weitek)	68000, 10MHz	68020, 16MHz
	outline	outline	outline	outline	outline	outline	outline
-	Macintosh hard disk	printer	printer	printer	printer	printer	printer
-		43	35	35	35	35	35
	no	no	no	no	no	yes	no
	no	no	no	no	no	no	included
	yes	no	no	no	no	no	no
	yes	no	no	no	no	no	по
	no	yes	yes	yes	yes	yes	yes
	none	2MB	3MB	2MB	3MB	2MB	6MB
	none	to 4MB	none	to 3MB	none	none	none
	to Business LaserPrinter;	none	none	none	none	none	none
	PLP Share network interface			A SHINE SHARE I			
	varies (in Mac's memory)	238K‡	400K	279K	130K ¹¹	286K	10MB5
	SCSI	A, P, R	A, P, R	A, P, R	A, P, R	A, P, R	A, P, R
	none	HP LaserJet Plus,	Diablo 630,	Diablo 630, HP LaserJet	none	Diablo 630, HP LaserJet	none
		IBM ProPrinter XL	HP LaserJet Plus	Plus, HPGL plotter		Plus, HPGL plotter,	
				All of the state		Texas Instruments 855	
	Ricoh 1060	Ricoh 1060	NEC 890	LBP-SX	Casio LCS-130	Ricoh 1060	(undisclosed)
	300	300	300	300	300	300	600
	180,000	180,000	600,000	300,000	300,000	180,000	360,000
-	black	black	black	black	black	black	black
	toner, drum,	toner, drum,	toner, drum	toner, drum	toner, drum	toner, drum,	toner, developer,
	cleaning magazine	cleaning magazine				cleaning magazine	drum
	toner, 1500;	toner, 1500;	toner, 3000;	4000	toner, 6000;	toner, 1500;	toner, 2000;
	drum, 20,000;	drum, 20,000;	drum, 7000		drum, 10,000	drum, 20,000;	developer, 30,000;
	cleaning magazine, 10,000	deaning magazine, 10,000	droin, 7 dod		urom, rojovo	cleaning magazine, 10,000	drum, 30,000
_	toner, \$29; drum, \$110;	toner, \$31.75;	toner, S20;	\$130	toner, S99; drum S129	toner, S29; drum, S110;	toner, S108 (for
-	cleaning magazine, \$89	drum, \$218;	drum, \$110	3100	ional, 577, droiti 5127	cleaning magazine, \$89	12,000 pages);develop
_	treaming magazine, 507	cleaning magazine, \$108	droin, 5110			treating magazine, 307	\$149; drum, \$785
	8 1/2 by 14	8 ½ by 14	8 ½ by 14	8 ½ by 14	8 ½ by 14	8 ½ by 14	11 by 17
	1	1	2	1	1	1	1
_	VAC	VAC	no	Vac			
_	yes 150	yes 150	each tray, 250	yes 200	no 100	yes 150	yes 200
-			face-up output tray	envelope, A4, legal		250-sheet feeder	A4, B4, legal casssettes
	none	none	rate-op output truy		none	ZJU-Slicel redder	A4, 64, legal casssenes
-	C2000 (Plus C2200)	CADOD	CA705	cassettes	CAADD	20202	200 005
	S2099 (Plus, S2299)	\$4999 37	S4795 68	\$4995 45	\$4499	\$4595	\$22,995

[§] The size of these printers' fant caches increases as memory is expanded.
The value listed reflects the size of the fant cache with base memory configuration.

"The CrystalPrint Publisher's font cache operates differently from that of a PostScript printer, so this figure shouldn't be used as a point of comparison.

Interfaces: A = AppleIalk; R = RS-232C serial; ADB = Apple Desktop Bus;

C = Centronics parallel; SCSI = small computer system interface.

bypass Adobe Systems' PostScript interpreters. Qume's CrystalPrint Publisher, which sells for \$4499, is the first mass-market PostScript clone available. Jasmine and La Cie sell the same printer for about \$1000 less; La Cie throws in Casady & Greene's entire library of downloadable fonts. Abaton recently announced its own Qume printer, the Abaton QuickStep,

which retails for \$4495.

Like the NEC SilentWriter, the Crystal-Print Publisher doesn't use a laser. Within its Casio LCS-130 engine, thousands of liquid-crystal shutters open and close, allowing light from a halogen lamp to illuminate the photosensitive print drum. Setup is straightforward although, once again, somewhat prone to toner spillage.

Output quality is excellent, and black areas print beautifully.

The CrystalPrint Publisher's paperhandling features, however, are minimal. The paper tray holds only 100 sheets, and there is no manual feed slot for envelopes or nonstandard paper sizes.

In speed tests, this printer usually left the others in the dust. However, in the

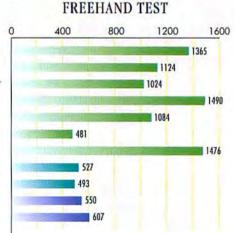
POSTSCRIPT PRINTER BENCHMARKS

(All times are in seconds)



 Results also apply to Abaton QuickStep, Jasmine DirectPrint, and La Cie Panther PDX.

Apple LaserWriter IINT GCC Business LaserPrinter IBM Personal Page Printer II NEC SilentWriter LC-890 QMS-PS 810 Qume CrystalPrint Publisher Super Script* Texas Instruments OmniLaser 2106 Apple LaserWriter HNTX DataProducts LZR-1260 Agfa P3400PS Varityper VF600W



The FreeHand test measures the time required to print an Aldus FreeHand 2.0 document (the Motorcycle sample file). This document tests the printer's ability to process the kind of complex PostScript images that Aldus FreeHand and Adobe Illustrator users create.

TESTING PAGE PRINTERS

To measure the performance of the printers reviewed here, I created four benchmark documents for the PostScript printers and three for the QuickDraw printers, each of which tests a different aspect of a printer's performance.

In the lowest-priced category, the IISC prints text-oriented documents faster than the PLP, especially when used with a 1MB SE. With complex graphics, the PLP was faster.

Qume's CrystalPrint Publisher won the Free-Hand and Fonts events easily in its category. (Do recall, though, that it frequently crashed during the latter.) Its 10-ppm engine held it back during the Courier tests, and the scanned images slowed it down during the Newsletter test (Adobe interpreters are especially adept at dealing with large bitmaps). Of the 68020-based printers, Dataproducts' LZR-1260 was the all-around performance champion. The Apple LaserWriter IINTX edged it out by a negligible five seconds in the Newsletter test. The Agfa Compugraphic and

Varityper printers turned in faster times in the Fonts test, but they had the benefit of a hard disk. The 12-ppm engines in the Dataproducts and Agfa Compugraphic printers drove them to a first-place tie in the Courier test.

As for the midpriced printers, GCC's Business LaserPrinter, IBM's Personal Page Printer II, and the QMS-PS 810 share the winner's circle. (The CrystalPrint Publisher beat all three printers, but its unreliability puts it out of the running.) The NEC SilentWriter ran like a turtle in all but the Courier test, when its 10-ppm engine pushed it to a first-place victory in its class.

I ran the QuickDraw tests on a 1MB SE and on a 5MB Mac II, with MultiFinder, disk cache, and background printing disabled. All the PostScript tests were performed using a 2MB Mac II running System 6.0.2 (with version 5.2 of the LaserWriter drivers), with MultiFinder and cache disabled. I ran each test three times; the graphs show the averaged results of the second and third times.

QUICKDRAW PRINTER BENCHMARKS

(All times are in seconds)

Because of the text and graphics limitations of the QuickDraw-based LaserWriter IISC and the Personal LaserPrinter, I used a different set of benchmark documents to test these units.

Under \$3000

LaserWriter IISC Mac II

Personal Laser Printer Mac II Mac SE



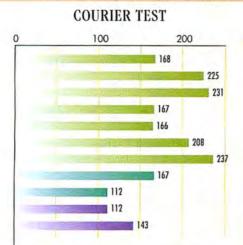
Fonts document heat it crashed into the wall. While a document would generally print properly the first time (and in the FreeHand and Fonts tests, quite quickly), on subsequent runs the printer would hang and I would have to shut it off. Occasionally, the document wouldn't print at all. This problem also occurred with the Jasmine and La Cie units, so it wasn't an isolated flaw in Qume's review unit.

A Qume representative said the prob-

lem was related to the way Microsoft Word 3.02 and 4.0 format documents for a PostScript printer, and that the problem doesn't occur with WordPerfect 1.0.2 or MacWrite 5.0. Qume promises that version 3.0 of the printer's firmware, which should be released by the time you read this, will fix the problem. For upgrade availability and pricing,

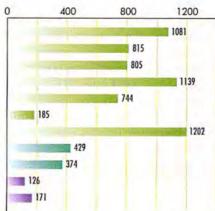


QMS-PS 810



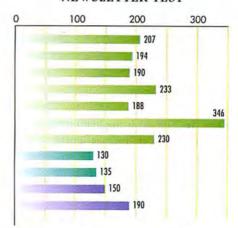
The Courier test measures the time required to print a 20-page, double-spaced Microsoft Word 4.0 document containing Courier with some bold and underlined text. This test doesn't make extensive demands of a printer's controller; indeed, it's the only test whose results depend largely on the speed of the print engine.

FONTS TEST



The Fonts document is a 7-page Word 4.0 document that contains the entire Macintosh character set in numerous fonts, sizes, and styles. This test measures a printer's ability to generate font bitmaps and to store and retrieve them from the font cache. It was this test that tripped up Qume's CrystalPrint Publisher and its Abaton, Jasmine, and La Cie counterparts.

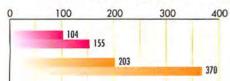
NEWSLETTER TEST



The Newsletter document is a 2-page Aldus PageMaker 3.0 document containing four downloadable fonts, three gray-scale scanned images, and a mix of font sizes and styles.

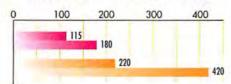
Because the Qume CrystalPrint Publisher can't use Adobe fonts, I substituted Bitstream downloadable fonts in their place when testing the Qume, Abaton, Jasmine, and La Cie printers.

COURIER TEST



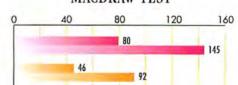
The Courier document created for the QuickDraw printers, like the one used with the PostScript printers, tests the speed of the print engine. This document contains 10 pages.

COMPLEX DOCUMENT TEST



The Complex document was created in Word 4.0 and, like many newsletters and other desktop-published documents, it contains bitmapped graphics and several type sizes.

MACDRAW TEST



The MacDraw document was designed to test the printers' ability to work with complicated object-oriented documents. This one contains 960 objects.

check with the company whose name appears on the printer.

Another shortcoming is the Crystal-Print Publisher's inability to use Adobe's vast library of top-notch downloadable fonts. Only an Adobe interpreter can read the encrypted format. You can use downloadable fonts from other sources, including Bitstream and Casady & Greene, but because character widths may not match Adobe's equivalents, you could run into problems if you use the printer to proof documents and then have the final output printed by a service bureau that uses Adobe fonts.

I successfully used Bitstream downloadable fonts with the CrystalPrint Publisher, but the font quality was poor in small sizes (12-point and smaller).

If the CrystalPrint Publisher cost less than \$3000, it might be a serious contender. As it stands, it's too expensive, especially given its occasional crashing, its inability to use Adobe fonts, and its spartan paper-handling features. The first wrinkle is the only one likely to be ironed out.

Texas Instruments' OmniLaser 2106 The \$4595 OmniLaser 2106 proved quite slow in nearly every test. The fact that the 2106 contains the same Ricoh 1060 engine as the GCC and IBM printers illustrates the difference that a controller can make in performance.



Qume's CrystalPrint Publisher

While the 2106 is strong in emulations, this is of little value in the Mac world. The OmniLaser 2106 just isn't in the running. It's slow, its LCD status display is hard to read, and it offers no memory-expansion capabilities.

Recommendations—\$3000 to \$6000 The winners in this class are GCC's Business LaserPrinter and IBM's Personal Page Printer II. Both deliver good performance and memory-expansion capabilities, plus some unexpected extras. GCC offers the SCSI port. IBM offers extra fonts. GCC has the price advantage.

Printers to avoid include Qume's CrystalPrint Publisher, which is fast but flawed, and Texas Instruments' sluggish OmniLaser 2106. The Apple LaserWriter IINT is an uninspiring performer with no expansion capabilities. For \$4 less than the IINT, you can buy the faster, more expandable QMS-PS 810.

HIGHER PRICE RANGE — \$6000 to \$8000

Several years ago, this price range represented the low end of the Mac laser printer spectrum. Today, it houses the upper tier of 300-dpi printers. Fast and expandable, the printers in this class are designed to accommodate high-volume and processorintensive printing tasks.

Apple Laser Writer IINTX Apple's best printer, the \$6999 Laser Writer IINTX combines a high-performance controller with the popular Canon LBP-SX engine. This is an excellent combination, unless you routinely print large documents or multiple copies of a single document. The 8-ppm Canon engine can't always keep up with the printer's 68020-based controller.

The NTX is eminently expandable. You can boost its RAM to a nearly absurd 12MB, and the printer contains a SCSI port for a hard disk. The NTX also accepts plug-in font boards, although none are currently available for it.

The NTX can emulate an HP LaserJet Plus, but it lacks the Centronics parallel port that generally connects to IBM PCs. Apparently Apple isn't as interested as IBM is in serving mixed environments.

On the race track, the NTX confirms the adage, You get what you pay for. The NTX blew away printers in lower price ranges, but it fell behind Dataproducts' LZR-1260.

Dataproducts' LZR-1260 Combine a 68020-based controller containing 4MB of RAM with a 12-ppm engine as standard equipment, and you have Dataproducts' LZR-1260. At \$7995, the 1260 costs more than a IINTX, but the 1260 is faster and better suited to the demands of high-volume printing.

The 1260 uses a heavy-duty Toshiba A-739 print engine, rated at 25,000 pages per month. (The IINTX's Canon LBP-SX engine is rated at only 3000 pages per month.) The Toshiba engine does require more setup effort than a Canon LBP-SX; you must install a disposable drum, developer cartridge, toner cartridge, and fuser cartridge. Wear work clothes, because you're likely to spill something.

You can't expand the 1260's memory, but the printer does provide an internal SCSI connector for a hard disk. Unfortunately, it can't accommodate an external SCSI drive such as Apple's Hard Disk 20SC. Dataproducts says most internal SCSI drives will work with the 1260, and the company sells a 20MB drive for \$895.

The 1260's Toshiba engine handles paper better than a bank teller. The standard cassette holds 250 sheets; an optional two-tray feeder with a 500-page capacity sells for \$895; and an envelope feeder that holds 100 envelopes costs \$995. Print quality is excellent.

The 1260 finished all but one performance test ahead of the IINTX. In the Courier manuscript test, the 1260 was roughly 50 percent faster than the IINTX.

Recommendations—\$6000 to \$8000 Both printers in this class are excellent, but Dataproducts' LZR-1260 offers superior

paper handling, faster performance, and a workhorse of an engine. It is best in environments that require high-volume printing. The IINTX isn't completely out of the running, however. I recommend it for offices that print limited numbers of complex documents.

HIGHEST PRICED - OVER \$8000

What do you get when you spend more than \$8000 for a laser printer? For starters, standard equipment includes lots of memory and a built-in hard disk. But more important, output prints at more than 300 dpi. The printers in this class blur the boundaries between laser printer and typesetter.

Agfa Compugraphic's Agfa P3400PS The P3400PS is a 400-dpi printer that packs 6MB of RAM, a 20MB hard disk containing 73 Adobe fonts, and excellent paper-handling features into a remarkably compact package.

The P3400 uses a Minolta SP-100 print engine that can handle 12 ppm and 10,000 pages per month. Once you and a few friends heft the 102-pound printer from its wooden packing palette, setup is a straightforward process. You simply install the toner and developer cartridges into a slide-in imaging unit that lasts for 30,000 pages.

The Minolta engine produces excellent copy, noticeably better than 300-dpi output, although solid black areas could



Data Products' LZR-1260

be darker. The printer offers two paper trays; each one holds 250 sheets. You can configure the printer to treat both trays as one 500-sheet tray; when one tray empties, the printer switches to the other. The P3400PS is an excellent

performer. Its internal hard disk helped it finish first with the Fonts document. It fell behind

in the FreeHand and Newslet-

ter tests, but keep in mind that the 400-dpi P3400PS must manipulate more memory to create a page than does its 300-dpi competitors.

Varityper VT600/VT600W The \$22,995 VT600W is the senior sibling to Varityper's \$17,000 VT600. They are identical except for their maximum paper size; the VT600 prints up to 8½ by 14 inches, while the VT600W can print 11-by-17-inch documents. We performed all tests on a VT600W.

Varityper doesn't disclose the manufacturer of the print engines, but those in the know say it's Panasonic. The engine is rated at only 3000 pages per month, versus the 10,000-page duty cycle of Agfa Compugraphic's P3400, and the Varityper engine provides just one paper cassette. Setup is easy because you don't have to do it; the printer must be installed by a Varityper service representative.

The VT600W includes only the standard 35 fonts found in most PostScript printers. A 20MB internal hard disk is standard, but unlike that of the Agfa P3400PS, it arrives nearly empty. Also unlike the P3400, the VT600W provides no emulation modes. That isn't surprising, however, considering that this printer is billed as a plain paper typesetter, not an office laser printer.

As for the printer's output, it's gorgeous. The 600-dpi resolution is stunning, and solid black areas really are solid black. Performance is excellent, too. The VT600W is slightly slower than the P3400PS, but that is to be expected given the extra memory the controller must manipulate to create 600-dpi output.

Recommendations—Over \$8000 Among the true Adobe PostScript printers reviewed in this article, the Agfa P3400PS is the allaround performance champion. And it's



Varityper VT600W

the better value in this upper stratum, delivering more fonts, better performance, and superior paper handling, all with a price tag \$4500 lower than the VT600's. Still, although the P3400's output quality is superior to that of any 300-dpi printer, the VT-600's is far superior to all of the printers reviewed here. Thus, the Varitypers are better suited to printing final output, while the P3400 is preferable for high-volume proofing and low-end typesetting applications.

PARTING THOUGHTS

The printers reviewed here aren't the only ones available. Some alternatives you might consider are

- TurboLaser/PS Plus 3 (\$5695) This printer uses a write-white Ricoh 4081 engine that produces deep, rich blacks, but can print small text very dark. The engine is rugged, however, and the controller's 3MB of RAM help provide good performance.
- NewGen Systems' TurboPS/300 (\$5495) and TurboPS/400 (\$6495) These Post-Script clones are built around Canon's LBP-SX engine and should be shipping by the time you read this. The TurboPS/400 will be the first midpriced 400-dpi printer. Both units contain 35 Bitstream fonts.
- QMS-PS 820 (\$6495) The PS 820 contains the same controller as the PS 810, but uses Canon's heavier-duty TX engine, which provides two paper cassettes and is rated for 10,000 pages per month. Another QMS offering, the PS 1500 (\$7995) uses the 15-ppm Ricoh 4150, a write-white engine that produces excellent blacks, but has trouble with small text and fine lines (as does Ricoh's 4081). The PS 1500's controller contains a 16MHz 68020 and

accepts a SCSI hard disk.

- Qume ScripTen (\$5595) This pastelcolored fugitive from a Miami Vice set contains an Adobe PostScript interpreter, 3MB of RAM, and a 10-ppm engine. The printer uses a write-white Hitachi engine that produces excellent blacks, but still handles small text and fine lines well.
- Canon is expected to announce its own PostScript printer late this year.

Finally, while I've presented buying recommendations for each price range, your choice of a printer may be influenced by other factors. For example, if you live in a rural area, you may be closer to an Apple dealer than to a Dataproducts regional service office. In such a case, an Apple printer may be a smarter buy, since service and supplies will be easier to obtain. Similarly, if you work in a corporation that has a service contract with IBM, an IBM printer may be the more sensible purchase.

Before making a final decision, consult the benchmark results in "PostScript Printer Benchmarks" and "QuickDraw Printer Benchmarks" to learn how each contender fared when printing the types



Agfa P3400PS

of documents you print. And shop around, because many dealers and mail-order houses sell the printers reviewed here for prices well below suggested retail.

See Where to Buy for contact information

Jim Heid is a Macworld contributing editor and columnist. He would like to thank Maryellen Kelly for her benchmarking assistance.

Write,

ike the television in the family room or the car in the garage, a word processing program lurks in nearly every Mac owner's software library. Choosing a word processor used to be easy—either you stuck with the MacWrite program that came bundled with the Mac, or you went out and bought Microsoft Word. Times have changed. Free word processors no longer fall out of Macintosh boxes, and the marketplace is crowded with feature-laden programs, each touting its own strengths and special attributes.

Deciding which word processor best meets your needs can be frustrating. There are dozens of concerns, but the first question you might ask yourself is whether you would benefit most from

Write

A comparative
review of three
midrange
word processors:
MacWrite II,
Microsoft Write 1.0,
and WriteNow 2.0



a simple, straightforward low-end program or whether you really need a more expensive, higher-end word processor.

WHY NOT THE BEST?

Top-of-the-line programs like Microsoft Word and FullWrite Professional are flexible, and they are especially useful for working with long and complex documents. Besides offering the user thesauruses, glossaries for automated text entry, and style sheets for automatic formatting, high-end programs also provide tools for generating indexes and tables of contents. While these features may prove indispensable to the authors of textbooks, legal contracts, and environmental impact statements, not everyone benefits from all these enhancements.

Many word processor users pay a premium price for features they don't need. If you simply want to compose memos, letters, or monthly reports to the

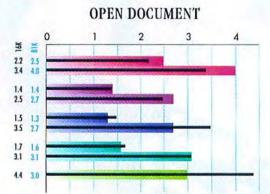
SPEED TESTS

Speed isn't everything, but for a writer who spends a great deal of time at the keyboard, it is far ahead of anything in second place. To test just how fast Write, MacWrite II, and WriteNow 2.0 really are, I subjected the three programs to six standard speed trials. I used two different documents and two Macintosh systems. For purposes of comparison, Microsoft Word 4.0 and FullWrite 1.1 were included in the tests.

First I created two test documents in MacWrite 5 (precursor to MacWrite II). Both documents were set in Palatino Roman and otherwise contained no special paragraph or character formatting. One document occupied 81K of disk space, contained two bitmapped and two PICT graphics files, and was approximately 34 pages in length. The other document occupied 16K of disk space, contained no graphics, and was about 7 pages long. I used a Macintosh II with 5MB of RAM, an 80MB hard disk, and an Apple color monitor in 2-bit, black-and-white mode in one test environment.

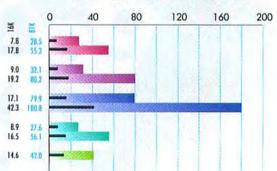
In these tests, each word processor was assigned a 1MB MultiFinder partition. The other test system consisted of a Macintosh SE with 1MB of RAM and two 800K floppy disk drives, with MultiFinder turned off. I conducted each test three times and averaged the results.





This graph shows the amount of time it took to open each test document.

CONVERT FROM MACWRITE



This graph shows how long it took each program to convert the original MacWrite 5 file to the program's native format and display each document on screen. FullWrite continued to format out-of-view pages long after the document was displayed and the stopwatch was clicked off; Microsoft Word and Write documents were unpaginated at the conclusion of the conversion.

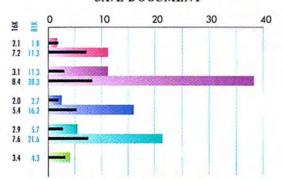
boss, you will waste time and patience learning the intricacies of the higher-end programs. Even seasoned authors may not relish navigating through all the options in the menus and dialog boxes, and the enhancements to some of these programs often make them run more slowly than their simpler cousins. (You can re-

duce the number of options in Microsoft Word, however, by choosing the Short Menus command, and in galley view, Word tested as fast or faster than most of the simpler programs—see "Speed Tests.") And finally, programs that are more fully featured are generally too large to work conveniently (or, in the case of FullWrite,

at all) on a floppy-based system.

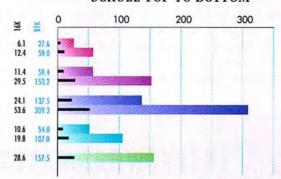
For those who do decide to choose a lower-end word processor, there are currently three that warrant serious attention. MacWrite II, from Claris Corporation, is a major overhaul of the venerable, now retired, original MacWrite. T/Maker's Write-Now 2.0 is a perennially popular program

SAVE DOCUMENT



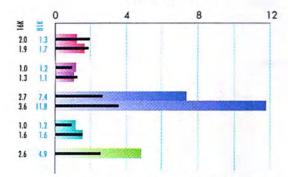
This graph shows how long it took each program to save the test document as a new file using the Save As command. Although it doesn't really have an effect on the initial save, the Fast Save option in both Word and Write was turned off.

SCROLL TOP TO BOTTOM



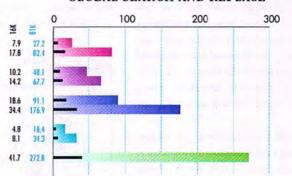
This graph indicates the length of time it took to scroll from the beginning of each test document to the end by pointing to the scroll bar's down arrow and pressing the mouse button.

CHANGE FONT



This graph shows how long it took to change all the text (which was selected before initiating the test) from Palatino to Avant Garde. For both fonts, the size used (12 points) was an installed size. Although the screen text in WriteNow changed immediately, figures in the table reflect the length of time required to regain control of the cursor.

GLOBAL SEARCH AND REPLACE



This graph shows how long it took to replace all occurrences of the with two (whole words only). In the long document, there were 1016 replacements; in the short document, there were 191. When the is replaced by a longer string—more than 30 characters—Microsoft Word still turns in the fastest speed and WriteNow begins to outpace MacWrite II.

sporting a relatively minor upgrade. And Microsoft Write 1.0 is a stripped-down version of its august older cousin, Microsoft Word. I lived with each one of these programs for extended periods to find out which was best.

NEW AND IMPROVED-MACWRITE II

If you think MacWrite II is nothing more than a glossy facade for the original MacWrite, think again. The simple and intuitive (some say simple-minded) original has been replaced by a versatile and relatively powerful program that loses little of MacWrite's legendary ease-of-use and full WYSIWYG point of view. MacWrite II corrects all of MacWrite's serious flaws: you can now open up to seven windows simultaneously (and select an

open window from the View menu); scroll horizontally for easy navigation in extrawide documents; set the left margin to any width; create footnotes or endnotes (numbered either automatically or manually); and open or save files in Text Only, original MacWrite, WriteNow, Write, Word 3.0, and Microsoft Works formats.

And that's not all. MacWrite II does much more than plug up MacWrite's more serious holes. A new mail merge function, for instance, allows you to insert fields and IF-THEN-ELSE conditions into form letters with a few clicks of the mouse. In addition to the spelling checker, which can check either as you type or after you're finished typing, the WordFinder thesaurus desk accessory and built-in hyphenation are also included (see "Checking Spelling from the Keyboard"). On a slightly more

frivolous note, the Font menu displays each font name in its own font. And MacWrite II's new HyperCard-based online help system is a model of its kind (the size of the Help file—386K—could pose a problem, however, if you don't have a hard disk).

Just as in most word processors, MacPaint and PICT graphics can be imported via the Clipboard, but in MacWrite II, the Insert File command can be used to import graphics directly without opening the graphics program. Once placed in the document, a graphic can be cropped and scaled using graphics tools or by typing in exact coordinates. As with WriteNow, you can hide graphics while working to speed up scrolling.

But it's in the realm of layout that MacWrite II takes a quantum leap. Although all the pages in a document will have the same number of columns (except for the optional title page, which always has a single column), you can define up to ten columns per page. You can define font size and fixed spacing between lines (in points, inches, or metric units) from a dialog box, or you can alter them in 1-point increments by clicking on the ruler. Indents and tabs can also be set from either the ruler or, for greater accuracy, from a dialog box. Font sizes range from 2 to 500 points in 1/4-point increments. For previewing your work, a Reduced Size command displays a single page or pair of pages in miniature. Although usually too small to read, the text on these pages is fully editable.

A few minor complaints about MacWrite II include the fact that although you can define facing pages that have different headers and footers on right- and left-hand sides, these elements will appear throughout the entire document; you cannot insert a new set in the middle of a document. Also, there are no "keep together" commands; manual page and column breaks can be used to avoid widows and orphans, however. The first shipping copies of MacWrite II were somewhat bug-ridden, but the current version, MacWrite II 1.0.2, appears to have solved the earlier problems.

Despite its many improvements and additions, MacWrite II 1.0.2 is just about as

ENTER WORDMAKER

ou may wonder, and legitimately so, if the world needs yet another low-end word processor. Well, a program like WordMaker may not reverse global warming, but it could give MacWrite II and WriteNow 2.0 a run for their money. WordMaker is a soon-to-be released word processor built on the same less-is-more principle. Unlike the other programs in this category, however, WordMaker enthusiastically embraces the submenu concept. Although some menus are overloaded with submenus (the Format menu, for example, contains eight submenus), WordMaker is easy to use, with commands and options logically organized.

WordMaker includes virtually all the features low-end word processors are expected to have: multiple windows and a window menu; stationery files for storing commonly used formats; mail merge; a spelling checker (which runs either in batch mode or as you type); headers and footers; page number, date, and time stamps; fixed and automatic line spacing; character, word, and paragraph counts; and the ability to copy and paste formats as well as text. At the time this was written, WordMaker lacked two fundamental features, footnotes and a mechanism for producing right and left pages. On the other hand, WordMaker is capable of color text and graphics, alphanumeric sorting, a variety of different page-numbering styles (Arabic numerals, Roman numerals, letters), and unusually powerful graphics capabilities (see "Side by Side by WordMaker").



Side by Side by WordMaker

Color text and flexible graphics positioning are two hallmarks of WordMaker. Graphics can be positioned anywhere on the page, even directly on top of text. Side-by-side graphics and wraparound text aren't automatic but can be created relatively easily by resetting text margins.



Checking Spelling from the Keyboard
Because replacement suggestions and action buttons
in the Spelling dialog box are all assigned keyboard
shortcuts, checking spelling can be accomplished
entirely from the keyboard in MacWrite II. On a
small screen, you can click on the flag lever to
enlarge the dialog box, which displays misspelled
words in context. The Spelling Checker can also be
used to count the number of words in a document or
in a section of selected text.

easy and obvious as its predecessor. Nearly all commonly used commands and options are immediately available on a menu or on the ruler. Only specialized options (such as Space Before, and Space After Paragraphs) appear solely in dialog boxes. If you're tired of menus, most commonly used commands as well as ruler settings, editing and formatting commands, and document navigation movements now have keyboard shortcuts. You can also create up to 30 custom combinations of font, size, and style; these custom styles are automatically added to the Style menu for easy access. In addition, you can now create stationery files to safely store frequently used document layouts and text.

All in all, MacWrite II is an excellent indicator of how far word processing has come on the Macintosh.

MICROSOFT WRITE—A SECOND COUSIN

Unfortunately, Microsoft Write is little more than a pale shadow of Microsoft Word. Even worse, Write is based on Word's often-criticized version 3.0. While many of Word 3.0's more arcane features, such as side-by-side paragraphs, have been stripped away (thank goodness), a number of Word's less user-friendly features still remain. To see what your page will look like when you print it, for instance, you must use the uneditable Page Preview mode, since headers, footers, and mul-

WORD TRIO COM	MPARED		
	MacWrite II 1.0.2	Microsoft Write 1.0	WriteNow 2.0
	Claris Corporation	Microsoft Corporation	T/Maker Company
SPECS			
Price	S249	\$125	\$195
Minimum required RAM	1MB	512K	128K
Program size	577K	287K	102K
Total on-disk size, incl. dictionary & help	1139K	516K	324K (large dictionary),
			210K (small dictionary)
WINDOWS			
Editable, full-size WYSIWYG view	1 U.		
Automatic repagination			
Reduced view	• (editable)	• (not editable)	
Split screen		•	
Window menu	•	•	2.0
Horizontal scrolling			•
KEYBOARD			
Smart quotes	•		•
Advanced keyboard navigation		•	
Extended keyboard support	named keys only	named keys only	named keys only
Keypad cursor controls		•	
FONTS			
Size range (points)	2-500	7-72	4-127
Size increments	1/4 point	standard sizes only	1 point
TEXT STYLES AND FORMATTING	-		
Condensed and expanded			
Subscript and superscript		•	•
Uppercase, lowercase, initial caps			•
Strikethrough and multiple underline			
Color text			
Copy and paste formats	ruler settings only	any formatting	ruler settings only
Custom styles		, ,	
EDITING			
Check spelling in batch		•	•
Check spelling while typing			
Thesaurus	with Word Finder		
Hyphenation			
FIND/CHANGE			
Wild card characters		•	•
Invisible characters	extensive	extensive	limited
One-step find and change for formats	•	find only	
DOCUMENT LAYOUT			
Maximum number of columns	10	4	4
Precise (fixed) line spacing	•	1	-
Liense (uxen) ing sharing			1,000

	MacWrite II 1.0.2	Microsoft Write 1.0	WriteNow 2.0				
DOCUMENT LAYOUT							
Footnotes	•						
Endnotes	•						
Multiple headers and footers			•				
Facing pages	•		•				
GRAPHICS							
Formats supported	MacPaint, PICT	MacPaint, PICT	MacPaint, PICT				
Import directly	•						
Crop and scale	•	limited cropping	scale only				
Hide to speed scrolling	•		•				
SPECIAL FEATURES							
Mail merge	•						
Stationery files	•		•				
Online help	•						
Time, date, page number stamps	•	header/footer only	•				
Character/word/paragraph count	word count in	character count only	•				
	spelling checker only						
IMPORT/EXPORT							
Open files in these formats*	1, 2, 3, 4, 5, 6, 7	1, 2, 3, 7, 8	1, 2, 3, 8				
Save files in these formats*	1, 3, 4, 5, 6, 7	1, 2, 3, 7, 8	1, 2, 3, 8				

*1 = text; 2 = text with line breaks; 3 = MacWrite 5.0; 4 = WriteNow; 5 = Write; 6 = Word 3.0; 7 = Microsoft Works; 8 = RTF (Microsoft Interchange).

tiple columns are not displayed in the active window (see "Previewing Pages in Microsoft Write"). And you must select the Pagination command in order to see the current page breaks.

In a major concession to ease-of-use, Write puts commands in menus rather than in dialog boxes. And for those who prefer to keep their hands on the keyboard, key commands abound. Many keyboard equivalents are inconveniently listed in the manual, however, and not displayed on the menus themselves. Even worse, Write continues an unpopular Word tradition of having many commands (such as Manual Page Break and Find Format) available only from the keyboard.

Write falls particularly short when it comes to long documents and complex layouts. In a fit of oversimplification, Microsoft stripped out a number of important Word layout options and commands while inexplicably leaving in such esoterica as a code-based system for constructing mathematical formulas. The maximum number of columns is four, for example, and the number of columns cannot vary within a document. Only a handful of font sizes are available; line spacing is limited to single, double, and space-and-a-half; and paragraph spacing is either closed (no extra space between paragraphs) or open (12 points of space). Because both paragraph and first-line indents can only be set by dragging markers on the ruler, there is no way to set paragraph and first-line indents by a precise amount.

In Write, a document can have only one header and one footer, and there is no provision for right- and left-side pages. Because footnote and endnote numbering is completely automatic, there is no way to use symbols as reference marks. While MacPaint and PICT graphics imported via the Clipboard can be scaled by

dragging, they cannot be cropped. Text will not wrap around a graphic (you can convert a piece of text into a graphic, however, and then scale it asymmetrically to create text special effects).

On the brighter side, Write did inherit Word's ability to open more than one window at a time. Open files are listed under the Window menu. The horizontal scroll bar and a split window bar are both handy tools for viewing documents. Commands such as Keep With Next Paragraph and Keep Lines Together help prevent bad breaks; Write also has manual page break and column break options. Finally, Write incorporates Word's excellent spelling checker.

WRITENOW-AN EARLY RIVAL

According to its many loyal fans, the first version of WriteNow was the word processor the original MacWrite should have been. For years, while MacWrite owners were making do, WriteNow users gloated over their multiple windows, horizontal scroll bars, spelling checker, multiple columns, stationery files, and automatic footnotes—all set within a framework at least as intuitive as MacWrite's (see "Multiple Columns in WriteNow"). WriteNow fans also boasted about the program's speed and compact size.

WriteNow 2.0, which really should have been called WriteNow 1.5, fixes the original version's most obvious flaws: it adds fixed line spacing, supports the arrow keys, and eliminates the need for a separate program to convert files to and from WriteNow format. The second version also adds a few new features: most notably a Window menu, smart quotes (right and left quotation marks appear automatically), and a Word-like mail merge function with IF-THEN-ELSE conditional statements. And all without affecting the program's small space requirements (it still runs on a 128K Mac) or its ease-of-use.

Of the three programs reviewed here, WriteNow has the easiest-to-locate commands and options; they all appear on menus or the ruler. Keyboard commands are in short supply, however, because WriteNow supports only two-key short-

Must save in text-only, Word 1.0, or MacWrite 4.0 format.

cuts. Instead of using \(\mathbb{H}\)-Shift-letter-key triplets to expand the number of key commands, WriteNow uses number keys in some of its \(\mathbb{H}\)-key pairs, which is anything but mnemonic. On the other hand, several keyboard shortcuts involving arrow keys provide efficient document navigation. And the named keys on the extended keyboard (cut, paste, page up, and page down, for instance) are supported as well.

WriteNow rivals MacWrite II in overall intuitiveness and surpasses it in compactness, but when it comes to laying out complex documents, WriteNow 2.0 is, by and large, a disappointment. It's true that you can have as many headers and footers as you like (no more than one per page, of course); a very useful Change Case command lets you change text case; and the Keep on Same Page command can help prevent bad paragraph breaks. In most other ways, however, MacWrite II's layout abilities are superior to those in WriteNow 2.0.

The number of columns in WriteNow 2.0 is limited to four. Specifying page margins, intercolumn spacing in multicolumn documents, and gutters in double-sided documents is awkward at best, and difficult most of the time. You must select nonstandard font sizes and all line spacing from the ruler by laboriously increasing or decreasing the current size one point at a time with mouse clicks. You can set paragraph and first-line indents only with



Previewing Pages in Microsoft Write

To see headers, footers, footnotes, and multiple
columns as they will print on the page, you must open
Write's Page Preview window. You can add page numbers, insert manual page breaks, adjust margins and
header and footer positions, view two pages side-byside, and zoom in on specific areas with a magnifying
glass tool, but you cannot edit text in this view.

the ruler so there is no way to enter a precise amount of space. Formatting unevenly spaced subheads is far more difficult than it is in MacWrite II (you add blank lines and adjust their spacing).

WriteNow 2.0 falls short in other ways as well. It is the only program of the three that doesn't have online help. There is no reduced view, and although WriteNow displays each page as it will look when printed, you need a full-page or two-page display to see your pages all at once. The mail merge feature, while powerful, is not nearly as easy to use as MacWrite II's. WriteNow's answer to custom styles and style sheets can hardly be described as automatic. Footnotes that are referenced by symbols, rather than automatically numbered, are difficult to create. And objective speed tests indicate that WriteNow's speed advantage has largely evaporated (see "Speed Tests").

AND THE VERDICT IS . . .

I found Write, WriteNow, and MacWrite II all comfortably quick and responsive during text entry. They are equally effective for creating simple documents like one- or two-page letters, memos, and the like. Therefore, if you have elementary word processing requirements, the choice comes down to price, disk space limitations, minimum RAM requirements, and personal predisposition (see "Word Trio Compared").

Once documents become the least bit sophisticated, however, significant differences between the programs quickly become apparent. Microsoft Write is the least intuitive and most difficult to use, with many commands available only from the keyboard and no editable, full-size WYSIWYG view. Write is too much like the Word 3.0 that writers love to hate. It is, however, the cheapest of the three, so if it's a bargain you're after, then Write may be an appropriate choice. Microsoft's generous policy on upgrades to Word 4.0 (\$220) means that you have a convenient escape hatch should you subsequently decide that, bargain or not, Write just isn't for you.

If memory constraints are your primary concern, then WriteNow 2.0 is proba-



Multiple Columns in WriteNow

In multicolumn documents, the tops of the columns in WriteNow often do not align properly on the screen, although they do print correctly. Fortunately, the ruler conveniently changes into a series of rulers (one for each column) when there are multiple columns, making it easy to set paragraph and first-line indents anywhere in the document.

bly your best choice. It can run on a 128K Mac and, with the smaller of its two dictionaries, it requires only 210K to run. However, while WriteNow clearly had an edge over the original MacWrite in terms of power and ease-of-use, with few exceptions WriteNow 2.0 has been outdone by MacWrite II.

All things considered, MacWrite II succeeds where Write and WriteNow fail: its power and versatility are balanced by its speed and ease-of-use. Undeniably, MacWrite II is more expensive than the other two programs, and it requires more disk space and more RAM than either Write or WriteNow. But MacWrite II handles simple notes and long, complex documents with equal grace, and it manages to incorporate a wide variety of useful features without losing the intuitive feel of its venerable predecessor. If I were packing my bags for a desert isle, in addition to those compact disks I've been carefully hoarding, I'd unhesitatingly pick MacWrite II over Write or WriteNow as my word processor.

See Where to Buy for contact information.

Robert C. Eckhardt spends the better part of every day writing on a Macintosb. He is a Macworld contributing editor and author of The Fully Powered Mac (1988) and The FullWrite Professional Handbook (1989), both published by Brady Books.

What do teddy bears, samurai warriors, human skeletons, and military aircraft have in common? Not much, really. Except that they can all be found in several Macintosh clip art collections. If you're in the market for prefab art, you now have hundreds of disks and thousands of images to choose from—Mac art is being generated at a rapid clip by more than 50 companies. In addition to floppy disks, several companies now offer compact disks packed with images in almost every subject area imaginable.

Mac clip art falls into four basic species: bitmapped (Paint), Draw (PICT), scanned images (TIFF), and-in ever-increasing amounts-PostScript. Each format has its advantages and its drawbacks. Bitmapped and TIFF images capture fine-grained, dotby-dot detail, but can take up a lot of disk space, are difficult to modify, and may lose clarity when scaled. PICT images can be easily scaled or modified with a drawing program, but are losing ground to the elegant flourishes of PostScript's bezier curves. Many clip art developers are turning to FreeHand and Illustrator 88 to create crisp, clean-and editable-artwork. These images are often available in the parent application's format or saved as encapsulated PostScript (EPS). If you have Illustrator 88 or FreeHand, you can edit EPS images, adding or changing colors, scaling images, modifying paths, or even separating images into their component parts and combining them with parts of other images. FreeHand owners can open art created with Illustrator 88 if it's saved in EPS or Illustrator 1.1 format, but colors may be altered in the translation.

With all these companies and all these formats, what's a clip art shopper to do? For starters, you can examine "Clip Art Collections" to find which companies supply images in the subject areas you want (to be included in any category in the table, a CLIP ART

Buyer's Guide

Macworld's third buyer's guide shows that Mac clip art collections offer something for everyone

collection had to have at least four images in that category). The table will help you narrow your search, but how do you know if a given company's artwork meets your standards? Look at the figure "Eight Abes," for example, and note the vast differences in how the same subject is rendered by different companies. I've marked companies whose artwork I recommend in the table with a star, and provided samples of quality artwork in "Clip Art Gallery." Your best bet is to contact likely manufacturers for information; many will send you promotional material with sample drawings. For a comprehensive visual overview, you can purchase The Electronic Clip Art Digest (\$135.95 including shipping) from The Electronic Clip Art Company. This handy catalog includes more than 15,000 images from 30 companies, as well as a detailed subject index and a clip art sampler disk.

If traditional clip art formats don't meet your needs, perhaps 3-D clip art will. Enabling Technologies' (800/544-0629, 312/427-0408 in Illinois) Clip3D includes software that lets you tilt, rotate, and add perspective and lighting to color images, which can then be saved in MacPaint, TIFF, or EPS format and transferred to other programs. The \$99 volumes encompass the following categories: Geography, Fonts, Accents, Business, Lifestyle, Messages, People, and Recreation.

Comstock (212/353-8600) offers five volumes of stock photographs stored as TIFF files on CD ROM. The images, which are licensed for in-house, noncommercial use, fall into the following categories: Business, Health and Fitness, Travel and Vacations, People, and Miscellaneous.

Or, if you have an image you want to convert to a Mac graphics format, several companies will oblige. Wordscapes (415/968-8737) will convert a logo, technical drawing, or just about any other type of graphic into EPS format. The Sorcerer's Apprentice (513/221-0748) will magically transform photos or video frames in VHS, Betamax, or 8mm format into Mac artwork.

Finally, some clip art companies take requests. For example, Showker Graphic Arts & Design (703/433-1527) offers a service called Clip Art to Go. If you have a special request, they'll create artwork for you. The company will also convert logos or other drawings to EPS or PICT format.

With a little perseverance, you're bound to find the subjects and styles that suit your publications.

See Where to Buy for contact information.

Erfert Fenton is a Macworld contributing editor and the author of The Macintosh Font Book (Peachpit Press).

by Erfert Fenton



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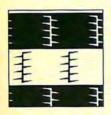
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Several clip art collections have come to my attention since "Clip Art Collections" was compiled:

Advanced Visuals: Volume I from Genesis Systems (319/266-7585, 800/728-7488), a Summer

'89 collection from Studio Advertising Art, People and Headings volumes from Multi-Ad Services, and
additional collections on CD ROM from United Syndicated Artwork. Also, Computer Application

Resources (314/721-6305, 800/288-7585) offers Clipables, 600 EPS images for \$149.95; and
Media Clip-Art (609/795-5993) sells 8- and 24-bit images in EPS, TIFF, and PICT format, on CD

ROM or on floppies.

- Format abbreviations: P = MacPaint, HC = HyperCard, I = Adobe Illustrator, FH=Aldus FreeHand, PB = PictureBaseDA
- ² Some manufacturers add shipping and handling charges to the prices shown here.
- ³ Adobe Collector's Edition: Patterns & Textures includes U.S. Geological Survey patterns and textures for mapmaking.
- ⁴ Subscriptions available for \$49.50 per month.
- 5 PictureBase is a popular art cataloging program from Symmetry Corporation. PictureBase DA is sold for \$20 with the purchase of MacMatbook.
- 6 Image Club's clip art is also offered in CD ROM format. The S999 CD includes PostScript fonts as well as artwork.
- ⁷ The maps in MacAtlas Presentation Pack are designed to be used with presentation programs; color can be added to the PICT-format maps with the presentation program.
- * SunShine Graphics offers 46 disks to date; space restrictions prevent us from listing each title.
- Quantity discounts are available: 5-9 disks, \$18 each; 10-19 disks, \$15 each; 20+ disks, \$13 each.

THE PRESS CONNECTION

Linking Macintosh publishing tools to the prowess of high-end prepress systems

brings you the best of both worlds . . .

Or does it?

BY STEVE ROTH

here's no denying it. When it comes to producing top-quality, glossy publications with color photographs, Macintosh publishing hits its head on a technological ceiling. For a variety of reasons, desktop technology still can't beat minicomputer-based electronic prepress systems at this type of job.

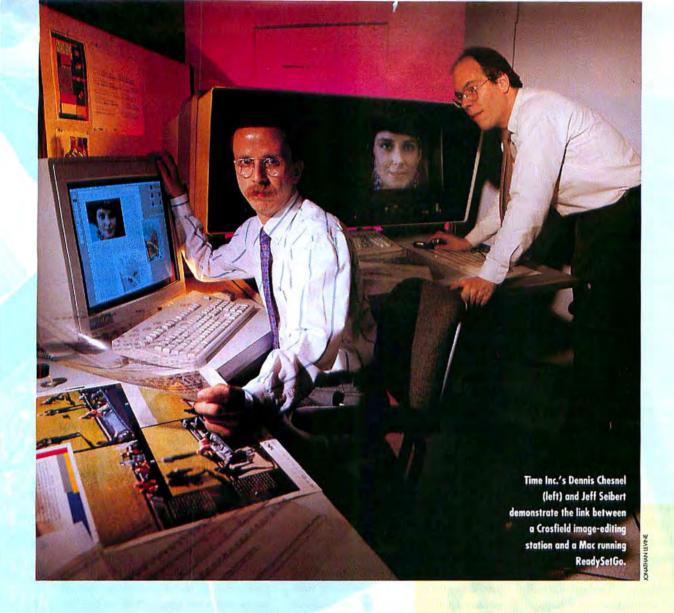
To begin with, PostScript imagesetters like the Linotronics still can't match the speed and image-handling abilities of high-end film recorders. Even in film for simple colored boxes and type, moiré patterns often rear their ugly, plaid heads. Moirés are even more common in scanned photographs. Mac page-makeup programs don't have the tools to easily trap page elements, a necessary precaution against registration variance on press. Desktop scanners and scanner software are hard-pressed to capture high-quality, separation-ready scans. And the files required for such scans would be too big to manage on most Mac systems anyway, not to mention the time such huge files would take to print.

Even assuming these and other technical prob-

lems are solved in the near future, questions of inclination and expertise would keep many publishers from cancelling their prepress contracts in favor of in-house Macintosh production. Few designers want to concern themselves with nitty-gritty production details like setting frequencies or building traps. And it's hard to find a PostScript imagesetting service with the skill and will to achieve the strict tolerances that color separation requires.

Such considerations, however, no longer need keep Macintoshes out of high-powered publications. Hybrid systems are now emerging that promise to combine the flexibility, control, and economy of desktop publishing tools with the prowess and quality of high-end prepress systems, in the process keeping the onus of color production from the shoulders of Mac designers.

With these desktop/prepress combos, a designer builds pages on the Mac, specifying colors for page elements and placing low-resolution scanned images, and prints the pages on a color printer for approval. Instead of using the page files to produce



final output, the designer saves a file that specifies the positions, sizes, colors, and contents of all the page elements (the *page geometry*) and passes it on to the prepress house. Using this page geometry, the prepress operator can quickly assemble pages on a prepress page-assembly console, scanning color photographs and merging them into the pages, trapping page elements, correcting colors, and producing color-separated film along with color proofs.

While this scenario sounds ideal, how well the hybrids will really work and whether they will save time or money remain largely matters of speculation at this writing. Some significant kinks need to be worked out before these systems can offer obvious efficiencies to a wide variety of users. The problem of how to handle the scanning and separation of photographs is a case in point.

SCANNING SCHEMES

The simplistic scanning scenario being thrown around in the literature coming from prepress

vendors goes something like this. The prepress service scans images on a drum scanner at high resolution but creates low-resolution versions for use in page layout. The designer places, sizes, and crops the low-resolution images and, if it's desirable, prints comps on a color printer. Once the designs are approved, the designer passes the files to the prepress shop, where high-resolution scans are automatically substituted and separations made. Since the prepress software assembles, sizes, crops, distorts, and rotates the high-resolution scan files automatically, reproducing the operations that were performed on the low-resolution scans, it keeps operator times to a minimum and makes real cost savings possible.

In reality, this high-res/low-res approach works only if you know the image scaling, rotation, and other placement characteristics *in advance* of scanning. Of course, this is self-defeating, since the beauty of these systems is supposed to be that they accommodate the flexible, interactive design process to which desktop publishers are accustomed.

COMPARING COSTS

iven that prepress systems can provide quality that the Mac/PostScript combo can't (not yet, at least), the next question is whether the desktop/prepress links provide any savings over traditional methods. The answer? It depends.

If you're statisfied with the quality you can get from Macintosh/PostScript color separations of object graphics (colored type and page elements), then the systems reviewed here don't have anything to offer you. They will cost more and will increase turnaround time. If you're not satisfied with the level of quality you see, for example, in Macworld or if you just don't want to worry about things like trapping and adjusting screen angles, these systems will be worth considering.

If you are in the exclusive group of publications who might need one of these systems, your potential for the greatest savings lie in automating the stripping process and limiting revision cycles—especially late revisions that require restripping. Prepress shops bill for the process of converting, separating, and outputting page files at a much lower rate—about \$200 an hour—than they do for actual color console time. Of course, these savings are possible only if everything really does fall into place without human intervention. If the page has to go to the color page-assembly console for adjustment, the fee is \$400 to \$900 an hour, compared to \$50 an hour for a skilled stripper assembling elements by hand. Computers make for

fast work, but they're probably not ten times as fast as manual methods.

Also, contrary to what you may have heard, you won't find real savings with scanned photographs. The process can't really be automated unless you know the image sizing and rotation in advance (see the discussion under "Scanning Schemes" in the main article), so most image handling is done just the way it has been in the past, and costs are about the same.

Prepress houses are starting to find that desktop links are mainly appropriate when there's a need to modify images on the system anyway—for photographic special effects or color correction, reversing type out of a photo, or dropping a photo into a complex shape. Otherwise, the half hour or so per page that it takes just for conversion and output (at \$200 an hour) eats up savings fast.

Before you study the accompanying cost chart, be warned that there are dozens of variables in figuring the cost of prepress work. Are you a regular customer? How many subheads will you have in a given process color combination? Are the lines around sidebars hairlines or 2-point rules? Do you want traps built? Even within a given prepress shop, there can be two or three methods of pricing jobs, depending on the type of job and type of customer. These numbers are meant only to give a rough comparison.

With all those variables in mind, we've developed three projects and figured approximately what the production invoice would look like using four different methods.

A. The first method is the traditional one: produce the whole page in black and white with your desktop publishing system, mark it up for color and photo positioning on a tissue overlay, and have the film tints and traditionally separated photos stripped in by the prepress house. It's up to them whether they use the prepress system or hand stripping—whichever is cheapest.

B. The second method uses QuarkXPress, PageMaker with Color Extension, or some other separation-capable program to separate the basic pages—type and graphics. Photos are separated by a separation house and stripped in by hand. (This is the routine we follow at Macworld.)

C. The third method also uses QuarkXPress or PageMaker Color Extension with a PostScript imagesetter, but the files move through a Cyber-Chrome shop that handles all the scanning, separations, and output of complete pages to film.

D. The fourth method uses a prepress link like those described in this article. These systems are just developing, and prepress services aren't sure how much it's going to cost, so we provide a range, assuming a half-hour per page for conversion and output at \$200 an hour. The low estimate assumes no operator time for color console work (trapping and image placement); the high estimate assumes half an hour per page at \$600 an hour.

CES •				
	Traditional	Desktop	CyberChrome	Prepress Link
Includes 5 two-color subheads, 2 three-color heads,	\$500	\$180	\$180	\$300-\$700
2 two-color sidebars, 5 two-color 1-point rules, color page proofs				
Includes same as above, plus 4 color photos, color page proofs	\$1150	\$830	\$380	\$700-\$1300
Includes 48 two-color subheads, 10 three-color heads,	\$7425	\$4425	\$2614	\$4700-\$11,900
7 two-color pull quotes, 8 two-color sidebars,		The state of the s		
	2 two-color sidebars, 5 two-color 1-point rules, color page proofs Includes same as above, plus 4 color photos, color page proofs	Includes 5 two-color subheads, 2 three-color heads, 2 two-color sidebars, 5 two-color 1-point rules, color page proofs Includes same as above, plus 4 color photos, color page proofs \$1150\$	Includes 5 two-color subheads, 2 three-color heads, S500 S180 2 two-color sidebars, 5 two-color 1-point rules, color page proofs Includes same as above, plus 4 color photos, color page proofs S1150 S830	Includes 5 two-color subheads, 2 three-color heads, 2 two-color sidebars, 5 two-color 1-point rules, color page proofs Includes same as above, plus 4 color photos, color page proofs \$150 \$830 \$380

There are a number of reasons why high-resolution scans can't be prepared in advance. First, the files are huge, and the prepress service would have to archive them during the days, weeks, or months that the pages were being designed and approved. Second, and more important, unless the prepress operator knows the final screen ruling and has at least a good idea of the scaling, he or she can't know the scanning resolution that will yield the best quality. Processing time is also an issue: it takes a lot of machine time to resize or rotate a 5MB-to-30MB image, more time and trouble than it takes to simply rescan it. So the truth is that images must usually be scanned twice—once for the low-res version and once for the final version.

You could make the low-res scan using a desktop scanner attached to a Mac II, but then the prepress operator would have to manually specify the crop points for the final scan and place the image on the page—probably following a comp that you would provide along with your electronic page files. Prepress operators can do this with a great deal of accuracy, but it takes time, especially if you have a lot of images, and on a prepress system time is money—big money (see "Comparing Costs"). In the end, manual stripping is often cheaper and easier.

POSTSCRIPT'S PART

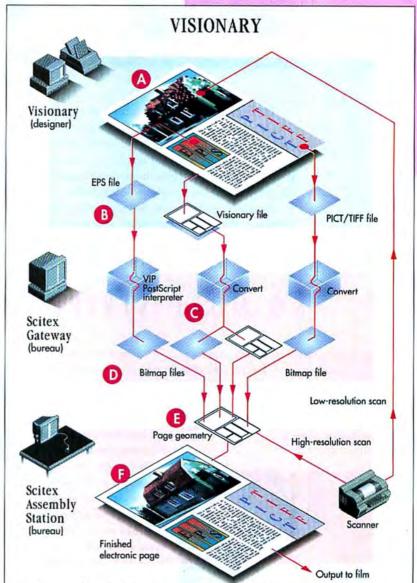
With its central role in desktop publishing, it's only natural that PostScript should have an important part to play in desktop-to-prepress links. As it turns out, PostScript can play many different roles in these systems.

The most far-ranging approach is the Open Prepress Interface (OPI), which Aldus has developed and all the major prepress vendors have at least announced they will support. The idea is that a Mac program puts out PostScript just as it normally would but with embedded comments specifying the position, scaling, distortion, cropping, and rotation of scanned images. According to Aldus, prepress systems that can read OPI PostScript (there are none as of this writing, though Hell's ScriptMaster is close) can work with these files in a number of ways.

One approach is to output the PostScript page to a PostScript imagesetter, meanwhile using the image comment information to scan images and create a second set of film on the prepress system. This second set of film includes all the scan separations, positioned, registered, and masked for manual stripping into the PostScript pages. Under this scheme, the output quality of the nonscanned elements is subject to the limitations of PostScript devices. Manual stripping is partially automated, which may achieve a small sav-

ings, and you may require fewer color proofs, since all the images from a page will be on a single set of film.

Another method is to have the prepress operator use the image-placement comments to merge separated images in PostScript format into the PostScript page file and output the complete page to a PostScript imagesetter.



This diagram shows the Scitex system at its most automatic. It assumes that the designer knows the approximate scaling of photographs previous to scanning. (A) The designer uses Visionary software on a Macintosh to lay out pages, placing low-resoluton FPO scans provided by the prepress service. EPS, TIFF, and PICT images may also be used. (B) The designer saves the page in Visionary format and passes this file along with any EPS and TIFF or PICT files to the Gateway station at the prepress house. (C) The Gateway operator converts the files to Scitex format, and (D) passes the resulting bitmaps (including one for text) and page geometry files to a Scitex Response system for assembly. (E) Page geometry information is used to merge the linework bitmaps automatically with high-resolution scans, which replace the FPO versions. (F) A Response operator performs digital retouching and builds any masks or traps required, using information garnered from a digital comments layer; when the page is ready, it is separated and sent to a Scitex film plotter.

Pushing the Limits of Desktop The PC-based Cyber-Chrome system was used to print 133-line separations of this still life on a PostScript imagesetter.



If the prepress system has a PostScript interpreter as a front end (as with Hell's forthcoming ScriptMaster), the operator can convert a whole PostScript file to a color bitmap. Scanned images can be merged and positioned into the color bitmapped page based on the OPI comments, and the whole page can be output to the film recorder on the prepress system. This approach overcomes the moiré and speed problems

associated with PostScript imagesetters, and allows for trapping on the prepress system, where the operator can make use of automated trapping tools.

In the basic Scitex Visionary and Crosfield Studio-Link systems, PostScript plays no role at all. Page geometry and typesetting information are transferred using proprietary file formats. However, both Crosfield and Scitex plan to offer optional interpreters, the Scripter/PS interpreter and the Visionary Interpreter for PostScript, which will convert PostScript illustrations to big color bitmaps so that they can be merged with the rest of the page.

SCITEX VISIONARY

The final version of Scitex Visionary wasn't ready when I wrote this, but the system was already in use by several Scitex customers (see "No More Stripping at Playboy"). One of the more expensive and restrictive of the systems in this article, the Scitex hybrid is based on a customized version of QuarkXPress that's hardware-locked to a board in the Mac II (see "Visionary" for an outline of the Scitex scheme).

NO MORE STRIPPING AT PLAYBOY

ric Shropshire, assistant art director at Playboy magazine, is leading the effort to move Playboy from traditional to fully electronic color page makeup. The magazine is testing both the Lightspeed Color Layout and Scitex Visionary systems.

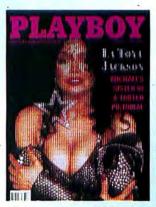


Playboy's Eric Shropshire: "The designs are better, because you can try out more options faster."

Shropshire says that using color scanners in dummying layouts saves a lot of time and money, even before they get to the prepress output. Previously, the art department took 30 or 40 shots from the 150 or so that come in from a photo shoot, sent them out to get photostats (black-and-white halftones) at \$10 apiece, and then shoved the stats around until

they had a layout. If they needed any photos at different sizes, they had to send out for more stats.

Now they use color scanners to capture the images, and use Visionary or Color Layout System to create the layouts. They can see the color images on screen, size them, wrap type just the way they want it, and print color comps for approval by the powers-that-be. Then they mark up the final comps with their specifications and send them to the printer. *Playboy* is just begin-





Color mock-ups help to limit revisions. The comp of this March '89 cover was designed on the Lightspeed system and printed on a Mitsubishi G650.

ning to test the electronic prepress connection.

Shropshire says that the greatest savings result from the reduced turnaround time and reduced revision cycles. With the prepress link, most of the savings will come in typesetting and stripping.

The Visionary version of XPress includes a number of special features that help color publishers to work with images. The software uses Bitstream type-faces, 38 of which are included in the package. When the Visionary Interpreter for PostScript (VIP) option becomes available (it should be by the time you read this), designers will be able to use PostScript graphics and type, including Adobe typefaces. The initial version of VIP will permit only 256 colors per graphic, which will preclude images that make extensive use of gradients.

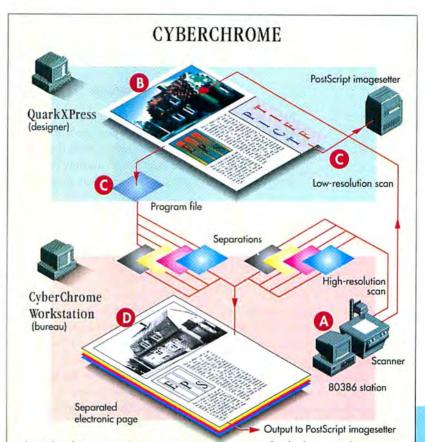
While Visionary offers great tools for color publishers, some users complain about being locked into using XPress rather than one of its brethren, such as PageMaker, and about being restricted to Scitex systems for output. In addition, Visionary requires a major investment. Even with a Mac II in place, the software alone (remember this is a modification of a \$700 program) costs \$8000 if you buy it from Scitex, somewhat less if you buy it from a Scitex service bureau. And it won't open files created with the standard version of QuarkXPress, so you have to buy a copy of the Visionary software for each workstation in your art department.

CYBER CHROME

Since CyberChrome is based on off-the-shelf Macintosh desktop publishing programs, a desktop scanner, and PostScript imagesetter output, one wouldn't expect it to provide the quality of hybrids linked to more traditional prepress systems (see "CyberChrome"). Until recently, it produced "good enough" separations—great for newsprint and fine for many catalogs. The latest images I've seen from this system, however, are top-notch (see "Comparing Costs").

Because CyberChrome equipment is much less expensive than high-end systems, CyberChrome services (there are only a handful at this writing) can offer much better hourly prices than traditional shops—around \$150 an hour plus normal imagesetter output fees (see "Pushing the Limits of Desktop"). Also helping to keep fees down, according to the company, are the time savings made possible by automated production techniques such as machine vision, which helps the scanning operator focus and crop quickly, and automatic stripping. At about \$200,000 for two 80386-based workstations, a network, a file server, software, and an imagesetter, though, CyberChrome is still beyond the range of most in-house operations.

The CyberChrome system includes no provision for trapping, so CyberChrome users will have to do without until Mac publishing programs provide trapping tools. But on the whole, CyberChrome looks like a promising system for the economy-minded.



The CyberChrome system uses a PostScript imagesetter for final output. The scenario pictured assumes that the designer was able to supply approximate cropping and scaling information for photographs to the scanning operator previous to scanning. (A) A scanning operator scans the photograph. A high-res version is separated and stored, while a low-res version is sent to the designer. (B) The designer uses QuarkXPress to lay out pages, speccing CMYK color and placing the FPO scans. (C) The designer sends a Quark file to the CyberChrome bureau and sends color PICT and TIFF files to an imagesetting bureau for separation and outputting (these are later stripped in manually). (D) An operator uses a Macintosh at the CyberChrome bureau to open the Quark file, access the high-res scan separations stored in a file server, automatically apply scaling and cropping to the scan files, separate the page, and send the separations to a PostScript imagesetter. In addition to the 80386-based scanning workstation pictured, another workstation is available to perform image editing if desired. Traps, however, must be built by the designer.

HELL'S SCRIPTMASTER

Hell's ScriptMaster is based on a PostScript-compatible interpreter from Hyphen running on a UNIX-based Apollo workstation with Bitstream and Agfa Compugraphic PostScript typefaces. The interpreter takes PostScript output from a variety of programs and converts it to Hell's color bitmap format. The prepress shop scans and places images based on a hard-copy comp you provide with the electronic file. Future versions of ScriptMaster will (theoretically, at least) allow for automatic placement of high-resolution scans based on embedded OPI comments.

As with the Crosfield system (which uses the same PostScript interpreter), ScriptMaster won't work with Adobe fonts, so you face all the problems involved in type substitution. You are free to use any program that can generate PostScript, however, using any non-Adobe PostScript typeface.

ATEX DESIGN SOFTWARE

Atex is a network-based editorial and production system widely used by newspapers and magazines. Atex Design Software runs on a Mac II and lets designers lay out color pages with dummy body text, Bitstream display type, low-resolution scanned im-

MAKING TIME

like some people have Macs. With six Crosfield systems of different descriptions networked in its IMPACT center (that's Image Processing and Color Transmission), Time produces seven publications a month plus a variety of other materials, for a total of about 1000 pages. Just to give some idea of the size of this system, the IMPACT center has more than 200 disk packs of 300MB each.

Dennis Chesnel, who is responsible for building design and layout systems for Time's Magazine Manufacturing and Distribution division, started serious testing of Crosfield's ReadySetGo/StudioLink connection by producing a 16-page magazine for internal presentation to Time Inc.'s 200 top executives. The magazine was designed and laid out by the Sports Illustrated art department using ReadySetGo.

The Time experiment faces some unique obstacles, the primary one being type. Time has several custom typefaces and thousands of custom characters for its Information International, Inc. (Triple-I) typesetting equipment. To use the same typefaces and special characters with ReadySetGo and StudioLink, Chesnel will have Mac screen fonts created, along with PostScript versions so the designers can proof pages on 300-dpi printers. Time will also need type-

faces that work with the PostScript interpreter on the Sun that's used to convert the Mac files into Crosfield Linework format, not to mention faces in Quick-Draw outline format when that hits the market with Apple's System 7.0

Other problems are due to limitations of the Crosfield system. It can handle only 121 tint combinations in a single file, so graphics with color blends run into problems quickly (a single blend can easily eat up 100 tint combinations). The solution was to break those graphics up into multiple files, process them separately through the PostScript interpreter, and overlay the resulting files on the Crosfield.

Jeff Seibert, the man responsible for actually moving all the pages through the system, says that the Mac connection will save immense amounts of time. Time magazine, for instance, is currently created on a Scitex system, then all the page geometry is rekeyed into the Crosfield system to create the actual production pages. Graphics are also laboriously re-created. A simple Illustrator or FreeHand chart that might take five or ten minutes to process through the Hyphen interpreter could take a Crosfield operator two or three hours to manually re-create based on an artist's mechanical. Such reduplication of effort, Seibert hopes, will soon become a memory of bygone Times.

ages, and geometric elements such as lines and boxes.

Links to page-layout and color prepress systems are still in the future for Atex; currently the system outputs only to PostScript printers. The system generates a specification sheet listing all page elements and their positions; the designer passes this and a color comp on to a page-makeup operator, who re-creates the page on a prepress system using the actual text.

An interface is in the works to transfer the specifications for size and placement of type columns to an Atex Page Makeup workstation, where coded text can be poured into the columns. Another planned interface will pass specifications for color elements to Scitex systems for assembly and separation. And a third interface will allow full page-geometry to be passed to the Atex PC Page Makeup Workstation. No solid release dates have been set for these interfaces.

If you're not already an Atex customer, this software won't provide a reason to become one. If you do use Atex now, the Design Software gives you the ability to use Macintoshes as inexpensive design workstations.

CROSFIELD/LETRASET STUDIOLINK

Crosfield and Letraset have taken the off-the-shelf approach to prepress with their ReadySetGo/Studio-Link combo, which was scheduled for release this summer. Designers use standard copies of ReadySetGo to build pages, and a Crosfield operator on a Mac uses a special version of the program to open the designers' files and save them into three separate files—one for electronic mechanicals, a second for coded text, and a third for PostScript graphics.

These files go to a Sun workstation, where they're converted to Crosfield Linework format (a big, compressed color bitmap). Next, the Crosfield system is used to merge the Linework files with high-resolution scans, to trap desired elements, and to output separations. The Sun system includes a PostScript-compatible interpreter, so designers can use PostScript graphics and type (though not Adobe type, at least not for the time being).

The greatest problem with this combo (aside from the Adobe hitch) is on the desktop side. ReadySetGo doesn't have CMYK speccing, only RGB and HSB (the standard Apple Color Picker), plus a Pantone palette. The Pantone colors can be separated into their CMYK equivalents, but this seems a clumsy way to handle things, and certain shades may not be available.

LIGHTSPEED COLOR LAYOUT SYSTEM

The Color Layout System (CLS) from Lightspeed (a subsidiary of Crosfield) has gotten a lot of attention

from the design community for its flexible tools and intuitive interface, but it's much more expensive than off-the-shelf packages. (For a description of how the system works, see "Color Layout System.") A complete system begins at \$43,000 and consists of a Macintosh IIx; a Howtek color flatbed scanner; a Mitsubishi color thermal printer (like the QMS ColorScript without the PostScript); the Lightspeed color page-layout software; and a prepress software option for transferring files to Crosfield, Hell, and Scitex systems.

CLS uses Bitstream outline typefaces for both screen display and output, and the prepress link software converts all the type on a page into high-res color bitmap format (Linework on Scitex and Crosfield systems), assuring good correspondence between screen display and output. You can select the resolution of the final bitmap, with several options given for preferred resolutions on different systems.

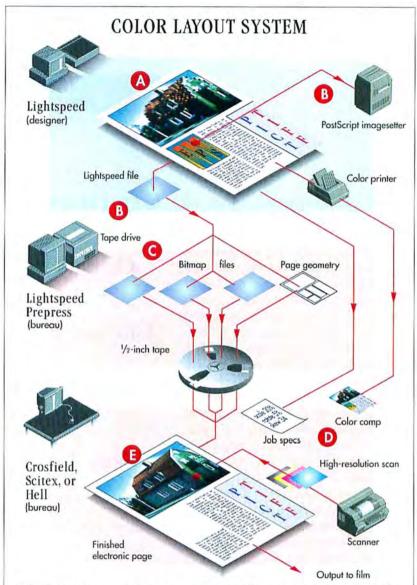
CLS is not an inexpensive solution. Among its advantages, however, is the ability to link to any of the three major prepress systems. There's no prepress link at all for photographs, so these will have to be produced in a conventional manner.

EVOLUTIONARY ROULETTE

For the next year or two, until we see more powerful Macs, faster networks, better scanners, and improved halftoning from PostScript imagesetters, it's going to be difficult or impossible to get *National Geographic* quality using Macintosh/PostScript tools alone. During that time, prepress links will provide a workable if somewhat patched-together method of combining the old with the new, providing more flexibility and control (and perhaps economy) than older methods, and better quality than straight desktop.

Let's face it, though; prepress systems aren't exactly the latest technology. Most of them are based on seventies-era minicomputers, and the software they run doesn't even know about object-oriented graphics—these systems work with huge color bitmaps only, even for lines, boxes, and type. There is a strong argument that says that desktop/prepress links are just stopgap solutions based on outdated technology, filling the hole until fully Macintoshbased systems are available. Systems like Cyber-Chrome, which take today's microcomputers and PostScript imagesetters to the limits, may point the way to future systems.

So be warned. In the long run, the powerful 1970sera prepress systems may become the dinosaurs of the production world. Think carefully before locking yourself into any system, even if it does provide savings in the short term; it may disappear into a tar pit somewhere between now and 1992.



Lightspeed's Color Layout System is compatible with all the major prepress systems. (A) The designer lays out pages in Lightspeed software, placing FPO scans and using the program's facilities to draw line graphics and to spec colors. (B) The designer saves a Lightspeed file that includes everything but EPS graphics, which are sent to a PostScript imagesetter for outputting (the EPS film will be stripped in manually). (C) An operator uses a Mac to convert the Lightspeed file to one or more high-res color bitmaps of the specified resolution, a page geometry file, and a file for low-res color bitmaps. These files are saved, typically to ½-inch tape, and sent to the prepress assembly station. At the same time, a job spec sheet is printed and sent to the scanning station (D), where high-res scans are made according to the information in the spec sheet. The high-res scans are separated and sent to a prepress assembly station (E), where an operator merges them, the high-res bitmaps, and the other bitmaps into the page geometry. The operator performs trapping and image editing as needed, separates the page file, and sends the page to a film plotter.

See Where to Buy for contact information.

Steve Roth operates Open House in Seattle, producing editorial packages for book and magazine publishers. He is the editor of Real World PostScript (Addison-Wesley, 1988).

At Your Service

BUREAU

Three hundred dots per inch sounds like a lot of dots. But to the jaded eye of today's reader, the 300-dpi type and graphics that roll off a laser printer have a rough-hewn look. More and more Mac publishers are taking advantage of the crisp, 1270-dpi or higher resolution offered at local typesetting service bureaus. Ideally, you should be able to walk into a service bureau, hand over a disk, and return the next day for a high-resolution printout. In the real world, service bureau customers must contend with a host of potential printing problems-incorrect fonts, missing elements, elegant PostScript type that mysteriously becomes bitmapped, inaccurate screen densities, and pages that don't print at all, to name a few.

With a little practice, you and your service bureau can iron out the wrinkles in your printing projects. If you've never been to a service bureau, the following information will help you ask the right questions as you shop for one. Even if you've used a service bureau before, you can benefit from service bureau managers' advice on preparing documents for trouble-free printing.

SHOPPING FOR SERVICE

Typesetting service bureaus vary in the types of services they offer, ranging from do-it-yourself Linotronic printout centers to full design and publishing facilities. For example, MicroPrint in Waltham, Massachussetts, can scan artwork at 1000 dpi, which gives you the option of scanning a logo or other artwork rather than redrawing it. Krishna Copy Center in San Francisco specializes in outputting film for color separations and has the equipment and expertise to help publishers who

GET HIGH-RESOLUTION

OUTPUT WITHOUT

GETTING PUT OUT -

TIPS FOR TROUBLE-

FREE TYPESETTING

by Erfert Fenton



work in color. Omnicomp, also in San Francisco, offers color proofs for customers who want to do mockups before printing their artwork. Other services you can find today include file conversion (from IBM PC to Mac), optical character recognition, and slide printing.

While the degree of service varies from bureau to bureau, the common denominator is a high-resolution *image-setter*, a device that, like the LaserWriter, uses Adobe's PostScript page-description language to image and print text and graphics. Because PostScript is a *device-*

independent language, a document you print on your LaserWriter can also be printed on a high-resolution PostScript imagesetter without being modified. Post-Script is also resolution-independent; the same document can be printed at 300, 400, 600, 1200, 1600, or 2400 dpi, depending on the capabilities of the output device. Agfa Compugraphic, Varityper, and Monotype, among others, offer high-resolution PostScript imagesetters, but Linotype is the name you hear most often (see "The Lino Line" for descriptions of several Linotype imagesetters).

At the full-service end of the service bureau spectrum, Graphics Plus in Los Angeles offers slide scanning, QMS color printing, training, and even system consulting and sales along with imagesetter outputting.



Your first task should be to figure out if you really need high-resolution output. If you have budget constraints but don't want to settle for 300-dpi output, you might consider a compromise move. A colleague of mine, for example, produced a 500-page book on the Mac. To send this tome to a service bureau would have been prohibitively expensive, so he printed the pages out about 25 percent too large and had his printer shoot the pages at approximately three-quarters of original size, effectively increasing the resolution from 300 to 400 dpi (see "Output Resolutions").

If you decide you need a service bureau, how do you find a good one? I learned the hard way: I set a 250-page book on the Mac and tried out three bureaus before I found one that was right for me. The first bureau had the right price (around \$5 a page), but the employees weren't familiar with the program I was using, QuarkXPress. After much gnashing of teeth and some missed deadlines, I went to a second bureau, which was more expensive (around \$10 a page), but the employees knew QuarkXPress inside out, were good troubleshooters, and were

well-versed in font management (a must, since my book contained numerous non-Adobe typefaces). Unfortunately, at that time the bureau hadn't upgraded its Linotronic software and was unable to handle my font-intensive project. Finally, I found a bureau that gave me a reasonable price (\$7 a page), was fast, was close to my house, had up-to-date equipment, and was familiar with QuarkXPress. This experience taught me a valuable lesson: if you've got a large project, send small samples to several bureaus and see which one works out best.



Terry Moore of MicroPrint in Waltham, Massachusetts, points out that service bureau customers need to learn about the printing process. "The user is now involved in prepress activities; today's service bureau dients need to become more knowledgeable about prepress and printing technology, especially in the area of color. Many users are looking to service bureaus to answer questions that they really should be asking their printer."

If you don't know where the service bureaus are in your area, start by looking in the phone book under Typesetting or Printing. If the bureaus listed aren't in your immediate area, take heart, many bureaus accept files by modem. If you're a Compu-Serve subscriber, you have access to Adobe's list of Linotronic-based service bureaus in the United States and Canada. The list can be found in the Adobe Forum; log on and type **60 Adobe**, enter the Service Bureaus library, and download the file called SRVBUR.TXT.

Your best bet may be to get a recommendation from a friend or coworker who has had good luck with a particular service bureau. You can also ask members of a local Mac user group which bureau they swear by. While you're shopping around, keep in mind that certain bureaus have more expertise with particular programs or special printing needs such as color separations or halftones.

ASKING THE RIGHT QUESTIONS

The following list of questions combines my own service bureau—hunting experiences with advice from service bureau managers as well as artists, designers, and art directors. Use it to help you find a bureau that meets your publishing needs.

How much does the bureau charge? Most bureaus charge by the page. Self-service bureaus may also charge by the hour for computer rental time. In an informal survey I made, base prices for an

8½-by-11-inch page on paper at 1270 dpi ranged from \$7.50 to \$15 for a single page, with \$10 to \$12 being typical. Keep in mind that a number of factors can affect price, including page size, printing resolution, whether the output is on film or paper, and whether you're dealing with a full-service or self-service operation. At all of the bureaus I queried, the price per page goes down as the number of pages in a job goes up. For example, one bureau charges \$12.50 for a single page, but \$7.50

a page for jobs of 50 pages or more. Prices for large jobs, such as a book or a catalog, are often negotiable; one bureau I talked to charges \$3.75 a page for orders of 500 or more pages. If you'll be printing a large job, talk to the service bureau manager about getting a volume discount.

Printing at 2540 dpi is more expensive than at 1270 dpi. However, you probably won't need to set your work at 2540 dpi unless you're doing high-resolution halftones or printing to film instead of paper.

Ask if there's a minimum charge. A few of the bureaus I talked to charged a minimum of \$20 per job, even if it was only a single page. Ask about rush charges as well. Most bureaus promise a standard 24-hour turnaround time. If you're on a tight deadline (and what publisher isn't?), bureaus will add anywhere from 50 percent to 400 percent to the base price for output in a few hours.

Find out about extra charges. For example, one bureau I contacted charges a fee for downloading non-Adobe fonts. Many bureaus charge by the minute if a print job exceeds a certain period of time (usually 10 minutes). With recent advances in the Lino's printing capabilities, this usually isn't a problem, but a large,

INFORMATION, PLEASE

he more an imagesetter operator knows about your file, the better the chances of it being printed right the first time. Before heading for a service bureau, write down the following information about your file. Many bureaus will ask you to fill out a job order form, but you're better off making notes at your Mac, where you have information such as version numbers at your fingertips.

PRINTING CHECKLIST

- Program used (including version number)
- The Mac model and System and Finder version numbers used
- Fonts used

- Number of pages in document
- " Page size
- Scaling (100% or resized)
- Printing resolution
- Does document include EPS or TIFF files?
- " Line screens?
- " Print to film or paper?
- When do you need the output?

Note: Does the document contain numerous fonts, large or complex illustrations, PostScript special effects such as radial fills, or any other characteristics that might cause the file to take a while to print? If so, the bureau may want to schedule the job during off-hours.

complex document with numerous fonts and illustrations might go into overtime. Also, certain PostScript effects (radial fills, for example) tend to take a long time to print. Most of the bureaus I looked at charge \$1 or \$2 a minute for overtime printing. If you think a document may take a long time to print (if it takes a long time to print on your LaserWriter, that's a good clue), talk to someone at the service bureau about any overtime policy.

- If the bureau is self-service, can you make an appointment to use an image-setter? If not, you may have to wait while other customers finish their jobs.
- What equipment does the service bureau have? An L100 might be satisfactory for simple printing jobs, but not those requiring fine detail and accuracy (see "The Lino Line"). You may also need additional hardware such as a scanner or a slide printer.
- Which RIP (raster image processor) does the service bureau's Lino have? The newer the RIP, the faster the printing will be (a factor if your job goes into overtime). If you use more than eight or ten typefaces (count bold or italic as a separate face) on a page, the original RIP may have trouble printing it. QuarkXPress and PageMaker are particularly memory-hungry, and may cause printing problems on a machine with the RIP 1. While the RIP 1 may pose problems, whether a bureau has the RIP 2 as opposed to the RIP 3 is generally of little practical importance.
- Is someone at the service bureau familiar with the software you're using?
- Does the bureau accept files by modem? If so, does the bureau have a bulletin board set up so you can send files at any time? What baud rate does the bureau's modem use? Large files can take a mighty long time—and time is money—to send at a low baud rate. Does the bureau have a file-compression utility like StuffIt so you can send them compressed files?
- If you have special printing needs, can the service bureau accommodate you? Most bureaus do the majority of their printing on paper; if you need output on film, you may want to look for a bureau that specializes in film work. *Macworld* senior production editor Luis Camus sends *Macworld* type—which is printed on

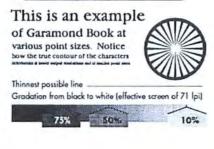
RESOLUTION OPTIONS

Although there's a quantum leap in quality between 300 and 1270 dpi, it's hard to discern the difference between text set at 1270 and 2540 dpi.

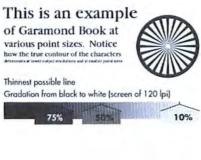
300 dpi (LaserWriter)

This is an example of Garamond Book at various point sizes. Notice how the true contour of the characters the true contour of the characters. Thinnest possible line Graddion from black to white (effective screen of 71 lpi)

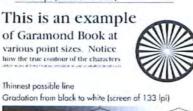
400 dpi (300 dpi photomechanically reduced to 75%)



1270 dpi (Linotronic 300)



2540 dpi (Linotronic 300)



paper—to one service bureau, and color separations for artwork—which are printed on film—to another.

Although film output is more expensive than paper output, it may save your printer the step of shooting film negatives. If you plan to print to film, talk to your printer first. Some printers prefer to shoot their own negatives, but others will tell you what they need in the way of film.

While many self-service bureaus have troubleshooters who can help out when you encounter a printing problem, if you plan to use an imagesetter on a frequent basis you may be better off developing a relationship with a full-service bureau that will learn your particular printing needs. As Earl Douglas of Publishing Solutions in Rockville, Maryland, points out, "You shouldn't be afraid to pay more for a bureau with experience."

PREPARING FOR PRINTING

A few preparatory steps can save you and the service bureau employees a passel of headaches. In the world of traditional typesetting, a group of people that can include typists, typesetters, artists, proofreaders, and pasteup and layout specialists turns a page of raw text into a finished page. These days, you're in charge of everything from layout to proofreading to setting up color separations. Unless you arrange for additional services, it's your responsibility, not the service bureau's, to make sure your output is complete and ready to be sent to a printer. Before sauntering into a service bureau, you should talk to your printer about issues such as resolution, lines per inch, and whether to print on paper or film.

• Bring a laser-printed proof of your document to the service bureau. When I interviewed service bureau managers, this was the most frequently uttered piece of advice. Without hard copy, service bureau personnel won't be able to tell if your job printed correctly on the imagesetter. If you use a modem to send a file to the bureau you can fax it a copy of the laserprinted document.

If you don't have a laser printer, rent some time on a copy shop's laser printer or see if you can use one at the service



Although Krishna Copy is a self-service operation, customers aren't left to their own devices. Employees at shops like this one in San Francisco are always available to answer questions and to troubleshoot.

bureau; an ImageWriter printout will do you no good at a service bureau. If you print on an ImageWriter at home and don't have access to a LaserWriter, you should at least set up the document for PostScript printing to avoid discrepancies in margin widths and line breaks. First, make sure you use a laser printer screen font (Times or Helvetica, as opposed to New York or Geneva). If you can't get a LaserWriter, at least get hold of a Laser-Writer driver file and install it on your Mac. Select Chooser from the Apple menu and click on the LaserWriter icon. Then, open the document, choose Page Setup from the Print menu, and click on OK. Check the document's line breaks and page breaks before taking it in to be printed.

To save yourself time and money, carefully proof the laser-printed document. It's much cheaper to print another copy on the LaserWriter than to redo a page on the Lino.

Find out what file format the bureau prefers. Although most bureaus print documents from the applications they were created in, others find it easier to print PostScript files. Weimer Typesetting in Indianapolis, for example, asks customers to send files in PostScript format; feeding PostScript directly to the imagesetter ensures that the bureau's output exactly matches the client's. (Printing PostScript files is a good way to avoid the heartbreak of font ID number conflicts.) To save a document in PostScript, choose Print from an application's File menu, click on OK in the dialog box, then immediately press #-F. A file named PostScript0 will appear in the System Folder.

Find out if the service bureau has the typefaces you used in your document. If not, you'll have to bring in the screen and printer fonts you used. The bureau will download your fonts, print the job, and then throw the fonts away. If you're a frequent customer, most bureaus will purchase a typeface you use regularly.

In general you should send in a list of the fonts found in your document with the job. If you use several fonts-even if they're all Adobe fonts-keep in mind that you may encounter font ID number conflicts (for an explanation of font ID number conflicts, see "Enhancing Post-Script Fonts," Macworld, May 1989). Service bureau personnel are well aware of the possibility of font ID conflicts, and most bureaus have developed strategies to minimize them. Linotype's new Concert utility eliminates conflicts within the Linotype/Adobe library, and font/DA extenders such as Suitcase and Font/DA Juggler include font-harmonizing utilities.

For best results, talk to the staff at your service bureau and find out how they'd like you to set up your fonts. Almost all of the service bureaus I encountered use Suitcase, Font/DA Juggler, or MasterJuggler to manage screen fonts. These handy utilities eliminate ID number conflicts because they enable you to put just the fonts you will be using in a file outside the System. You needn't own one of these utilities to place your fonts in a suitcase file for the service bureau; you can use Apple's Font/DA Mover to make your own file full of fonts. Using Font/DA Mover alone

won't guarantee a lack of ID number conflicts, however, so I'd strongly suggest buying a font/DA extender.

• Find out if the service bureau's version numbers for applications and system software match yours. Mismatched program and System versions have been known to cause printing problems. Your best strategy is to keep your software up-to-date (send in those registration cards!), since service bureaus are usually conscientious about installing the latest versions.

LINOS VERSUS LASERWRITERS

You might think that a Linotronic imagesetter is simply a grown-up LaserWriter, but there are several substantial differences between the two devices. A document that prints just fine on a LaserWriter might not print properly on a Linotronic. The following pointers should help you know what to expect from a Lino.

- Unlike the LaserWriter, the Linotronic won't smooth bitmapped graphics such as those produced in MacPaint. If you want to smooth the jaggies, print the bitmapped graphics on a LaserWriter and manually paste them into the final document.
- While you may be accustomed to letting the LaserWriter convert the Mac's original screen fonts—New York, Geneva, and Monaco—to their PostScript equivalents— Times, Helvetica, and Courier—the Linotronic doesn't offer this convenience. Make sure you've saved your document using the screen fonts for the associated PostScript typefaces.
- Unlike the LaserWriter, the Lino doesn't have Helvetica Narrow built into its memory. The LaserWriter's Helvetica Narrow isn't really a typeface per se; it's a mathematically derived version of the LaserWriter's built-in Helvetica font. Aesthetically speaking, you're better off using Adobe's Helvetica Condensed, which was crafted by a typographer rather than calculated by a set of PostScript routines. If you don't have Helvetica Condensed, some service bureaus have a PostScript utility file, available from Adobe, that condenses the Lino's built-in Helvetica to produce Helvetica Narrow.
- While many laser printers are limited to 8½-by-11-inch paper, the Linotronic can

accommodate larger page sizes. In addition, while the LaserWriter's print area is restricted to 8 inches across, the Lino can print all the way to the edge of the page.

TROUBLESHOOTING-

If, despite your careful preparations, the service bureau's output goes awry, the following tips may help you pinpoint the problem.

- If the wrong typeface appears in your Lino printout, you've run into a font ID conflict: to ensure that you don't have to pay for this type of mistake, provide the bureau with a list of all the fonts you'll be using. If a typeface appears in Courier or as a bitmap, the correct face wasn't available to the Lino. Once again, perhaps you forgot to list this font on the service bureau's job form, or maybe the bureau forgot to download the printer font. If vou're using a font/DA extender such as Suitcase, ask the service bureau operator to make sure no screen fonts are lurking in the Mac's System file (fonts installed in the System are read before those installed in a Suitcase file).
- If the leading or other spacing on your laser printer proof doesn't match that of the Lino output, you may have encountered mismatched screen fonts. Certain screen fonts issued by Apple have a different amount of built-in leading than the same fonts issued by Adobe. If you create a document with Apple's version of Palatino, for example, then print the document on a service bureau's Lino with its Adobe Palatino, spacing problems will occur. This problem is fairly rare, but you might want to bring in copies of your screen fonts to be safe.

An even more obscure (but maddening) problem occasionally crops up with Adobe's Garamond typeface. Adobe released two incompatible versions of Garamond. If a document typed in Garamond won't print at a service bureau, convert it to the bureau's Garamond screen font and try printing it again.

Remember, grays print much lighter on a Lino than on a laser printer. When you're proofing a document on your LaserWriter, keep in mind that the grays will be lighter when printed on an imagesetter, and raise

THE LINO LINE

any service bureaus use one of Linotype's Linotronic line of PostScript imagesetters. The L300, which can print at 1270 or 2540 dpi on film or on resin-coated (RC) phototypesetting paper, is the model of choice for service bureaus. The older L100 model, although discontinued by Linotype, can still be found in some bureaus; the L100 and the newer L200 have a top resolution of 1270 dpi. The L100 is adequate for printing, say, pages of text and line art, but it might not meet the needs of discerning publishers. The laser diode technology of the L100 and L200 produces larger dots than the L300's helium neon laser at an equal resolution (1270 dpi). If a service bureau you're considering uses an L100 or L200, look at some sample output; chances are it will work out fine unless you plan to print color separations on film, halftones with a screen of over 120 lines, or other output that requires highresolution precision. Linotype's L500, which prints at 1693 dpi, supports wide paper and is suitable for printing newspapers and the like.

The Lino's model number isn't the only factor you need to consider in your search for a service bureau. Which RIP (raster image processor) a bureau's Lino has may affect your decision as well. The RIP is a mechanism that converts PostScript's descriptions of lines and

curves into the map of dots that makes up a printed page. The original RIP, released in 1985, uses a 68000 processor board and has 1MB of RAM. The RIP 2, which came out in 1987, uses the faster 68020 processor, employs a newer version of PostScript, and has 6MB of RAM and an 80MB hard disk that allows it to store more downloadable fonts than the earlier version. The new RIP 3, released this year, offers further speed and storage enhancements over the RIP 2: according to a Linotype representative, the RIP 3-which uses the 68030 chip-offers a 20 percent speed improvement over the RIP 2 in text processing and a speed improvement of up to 300 percent for graphics, as well as more hard disk space for storing fonts. At the time this was written, most of the bureaus I surveyed were using the RIP 2 and had a RIP 3 on order.

Linos come with a basic set of built-in fonts from Adobe (Linotype manufactures most of Adobe's typefaces, and the two companies comarket the faces); additional fonts from Adobe or other PostScript font vendors can be downloaded to the device. Adobe/Linotype fonts can be permanently downloaded to the Lino's hard disk; fonts from other manufacturers are temporarily downloaded as needed. Most Linotronic-based service bureaus offer Adobe's entire typeface library, or at least a substantial portion of it.

the percentages if necessary.

- If you've placed graphics in TIFF or EPS format into a document created with a page-layout program, be sure to bring the original files with you to the service bureau. In many cases, the TIFF or EPS image isn't included with the page-layout document, and the original file must be accessed during printing. Believe me, it's frustrating to go into a service bureau to pick up a document, only to see a blank space or a bitmapped image where an illustration was supposed to be.
- If you print a large, complex page at 2540 dpi, you're pushing the limits of the Lino. Check your printed document carefully; occasionally a piece of type or

graphics will drop out without generating a warning.

Although service bureaus vary in their equipment, expertise, and the types of services they offer, one piece of advice holds true for all service bureau users: talk to someone at the bureau and find out what they need from you. After that, you'll have an easier time getting what you need from them.

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START WITH tilities

How to

by Robert C. Eckhardt

survive the

flood of

self-loading,

RAM-resident

utilities

Self-loading utilities make souping up the Macintosh's system software no more difficult than telling a car salesperson that you want the red car with air-conditioning. If you want the illusion of a larger screen, you need only copy the utility Stepping Out II to your System Folder. If you want a sophisticated keyboard enhancer (like QuicKeys) or an improved version of the Scrapbook (such as MultiClip), just drop in another file or two.

But the ease with which system software enhancements can be added, together with the great number of enhancements available, is a double-edged sword. Although they can improve the way the Macintosh operates, the abundance of utilities also threatens to make life with Macintosh more complex. As the number of self-loading utility programs in the System Folder increases, their behind-the-screens manipulations increase the potential for problems. Since two incompatible self-loading utilities can be as debilitating as a flat tire, Macintosh owners should understand how they work, how to manage them, and how to fix problems when they arise.

COMING TO TERMS

The term *utility* describes a great variety of software. Many utility programs behave like standard applications, running only when you request them. Desk accessories are "off" until you select them from the Apple menu and thus turn them "on."

But many utilities run constantly in the background. For some time, you could only install these RAM-resident utilities in the System file manually, using an installer program. But System 3.0 introduced self-loading RAM-resident utilities called start-up documents, or more commonly, INITs (initialization resources). To use an INIT like On Cue or MultiClip, you need only copy it to the System Folder; it then runs automatically every time you switch on the Mac. Manually installed RAM-resident utilities are now quite rare, while the variety of INITs has mushroomed.

INITs are often confused with CDEVs, another type of file stored in the System Folder. A CDEV (Control Panel device) displays an icon in the Control Panel; a click on this icon causes the CDEV to display a set of software or hardware controls. The General CDEV, for example, can set the date and time stored in the Mac's parameter RAM, the speaker volume, and so on. Confusion arises because some INITs, such as Pyro and QuicKeys, are both INITs and CDEVs; they are start-up documents, but they let you control their activities through the Control Panel.

STARTING UP INITS

An INIT is defined, in layperson's terms, as a piece of code that the Macintosh loads at a certain point in the start-up process. Thus, in order to understand what makes INITs tick, we need to take a brief look at the Macintosh start-up sequence.

In the first phase, the Macintosh locates and reads the start-up disk's boot blocks (a small but critical collection of information), surveys the hardware to make sure it is operating correctly, and begins to read the System file and to load parts of it into memory. For those of us looking in from the outside, landmarks for this phase are the smiling Mac icon and the welcome message or, if you have one, the start-up screen.

Any INITs in the System Folder are read and loaded into memory during the second phase of start-up. If two or more INITs are stored in the System Folder, they are dealt with in the Mac's version of alphabetical order (in which symbols like #, \$, %, and & are listed first, then numbers,



then letters). As each INIT is loaded, any number of things may happen; but three things are of special interest.

One, the INIT will ask for some memory to call its own. Some INITs require next to nothing, while others require a significant amount. Capture and SFScroll-Init, for example, require less than 10K or 15K. Stepping Out II, on the other hand, can take anywhere from 100K to 16MB out of service, depending on what size screen you want to emulate. If the amount of memory requested is small, the standard memory allotment for system functions may be sufficient to accommodate it. If the amount of memory requested is large, or if there is not enough memory to spare, the amount of memory used by system functions will be enlarged as required.

Two, the INIT will probably alter some existing operating system code. For example, the screen saver Pyro alters a ROM routine that applications use to intercept mouse clicks and key presses; the altered routine determines how long the Macintosh has been idle and tells Pyro when it is time to darken the screen.

Three, the INIT may display an icon in the lower-left corner of the start-up screen. Not all INITs do this, and many allow you to turn their start-up icons off. Many

Finder: 6.1 System: 6.0.2		Carry, John, Steve, and Bruce OApple Computer, Inc. 1983-88
Total Memory:	5,120K	Largest Unused Block: 3,391K
Finder	256K	188
System	1,474K	

Finder: 6.1 System: 602		Carry, John, Steve, and Bruce OApple Computer, Inc. 1983-88
Total Memory:	5,120K	Largest Unused Block: 4,534K
Finder	256K	
System	330K	SHEEKS STORY OF BUSINESS

A Loss of Memory

The System thermometer in the About the Finder dialog box displays the amount of memory that is not available to your applications. Having a large number of INITs can add substantially to this amount. For example, all INITs were turned off before opening the upper dialog box; several dozen were then turned on, with the results shown in the lower dialog box.

people dislike having their start-up screens peppered with icons, but icons can be used to diagnose certain kinds of INITrelated problems.

In the last phase of start-up, other parts of the System are read and loaded into memory. (On screen, nothing much happens during this phase.) Then the Finder or MultiFinder and one or more start-up applications are launched.

UP AND RUNNING

Once the start-up process is complete, the loaded INITs are "alive," and remain so until you turn the Macintosh off (or, as with EZ-Menu, until you deactivate the utility from the Control Panel). INITs may be passive, waiting for you to press a certain key combination like QuicKeys. Or they may be active, counting the seconds since the last keystroke as Dimmer does or, like Stepping Out II, working furiously to maintain the illusion of a two-page display on a half-page screen. Either way, INITs are a part of the operating system, indistinguishable at this point from all other parts of the operating system.

Because an INIT becomes an integral part of the operating system, an INIT can replace an existing feature with something you like better, such as EZ-Menu's menus that drop down automatically or Capture's ability to take color screen shots. Or an INIT can extend basic operating system features, for instance, injecting a little humor with a funny sound (selected with SoundMaster), or add a visual, such as a school of colorful fish swimming across the desktop (using Fish, of course). Or an INIT can add completely new features, such as Vaccine's virus detector, or Multi-Disk's disk partition manager.

No FREE LUNCH

Although INITs may be convenient and versatile, they don't provide a free lunch. You pay a price when you install an INIT, and the more INITs, the higher the price, especially in memory loss. If the System Folder contains lots of INITs (or a few memory-hungry ones), you can lose half a megabyte of memory, a full megabyte, or more. To determine approxi-

mately how much memory the INITs are eating up, consult the About the Finder dialog box (see "A Loss of Memory").

Memory loss is not the only drawback associated with increasing numbers of INITs. As the number of installed INITs goes up, so does the probability of an INIT compatibility conflict or some other INIT-related problem. And it doesn't take huge numbers of INITs to generate a problem. Although the average number of INITs in the System Folders of *Macworld* editors is only 10 or 12, over three quarters of the editors have experienced difficulties.

Some of the problems INITs can cause are predictable. For instance, with Pyro you must select options to monitor the Mac's serial and printer ports thus allowing background tasks. Otherwise, this screen saver will shut everything down when it darkens the screen—terminating. for example, an unfinished print job or a background telecommunications session. Vaccine can confuse software installation programs and prevent them from copying legitimate programs onto your hard disk. Fortunately, predictable problems are easily solved: know how your INITs work, and turn problem INITs off when a conflict is imminent. Better yet, throw out the problem INIT and use a more compatible alternative, if there is one.

Other INIT problems are unpredictable and can range from causing benign trouble to being fatal. During the INITloading process, one INIT may disable another. In less amiable situations, applications may (incorrectly) claim that they are out of memory and refuse to perform memory-intensive tasks. A major INIT conflict during start-up can cause the Macintosh to crash before the start-up process is completed. Fatal incompatibilities can surface when a problem INIT is asked to do something during the course of your work; any unsaved data will be lost in the ensuing crash. Fortunately, such calamities are rare.

An Ounce of Prevention

Always test new INITs and new combinations of INITs thoroughly, using expendable data, before trusting them with valuable work. If you have installed a new

THE INIT HALL OF FAME

polled Macworld editors to determine the state of the INIT among state-of-the-art Mac owners. Although the number of INITs used by Macworld editors is large, only about 20 were used by two or more of the people surveyed. Of these, 12 were mentioned often enough to deserve a place in the INIT Hall of Fame. Many are shareware. You can download them from a bulletin board or get them from your local user group. Information about how to pay for them can usually be found in the product file.

ON CUE
(ICOM Simulations, \$59.95)
This is clearly the most popular INIT
among Macworld editors. By creating a pop-up
menu containing the names of applications and
often-opened documents, On Cue eliminates the
need to search through folders and files.



SUITCASE II (Fifth Generation Systems, \$79) MASTERJUGGLER (ALSoft, \$89.95)



Were it not for competition from MasterJuggler, Suitcase II would head this list. Both programs enable

you to add unlimited numbers of fonts and DAs to menus, as well as F-keys and funny sounds.



CAPTURE

(Mainstay Software, \$79.95)

'Capture is an elegantly designed replacement for the Mac's standard screen-shot utility. It lets you select the portion of the

screen you want to save, and saves both color and black-and-white screens in PICT format.



QUICKEYS

(CE Software, \$99.95)

With QuicKeys, you can assign almost any task to just about any key combination; people with extended keyboards can use it to give the #6 key and the function keys something to do. QuicKeys can also assign new keyboard equivalents to menu commands and automatically insert right and left quotation marks.



EZ-MENU

(part of MockPackage Plus Utilities; CE Software, \$49.95)

EZ-Menu makes menus drop down automatically whenever the pointer passes over the menu bar. Although it's confusing at first, you will find it faster and more efficient once you get used to it.



SFVOL INIT

(shareware)

FILEMAGIC

(Magnus Corporation, \$99)



These two utilities make file selection easier. SFVol INIT improves on the Drive

button by adding a pop-up menu listing all mounted disks and disk partitions in Save and Open dialog boxes. FileMagic converts the hierarchical menu in Save and Open dialog boxes into a pop-up menu containing submenus of commonly needed files and folders and a selection of file and folder management commands.



SUPERCLOCK

(freeware)

This INIT places a digital clock in the menu bar; click on it and it displays the date. You can also use SuperClock as a timer or an alarm clock, and you can select a number of special features from the Control Panel.

VACC (CE Se

VACCINE

(CE Software, freeware)

Only the foolhardy fail to use Vaccine, or its commercial (and more robust) counterpart, AntiToxin (Mainstay; \$99.95). Both help prevent virus infection.



SESCROLLINIT

(freeware)

With SFScrollinit, Open and Save dialog boxes open not to the top of the scrolling file list, but to the place in the scrolling list where you last used the dialog box. Rebound (shareware), a further refinement of this INIT, is also popular.



PYRO

(Fifth Generation Systems, \$24.95)

This utility darkens the screen after a predetermined period of inactivity, thus preventing screen burn-in. A new shareware utility, Moire, from John Lim and ThinkTech of Australia, has recently swept Macworld offices, threatening to displace the long-standing Pyro. Some prefer the slightly different approaches of two other screen savers: Flex (shareware) and Dimmer (part of Screen Gems; Microseeds Publishing, \$79).

version of the System, thoroughly test your INITs once again; System updates have been known to make previously compatible INITs incompatible. Also, avoid installing two or more INITs that perform essentially the same task, such as Berkeley System Design's Stepping Out II and Radius's monitor-display INITs. The two utilities may crash the computer as they argue over who's in control.

You must be sensitive to memory considerations as well. If you have a 1MB

machine and the System allocation listed in the About the Finder dialog box is 500K, for example, programs such as FullWrite Professional and HyperCard won't run, while other programs may have very little room to spare. So, whenever you add INITs to the System Folder, make sure there's still enough memory available for your applications. And if you no longer use an INIT, remove it from the System Folder so that it doesn't needlessly occupy precious memory.

DEALING WITH PROBLEM INITS

Even with the best preventive medicine and careful memory management, you may encounter two INITs, or an INIT and something else, that cannot coexist. In some cases, observing the problem will help locate the offending INIT. For example, if the problem only occurs when using QuicKeys, then QuicKeys may be at fault. If the computer crashes during the start-up sequence, watch the INIT icons as

	Product	Company	Price	Description
ont and DA managers	Suitcase II	Fifth Generation Systems	\$79	Increases number of fonts/DAs
on and DA managers	MasterJuggler	ALSoft	\$89.95	Increases number of fonts/DAs
NIT managers	Aardvark	Microseeds Publishing	\$39.95	Turns INITs on and off
att munugers	Aask (MockPackage Plus Utilities)	CE Software	S49.95	Turns INITs on and off
	INITPicker	Microseeds Publishing	\$49	Picks the loading order of INITs
	Inix	Natural Intelligence	\$79.95	Turns INITs on and off
Menu additions	EZ-Menu (MockPackage Plus Utilities)	CE Software	\$49.95	Makes menus drop down when cursor touches menu bar
netto duditions	HierDA	n/a	freeware	Converts Apple menu to hierarchical form
	MenuFonts 2	Beyond	\$49.95	Displays each font name in its own font
	On Cue	ICOM Simulations	\$59.95	Creates custom menus
	Powermenus	Magic Software	\$79.95	Provides pop-up list of application menus
	Staircase	n/a	freeware	Opens menus from keyboard
	SuperClock	n/a	freeware	Date/time/alarm clock in menu bar
		Advanced Interface Programming	S59	Creates tear-off menus
ile and folder managers	TOM/INIT		S99	Control of the Contro
ile and rolder managers	FileMagic	Magnus Corporation		Adds files, folders, commands to Open/Save dialog box Finds files
	Findswell	Working Software	\$59.95	
	MultiDisk	ALSoft	S69.95	Creates and manages disk partitions
	QuickFolder	n/a	shareware	Creates folders from Open/Save dialog boxes
	Rebound	n/a	shareware	Saves your place in GetFile scrolling list
	SFScrollInit	n/a	freeware	Saves your place in GetFile scrolling list
1-A 17 1-A	SFVol INIT	n/a	shareware	Creates volume menu in Open/Save dialog boxes
Macro makers	F1F4	n/a	shareware	Activates keys F1—F4
	lcon-II	Olduvai	579	Attaches keystrokes to icons
	QuicKeys	CE Software	\$99.95	Provides comprehensive macro making
	Tempo II	Affinity Microsystems	\$149.95	Provides comprehensive macro making
creen savers	Dimmer (Screen Gems)	Microseeds Publishing	S79	Dims the screen in variable levels
	Flex	n/a	shareware	Displays twisting geometrical shape
	Pyro	Fifth Generation Systems	\$24.95	Displays fireworks or clock
ystem replacements	Capture	SuperMac Technology	\$79.95	Provides background printing
	MultiClip	Olduvai	599	Clipboard and Scrapbook replacement
	SPAMM	Mainstay Software	\$79	Replaces Mac screen-shot utility
	SuperLaserSpool	Bravo Technologies	\$149.95	Speeds up arithmetic operations
Vriting aids	BigThesaurus	Deneba Software	\$99.95	Provides thesaurus at the press of a key
	Thunder II	Electronic Arts	\$79.95	Checks spelling interactively
Vark protectors	AntiToxin	Mainstay	\$99.95	Protects against virus infection
	AutoSave II	Magic Software	\$49.95	Automatically saves your work
	Guardian (SUM)	Symantec	\$99.95	Tracks file data for easy disk recovery
	SAM	Symantec	\$99.95	Protects against virus infection
	Vaccine	CE Software	freeware	Protects against virus infection
	VirexGuard (Virex)	HJC Software	\$99.95	Protects against virus infection
creen managers	Front & Center	n/a	shareware	Centers dialog boxes under cursor
	Stepping Out II	Berkeley System Design	S95	Makes small screen act larger
	Windows	n/a	freeware	Adds window menu to menu bar
	WindowMagic (FileMagic)	Magnus Corporation	\$99	Adds window management into Apple menu
un stuff	ColorDesk (Screen Gems)	Microseeds Publishing	S79	Selects custom desktop background
	Cursor INIT	n/a	shareware	Colors cursor with Apple's stripes
	Earth	n/a	shareware	Replaces Apple with spinning globe
	Fish	Bogus Software	freeware	Makes colorful fish swim on desktop
	SoundMaster	n/a	shareware	Selects custom system beeps

they appear on the screen. Assuming all your INITs display an icon, the INIT that caused the crash will be either the one that displayed an icon immediately prior to the crash, or, more likely, the next INIT in the launch sequence.

If the problem does not point to a specific INIT, you'll have to use trial and error to locate the troublemaker. First, turn off all the INITs to make sure that the problem is indeed INIT-induced. (One way to turn an INIT off is to put it in a folder other than the System Folder and restart the Mac. Another, easier, way to turn INITs off and on is to use an INIT manager like INITPicker or Aask.) If the problem persists, the perpetrator is probably not an INIT. If the problem disappears, then INITs are probably at least part of the problem, and there are several things you can try to resolve it.

First, turn the INITs off one by one, and try to duplicate the problem after each INIT is turned off, until the problem goes away. The INIT that was turned off immediately before the problem cleared up is probably the guilty party or one of the guilty parties. This may be an easy way to solve the problem, but it may be just a kludge. Some problems can be cleared up by turning off any INIT (or any five or six INITs). These INITs may not be the actual source of the problem—an example of the vagaries involved in dealing with numerous INITs.

Once you've isolated the INIT (or INITs) causing the problem, there are several ways you can effect a cure. Try changing the loading order of the INITs, either by renaming them so their alphabetical order matches a new, experimental loading order, or by using INITPicker to change the loading order without renaming. Change the order randomly, or rotate the list so that the INIT that had been launching last becomes the one launched first. Try a number of different combinations, testing each one to see if it solves the problem. If reordering loading doesn't work, and if the problem is System-related (if it occurs in a Save or Open dialog box, for example), replace your System file with a new one. If replacing the System file doesn't help either, you may be the victim of an esoteric problem

HIGH TECHNICALITIES

wo nonspecific, INIT-related problems are difficult to diagnose and require special tools to resolve. Both problems have similar symptoms: applications complaining of not enough memory, oddball crashes, generally weird and inexplicable behavior. If your Mac's problems fit this description, and all other attempts at a cure have failed, try the following suggestions.

One possible reason for your difficulties is that the System heap (the part of RAM devoted to System file resources, INIT code, and the like) does not contain enough free memory. The System thermometer in the About the Finder dialog box is not a reliable indicator of the amount of free memory for INITs in the System heap, so don't bother looking there. Instead, use Widgets (part of MockPackage Plus) to increase the size of the System heap.

If you have lots of memory to spare, increase the System heap by 250K. If your Mac only has 1MB or 2.5MB, try adding 64K or 125K. If this doesn't resolve the problem, reset the System heap size to what it was originally, and look elsewhere for a cure. If it does solve the problem, slowly reduce the heap size, in 16K increments, until the problem reappears. Then increase it again by 16K in 1MB or 2.5MB Macs or

by 64K in Macs with 4MB or more.

Keep in mind, however, that increasing the size of the System heap may result in other problems, especially in 1MB or 2MB Macs. Some applications may not run at all if the System heap is too large, some may no longer be able to open large documents, and the number of applications you can run under MultiFinder may be reduced. If the cure is as bad as the disease, it may make more sense to reduce the number of installed INITs rather than increase the size of the System heap.

The other possible, though less likely, cause of your problems may be that there are too many open files. Some invisible files are open all the time. For each mounted disk or disk partition, the System software keeps several invisible files open. If you use Suitcase II or MasterJuggler, they may keep 12 or more suitcase files open. Other INITs, open DAs, and open applications may keep a hidden file or two open as well. All those open files, including invisible ones, add up and may come close to the System's limit.

If you use Suitcase II, you can raise the limit on open files and see if that alleviates your problems. If too many open files is the cause of your distress, this adjustment should fix the problem immediately.

requiring special attention and special repair tools (see "High Technicalities").

If nothing works, you are left with two less-than-ideal alternatives. One is to call the manufacturer of the errant INIT to see if an updated version exists that solves the problem. If it does, great; if not, and the problem is not otherwise solvable, your call may inspire the manufacturer to create an updated version. The other alternative is to remove the offending INIT from your System Folder for good. It's not a perfect solution, but it solves the problem.

WHAT'S INIT FOR YOU?

Nowadays, INITs are a fact of Macintosh life. Many hardware manufacturers supply INITs with their products. INITs protect against viral infection, improve file management, dim the display, add new menus to the menu bar, convert complex tasks into a single key command—you name it. True, INITs are not without their faults, and they can make life with Macintosh a little more complex. But without INITs, we'd all be driving a basic black Ford. With them, we can each drive a red roadster convertible with a custom interior—just watch out for those speeding tickets.

See Where to Buy for contact information.

Robert C. Eckhardt is the author of The Fully Powered Mac (Brady Books) and is a Macworld contributing editor.



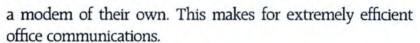


Aside from being a tad easier to install than a satellite, the Hayes Smartmodem 2400M™ for the Macintosh® II and Smartcom II[®] for the Apple[®] Macintosh make up the most advanced communications system you can put inside a Mac."

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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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 identifi-

able 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.

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REVIEWS

7

SUPERCARD 1.0

Hypermedia Development Environment

Pros: Full color support; object-oriented drawing tools; multiple, resizable windows; customizable menus; innovative resource handling; and the ability to create royalty-free, stand-alone applications.

Cons: Slow; steep learning curve; mediocre documentation. Company: Silicon Beach Software. Requires: Mac Plus; 2MB for color; System 6.0. List price: \$199.

It takes a lot of nerve to challenge a program like Hyper-Card. To compete successfully with a product that is free, distributed by Apple, and well established, Silicon Beach Software needed to create an application that would effectively extend the boundaries of the hypermedia development environment. SuperCard does just that. Adding full color support; object-oriented drawing tools; multiple, resizable windows; customizable menus; innovative resource handling; and the ability to create royaltyfree, stand-alone applications, SuperCard will win over a fair number of HyperCard fans. I am still waiting for the ideal development tool, but in the meantime, SuperCard fills in many of the blanks.

Among its strengths, SuperCard counts full gray-scale and 8-bit color support. Each card and background can have its own palette of up to 256 colors or shades, which are stored as color-look-up-table (CLUT) resources. When you import an image from another color application, SuperCard lets you choose whether or not you want to add the new CLUT resource.

A problem sometimes occurs, however, when you move between cards with different palettes. There is often a delay and colors may appear randomly as one CLUT replaces another. The Select Colors command attempts to alleviate this problem by letting you choose from among five color-matching levels. The highest, Perfect, completely replaces one palette with the next. The lowest of the five levels, None, eliminates the flash between cards by forcing the program to draw the new image with any matching colors from the old CLUT—a good solution for cards with similar palettes.

SuperCard incorporates a number of new animation techniques. Using the Cycle command, you can specify the number of times and the rate of speed at which a card rotates through all or some of the colors in its current CLUT. The Move command lets you guide an object (a button, field, or graphic) from one pixel location to another; from one relative pixel location to

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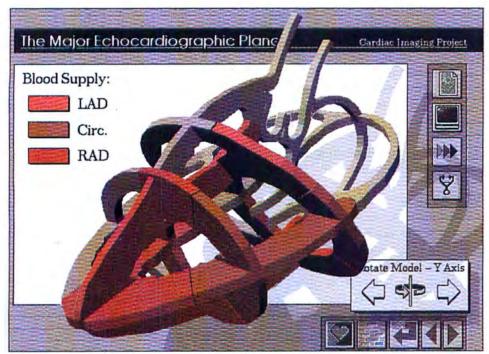
What's Up, Doc?

Peter Samuel Marx and William V. Glenn, M.D., of the Harbor/UCLA Medical Center in Los Angeles import radiology images—CAT scan, MRI (magnetic resonance), X ray, cryosections, and ultrasound scan—into SuperCard from Grease Pencil, a medicalimaging—workstation program they wrote. They have found that disseminating information in this format is much less expensive than more traditional methods. another; or, most usefully, along the points of a previously defined polygon. You can record, store, and play animations in PICS format (or import PICS files from programs such as Super 3D or MacroMind Director) or record animations in an accelerated animation format called STEP. You may run into memory problems, however, with the byte-hungry STEP files.

Like HyperCard, SuperCard lets you create, edit, and store bitmapped images using the standard 72 dots per inch, but you can also include object-oriented images that are stored as mathematical equations. Object-oriented drawings take up less disk space, they are easy to edit, and they can be printed using the resolution of your output device (300 dpi on most laser printers). SuperCard even includes an AutoTrace tool that lets you turn bitmapped graphics into object-oriented images. Used with the # key, AutoTrace is particularly useful; simply click within a shape to trace it from the inside.

My favorite SuperCard trick is the ability to write a script for *any* object, even a graphic or a field. In HyperCard, it is tedious and troublesome to define an irregular object (such as a circumscribed area on a map) as a button. With SuperCard, it is easy to attach a script to any object or shape.

Having color, draw, and new animation abilities should certainly please Hyper-Card veterans, but the program structure and vocabulary will take a bit of getting used to. In SuperCard parlance, a Window has one or more cards and is roughly equivalent to a stack in HyperCard. More than one Window can be displayed at one time, and several Windows may be included in one document or application, called a Project. This is a real boon to hypermedia developers previously restricted to HyperCard's single-window



SuperHeart
C. Carl Jaffe, M.D., and Patrick J. Lynch, M.S., of the Yale University School of Medicine used SuperCard in conjunction with Super3D to develop an interactive teaching aid for courses in introductory echocardiography.

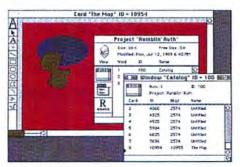
display with its 512-by-342-pixel size.

To create a project you alternate between two programs, SuperCard and SuperEdit. The SuperEdit environment is optimized for creating and editing Projects; SuperCard, while it does allow some access to graphic and object tools, is primarily designed for running Projects. You can bounce back and forth between the two applications fairly easily, but there are drawbacks. Speed, for one. Security, for another. While SuperCard automatically saves changes, SuperEdit does not. In SuperEdit, you must continually repeat the mantra, "Save, save, save."

You can install a Runtime Editor into SuperCard that allows access to many of SuperEdit's operations, but this is not a viable solution for the serious SuperTalk programmer. Among other shortcomings, the Runtime Editor is much slower than SuperEdit; you can't add Windows, resources, or backgrounds; and you can't use keyboard shortcuts.

In SuperEdit, you have access to scrollable windows called Overviews that list the Windows, cards, menus, menu items, and resources in the current Project. While they are a bit awkward at first, these Overview lists prove to be one of Super-Card's better additions. You can view, shuffle, and cut and paste Project elements (even resources such as cursors, sounds, XCMDs, and XFCNs), a task that tries the patience of HyperCard authors.

Copying and pasting between scripts is just as simple. There are Script Editors for each SuperCard object and you can have as many open as your Mac's memory allows. At the top of each Script Editor are five pop-up menus containing all the SuperTalk terms that you can use in writ-



Overview Ease
SuperEdit displays various Project elements in
hierarchical Overview windows. In this example, the
Project Overview for "Ramblin' Ruth" lists the Windows, Menus and Menu Items, and Resources.

ing scripts. The sheer length of these menus can be distracting, but once you choose a term, it is immediately inserted into the current script, along with automatic formatting. You can set script fonts and tabs, and you can use the Comment and Uncomment commands to insert or remove remarks concerning the scripts for future reference.

My chief complaint is that SuperCard doesn't really convert HyperCard stacks into its own environment as seamlessly as Silicon Beach would lead us to believe. Text doesn't always appear in target fields as it should. Dragging selected objects from one point to another doesn't always work as one would expect.

Which brings us to the documentation. While most conversion difficulties can be solved through trial-and-error changes to the script, the manual offers few clues to many of the dilemmas faced by the new SuperTalk programmer. The index is scant; a program this complicated deserves documentation at least twice as comprehensive, particularly for the user who might not be familiar with Hyper-Talk's protocols. While offering much too little information on many topics (animation techniques, for example), the documentation gets downright labyrinthine in its descriptions of ink effects such as srcXor and notSrcBic.

My wish list for the next version of SuperCard would include an augmented manual; an undo command; a show PICT command; color field text; color button icons and button names (still black-and-white); and sticky buttons (the ability to attach a button to a word in a scrollable window). I'd like it to be more compatible with already-installed INITs (opening SuperCard caused my Mac to crash until I removed a couple of offending INITs), and I can't help wishing it would run better on a 1MB system.

Still, SuperCard pushes hypermedia into the color realm, and it offers programmers many tools and options currently unavailable in HyperCard. The implementation may prove difficult for some to adopt quickly, but SuperCard goes a long way toward facilitating interactive hypermedia development.—Suzanne Stefanac See Where to Buy or circle 876 on reader service card.

MICROSOFT WORD 4.0

Word Processing Software

Pros: Easier, more powerful interface than Word 3; configurable menus and 3€-key combinations; new table feature; WYSIWYG Page View mode; background pagination; word, line, and paragraph counting; bundled MacroMaker, SuperPaint 1.1, and WordFinder thesaurus. Cons: Multiple modes and features can be confusing; no integrated macros; no search and replace for formatting; weak typographic control. Company: Microsoft Corporation. Requires: Mac Plus; 2MB or more required for Quick Switch. List price: \$395.

As you probably already know, Microsoft Word is loaded with features, it works well with the big-three desktop publishing programs, and it lets you share files with the IBM version of Word. With other word processors out there that boast bigger toolboxes, and with less daunting competitors that are less expensive and in some cases faster, you might be wondering whether or not to buy Word 4.0.

Well, you won't go wrong if you do. This latest release is more accessible and useful for both novices and pros; it's got impressive table-creation tools, additional formatting powers, a whole menu full of word processing utilities, and at least a dozen other nifty enhancements.

Even though the interface has been streamlined, casual users might still be intimidated. There are four display modes (Galley View, Page View, Print Preview, and Outline View), for instance, plus table and equation editing. It takes a while to figure out what you can and cannot do in the different modes, and how to do it.

And even with all the new features, a few obvious ones are still missing. There's still no integrated macro language (one has been available for more than a year in the IBM version), no search and replace based on formatting, and no additional typographic control—no fractional point sizes, kerning (automatic *or* manual), or adjustments for hyphenation and justification parameters. Nor will you find integrated drawing or painting tools. (The

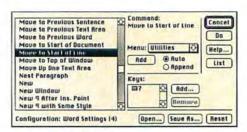
copy of SuperPaint combined with Word's Quick Switch feature lets you create and include bitmapped and object-oriented art with only a couple of extra steps.)

The program is extremely sluggish on less powerful machines (SE or below), though it performs fine on a Mac II and is much faster than the previous version for basic word processing tasks—search and replace, automatic numbering, index and table-of-contents generation.

What You See

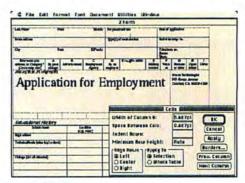
One of the most obvious changes in this version is the addition of a Page View mode—it resembles normal Galley View mode except that you see pages as they will print, including page numbers, headers, footers, and dotted lines for margins and columns. It's like Word 3's zoomed-in Print Preview mode, except you can edit all the page elements freely.

Print Preview mode is still there, but without the magnifying glass for zooming



Choose Your Weapon

You can assign your own keyboard combinations to commands in Word 4.0, move menu items from one menu to another, and save the settings in a custom configuration file.



On the Table

The new table feature in Word 4.0 lets you create complex forms, with text that wraps within tabular columns. You can specify column widths numerically, or Word will figure them for you.

in. Instead you click on the Page View button to go from Print Preview to Page View. With background pagination turned on, Word can now update page breaks on the fly, though speed suffers some and the constant screen activity is annoying.

Other interface changes include reorganized menus and dialogs, hot click areas, and the capability to reconfigure menus and #-key combinations. There's a new Utilities menu, where you'll find search and replace, a spelling checker, hyphenation, indexing, word count (characters, words, lines, and paragraphs, at last), calculating, renumbering, and sorting (but still no control over sorting parameters as in the IBM version).

The Format and Document menus are more logical and efficient, and the Paragraph formatting dialog has once again adapted the much better layout from version 1.05. You can change paragraph formatting without mousing around with the ruler. You can call up the Paragraph dialog by double-clicking on the ruler, or the Tabs dialog by double-clicking on the tab area. You can apply a style, or modify one by example, based on the formatting of the current selection, through a drop-down menu in the ruler.

Word 4.0 makes better use of the extended keyboard than any word processing program to date—including all those F-keys up top. You can assign menu commands and most dialog box commands to any keyboard combination you like (you can have multiple keyboard equivalents for an item), and you can even move menu items around between menus. You can load and save all those settings in external files, so different people using the same machine can use their own settings.

The interface for outlining has also improved. Now you can grab outline items and drag them up and down and in and out, and choose whether to display formatted text in outline mode or not.

You Got the Look

New formatting controls include a Position dialog box, which lets you specify a position for any paragraph, and improve paragraph border controls. You can set up custom borders for paragraphs with differ-(continues)



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ent line sizes for each of the four sides, and you can border multiple paragraphs with or without lines between them.

The Position dialog lets you specify a position for a paragraph—either absolute or relative to the page or column. Other text flows around positioned paragraphs, which is especially useful when you want graphics in a certain place. In Print Preview mode, you can grab positioned paragraphs and move them around; other text reflows around them. The vertical position for a paragraph can be *In line*, making it easy to hang multiline subheads in the margins without resorting to the feature everyone hates and hardly ever uses: side-by-side paragraphs.

The new table feature is an even better answer to that worst-of-all-possible features. You can now insert a table—a distinct entity that is different from normal tabular matter. Text within table columns wraps to the width of the column, a cell can contain multiple paragraphs with all the normal character and paragraph formatting, and the table cell expands downward as you type (unless you tell it not to)—eliminating all that cutting and pasting between columns and rows. The borders that work with paragraphs work just the same with table cells.

Creating a table from scratch is straightforward, and you can easily convert comma- and tab-delimited data (from databases and spreadsheets, for instance) into tables. If you currently have tables that are formatted with fancy tab stops, though, Word 4.0 can't convert them to the new type of table. Say hello to cut and paste again. And you can't convert a new table to a normally formatted table, either (not with multiple-line entries, at least), and other programs can't import the new tables. As with equations, you must either print these tables from within Word or rebuild them in another program.

At least for the time being you'll have to save all Word 4.0 documents in Word 3 format if you want to import them into page-makeup programs.

A host of other small features make Word 4.0 much more usable. Quick Switch lets you paste a graphic or spreadsheet with a warm link so you can update it quickly under MultiFinder. It also remembers where the file containing the graphic or spreadsheet is on your disk, launches the graphics or spreadsheet program, loads the file, and selects the appropriate material. And you can now use Microsoft Mail right from the File menu.

There's a smart quotes option that automatically uses open and close quotation marks rather than typewriter-style quotes, and another option gives you a slanting cursor when you're working with italic text. All the fonts in the System Folder appear on the font menu without your adding them; you can choose from six colors (plus black and white) for text: there are menu items for inserting page breaks, index codes, and table-of-contents codes; and you can display graphics as gray boxes for faster screen painting. Word takes advantage of all available memory, and it remembers the size and position of the window for every document, so they open up the way they were the last time you worked with them.

Compared to programs like FullWrite and Nisus, which include complete drawing tools, thesauruses, and macros, Word 4.0 may seem to pale. It comes with three free add-ons, though (MacroMaker, SuperPaint, and WordFinder), that go a long way toward filling the gaps. While MacroMaker is a second-rate macro utility, SuperPaint is a top-notch paint-anddraw program, even in version 1.1, which comes with Word. Upgrading to SuperPaint 2.0 costs only \$50. WordFinder, a thesaurus in a DA, is all you could ask for, though it's annoying that it only works with Word unless you resort to some undocumented ResEdit tricks.

Word is at its best within a suite of programs for different purposes—graphics, number-crunching, desktop publishing, and various utilities. If you have to buy just one program and want the whole ball of wax, you might look into the more feature-laden competitors. Or if your word processing needs are more modest, check out simpler programs like Microsoft Write or Works, MacWrite II, or WriteNow. But remember that Word still qualifies as the most useful general-purpose word processor within the Macintosh environment.

—Steve Roth

See Where to Buy for contact information.



MACLITE

Portable Computer with Mac File-Transfer

Pros: Light, easy to use, portable; easy file transfer to and from the Mac; HyperCard information can be downloaded to Z88. Cons: Keys, autorepeat settings too sensitive; no way to anchor serial cable to Z88; small characters on display. Company: Cambridge North America. List price: \$899.



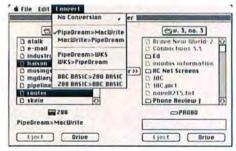
Although certainly not the longawaited Mac portable, MacLite is a reasonable solution for tak-

ing some sort of portable on the road and still being able to transfer files from it to the Mac. This Sinclair Z88 battery-powered computer comes with 32K of RAM and an 8-line display. You also get an additional 128K RAM, a serial cable, file-transfer software, and a vinyl carrying case. For the price, it's hard to beat.

Look-and-Feel

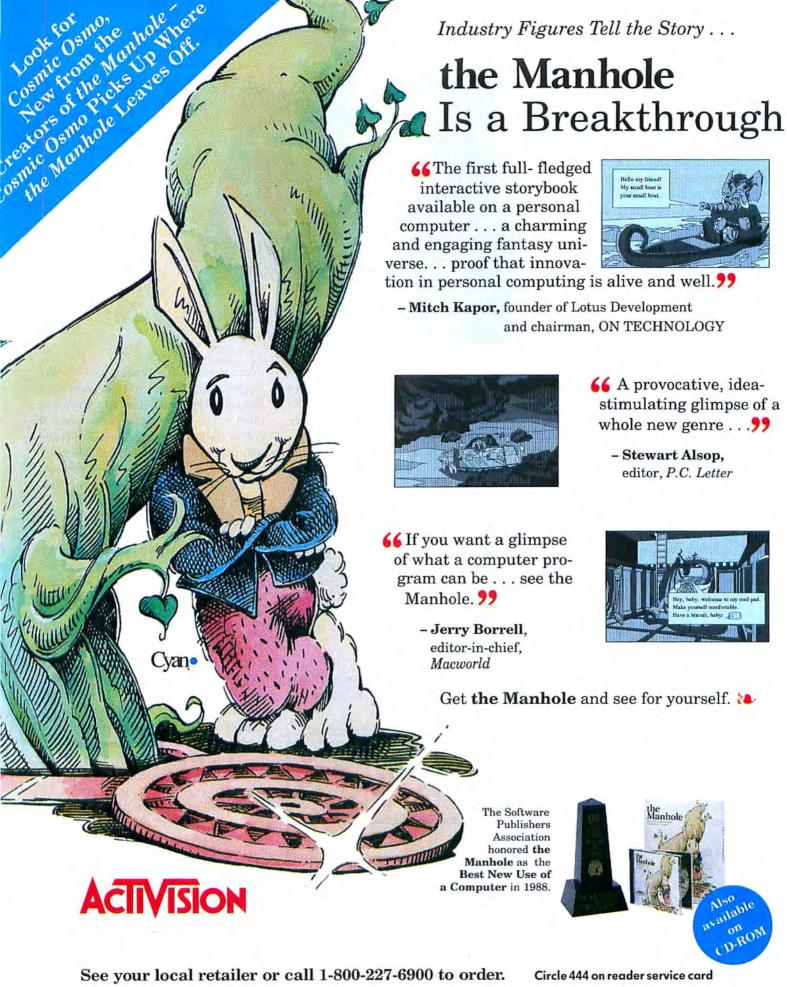
But don't go reaching for your mouse just yet. The MacLite—with its small, 8-line character-oriented display—is most definitely not a Mac-like portable. And its OZ operating system, although easier to use than MS-DOS, doesn't have the intuitive display of the Mac's Finder.

The MacLite keyboard has three keys that simplify the use of its operating system: Index, Menu, and Help. The Index key calls up a display that shows the applications available and which applica-(continues)



Making the Trade

Once you've selected the form of the file conversion from the pull-down menu, you simply select the appropriate files on the MacLite for transfer (Shift-click to select more than one file) and click on the Transfer button.



tions and files are currently active. You use the Menu key to scroll through the menu of command categories, such as File and Edit, which appears on the left-hand side of an application's display.

The Help key calls up a context-sensitive help screen. Unfortunately, OZ's help files offer uneven quality; the file for Pipedream, the combined word processor/spreadsheet, includes the most information, and there's little, if any, information for the 12 other applications that come with MacLite. A small metal plate positioned just below the MacLite display shows frequently used word processing commands.

Even though the keyboard is a comfortable size, it takes getting used to. Its rubberized coating is fine for protection, but has an odd feel and tends to attract dirt and dust. And although the coating helps quiet the keys, it also curtails much in the way of positive feedback. In fact, turning off the keyboard's autorepeat feature is the only way to prevent unwanted repetitions of a character for each keystroke.

If you plan to use Pipedream for setting up tables or any formatted documents, you may like the option of turning on a tiny page display, which appears to the right of your document, uses one pixel for each character you type, and shows each page's format at a glance. It's a nice feature, but full pages tend to slow down the display.

The Z88 automatically turns itself off after a user-selected time period and remembers what program and file you were using; that way, when you turn the Z88 on again, you come right back to where you were originally. Be sure to carry around some extra batteries, because you'll find that the batteries never seem to last as long as you would like. An AC adapter is available, at an extra cost, and is helpful when you're near an electrical socket.

The Mac in MacLite

MacLite's file-transfer package consists of an EEPROM for the Z88, a serial cable, and software for the Mac. You need to pay close attention when using the serial cable, however, since the Z88 case has no holes for the two screws that attach the DIN9



MacLite, the batterypowered Sinclair Z88 from Cambridge North America, weighs less than 2 pounds.

connector to the Z88. You can only push the connector into the socket and hope for the best. As long as I kept the Z88 and the cable stationary during file transfers, everything worked fine.

Once you start the transfer program (called Link) in the Z88 program cartridge, all file transfers are handled from the Mac. The Mac program, called Z88-to-Mac, resembles Apple's Font/DA Mover or the Apple File Exchange (see "Making the Trade"). Although you can convert Pipedream word processing files into textonly or MacWrite-format files, you can only convert Pipedream spreadsheet files into Lotus's WKS format.

Portable HyperCard

The MacLite also comes with a HyperCard stack called HC Organiser for managing an address and phone book, notes, ap-



Using HyperCard

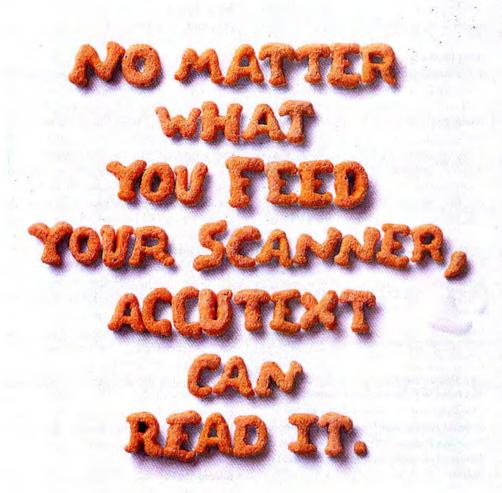
This screen shot illustrates a phone call card in the HC Organiser stack. Recall reminders can be set for transferring to the MacLite or can be updated with information from the MacLite. pointments, and reminders (see "Using HyperCard"). With it, you can keep all of this data organized in files and download them to the Z88 for use on the road. If you're already using a HyperCard-based information manager like the Datebook stack or Focal Point, HC Organiser can act as a go-between for information in those stacks and the Z88.

Unfortunately, the MacLite's usefulness is offset by a somewhat slow-to-respond support department at Cambridge North America. I had a problem with my MacLite (certain keys stopped working), so I called the toll-free numbers on the warranty cards. One was disconnected, the other reached someone in Cambridge, Massachusetts, who gave me the address of the company's Portland, Maine, facility, to which I was instructed to return my unit for repair. A month later I still had not received my repaired MacLite, but I eventually hooked up with someone in Portland who was able to track it down.

The small and lightweight (less than 2 pounds) MacLite is definitely a very portable and reasonably priced machine. It works well exchanging files with the Mac and is an adequate word processor and small spreadsheet-like calculator. It's also quiet enough for taking notes in a conference. I like it, and I'll continue to use it as a portable word processor and note-taker. But if you're looking for something with a mouse and a Mac interface, you'll have to look elsewhere.—Dave Kosiur

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DOCUCOMP 1.0

Document-Comparison Utility

Pros: Offers painless procedure for comparing revisions of word processing and text-only files; reports to screen, printer, or file; free upgrades will support additional file formats. Cons: Doesn't track font, style, or size changes or preserve them on screen or in the saved comparison document; supports a limited number of document formats. Company: Advanced Software.

Requires: Mac 512KE; hard disk recommended.

List price: \$159.95.

ally or simply make frequent use of a word processing or text-editing program, eyeballing sheaves of paper to identify the differences between document versions can be a real nightmare—particularly if you're in a rush but still need to be accurate. With the release of DocuComp, a document-com-

parison utility, the right tool for the job is

Whether you write profession-

Automatic Comparisons

at hand.

DocuComp reads files in their native format and allows you to compare any two documents, showing every text insertion, deletion, replacement, or movement. Version 1.0 works with Microsoft Word 3 and 4, WordPerfect 1, Nisus, and ASCII text files. Different file types can be compared to each other (text-only versus Word, for example) as long as both formats are supported. Later releases will handle additional formats-including MacWrite, WriteNow, and FullWrite-and will be available as free upgrades. Right now, copies of Microsoft Word 4.0 include a coupon entitling the bearer to a Wordspecific version of DocuComp for \$10.

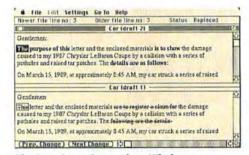
The program identifies changes in both wording and punctuation. When comparing files, however, DocuComp ignores differences in font, style, and size; graphics; page formatting; and blank spaces and lines. It can compare computer program listings and database files, treating each line as a separate paragraph. A Display Settings dialog box lets you pick the combination of font styles (bold, italic,

strikeout, and so on) that will represent the different types of changes after the comparison has been made.

Since double-clicking on a document icon from the Finder would naturally bring you into the program that was used to create the document, Advanced Software includes a tiny utility called Docu-Comp Launcher that starts DocuComp for you. Since it's small (approximately 2K), you are encouraged to place it in every word processing folder from which you might like to start DocuComp.

Using DocuComp

To compare documents, all you have to do is select the new and old versions, and click on the Compare button. Since few word processing programs automatically make backup files, you must get in the habit of saving multiple versions if you want to use DocuComp. When the program finishes processing the two files, it displays the result on a split screen (see "The DocuComp Comparison Window").



The DocuComp Comparison Window

DocuComp uses a split screen to display the two
document versions simultaneously. Cursor movement
in one pane is automatically matched in the other.
Buttons let you quickly jump from one difference to
the next.



Summary of Differences
Selecting Document Info from the File menu brings up
this dialog box, which summarizes differences
between the documents.

The upper pane contains the newer document, and the lower pane displays the older document. You can activate either window by clicking in it. Although you'll mostly go through the files by moving from change to change using the Previous Change and Next Change buttons, you can also use the scroll bars and a variety of keyboard commands to move through the documents.

Report Options

Although examining the differences on screen is useful, for many users Docu-Comp's greatest utility will be its report-creation capabilities. If you need a quick summary of the differences between two drafts—including, for example, the file names, dates, sizes, and number of changes—a simple menu command can pop it up (see "Summary of Differences").

If you want a permanent record, you can create a composite document that's a combination of both files. This can be printed from DocuComp or saved to disk for viewing or printing in a word processor. In addition to the text that was unchanged in the two versions, all insertions. deletions, and moved text blocks will be shown. Lines that contain changes can be marked by revision bars that appear to the left of each affected line. You can also specify the format for line and page numbering, line spacing, and the way that deletions are shown. An elaborate comparison summary is also available that provides the details of every change (page, line number, type of change, and a few words that identify the phrases involved).

A Good Start

DocuComp's only limitations are the small number of file formats supported in version 1.0 and the program's inability to consider text-formatting changes as differences. In any event, considering what the program can do now, most users won't find these to be significant drawbacks.

For professionals who work with words, the usefulness of a tool like DocuComp is obvious. If you must track multiple versions of a document and must be able to see the differences, you need DocuComp.—Steven Schwartz

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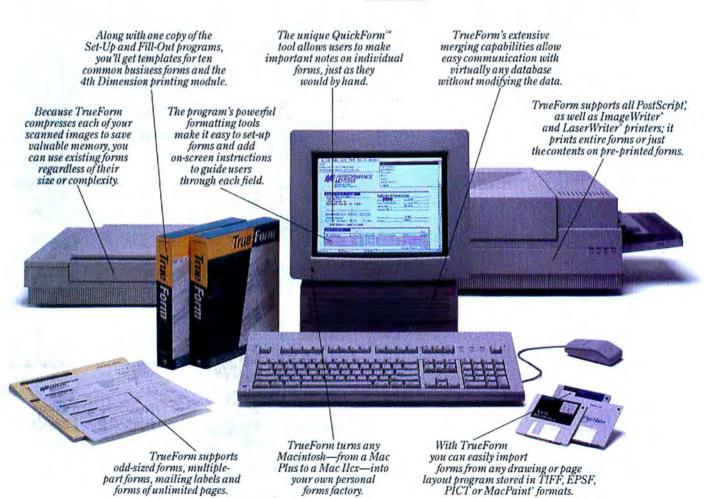
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VIRTUAL 1.05

Virtual-Memory System for Macintosh

Pros: Less expensive than real memory; easy to install. Cons: Slower than RAM; uses 8MB of hard disk space. Company: Connectix Corporation. Requires: Mac with 68020 microprocessor and PMMU, or Mac with 68030; hard disk. 2MB RAM recommended. List price: with 68851 PMMU chip \$695; \$295.

Given today's crop of memory-hungry applications, it's no wonder that the Macintosh has outgrown its 1MB standard RAM allocation. Even with a second megabyte, running more than two programs under Multi-Finder is usually impossible. One answer is to buy more memory, a costly proposition even with today's falling prices. A cheaper solution, known as *virtual memory*, is slated to appear with System 7.0 sometime next year. Until then, there's Connectix Corporation's virtual memory system, Virtual.

Thanks for the Memory

Virtual memory has been commonplace for years on mainframes and minicomputers. Virtual brings that capability to the Mac, fooling it into using a hard disk instead of RAM. Because mechanical drives are much slower than silicon chips, Virtual minimizes the number of disk accesses by exchanging "pages" of information between memory and disk only when it has to. To further reduce disk activity, Virtual swaps out the least recently used pages, ensuring that active portions of code or data remain in real memory.

To run on a Mac II, Virtual requires a specialized chip called a Paged Memory Management Unit, or PMMU (the Macintosh IIx, IIcx, and 030 SE already have one built in). Connectix recommends that you have the chip (around \$400) installed by a certified technician. If the warnings about bent pins and cracked system boards don't intimidate you, you can do it yourself—the procedure takes only a few minutes and is well illustrated in the manual.

Part two of the installation process is much easier: just drop the 10K Virtual INIT file into the System Folder and restart the Mac. If all's well, the computer will take a bit longer than usual to reboot, and the Virtual start-up icon will pop up at the bottom of the screen.

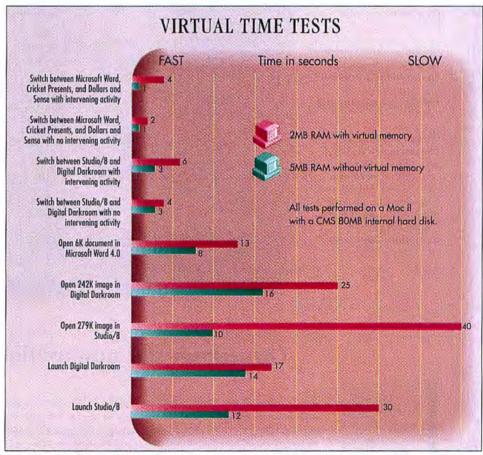
The first time it loads, Virtual grabs an 8MB chunk of contiguous disk space. (If Virtual can't find an unbroken block, you will have to defragment the disk using a utility like ALSoft's DiskExpress.) Because of a limitation imposed by the Mac's current operating system, Virtual can't be configured for more than 8MB.

Faster than a Speeding Hard Disk

How well Virtual works depends on the speed of your hard disk, the amount of RAM you have, and the applications you use. As you'd expect, the faster the hard disk and the more real memory, the better the performance. Connectix suggests that

you start with at least 2MB of RAM. For my tests, I used a 2MB Mac II equipped with a CMS 80MB internal hard disk (see "Virtual Time Tests"). With Virtual enabled, I was able to run two heavy-duty graphics programs that need more than 2MB (Digital Darkroom and Studio/8) under Multi-Finder. Next, I installed 5MB of RAM and ran the same applications without Virtual. Finally, I repeated the tests with three less-demanding applications (Microsoft Word 4.0, Dollars and Sense 4.1c, and Cricket Presents 2.0).

The results with less-demanding software, like word processors, were more impressive, with a lag of under a second between programs. Rarely, Virtual went into a thrashing fit where it accessed the disk continuously for over a minute (the record was almost four minutes). According to the manual, there's no predicting what will set off one of those episodes. (continues)



Launching applications and opening documents on a 2MB Mac II using Virtual suffered in comparison with the same activities on a 5MB Mac II without Virtual. Application-switching times for the two machines were almost identical, however.

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Thankfully, it only occurred three or four times during three months of testing.

Virtual might degrade the performance of some software, especially sound and animation programs. And there's no assurance that your unique combination of applications, desk accessories, and INITs will run at all. (If you suspect that Virtual is at fault, you can temporarily disable it by holding down the esc key, or an equivalent key combo, at start-up.) Virtual might also be incompatible with some NuBus cards that access memory directly. If possible, I suggest that you try your setup before buying, or ask your dealer for a 30day money-back guarantee.

Virtual is a bargain if your Mac already has a PMMU installed, or if you have one of the newer 68030 machines. For \$295, you can upgrade to 8MB for about \$40 per megabyte, a price that won't be matched soon. If you have an 020 Mac with 1MB, you'll have to add the cost of a second megabyte (currently well under \$100 for a 256K chip) to Virtual's \$695 price tag. But buying Virtual also nets you a PMMU, which you'll need to run Apple's virtual memory operating system when it appears. Virtual isn't perfect, but it certainly works well enough to be a viable solution until Apple comes through.

-Franklin Tessler

See Where to Buy or circle 893 on reader service card.



SUPER 3D 2.0

Three-Dimensional Modeling Program

Pros: Intuitive interface: effective animation options. Cons: Slow redrawing without a moth coprocessor. Company: Silicon Beach Software, Requires: Mac Plus; hard disk highly recommended. List price: \$495.



Super 3D 2.0 is a major, featureladen upgrade to Silicon Beach Software's three-dimensional modeling program. Like its predecessor,

Version 2.0 has a superb user interface: shapes are created in a familiar two-dimensional drawing environment, then are revolved, extruded, or swept (which combines revolving, extruding,



Three-Dimensional Space Super 3D version 2.0 adds color to its hierarchical, three-dimensional models.

and repositioning) into three dimensions.

The new version retains intuitive spin wheels for rotating models and changing viewing angles. The program still allows you to choose the position and intensity of up to four light sources and render as models wire frames or solids. The three algorithms for rendering solids offer varying trade-offs between speed and accuracy. You can still view your model with a "camera" that you locate anywhere in space and zoom, pan, or dolly for different views.

Super 3D still supports creation of hierarchical models from collections of stock or custom 3-D objects.

So What's New?

The most notable change offered by version 2.0 is support for color and gray scales when running on Macs with color support. Any element can be assigned one of 16,000 colors or 64 shades of gray. As the object moves through light and shadow, Super 3D will shade it using available shades or, if necessary, dithering.

My biggest complaint about version 1.0 was lack of speed. Silicon Beach incorporated its own math routines into version 1.0 to improve performance, but that meant that the program was unable to take advantage of the math coprocessor in Mac IIs and SE/30s. Version 2.0 fully supports the coprocessor, and the performance improvement is noteworthy. Complex models still take a while to redraw, but working with average models in wire-frame mode is quick enough. Silicon Beach also includes a special version of the program, Super 3D 2.0 bw, for Macs without color or math coprocessors.

Another gripe I had with Super 3D was the lack of any kind of scaling or dimensioning. Version 2.0, however, adds a scaling feature designed to silence critics like me once and for all: one inch, centimeter, or pixel on the screen can be scaled to represent any number of inches, feet, yards, miles, nautical miles, millimeters, centimeters, meters, kilometers, angstroms, light years, parsecs, or pixels. Of course it's all relative, so the actual units you choose don't affect the drawing, but it is somehow comforting to know they're there.

You're the Director

One of the program's most entertaining features is its ability to create animations. Super 3D will record a series of frames, each showing objects rotated or moved slightly from the previous screen, and then play them back at high speed to show a movie of your model in motion. As with version 1.0, you can create an animation by painstakingly hand-positioning each object in each frame; by allowing the program to automatically perform simple, repetitive transformations on objects; or by importing animation data generated by another program. Version 2.0, however, adds a powerful animation feature called tweening, which really makes creating animations a snap.

To use tweening, you record a sequence of key frames. Super 3D then automatically creates a number of frames between each of these key frames, positioning each object at the appropriate intermediate location and rotation to simulate movement. Tweening can't think for you-it will only move objects in a straight line at a constant velocity-but it eliminates most of the drudgery in creating long, complex animations.

Another feature of Super 3D 2.0 that makes creating animations easy is its ability to attach the camera view to an object. The manual gives an example in which the camera is attached to a camera-shaped object. By opening two views of the model, one looking through the camera and another looking down on the entire scene from above, you can act as the director of your movie, positioning the (continues)

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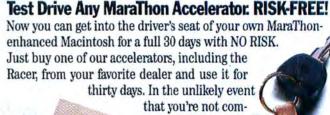
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camera and other objects from your bird's-eye vantage point, then recording the key frames as the camera sees them. Imagine an animation sequence where the camera walks through your model, exploring it inside and out.

Nice Little Touches

A number of elegant improvements have been made to the user interface. For example, when you rotate a model using the spin wheels, the program superimposes a set of three-dimensional axis lines over the model to give a good visual indication of the amount of rotation you're applying. Silicon Beach has also included a HyperCard stack that provides a brief overview of some of Super 3D's features. Super 3D now imports and exports in a variety of formats, including the emerging PICS standard format for animations. Recorded animations can be played by the Projector program, which is being distributed without licensing fees.

The already excellent manual has been expanded and improved. That's important; unlike 2-D drawing programs, 3-D programs require a level of spatial awareness that you can't readily pick up just by playing with objects on the screen. The manual does a great job of guiding the user through that discovery process. Unfortunately, though, Super 3D has no online help.

Super 3D is still not perfect. I found the Undo command to be unpredictable. Simple mistakes like rotating the camera away from the model or accidentally painting the background all black wouldn't undo; the last drawing operation, often not visible, was undone instead. Redrawing was still slower than I'd like, even on a Mac II. And some of the checkboxes and radio buttons still require you to click directly on the button, instead of anywhere on the title as most Mac programs allow.

Except for the slow redraw, which can't be increased much without improvements in the hardware, these complaints are mere quibbles. Super 3D 2.0 is a significant and worthwhile enhancement of an already excellent 3-D modeling environment.—Ron Risley

See Where to Buy or circle 877 on reader service card.

MACFONTWARE

Bitmapped Fonts

Pros: High-quality fonts; can be shared among QuickDraw and PostScript printers. Cons: Some PostScript faces are a bit dark and dense at 300 dpi. Company: Bitstream. Requires: Mac Plus; hard disk. List price: \$169 per family.



Outlines are outlines and bitmaps are bitmaps, and ne'er the twain shall meet—that is, unless you're

talking about Bitstream's unique approach to Macintosh typography. MacFontware combines PostScript outline fonts—like those printed by the LaserWriter IINT—and high-quality bitmapped fonts—like those printed by the LaserWriter IISC and other QuickDraw printers—in the same package.

With MacFontware, you can print a document on a QuickDraw printer and rest assured that characteristics such as character spacing, word spacing, and line width will be the same when the document is printed on a PostScript device. You might have a PostScript printer at the office, for example, and want to print proofs of a presentation on an ImageWriter while working at home. Or perhaps you need to send a report by modem to a branch office that has a different type of printer. Or maybe you plan to start out with a QuickDraw printer like the Laser-Writer IISC and later upgrade it to use PostScript; with MacFontware you won't have to buy a new set of fonts. Mac-Fontware not only bridges the printer gap, but the computer gap as well-Mac documents match IBM PC documents that are printed with Bitstream's Fontware.

One Face, Two Formats

The PostScript faces work like those you purchase from Adobe or other typeface companies: you install a set of screen fonts with Apple's Font/DA Mover, drag the appropriate printer font icons into the System Folder, and you're ready to print. If you want, you can use the LaserWriter Font Utility included in each package to manually download fonts to a laser print-

er, a printer's hard disk, or a Linotronic imagesetter's hard disk. A set of printer fonts for PostScript clones is also provided, as well as font metrics files for those typesetting applications that need them.

Installing the QuickDraw fonts (also known as screen fonts) is easy; simply place them in the System file with the Font/DA Mover or use a font/DA extender like Suitcase II or MasterJuggler. Although the installation procedure itself is easy, figuring out which sizes to install may intimidate you at first. A typical MacFontware package contains the following screenfont point sizes: 9, 10, 12, 14, 18, 24, 25, 27, 30, 35, 36, 40, 42, 45, 48, 54, 56, 60, 72, and 96. You won't need them all; which sizes you install depends on which QuickDraw printer you have. QuickDraw printers output bitmapped fonts like the ones displayed on the screen, but improve their appearance by scaling a larger version of a font to produce a given point size. Different printers have different screen-toprinter font-scaling ratios. The ImageWriter, for example, has a 1:2 scaling ratio-for best results it needs a screen font twice the size you want to print; if you're printing (continues)

Charter

A fine type possesses a simple grandeur

Baskerville

A fine type possesses a simple grandeur

Futura Medium

A fine type possesses a simple grandeur

ITC Garamond Book

A fine type possesses a simple grandeur

Brush Script

A fine type possesses a simple grandeur

Hoho

A fine type possesses a simple grandeur

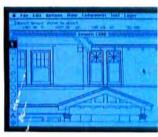
Faces with Character

Bitstream's first Mac typefaces range from lighthearted display faces, such as Brush Script and Hobo, to utilitarian old-timers like Baskerville and Garamond.



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Circle 157 on reader service of



Charter

"A fine type possesses always a simple grandeur that makes it monumental."

- Frederic W. Goudy

ITC Garamond Book

"A fine type possesses always a simple grandeur that makes it monumental."

- Frederic W. Goudy

QuickDraw Contenders

In addition to PostScript outlines, MacFontware provides high-quality bitmapped fonts such as these printed on the LaserWriter IISC.

10-point text, it scales a 20-point font. The ImageWriter LQ has a 1:3 scaling ratio—you need a 30-point font to print 10-point text. And the LaserWriter IISC has a 1:4 ratio; it scales a 40-point font to print 10-point text. Fortunately, the MacFontware user's guide has a handy chart that shows you which sizes to install for your particular printer.

Since you don't need to install all the screen font sizes, it would be nice if Bitstream had separated the screen fonts into prefab suitcases for various printers. Doing so, however, would add more files and yet another disk to the five or six disks already supplied in each package.

Handsome Faces

Bitstream's initial offering includes a good mix of display and text faces. Two Headlines packages contain four display faces each. The Headlines 1 package features Cooper Black, University Roman, Broadway, and Cloister Black, a black-letter or gothic face modeled on the typefaces of Gutenberg's time. Headlines 2 offers Brush Script, Blippo Black, Hobo, and Windsor. The other packages each offer four weights and sizes (roman, italic, bold, and bold italic) for a single typeface. Two sans serif faces-Futura Medium and News Gothicare offered, as well as three classic serif faces: ITC Souvenir, ITC Garamond, and Baskerville. Another serif face, Charter, was designed by Bitstream to look good at the LaserWriter's relatively low resolution

of 300 dpi. It does, too; I've taken to using this classy face for my business correspondence. "Faces with Character" shows a number of MacFontware faces printed on the PostScript-based Linotronic L300 at 1270 dpi. "QuickDraw Contenders" shows two faces printed on the QuickDraw-based LaserWriter IISC.

On the whole, Bitstream has done an excellent job tackling a challenging task. Many of Bitstream's PostScript faces print out darker on a LaserWriter than similar Adobe faces, which are generally considered the standard by which other faces are judged. Bitstream's versions are not necessarily bad, but I prefer the delicate strokes of some of Adobe's faces. For example, I found Adobe's Futura Medium crisper and more pleasing to the eye than Bitstream's Futura Medium printed at 300 dpi. Unlike Adobe, Bitstream doesn't employ bints, algorithms that help smooth and refine characters at 300 dpi. Nevertheless, Bitstream's faces look good at 300 dpi. And hints are a moot point if you're printing on a high-resolution PostScript device such as Linotronic's 1,300; the samples I printed at 1270 dpi looked great.

To test the QuickDraw-PostScript correspondence, I compared the same document output from a LaserWriter IISC and a PostScript LaserWriter. A few of the line widths didn't quite match (they differed by only two or three points), but on the whole the two versions matched up.

Although I don't have many complaints about the fonts, I will complain about the chintzy packaging. (It's always something!) The 5- or 6-disk sets are packaged in a shrink-wrapped cardboard folder along the lines of an oversize checkbook. Once the cellophane's off, disks and documentation go flying all over the place. A minor point, I concede, but I like to store my fonts in their original packages.

Bitstream has done a fine job, not only of combining two disparate font technologies, but of bringing a set of beautifully rendered classic faces to the Macintosh. If their future faces retain the quality of the first offering, Bitstream will be a force to be reckoned with in the growing world of Mac typefaces.—Erfert Fenton

See Where to Buy or circle 813 on reader service card.



VISION 1.01

Advanced MIDI Sequencer

Pros: High timing-resolution; on-screen controller faders; innovative chaining and triggering of sequences; sophisticated editing features; many live performance and control features; flexible file operations.

Cons: Limited editing in Graphic Editing window; SMPTE reference not provided in graphic window; cursor doesn't snap to event start-time when you drag events; key disk with two hard disk installs.

Company: Opcode Systems. Requires: Mac Plus; second disk drive; MIDI instrument, interface, and cables. Hard disk recommended. List price: \$495.



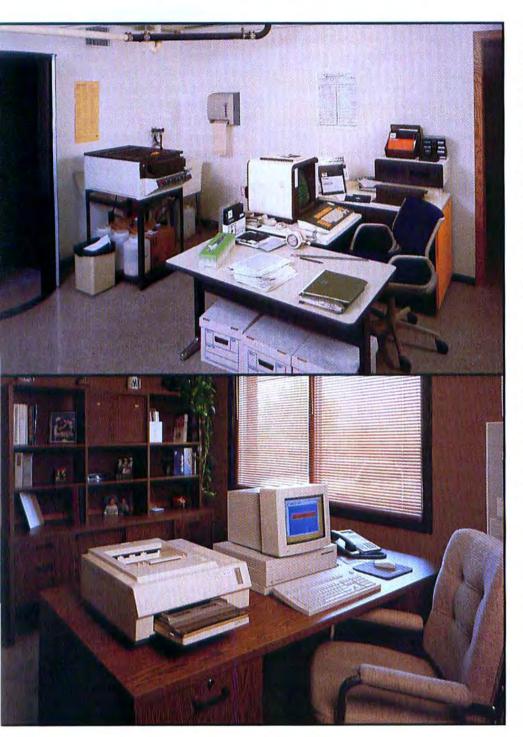
It looks as if Vision, the latest professional MIDI sequencer software entry in the Mac mar-

ket, will be a winner. With an architecture that allows you to easily change—and even improvise—the playback of sections and layers of your music, programmable transposition tables that can intelligently change music from one key and scale to any other, and the ability to eliminate undesirable notes as you play, Vision provides features that none of its competitors offer.

Work Faster, but Not Harder

Vision's structure lets you create up to 26 separate sequences (each of which can be assigned to a letter of the alphabet) of any length, each with 99 parallel tracks of music. Vision's Loop Record mode allows you to overdub (add) layer after layer of music while a specific section repeats indefinitely; you can decide to keep or throw away layers of music as you go by using the Enter and Delete keys. You can also use Vision's Punch-in/Punch-out Record mode to isolate and work on a specific trouble spot. The MidiKeys window lets you assign any Mac key to be triggered by any incoming MIDI event. For example, you can punch in and out of record with a foot switch or any MIDI keyboard key. Each track can be quantized (all events lined up to a user-definable rhythmic grid) and shifted (slightly advanced or delayed relative to all the (continues)

Traditional Typesetting vs. 1000 dpi Plain-Paper Typesetting



hat you see in the top photo is a traditional type shop, complete with a bulky developing system, toxic chemicals, long rolls of expensive photo-sensitive paper, clean-up supplies, the works.

In the second picture, you are also viewing a complete typesetting system. But with this system, you compose your type with a Macintosh, and you output your type on a LaserMAX 1000 plain-paper typesetter.

MAXimum Resolution

What's so phenomenal about the LaserMAX 1000 is **1000 x 400 dpi** resolution on plain paper. This means that you can create to your heart's content and print as many variations as you want, at only pennies per page. And with resolution this good, you use plain-paper pages for *final* copy—not just for proofing copy. (Say good-bye to all the toxic chemicals and bulky developer and cluttered clean-up supplies. *And* to the *expense* of all those things!)

MAXimum Speed

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The LaserMAX 1000 costs less than you would think. At a complete price that's under \$8,000, you pay less than HALF of what Varityper charges for its 600 x 600 dpi printer, the VT600P. (And remember: the LaserMAX 1000 provides higher resolution and is 10 times faster.)

If you've been waiting for a *plain-paper* typesetting solution that you can enjoy right now with your Macintosh II, IIx, or IIcx, there's simply NOTHING that comes close to the LaserMAX 1000. It out-performs them all, at a price that can't be beat.



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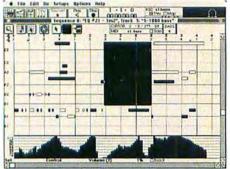


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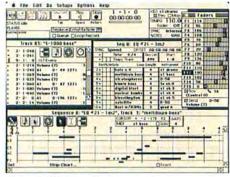
Circle 161 on reader service card

other tracks) while the sequence is playing. This makes Vision extremely fast to work with because you can hear the results of these actions without having to stop and restart the music. Even better, both quantizing and shifting are non-destructive; they only affect the playback of the notes, and can be changed at any time.

Tracks can also loop independently of each other, although all loops must start together and can only end on measure boundaries. Another unique feature is that a single track can contain data for a



The Graphic Editing Window
Vision's graphics-based editing screen shows a region selected for editing (white notes on black background), as well as additional notes selected by Shift-clicking (white bars on white background). The Strip Chart at the bottom of the window displays the movement of a slider, in this case controlling volume.



Vision's Working Environment

In a typical screen setup in Vision, the Control Bar is at the top, with the List Editing window under it on the left. The Sequence window (showing the tracks in one of the 26 sequences) is in the center. Here fader number 12 is set to control a synthesizer's volume. The whirlpool-like button near the top of both the Graphic and List Editing windows pops up a menu containing items from the main menus, saving long trips across large screens.

number of instruments, each receiving different parts on different MIDI channels. This lets you represent a set of instruments that combine to make a single sound as a single track, greatly reducing screen clutter and simplifying editing.

To the average user who often needs to rearrange a song quickly, Vision will be a must. You can trigger individual sequences by typing the letters you have assigned them to on the Mac keyboard; the Queue function plays these sequences in the order you type the letters. A rough mock-up of a song can be made, for example, by recording four sequences-Verse, B-section, Chorus, and Solo-and then simply typing VVBVBCSBBB on the keyboard. Changing the arrangement of a song can be much more complex in most other sequencers. If you are in record mode when you type the Queue letters, the resulting track contains copies of the sequences you triggered. These copies, called subsequences, will now play back the sections of your song in the order you defined. The ability to, in effect, put entire sequences of music inside a single track is almost like nesting many levels of files within folders on the desktop: it can make complex song construction much easier. You could, for instance, set up one chain of subsequences to play the drum/bass patterns, one to play the keyboards, and one to automate effects. You could then record linear tracks running the length of the song as well.

By using the Faders window, which has 32 user-definable sliders that can send any MIDI controller message, Vision can perform automated MIDI-volume mixdown, control many different effects devices, and even some lighting boards. These features, combined with Vision's unique abilities to trigger and transpose any sequence in response to live MIDI input, create exciting creative possibilities for live performance.

Fix It Before You Mix

Performances can be edited via an enormous variety of pull-down menu commands. Vision lets you apply multilevel conditions in order to select events by pitch, time location, note velocity and duration, metrical placement within the measure or beat, or any combination of these possibilities—which goes far beyond the ordinary regional editing found on most sequencers.

The easiest way to edit individual notes and events is to use the Graphic Editing window (see "The Graphic Editing Window"), where notes can be moved and resized with the mouse, and a userdefinable Quantized Cursor mode will keep events aligned to the rhythmic grid after they have been moved. A Strip Chart across the bottom of the screen can show MIDI controller movements, note velocity and duration, tempo, program changes, and the various text events that Vision lets you insert into a track. These text events can store things like lyrics, markers, and cue points; but you can only view them, not enter or edit them, in the Graphic Editing window. It's great to be able to see the lyrics running across the bottom of the display; unfortunately, you can't double-click on the displayed text event and edit it.

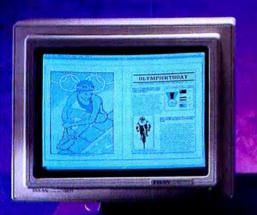
To enter or edit any text event (or view the location of events referenced to SMPTE time code, which is necessary for film work) you must use the List Editing window, which displays events as a series of numbers and letters in a chronological listing (see "Vision's Working Environment"). The primary advantage to list editing is that all parameters of all events are editable, and no zooming in or out is necessary. On the other hand, however, once you are familiar with the Graphic Editing window, you will probably want to use the List Editing window only in an emergency.

Aside from the shortcomings of the Graphic Editing window, Vision is an amazingly complete and versatile program that should satisfy the most power-hungry user, whether the application is scoring films or doing dance remixes. While priced at the high end, Vision is more powerful and functional than anything else out there. Even if Vision's super features won't matter to nonprofessional musicians just trying to get a demo tape together, its song-construction features probably will, and that should be good enough reason to take a look at Vision.

-Charlie Clouser

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Gray-Scale Flatbed Scanner

AGFA FOCUS S800GS

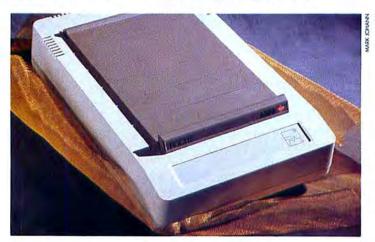
Pros: 400-dpi resolution (800 dpi with interpolation); vectorization (for both bilevel and gray-scale scans); descreening for scanning halftoned images; automatic density adjustment; adjustable sharpening; gamma compensation in dithered halftone mode; competent, basic paint tools. Cons: Expensive; scan size limited by memory; limited to 6 bits of gray scale; resolution in 25-dpi increments; no gamma compensation for gray-scale scans; limited dither patterns; doesn't scan to printer; mediocre manual and online help. Company: Agfa Compugraphic Division.

Requires: Mac Plus. List price: \$5495.

Desktop publishing has always been driven from two directions: at the low end, by microcomputer mavens making micro-based systems more capable, and from the high end by graphic arts vendors moving down into the desktop world. One new entry from on high is the S800GS scanner from Agfa Compugraphic Division (the folks who brought you the P3400PS 400-dpi Post-Script printer). The S800GS is a 400-dpi, 6-bit, gray-scale flatbed scanner that provides a somewhat predictable mix: impressive specifications combined with a high price, a direct sales force, and poorly implemented features.

The scanning hardware itself is quite competent and provides good scans in line-art, dithered-halftone, and gray-scale modes. It captures only 6 bits per sample, though, which is borderline if you're after

The S800GS 6-bit grayscale flatbed scanner from Agfa Compugraphic Division.



high-resolution imagesetter output. And you can't scan with 4 bits, which you might want to do if your final output will be to a 300- or 400-dpi printer.

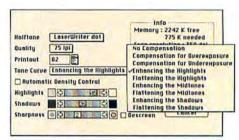
The S800GS has a true maximum resolution of 400 dpi, but the MC View scanning software will interpolate dots between the true sample points, providing an addressable resolution up to 800 dpi. The S800GS's high-res scans provide exceptionally high quality line-art output, as long as you have the disk space as well as some patience when it's time to print. The biggest problem with high-res scans, for those who aren't blessed with unlimited RAM, is that MC View is limited to scanning in available memory.

Controlling the Scanner

MC View's several controls for adjusting scanning differ somewhat depending on the type of scan (gray-scale, dithered halftone, or line art). You can set the Sharpness, for instance, which accentuates the edges of images and can improve the quality of your scans in any of the three modes. An option to Descreen images prevents the moiré patterns you get when you try to scan an already-screened image (such as a photo in a magazine), but the results are pretty blurry.

All the modes use automatic density control (setting contrast and brightness for you), which seems to work better as a guide to manual adjustment than as a tool for capturing final scans. You scan once with the automatic density settings, which gets you pretty good quality, and then adjust those settings manually.

If you're capturing gray scales, for in-



Grabbing Scans

MC View offers automatic density adjustment for both line art and halftones, and a variety of compensations when capturing dithered halftones.

stance, you can get reasonably good brightness and contrast values using automatic density control, and then use a densitometer to measure the values in light and dark areas before mapping, or adjusting, those values to other values and rescanning. For dithered halftones, several canned gamma compensation curves-Enhancing Midtones, Flattening Shadows, Compensation for Underexposure-let you adjust scans quickly, often with good results. There's no way to create your own compensation curves, though, and the compensation curves aren't available for gray-scale scanning; you're limited to the contrast and brightness sliders.

When it comes to setting the scaling and resolution of your scan, MC View acts like it's smarter than you are. You tell it the printer resolution, the output quality (reduced, medium, or high), and the scaling percentage you're going to use (choosing from about half a dozen presets), and MC View tells you the scanning resolution. In theory this makes it easier for novices to get good scans, but if you're buying a \$6000 scanner, either you aren't a novice or you won't be for long. You can trick MC View into giving the resolution you want, but only in 25-dpi increments. If you want exact size and resolution-as you often do when capturing dithered halftones-you generally can't get it.

There are only a few dither patterns available in MC View (just two for 300-dpi laser output), so you don't have the flexibility you get from programs like HP's DeskScan (five patterns, including a diffusion dither) or Datacopy's MacImage (a dozen or so patterns, and you can build your own).

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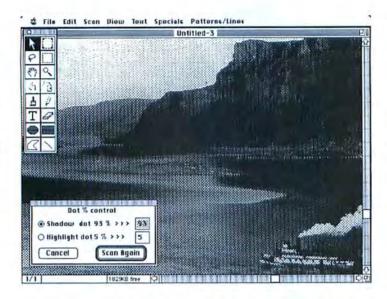
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Scanning and Printing

There's no way to scan straight to the printer, or for printing test sheets with multiple scans on a single page (features available in DeskScan Plus and Apple-Scan, respectively). Instead, you have to scan, print to see the results, and then scan again with different settings. MC View conveniently prints the scan parameters on the sheet when you do print, so it's easy to keep track of which printout is which.

A pencil, an eraser, hollow and filled circles and boxes, a marquee, and a lasso are the basic paint tools in MC View. There's a text tool as well, but it doesn't allow you to choose a font; there's Scan-Font and that's it. You can also pick up user-definable line and fill patterns from images and save up to three of them, which is particularly useful for editing dithered halftones. But although you might find these tools useful for quickly cleaning up a scan, count on using a black-and-white or gray-scale editing program for most of your postscan manipulations.

If you want to convert your scans to object-oriented art, you can vectorize them right from within MC View and save the objects to PICT or Illustrator (1.1 or 88) files, or straight to the Clipboard. You can even vectorize gray-scale images. The conversion is pretty good for simple objects, but the resulting files aren't as useful as those resulting from autotracing in Illustrator, FreeHand, Streamline, or Digital Darkroom.

The MC View manual is acceptable if not exceptional. There are several pages showing the output results using different scanning parameters, which can prove very useful when you're trying to predict what output will look like. However, step-by-step procedures often lack illustration, and the manual often glosses over explanations of what the more advanced features are actually doing.

The online help is reasonably good, with a HyperCard-size card for each of the pull-down menus. It doesn't begin to compare to Hewlett-Packard's DeskScan Plus for the ScanJet Plus, however, and the ScanJet Plus gives you 300 dpi (up to 1500 dpi addressable, all in 1-dpi increments) plus 8 bits of gray. If you must have 400 dpi, you can get it from the Microtek MSF-400G, again with 8 bits of gray, for under \$4000 including an impressive software bundle.

The S800GS is not sold retail (only through Agfa Compugraphic's direct sales force), so don't expect the discounts you can get on those competitive machines through dealers. And if you want tech support, there is currently no number to call. The manual gives no number at all, and the only address is in Belgium, so you'll have to count on your Agfa representative for any support. Given the quality, price, specifications, and support of the S800GS's competitors, there is little reason to consider buying this machine. —Steve Roth

See Where to Buy or circle 706 on reader service card.



INIT Manager

Pros: Intuitive graphical interface; buttons for turning all INITs on or off; allows onetime-only changes at start-up; user-definable start-up key command; occupies no memory after start-up completed. Cons: Cannot change INIT loading order; always scans System Folder when program is opened. Company: CE Software.

Requires: Mac 512KE. List price: \$49.95 (included in MockPackage Plus Utilities 4.4).

INITPICKER 1.0

INIT Manager

Pros: Compact, elegant design; can change INIT loading order; detailed information windows for each INIT; buttons for quickly turning all INITs on or off; allows onetime-only changes at start-up; user-definable start-up key commands; scans System Folder either automatically or on request. Cons: Occupies approximately 15K of memory. Company: Microseeds Publishing.

Requires: Mac Plus; System 6.0; Finder 6.1.

List price: \$49.

INIX 1.1

INIT Manager

Pros: Can create and select combinations of on and off INITs; displays Control Panel and Chooser documents; occupies no memory after start-up completed. Cons: Cannot change INIT loading order; must also install as a DA; no onetime-only changes at start-up; no quick way to turn all INITs on or off; start-up key command not user-definable; always scans System Folder when program is opened. Company: Natural Intelligence.
Requires: Mac 512KE. List price: \$49.95.

Strangulation by start-up document has become a common complaint among Macintosh owners. It's a cause of fatal system crashes and many less serious, but decidedly undesirable, symptoms. The root cause is the ever-expanding number of useful start-up documents (also called INITs), including desk accessories (DAs) and font managers. Each INIT may be a welcome (continues)



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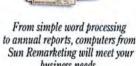
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enhancement, but unpredictable incompatibilities sometimes cause debilitating problems when a number of start-up documents are in use at the same time.

Until recently, determining which INITs were causing an incompatibility problem meant turning INITs off and then on again by moving them in and out of the System Folder. Once the errant INIT was located, the most common remedy-altering the alphabetical order in which INITs load during start-up-could only be accomplished by changing the names of individual INITs. And turning off all INITs so a memory hog like FullWrite could run on a 1MB machine, or so a finicky game could run at all, required mass file migrations out of (and later back into) the System Folder. A new kind of utility software, the INIT manager, promises to eliminate the need for such awkward procedures.

Three INIT managers are now available, with more in the offing. All are INITs themselves so you install them by placing them in the System Folder. All three INITs can be used to interrupt the start-up process; you can select from the program's window which INITs will be loaded (turned on) and which will not be loaded (turned off) at start-up. Each program's window is also available through a DA or the Control Panel, so you can select which INITs will load the next time you start the Macintosh. Sadly, none of these INIT managers provides a way to unload an INIT that was loaded at start-up, or to load an INIT that was passed over at start-up, except by restarting the Mac. Except for these basic similarities, each program approaches the problems of administering large numbers of INITs in a different way.

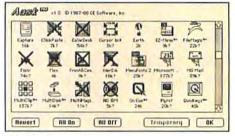
Aask

Aask, part of the MockPackage Plus Utilities collection of utilities and DAs, is the simplest in conception. Aask's window displays the icons of all the INITs in the System Folder (see "Ask Aask"). To turn an INIT on or off, you simply click on its icon (Aask puts an X over the icon to show that the INIT is off). Two buttons expedite matters by allowing you to turn all INITs on or off with a single mouse click. The key command that opens Aask during start-up is user-definable; you can use the

mouse button in addition to or instead of a key command. If you use Aask during the start-up process, you can turn INITs on or off for all start-ups or for that start-up only (a great convenience when you're trying to determine which INIT is causing a problem). Temporary changes cannot be made from the Control Panel version of Aask, however.

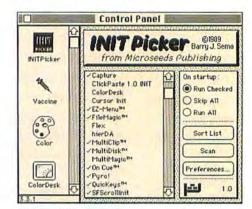
Inix

Unlike the other two programs, Inix operates via predefined combinations of on and off INITs called INIT sets. These are especially helpful if you usually use one of a number of unvarying INIT combinations—for example, if you often want to turn off all INITs except Suitcase II so you can run FullWrite, or if you have collections of special-purpose INITs that you use relatively often but only under certain circumstances. In Inix, you create sets with the Set Editor, which looks and



Ask Ausk

If memory is in short supply, Aask can help. Beneath each INIT's icon, Aask displays the amount of memory used by the INIT when it is turned on. Question marks indicate estimated amounts.



Picking INITs

In INITPicker, you can drag file names to change the order in which INITs load, sort the list to put it back in alphabetical order, or sort the list so that loaded INITs are segregated from INITs that are turned off.

works much like Font/DA Mover. In the Set Editor, INITs are shuffled, one at a time, between an on list and an off list; combinations of on and off INITs are then saved for later retrieval.

While Inix's sets can make INIT management easier, other aspects of the program are not so convenient. Unlike the other two programs, Inix requires that you install a DA as well as an INIT file. With the DA or the start-up window, you can select or alter the current set as desired. New sets can be created only in the desk accessory, however. Inix's list of INITs also displays all Control Panel documents and certain types of Chooser files. There are other drawbacks to Inix, for example, the key command that opens Inix during the startup process isn't user definable; and unless you create special sets to do the job, there is no convenient way to turn all INITs off or on at once.

INITPicker

INITPicker's classy color display is one of the many features that set it apart from Inix and Aask (see "Picking INITs"). A check mark next to an INIT's name in the display's scrolling list indicates that the INIT is turned on; clicking to the right of a file name turns the INIT on or off. Radio buttons make it possible to turn all INITs on or off with a click of the mouse. The Once Only button in the start-up window allows you to make changes for that start-up only (temporary changes cannot be made from the Control Panel window).

INITPicker allows you to easily change INIT loading order—by dragging file names to new positions, while both Inix and Aask require you to rename INITs. The Sort command quickly returns the INITPicker list to alphabetical order.

Other notable advantages over Inix and Aask include the fact that INITPicker can be configured to scan the System Folder for INIT files—a time-consuming process—only when requested, rather than each time the program is opened. In addition to a user-defined key command for opening INITPicker at the beginning of start-up, for those times when things get really rough, there is an "ejector button": a second user-defined command for turn-(continues)

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ing off all INITs at start-up. Double-clicking on the name of any file name in INITPicker's scrolling list opens the Info window, which contains the kind, size, creation, and modification dates of the file, as well as a list of the resources it contains. A long list of keyboard combinations allows you to select many INITPicker commands and options from the keyboard. On the minus side, unlike Inix and Aask, which vacate memory during normal working hours, INITPicker occupies about 15K at all times.

Which Program Should You Buy?

So if your System Folder is beginning to bulge at the seams with INITs, and you've about had it with the old-fashioned INITmanagement methods, which program should you buy? Inix will appeal to you if your work habits demand INIT sets, but its less convenient aspects make it less desirable for most Mac owners. Aask is simple and straightforward, and you might want some of the other programs that Mock-Package Plus Utilities offers. But as long as you don't need INIT sets or the other MockPackage programs, INITPicker's ease of use, many helpful features, and capability to change INIT loading order put it head and shoulders above the other two. -Robert C. Eckhardt

See Where to Buy or circle 702 (Aask), 794 (INIT-Picker), and 795 (Inix) on reader service card.



DIFFERENT DRUMMER 1.0

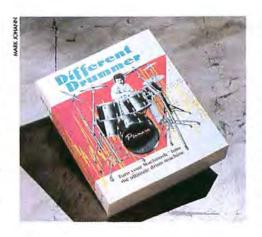
Graphic Rhythm Composer

Pros: Wide selection of high-quality sampled percussion sounds; versatile, easy-to-use editing features; extensive MIDI implementation for controlling standalone drum machines and MIDI instruments.

Cons: Lacks ability to vary tempo within a song; no swing feature. Company: Primera Software.

Requires: Mac 512K. List price: \$99.95.

Whether you're a serious MIDI musician looking for a good backbeat, or you just can't stop tapping on tables, Primera's Different Drummer is just what you need to realize your passion for percussion. This graphi-



cally oriented rhythm composer turns the Macintosh into an automated percussionist that beats those music store drum machines at their own game, letting you create your own sizzling rhythm tracks with relative ease.

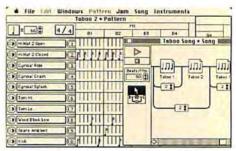
Boasting an extensive selection of digital samples of real percussion instruments, Different Drummer will substitute capably for a stand-alone drum machine and will also cost you a lot less than the real thing. You can play anything from standard drum-kit sounds-bass, snare, toms, and cymbals-to ethnic instruments like tablas and timbals, and miscellaneous things that go clank or bonk. The recordings sound great, within the inherent limits of the Mac's built-in sound generator (even when fed through a high-quality audio system, the Mac's musical performance suffers from obvious extraneous noise and distortion, and the Different Drummer samples don't escape this problem). And if the sounds provided aren't enough, Different Drummer can load samples stored in several standard sound file formats.

Although Different Drummer lets you freely play any ten sampled sounds directly from the Mac's keyboard, you'll spend most of your time with the program creating rhythmic recordings. Like most drum machines, Different Drummer lets you chain together brief reusable *patterns*, of several measures each, into longer *songs*. This is a time-tested system—it's well suited to the repetitive nature of pop music, and it's economical with memory, because each pattern consumes RAM only once, no matter how many times you use it in a song.

Graphic Rhythms

Compared to a regular drum machine, though, Different Drummer has the big advantage of a note-by-note visual display of your pattern recordings, which makes it much easier to input percussion notes where you want them. Much like a multi-track tape deck, Different Drummer records up to ten instruments each on a separate track—but with the additional benefit of an on-screen representation of all the tracks and their individual notes.

To record a pattern, you start by choosing a rhythmic factor (anything from an ordinary whole note to a septuplet 256th note) that establishes a timing grid. The grid has a lot in common with those snapto-grid features found in graphics and desktop publishing programs, only the Different Drummer grid works in time as well as space—when you click on a track, Different Drummer records a note in the track at the nearest grid hash mark, ensuring that each note falls on an even division of the rhythmic pulse during playback. You can change a song's grid divisions whenever you like, so it's easy to create rhythmic patterns that are both complex and accurate. On the other hand, if you'd rather pound out the rhythm yourself from the Mac keyboard, you can have Different Drummer record your creation directly, in real time. Don't worry about playing off the beat-Different Drummer still locks each note to a grid division automatically. Either way, you can assign one of nine (continues)



Where the Beats Are

In the foreground, Different Drummer's Song window lets you link patterns (Taboo 1 and 2) into complete rhythm tracks. The lines connecting the pattern groups indicate repeats, the boxes determine the number of times each group will repeat. The pattern window in the background shows the pattern's percussion instruments and when they play.

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Circle 275 on reader service card

accent levels to each note individually, giving you an effective dynamic range.

Once you're ready to combine your patterns into a song, Different Drummer's graphics again simplify the task. Since a song consists of a single-file succession of patterns, Different Drummer displays the patterns in a horizontal row within a scrollable window (see "Where the Beats Are"). Where a drum machine makes you assign patterns to a song by typing in their numbers out of context, Different Drummer's Song window lets vou see exactly where each pattern goes. The mouse makes it easy to add, delete, and move patterns in the chain, and to copy whole patterns as you need them elsewhere in the song. And you're a click-and-drag away from repeating individual patterns or any number of consecutive patternsrepeats can even be nested.

MIDI and More

Even if you already own a MIDI drum machine, Different Drummer might still be a smart buy, depending on how complex you make your rhythm tracks. The program's excellent full-screen editing features surpass anything you can find on a drum machine. What's more, most drum machines are diskless and store only a finite number of notes, while Different Drummer's memory is limited solely by your budget for floppy disks. And if you have one of those new synthesizers that come with built-in percussion sounds, but with weak or absent recording features, Different Drummer is practically a necessity. Whatever your MIDI instrument, a flexible setup window ensures compatibility with Different Drummer.

Still, Different Drummer lacks a few important features found on many drum machines. For one thing, you cannot change tempos within a song. Nor can you automatically add a swing rhythm to your patterns or songs. Also missing is a human-feel feature found on some of the latest drum machines, that subtly varies the timing and tonal quality of each note to more realistically simulate the sound of a human drummer. Intelligent Music's UpBeat lacks the ability to play sampled sounds, but has more flexible rhythmic options, and makes a better choice

for sophisticated MIDI drum machine programming.

Most of us, though, can happily ignore Different Drummer's minor deficiencies. With its combination of slick editing features and built-in, quality sounds, Different Drummer will turn ordinary table tappers into near-pro percussionists in a flash.—Steve Cummings

See Where to Buy or circle 762 on reader service card.



EPSON LQ-950 AND EPSON LQ PRINTER SOFT-WARE FOR MACINTOSH COMPUTERS 1.0

Dot Matrix Printer with Mac Software

Pros: Reliable; relatively quiet; good graphics output.
Cons: User-hostile installation (by Mac standards);
disappointing text appearance with most digitized fonts.
Company: Epson America. Requires: Mac Plus;
System 4.2; Finder 6.0. 2MB RAM recommended.
List price: Printer \$949; software \$69.



The LQ-950 is, as you would expect from Epson, a very fine printer. More's the pity, then,

that the Macintosh software sold with the 950 and other Epson LQ printers has so many disadvantages. The LQ-950 is based on software originally developed as Printworks for the Mac, and there are enough quirks in the package to discourage all but the most dedicated Epson fans.

This system's virtues can be easily summarized: if you are willing to confine your printed documents to graphics and the Epson fonts included with the LQ-950, you will have a solid, reasonably fast printer that costs less than an ImageWriter LQ. The difficulties appear when you try to use the Epson with most traditional Mac fonts; you get crisp, clear, funny-looking type, with anomalous thicknesses on the strokes of an odd assortment of letters.

Installing and Stalling

You'll need to know whether the Mac has a parallel or serial interface and whether it has odd, even, or no parity, since the LQ-950 ships to you all set to plug into the parallel printer port of an IBM PC. Conse-

quently you'll have to search around in the manuals and do a bit of DIP-switch flipping to set it up. If you incorrectly set one of the tiny switches, you don't receive any usable error messages; the printer simply fails to do anything. Both the printer and software manuals presuppose more enthusiasm for nuts-and-bolts investigation of the printing process than one typically finds among Mac users, and the troubleshooting sections are weak enough to quickly send you to Epson's 800 number for support.

You use Installer to activate the Epson LQ printer as a choice under the Chooser and to handle the built-in Epson fonts (Compressed, Elite, Pica, Proportional). You must install four more digitized fonts—Epson TMS Roman, Epson Helvetica, Epson Courier, and Epson Symbol—with Font/DA Mover. These special fonts are actually screen fonts adapted by Epson to produce the best results with the 950's 24-pin print head.

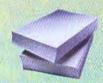
Not Fontastic

In principle, the LQ-950 supports Apple and other third-party fonts, giving reasonable output in Digitized mode, which approximates the bitmap you see on screen. This works best if you have both the size you want to print and a size 21/2 times larger in the System Folder, because the Epson driver uses the larger size to scale the bitmaps for high-quality output. In practice, however, what you get on the page often looks very odd indeed-certainly not equivalent to what you'd get from an ImageWriter LQ using the same fonts (see "Not Your Type?"). Stranger yet, when you print out text with non-Epson fonts in Letter or Draft mode, the software (continues)



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This is Epson Courier
This Geneva sample, on
And Monaco starts to
This funny font is Compressed
If you like Times Roman,

Not Your Type?

In Digitized mode, both Geneva and Monaco display uneven thicknesses and bear little resemblance to their on-screen selves, while Epson Courier, specifically designed to work well with the LQ-950, prints out sharp and clear.

This is Epson Courier

This Geneva sample, on

And Monaco starts to look

This funny font is Compressed,

If you like Times Roman, you will be happy

Letter

In Letter mode, Geneva and Monaco print out in completely different typefaces—printer-resident fonts that matched their general spacing arrangements. Epson Courier, again, prints out just fine.

simply selects the printer-resident font that has the most similar spacing. As a result, fonts such as Geneva or Monaco bear little resemblance to their screen representations.

For best results, what you really want to do is use Epson's own fonts on the printed page, regardless of what you see on the screen. To do this, Epson supplies Font Adjustment, a DA designed to let you associate the fonts that appear on screen with the resident fonts on the LQ printer. This way, you can print out text in Epson Courier, for example, that you have marked on the screen as Geneva, although clearly, what you see is not at all what you'll get. You will find, as you use the LQ-950, that the output quality of its resident fonts exerts a subtle pressure to do things

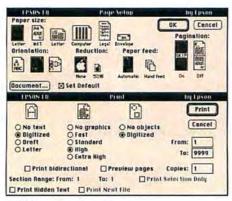
Epson's way (catering to the printer's strong points) rather than the Macintosh way, in which it is assumed you can have on paper what you see on the screen.

Epson's dialog boxes (see "A Dialog with Epson") replace the familiar ones in nearly all applications (there are instructions for making this work). A preview mode displays a reduced view of the document, and a moving bar on the scaled document shows the progress of the print job. And a set of application notes provided with the hardware and software manuals list the idiosyncrasies of the printer when it is used with various popular software packages. These range from memory problems to restrictions on point sizes of text available for use with particular applications.

Not Yet

The Epson LQ-950 printer is great at handling graphics and its own fonts, and it promises to be mechanically trouble-free. However, installation is a nuisance by Mac standards, performance with many popular fonts is disappointing, and the tinkering required from one application to the next is exactly what the original Mac printer interface was designed to avoid. One can only hope that this product gets enough support from Epson to evolve into a system of ImageWriter-like simplicity.

See Where to Buy or circle 771 (Epson LQ-950), or 770 (Epson LQ Printer Software) on reader service card.



A Dialog with Epson

-Charles Seiter

These snappy dialog boxes for Page Setup and Print replace Apple's old standards when you select the Epson LQ. Bidirectional printing is a key convenience option; you may want the slower unidirectional printing for more nearly letter-quality results.

EXPRESSWRITE 1.01

Letter-Writing Desk Accessory

Pros: Easy to learn; good mail merge feature; automatic stationery and standard paragraphs; good tutorial. Cons: Doesn't include page preview; doesn't support graphics. Company: Exodus Software. Requires: Mac 512KE. List price: \$99.95.

QUICKLETTER 1.0

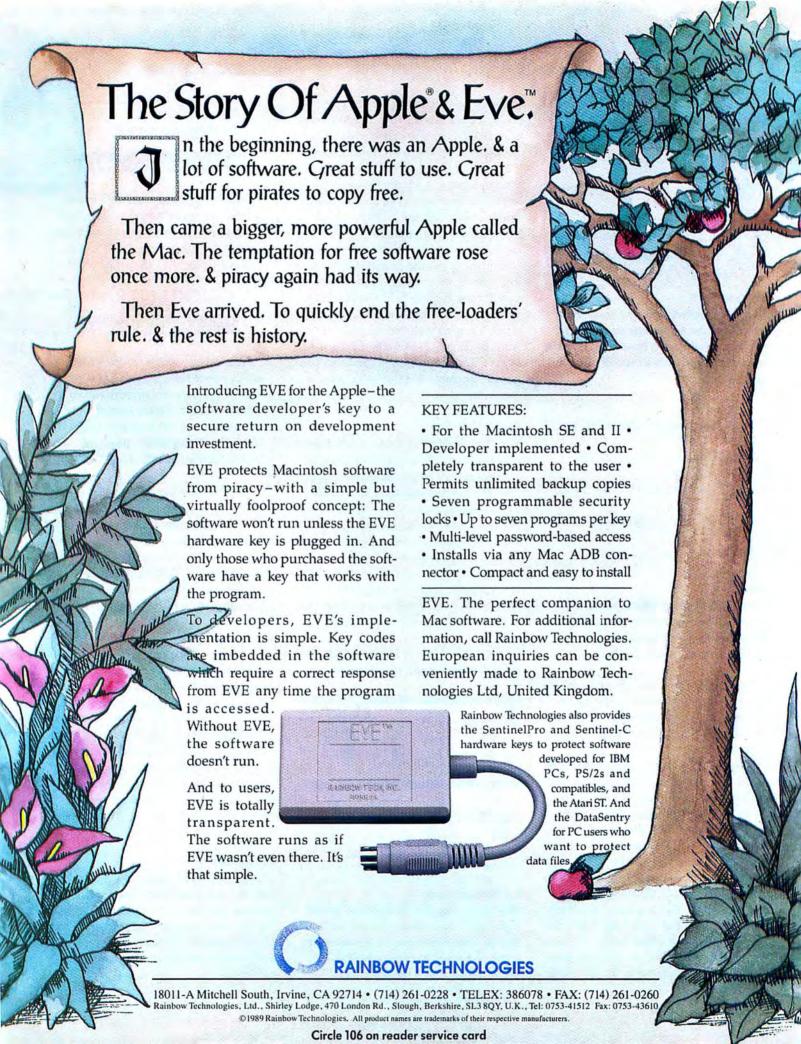
Letter-Writing Desk Accessory

Pros: Supports graphics and multiple windows; good page-preview feature; includes Spellswell spelling checker and proofreader; user-defined keyboard shortcuts. Cons: Cumbersome interface; no mail merge; graphics can't be moved on page. Company: Working Software. Requires: Mac 512KE. List price: Version 1.01 \$124.95.

Now, while you're still inspired, you'd like to dash off that crucial business letter without quitting the application you're in. Two new desk accessories, ExpressWrite from Exodus Software and QuickLetter from Working Software, let you do just this. They offer many similar features, including automatic letterhead, complete font control, rulers, top and bottom margin settings, search and replace capabilities, and keyboard shortcuts. ExpressWrite has a mail merge feature, QuickLetter doesn't. Quick-Letter, however, supports graphics from any paint or draw program, while ExpressWrite does not. In fact, QuickLetter includes quite a few more bells and whistles, as well as some additional crucial features. But in terms of providing absolute ease-of-use, a logical interface, and well-written tutorial and documentation. ExpressWrite is the stronger candidate.

ExpressWrite

The ExpressWrite manual begins with a concise, comprehensible tutorial for beginners, followed by a reference section for the more experienced Mac user. The ExpressWrite interface is so friendly that you can skip the documentation and use (continues)



the detailed index to look up any specific problems you run into.

The Status Bar, or Icon Bar, at the top of the window displays 12 icons that represent all the functions you need. Most of the icon commands are also found in the ExpressWrite pull-down menu. Once familiar with these functions, you can refer to a cheat sheet for 光-key equivalents.

Automatic Everything

Both programs feature automatic stationery. ExpressWrite allows you to write a form letter, format it with tabs and margin settings, and Save As Stationery. Each new letterhead or form letter that you create can be saved, stored, and listed in the Stationery menu. In addition, using the Standard Paragraph feature you can store your most commonly used paragraphs in a folder that can be easily accessed by selecting the paragraph icon on the right side of the Status Bar.

The mail merge feature for letters, envelopes, and labels is uncomplicated



Default Stationery

Any graphic can be pasted onto a Quickletter document to create your letterhead. Once pasted, however, the image cannot be altered in any way, and it can take several attempts to center the graphic on the page.



Mail Merge

The Status Bar at the top of the document displays all the functions of the program as icons. The mail merge window appears in a spreadsheet format as a separate window. but effective and takes the angst out of that often odious task. Each Mail Merge file can hold up to 32K of data. You can import data from any database program into a merge file as long as each field is separated by tab stops. ExpressWrite also has a Find and Replace feature and an Auto Save option.

A Few Minor Details

Aside from ExpressWrite's lack of graphics support, it has other minor, but nevertheless irksome, drawbacks. You can only open one ExpressWrite document at a time. ExpressWrite does not have a linespace option, and although there is a pagebreak marker, it does not have a repagination command. (If you could view the entire document before printing, the lack of a repagination command wouldn't be so bad.) Although ExpressWrite allows envelope previewing, it lacks QuickLetter's page-preview feature. Similarly, there are sliding tab stops, but no sliding margin stops. Setting the margins is a cumbersome task; you must enter numerical calibrations for left, right, top, and bottom margins in a dialog box. Why you can't set the margins the same way as tab stops is a mystery.

Finally, there is no way to cancel the Quit command. Still, these minor problems do not really mar the overall efficiency and effectiveness of ExpressWrite.

QuickLetter

The documentation for QuickLetter includes a section explaining basic Macintosh operations such as scrolling, cutting, and pasting. But despite this elaborate and carefully prepared tutorial, getting the hang of this program involves flipping from page to page in the documentation to find solutions to even the most basic questions. Also, the interface is not as easily assimilated as ExpressWrite's. Still, QuickLetter does have more features, so if you are willing to take its hurdles in stride, it could be for you.

On or Off, Yes or No

The rules for turning on and off the automatic stationery feature were confusing. The Make Default Stationery command allows you to have the letterhead automatically displayed when you open up QuickLetter. Consequently, this command was on when I thought it was supposed to be off and vice versa. In order to print the letterhead with your letter, you must select Print Picture in the Page Preview dialog box, which allows you to line up the text of a letter with the letterhead in the printer.

The graphics feature is confusing, too. You can paste a graphic from any paint program into your document, but the image automatically shoots to the upper left-hand corner of the page, and *cannot be moved*. There are ways to get around this, but it can often take several tries to get the letterhead to look the way you would like it to. If you don't like the way your letterhead looks, or if you made a mistake, it can not be fixed. You have to create a new document and import the graphics all over again.

More Good Stuff

Even though the graphics won't budge once pasted down, formatting the rest of the letter is a snap with QuickLetter. There is a page-preview feature with an added bonus; you can drag the text around the page with the pointer. You set tabs and margins by sliding markers along the ruler at the top of the document, and the tab feature includes a stop that allows you to line up decimals. Unlike ExpressWrite, QuickLetter lets you to choose line spacing and also offers a repagination command. In addition to the Find and Change feature, Working Software has included its Spellswell spelling checker and proofreading software. QuickLetter also has changeable keyboard equivalents for most menu commands.

Less Might Be More

If you just want to generate letters quickly and painlessly, ExpressWrite is a less costly solution than QuickLetter. In any event, it might be worth giving up some of QuickLetter's flashier features in the interest of a shorter learning curve and eliminating the frustration of using a clumsily orchestrated interface.

-Pamela T. Creighton

See Where to Buy or circle 773 (ExpressWrite) and 855 (QuickLetter) on reader service card.

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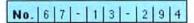
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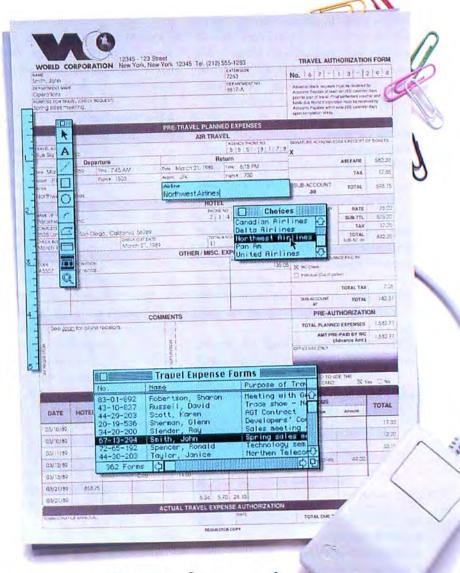
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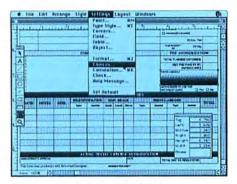


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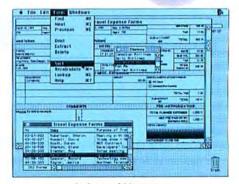


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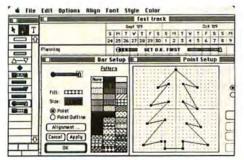
by Lawrence Stevens

This month I review software that will help you keep a project on track, convert quantities, make writing winning résumés a breeze, and replace the old Mac Scrapbook with something much better

FastTrack Schedule 1.02

FastTrack Schedule from AEC Management Systems (list price \$195) creates attractive Gantt charts (also called schedule or calendar charts) that can help keep your project on track. While FastTrack Schedule doesn't have the calculation capabilities of project-management software like MacProject or MicroPlanner, it does give you more graphic control of your charts than any other scheduling program I've seen.

You begin by specifying a project's start and stop dates and the display intervals (hours, days, weeks, months, or quarters). The dates appear across the top of the screen. You then type in the project's activities, one under the other. You can enter subactivities—component tasks that make up a main activity—by tabbing



Customizing Time Line Bars

FastTrack Schedule lets you customize the bars that span the time intervals for a given activity. You can select the pattern and color for the bar and the fill, which indicates the percentage of completion. You can also add a symbol to be used as the start or end point of the bar by using the dot-to-dot utility above or pasting in a MacPaint image. Once you create a bar, it is listed in the Tool Box (left side of the screen), and can be placed on the chart at any time.



and typing them under the main activity. Clicking next to a main activity compacts (hides) all the subactivities under it and places a bar on the main activity line to represent the total time of its subactivities.

To represent the projected duration of an activity, you select one of the bars from the Tool Box. Dragging from the expected begin date or time to the expected end date or time makes the bar span the two time periods.

FastTrack Schedule can add up the total time a project's subactivities will take, but beyond that, you're basically on your own. You can display the percentage completed by clicking on any subactivity bar, and the program fills in the activity bar proportionately, but FastTrack Schedule can't use this information to reschedule other events. If you select several bars and then extend or contract one to represent an activity that took more or less time to

complete than anticipated—the other selected bars move over. There is no way, however, to link activities so that changing the time period for one automatically affects the others.

The strength of this package is not in its brains but in its beauty. You can create your own bars and end points, which then appear on the Tool Box, by selecting a pattern, fill, and color (see "Customizing Time Line Bars"). You can also place a MacPaint graphic or text on your chart and specify the color and pattern of virtually all chart elements.

If you manage large, complex projects with many tasks that cannot begin until previous ones are completed, you need project-management software. For simpler projects, however, FastTrack Schedule makes it easy to create and display a schedule so everyone will know exactly what needs to be completed to keep your project on schedule.

ResumeExpert

ResumeExpert from A Lasting Impression has 42 résumé and cover-letter templates and comes in two versions-one for Microsoft Word 1.05, and one for Word 3.01 and later versions. The manual is similar to a typical résumé handbook that contains tips on writing résumés along with samples. The advantage ResumeExpert has over a handbook, however, is that once you've selected the sample résumés you want to use as a guide, all you have to do is insert your own information in the program's Word version of the template, which is a completely formatted document containing tabs, spacing, fonts, and other layout elements.

The templates cover most situations. For example, if you want to make a career change, there are templates that empha-(continues)



Custom Résumés

Many ResumeExpert files provide résumés for special circumstances. This one, for those who want to change careers, emphasizes skills more than actual company experiences.

size skills rather than specific jobs. Some candidates will prefer the format that omits critical dates that may reveal the applicant's age. And for those with little experience, there are résumés with plenty of white space. While there is no index to the templates, it's easy to find the one you need by browsing through the manual. There is, however, an excellent 6-page guide that directs you to the best résumés for special circumstances such as All Experience in One Company, or Gaps in Employment.

Even though ResumeExpert gives you the same information as less-expensive résumé handbooks, the templates can save you hours of formatting time. If that seems worth \$75 to you, and if you are a Microsoft Word user, I would recommend ResumeExpert.

UNITize 1.1

UNITize (\$79.95, Rainbow Bridge Software) is so similar to ConvertUnits, which I reviewed last May, that I'll just paste in the first sentence of that review here: "ConvertUnits... will convert many things into other things: U.S. pints to milliliters, the time in Afghanistan to the time in Kansas City, modern measures into traditional Arabic measures, and your weight on Earth to your weight on any planet in the solar system." Both UNITize and ConvertUnits cover the same units, and because there are thousands of them, it's likely that you'll find the conversion you need.

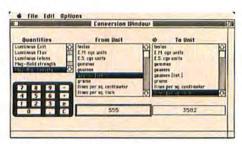
While both products are virtually the same, there are enough functional differences to slightly favor UNITize. For one thing, it has a slightly more convenient user interface, since the quantities and units are simultaneously displayed in three boxes instead of only one at a time as with ConvertUnits (see "UNITize's Conversion Window"). But the most important difference is that UNITize allows you to input your own quantities and conversion formulas, while the current ConvertUnits does not. You can define and modify these new units in terms of existing units. You can also remove unused units to save desk space. (According to the developers of ConvertUnits, the new version will also be user definable.)

On the other hand, ConvertUnits has advantages too. It provides an automatic journal that keeps a record of your session and can save you the hassle of cutting and pasting individual results. It is also anywhere from \$5 to \$20 cheaper than UNITize, depending on the version you buy.

PictureBook 2.1

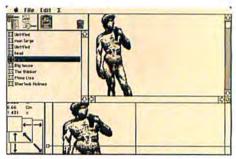
While Apple's Clipboard and Scrapbook do a good job of storing data, their big disadvantage is that the data stored in them cannot then be manipulated. Loop Software's PictureBook, a desk accessory, goes further than any product I've seen to unlock the Clipboard and replace the Scrapbook with a friendlier repository for diverse data.

This DA improves on the Scrapbook in a number of ways. You can have as many different Books as you want, so you can group Scrapbook-type data by category. All of the Books can be open at the same



UNITize's Conversion Window

Converting one unit to another is very simple with UNITize. You select the quantity and the from and to units. Then, using either the keyboard or the on-screen keypad, you enter the From Units amount. The conversion amount then appears under the To Unit box.



Getting Control of Scrapbook and Clipboard
The upper window, which can act in place of the Mac
Scrapbook, has a familiar, Finder-type user interface. You
open items by clicking on their icon, and you name or
rename items by selecting and retyping. You can paste a
PictureBook page to the Clipboard by dragging the page
icon to the Clipboard icon. And you can delete items by
dragging them to the trash. The lower window enables
you to edit Clipboard items. The horizontal and vertical
lines around David are crop lines. The arrows to the left
allow you to enlarge or shrink the image in the direction
of the arrow.

time, so you can easily cut, copy, and paste between them. Also, the arrangement of PictureBook (list price \$69.95) makes accessing data much easier than in the Scrapbook.

Every time you add a new item to the PictureBook, you can name it. All the names appear in the PictureBook window, so you can access any page by clicking on its name. Alternatively, you can access items the way you would in the Scrapbook, by flipping through the pages. PictureBook also lists the type of data of each entry (PICT, text, and so on), the name of the user who pasted in the data, and the date and time the data was entered.

Even more impressive is PictureBook's facility that allows you to edit PICT files on the Clipboard. You can take any PICT file from .139 inch to 100 inches and enlarge or diminish it, stretch the image in any direction, and crop it.

If you find yourself often rummaging through the Scrapbook to find a picture or text file, or if you need to fine-tune PICT images before pasting them into a nongraphics application, using PictureBook might make you wonder how you ever got along without it.

See Where to Buy or circle 774 (FastTrack Schedule), 863 (ResumeExpert), 890 (UNITize), or 842 (PictureBook) on reader service card.



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Expressionist 2.0	79.	EndLink	58
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Broderbund		QuarkXPress V2.0	489
DTP Advisor	47.	QuarkStyle	175



DeskPaint 2.0 & ZBasic 5.0 by ZEDCOR, Inc.

DeskPaint 2.0 is a powerful desk accessory that creates, loads, edits and saves bitmap graphics including TIFF, MacPaint and PICT formats. DeskPaint 2.0's features include: Auto Trace, Air Brush, Distortion, perspective control and more (\$65). ZBasic 5.0 is an interactive basic compiler with all the tools needed to help serious Mac programmers create applications. ZBasic 5.0 includes color and full toolbox support, an MSBASIC conversion utility and more (\$89).

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Electronic WordFinder by Microlytics

NETWORKING SOFTWARE & HARDWARE

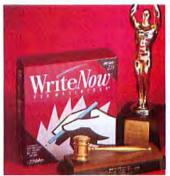
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MacSnap Memory Boards by Dove Computer

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.





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.

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Tempo II by Affinity

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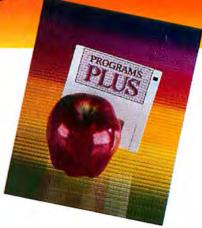
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179.	Mac2400E (Int. Mac II w/MS Works)	399.



DAtabase by Preferred Publishers

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Deneba Software		(9-15 users)	199
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Icom Simulations MacKern	119.	Solutions, International Super Glue II	62
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Smart Alarms w/Appt. Diary	Special 49.	Symmetry HyperDA (Req. 512K)	35



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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AIRBORNE EXPRESS OVERNIGHT DELIVERY



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Beacon Technology		Microsoft	
HyperBible King James	145.	Quick Basic	65.
HyperBible International	175.	Olduvai Corporation	
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Turbo Pascal	68.	Power Up	
Bright Star Technology		Hyper Tutor	29.
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MacBottom HDDs by PCPC

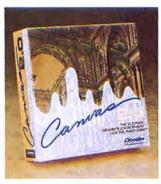
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7.

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MacSnap 4S	699.	HD-WSI	199.
			. 30.



MacTilt by Ergotron

MacTilt relieves the physical discomfort caused by crouching and squinting to see the Macintosh screen. By raising the Mac 4-inches and providing unequaled tilt/swivel capabilities, the MacTilt provides the increased height necessary to bring the Mac up to eye level and the flexibility necessary to reduce eye, neck and back strain. Models are available for the Mac Plus, SE and Mac II. \$68.

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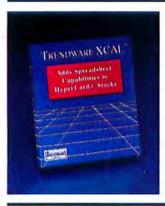
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XCAL adds spreadsheet capabilities to HyperCard. Create formulas by clicking on fields and buttons in a transparent spreadsheet which displays over cards in a stack. XCAL recalculates formulas automatically when HyperCard objects are clicked or modified. Perform calculations across all cards of a background or just those matching a search criterion. Access advanced capabilities with the macro editor. \$89.

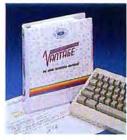
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dvanced Gravis		Printer Muffler 80	43
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The Cutting Edge 800K floppy disk drive takes advantage of the newest technology to offer high speed, low noise, high reliability in a compact, stylish case. The Cutting Edge 800K floppy drive is compatible with all new ROM Macs including the Mac SE and Mac II. The Cutting Edge 800K would make an attractive addition to many Macs. \$149.



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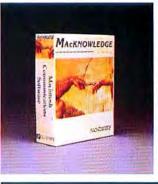
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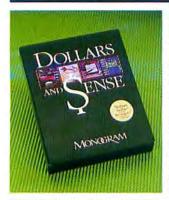
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MacMoney is the user-friendly money management program for the Mac at home or in business. MacMoney features easy point and click transaction entry. Let MacMoney help you solve your cash management problems today. \$59.

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QuicKeys (Macro Program)
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Dantz Software Development
Retrospect
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Calculator Construction Set v2.0
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Pyro!
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65.	Peripheral Land TurboOptimizer	25
32	TurboBack	49
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155.	TurboSpool	59
	SuperMac Software SuperSpool 5.0	59
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31.		cial 59
	Sentinel 2.0	89
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55.	OpenIT!	49
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79.	w/LaserWriter Option	34
57.	StickyBusiness	89
87.	XTree Company XTree	52



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PROGRAMS PLUS

PixelPaint Professional by SuperMac Software

PixelPaint Professional is the first "true-color" paint program for the Mac. 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, antialiasing and transparency control for advanced graphics effects and photographic-quality images. \$405.



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	cial 359.	MBA Travelog	115.



DiskFit 1.5 by SuperMac Software

Now there is no excuse for not protecting the information on your hard disk! Quickly and automatically, Disk-Fit performs an incremental back-up of your hard drive onto standard or high-density floppies, cartridges, tape or other hard drives. Allows you to select the type of files for back-up and finder-readable storage format lets you copy single files from the back-up media in the Finder. \$59.

Borland Reflex Plus	185.	Icom Simulations	
Claris		Formulator	89.
FileMaker II	229.	Microsoft Microsoft File 2.0	125.
Exodus Retriever	59.	Microsoft Office (includes Exce	i.
Fox Software FoxBase+ V2.0	255.	Word, PowerPoint & Mail)	499.
FoxBase+ Multi-User V2.0	355.	Odesta Double Helix II	339.
FoxBase+ Runtime V2.0	155.	DataDesk Professional	Special 285
Generation Four		GeoQuery	199
Multiuser Business Administration S	Series:	Preferred Publishers	
MBA Clients	115.	DAlabase	Special 69.
MBA DistList	115.	ProVUE Panorama	205.
MBA Docutrak	115.	Software Discoveries	
MBA Inventory	115.	RecordHolderPlus	65.

LightningScan by Thunderware

LightningScan is a hand-held, high resolution image scanner for the Macintosh. Its design allows fast scanning of photographs, images from books and magazines, drawings, and logos. Its speed and flexibility make it an ideal tool for all Macintosh graphic applications including desktop publishing and design. After use, the scanning unit is easily stored in any desk drawer. \$409.



ENTERTAINMENT SOFTWARE

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World Class Leader Board Golf	27.	Flight Simulator 1.02	32
Accolade		Miles Computing Inc.	
Hard Ball or Mean 18	27.		
4th & Inches	27.	The Fool's Errand	32
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Activision		Might and Magic	36
Universal Military Simulator		Mindscape	00
or Manhole	30.	Balance of Power 1990 or	
Manhole CD ROM	35.	Crossword Magic	30
Broderbund	00.	Deja Vu or Deja Vu II	30
Ancient Art of War or At Sea	27.		00
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Bullseye Software	23.	or The Uninvited	30
	20		30
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Crystal Quest	25.		20
Crystal Quest w/Critter Editor	41.	Road Racer	39
Centron		Mac Golf Classics	53
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or BlackJack Ace	27.	Strategic Conquest Plus 2.0	35
Pokemaster or Baccaratmaster	27.	Net Trek	35
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Casino Master (Mac II)	Special 55.	Smash Hit Racquetball II	18



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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. \$289.

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or Life & Death	32.	Sir
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	Airborne or Enchanted Scepters	21.
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	Beyond Dark Castle	32.
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36.	Mac Wizardry	35.
	SoftStream, Inc.	
	Colour Billiards	35.
15.	Mac Man or Solitaire DA	23.



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Omnis 5 by Blyth Software

Omnis 5 is a comprehensive program for developing business data management applications. It is a multiuser, multi-platform database management system for the Macintosh and IBM compatible personal computers. \$359.

Joseki Tutor

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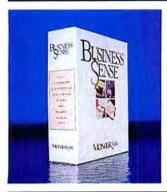
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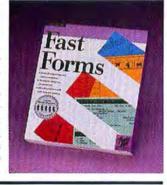
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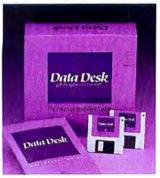
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With Managing Your Money, you can write, print checks, set up a personal budget, estimate your taxes, set up a retirement plan, manage an investment portfolio, and calculate your net worth. \$125.

COMMUNICATION SOFTWARE

Compuserve		Insigna SoftPC	245.
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DataViz MacLink Plus/Translator	105	Meta Comet	
MacLink Plus with Cable	125.	Accu-Weather Forecaster	Special 58.
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News/Retrieval Membership Pack	24	Microphone II v3.0	219.
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Condensed	239	#46 Futura 2	179.	w/Commercial Pi	95
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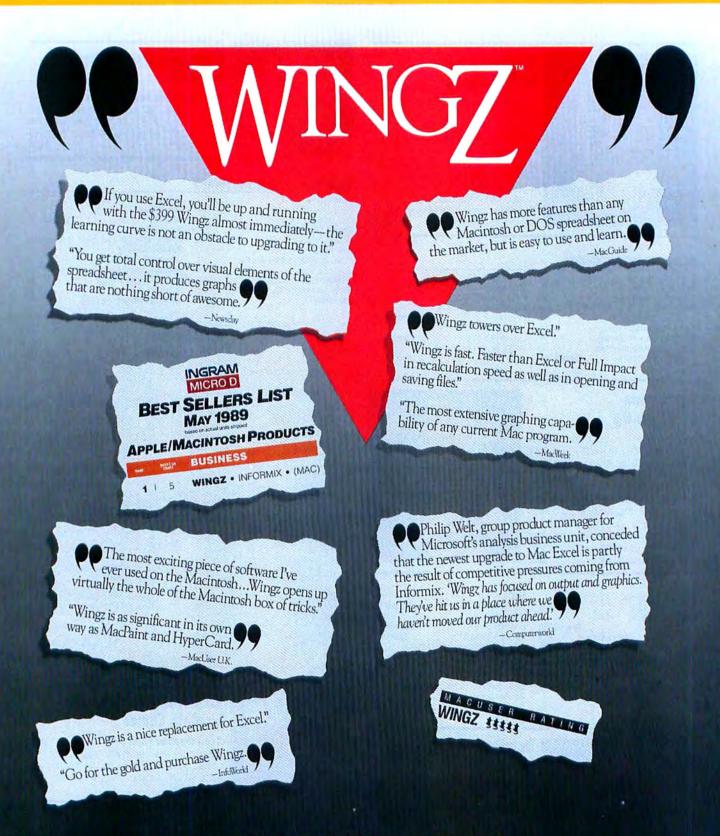
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NEW PRODUCTS

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

Aligne UPS Systems

Online UPS systems for Mac Plus, SE, and II that turn on and off automatically with the Mac. Backs up CPU, monitor, and one additional piece of hardware. Convection-cooled; matches footprint of the computer. Aligne SE \$440; Aligne Plus \$460; Aligne II \$1100. American Lotus Technologie, 404/284-1828.



Aligne UPS Systems

Apple FDHD External Drive

External 1.4MB drive for Mac IIcx and SE/30 takes advantage of the FDHD's ability to format, read, and write Mac 400K, 800K, and 1.4MB disks —in addition to MS-DOS, OS/ 2, and 800K ProDOS disksusing Apple File Exchange 1.1 or greater. \$629. Apple Computer, 408/996-1010.

Baytec 2000

Computer network that integrates Macs and workstations with mainframes and minicomputers, LANs, and other networks. Uses SCSI interface for data-transfer rate of up to 200 megabits per second. Conforms to ISO/OSI model. \$16,996 for 56-node base unit, which includes file server, print and plotter spooler, and network interface. Baytec, 313/427-1250.



Complete Page Scanner

The Complete Page Scanner, The Complete Half-Page Scanner/400

The Complete Page Scanner is a 200/300-dpi sheetfed scanner that scans images up to 8½ by 14 inches in less than 30 seconds. The Complete Half-Page Scanner/400 scans images up to 4 by 14 inches at 200 dpi, 300 dpi, or 400 dpi. Both units simulate 16 levels of gray. \$499. The Complete PC, 408/434-0145.

FaxPro

Combines the functions of a 9600-bps facsimile modem

with a 2400-bps Hayes-compatible intelligent modem. Features include background operation with MultiFinder, delayed transmission, and multidestination sending. Communications software bundled. \$995. Cypress Research, 212/475-7782.



Genesis 6000

Genesis 6000

600MB erasable optical disk drive designed for applications with large-capacity storage needs. Automatically manages bad blocks and formats disk cartridges. Uses 5 1/4-inch removable cartridges. S4995. Macsetra Technologies, 306/934-6044.

Heart Data Drives

Series of 13 hard disks for the Mac including 4 high-capacity internal hard disks for the Mac II/IIx. \$1035 to \$4795. Heart Data Corporation, 818/998-1691.

Jasmine DirectDigital Tape Drive

Digital audiotape drive with 1.2 gigabyte capacity. Can locate data anywhere on the tape within 40 seconds. Uses 4mm tape cassettes. \$6995. Jasmine Technologies, 415/282-1111.

M300 Floppy Disk Drive

External 3 ½-inch 800K floppy disk drive. Has a microprocessor-controlled, variable-speed, spindle motor and optional software-controlled automatic disk ejection. Without push-button eject \$229; with push-button eject \$249. SystemGate, 818/282-4720.

NB-PRL Plug-in Board

Plug-in interface board for the Mac II that lets documents written in Mac word processing programs be printed on Centronics-compatible printers and plotters. \$245. National Instruments, 512/250-9119.



ParaLink

ParaLink

Printer cable that houses both a serial-to-parallel converter and a high-speed buffer. Comes with software drivers for all printers. \$129. Jonathan Freeman Technologies, 415/822-8451.

Photolink

Product that uses infrared light as a medium for connecting Macintosh computers (continues)

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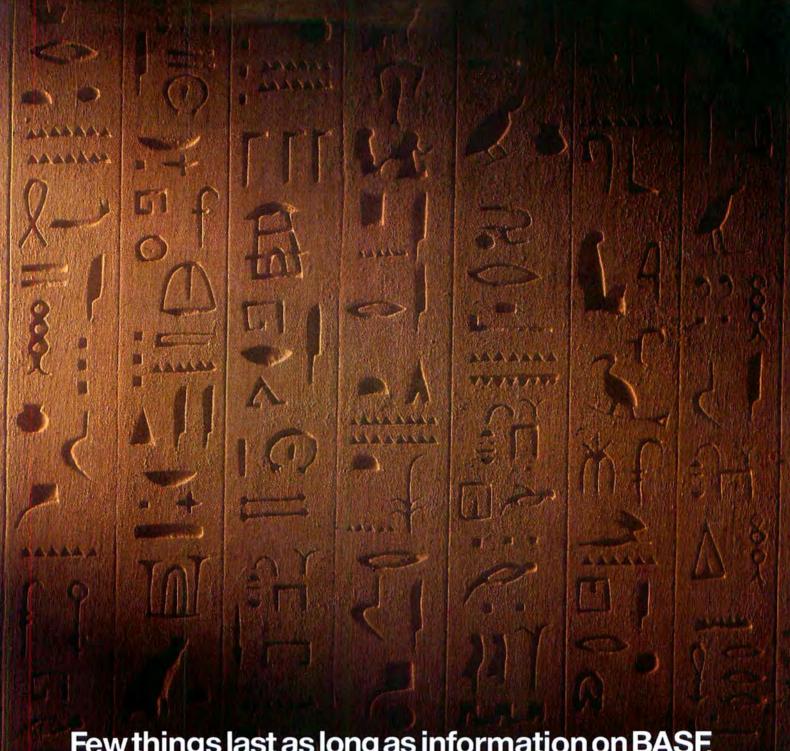
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and service for this product, contact Air Land Systems.

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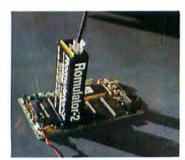
2710 Prosperity Avenue, Fairfax, Virginia 22031-4387 (703) 573-1100; FAX (703) 573-0121; TWX 710-833-1174 AIRLAND FRAX and peripherals within a local area network. User-installable and portable. Attaches to office partition. \$995. Photonics, 408/370-3033.



Photolink

Pow-R-Lok

Keylock device controls access to computers, hard disks, printers, and peripherals by preventing power-up without the appropriate key. \$69.95. Mac Products, 714/595-4838.



Romulator-2

Romulator-2

EPROM emulator that can be used to develop programs for any processor for which you have an assembler. Miniature surface-mount design reduces connection distance and eliminates interline capacitance and cross talk. \$295 and up. Onset Computer, 508/563-9000.

RX7100PS PostScript Printer

PostScript-compatible printer runs with both Macs and IBMcompatible PCs. Comes with 35 fonts, dual paper trays, and the ability to emulate several industry-standard interfaces. \$4495. Fujitsu America, 408/432-1300.

XY600RW Optical Laser Drive

High-density optical laser drive compatible with Mac SE and all later Mac models. Drive is accessed via standard SCSI interface and uses 51/4-inch industry-standard ISO format disks, each of which stores up to 600MB of information. \$4995. Xyxis, 612/944-9011.

SOFTWARE

Aldus PageMaker Color Extension

Software adds color capabilities to Aldus PageMaker. Lets you add color text and Page-Maker-drawn graphics, and import color illustrations saved as encapsulated Post-Script files. Supports full palette of Pantone colors. \$195. Aldus, 206/622-5500.



Aldus PageMaker Color Extension

AppMaker

Programmer's tool designed to cut development time by automatically programming the user interface (menus, windows, dialogs, and alerts). Developer points and clicks (continues)

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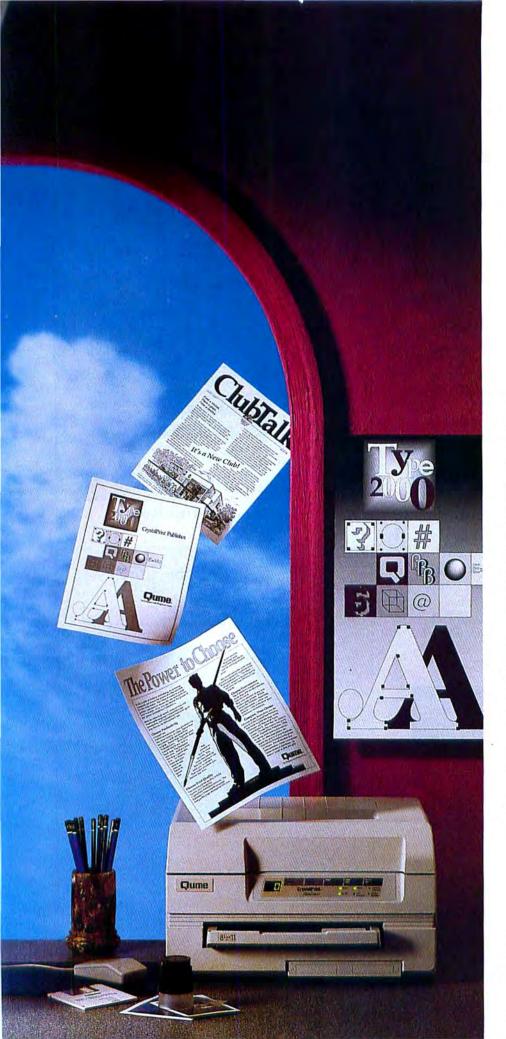
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Dealers circle 115 on reader service card End users circle 353 on reader service card to arrange elements of the user interface on the screen and AppMaker generates the source code. \$295. Bowers Development, 617/259-8428, 800/245-8999.

atOnce

Integrated accounting application for small businesses. Contains modules for General Ledger, Accounts Receivable, Accounts Payable, and Payroll. Handles up to 20 userdefined journals and multiple companies. Allows transactions of up to \$99 million. \$395. Layered, 617/242-7700.



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Software for small- to mediumsize businesses to do job costing and budgeting written in spreadsheet format. \$199. Absolute Solutions, 800/458-3399, 800/633-7666 outside California.

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Final chapter of four-part series that takes J. R. R. Tolkien fans on a journey through Middle-Earth that is populated by deadly spiders, evil trolls, and grinning orcs. Based on Book VI of *The Return of the King*, by J. R. R. Tolkien. \$39.95. Addison-Wesley, 617/944-3700.

DavkaGraphics EPS: Jewish Holidays

Collection of Judaic clip art in encapsulated PostScript format, created with Adobe Illustrator. Encompasses a variety of Jewish holiday symbols and scenes. \$79.95. Davka Corporation, 800/621-8227.

DB/Write

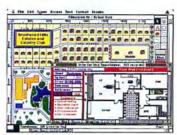
Word processor that can be seamlessly integrated into any new or existing 4th Dimension applications. Lets users merge data from any field or variable into the database. Includes features similar to those in MacWrite version 4.5. \$179. Metropolis Software, 415/322-2001.

Ed-U-Games

HyperCard-based teaching software designed to create object-oriented games out of educational materials. \$69.95. Solar Systems Software, 415/952-2375.

Filevision IV

Multilayer imaging, drawing, and database program that includes 30-by-32-inch adjustable drawing page and allows up to 32 database types with 255 fields per type. Includes report generator. \$495. Marvelin, 213/450-6813.



Filevision IV

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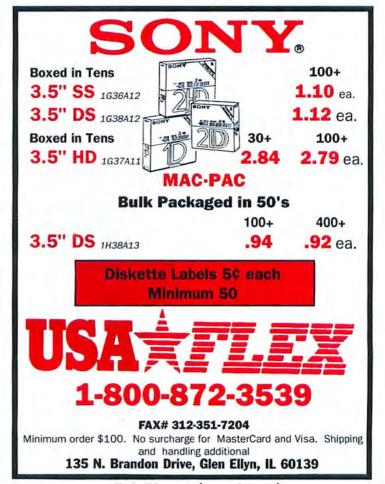
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We've revolutionized the features we pioneered with PixelPaint. To take advantage of the millions of colors available in 16, 24, and 32-bit modes. And to dramatically improve how you work in 8-bit mode.

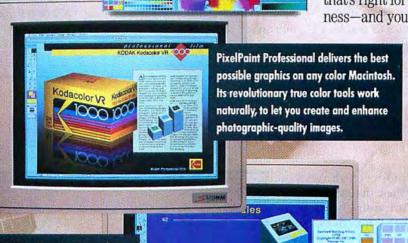
These new true color tools work easily and naturally. Mix colors on screen like paint on a canvas. Add transparent tints and shadows. And use real antialiasing for smooth shapes and blends. To create

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485 Potrero Avenue, Dept. 300 • Sunnyvale, CA 94086 408 • 245 • 2202 be accessed by subsequent users), and file encryption and decryption. Runs in the background under MultiFinder. \$195. Transfinite Systems, 617/969-9570.

Genesis

Design and presentation tool provides an object-oriented drawing environment for drawing symbols that represent ideas or processes. Lets the user link related symbols, attach headings to them, and create hierarchies. \$149.95. Futuresoft System Designs, 212/674-5195.

Hot-Spot

Graphics- and text-linking tool that serves as a text and graphic authoring system. Lets you place graphics and text files in any application, and link graphics to graphics or text using point-and-click

method, \$79.95. Antic Software, 415/957-0886.



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Self-paced tutorial for Microsoft Word version 4.0 that provides audiocassette and disk-based interactive instruction. \$49.95 per module. Personal Training Systems, 408/559-8635.

MacLog

Wireline-log evaluation application for geologists. Measures subsurface rock characteristics, processes subsurface

measurements, and transforms data into values of porosity and hydrocarbon saturation. \$4000 plus \$500 for digitizing software. Bowler Petrophysics, 303/860-1641.

MacSticker

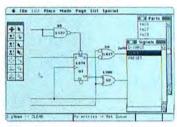
Drawing program for designing and printing custom signs, labels, name tags, and badges. Includes sticker templates, clip art library, and 32 sheets of 81/2-by-11-inch self-adhesive sticker stock, \$49.95. Intercontinental Computer Services, 312/440-1721.

MaxNotes

Front-end application for Digital's VAX Notes electronic conferencing system. Uses Alisa's TSSnet Macintosh DECnet package to connect to remote VAX Notes conferencing servers via DECnet. \$295. Alisa Systems, 818/792-9474.

McLogic

Design tool for electronics engineers. Allows an engineer to enter a schematic directly onto the Mac. Outputs to a variety of schematic-capture programs or directly into the simulators resident on those programs. \$1995. Eclipse Software, 215/696-2801.



McLogic

Mr. Postman

HyperCard stack designed to help users prepare for U.S. Postal Service Employment exam. Contains address-checking exams and memory-for-(continues)

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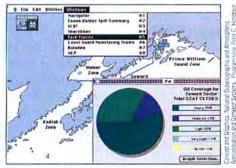
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Oakley® Sunglass Selector



With this interactive brochure, anyone can design a custom pair of sunglasses on screen and order automatically. This multimedia standalone uses color, digitized music and voice, animation and custom menus.

CAMEO Valdez



NOAA and the U.S. Coast Guard monitored the Exxon Valdez oil spill cleanup and conducted daily briefings using this interactive information system that combines maps, graphs and databases.

Marketing Strategy Planner



This hypermedia information system was designed for boardroom presentations and strategic analysis. By clicking on the graphics, speakers can pull up relevant data and analyze it quickly in response to questions.

SuperAnimator"



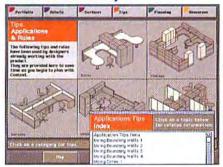
SuperAnimator is a toolkit for creating animated "agents" with synchronized sound. A commercial product created in SuperCard, it incorporates the elements of a traditional Macintosh* application.

The "Guernica" Project



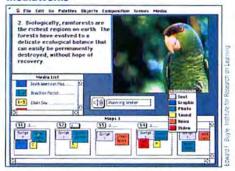
This stunning graphical interface is the interactive front end to a multimedia database related to Picasso's lamous painting. Starting from *Guernica*, users can explore nearly any path of association imaginable.

Context Information System



Steelcase Furniture uses this interactive multimedia presentation and electronic catalog to present their new line of modular office furniture, "Context." It incorporates Super 3DTM models and animations.

MediaWorks



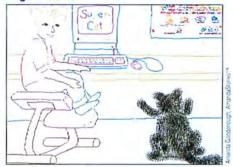
This multimedia composition environment was created as an Apple Classroom of Tomorrow project to allow 12year-olds to create their own educational applications by combining information from a variety of sources.

Cardiac Imaging



This interactive medical education project makes use of color graphics, interactive video, digitized sound and images created in Super 3D" to teach residents and clinical staff at Yale University School of Medicine.

Inigo At Home



Inigo achieved fame in the HyperCard® story stack entitled, "Inigo Gets Out." Author Amanda Goodenough easily converted her charming character to SuperCard and colored his world.

Suggested Retail Price \$199

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SUPERCARD the personal software toolkit.

System requirements: Macintosh Plus, SE, SE/30, II, IIx or Ilcx, System 6.0.2 or later. SuperCard, Super 3D and the Silicon Beach Software logo are trademarks of Silicon Beach Software, Inc. All other trademarks are the property of their respective owners. P.O. Box 261430 San Diego, CA 92126 (619) 695-6956

SILICON BEACH

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address exams, both of which are required by the U.S. Postal Service. \$24.95. Mac of All Trades, 702/646-2185.

Mum's the Word

Garden-planning software to help in designing gardens: selecting plants, deciding where to plant them, planning for continuous bloom, and keeping records of a garden's progress. Includes horticulture database and draw program. \$125. Terrace Software, 617/491-4725.

Nemesis Tactical Wizard

Software tutorial for the game of go. Analyzes life and death tactics *tsumego* in the context of the particular game you are playing, and allows you to explore potential moves to see the result. Runs with Nemesis Go Master. \$59. Toyogo, 617/861-0488.



Paint Tools Plus

Paint Tools Plus

Collection of tools and accessories—including patterns, gray scales, paintbrushes, rulers, and special effects—that can be installed in any Macintosh paint program. Contains a Special Effects tutorial. \$49.95. Galileo Software, 219/879-7803.

The Philadelphia Zoo

Hypertext-based tour of the Philadelphia Zoo. Stack con-

tains more than 1000 trivia questions about animals. Has sounds and digitized images of animals. Includes maps of the zoo and zoo information. \$29.95. Everett Faircloth, 609/354-8117.



The Philadelphia Zoo

QuickMail Bridges

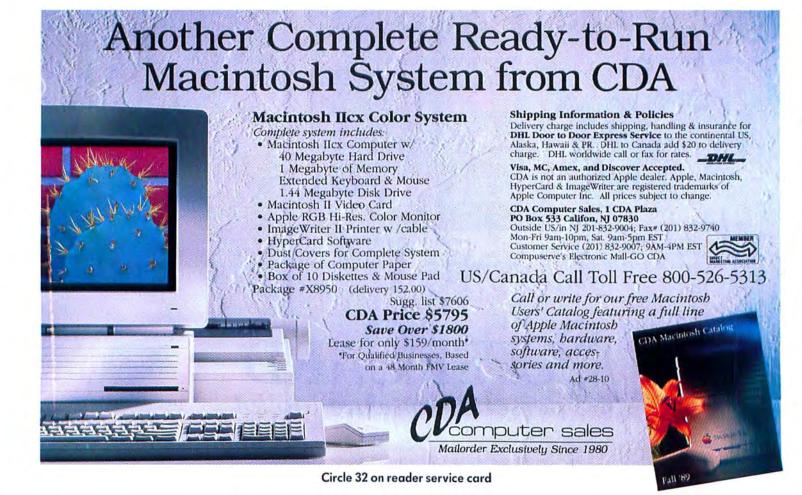
Connectivity products for CE Software's QuickMail. QM-Connect Bridge exchanges mail and multiple files and is accessible through Tymnet and Accunet; QM-Serial Bridge provides a direct hard-wire link to mainframes; QM-Data-Collection Bridge collects text from QuickMail messages and adds it as a tab-delimited record in selected text files. QM-Connect Bridge and QM-Serial Bridge \$99.95 per server; QM-DataCollection Bridge \$149.95. CE Software, 515/224-1995.

ReSet

HyperCard-based readingskills-evaluation software. Checks 23 reading skills in the categories of resource skills, comprehension, vocabulary, and word structure. \$79.95. Lazybones, 206/736-8680.

Studio Convert

Utility that allows the user to import a LetraStudio or Free-Hand encapsulated PostScript document into Adobe Illustrator and have each element of the imported file be treated (continues)



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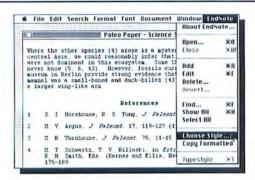
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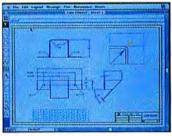
Niles & Associates, Inc., (415) 655-6666 2000 Hearst Street, Berkeley, CA 94709

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as an object. Allows consistent assignment of color and line weight. \$149.95. ISDC, 312/705-9107.

Ta Biblio

Database for antiquarians, and out-of-print and second-hand booksellers. Based on Odesta's Double Helix II; designed to organize and simplify the daily details of business for selling print material. Contains Library and Clients databases and Orders menu. \$495. TurnKey Technologies, 914/633-3940.



Vellum

TK Solver Plus

Mac version of this equationsolving and knowledge-management software. Incorporates Mac user interface and graphics. \$395. Universal Technical Systems, 800/435-7887, 815/963-2220 in Illinois.

Vellun

Engineering and drafting CAD software. Drafting Assistant feature delivers continuous on-screen visual feedback and highlights important points in a drawing. Integrated parametrics permit the user to conceptualize designs on screen without knowing exact dimensions or shape of the drawing ahead of time. \$995. Ashlar, 408/746-0749.

WeatherStation

HyperCard-based system for real-time data logging of tem-(continues)



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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.

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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.

Image showing the Apple Macintosh user interface.

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.

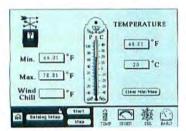
With over 450 commands and features to meet your design needs, MicroStation Mac exemplifies the most complete functionality of any CADD package available for the Macintosh, making MicroStation Mac your best choice for design needs.

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



perature, barometric pressure, wind speed, and wind direction. Comes assembled with sensors mounted on stub mast, microprocessor-based interface, HyperCard, and cables. \$595. Design Engineering, 413/624-5557.



WeatherStation

Wild Things

Program that adds animation as well as mathematical and statistical capabilities to HyperCard. Provides 40 ready-to-paste HyperCard commands and instructions for writing new commands.

\$150. Language Systems, 703/478-0181.

XVT for the Mac

Software that allows programmers to develop and maintain one set of application source code for Windows, Presentation Manager, and the Mac environment. One XVT call can produce many native toolkit calls and handle a variety of programming details. \$595 (no run-time royalty fee). GSS, 503/641-2200.

ACCESSORIES

Glare Eliminator

Antiglare, antireflective aerosol optical coating. \$29.95. OptoTechnics Company, 312/205-0340.

Macintosh IIcx Case

Carrying case designed for the Mac IIcx. Padded pouches



Macintosh Ilcx Case

store mouse and accessories above the CPU; zippered sleeve protects extended keyboard. Includes cord keeper and paper pocket. \$85. West Ridge Designs, 503/248-0053.

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Transport cases for the Mac II and ImageWriter II made of

2024 alloy. Mac II/IIx system comes with two cases: one for an RGB monitor, one for a keyboard and accessories. Mac II/IIx system \$799.95; Mac IIcx system \$719.95; Image-Writer case \$369.95. Zero Halliburton, 818/897-7777.



Mac II Transport Case

Ripper Stripper

Lightweight plastic device for stripping perforated edges from computer printouts. Works on up to 25 printout sheets at a time, \$9.95 plus \$3 (continues)

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ZRef

Set of two 8½-by-11-inch ZBasic quick-reference cards for Mac programming. \$10 per set. Master Manufacturing, 213/694-6861.

BOOKS & VIDEOS

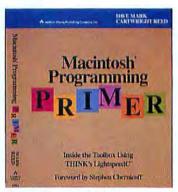
Confessions of a Data Administrator

Sets out to provide insight into the problems and solutions of information resource management. Contains topics for both data resource managers and technicians. Written by William Durell. \$49.95 plus \$5.00 s/h, Data Administration, 301 N. Harrison St., Bldg. B, #203, Princeton, NJ 08540.

Expert Advisor: Microsoft Word 4.0 for the Macintosh Reference book for all versions of Microsoft Word up to and including version 4.0. Contains list of all commands and their functions. Written by Paul E. Hoffman. \$19.95. Addison-Wesley Publishing Co., 617/944-3700.

Macintosh Programming Primer

Book for developers new to the Mac. Covers characteristics and concepts unique to the Mac. Examples in Think's LightspeedC direct the reader from fundamental concepts



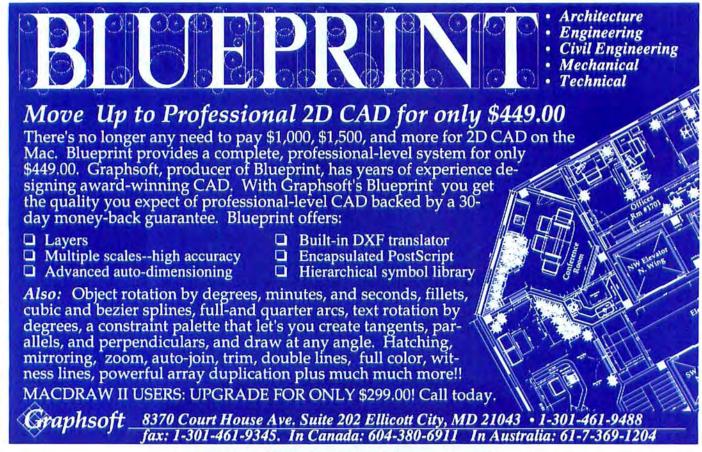
Macintosh Programming Primer

through specifics of writing, compiling, and running programs. Written by Dave Mark and Stephen Chernicoff. \$24.95. Addison-Wesley Publishing Co., 617/944-3700.

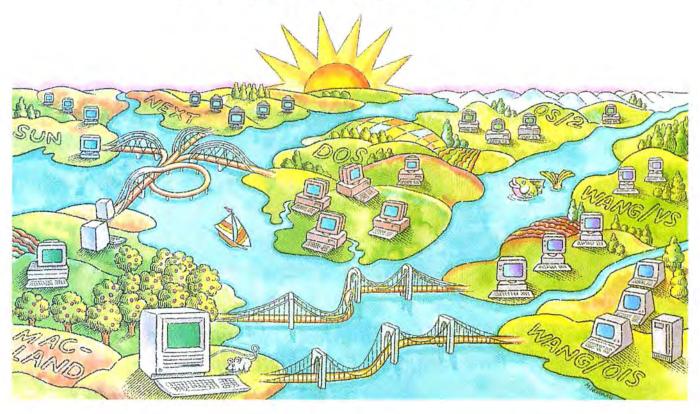
PageMaker 3 by Example

Self-paced tutorial for beginning and intermediate Page-Maker users. A series of models gives increasingly detailed information about PageMaker operations. Written by Tony Webster and David Webster. \$22.95. M&T Books, 415/366-3600.

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QUICK TIPS

Quick Tips

Raw hard disks,
eliminating mailing-list
duplicates, quick
disk ejection, and more

by Lon Poole



onts in a desktop publishing document may get mixed up when you send the document to a service bureau for typesetting. Sending a PostScript derivative of the document avoids the potential mix-up. If you have trouble creating a PostScript derivative by pressing #-F (after clicking OK in a Laser-Writer Print dialog box, as described here last January), you may not be holding down that key combination long enough. Doug Smith of Wheaton, Illinois, suggests you press #-F until a message appears on screen informing you that the PostScript file is being created.

COLOR ON AN IMAGEWRITER II

You can print color documents, including overhead transparencies, on an Image-Writer II fitted with a multicolor ribbon. A tip last February suggested printing overheads on film made for the Hewlett-Packard PaintJet printer. If, like David Zimmerman of Austin, Texas, you can't find the film, call 800/752-0900 for the name of an HP dealer near you, or call 800/538-8787 to order directly from HP.

An ImageWriter II with an out-ofalignment multicolor ribbon prints rainbows instead of solid colors. A tip last March showed how to align the ribbon using small adhesive labels as shims un-

derneath the ribbon cartridge. You may not need the shims if your ImageWriter II has a ribbon-adjustment knob. Tony Kipouros of Hausen/Brugg, Switzerland, found a description and photo of the knob in the German edition of the ImageWriter II manual. My two-year-old ImageWriter II does

not have the knob (and the manual doesn't mention it), but I presume that newer ImageWriter II printers have the knob and that their manuals explain how to use it.

INTERNATIONAL ERROR

Did you catch my Franco-American error last May? Duane Marcroft of Santa Clara,

California, did. To set the record straight, a modem that uses the Bell 212A protocol (the American standard) *cannot* communicate at 1200 bps with a modem that uses the CCITT V.22 protocol (the French standard). Both use the same carrier frequencies and modulation schemes but different handshaking (connect sequences). Some American modems (such as the Hayes SmartModem 1200) are compatible with both protocols.

DUAL MAC SYSTEM

Is there a way to connect my new Mac SE to my Mac 512K (with 1MB of RAM)? I'd like to simultaneously view one file on the SE monitor and another file on the 512K monitor. Obviously, it would be best if I could control the 512K monitor from the SE. If this is not possible, can I connect the two Macs using AppleTalk so that the 512K can use the SE's hard disk? Matthew Geller

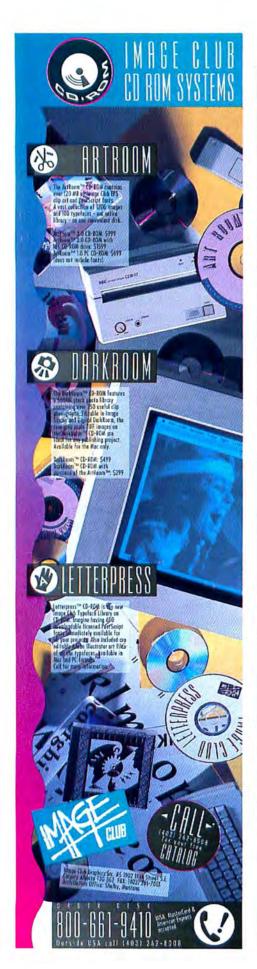
New York, New York

You can't use your Mac 512K as a second monitor for your SE, but you can connect the two Macs with an AppleTalk network. Basic AppleTalk hardware and software are built into every Mac; all you add are connector boxes and cables. You can use Apple's LocalTalk connector kits (model M2068 for the SE, model M2065 for the 512K), Farallon's PhoneNet connector kits (model PN208 for the SE, model PN209 for the 512K), or their equivalents. To access the SE hard disk from the 512K, you must also have file-server or disk-server software such as TOPS, InfoSphere's MacServe, or La Cie's Silverserver.

When you use a remote hard disk over the AppleTalk network, its performance degrades to approximately the speed of a floppy disk. It's also possible to control the 512K from the SE over the AppleTalk network using Timbuktu software from Farallon, but be prepared for similar performance limitations.

BUILD YOUR OWN DISK DRIVE

I read with great interest this advertisement by MacWarehouse in the May 1989 Macworld: "Quantum 40MB (continues)



Raw Drive...\$545." The price seemed too good to be true, so I called MacWarehouse to find out whether I could use the product with my Mac Plus. However, it was obvious that the two employees I talked to had no idea what they have or how to use it. I called Quantum but once again did not get answers to my questions. What is needed to use the drive with a Mac Plus? Why does PCPC's MacBottom HD45 drive cost \$314 more, apart from its additional 5MB of storage?

Charles Brinkman Colorado Springs, Colorado

The two people I talked to at Mac-Warehouse (201/367-0440) did not seem very knowledgeable either. However, after much cross-examination, I discovered that you can use the Quantum drive as an external SCSI with a Mac Plus if you also buy a \$189 Cirrus Capsule Kit. Consisting of a cabinet, power supply, fan, cables, carrying case, installation guide, software, and manual, the kit is manufactured by La Cie (503/684-0143), and the case has the same design as fully assembled La Cie external hard drives. Included in the package are La Cie's Silverserver (for local and remote hard disk and modem sharing) and Silverlining (for formatting, partitioning, and other hard-disk management functions).

You provide the labor to assemble the components and format the drive. If you had a Mac SE or a Mac II, you could install the Quantum drive internally using a MACstor Capsule Kit, also manufactured by La Cie, or a UniMac Mounting Kit. MacWarehouse sells each kit for \$99.

When you factor in \$189 for the external drive kit, a MacBottom HD45 costs only \$125 more than the mail-order Quantum. That's what you pay for plug and play.

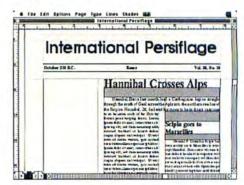
PAGE LAYOUT GUIDES

TIP: To get accurate spacing between objects in a page-layout document, use boxes as guides. They're perfect for matching the space throughout a publication between a headline and body text, body text and graphic, and so on. Unlike rulers, guide boxes are completely visual, involving no arithmetic. Drag the guide to the

edge of one object, and then drag the other object to the other side of the guide. "Guide Box" shows a guide in use.

Perry Bessas

Cliffside Park, New Jersey



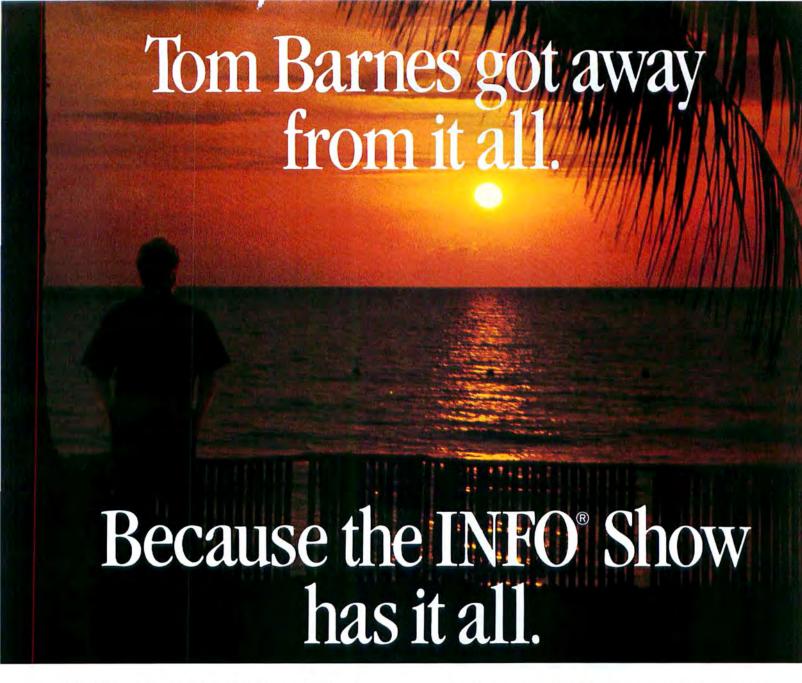
Guide Box

Draw a box (shaded or not) to use as a spacing guide when laying out the pages of a publication. The shaded boxes here, facilitating standard spacing between headlines and body text, will be removed before printing.

REMOVING DUPLICATE ADDRESSES

TIP: You can remove duplicate addresses from a mailing list that you maintain as a Panorama database by using half a dozen menu commands. With the database file open, choose Select All from the Search menu to make sure all records are visible. Then select the field from which you want to eliminate duplicates by clicking on any of its cells (for example, click the Street Address field if you wanted to eliminate all records having duplicate street addresses). Next, group duplicate records by choosing Sort Up from the Sort menu, and blank the duplicates by choosing Unpropagate from the Math menu. Now you can eliminate the duplicate records. Choose Select from the Search menu, and in the data input window just below the menu bar, click the ≠ option and press Return without typing anything else. Finally, choose Remove Unselected from the Search menu. You can record the procedure as a Panorama macro (which is described in the Panorama manual) if you need to use it often.

Determining bona fide duplicates may involve looking at more than one field (the name and address field, for example, to see whether your mailing list contains (continues)



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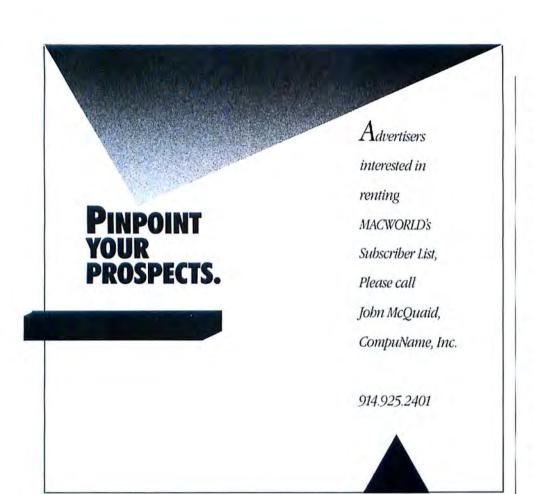
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more than one person at the same address). To set up a multiple-field search, make a new text field by adding a new line to the database's design sheet and clicking the New Generation icon (the check mark) in the design window. In any cell of the new field, enter an expression that combines all the fields you want to use as criteria. The following example combines six fields for use as a single criterion:

Name+Company+Address+City+State+Zip

Use your new combination field as the criterion field in the procedure outlined in the previous paragraph.

Paul Chance

Huntington Beach, California

INSIDE-OUT TEXT FLOW

TIP: PageMaker 3.0 normally flows text around the outside of a graphic object, but it can flow text inside the object instead. The key lies in the text-repelling graphic boundary that PageMaker creates around the object; the trick is to turn the boundary inside out. "Flow Within" illustrates the procedure. Here are the steps.

- Select the object and choose Text Wrap from PageMaker's Options menu. In the dialog box that appears, select the middle Wrap option and click OK. Page-Maker draws a rectangular graphic boundary with diamond-shaped handles at each corner.
- 2. Select the pointer tool from the toolbox and drag the upper-right handle to the left, close to the upper-left handle. Then drag the upper-left corner to the right. Repeat with the lower handles. The graphic boundary is now inside out.
- Adjust the handles until you get the spacing you want between the text and the inside of the graphic object. For a nonrectangular graphic boundary, add diamond handles by clicking anywhere along the graphic boundary.

One last important note: You may have to experiment with the text handles to make the inside wrap work. For example, the text will not wrap to the inside of a graphics boundary if the text is narrower than the widest part of the graphics boundary.

Paul Schiring Everett, Washington (continues)



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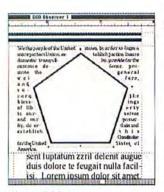
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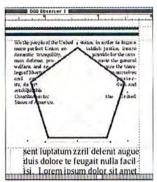
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Flow Within

PageMaker 3.0 wraps text around graphics by constructing a graphic boundary that repels text (left). Dragging the handles on the right side of the graphic boundary to the left side and those on the left side to the right side (center) turns the graphic boundary inside out. As a result, PageMaker wraps text inside the graphics boundary (right).

QUICK DISMOUNT

TIP: Recently it occurred to me that there must be some way to eject a disk and dispose of its icon without dragging the icon to the Trash. Well, what about the Option key? Option-#-E seemed like a good method, and it works! The only trick: you must hold down the Option key until

the disk has ejected. Releasing the key too soon leaves the icon on the desktop. Ralph Krug Dexter, Michigan

You can also press Option while choosing Eject from the Finder's File menu. If you're using MultiFinder, the Finder must be active for these shortcuts to work.

COMPLEX FILEMAKER II LOOKUPS

TIP: Most people use the lookup feature in FileMaker II for tasks like retrieving addresses for invoices from a client list. But it can also be used for more complex tasks, such as indexing a federal withhold-

ing tax table. To create the index, combine in one calculation field the three factors used to calculate federal withholding tax on a payroll check: gross pay, number of deductions, and marital status. The formula below for the calculation field works for any pay amount from \$10 to \$999.99 and any number of deductions from 0 to 9: if (Gross Pay < 100, Marital Status & # of deductions & 0 & int (Gross Pay), Marital Status & # of deductions & int (Gross Pay))

This formula calculates a 5-digit index number. The first of the 5 digits is marital status (1 for single, 2 for married), the next digit is the number of deductions (0 to 9), and the last 3 digits are the gross pay in even dollars (if the gross pay is less than \$100, the formula prefixes it with a 0 so that the resulting amount will have three digits). The Gross Pay field is calculated from the number of hours-which is entered manually-and the pay rate. File-Maker II looks up the pay rate (as well as the Marital Status and No. of Deductions fields) in the appropriate employee record. Calculations begin as soon as you (continues)

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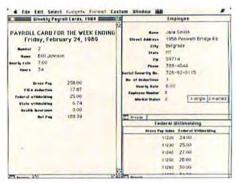
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Triple-Index Lookup

FileMaker II can look up a value based on a compound index. Here, a formula in an undisplayed field of the Weekly Payroll Cards file (left window) combines the marital status, number of deductions, and gross pay to form a triple index. FileMaker II looks up that 5-digit index in the Federal Withholding file (lower-right window) to find the appropriate withholding tax. It also gets the employee number from the Weekly Payroll Cards file and looks up that number in the Employee file (upper-right window) to determine the pay rate, marital status, and number of deductions.

enter an employee number and the number of hours worked.

After calculating the 5-digit index, File-Maker II looks it up in a file containing a list of 5-digit numbers and corresponding withholding-tax amounts. If FileMaker can't find an exact match for the 5-digit index number in the table, it uses the next smaller value. For example, the number 11238 (single, one deduction, and \$238 gross pay) isn't in the table, so FileMaker uses 11230, "Triple-Index Lookup" shows sample records from the three files involved. Christopher Brodin Bozeman, Montana

We pay from \$25 to \$100 for tips published here. Send tips or questions (include your address and phone number) to Quick Tips, Macworld, 501 Second St., San Francisco, CA 94107. Send electronic mail to CompuServe (70370,702) or MCI Mail (addressed to Macworld). All published submissions become the property of Macworld.

Lon Poole answers readers' questions and offers advice in his monthly Macworld column. Many of the tips he's compiled can be found in his book Mac Insights (Microsoft Press, 1986). More recently be bas written the quick reference, Hyper-Talk (Microsoft Press, 1988).

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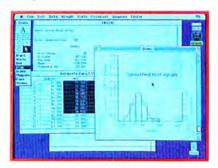
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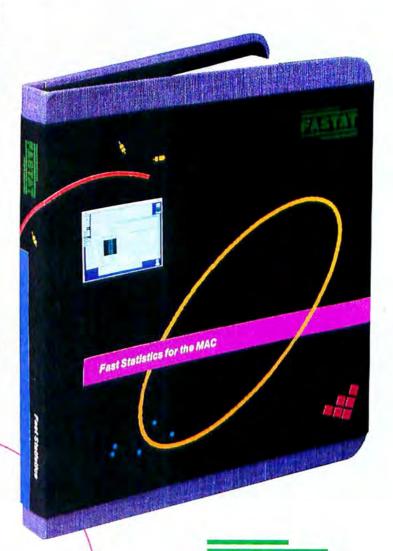
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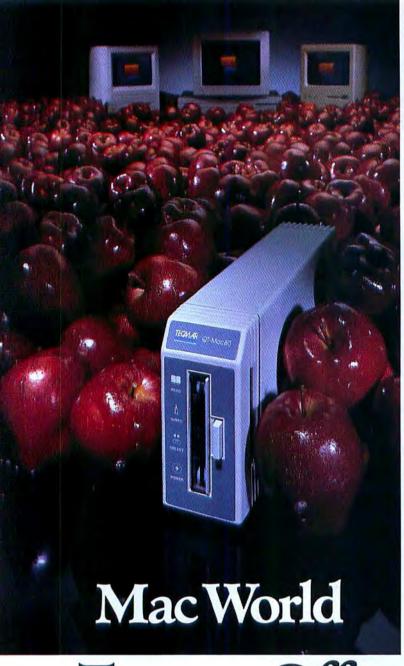


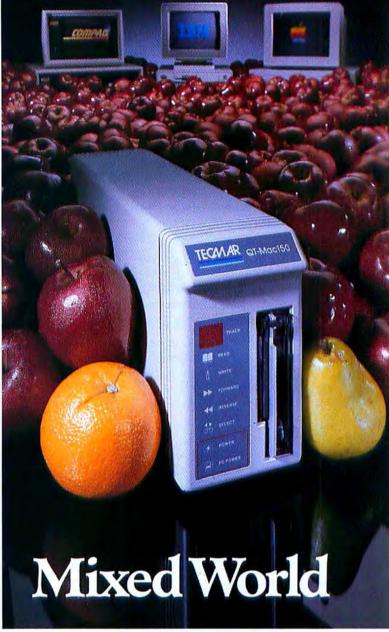
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	Apple* Macintosh*			IBM*/ Compatibles		
	Plus	SE	П	пх	PC	PS/2"
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QT-Mac80 80MB SCSI		6	*	•		
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Circle 321 on reader service card

GETTING STARTED

he marriage of Mac and laser printer is a happy one—even if it does require a hefty dowry.

But finding the perfect partner isn't easy. Today's laser printer shopper faces a raft of specifications and technical issues. And now that new system software with enhanced font features is on the horizon, picking a printer will only get harder. This month's column examines the technical processes behind laser printers,

and takes a brief gaze into the haze of the future. For a comparison

of 16 laser printers, see the article "Paging All Printers," in this issue.

Getting Started of 16 laser p ing All Printe with Laser MECHANICA A laser printe laboration be troller. The e

How they work, and what to look for when you're shopping for one

by Jim Heid



A laser printer's output results from a collaboration between an engine and a controller. The engine is the mechanical half of the duo; it works much like a photocopier. The engine helps determine print quality and speed, and it defines how well the printer can handle different kinds of paper, such as envelopes. The controller determines the printer's typographical features—the range and quality of the fonts, styles, and the sizes it can produce-as well as its compatibility with Mac applications and with other computers. The controller also guides the engine's imaging mechanism, telling it where to apply the toner powder that forms the image. And because describing the appearance of a page requires complex calculations,

the controller also helps determine printer speed. In most printers, the controller is housed within the printer's case and contains its

own microprocessor and memory

chips. As I'll explain shortly, however, some less-expensive printers use the Mac's processor and memory as their controller.



The primary difference between laser printer controllers lies in the type of commands they respond to. PostScript control-



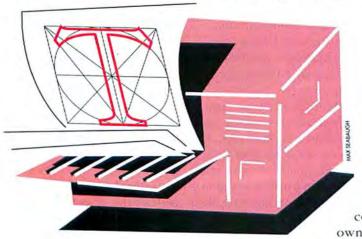
lers use commands written in PostScript, a programming language created by Adobe Systems for describing the appearance of pages (see "Getting Started with Post-Script," Macworld, December 1987). A PostScript controller is a powerful computer in itself. It typically has 2 megabytes of memory or more, a microprocessor, and ROM chips containing the PostScript language interpreter as well as a selection of font outlines, mathematical formulas the controller can use to create text in virtually any size and orientation. Apple's LaserWriter IINT and IINTX are both PostScript printers, as were the pioneering LaserWriter and LaserWriter Plus.

QuickDraw printers use the Mac as the controller, so they don't contain the complex controllers that PostScript printers require. And because QuickDraw printers make the Mac do more of the work, they generally cost less. But they often do less, too. At this writing, two QuickDraw printers were available: Apple's Laser-Writer IISC and GCC Technologies' Personal LaserPrinter.

THE DIGITAL TYPE FOUNDRY

Their driving language aside, the most important differentiating factor between printers is the *font mechanism*—the techniques they use to produce text. *Outline fonts*, combined with PostScript's wide array of graphics-manipulation commands (called *operators*), give PostScript printers tremendous typographic versatility (see "Outlines versus Bitmaps"). Need a 10-foot-high *W* filled with a checkerboard pattern? Want to produce a record label with the musician's name set in a circle? With a shadow behind it? Chores like these are a cinch for PostScript.

QuickDraw printers aren't as typographically talented. The LaserWriter IISC uses the Mac's bitmapped screen fonts to (continues)



print text, and therefore can produce only those type sizes that are installed in your System file. (Apple's System 7.0, due to debut next year, will change that by providing outline fonts for the screen and for QuickDraw printers; see "Caution: Outlines Ahead.") Moreover, the LaserWriter IISC can't stretch or apply patterns to text.

GCC's Personal LaserPrinter handles type much like a PostScript printer. The PLP uses outline fonts (stored on a hard disk), which allow it to create text in virtually any size; but because QuickDraw lacks PostScript's wide array of graphics operators, the PLP still can't produce all the special text effects of its PostScript competitors. You can also supplement a PostScript printer's built-in, or resident, fonts with downloadable fonts, whose outlines are stored on disk and downloaded to the printer's memory before printing.

THEY DON'T SHARE ALIKE

The differences between printer-driving languages are also important if you plan to share a printer with other computers. Since QuickDraw is confined to Macs, you can't use a QuickDraw printer with an IBM PC or clone. And because QuickDraw printers attach to the Mac's SCSI port, they can't be shared on a network. (You can, however, put a Personal LaserPrinter on a

CAUTION: OUTLINES AHEAD

major shortcoming in the Mac's current font mechanism is its reliance on bitmapped screen fonts. For example, to print smooth 18-point text on a Laser-Writer IISC you need a 72-point font as well as an 18-point font in your System file, since the driver reduces fonts to a fourth their size before printing.

All this will change with System 7.0, which will provide outline fonts for the screen, allowing Macs to produce smooth text in any size. Instead of the jagged-edged characters you see when choosing a size that isn't in the System file, you'll see smooth, well-formed characters. (If you have a large investment in bitmapped screen fonts, don't worry; System 7.0 will be able to use them too.)

The LaserWriter IISC will be able to produce high-quality text in virtually any size.

Programs that let you view documents in various magnification scales will display sharp—not jagged—text in all viewing scales.

Also, the new fonts will work together with a new system software component, the Layout Manager, to provide more consistent character positioning from one type of printer to another. This should allow you to use

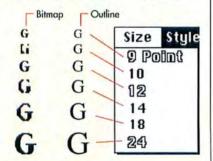
inexpensive printers such as ImageWriters as proofing devices for documents destined for PostScript printers.

What About PostScript?

Which brings up the question, where does all this leave PostScript printers? Well, in more or less the same place. Under System 7.0, when you use a font for which a PostScript outline font exists, the Mac will use the PostScript font, just as it does now. However, to use Apple outline fonts on a PostScript device, you'll need to translate them into downloadable PostScript fonts using an Adobe utility currently under development.

The fact that PostScript printers can be shared on a network still makes them the printers of choice for offices, especially those using both Macs and PCs. And Adobe's forthcoming Adobe Type Manager utility will allow users of PostScript printers to create outline screen fonts for the thousands of PostScript fonts that currently exist. Since many of these fonts may not be available in Apple's outline format for some time—if ever—Adobe Type Manager is likely to be valuable even after System 7.0 ships.

OUTLINES VERSUS BITMAPS



Because outline fonts are mathematically described as a series of lines and curves, a laser printer can produce them in virtually any size. Bitmap fonts, described as a series of bits, require a separate bitmap for each type size. Sizes that don't exist in the System file must be scaled from available sizes, producing jagged characters such as those highlighted here.

network using GCC's PLP Share, a \$499 hardware add-on.)

PostScript printers are far easier to share. Every PostScript printer contains a LocalTalk connector and built-in *print server* software, which allow it to be used with up to 32 Macs (and PCs equipped with LocalTalk boards).

Another PostScript plus is its industrywide support. PostScript is available on output devices ranging from laser printers to typesetters, and it's supported by a wide range of computers. PostScript's popularity lets you move files between printers or computers while retaining file formatting.

FROM SCREEN TO PRINTER

Every page must ultimately be described as a *bitmap*—an array of bits, each corresponding to one dot on the page. A full-

page bitmap for a 300-dots-per-inch printer is roughly 1MB in size.

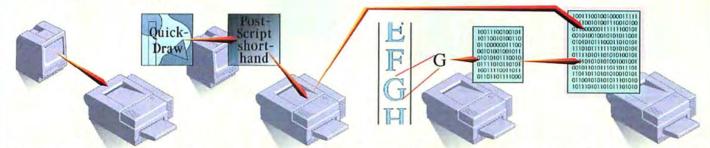
All that data has to be stored somewhere. PostScript printers and the Laser-Writer IISC store it in the controller's *page buffer*, a 1MB area of printer memory. The Personal LaserPrinter, stores it in compressed form on the Mac's hard disk and sends it to the printer just before printing.

PostScript printers and the PLP must translate font outlines into bitmaps in the type sizes needed for the page. Because the LaserWriter IISC uses the bitmapped fonts stored in the System file, it need not perform this time-consuming process.

Because some character bitmaps will probably be needed again later, PostScript printers and the PLP store them in an area of memory called the *font cache*. Retrieving a character bitmap from the font cache is much faster than creating a new one

PRINTING APPROACHES COMPARED

POSTSCRIPT PRINTERS

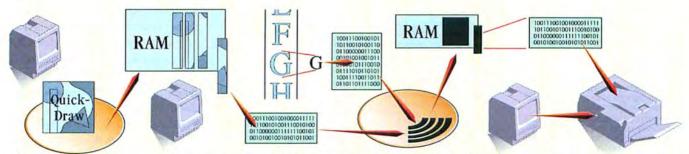


If LaserPrep is not present in the printer's memory, the Mac downloads it, preparing the printer for PostScript shorthand commands.

The LaserWriter driver translates the QuickDraw description of the page into PostScript shorthand and sends it to the printer. The printer's controller uses font outlines to create font bitmaps in the required sizes and stores them in the printer's font cache for future use.

The controller prepares a bitmap of the page, stores it in the page buffer, then directs the engine to print, using the page bitmap as a guide (see "Inside an Engine").

GCC PERSONAL LASERPRINTER

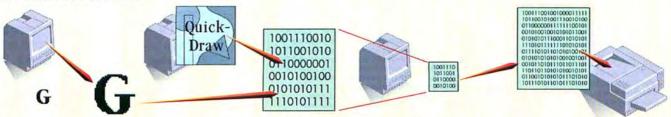


First, the PLP driver saves the QuickDraw page description on disk. Then the driver divides the page into sections called bands.

The driver prepares a 300-dpi bitmap of each band one-by-one, compressing and storing it on disk. Font bitmaps are generated from font outlines, as needed, and stored in the font cache in RAM. The PLP driver then reads all the compressed bands and assembles one compressed bitmap of the entire page, all in the Mac's memory.

The driver then decompresses the page and sends it to the printer, timing the data transmission to match the rotation of the drum.

LASERWRITER IISC



The IISC driver looks in the System file for fonts that are four times the size to be printed. If it doesn't find them, it uses actual-size fonts, which look jagged when printed.

The IISC driver creates 300-dpi bitmaps of any object-oriented graphics.

The driver scales bitmapped graphics and type bitmaps to 300 dpi and sends them over to the printer's page buffer as they are prepared.

When the entire bitmap for the page is in the page buffer, the page is printed.



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GETTING STARTED

HOW TO

from the outline. On a PostScript printer, a fixed amount of memory is reserved for the font cache. The PLP creates a font cache in the Mac's memory; its size depends on how much memory the Mac has.

OTHER POSTSCRIPT ISSUES

All PostScript printers are Mac compatible, but there can be significant differences among printers. Some questions worth asking include

- Does it use an Adobe interpreter? To avoid the cost of licensing PostScript interpreters from Adobe Systems, some manufacturers have developed their own. These so-called PostScript clones generally provide faster performance, but at a price: although they can generally use downloadable fonts from other firms, such as Bitstream and Casady & Greene, they can't use Adobe's downloadable fonts, which are encrypted in a format only an Adobe interpreter can read. This can be a serious drawback if you plan to take your documents to a service bureau that uses Adobe fonts. Moreover, PostScript is a complex language and incompatibilities can arise. For example, one clone I tested (Qume's CrystalPrint Publisher) crashed frequently when printing a typographically complex document.
- How much memory is provided? Most laser printers provide 2MB or 3MB of memory, divided into three areas: the page buffer, the font cache, and virtual memory, or VM—general work space that also holds downloadable fonts. The more memory a printer provides, the larger its font cache and VM. A larger font cache means faster performance, and more VM means more room for downloadable fonts. Many printers also accept memory-expansion options.
- Can it accept a bard disk? Some printers can accept an optional hard disk. A hard disk attached to a printer stores downloadable fonts, making them available to all machines on the network and eliminating downloading time. A hard disk also acts as an extension to the font cache, which further improves printer performance.
- Can it imitate other printers? Older software for IBM PCs and other computers may not support PostScript, but it gener-



With the bitmapped image of the page as a guide, the engine uses a light source (usually a laser) to expose its photosensitive drum or belt (A). In a write-black engine (shown here), the exposed areas (those to be printed) have an electrical charge that attracts toner as the drum rotates past the toner compartment (B). In a write-white engine, the exposed areas (not to be printed) have a charge that repels toner. Because areas exposed by the laser beam do not completely overlap, write-black engines usually produce less solid blacks than do write-white engines (C). When the drum meets the developing cylinder (D), charged toner particles are attracted to areas of the drum that have the opposite charge (E). An electrically charged wire attracts toner from the drum onto the paper (F). After a discharge brush removes all electrical charges from the paper (G), heat rollers fuse toner to the paper (H). A second wire neutralizes the drum's electrical charge (I) so the drum may be written to again.

ally does support letter-quality printers. Most PostScript printers provide *emulation modes* that allow them to respond to commands for such printers.

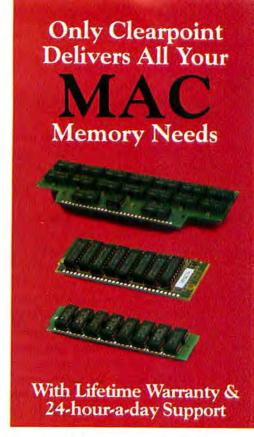
• What ports does it provide? All Post-Script printers provide a LocalTalk port for connecting to Macs and LocalTalk-equipped IBM PCs (and compatibles). Most PostScript printers also provide RS-232C serial ports; some also have Centronics parallel ports—the dominant printer port in the IBM world. To use the printer with computers lacking LocalTalk, you'll need one of the latter two ports.

PRINT ENGINE CONSIDERATIONS

A print engine forms images using a series of evenly spaced parallel lines that are painted on a photosensitive drum or belt by a laser beam or some other light source (see "Inside an Engine").

A print engine's design determines several important factors, including

- Resolution All of today's under-\$10,000 printers produce output containing 300 dpi. Printers from Agfa Compugraphic and Varityper produce 400- and 600-dpi output respectively but cost between \$13,000 and \$23,000.
- Print quality This is influenced in part by the method the engine uses to create an image. In a write-black engine, the engine's light source exposes areas of the image that will appear black on the page, and the toner adheres to those areas. In the less-common write-white engines, the light source exposes areas that will appear (continues)



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white, and toner is attracted to the unexposed areas.

Write-white engines tend to produce richer blacks than write-black engines, but they don't print fine lines or small text as well. But even within a category, print quality can vary dramatically. For example, the Canon SX engine in Apple LaserWriters produces much richer blacks than the Ricoh 1060 engine that several other printers use, yet both are write-black devices.

- Engine life If you churn out hundreds of copies of documents or share a printer in a busy office, you need an engine designed to take a beating and keep on feeding. A LaserWriter's engine is rated for 300,000 pages; the Ricoh engine in QMS's PS-1500 is rated for 1.5 million pages. You should probably have an engine overhauled when it reaches its engine-life rating.
- Paper bandling The features an engine provides for storing and feeding paper break down into several categories: maximum page size (usually 8½ by 14 inches); paper capacity (from 100 to 1000 sheets);

number of paper trays (usually one, sometimes two); and manual-feed features. If you plan to feed envelopes or other nonstandard paper sizes frequently, look for a printer that offers a *self-centering* manual-feed slot. Such slots use two adjustable guides; move one, and the other moves accordingly.

PICKING YOUR PRINTER

Should you buy a PostScript printer? Will a clone suffice? Or should you gamble and buy a QuickDraw printer on the hopes that System 7.0 will give it similar typographic skills?

If you need to share a printer—especially between Macs and PCs—go for Post-Script. I would be wary of PostScript clones, however, until their font libraries grow and their compatibility wrinkles are ironed out.

As for the QuickDraw camp, it's too early to tell whether System 7.0's outline fonts will provide the same typographic quality as Adobe's. Nor is it certain yet how the Mac's new outline fonts will fit into the typesetting world. Will you be

able to create a document using Quick-Draw outline fonts and then print it on a PostScript-based typesetter? Will line endings and character widths match? Will the fonts themselves look the same? Will a slew of incompatibilities threaten the relative tranquillity that the Mac printer world has enjoyed up to now?

We won't know until System 7.0 meets the real world. And that brings up a bigger question: Should you wait to buy a laser printer? I say no, especially if your needs dictate PostScript. System 7.0 will give QuickDraw printers improved typographic features, but it won't send PostScript printers to the breadlines. When it comes to maintaining consistent document formatting across different printers and computers, PostScript excels. That isn't going to change.

Jim Heid is a Macworld contributing editor who is currently writing an advanced guide to the Macintosh, to be published this fall by Brady Books. This is his 50th consecutive Macworld column.



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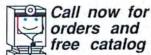
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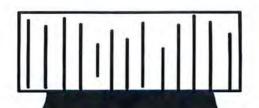
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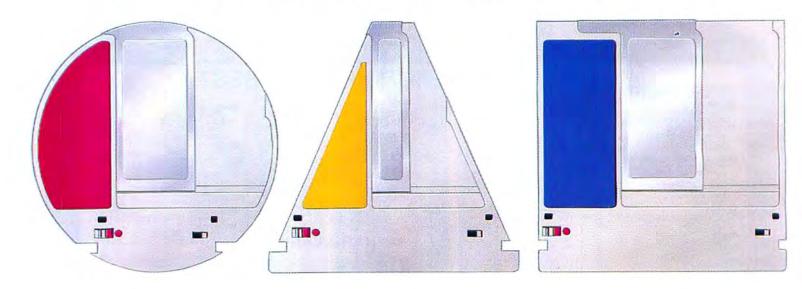
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INSIGHTS

ompetition from the newer, feature-loaded programs Wingz and Full Impact has forced Microsoft to add some much-requested capabilities to its newest version of Excel, while other features (3-D graphics, in particular) are nowhere in evidence. The main changes from version 1.5 include more keyboard shortcuts, direct links to Word and other programs, improved text and chart formatting, and enhanced macros. (A bug affecting formula references has been discovered in early copies of Excel 2.2. For more information, see *MacBulletin* in this issue.)

ALL KEYED UP

Excel 2.2 offers more than 200 keyboard commands, but not all of these are necessarily easy to learn or convenient to use, unless perhaps your mouse is out of order. One particularly useful set consists of keyboard commands for text enhancement (see "Fast Formats"). These are not only easy to memorize, they also represent, in most cases, new style options for Excel. Here are some other quick options you may find useful:

%- This one's easy to remember—the two keys are next to each other left of the space bar on standard SE and Mac II keyboards. This combination toggles your worksheet between a view of the values and a view of the worksheet formulas.

₩-Option-O If you mark a range or a cell

and press this combination, you get a border around the selection. \(\mathbb{H}\)-Option-(Arrow Up) underlines all items in a selected area.

/ Perhaps included for nostalgia's sake for former Lotus 1-2-3 users, this key nonetheless makes it possible for you to manage every aspect of Excel without touch-

ing the mouse. When you press /, the menu bar displays little underlines to indicate which letter activates which menu. \mathfrak{H}-click This combination automatically inserts new cells. If you select a row, \mathfrak{H}- click inserts a new row above it; select a block of cells, and it inserts a similar block. Conveniently, the new block keeps the old block's formatting.

Arrange All and Double-Click The Arrange All command under the Window menu shows you little views of all open worksheets, macros, and charts (see "A Convenient Arrangement"). When you double-click on the title bar of one of the little windows, that window zooms to full screen size. This is probably the easiest way to keep track of your work if you're dealing with more than three open files.

HOT LINKS

Excel 2.2 has been designed for smooth integration with Word 4.0. Thus Paste Link, a command that establishes an active link between worksheets, also establishes links between worksheets and word processing documents in Word (see "Thinking about Linking"). A precaution on linking is in order, though.

When you copy a section of a spreadsheet in Excel and then (using MultiFinder) switch to Word and choose the Paste Link command, your selection appears as a new Word table that includes any fancy formatting you've used in the spreadsheet, and an identifier paragraph including the source application and file name (the dotted underline means it is normally invisible in printing). If you're serious about producing a presentation-quality table in a document, however, you should do the formatting in Word and let Excel handle just the numbers. Many changes in spreadsheet formatting are not automatically updated by the Update Link command in Word. In fact, all you have to do is use the cursor to select an area that doesn't exactly match the linked worksheet table, and all formatting will be erased.

DATABASE DESIGN

There are a few rough points to watch for in Excel 2.2's database capabilities. For example, Form, a new feature of the Data menu, is a great improvement for data entry over the previous Excel spreadsheet-only mode; it's fairly easy to design custom data-entry spreadsheets that automatically pop open in a Form view remi(continues)

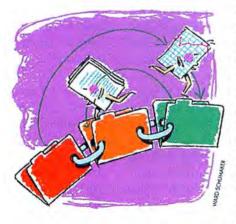
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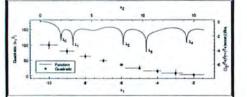
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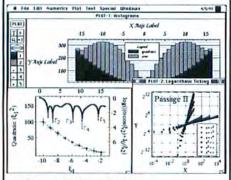
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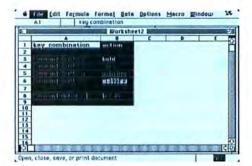
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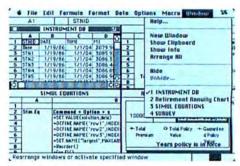
Fast Formats

These are among the most useful of Excel 2.2's new keystroke combinations for formatting text and numbers.

niscent of true database programs. Things are less efficient when you use the Form command to search data rather than enter it. First, there's no equivalent of Excel's Extract command. Second, the Find command under Form reports a misleading statistic at the top right of the dialog box. For example, in most other database programs the information "12 of 250" means that the program has found 12 matching records out of the 250 in the database. In Excel 2.2 it merely means that record number 12 is the first match it's found rather than the number of records that match the search criteria.

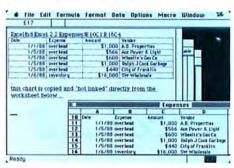
To get the information you usually expect from a search, you need to use a spreadsheet Criteria range and an Extract range in a clear zone near the bottom of your database range. Extract shows all the records that match the search criteria, and writes them in the space directly under the field names in the Extract range. Make sure the zone is clear, because the search results overwrite any data you may have there.

Although the Criteria/Extract range is the preferred way to search a database, watch out for one little oddity. Because the Criteria range is a standard spreadsheet range, you might assume that you can remove an old search criterion simply by selecting a cell and pressing the space bar to erase the contents. The contents are indeed erased on screen, but the program now looks for a space as a criterion instead of treating the cell as blank. Assuming none of the records have a space as the data in that field, you will get a particularly frustrating No Match dialog box.



A Convenient Arrangement

Arrange All lets you see at least a small piece of every open document. Double-click on the title bar to work with your selection in a full screen.



Thinking about Linking

Here a small table is pasted into Word 4.0 using Paste Link, with an accompanying Hidden Text identifier that labels the source. Excel 2.2 still leaves integrated document-handling tasks to your word processor, but it provides for semiautomatic updating of pasted data.

MATTERS OF FORM

Mac Excel worksheets are now PC Excel compatible in the new the BIF format, which leaves one bit of normally automatic format conversion up to you. In both versions, dates are actually stored as numbers (from a starting date) and then formatted as month/day/year. PC startdates always refer to January 1, 1900, whereas for the Mac the default start-date is 1904. Remember to check the date calculation by typing 1/1/00 and trying to convert it to a plain number. If nothing happens, you are dealing with the 1904 date system. To change this, reset the calendar start-date with the Calculation dialog box under the Utilities menu.

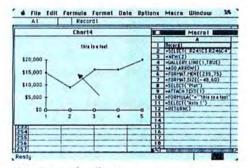
The new Note facility (under the Formula menu) lets you attach reminder notes to spreadsheet cells, but the Note interface is awkward. It's probably best to shade every cell to which you attach a (continues)

note to remind you that it's there (shading is one of the Format options under Border). When you want to read the note, just double-click on the cell.

You may also wish to turn on the macro recorder the next time you experiment with chart formatting, since Excel now allows macros to automate all aspects of charting, including the new text enhancements and arrows (see "New Macros for Charts"). The macro facility runs so rapidly that, even if it has to step through a few changes and corrections, you can use a macro to format a chart more efficiently than you could by repeating even a minimum set of menu choices.

FROM START TO FINISH

If you typically work with a special worksheet for several days at a time (a project budget, for example), you can drag it to the System Folder and rename it Excel Startup. Then every time you start Excel, this worksheet is automatically loaded. The worksheet can also contain an autoexec macro (a macro with the name auto_open) that executes when it is



New Macros for Charts

Charts now feature a few enhancements, such as text fields and arrows, but the real progress here is automation. You can record macros to reproduce special custom chart formats you've designed.

opened. Since this macro can be as complex as you wish, you can set up an entire customized environment, with not only custom formats but any changes you may want to make in the arrangement of menus and menu items.

Another type of autoexec macro worth considering in a multiuser environment is now possible in Excel 2.2 with the addition of the commands FWRITELN and (continues)

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INSIGHTS

FREADLN. These commands allow you to read and write text in external files one line at a time. Using two external files, one for matching names and passwords and another for logging names and access times, you can record and control access to any worksheet. The procedure involves writing an autoexec macro that asks for a user name and password; checks it against the external file listing names and passwords; and writes the name, time, and

date of access to the external log file. The macro records unsuccessful attempts at access as well, so you can find out if anyone's tried to break in.

Almost lost in the new documentation is a remarkable pair of commands that, by linking Excel to externally compiled code, represents Microsoft's attempt to let developers "complete" some additional features in the program. If you compile a C or Pascal program as a code resource, you

can enter it into memory with the REGIS-TER macro command (which is also used to establish the type of parameters to be passed between Excel and the code resource). The CALL command then invokes the resource and passes the actual parameters of interest.

At least two types of applications should use the Call and Register pair to run external code instead of relying on Excel's own macro language. First, it's much more efficient to have advanced mathematical and statistical functions coded in C (using routines available in dozens of standard programming books); the speed difference for complex calculations can be a factor of from 10 to 60. Second, Call and Register commands are the easiest way to get access for Excel to database files in other formats. Records from other databases can be written directly to database areas of a worksheet, or summary data can be entered in specially formatted areas.

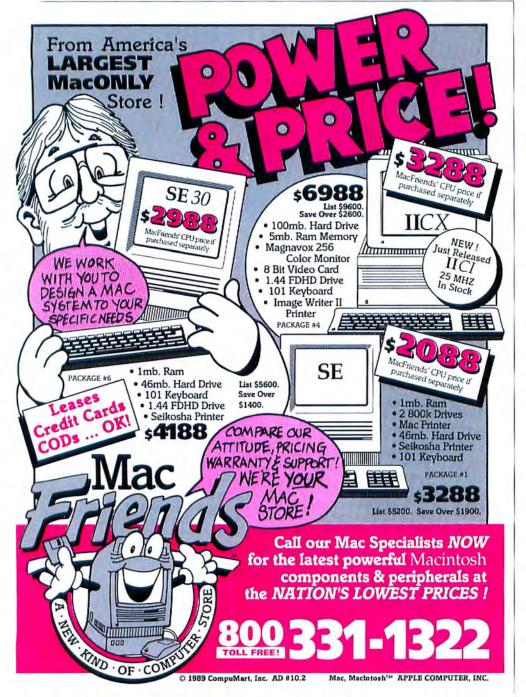
A LAST NOTE ON SPEED

Especially with large monitors, Excel spends lots of time rewriting the contents of the screen, particularly when charts are present. Thus for macros that perform complex calculations, or simply for large spreadsheets, set the calculation mode to Manual, use the Hide command on the Window menu, and recalculate manually with the spreadsheet hidden. When you see the Ready flag in the status zone, at the lower-left of the screen, Select Unhide (this can, of course, be incorporated into a macro as well). This procedure is worth trying for any recalculation or macro that takes more than about ten seconds in the usual automatic calculation mode.

SHARING THE WEALTH

If you've discovered a tip or 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.

Charles Seiter is a Macworld contributing editor who has done beta-testing for most Mac spreadsheets. His primary interest is in macro programming for scientific applications.



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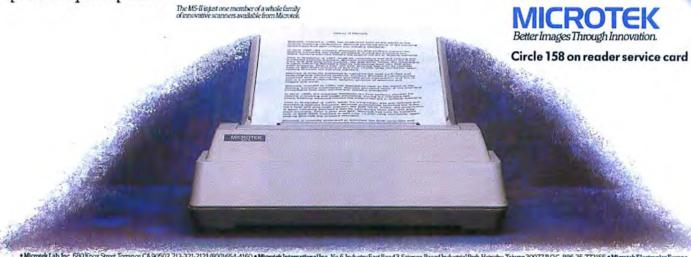
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UPDATES

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.

AmPack Plus version 4.2.2 compares multiple loan amortization schedules on screen simultaneously, generates annual percentage-rate disclosure statements, handles biweekly payments, is MultiFinder compatible, and calculates and prints faster than previous version. Softflair, 8753 Parkview, Milwaukee, WI 53226; 414/797-4490. \$29.95; \$89.95 new.

Ball & Stick version 2.2 includes color and adds an interactive structure-manipulation facility with up to 8000 atoms (32,000 in the Mac II version) to this molecular graphics program. Most operations have been accelerated and the manual has been rewritten. N. Mueller, J.K.U., Altenbergerstrasse 69, A-4040 Linz, Austria. Free; \$299 new.

Capture version 2.0 is now a CDEV, so you can set your own key sequence and set the 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.

CompileIt version 1.2 runs three times as fast as previous version, supports HyperCard properties such as text size and location, supports *Inside Macintosh*, volumes IV and V, adds a debug feature to isolate programming errors, and supports 1MB Macs. Includes a tutorial on Callbacks. Heizer Software, 1941 Oak Park Blvd., #30, Pleasant Hill, CA 94523; 415/943-7667. Free; \$99 new.

Digital Darkroom version 1.1 includes image-preview option that enables you to define and edit a portion of an image and to determine the resolution of an image. Also adds new features and interface improvements based on customer feedback. Silicon Beach Software, 9770 Carroll Center Rd., Ste. J, San Diego, CA 92126; 617/695-6956. Free; \$395 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 and endnotes with any style text in Word version 4.0. Niles & Associates, 2200 Powell St., #765, Emeryville, CA 94608-1809; 415/655-6666. Free; \$129 new.

foxBose+/Mot version 2.0 includes an object-oriented report writer and label generator, supports Hyper-Card XCMDs and XFCNs, does sorting and indexing twice as fast as previous version, supports custom hierarchical menus, lets you customize menu bar, and has a new database-editing window to make data entry and editing easier. Fox Software, 118 W. South Boundary, Perrysburg, OH 43551; 419/874-0162. \$495 for single user, \$695 for multiuser new.

LetrTuck+ version 2.0 allows the user to add or modify kern pairs in the System Folder, in any suitcase, or in the QuarkXPress 2.1 data structure. Edco Services, 1240 N. Dale Mabry Hwy., Tampa, FL 33618; 813/962-7800. \$20; \$147 new.

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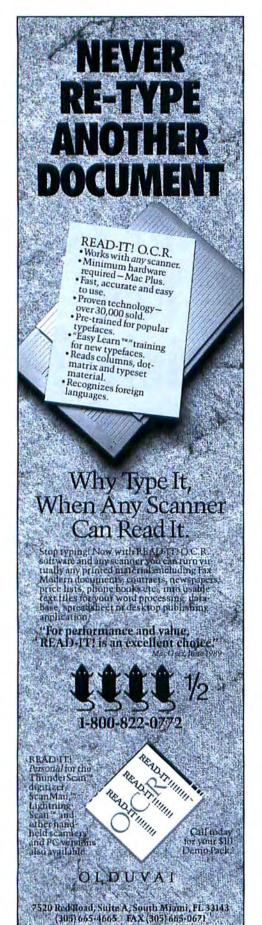
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MacFlow version 3.0 adds color for the Mac II. Elements of a flowchart can be selectively colorized. Allows text to be varied in font, style, and size within each symbol and on connecting lines, and includes a stationery feature that lets the user set suitable defaults for flowcharts. Adds automatic right-angle setting to automatically adjust multisegment lines to right angles. Manual has been rewritten. Mainstay, 5311-B Derry Ave., Agoura Hills, CA 91301; 818/991-6540. \$30; \$245 new.

MacFortran for MPW version 1.1 supports SADE (Standard Apple Debugging Environment) and has increased support for MacApp (Macintosh Applications Development Package). Requires MPW version 3.0, which is not included. Absoft, 2781 Bond St., Auburn Hills, MI 48057; 313/853-0050. Free; \$295 new.

Macintosh Information Service version 2.0 has been rewritten in HyperCard instead of its original FoxBase. User can install an MIS button on home card that will access the directory. MacKay Associates, 111 N. 56th St., #102, Lincoln, NE 68504; 402/466-6665, 800/458-3463. Free; \$245 for site license that includes up to 10 users new.

MacPrint version 1.1 runs with Hewlett-Packard's LaserJet Plus, DeskJet, and DeskJet Plus. Prints envelopes and prints in landscape mode. Includes four fonts designed by Agfa Compugraphic, uses Insight's Font Mapper to create Macintosh screen fonts, and supports more font cartridges than earlier versions. Insight Development Corp., 2200 Powell St., #500, Emeryville, CA 94608-1809; 415/652-4115. Free; \$149 new.

MacSprint II enables the MacSprint cache card accelerator for the Mac II to support the Motorola PMMU and makes it compatible with System 7.0. Orchid Technology, 45365 Northport Loop W, Fremont, CA 94538; 415/683-0300. Free; \$299 new.

Mac286 and Mac86 version 2.0 of each model increases screen-refresh rate fourfold, includes multitasking under MultiFinder, and allows the user to cut and paste graphics and text between MS-DOS and Mac applications. Orange Micro, 1400 N. Lakeview Ave., Anaheim, CA 92807; 714/779-2772. \$10 each; Mac286 \$1599 new, Mac86 \$699 new.

More II version 2.01 is a maintenance upgrade to fix problems discovered in version 2.0. Symantec, 117 Easy St., Mountain View, CA 94043; 415/964-6300. Free; \$395 new.

Nutrition Stock version 2.0 lists data for over 2000 foods from USDA Handbook. Database has data for types of fat and 18 amino acids, and includes a food-exchange-group calculator for use by diabetics. Supports multiple users and has context-sensitive help buttons. Big Byte Software, 25 Blake St., Needham, MA 02192; 617/444-3028. \$20; \$79 new.

StickyBusiness version 1.0.6 includes the capability to Save and Use frequently used label layouts; can grab icons from applications, icon libraries, or the desktop; can align and print pin-feed label forms in LaserWriters. Also contains more preformatted templates than original version. Williams & Macias, S. 3707 Godfrey Blvd., Spokane, WA 99204; 800/752-4400, 509/458-6312. Free; \$179.95 new.

To have products listed in this section, send upgraded software, an outline of major changes since the previous release, upgrade price, suggested retail price, company name, mailing address, and phone number to Updates, Macworld, 501 Second St., San Francisco, CA 94107.

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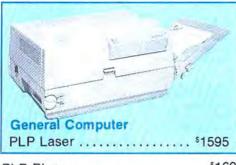
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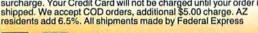
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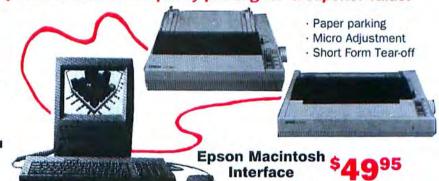
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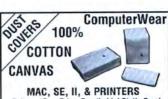
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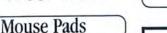
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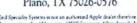
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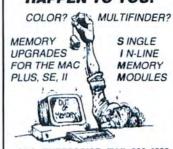
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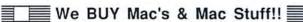
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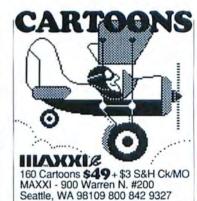


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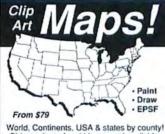
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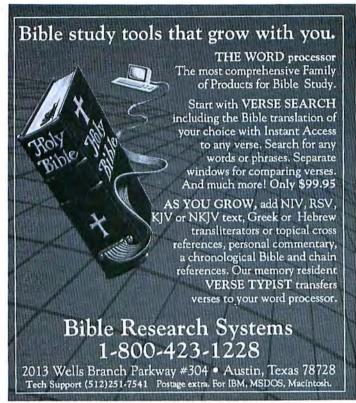
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12	9	9	WriteNow for Macintosh T/Maker				
11	8	10	Adobe Illustrator/Illustrator 88 Adobe	10	5	1	Video Board/Large Screen Ryad
				10	2	2	Radius Interface Display Radius
				22	_	3	Radius Accelerator Radius
	_		EDUCATION SOFTWARE	22	1	4	Apple 2MB Memory Expansion Kit
							Apple Computer
7	1	1	Where in the World Is Carmen Sandiego? Brøderbund	3	-	5	Micro Snap Memory Expansion Kit Microtech International
20	2	2	Reader Rabbit The Learning Company				
36	3	3	Math Blaster Davidson & Associates				
33	4	4	Typing Tutor Simon & Schuster				PRODUCT WATCH
			Computer Software				
1	_	5	SAT Preparation Guide Barron's Educational Series				Editors' choice of other recent or forthcoming products of particular interest.
•	•	•	ENTERTAINMENT SOFTWARE				ColorBoard 264 RasterOps 24-bit color board
32	2	1	Dark Castle Silicon Beach Software				Microsoft Mail 2.0 Microsoft Network mail
36	1	2	MacGolf PCAI				
35	3	3	Flight Simulator Microsoft				PixelPaint Professional SuperMac Technology
16	4	4	Falcon Spectrum HoloByte				Image processing software
1	-	5	SimCity Maxis Software				
•	•	•	NETWORK/DATA COMMUNICATIONS				Source: Exclusive InfoCorp survey of more than 125 Macintosb retailers and selected mail-order vendors.
32	1	1	TOPS TOPS				Covers sales during June 1989.
35	2	2	LocalTalk Apple Computer				
21	4	3	PhoneNet Farallon Computing				*Does not include hard disks installed at the factory

AppleShare Apple Computer

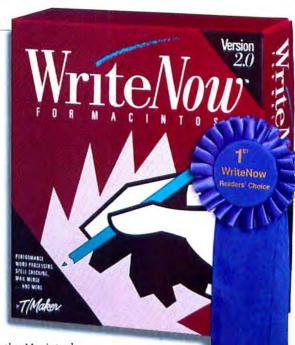
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"Readers' Choice" MACazine, January 1989

"Golden Gavel Award" MacGuide, Winter 1988



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	Copy & paste large area	Search for a word	Spell check document	Change indents & double spacing	Undo ruler cbanges
WriteNow 2.0	6.7 sec.	2.9 sec.	7.4 sec.	23.3 sec.	1.6 sec.
MacWrite II	45.9 sec.	40.2 sec.	33.6 sec.	44.7 sec.	24.7 sec.
MS Works 2.0	1 mln. 50 . 8 sec.	35.7 sec.	5 min. 13 . 4 sec.	2 min.24.1 sec.	1 mln.14.5 sec.
MS Word 4.0	21.6 sec.	11.0 sec.	3 min.55.1 sec.	39.4 sec.	25.8 sec.

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